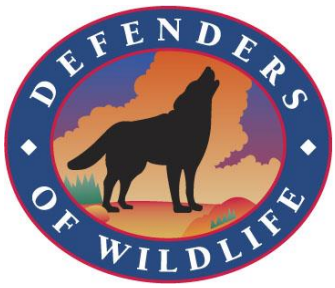

January 21, 2014

Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Submitted Electronically Via the Federal eRulemaking Portal:
www.regulations.gov
Docket # NOAA-NMFS-2013-0159

Re: Comments on the 90-Day Finding on a Petition to List 19 Species and 3 Subpopulations of Sharks as Threatened or Endangered Under the Endangered Species Act, 78 Fed. Reg. 69376 (November 19, 2013)

To Whom It May Concern:

Defenders of Wildlife and WildEarth Guardians hereby submit the following joint comments on the National Marine Fisheries Service's (NMFS's) 90-day finding on WildEarth Guardians' petition to list 19 species and 3 distinct population segments (DPSs) of sharks as threatened or endangered under the Endangered Species Act (ESA). 78 Fed. Reg. 69376 (November 19, 2013).

Defenders of Wildlife (Defenders) is a national, non-profit, science-based, conservation organization with more than 1.1 million members and supporters. It focuses on conserving and restoring native species and the habitats upon which they depend. Defenders' 2013-2023 Strategic Plan identifies sharks as one of several categories of key species whose conservation is a priority for Defenders' work.

WildEarth Guardians (Guardians) is a non-profit, environmental advocacy organization that works to protect threatened and endangered species throughout the world. It has 43,000 members and supporters. Guardians works to protect vanishing marine species through its Wild Oceans Campaign. Guardians filed the petition which is the subject of NMFS current 90-day finding. All information and attachments related to 19 species and three population segments of sharks previously provided to NMFS by Guardians with its original petition are incorporated into these comments by reference.

GENERAL COMMENTS

ENDANGERED SPECIES ACT AND IMPLEMENTING REGULATIONS

The Endangered Species Act (ESA), 16 U.S.C. §§ 1531-44, was enacted in 1973 "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species." 16 U.S.C. § 1531(b). The protections of the ESA only apply to species that have been listed as endangered or threatened according to the provisions of the statute.

As defined in the ESA, an "endangered" species is one that is "in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6); see also 16 U.S.C. § 1533(a)(1). A "threatened species" is one that "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20). NMFS must evaluate whether a species is threatened or endangered as a result of any of the five listing factors set forth in 16 U.S.C. § 1533(a)(1):

A. The present or threatened destruction, modification, or curtailment of its habitat or range;
B. Overutilization for commercial, recreational, scientific, or educational purposes;
C. Disease or predation;
D. The inadequacy of existing regulatory mechanisms; or
E. Other natural or manmade factors affecting its continued existence.

A taxon need only meet one of the listing criteria outlined in the ESA to qualify for listing. 50 C.F.R. § 424.11.

NMFS is required to make listing determinations "solely on the basis of the best scientific and commercial data available to [it] after conducting a review of the status of the species and after taking into account" existing efforts to protect the species. 16 U.S.C. § 1533(b)(1)(A); *see also* 50 C.F.R. §§ 424.11(b), (f). In making a listing determination, NMFS must give consideration to species which have been "identified as in danger of extinction, or likely to become so within the foreseeable future, by any State agency or by any agency of a foreign nation that is responsible for the conservation of fish or wildlife or plants." 16 U.S.C. § 1533(b)(1)(B)(ii). *See also* 50 C.F.R. § 424.11(e) (stating that the fact that a species has been identified by any State agency as being in danger of extinction may constitute evidence that the species is endangered or threatened). Species may be listed on NMFS's own initiative or in response to a petition, such as that submitted by Guardians in the present situation. 16 U.S.C. § 1533(b)(3)(A).

90-Day Finding Standard

After receiving a petition to list a species, NMFS is required to determine "whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). Such a finding is termed a "90-day finding." A "positive" 90-day finding leads to a status review and a determination whether the species will be listed, to be completed within twelve months of the date the petition was received. 16 U.S.C. §1533(b)(3)(B). A "negative" 90-day finding ends the listing process, and the ESA authorizes judicial review of such a finding. 16 U.S.C. § 1533(b)(3)(C)(ii). If Guardians or Defenders elects to seek judicial review of any

of the negative 90-day findings in NMFS's current decision, a separate formal written notice of intent to sue will be provided to the extent required by law. *See* 16 U.S.C. § 1540(g).

The applicable regulations define "substantial information," for purposes of consideration of petitions, as "that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted." 50 C.F.R. § 424.14(b)(1). In making a finding as to whether a petition presents "substantial information" warranting a positive 90-day finding, NMFS considers whether the petition:

i. Clearly indicates the administrative measure recommended and gives the scientific and any common name of the species involved;
ii. 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;
iii. Provides information regarding the status of the species over all or significant portion of its range; and
iv. Is accompanied by appropriate supporting documentation in the form of bibliographic references, reprints of pertinent publications, copies of reports or letters from authorities, and maps.

50 C.F.R. §§ 424.14(b)(2)(i)-(iv). NMFS's guidance on "substantial information" states that the information presented should merely be "adequate and reliable,"[1] not conclusive.

Both the language of the regulation itself (by setting the "reasonable person" standard for substantial information) and the relevant case law underscore the point that the ESA does *not* require "conclusive evidence of a high probability of species extinction" in order to support a positive 90-day finding. *Ctr. for Biological Diversity v. Morgenweck*, 351 F. Supp. 2d 1137, 1140 (D. Colo. 2004). In reviewing negative 90-day findings, the courts have consistently held that the evidentiary threshold for the 90-day review is much lower than the one required under a 12-month review. *See, e.g.*, *Ctr. for Biological Diversity v. Kempthorne*, No. CV 07-0038-PHX-MHM, 2008 WL 659822, at *8 (D. Ariz. Mar. 6, 2008) ("[T]he 90–day review of a listing petition is a cursory review to determine whether a petition contains information that warrants a more in-depth review."). *See also Moden v. U.S. Fish & Wildlife Serv.*, 281 F. Supp. 2d 1193, 1203 (D. Or. 2003) (holding that the substantial information standard is defined in "non-stringent terms" and that "the standard in reviewing a petition...does not require conclusive evidence.").

Rather, the courts have held that the ESA contemplates a "lesser standard by which a petitioner must simply show that the substantial information in the Petition demonstrates that listing of the species *may* be warranted" (emphasis added). *Morgenweck*, 351 F. Supp. 2d at 1141 (quoting 16 U.S.C. § 1533(b)(3)(A)). *See also Ctr. for Biological Diversity v. Kempthorne*, No. C 06-04186 WHA, 2007 WL 163244, at *3 (N.D. Cal. Jan. 19, 2007)(holding that in issuing negative 90-day findings for two species of salamander, FWS "once again" erroneously applied "a more stringent standard" than that of the reasonable person). Thus, a petition does not need to establish that there is a high likelihood

[1] U.S. FISH AND WILDLIFE SERVICE & THE NATIONAL MARINE FISHERIES SERVICE, PETITION MANAGEMENT GUIDANCE 13 (1996), *available at* http://www.nmfs.noaa.gov/op/pds/documents/02/110/02-110-06.pdf.

that the species is either threatened or endangered at the 90-day finding stage. Although a reviewing court is highly deferential to the Agency's listing determinations:[2]

> The 'may be warranted' standard, however, seems to require that in cases of such contradictory evidence, the Service must defer to information that supports petition's position. It would be wrong to discount the information submitted in a petition solely because other data might contradict it. At this stage, unless the Service has demonstrated the *unreliability* of information that supports the petition, that information cannot be dismissed out of hand.

Kempthorne, 2007 WL 163244, at *4.

NMFS's 90-day finding for the shark species at issue states the 90-day finding standard as follows:

- 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.
- 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 petitioner'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 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.

78 Fed. Reg. at 69377-78.

Best Available Scientific and Commercial Data Standard

ESA listing decisions, such as 90-day findings, must rely on the "best scientific and commercial data available." 16 U.S.C. § 1533(b)(1)(A). Similar to the "substantial information" standard under the 90-day review, case law has established that the scientific evidence presented need not be conclusive.[3]

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[2] *Colo. River Cutthroat Trout*, 448 F.Supp.2d at 175 ("Although the Court may not substitute its judgment for that of the agency, the Court's review must nevertheless be 'searching and careful.'") (citing *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 378 (1989)).

[3] *See City of Las Vegas v. Lujan*, 891 F.2d 927, 933 (D.C. Cir. 1989) ("[Section 4] merely prohibits the Secretary from disregarding available scientific evidence that is in some way better than the evidence he relies on. Even if the available scientific and commercial data were inconclusive, he may – indeed must – still rely on it at this stage…"); *Trout Unlimited v. Lohn*, 645 F. Supp. 2d 929, 950 (D. Or. 2007) ("[T]he agency 'cannot ignore available biological information'") (citing *Kern Co. Farm Bureau v.*

If the evidence presented is the most recent, available biological information on a species, NMFS cannot simply disregard it because it is inconclusive. This is particularly important under a 90-day review because as noted above, NMFS must make a positive finding and commence a status review when a reasonable person would conclude based on the available evidence that listing may be warranted.

The IUCN Red List

The IUCN is the largest professional global conservation network. The IUCN is a highly respected scientific authority. The organization is perceived as a neutral forum gathering and distributing scientific information on the conservation status of species. Its 11,000 experts establish and use definitive standards to evaluate the extinction risk faced by particular species and maintain this information in an on-line database known as the IUCN Red List of Threatened Species ("Red List"). The Red List is well respected and is considered an authoritative source on species' conservation status.[4] The United States supports the work of the IUCN and scientific wildlife agencies of the United States, including the United States Fish and Wildlife Service (FWS) and NMFS, use the Red List as a reference and a source of best available scientific and commercial information when evaluating the extinction risk faced by species.

