



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Parts 223 and 224

[Docket No. 130213133-3133-01]

RIN 0648-XC508

Endangered and Threatened Wildlife; 90-day Finding on Petitions to List the Great Hammerhead 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 a 90-day finding on two petitions to list the great hammerhead shark (*Sphyrna mokarran*) range-wide or, in the alternative, the Northwest Atlantic distinct population segment (DPS) or any other identified DPSs as threatened or endangered under the Endangered Species Act (ESA), and to designate critical habitat. We find that the petitions and information in our files present substantial scientific or commercial information indicating that the petitioned action may be warranted. We will conduct a status review of the species to determine if the petitioned action is warranted. To ensure that the status review is comprehensive, we are soliciting scientific and commercial information pertaining to this species from any interested party.

DATES: Information and comments on the subject action must be received by [insert date 60 days after date of publication in the FEDERAL REGISTER].

ADDRESSES: You may submit comments, information, or data on this document, identified by the code NOAA-NMFS-2013-0046, by any of the following methods:

- Electronic Submissions: Submit all electronic comments via the Federal eRulemaking Portal. Go to [www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2013-0046](http://www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2013-0046), click the “Comment Now!” icon, complete the required fields, and enter or attach your comments.
- Mail: Submit written comments to Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910.
- Fax: 301-713-4060, Attn: Maggie Miller

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 [www.regulations.gov](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. NMFS 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: Maggie Miller, NMFS, Office of Protected Resources, (301) 427-8403.

#### SUPPLEMENTARY INFORMATION:

##### Background

On December 21, 2012, we received a petition from WildEarth Guardians (WEG) to list the great hammerhead shark (*Sphyrna mokarran*) as threatened or endangered under the ESA

throughout its entire range, or, as an alternative, to list any identified DPSs as threatened or endangered. The petitioners also requested that critical habitat be designated for the great hammerhead under the ESA. On March 19, 2013, we received a petition from Natural Resources Defense Council (NRDC) to list the northwest Atlantic DPS of great hammerhead shark as threatened, or, as an alternative, to list the great hammerhead shark range-wide as threatened, and to designate critical habitat. The joint U.S. Fish and Wildlife Service (USFWS)/NMFS Endangered Species Act Petition Management Guidance (1996) states that if we receive two petitions for the same species, the requests only differ in the requested status of the species, and a 90-day finding has not yet been made on the earlier petition, then the later petition will be combined with the earlier petition and a combined 90-day finding will be prepared. Since the initial petition requested listing of the species as threatened or endangered and the second petition only requested a threatened listing, and a finding has not been made on the initial petition, we have combined the WEG and NRDC petitions and this 90-day finding will address both. Copies of the petitions are available upon request (see ADDRESSES, above).

#### ESA Statutory, Regulatory, and Policy Provisions and Evaluation Framework

Section 4(b)(3)(A) of the ESA of 1973, as amended (16 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 to promptly publish such finding in the Federal Register (16 U.S.C. 1533(b)(3)(A)). When it is found that substantial scientific or commercial information in a petition indicates that 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 during which

we will conduct a comprehensive review of the best available scientific and commercial information. In such cases, we conclude the review with a finding as to whether, in fact, the petitioned action is warranted within 12 months of receipt of the petition. Because the finding at the 12-month stage is based on a more thorough review of the available information, as compared to the narrow scope of review at the 90-day stage, a finding that the “petition presents substantial scientific or commercial information that the action may be warranted” at this point does not predetermine 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-USFWS (jointly, “the Services”) policy (DPS Policy) clarifies the agencies’ interpretation of the phrase “distinct population segment” for the purposes of listing, delisting, and reclassifying a species under the ESA (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, we determine whether species are threatened or endangered based on any one or a combination of the following five section 4(a)(1) factors: (1) the present or threatened destruction, modification, or curtailment of habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) 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 the Services (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. In evaluating whether substantial information is contained in a petition, the Secretary 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)).