The Red List provides "taxonomic, conservation status and distribution information on plants and animals" throughout the world.[5] It categorizes species into nine different categories. Based on the best available evidence, a species can be (1) Extinct; (2) Extinct in the Wild; (3) Critically Endangered; (4) Endangered; (5) Vulnerable; (6) Near Threatened; (7) Least Concern; (8) Data Deficient; and (9) Not Evaluated.[6] The Red List places species into categories denoting their extinction risk based on certain criteria. The general aim of the system is to provide an explicit, objective framework for the classification of species according to their extinction risk. The IUCN

Allen, 450 F.3d 1072, 1080 -81 (9th Cir.2006)); *In re Polar Bear Endangered Species Act Listing and 4(d) Rule Litigation*, 794 F. Supp. 2d 65, 106 (D.D.C. 2011) ("As this Court has observed, 'some degree of speculation and uncertainty is inherent in agency decisionmaking' and 'though the ESA should not be implemented 'haphazardly'…an agency need not stop in its tracks when it lacks sufficient information.'") (citing *Oceana v. Evans*, 384 F. Supp. 2d 203, 219 (D.D.C. 2005)).

[4] *See generally*, Ana S.L. Rodrigues, et al., *The Value of the IUCN Red List for Conservation*, *in* 21 TRENDS IN ECOLOGY AND EVOLUTION 71 (2006), *available at* http://intranet.iucn.org/webfiles/doc/SSC/Gen_docs/e_bulletin_/May_2008/Rodrigues_etal_2006.pdf; *See also*, S.H.M. Butchart, et al., *Using Red List Indices to Measure Progress Towards the 2010 Target and Beyond*, *in* 360 PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY 255, 256 (2005) ("The IUCN Red List is now widely recognized as the most objective and authoritative system for classifying species in terms of their risk of extinction."), *available at* http://rstb.royalsocietypublishing.org/content/360/1454/255.full.pdf+html; Joshua Ginsburg, *The Application of IUCN Red List Criteria at Regional Levels*, *in* 15 CONSERVATION BIOLOGY 1206, 1206 (2001) ("Red Lists and Red Data Books of the World Conservation Union (IUCN) are among the most widely used tools available to conservationists world-wide for focusing attention on species of conservation concern."), *available at* http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2001.00112.x/pdf.

[5] *About*, IUCN RED LIST, http://www.iucnredlist.org/about (last visited Oct. 17, 2013).

[6] SPECIES SURVIVAL NETWORK, IUCN RED LIST CATEGORIES AND CRITERIA 14-15 (2001), *available at* http://jr.iucnredlist.org/documents/redlist_cats_crit_en.pdf.

Red List categories are widely recognized internationally, are relied on in a variety of scientific publications, and are used by numerous governmental and non-governmental organizations.

The scientific data utilized to support the Red List determinations "are regularly published in scientific literature," and should be peer reviewed.[7] Additionally, the science supporting IUCN's species assessments is considered the best scientific information available.[8] Any IUCN listing determination can be challenged, though any challenge must also be backed by scientifically published sources.[9] Finally, all species are reviewed either every ten or five years by Red List Authorities ("RLAs"). A RLA is the Species Survival Commission ("SSC," one of IUCN's six scientific commissions) or Specialist Group "responsible for the species, group of species, or specific geographic area."[10] The reassessment of the species and the supporting information ensures that the "IUCN Red List is credible and scientifically accurate."[11]

In evaluating the extinction risk faced by a species, the IUCN first decides whether adequate data exists to make an assessment. For those species without sufficient data, the IUCN lists the species as Data Deficient. If there is adequate data, the IUCN places the species into one of seven categories based on application of its criteria. The seven categories are: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, and Least Concern. The IUCN considers species in the Critically Endangered, Endangered, or Vulnerable categories to be threatened with extinction.

The IUCN's listing criteria are quantitative, extensive, and rigorously applied. The IUCN's species assessment criteria, like those found in the ESA, require the use of the best available scientific information, but are more objective and quantitative than the ESA's definitions of threatened and endangered species. The IUCN defines a Critically Endangered species as one where the best available evidence indicates that it meets the criteria for this category and the species is considered to be facing an extremely high risk of extinction in the wild. An Endangered species is one considered to be facing a very high risk of extinction in the wild and a Vulnerable species is considered to be facing a high risk of extinction in the wild. Accordingly, these categories are analogous to the ESA's endangered and threatened species definitions.

IUCN Red List and ESA Listing

Although the IUCN criteria differ from the requirements of listing a species as endangered or threatened under the ESA,[12] both NMFS and FWS have utilized IUCN data and criteria on species in listing decisions. This is because the IUCN is considered a credible source of scientific data that meets the "best available science" requirement of the ESA.[13] Reliance on IUCN data generally meets

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[7] *Red List Overview: Introduction*, IUCN RED LIST, http://www.iucnredlist.org/about/red-list-overview (last visited Oct. 18, 2013).
[8] *Id.*
[9] *Procedure for Handling of Petitions against Current Listings on the IUCN Red List of Threatened Species*, IUCN RED LIST, http://www.iucnredlist.org/documents/petitions_process.pdf (last visited Oct. 18, 2013).
[10] *Red List Overview: Establishment of Red List Authorities*, IUCN RED LIST, http://www.iucnredlist.org/about/red-list-overview (last visited Oct. 18, 2013).
[11] *Id.*
[12] 16 U.S.C. § 1533.
[13] *Id.* § 1533(b)(1)(A).

the "substantial information" standard required to initiate a status review under ESA.[14] Given the rigorous set of listing criteria that must be evaluated and applied, the IUCN Red List is arguably a more objective and science-based listing evaluation than ESA listing. Indeed, a 2012 study by Harris *et al.* underscore that the data for bird taxa, the focus of the case study, show that U.S. wildlife agencies are "failing to keep pace with global listing assessments of imperiled species."[15] This study contrasts the IUCN Red List, based on "unambiguous criteria, objective categories that measure probability of extinction, and a dynamic system that quantifies uncertainty in assessments" with the vague and much more subjective ESA categories of "threatened" and "endangered."[16] With respect to marine fish species, Davies and Baum (2012) found that IUCN Red Listings were not biased towards exaggerating threat status, and that IUCN threat listings can serve as an accurate flag for relatively data-poor fisheries.[17]

NMFS has previously relied on IUCN data and species categorizations a number of times in both proposed and final listing decisions. In its decision to list the Guadalupe fur seal as threatened, NMFS specifically noted in its response to the IUCN comment supporting the seal be listed as endangered:

> The Guadalupe fur seal is listed by IUCN as "vulnerable." Included in this category are species "believed likely to move into the 'Endangered' category in the near future . . ." and species whose populations "have been seriously depleted and whose ultimate security has not yet been assured." This classification corresponds more closely with the ESA definition of "threatened" than "endangered" and therefore, it appears that the "threatened" status is consistent with the IUCN category of vulnerable.[18]

Here, NMFS noted the IUCN categorization of the species and applied the comparable ESA categorization. NMFS thus validated the IUCN Red List as a legitimate source of information.

In a more recent listing decision, NMFS discussed the IUCN categorization of three species of seals. Specifically the decision stated that "the bearded seal is currently classified as a species of 'Least Concern" on the IUCN Red List. *These listings highlight the conservation status of listed species and can inform conservation planning and prioritization*."[19] Again, here NMFS clearly is giving credence to the IUCN Red List as a valid source of the best available scientific data.

NMFS has previously relied on and adapted the IUCN's criteria for estimating risk extinction. For example, in its proposed endangered listing of a distinct population of Hawaiian insular false killer whale, NMFS's biological research team "defined the level of risk based on thresholds that have

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[14] 16 U.S.C. § 1533(b)(3)(A).
[15] Harris, J. B. C., *et al.* "Conserving imperiled species: a comparison of the IUCN Red List and the U. S. Endangered Species Act. Conservation Letters 5 (2012): 64-72.
[16] *Id.* at 70.
[17] Davies, T. D., and J. K. Baum. "Extinction Risk and Overfishing: Reconciling Conservation and Fisheries Perspectives on the Status of Marine Fishes." Scientific Reports 2.51 (2012): 1-9.
[18] Threatened Fish and Wildlife; Guadalupe Fur Seal, 50 Fed. Reg. 51,252, 51,254 (Dec. 16, 1985).
[19] Threatened Status for the Arctic, Okhotsk, and Baltic Subspecies of the Ringed Seal and Endangered Status for the Ladoga Subspecies of the Ringed Seal, 77 Fed. Reg. 76,740, 76,748 (Dec. 28, 2012) (emphasis added).

been used to assess other marine mammal species, and consistent with the criteria used by the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (IUCN, 2001)."[20] This reliance on the IUCN risk criteria also appeared in a joint decision by NMFS and FWS to determine nine distinct population segments of loggerhead turtle.[21] Furthermore, almost the entirety of this joint decision was supported by IUCN Martine Turtle Specialist reports or IUCN scientists' papers on Loggerheads.[22] A number of other listing decisions by NMFS have also cited to IUCN reports and species categorizations.[23]

Relatedly, FWS has also relied on IUCN science numerous times. There have been some recent notable examples, including the listing of polar bears as threatened, justification for delisting the gray wolf, and the proposed delisting of three captive antelope species.[24] Additionally, FWS has a grant program called "Wildlife Without Borders." It funds projects to conserve species with a very high risk of extinction that are located outside the United States, Canada, and wealthier European