Judicial decisions have clarified the appropriate scope and limitations of the Services' review of petitions at the 90-day finding stage, in making a determination that a petition presents substantial information indicating the petitioned action "may be" warranted. As a general matter, these decisions hold that a petition need not establish a "strong likelihood" or a "high probability" that a species is either threatened or endangered to support a positive 90-day finding.

We evaluate the petitioners' 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 petitioners' 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 it supports the petitioners' assertions. In other words, conclusive information indicating that 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 that 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 faces an 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 (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 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 indicating 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 on 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/statusAssessment.jsp>). 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.

## Distribution and Life History of the Great Hammerhead Shark

The great hammerhead shark is a circumtropical species that lives in coastal-pelagic and semi-oceanic waters from latitudes of 40° N to 35° S (Compagno, 1984; Denham *et al.*, 2007). It occurs over continental shelves as well as adjacent deep waters, and may also be found in coral reefs and lagoons (Compagno, 1984; Denham *et al.*, 2007; Bester, n.d.). Great hammerhead sharks are highly mobile and seasonally migratory (Compagno, 1984; Denham *et al.*, 2007; Hammerschlag *et al.*, 2011; Bester, n.d.). In the western Atlantic Ocean, the great hammerhead range extends from Massachusetts (although the species is rare north of North Carolina), in the United States, to Uruguay, including the Gulf of Mexico and Caribbean Sea. In the eastern Atlantic, it can be found from Morocco to Senegal, including in the Mediterranean Sea. The great hammerhead shark can also be found throughout the Indian Ocean and the Red Sea and in the Indo-Pacific region from Ryukyu Island south to New Caledonia and east to French Polynesia (Bester, n.d.). Distribution in the eastern Pacific Ocean extends from southern Baja California, including the Gulf of California, to Peru (Compagno, 1984).

The general life history pattern of the great hammerhead shark is that of a long lived (oldest observed maximum age = 44 years; Piercy *et al.*, 2010), large, and relatively slow growing species. The great hammerhead shark has a laterally expanded head that resembles a hammer, hence the common name “hammerhead,” and belongs to the Sphyrnidae family. The great hammerhead shark is the largest of the hammerheads, characterized by a nearly straight anterior margin of the head and median indentation in the center in adults, strongly serrated teeth, strongly falcate first dorsal and pelvic fins, and a high second dorsal fin with a concave rear margin (Compagno, 1984; Bester, n.d.). The body of the great hammerhead is fusiform, with the dorsal side colored dark brown to light grey or olive that shades to white on the ventral



side (Compagno, 1984; Bester, n.d.). Fins of adult great hammerheads are uniform in color, while the tip of the second dorsal fin of juveniles may appear dusky (Bester, n.d.).

The oldest aged great hammerhead sharks had lengths of 398 cm total length (TL) (female – 44 years) and 379 cm TL (male – 42 years) (Piercy et al., 2010), but they can reach lengths of over 610 cm TL (Compagno, 1984). However, individuals greater than 400 cm TL are rare (Compagno, 1984; Stevens and Lyle 1989), which Piercy et al. (2010) suggest may be attributed to growth overfishing. Estimates for size at maturity range from 234 to 269 cm TL for males and 210 to 300 cm TL for females (Compagno, 1984; Stevens and Lyle 1989). Male great hammerhead sharks have also been shown to grow faster than females (with a growth coefficient,  $k$ , of 0.16/year for males and 0.11/year for females) but reach a smaller asymptotic size (335 cm TL for males versus 389 cm TL for females) (Piercy et al., 2010).

The great hammerhead shark is viviparous (i.e., give birth to live young), with a gestation period of 10-11 months, and likely breeds every other year (Stevens and Lyle, 1989). Litter sizes range from 6 to 42 live pups (Compagno, 1984; Stevens and Lyle, 1989). Length at birth estimates for great hammerheads range from 50-70 cm TL (Compagno, 1984; Stevens and Lyle, 1989).

The great hammerhead shark is a high trophic level predator (Cortés, 1999) and opportunistic feeder, with a diet that includes a wide variety of teleosts, cephalopods, and crustaceans, with a preference for stingrays (Compagno, 1984; Denham et al., 2007).