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[20] Proposed Endangered Status for the Hawaiian Insular False Killer Whale Distinct Population Segment, 75 Fed. Reg. 70,169, 70,170 (Nov. 17, 2010).
[21] Determination of Nine Distinct Population Segments of Loggerhead Sea Turtles as Endangered or Threatened, 76 Fed. Reg. 58,868, 58,899 (Sept. 22, 2011).
[22] *See id.*; *see also* 12-Month Finding and Proposed Endangered Listing of Five Species of Sawfish Under the Endangered Species Act, 78 Fed. Reg. 33,300 (June 4, 2013) (Relying on IUCN data throughout proposed listing).
[23] *See* 90-Day Finding on a Petition To List the Dwarf Seahorse as Threatened or Endangered, 77 Fed. Reg. 26,478, 26,481 (May 4, 2012); 90-Day Finding on a Petition To List Nassau Grouper as Threatened or Endangered, 77 Fed. Reg. 61,556, 61,561 (Oct. 10, 2012); *See also* Proposed Listing Determinations for 82 Reef-Building Coral Species, 77 Fed. Reg. 73,220, 73,253 (Dec. 7, 2012), *available at* https://www.federalregister.gov/articles/2012/12/07/2012-29350/endangered-and-threatened-wildlife-and-plants-proposed-listing-determinations-for-82-reef-building ("All the proposed corals are listed in the IUCN Red List of Threatened Species as vulnerable, endangered, or critically endangered. Thus, the proposed listing is consistent with these classifications."); Listing Determinations for Six Distinct Population Segments of Scalloped Hammerhead Sharks, 78 Fed. Reg. 20,718, 20,721 (Apr. 5, 2013) ("[T]he IUCN classification for the scalloped hammerhead shark alone does not provide the rationale for a listing recommendation under the ESA, but the sources of information that the classification is based upon are evaluated in light of the standards on extinction risk and impacts or threats to the species."); 12-Month Finding on Petitions To List the Northeastern Pacific Ocean Distinct Population Segment of White Shark as Threatened or Endangered, 78 Fed. Reg. 40,104, 40,123 (July 3, 2013), *available at* https://www.federalregister.gov/articles/2013/07/03/2013-16039/endangered-and-threatened-wildlife-12-month-finding-on-petitions-to-list-the-northeastern-pacific ("Listing a species on the IUCN Red List does not provide any regulatory protections for the species, but serves as an evaluation of the species' status.").
[24] Determination of Threatened Status for the Polar Bear (Ursus maritimus) Throughout Its Range, 73 Fed. Reg. 28,212, 28,216 (May 15, 2008); Removing the Gray Wolf (Canis lupus) From the List of Endangered and Threatened Wildlife, 78 Fed. Reg. 35,664, 35,678 (Jun. 13, 2013); 12-Month Findings on Petitions to Delist U.S. Captive Populations of the Scimitar-horned Oryx, Dama Gazelle, and Addax, 78 Fed. Reg. 33,790, 33,791 (Jun. 5, 2013).

nations.[25] Species eligible for the grant "should meet the criteria to be listed as 'Critically Endangered' or 'Endangered' on the International Union for the Conservation of Nature (IUCN) Red List."[26] FWS utilizes the IUCN's categorization of imperiled species, recognizing its legitimacy as a species-listing system. Moreover, in the past, FWS has used IUCN categorization of species in its Candidate Notice of Review. FWS explained:

> Those species with the highest IUCN rank (critically endangered) . . . originally comprised a group of approximately 40 candidate species ("Top 40"). These 40 candidate species have had the highest priority to receive funding to work on a proposed listing determination. As we work on proposed and final listing rules for those 40 candidates, we apply the ranking criteria to the next group of candidates with an LPN of 2 and 3 to determine the next set of highest priority candidate species.[27]

Again, this highlights FWS's reliance on IUCN's categorization of species and the IUCN's credibility as a source of the best available scientific data.

Although NMFS and the FWS are separate agencies, they have been given the same task of determining whether a species is endangered or threatened. In 1994, the agencies promulgated a "Notice of Interagency Cooperative Policy on Information Standards under the ESA," a joint statement by the agencies agreeing to both utilize "the best scientific and commercial data available" when determining whether any species is endangered or threatened. The information can include "…status surveys, biological assessments, and other unpublished material…from State natural resource agencies and natural heritage programs, Tribal governments, other Federal agencies, consulting firms, contractors, and individuals associated with professional organizations and higher educational institutions."[28] This type of policy agreement indicates that there is uniformity in what the agencies can and should rely on. Thus if FWS finds it acceptable to rely on IUCN categorizations and data, NMFS should as well.

Given the objective, data-driven process used by the IUCN Red List to categorize species and the reliance on IUCN species assessments by both NMFS and FWS in other contexts, the IUCN categorization of a species as imperiled, proves that reasonable people – experts in their field – have determined that the best available scientific evidence shows that the species is likely to be endangered or threatened as those terms are defined in the ESA. Accordingly, NMFS criticism of the Petition's reliance on IUCN species assessments showing that all 19 shark species and 3

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[25] U.S. FISH AND WILDLIFE SERVICE, WILDLIFE WITHOUT BORDERS: CRITICALLY ENDANGERED ANIMALS CONSERVATION FUND 2 (2013), *available at* http://www.fws.gov/International//pdf/factsheet-wildlife-without-borders.pdf.

[26] *Id.*

[27] Review of Native Species That Are Candidates for Listing as Endangered or Threatened, 76 Fed. Reg. 66,370, 66,380 (Oct. 26, 2011) (In 2012, the FWS did not mention IUCN and instead pointed to the recent settlement decisions).

[28] Notice of Interagency Cooperative Policy on Information Standards under the Endangered Species Act, NOAA FISHERIES: ENDANGERED SPECIES ACT POLICIES, GUIDANCE AND REGULATIONS, http://www.nmfs.noaa.gov/pr/pdfs/fr/fr59-24271.pdf (last updated Aug. 12, 2013).

population segments included in the Petition are critically endangered or endangered is misplaced. *See* 78 Fed. Reg. at 69378.

Additionally, as discussed above, the ESA requires the "best available" information, not conclusive proof. *See, e.g. Bldg. Indus. Ass'n of Superior Cal. v. Norton*, 247 F.3d 1241, 1246 (D.C. Cir. 2001) ("the Service must utilize the 'best scientific... data *available,*' not the best scientific data *possible*"). Information on the precise size, number, and location of populations either historically or currently is often unavailable for imperiled species. In establishing the best available information standard, Congress expressed a desire to not wait for perfect or conclusive information, which may come too late or never, before protecting species for which the best information available shows that threats puts them at risk of extinction now or in the foreseeable future. NMFS's negative 90-day decisions at issue in the current finding clearly frustrates the Congressional desire to "give the benefit of the doubt to the species" in interpreting the best available science standard in the listing provisions of the ESA. *Greenpeace v. Nat'l Marine Fisheries Serv.*, 55 F. Supp. 2d 1248, 1261 (W.D. Wash. 1999).

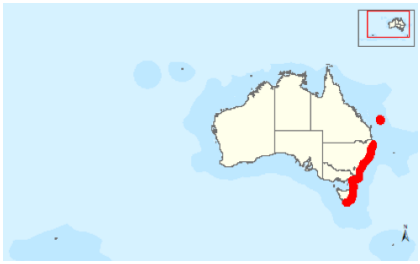
SPECIFIC COMMENTS ON POSITIVE 90-DAY FINDINGS

Defenders and Guardians support all nine positive 90-day findings made by NMFS in its decision and believe these nine species warrant the protection of the ESA. Specific information as to each of these nine species is presented below.[29] To the extent possible, Defenders and Guardians have attempted to avoid repeating information previously presented to NMFS with the original Petition and have concentrated on presenting only additional information not previously or adequately considered on topics of concern or uncertainty.

CENTROPHORUS HARRISSONI (HARRISON'S DOGFISH)

Distribution

Centrophorus harrissoni's likely distribution is depicted in the map below:



Source: www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=68444

[29] *See also* Dulvy et al. (2013), Extinction Risk and Conservation of the World's Sharks and Rays (specifically addressing the *Mustelus* and *Squatina* species discussed below and concluding they are at high risk of extinction).

Population Trends

A fishery independent survey by a trawl research vessel documented declines of *Centrophorus harrissoni* of over 99% between 1976/1977 and 1996/1997 between the Sydney area (central New South Wales) and the Eden-Gabo Island Area (southern New South Wales/northern Victoria). IUCN (Centrophorus harrissoni) 2012 at 4 (citations omitted). "Catches in the above mentioned areas in 220 to 605 m[eters] (i.e., most of the preferred depth range of this species) declined from a mean of 28.8 [kilograms per hour] in 1976 to 1977 to a mean of 0.1 [kilograms per hour] (a total of only eight specimens) in 1996 to 1997." *Id.* The species may now only be present within the non-trawlable areas of its narrow continental slope habitat. However, even in these non-trawlable areas, the species is likely taken by line fishers and this is likely to continue causing population declines even in these areas due to the species' life history traits. *See id.* at 3.

Threats to *Centrophorus harrissoni*

Overutilization for commercial, recreational, scientific, or educational purposes

"Gulper sharks[which include *Centrophorus harrissoni*] are medium-sized demersal sharks (adult lengths between 0.7 and 1.7m) that are commercially exploited for both human consumption and the high squalene content of their livers." Graham & Daley 2011 at 583 (citations omitted). The species' preferred depth range (300-800m has been extensively targeted by trawl fisheries in its habitat over the last 30 years and this level of fishing effort has largely eliminated *Centrophorus harrissoni* from this area. *Id.* at 591 (citation omitted). In addition to trawling, "[t]he capture of small juveniles (including neonates) by long- line indicates that, as with trawling, all size classes of gulper sharks are vulnerable to this fishing method." *Id.* at 593. "It is clear that the productivity of [*Centrophorus harrissoni*] is so low that even if stocks are not targeted and [the species is] only taken as incidental by-catch, populations are unlikely to recover in those areas where numbers have been greatly reduced but fishing continues." *Id.*

Inadequacy of existing regulatory mechanisms

In response to the extreme declines observed in this species, "the Australian Fisheries Management Authority (AFMA) has implemented gulper shark catch limits (15 kg per day) with the objective of preventing targeted fishing in Australian Commonwealth managed waters. In addition, some offshore seamounts and areas of deep water off Sydney, eastern Bass Strait and South Australia have been closed to trawling, long-lining and gill-netting." *Id.* (citation omitted). While these are positive steps, as discussed above concerning the threat posed by overutilization, *Centrophorus harrissoni* has already been overfished to the point that even incidental bycatch may likely prevent the species' recovery. Though only a small amount of bycatch may be retained, even non-retained sharks will often be thrown back into the ocean dead, dying, or severely injured and, therefore, a ban on landing is not necessarily sufficient to protect the species from bycatch. Additionally, while Australia's institution of fishing bans in certain areas is beneficial, fishing bans in limited areas are insufficient to protect this species because it may occur or stray outside of the protected area, the protected areas do not cover the species' entire range, and the effectiveness the enforcement of these closures is unclear. In sum, NMFS should consider these regulatory weaknesses in during its status review and give the benefit of the doubt to the species.