#### Analysis of Petition and Information Readily Available in NMFS Files

We evaluated the information provided in the petition and readily available in our files to determine if the petitions presented substantial scientific or commercial information indicating that the petitioned actions may be warranted. The petitions contain information on the species,

including the taxonomy, species description, geographic distribution, and habitat, with some information on population status and trends in certain locations, and factors contributing to the species' decline. The petitions state that commercial fishing, both targeted and bycatch, is the primary threat to the great hammerhead shark. The petitioners also assert that current habitat destruction, deposition of pollutants, lack of adequate regulatory mechanisms nationally and worldwide, global climate warming, as well the species' biological constraints, increase the susceptibility of the great hammerhead shark to extinction.

According to the WEG petition, all five causal factors in section 4(a)(1) of the ESA are adversely affecting the continued existence of the great hammerhead shark: (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) inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. The focus of the NRDC petition is mainly on the northwest Atlantic population and it identified the threats of: (B) overutilization for commercial, recreational, scientific, or educational purposes; (D) inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. In the following sections, we use the information presented in the petition and in our files to determine whether the petitioned action may be warranted. If requested to list a global population and, 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 will revisit the question of DPSs during a status review, if necessary. If the petition does not present substantial information that the global population may warrant listing, and it has requested that we list any 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.

#### Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Information from the petitions and in our files suggests that the primary threat to the great hammerhead shark is from fisheries. Great hammerhead sharks are both targeted and taken as bycatch in many global fisheries (e.g., bottom and pelagic longlines, coastal gillnet fisheries, artisanal fisheries). Because of their large fins with high fin needle content (a gelatinous product used to make shark fin soup), hammerheads fetch a high commercial value in the Asian shark fin trade (Abercrombie *et al.*, 2005). However, the WEG petition overstates the contribution of great hammerheads in the Hong Kong fin trade market by presenting information on the trade of scalloped, smooth, and great hammerhead fins together. According to a genetic study that examined the concordance between assigned Hong Kong market categories and the corresponding fins, the great hammerhead market category "Gu pian" had an 88 percent concordance rate, indicating that traders are able to accurately identify and separate great hammerhead fins from the other hammerhead species (Abercrombie *et al.*, 2005; Clarke *et al.*, 2006a). As such, here we provide the information on a finer scale level (down to the species level) to evaluate the extent that the fin trade may contribute to the overutilization of the great hammerhead shark. According to Clarke *et al.* (2006a), *S. mokarran* is estimated to comprise approximately 1.5 percent of the total fins traded annually in the Hong Kong fin market. As

mentioned above, great hammerhead fins are primarily traded under the “Gu pian” market category, where the market value for the average, wholesale, unprocessed fin is around \$135/kg, the most for any of the hammerhead fins (Abercrombie et al., 2005). Extrapolating the fin data to numbers of sharks, Clarke et al. (2006b) estimates that around 375,000 (95 percent confidence interval = 130,000 - 1.1 million) individuals of this species (equivalent to a biomass of around 21,000 metric tons, (mt)) are traded annually in the Hong Kong fin market. Given their high price in the Hong Kong market, there is concern that many great hammerheads caught as incidental catch may be kept for the fin trade as opposed to released alive.

In the United States, great hammerhead sharks are mainly caught as bycatch in commercial longline and net fisheries and by recreational fishers using rod and reel. A recent stock assessment by Jiao et al. (2011) used a Bayesian hierarchical approach to assess the data-poor hammerhead species and found that the northwestern Atlantic and Gulf of Mexico great hammerhead population likely became overfished in the mid-1980s and experienced overfishing periodically from 1983 to 1997. However, after 2001, the models showed that the risk of overfishing was very low and that this population is probably still overfished but no longer experiencing overfishing (Jiao et al., 2011), likely a result of the implementation of stronger fishery management regulations since the early 1990s. Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the term "overfishing" is defined as occurring when a stock experiences “a level of fishing mortality that jeopardizes the capacity of a stock or stock complex to produce MSY [maximum sustainable yield] on a continuing basis” (50 CFR 600.310). An “overfished” stock is defined as a stock whose biomass has declined below a level that jeopardizes the capacity of the stock to produce MSY on a continuing basis (50 CFR 600.310). However, it is important to note that these MSA classifications are based on different