Other natural or manmade factors affecting its continued existence

While fishing has clearly had devastating effects on this species, the negative impact of this threat is greatly magnified by the species' low fecundity and susceptibility to decline. For instance, Graham and Daley (2011) noted that the length at which 50% of adult males were sexually mature was 83% of the maximum length recorded for males of the species. *Id.* at 587. Graham and Daley also noted that the length at which 50% of adult females were sexually mature was an even greater 86.1% of the maximum length recorded for females of the species. *Id.* at 588. This indicates that the species is not sexually mature until it has reached nearly its maximum total length. For this species to reproduce, individuals must be able to survive for sufficient time to reach sexual maturity. Individuals killed before they are nearly their maximum size will not be able to reproduce, making the species extreme susceptible to fishing pressure. Furthermore, it appears females only have 1-2 developing embryos at a time and that pregnancy may last 2-3 years. *Id.* at 588, 592. This cycle of a maximum of 1-2 births per female every 2-3 years represents an extremely low fecundity that will make the species' recovery from overutilization extremely slow and precarious. Graham and Daley confirmed "that the life-history characteristics of Centrophorus species make them extremely vulnerable to fishing pressure." *Id.* at 593. They reported that "the intrinsic rebound potential of deepwater chondrichthyans [is] very low and limit[s] their ability to sustain fishing pressure or recover from over-fishing, and . . . that Centrophorus species are possibly the least productive of any chondrichthyan fish." *Id.* As a Centrophorus species, *Centrophorus harrissoni* must be protected from the overutilization that has caused its drastic population decline.

It also appears that adult males now dominate *Centrophorus harrissoni* populations with few adult females or juveniles of either sex being observed. *Id.* at 588-89, 593. In its status review, NMFS should consider the effects that this sexual skewed population structure may have on the species' survival, how the threats discussed above may have resulted in this population structure, and how the existing regulatory mechanisms fail to address this situation.

ISOGOMPHODON OXYRHYNCHUS **(DAGGERNOSE SHARK)**

Population Trends

In its 90-day finding NMFS acknowledges the population of *Isogomphodon Oxyrhynchus* off northern Brazil is thought to be decreasing at a rate of 18.4 percent per, with substantial declines (>90 percent) over the past 10 years. 78 Fed. Reg. 69383 citing (Lessa *et al.*, 2006). However, the IUCN species assessment at issue actually cities Santana and Lessa 2002 for this information. *See* IUCN (Isogomphodon Oxyrhynchus) 2012 at 3, 5 (citing Santana and Lessa 2002). NMFS further acknowledges the species is also taken by artisanal fishermen in Venezuela, Trinidad, Guyana, Suriname, and French Guiana, but then states merely that "data are currently lacking for these areas." 78 Fed. Reg. 69383 citing Lessa et al. 2006. However, NMFS ignores the complete statement in the IUCN assessment which actually says: "[a]lthough data are currently lacking for Venezuela, Trinidad, Guyana, Suriname, and French Guiana, **it is highly likely that similar declines have also occurred there** given that the species is taken primarily in artisanal fisheries. **Such fishing pressure is intense across [the species'] range, will continue to increase into the future**, and [the species'] restricted movements may limit re-colonization to depleted areas." IUCN (Isogomphodon Oryrhynchus) 2012 at 3 (emphasis added). Accordingly, NMFS' assertion in its finding that "[t]he petition makes **the assumption** that fishing pressures are similar throughout all of the species' range and, therefore, similar declines are likely," 78 Fed. Reg. 69384 (emphasis

added), is misplaced. The petitioners did not make an "assumption." Rather, the petitioners relied upon the IUCN species' assessment for this information. To the extent anyone has made an "assumption," it is the expert scientists preparing the IUCN assessment and not the petitioners. It is inappropriate for NMFS to discount the expert scientific opinion of the scientists completing the IUCN species' assessment as to the population trend of this species in those areas where specific data are lacking. The opinion of the IUCN experts represents the best available scientific opinion on this issue – not an unwarranted "assumption" by the petitioners.

NMFS also states a study from November 1983 to February 1985 conducted off northern Brazil showed the species represented around 10 percent of the floating gillnet elasmobranch catch (Lessa, 1986), while a later survey (Stride et al., 1992) reported a catch per unit effort (CPUE) of 71 kg/km/h for the species. 78 Fed. Reg. 69683. NMFS then faults the petitioner for not providing these studies with the Petition. *Id.* Again this is an inappropriate criticism of the Petition. NMFS' regulations state a petition **may** provide bibliographic references – but does not require copies of articles to be provided. 50 C.F.R. § 424.14(b)(2)(iv). More importantly, neither Lessa 1986 (Levanta memto faunistico dos elasmobranquious do litoral occidental do Estado do maranhau, Brazil. Bol. Lab., hrdrobiol, Sao Luis 7:27-42), nor Stride, 1992 (Pesca Experimental de Bubaroes com redes de emalhao no Litoral Marahense, Sao Luis Vol. III ODA/FINEP, UFMA) are in English. Accordingly, it is entirely reasonable for a petitioner to rely upon English sources, like the IUCN species assessment, for its statements summarizing what other scientific authorities, not writing in English, found and what conclusions can be drawn based on their work. This is particularly true at the 90-day finding stage. NMFS' criticism of the Petition in this regard is both parsimonious and inappropriate. The best available science indicates the population trend of the *Isogomphodon oxyrthynchus* is dramatically declining throughout its range.

For example, de Silva Rodrigues-Filho *et al.* (2009) found a notable absence of daggernosed sharks, *Isogomphodon oxyrhynchus*, from catches off northern Brazil despite it "previously [being] one of the most common species in local catches." In another study, Shark DNA Forensics, Rodrigues-Filho, et al., at 270 state: "A remarkable example of overexploitation involves the daggernosed shark, *Isogomphodon oxychynchus*, which is a coastal species with a low reproductive capacity and a fragmented distribution between Venezuala and northern Brazil. Although it is protected by law in Brazil, [it] continues to be illegally caught by fisheries and is currently listed as critically endangered in the Red List of the IUCN." (Internal citations omitted).

Threats to *Isogomphodon oxyrhynchus*

Overutilization for commercial, recreational, scientific, or educational purposes

As stated above, the population of *Isogomphodon Oxyrhynchus* off northern Brazil is thought to be decreasing at a rate of 18.4 percent per, with substantial declines (>90 percent) over the past 10 years. IUCN (Isogomphodon Oxyrhynchus) 2012 at 3, 5 (citing Santana and Lessa 2002). "Although data are currently lacking for Venezuela, Trinidad, Guyana, Suriname, and French Guiana, it is **highly likely that similar declines have also occurred there** given that the species is taken primarily in artisanal fisheries. **Such fishing pressure is intense across [the species'] range, will continue to increase into the future**, and [the species'] restricted movements may limit re-colonization to depleted areas." IUCN (Isogomphodon Oryrhynchus) 2012 at 3 (emphasis added). Other researchers describe this species as a "remarkable example of overexploitation." Shark DNA Forensics, Rodrigues-Filho, et al., at 270. Indeed, overutilization has resulted in a notable absence of

daggernosed sharks, *Isogomphodon oxyrhynchus*, from catches off northern Brazil despite it "previously [being] one of the most common species in local catches." de Silva Rodrigues-Filho et al. (2009). Additionally, Nachtigall et al., (2011) found: "The daggernosed shark, *Isogomphodon oxyrhynchus*, is an inshore tropical species endemic to the coastal waters off northern South America with a limited distribution and restrictive biological traits (low growth rate, low fecundity and delayed sexual maturity) **that makes it not able to support the fishing pressure experienced**. As a consequence, dramatic population declines (>90%) occurred over the past ten years resulting in daggernosed shark being considered a critically endangered species for which urgent conservation and management action is required." (Emphasis added.)

Inadequacy of existing regulatory mechanisms

In Shark DNA Forensics, Rodrigues-Filho, et al., at 270 state: "A remarkable example of overexploitation involves the daggernosed shark, *Isogomphodon oxychynchus*, which is a coastal species with a low reproductive capacity and a fragmented distribution between Venezuala and northern Brazil. **Although it is protected by law in Brazil, [it] continues to be illegally caught by fisheries** and is currently listed as critically endangered in the Red List of the IUCN." (Emphasis added, Internal citations omitted). Additionally, , Nachtigall et al., (2011) found: "The daggernosed shark, *Isogomphodon oxyrhynchus*, is an inshore tropical species endemic to the coastal waters off northern South America with a limited distribution and restrictive biological traits (low growth rate, low fecundity and delayed sexual maturity) **that makes it not able to support the fishing pressure experienced**. As a consequence, dramatic population declines (>90%) occurred over the past ten years resulting in daggernosed shark being considered a critically endangered species for which urgent conservation and management action is required." (Emphasis added.) In short, these scientific articles conclude that current regulatory mechanisms are inadequate to protect the daggernose shark, that illegal catches represent a threat to the species, and that additional protection is necessary to enable this shark to recover.