criteria (i.e., achieving MSY) than threatened or endangered statuses under the ESA. As such, “overfished” and “overfishing” classifications do not necessarily indicate that a species may warrant listing because they do not evaluate a species’ extinction risk. However, they are relevant considerations for us to consider when we evaluate potential threats to the species from overutilization for commercial or recreational purposes.

In Central America and the Caribbean, there are very little data on great hammerhead catches. The WEG petition references Denham et al. (2007) which states that hammerheads were heavily fished by longlines off the coast of Belize in the 1980s and early 1990s, leading to an observed decline in the abundance and size of hammerheads and prompting a halt in the Belize-based shark fishery. Fishing pressure on hammerheads still continues as a result of Guatemalan fishermen entering Belizean waters (Denham et al., 2007). However, catch records from the Cuban directed shark fishery show a small increase in the mean size of great hammerheads since 1992, suggesting partial recovery of the species in this region (Denham et al. 2007).

The WEG petition also references a study (Feretti et al., 2008) that indicated that the population of smooth, scalloped, and great hammerheads in the Mediterranean Sea has experienced a greater than 99 percent decline in abundance and biomass; however, the authors of this study note that only Sphyrna zygaena (smooth hammerhead) was assessed because the other hammerhead species occurred only sporadically in historical records. As such, this is not an appropriate index of the abundance of the other hammerhead species in the Mediterranean Sea and does not indicate overutilization of the great hammerhead shark in this region.

In the Eastern Atlantic, off West Africa, the WEG petition states that the “great hammerhead population is believed to have fallen 80 percent as a result of unmanaged and

unmonitored fisheries,” but we could not verify the original source of this statistic. Data from the European pelagic freezer-trawler fishery that operates off Mauritania shows hammerhead species, including S. mokarran, constitute a significant component of the fishery’s bycatch. Between 2001 and 2005, 42 percent of the retained pelagic megafauna bycatch from over 1,400 freezer-trawl sets consisted of hammerhead species, with around 75 percent of the hammerhead catch juveniles of 0.50 – 1.40 m in length (Zeeberg et al., 2006). According to Denham et al. (2007), the sub-regional plan of action for sharks of West Africa identified S. mokarran as particularly threatened in the region, with a noticeable decline in the population and collapse of landings. Citing unpublished data and anecdotal evidence, Denham et al. (2007) suggests that S. mokarran is “almost extirpated” from waters off Mauritania to Angola after previously being abundant in these areas in the early 1980s. The growth of fisheries targeting sharks in this region for the lucrative fin trade has likely contributed to the great hammerhead decline. By the 1980s, many fishers were specializing in catching sharks (Denham et al., 2007), with some artisanal fisheries in West Africa specifically specializing in catching sphyrnid species (CITES, 2010).

In the Indian Ocean, pelagic sharks, including the great hammerhead, are targeted in various fisheries, including semi-industrial, artisanal, and recreational fisheries. Countries that fish for 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 population is presumed to be fully to overexploited (de Young, 2006). Analysis of fishery-independent data from the KwaZulu-Natal beach protection program off South Africa revealed declines in the catch rates of S. mokarran since the late 1970s. Specifically, from 1978 – 2003, annual catch per unit effort (CPUE; in number of sharks per km net year) of S. mokarran

declined by 79 percent, from 0.44 to 0.09 (Dudley and Simpfendorfer, 2006). The results were statistically significant, with the slope of the linear regression = -0.014, and the majority of the catch (greater than 64 percent) being immature great hammerhead sharks (Dudley and Simpfendorfer, 2006).