Other natural or manmade factors affecting its continued existence

In its finding, NMFS appears to express some doubt that that the Petition explains how the biological characteristics of *Isogomphodon oxyrhynchus* make it more susceptible to fishing pressure: "The petition also asserts that the species' biological characteristics, such as slow intrinsic population growth and high natural mortality (neither of which have been estimated) have resulted in a population that cannot rebound from this fishing pressure." 78 Fed. Reg. 69384. This criticism is unfounded. Frisk & Miller (2005) "Life Histories and Vulnerability to Exploitation" and Lessa *et al.*, (1999) "Occurrence and Biology of Daggernose Shark *Isogomphodon Oxyrhynchyus*," specifically examine this issue and are provided as attachments. Nachtigall *et al.*, (2011) explicitly states "restrictive biological traits (low growth rate, low fecundity and delayed sexual maturity) [make *Isogomphodon oxyrhynchys* unable] to support the fishing pressure experienced."

MUSTELUS FASCIATUS (SRIPED SMOOTH-HOUND)

Distribution

According to the IUCN, this species occurs at low densities over a restricted area encompassing approximately 1,500 kilometers of coastline. In Brazil the species occurs only in the extreme south, between latitudes of approximately 29°S and 34°S. The range extends southward to around 35° to

30°S in Argentina. Nursery area and birth of young occur only on the coast of Rio Grande do Sul State, Brazil, at latitudes from approximately 29 to 34°S and into northern Uruguay (Soto 2001), which is a considerable portion of the species' distribution. IUCN (Mustelus fasciatus) 2012 at 4. A map is available on the IUCN webpage. *Id.*

Population Trends

According to the IUCN the species is nearing extinction in Brazilian waters and has declined 96% in the remainder of its range in Argentina and Uruguay. "During the 1980s, neonates were caught in large numbers in gillnets set off the beach during summer (10-100 per set), but by 2003 are caught only sporadically. This is clear evidence that the species is nearing extinction in Brazilian waters. In the coastal region of the Bonaerensean District of northern Argentina and Uruguay, the biomass of the species, as measured by trawl surveys, decreased by 96% between 1994 and 1999. Fishing for more abundant species is still intense across this species' limited distribution…" IUCN (Mustelus fasciatus) 2012 at 3, 5. Based on continued intense fishing effort in the species range, it is likely the species has continued to decline since the surveys relied upon by the IUCN were completed. *Id.*

Threats to *Mustelus fasciatus*

Overutilization for commercial, recreational, scientific, or educational purposes

Intensive demersal fisheries that exist throughout this species' range represent the most major threat to its continued existence. *Id.* at 4. These fisheries catch a high proportion of gravid females and neonates, which is clearly an unsustainable practice. *Id.* These catches have caused extensive declines and are a threat to the species' continued existence. *Id.* at 5.

Inadequacy of existing regulatory mechanisms

Though trawl fishing within three miles of the shore is forbidden in Brazil, enforcement is poor and trawling in this area continues. *Id.* at 5.

Other natural or manmade factors affecting its continued existence

This species appears to be naturally low in density, which means that removal of individuals has a high ability to cause extirpations in affected areas. *See id.* at 4.

In combination, these threats put the species at a significant risk of extinction and indicated that *Mustelus fasciatus* warrants listing under the ESA.

***MUSTELUS SCHMITTI* (NARROWNOSE SMOOTH-HOUND)**

Distribution

As show in the map below, the distribution of this species is similar to that of *Mustelus fasciatus*.

Distribution of *Mustelus schmitti*
Source: Food and Agriculture Organization of the United Nations Fisheries Department

Population Trends

Mustelus schmitti has undergone serious declines due to overfishing both in its nursery grounds and more generally. *See* IUCN (Mustelus schmitti) 2012 at 3. Catch per unit effort (CPUE) data shows that the abundance of the winter migrant population in south Brazil decreased by 85% between 1985 and 1997. *Id.* In addition a smaller local population that was known to breed in south Brazil has disappeared due to overfishing in its inshore pupping and nursery areas. *Id.* In the main fishing area for the species off of Argentina and Uruguay biomass has decreased by 22% and Argentinean landings decreased by 30% between 1998 and 2002. *Id.* Data from 2003 shows continuing population decline. *Id.* "Although the Maximum Permitted Catch (MPC) established by the Argentine fisheries authorities has been reduced annually for the last four years, landings of M. schmitti have continued to decline." *Id.* at 4. Market demand for the species is increasing and fishing continues, so these declines are almost certain to continue. *See id.* "[R]eductions in landings are an indication that the resource cannot withstand the current level of exploitation." *Id.* at 6.

Threats to *Mustelus schmitti*

In its decision, NMFS' recognized the massive declines experienced by the winter migrant population off south Brazil and the likely extirpation of the southern Brazil spring breeding population. 78 Fed. Reg. at 69385. NMFS also recognized decreases in abundance have occurred in Argentina and Uruguay signaling rangewide declines. *See id.* However, NMFS disagreed with the Petition that a complete ban on fishing for the species was necessary to halt these declines, opining it lacks sufficient information to reach such a conclusion. *Id.* Nonetheless, NMFS determined that "the species is commercially important, taken in substantial numbers in fisheries within its range, including in nursery grounds and pupping areas, and has experienced large declines (85 percent) in parts of its range, with a potential extirpation of a local population," and therefore found that "overutilization for commercial purposes may be a threat to the species' current existence." *Id.* We agree with this conclusion and provide additional information on threats to the species that were not included in NMFS's analysis below.

Overutilization for commercial, recreational, scientific, or educational purposes

Mustelus schmitti carcass prepared for sale
Source: http://coopdf.com.ar/en/productos/patagonian-smoothhound-mustelus-schmitti/

According to the abstract of a recent scientific article by Colautti *et al.*, in 2010, *Mustelus schmitti* is a commercially important and commonly targeted shark inhabiting the southwestern Atlantic coastal system and is usually found in shallow waters. Using experimental and artisanal fishing records, these researchers assessed seasonal biological and demographic characteristics related to fishing of *Mustelus schmitti* and its potential impact on this species. They found that after birth, juveniles remain in Anegada Bay until sexual maturity. The young adults mate in spring and then leave the bay in summer. The older adults come back to the bay in early spring to give birth, and mate and finally return to the open sea in late spring. This pattern suggests that the bay acts as a seasonal nursery and reproductive area. This species represents 95% of the fishery captures in this bay, although the fishery is highly seasonal. The average harvest during the years 2003–2008 was 164 tons, which represented only 2% of the total Argentinean smooth-hound landings. Fishing effort in the bay can be considered moderate due to the narrow time window and the use of selective gear that prevents the capture of juveniles. These researchers concluded that future research should be directed at developing management plans at a broader regional scale to allow the recovery of *Mustelus schmitti*

stocks under heavy fishing pressure in other fishing areas. Colautti *et al.* 2010 at 351.[30]

Citing other researchers, Colautti *et al.* further concluded: "*M. schmitti* is extensively exploited by commercial and artisanal fisheries along this coast-line (Chiaramonte, 1998; Miranda and Vooren, 2003; Paesch and Domingo, 2003) and especially within latitudes from 36◦ to 41◦S (Massa et al., 2004a), where the species represents the most highly targeted shark by artisanal gill net fishermen (Chiaramonte, 1998). *M. schmitti* is also captured during bottom trawling for other species through multifleet fishing and, as such, comprises up to 20% of that fishery's coastal harvest (Massa et al., 2004a,b; Fernández Aráoz et al., 2009)." Colautti *et al.* 2010 at 351.

Other significant findings of Colautti *et al.* 2010, again citing earlier researchers, include: "[t]he El Rincón area in the southwest Buenos Aires province is of particular significance because extensive coastal commercial fishing has developed there (Massa et al., 2004a) and because this region has also been identified as a main nursery site for this species (Cousseau, 1986; Cousseau et al., 1998). Colautti et al. 2010 at 351.

"This fishery uses bottom gill nets exclusively, which, unlike trawling, minimizes the impact on benthic sediments and organisms. Thus, this fishing pressure is exerted only on a narrow segment of the population (mostly 60–70 cm) as a result of gill net selectivity. This size range exceeds the TL50, therefore avoiding juveniles and retaining fewer than 40% of individuals that are mating for the first time. In other words, more than half of the individuals recruited to the fishery have the chance to reproduce at least once. The use of specific gill net mesh sizes also minimizes bycatch, promoting a highly monospecific fishery." Colautti *et al.* 2010 at 355.

"Fishing records from the Buenos Aires coastal ecosystems show that the El Rincón area indicate the highest catches. This feature is consistent with the distribution of smooth-hound densities, which are highest in the southern part of the El Rincón zone (Massa et al., 2001) and where *M. schmitti* biomass decreased by 50% between 1994 and 2003 (Massa et al., 2001, 2004c). Additional evidence of resource deterioration was found by Massa and Hozbor (2003), who noted that the CPUE for *M. schmitti* associated with large vessels (>20 m in length) operating in deeper waters decreased and that the mean length of the smooth-hounds retained declined from 59 cm in 1994 to 55 cm in 1999. Because this latter value is smaller than the TL50, conducting this fishery in deep waters can be considered unsustainable." Colautti et al. 2010 at 356.

"As stated above, however, this situation has not been observed in Anegada Bay, though the captures there represent an average of only 2% of the total Argentinean landings. Moreover, the fishing effort in the bay can be considered as only moderate because the selectivity of the gear used prevents the capture of juveniles along with an acceptable proportion of pre- and young adults. In contrast, in the El Rincón area outside of Anegada Bay and in the La Plata-estuary maritime front, *M. schmitti* is captured even before the onset of maturity, and the catch is composed of a high proportion of juveniles (Cousseau et al., 1998; Massa et al., 2001; Pereyra et al., 2008). The capture of high numbers of young adult or preadult sizes through high fishing effort, in combination with nonselective gear leads not only to overfishing on young sharks, but also favors a loss of genetic diversity by preferentially capturing those individuals exhibiting the highest growth rates." Colautti et al. 2010 at 356.

[30] The entire article, Colautti *et al.* 2010 is provided as an attachment to these comments. Some of its more significant findings are highlighted below.

"Because fishing in Anegada Bay shows a strong seasonal pattern, unlike in the deeper El Rincón areas, where fishing takes place during the entire year, different sustainability-management guidelines should be applied in the bay. Upon consideration of the seasonal characteristics of the fishing there and given the sustainable nature and the regional importance of artisanal fishing in this bay, in addition to the minimal impact that the captures have on the overall status of this species nationwide, the conservation measures imposed in recent years would seem to be poorly justified." Colautti *et al.* 2010 at 356.

"The typical life history characteristics of sharks, i.e., slow growth, low fecundity, and late maturity, make these species highly vulnerable to overfishing (Hoenig and Gruber, 1990; Frisk et al., 2005). Thus, future research on shark management should be directed at a better understanding of critical population issues, such as migratory patterns, density-dependent regulations, and stock-recruitment relationships, as well as with considerations of gear selectivity to predict population responses to variable fishing efforts (Walker, 1998). For *M. antarticus*, a species that can be considered highly productive, Walker (1998) proposed that up to 15% of its equilibrium biomass can be harvested sustainably. Although no similar analyses have been conducted for *M. schmitti*, Cortés (personal communication) has suggested that the minimum capture size in the Buenos Aires province shelf region should be longer than a TL of 75cm for the fishery to be sustainable. This size likely corresponds to 5-year-old adults entering Anegada Bay to give birth for the second time and to mate for the third time. Individuals larger than that length, however, do not appear to be dominant in Anegada Bay, as shown by both artisanal records and experimental fishing. As noted by Walker (1994), gill net fishing might represent an artificial selection mechanism that could modify population structure and growth performance either positively or negatively depending on how species vulnerability is regulated in accordance with body length through gear selectivity. Because the litter size of *M. schmitti* appears to be linearly related to the pregnant female's length (Oddone et al., 2005), the largest individuals should be protected by implementation of regulations related to appropriate gear." Colautti et al. 2010 at 356.

"Taking into account the fact that M. schmitti populations exhibit complex reproductive behaviors associated with migratory patterns between shallow and deep coastal grounds, regulatory models should encompass the overall El Rincón area to allow a recovery of currently overfished zones and to protect the still-healthy segments of the smooth-hound stocks that support artisanal fishing in Anegada Bay and other regions like it." Colautti *et al.* 2010 at 356.

Disease or predation

Researchers have investigated the parasitic copepod fauna of 182 specimens of *Mustelus schmitti* from the coast of Mar del Plata, Argentina. Three species of parasitic copepods were identified: *Nessipus orientalis* from the buccal cavity, *Perissopus oblongus* from the edge of pectoral, pelvic, dorsal, anal and caudal fins and in claspers, and *Lernaeopoda galei* from the base of the pectoral fins. *N. orientalis* was most common being present the entire year, while *P. oblongus* and *L. galei* occurred seasonally with low prevalence and mean intensity. Ivanov 2002 at 1.

Three species of *Calliobothrium* inhabit the spiral intestine of *Mustelus schmitti* in Argentina and Uruguay. Ivanov & Brooks 2002 at 1200.

In their revision of the small-bodied, nonlaciniate species of *Calliobothrium*, Nasin et al. (1997) discussed the specificity of *Calliobothrium* spp. for a single host and predicted that each species of

Mustelus would host at least 1 endemic species of *Calliobothrium*. Ivanov & Brooks (2002) corroborates this prediction and is consistent with the concept of oioxenous specificity described by Euzet and Combes (1980). *Mustelus schmitti* has its own species of *Calliobothrium* (*C. australis*, *C. barbarae*, and *C. lunae*) different from other species of *Mustelus*. Ivanov & Brooks at 1211.

Inadequacy of existing regulatory mechanisms

As mentioned above in discussing the threat of overutilization to *Mustelus schmitti*, Colautti *et al.* 2010 indicates that artisanal fishing within Anegada Bay may be somewhat adequately regulated. However, this area accounts for only 2% of the harvest. Conversely, in other areas, notably the important El Rincon area fishing is unsustainably managed as nonselective gear is leading to overfishing of young sharks. Colautti *et al.* 2010 at 356.

Other natural or manmade factors affecting its continued existence

Mustelus schmitti is not a very fecund species with an annual reproductive cycle and gestation lasting 11-12 months. Pereyra et al. 2010 at 468. This limits the species' recruitment rate and makes them more susceptible to collapse from fishing pressure. *Id.* Pereyra *et al.* 2010 conclude the low genetic diversity and little evidence of migration between study sites found in their study raises concern over the conservation status of this highly exploited species. *Id.* at 472

***SQUATINA ACULEATA* (SAWBACK ANGEL SHARK)**

In its 90-day finding, NMFS combined its discussion of three species of Angel sharks, *Squatina aculeate* (Sawback Angel Shark), *Squatina oculata* (Smoothback Angel Shark), and *Squatina squatina* (Angel Shark). 78 Fed. Reg. 69385. NMFS apparently chose to treat these three species together because they "have similar ranges and are found in coastal and outer continental shelf sediment habitats in the Mediterranean Sea and eastern Atlantic." *Id.* Accordingly, information presented on each of the three species below should be considered potentially applicable to all three species and is incorporated into the discussion of each species by reference.

Population Trends

This species used to be common over large areas of its habitat in the Mediterranean Sea and the eastern Atlantic. IUCN (Squatina aculeata) 2012 at 3. However, it has been subjected to extensive bycatch from birth onwards in the demersal fisheries throughout most of its range and habitat. *Id.* Declines in the North Tyrrhenian Sea appear to have begun in the early 1900s with the beginning of trawling activity in its habitat. *Id.* at 4. In this area, catches decreased from an average of 134 specimens from 1895-1905 to a mere 15 specimens from 1914-1922. *Id.* This dramatic decline in abundance appears to have continued throughout the species' range over the past 50 years with apparent extirpations from large areas of the northern Mediterranean and portions of its habitat on the West African coast. *Id.* at 3-4. For instance, off the Balearic Islands, angel sharks, that presumably included *Squatina aculeata* judging by the depth and substratum on which the relevant fishery operates, were frequent in the 1970s, decreased in the 1980s, and completely disappeared by the mid-1990s. *Id.* at 4-5. Aggregated decline information for *Squatina aculeata* and other related species caught off of Morocco and Mauritania indicate a 95% decline in CPUE from 1990-1998. *Id.* at 4. Even more concerning are the very few sightings since that time, with no sightings at all since 2002. *Id.* A 1985-1998 survey of the Mediterranean did not capture any *Squatina aculeata* specimens in

9,281 hauls, and another scan of the Mediterranean stretching from West Morocco to the Aegean Sea only found one specimen in 9,095 hauls. *Id.* at 5. This makes it clear that *Squatina aculeata* is now absent from nearly the entire Mediterranean coastline. *Id.* Ferretti et al. (2005) performed a detailed study of only a small portion of the Mediterranean Sea, but indicated they expected their results to be consistent and capable of extrapolation across the area. Ferretti et al. (2005) at 1 (abstract). These authors indicated "[w]e believe the magnitude of depletion of [the] elasmobranch community in the whole Mediterranean region [to] be largely underestimated and require an immediate large scale reassessment to prevent multiple cases of local extinction." *Id.* Specifically, with respect to angel sharks Ferretti et al. found: "The two species of angel sharks (*Squatina squatina* and *Squatina aculeata*) displayed the steepest negative rate of change by declining till extirpation." *Id.* at 7. *See also id.* at 9 ("The entire genus *Squatina* disappeared from the area about in the early 70's."). A more recent study, Ragonese et al, (2013) examining the abundance of demersal sharks from 1994-2009 in the central Mediterranean Sea found a "possible risk of local extinction" for all *Squatina* species. Recent studies also indicate the species is "very rare" off the coast of Tunisia and it has decreased from being "common" off the West African coast to having now "almost disappeared, now occurring very rarely." *Id.* The species is now considered very rare in the eastern Mediterranean and absent in the Black Sea. *Id.* Furthermore, although the species was recently discovered in the Aegean Sea and off Turkey[31], it appears to be rare there and to have already suffered observed declines in the short time since its discovery. *See* Damalas & Vassilopoulou 2010 at 485. These declines and extirpations are especially problematic for this species as "[a] low rate of exchange between *Squatina* populations makes them prone to local depletion and means that recolonisation will be extremely low." IUCN (Squatina aculeata) 2012 at 6.

Threats to *Squatina aculeata*

Overutilization for commercial, recreational, scientific, or educational purposes

As discussed above concerning the species' population trends, *Squatina aculeata* was recently found for first time in the Hellenic waters of the SE Aegean Sea. *See generally* Corsini & Zava 2007; Damalas & Vassilopoulou 2010. However, in an article exploring the declining trend in species richness in the Aegean Sea, the authors noted that "[t]he bottom trawl fishery [occurring in the Aegean Sea] represents some 20% of the total marine production in Greece with almost 45% of the catch being usually discarded at sea." Damalas & Vassilopoulou 2010 at 485. This study was based on trawl surveys occurring between 1995-2006 where only three *Squatina aculeata* individuals were caught in total and where the species was absent during the last four years of trawling. *Id.* at 485. This study determined that "species richness was reducing by an average of 1.83 species per year [in the Aegean], during the study period." *Id.* at 485. These losses are attributable to "a series of reasons [including those] associated to fishing impact on particular vulnerable species and habitats…" *Id.* at 485 (citations omitted). In fact, catches in the mid '00s were two to three times lower than in the mid '90s. Damalas & Vassilopoulou 2009 at 935. Captures of *Squatina aculeata*, even when discarded alive, may still have an important impact on the species as the uterine-cloacal chamber housing embryos at certain stages of development appears to make the species susceptible to abortion on capture. Capapé et al. 2005 at 154. This means that captured gravid females, even if released in time

[31] *See also* Basusta (2001) (Occurrence of a Sawback Angelshark off the Eastern Mediterranean Coast of Turkey); Corzini & Zava (2007) (Recent capture of *Squatina oculata* and *Squatina aculeata* from Dodecanese Islands); and Filiz et al., (2005) (Occurrence of *Squatina aculeate* from the Aegean Sea, Turkey).

to avoid their own fatality, may abort their young, thereby greatly reducing their fecundity. While this tendency to abort before release is distressing, it appears that the species is in fact marketed as opposed to discarded in the majority of cases. Damalas & Vassilopoulou 2009 at 938 (showing that the species was marketed in all but one case where a small individual was released, though the status of this individual on release – dead or alive – is not clear).