In Australian waters, sharks are caught by commercial, recreational and traditional fishers as targeted catch, retained catch, and bycatch. Almost all sharks landed in Australia are used for domestic consumption. According to Bensley *et al.* (2010), the annual commercial Australian shark catch from 1996 to 2006 ranged from about 8,600 mt to 11,500 mt; however, the reporting of catch weights varied due to the state of processing (e.g., whole weight, processed weight, landed weight, etc.). Data from protective shark meshing programs off beaches in New South Wales (NSW) and Queensland suggest declines in hammerhead populations off the east coast of Australia. Over a 35-year period, the number of hammerheads caught per year in NSW beach nets decreased by more than 90 percent, from over 300 individuals in 1973 to less than 30 in 2008, although the majority of the hammerhead catch was likely *S. zygaena* (Williamson, 2011). Similarly, data from the Queensland shark control program indicate declines of around 79 percent in hammerhead shark abundance between 1986 and 2010 (although it was estimated that *S. lewini* made up the majority of this catch) (Queensland Department of Employment, Economic Development and Innovation (QLD DEEDI), 2011). *S. mokarran* abundance in the nets fluctuated over the years, but remained below 20 individuals per year, until 2008/2009 when a peak of 33 individuals was caught in the net (QLD DEEDI, 2011). Abundance has since declined by around 48 percent to 17 individuals in 2011/2012 (QLD DEEDI, 2011). In Australia's northwest marine region, Heupel and McAuley (2007) analyzed CPUE data from the

northern shark fisheries for the period of 1996-2005 and reported hammerhead abundance declines of 58-76 percent.

Given the value and contribution of great hammerhead fins in the international fin trade and the evidence of historical and current fishing pressure and subsequent population declines, we conclude that the information in the petitions and in our files suggests that global fisheries are impacting great hammerhead shark populations to a degree that raises concerns of a risk of extinction.

#### Inadequacy of Existing Regulatory Mechanisms

The petitions assert that the existing international and domestic management measures of several nations have failed to adequately protect the great hammerhead or stop ongoing population declines and present information on some of the current national and international shark regulations. Although the WEG petition mentions the International Convention for the Conservation of Atlantic Tunas (ICCAT) Recommendation 10-08, prohibiting the retention, transshipment, landing, storing, or offering for sale any part or carcass of hammerhead sharks of the family Sphyrnidae (except for bonnethead shark), the petition states that “these are merely recommendations and do not do enough to bind the relevant actors.” On the contrary, the “relevant actors”, of which we assume the petitioner is referring to ICCAT Contracting Parties, are bound to implement management measures consistent with achieving ICCAT recommendations under Article VIII of the ICCAT Convention. On August 29, 2011, we finalized the implementation of Recommendation 10-08 through passage of a final rule that prohibits the retention, possession, transshipment, landing, storing, selling or purchasing of oceanic whitetip sharks or scalloped, smooth, or great hammerheads by U.S. commercial highly migratory species (HMS) pelagic longline fishery and recreational fisheries for tunas,



swordfish, and billfish in the Atlantic Ocean, including the Caribbean Sea and Gulf of Mexico (76 FR 53652; August 29, 2011). However, the exemption available to developing coastal States in this ICCAT recommendation, which allows them to retain hammerhead sharks for local consumption as long as no hammerhead parts enter international trade, is troubling. As this exception provides a lesser degree of protection for hammerhead sharks in some developing coastal States, it may be a cause for concern for great hammerhead populations in the Atlantic Ocean.

In addition, the petitions note that there is limited international management of the great hammerhead shark, which is generally allowed to be harvested outside of U.S. waters and ICCAT fisheries. The other regional fishery management organizations (RFMOs) do not have any species-specific regulations for great hammerhead sharks, but have addressed the controversial practice of shark finning (which involves harvesting sharks, severing their fins and returning their remaining carcasses to the sea) by adopting shark finning bans to reduce the number of sharks killed solely for their fins. However, as the WEG petition points out, these finning bans are enforced by monitoring the fin-to-carcass weight ratio, with this ratio set at 5 percent (i.e., onboard fins cannot weigh more than 5 percent of the weight of sharks onboard, up to the first point of landing). In a study that looked at species-specific shark-fin-to-body-mass ratios, the great hammerhead shark had an average wet-fin-to-round-mass ratio of 1.96 percent (Biery and Pauly, 2012), much lower than the designated 5 percent. These results suggest that fishers of great hammerhead sharks would be able to land more fins than bodies and still pass inspection, essentially allowing them to continue the wasteful practice of shark finning at sea in these RFMO convention areas.