Table 1: *Contribution of chondrichthyan fish in the total catch of the bottom trawl fishery in the Aegean Sea during 1995-2006.*

% of catch	Year									
	1995	1996	1997	1998	1999	2000	2003	2004	2005	2006
in weight	13.80	10.05	13.70	17.45	17.83	15.41	17.88	5.04	7.45	6.40
in numbers	2.43	0.76	1.58	3.21	1.98	2.17	2.28	1.32	0.30	0.45
Season										
	fall			spring			winter			
in weight	11.9			10.7			11.6			
in numbers	1.6			1.0			1.1			
Depth Stratum										
	0-149			150-299			300-450			
in weight	11.2			11.4			12.0			
in numbers	1.0			1.4			3.3			

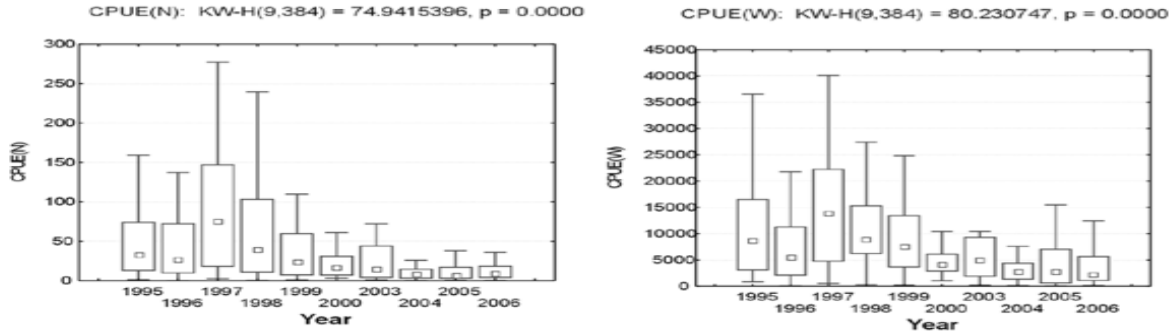


Fig. 2: Fishery dependent annual abundance trends (CPUE in numbers and in weight) *for cartilaginous fish caught in the bottom trawl fishery of the Aegean Sea during 1995-2006.*
(Upper and lower brackets: min-max values of CPUE, boxes: 25-75% percentiles, point: median).

These charts show the large contribution of chondrichthyan fish in the total catch of the Aegean bottom trawl fishery and the extreme declines these species have experienced in terms of percentage of catch and CPUE
Source: Damalas & Vassilopoulou 2009 at 937.

Other natural or manmade factors affecting its continued existence

While the losses in the Aegean Sea are largely tied to overfishing, "climate change causing the 'tropicalization' of Eastern Mediterranean which exacerbate[s] biodiversity loss," has also been identified as a source of declining biodiversity in this area. Damalas & Vassilopoulou 2010 at 485 (citations omitted). Therefore, climate change is also a threat to *Squatina aculeata's* continued existence.

The threats that this species faces are also exacerbated by its limiting life history characteristics. For instance, "[s]tudies suggest that the gestation period for *Squatina aculeata* likely lasts at least one year with a biannual reproductive cycle being probable." Capapé et al. 2005 at 153-54. "*S. aculeata* litter-sizes ranged from 8 to 12 with an average of 11.1. This low fecundity points out that, as other elasmobranch[] species, the sawback angelshark is not prolific, and its biannual reproductive cycle furthermore involves poor recruitment. Moreover, tagging experiments made in the Tunisian waters

showed that *Squatina spp.* are not prone to large movements…" *See id.* at 154-55. These factors limit the species' ability to recover from losses suffered in its range and make recolonization of areas from which the species has been extirpated less likely. Therefore, in conjunction with the extensive threats that this species faces and its resultant population losses, these limiting life history characteristics represent an additional threat to the species.

SQUATINA OCULATA (SMOOTHBACK ANGEL SHARK)

Population Trends

Formerly common in its Mediterranean and eastern Atlantic habitat, this species has declined dramatically in the last 50 years. *See* IUCN (Squatina oculata) 2012 at 3. It has now apparently been extirpated from large areas of the northern Mediterranean, parts of the West African coast, and "is now extremely uncommon throughout most of the remainder of its range." *Id.* This species was reported as common along the West African coasts in the 1970s and 1980s, however, CPUE data from off the coast of Morocco and Mauritania shows a 95% decline in the species from 1990-1998 with a complete cessation of sightings since 2002. *Id.* This CPUE data is backed up by personal accounts stating that the species has almost disappeared and is now very rare. *Id.* at 5. The species also experienced massive declines between 1898 and 1922 in the Northern Tyrrhenian Sea where catches decreased from 134 specimens to 15 with the beginning of trawling activity in the area. *Id.* Catches around the Balearic Islands were relatively common in the 1970s, decreased in the 1980s, and completely ceased in the mid-1990s despite surveys. *Id.* 9,281 research hauls in the Mediterranean between 1985-1998 did not find any *Squatina oculata* and neither did a north Mediterranean survey consisting of 9,095 hauls. *Id.* This indicates that the species is now extirpated from most, if not all, of the north Mediterranean coastline. *Id. See also* Ferretti et al. (2005) at 9 ("The entire genus *Squatina* disappeared from the area about in the early 70's."). A more recent study, Ragonese et al, (2013) examining the abundance of demersal sharks from 1994-2009 in the central Mediterranean Sea found a "possible risk of local extinction" for all *Squatina* species. *Squatina oculata* is considered to be very rare off Tunisia. IUCN (Squatina oculata) 2012 at 5. A recent Southern Portugal survey failed to identify any specimens, however the species is present in the country's fishing statistics, which show a clear decline over the past 20 years. *Id.* Additionally, while the species was recently located for the first time in the Aegean Sea, this single specimen was the only one found throughout the entirety of an extensive survey of the area taking place from 1995-2006. *See* Damalas & Vassilopoulou 2009 at 938; Corsini & Zava 2007 at 352-53.

Threats to *Squatina oculata*

Overutilization for commercial, recreational, scientific, or educational purposes

In an article examining the declining trend in species richness in the Aegean Sea, the authors noted that "[t]he bottom trawl fishery [occurring in the Aegean Sea] represents some 20% of the total marine production in Greece with almost 45% of the catch being usually discarded at sea." Damalas & Vassilopoulou 2010 at 485. In a study based on trawl surveys occurring between 1995-2006, *Squatina oculata* was absent from the last four years on the survey after having only been found once. *Id.* at 485; Damalas & Vassilopoulou 2010 at 938. The only capture of this species was discarded, however, status on release – alive or dead – is not clear. *See* Damalas & Vassilopoulou 2009 at 938. The authors of this Aegean study determined that "species richness [in the Aegean] was reducing by an average of 1.83 species per years, during the study period." Damalas & Vassilopoulou 2010 at

485. These losses are attributable to "a series of reasons associated to fishing impact on particular vulnerable species and habitats…" *Id.* at 485 (citations omitted). In the Aegean, "[c]atches in the mid '00s was two to three times lower compared to the mid '90's." Damalas & Vassilopoulou 2009 at 935. Therefore, overfishing represents a serious threat to this species in this part of its range as it has throughout this species' range historically.

Table 1: *Contribution of chondrichthyan fish in the total catch of the bottom trawl fishery in the Aegean Sea during 1995-2006.*

% of catch	Year									
	1995	1996	1997	1998	1999	2000	2003	2004	2005	2006
in weight	13.80	10.05	13.70	17.45	17.83	15.41	17.88	5.04	7.45	6.40
in numbers	2.43	0.76	1.58	3.21	1.98	2.17	2.28	1.32	0.30	0.45
Season										
	fall			spring			winter			
in weight	11.9			10.7			11.6			
in numbers	1.6			1.0			1.1			
Depth Stratum										
	0-149			150-299			300-450			
in weight	11.2			11.4			12.0			
in numbers	1.0			1.4			3.3			

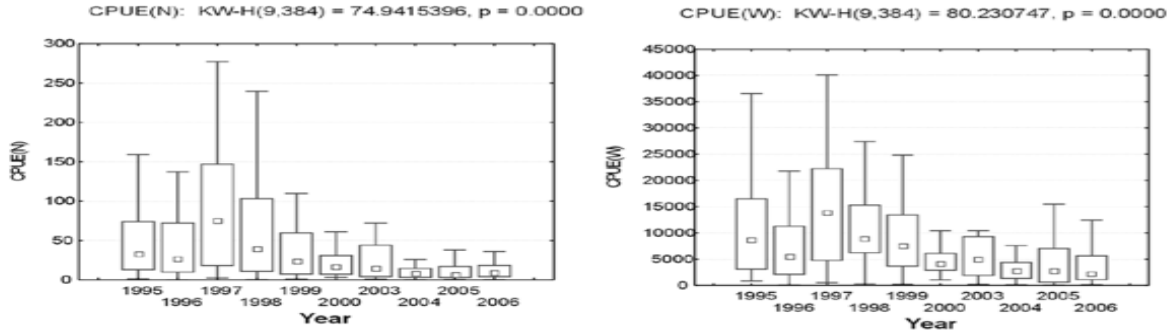


Fig. 2: Fishery dependent annual abundance trends (CPUE in numbers and in weight) *for cartilaginous fish caught in the bottom trawl fishery of the Aegean Sea during 1995-2006.*
(Upper and lower brackets: min-max values of CPUE, boxes: 25-75% percentiles, point: median).