Domestic laws and regulations for other nations may also be lacking in certain areas of the great hammerhead range. For example, in Central America and the Caribbean, Kyne et al. (2012) notes that due in large part to the number of autonomous countries found in this region, the management of shark species remains largely disjointed, with some countries lacking basic fisheries regulations, and weak enforcement of those they do have. Off West Africa, weak fisheries management has led to many of their fish stocks being declared fully exploited to overexploited (FAO, 2012). Environmental Justice Foundation (EJF) (2012) notes that even countries with stricter fishing regulations in this region lack the resources to provide effective or, for that matter, any enforcement, with some countries lacking basic monitoring systems. In addition, reports of illegal, unregulated, and unreported fishing are prevalent in the waters off West Africa and account for around 37 percent of the region's catch, the highest regional estimate of illegal fishing worldwide (Agnew et al., 2009; EJF, 2012). Illegal fishing is also common in the western central Pacific and eastern Indian Ocean (Agnew et al., 2009), with many reports of vessels being caught with illegal shark carcasses and fins onboard (Paul, 2009). As the NRDC petition notes, "as recently as 2011, illegal fishing and finning of hammerhead sharks was documented in the Galapagos Marine Reserve," suggesting that illegal shark fishing may still be an impediment to conservation despite increasing international efforts to protect sharks. Without stricter fishery regulations or enforcement, there is concern that captures of great hammerhead sharks, both legal and illegal, may be kept, especially considering the high price that great hammerhead fins fetch in the international fin trade market. The information in the petitions and in our files suggests that while there is increasing support for national and international shark conservation and regulation, the existing regulatory mechanisms in some portions of the S. mokarran range may be inadequate to address threats to the global great hammerhead population.

### Other Natural or Manmade Factors

The WEG petition contends that “biological vulnerability” in the form of long gestation periods, late maturity, and large size makes great hammerheads especially susceptible to overutilization. The species has low productivity (intrinsic rate of population increase per year = 0.070; Cortés *et al.*, 2012), which makes it generally vulnerable to depletion and slow to recover from overexploitation. In addition, both petitions mention the great hammerhead sharks’ high capture mortality rate on bottom longline (BLL) gear. This high at-vessel mortality makes the shark vulnerable to fishing pressure, with any capture of this species, regardless of whether the fishing is targeted or incidental, contributing to its fishing mortality. In the northwest Atlantic, at-vessel fishing mortality on BLL gear (averaged for all age groups) was estimated to be 93.8 percent for great hammerhead sharks (Morgan and Burgess, 2007). However, in an ecological risk assessment of 20 shark stocks, Cortes *et al.* (2012) found that the great hammerhead ranked 14<sup>th</sup> in terms of its susceptibility to pelagic longline fisheries in the Atlantic Ocean. This information suggests that the species’ biological vulnerability (low productivity and high at-vessel mortality) may be a threat in certain fisheries, possibly contributing to an increased risk of extinction, but may not be a cause for concern in other fisheries.

### Conclusion

We conclude that the information in the petition and in our files suggests that fisheries, inadequate existing regulatory mechanisms, and other natural factors may be impacting great hammerhead shark populations to a degree that raises concerns of a risk of extinction, with evidence of population depletions throughout the entire range of the great hammerhead shark. We find that the WEG petition’s discussion of the present and threatened destruction, modification, and curtailment of the great hammerhead’s habitat and range due to growing

human populations and both petitions' discussions of climate change threats to habitats do not constitute substantial information indicating that listing may be warranted. The petitioners fail to show if the great hammerhead shark is responding in a negative fashion to those specific threats. For example, neither petition provides evidence, nor is there information in our files, to indicate that hypoxic occurrences and dead zones, a result of growing human populations, urban pollution, and climate warming, negatively impact shark populations. In fact, shark abundance can be very high in dead zones (Driggers and Hoffmayer, personal communication, 2013). In addition, both petitions assert that the loss of coral reef habitat due to climate change puts great hammerheads at risk of extinction; however, great hammerhead sharks are highly migratory species and are not limited to reef habitats. Additionally, another interpretation of the information could be that as ocean temperatures warm, more adequate habitat for great hammerheads would become available as they are a tropical species. The WEG petition also does not provide substantial information indicating that listing may be warranted due to the presence of mercury, PCBs, and arsenic in the great hammerhead shark's environment. The WEG petition references studies that examined the concentrations of these metals and organic compounds in different shark species, but it does not provide information, nor is there information in the references or in our files, on the effects of these substances and concentrations on great hammerhead sharks. In fact, the petition quotes a reference, stating that "scientists found that '[a]ll life-history stages [of the great white shark] may be vulnerable to high body burdens of anthropogenic toxins; how these may impact the population is not known.'" In addition, one of the petition's references, Storelli *et al.* (2003), states "[i]t is hypothesized [sic] that the large size of elasmobranch liver provides a greater ability to eliminate organic toxicants than in other fishes." The reference also mentions that in marine mammals selenium has a

detoxifying effect against mercury intoxication when the molar ratio between the two metals is close to one, and observed similar ratios in shark liver “indicating that this particular mechanism may also be valid for sharks” (Storelli et al., 2003). We conclude that given the information in the petition, references, and in our files, the petition fails to show that the great hammerhead may be responding in a negative fashion to these proposed threats.

#### Summary of ESA Section 4(a)(1) Factors

We conclude that the petitions present substantial scientific or commercial information indicating that the petitioned action may be warranted due to a combination of the following three ESA section 4(a)(1) factors that may be causing or contributing to an increased risk of extinction for the great hammerhead shark: overutilization for commercial, recreational, scientific, or educational purposes, inadequate existing regulatory mechanisms, and other natural factors. However, we conclude that the WEG petition does not present substantial scientific or commercial information indicating that the petitioned action may be warranted based on the remaining two ESA section 4(a)(1) factors: the present or threatened destruction, modification, or curtailment of its habitat or range; or disease or predation.

#### Petition Finding

After reviewing the information contained in the petitions, as well as information readily available in our files, and based on the above analysis, we conclude that the petitions present substantial scientific information indicating that the petitioned action of listing the great hammerhead shark range-wide as threatened or endangered may be warranted. Therefore, in accordance with section 4(b)(3)(B) of the ESA and NMFS’ implementing regulations (50 CFR 424.14(b)(2)), we will commence a status review of the species. During our status review, we will first determine whether the species is in danger of extinction (endangered) or likely to

become so (threatened) throughout all or a significant portion of its range. If it is not, then we will consider whether any populations meet the DPS policy criteria, and if so, whether any of these are threatened or endangered throughout all or a significant portion of their ranges. We now initiate this review, and thus, the great hammerhead shark is considered to be a candidate species (69 FR 19975; April 15, 2004). Within 12 months of the receipt of the petition (December 21, 2013), we will make a finding as to whether listing the species (or any identified DPSs) as endangered or threatened is warranted as required by section 4(b)(3)(B) of the ESA. If listing the species (or any identified DPSs) 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 on whether the great hammerhead 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 great hammerhead shark bycatch and retention in industrial, commercial, artisanal, and recreational fisheries worldwide; (5) historical and current data on great hammerhead shark discards in global fisheries; (6) data on the trade of great hammerhead 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 their 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 from NMFS Protected Resources Headquarters Office (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: April 23, 2013.

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Alan D. Risenhoover,  
Director, Office of Sustainable Fisheries,  
performing the functions and duties of the  
Deputy Assistant Administrator for Regulatory Programs,  
National Marine Fisheries Service.

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