These charts show the large contribution of chondrichthyan fish in the total catch of the Aegean bottom trawl fishery and the extreme declines these species have experienced in terms of percentage of catch and CPUE
Source: Damalas & Vassilopoulou 2009 at 937.

It also appears as if this species' cartilage is powdered and used in chondroitin supplements. *See* Sim *et al.* 2007 at 533 (using this species' cartilage for chondroitin sulfate testing). Global sales of glucosamine supplements, which typically pair glucosamine with chondroitin, reached $2 billion in 2008, marking a 60% increase since 2003, with sales expected to rise to $2.3 billion in 2013. *See* Wandel et al. 2010 at 1. This indicates a rising popularity of these supplements that will require additional shark cartilage, which appears to include the cartilage of *Squatina oculata*, to satisfy demand. NMFS should consider the increase in overutilization that may occur to satisfy this projected increase in demand when making its 12-month finding for this species.

Other natural or manmade factors affecting its continued existence

The observed biodiversity losses in the Aegean have also been attributed to "climate change causing the 'tropicalization' of Eastern Mediterranean which exacerbate[s] biodiversity loss." Damalas & Vassilopoulou 2010 at 485 (citations omitted). Therefore, it appears that increased climate change

may drive further losses of this species and result in general declines in species richness in the Aegean which could affect *Squatina oculata's* prey base therein and/or cause other cascading effects that will negatively impact the species.

In addition to these threats, studies suggest that the gestation period for *Squatina oculata* lasts at least one year. *See* Capapé et al. 2005 at 153. Such a long gestation period reduces the species' fecundity and makes it harder for the species to repopulate after suffering losses. Therefore, this factor will negatively impact the species' recovery and will make it more susceptible to the aforementioned threats.

***SQUATINA SQUATINA* (ANGEL SHARK)**

Population Trends

This species was formerly common over large areas of its Northeast Atlantic, Mediterranean, and Black Sea habitat. IUCN (Squatina squatina) 2012 at 4. However, its abundance has declined dramatically over the last 50 years. *Id.* It has been declared extinct in the North Sea and has also seemingly been extirpated from large areas of the northern Mediterranean. *Id.* "It is now extremely uncommon throughout most of the remainder of its [confirmed] range…" *Id.* Steep declines have also been recorded in UK coastal waters, the French Coast, and Cendero. *Id.* Surveys in Cardigan Bay recorded low numbers of the species in the 1980s, but have only reported one individual in the last 15 years. *Id.* at 5. The population is becomingly increasingly fragmented and rare, though it may be somewhat less rare off the coast of North Africa. *Id.* The species also experienced massive declines between 1898 and 1922 in the Northern Tyrrhenian Sea where catches decreased from 134 specimens to 15 with the beginning of trawling activity in the area. *Id.* Catches around the Balearic Islands were relatively common in the 1970s, decreased in the 1980s, and completely ceased in the mid-1990s despite surveys. *Id.* 9,095 research hauls in the Mediterranean between 1995-1999 yielded only two *Squatina squatina* specimens, indicating about 1,400 individuals throughout the entire survey area. *Id.* Another Mediterranean study in which 9,281 trawls were utilized reported the species in only .41% of all hauls. *Id.* This indicates that the species is now extirpated from most of the Mediterranean coastline. *Id. See also* Ferretti *et al.* (2005) at 9 ("The entire genus Squatina disappeared from the area about in the early 70's."). A more recent study, Ragonese *et al*, (2013) examining the abundance of demersal sharks from 1994-2009 in the central Mediterranean Sea found a "possible risk of local extinction" for all *Squatina* species. The species has also likely been extirpated in the Adriatic Sea and corrected landing records in the Northeast Atlantic indicate a decline from 15-20 tons in the 1980s to a mere 1-2 tons in the 1990s with the last reported landing in 1998. IUCN (Squatina squatina) 2012 at 4. This indicates a huge decline, and possible extirpation, in this area as well. *Id.* Furthermore, "[s]ome commercial catch records of Angel sharks since 1990 are considered to be other species, misreported." OSPAR 2010 at 8 (citation omitted). Therefore, recent declines may be even more serious than have been reported.

Threats to *Squatina squatina*

Other natural or manmade factors affecting its continued existence

Squatina squatina are very sensitive biologically with a very low resistance and very low resilience. OSPAR 2010 at 6. "*S. squatina* reach maturity at a large size and likely several years old, give birth to a relatively small number of large pups after a long gestation and have a low intrinsic rate of

population increase. They are therefore very slow to recover from depletion. Their large size and morphology also make Angel sharks highly vulnerable to bycatch in trawl and net fisheries from birth." OSPAR 2010 at 6. With a reproductive cycle lasting two years and the aforementioned threats, *Squatina squatina* will have great difficulty recovering from the extreme population declines that it has experienced throughout most, if not all, of its range. *See* Colonello et al. 2006 at 138. Accordingly, this species clearly seems to warrant ESA listing.

***SQUATINA ARGENTINA* (ARGENTINE ANGEL SHARK)**

In its 90-day finding, NMFS combined its discussion of three additional Angel sharks, *Squatina argentina* (Argentine Angel Shark), *Squatina punctata* (Angular Angel Shark), and *Squatina Guggenheim* (Spiny Angel Shark). 78 Fed. Reg. 69386. NMFS apparently chose to treat these three species together because they "are endemic to the southwest Atlantic." *Id.* NMFS further concludes that some sources "symomymize *S. punctata* with *S. guggenheim*." *Id.* at 69387. On this basis NMFS finds the Petition failed to present substantial evidence that *Squatina punctata* is a taxonomically valid species for listing. *Id.* It is unnecessary to quarrel with this conclusion, and it does appear that *Squatina punctata* is now considered a synonymy of *Squatina guggenheim*. *See* Vaz *et al.* Morphological and Taxonomic Revision of Species of *Squatina* from the Southwestern Atlantic Ocean, available at http://biotaxa.org/Zootaxa/article/view/zootaxa.3695.1.1
Accordingly, Defenders and Guardians will discuss only their support for the listing of *Squatina argentina* and *Squatina guggenheim* below. However, all information previously presented in the Petition in support of the listing of *Squatina punctata* should now be considered to support the listing of *Squatina guggenheim* and is incorporated herein by reference. Additionally, all scientific articles that refer to *Squatina punctata* or the Angular Angel Shark should now be considered as referring to *Squatina guggenheim* during NMFS's status review. Finally, as NMFS considers *Squatina agrentina* and *Squatina guggenheim* together, information presented on either species should be considered potentially applicable to the other and is incorporated into the discussion of each species by reference.

Population Trends

"*Squatina argentina* is endemic to the Southwest Atlantic from Rio Grande do Sul, southern Brazil (32°S) through Uruguay to northern Patagonia, Argentina (43°S)…" IUCN (Squatina aculeata) 2012 at 4. Significant declines of angel sharks in south Brazil have been documented as a result of heavy fishing in the area. *Id.* "Annual catches of angel shark from the southern Brazil continental shelf peaked at about 2,000 t in 1986 to 1989 and again in 1993, and then decreased to 900 t in 2003. Angel shark CPUE by otter and pair trawl on the continental shelf decreased by about 85% from 1984 to 2002. Research trawl surveys of the outer shelf in the years 1986/87 and 2001/02 confirmed that in southern Brazil the abundance of *S. argentina* has decreased to 15% of its original level…" *Id.* Declines off of Uruguay and Argentina are less clear, though the species is now uncommon in these waters. *See id. Squatina argentina* is now the least abundant of the three angel shark species caught off of Rio Grande do Sul State, Brazil. *Id. at 5*. "A low rate of dispersal between angel shark populations makes them especially prone to local depletion and means that recolonisation will be extremely low." *Id.* "At present there is no evidence of the existence of abundant populations of the species outside southern Brazil." *Id.* at 6.

Threats to *Squatina argentina*

Overutilization for commercial, recreational, scientific, or educational purposes

By-catch (and retention as a secondary target species) is a significant threat to *Squatina argentina*. According to Perez & Wahrlich (2004), who performed a bycatch assessment of the gillnet monkfish fishery off southern Brazil, "[c]atches of … angel sharks(*Squatina argentina*) [in the monkfish gillnet fishery] … were … significant. […] [T]he unintended mortality exerted by monkfish gillnets may produce a significant impact on [*Squatina argentina*] sustainability because [this species] (a) tend[s] to be highly susceptible to capture by such fishing gear and (b) exhibit[s] a limited ability to recover [from] depletion." Perez & Wahrlich (2004) at 20 (internal citations omitted).

Perez & Wahrlich (2004) also states that *Squatina argentina* has been commonly found year round off Rio Grande do Sul State but is the less abundant of the three angel shark species captured by the fishing practices conducted in the region. "The numerous incidental catch produced by monkfish gillnetting in 2001 (8698 individuals) suggests that the development of this fishery off southern Brazil may not only generate a substantial increase in population mortality, but also introduce adverse effects in the recruitment process, considering that the species reproductive cycle may exceed one year. In fact, in the other angel shark species occurring off southern Brazil (*S. guggenhein* and *S. oculta*) a 3-year reproductive cycle has been estimated and recruitment overfishing has been diagnosed for all of them." Perez & Wahrlich (2004) at 21-22 (internal citations omitted). Perez & Wahrlich (2004) concludes that if *Squatina argentina* are to continue to be captured as a bycatch species in the developing monkfish fishery "limitation of fishing effort at the southernmost slope grounds of [the] Brazilian EEZ" should be considered. Perez & Wahrlich (2004) at 22. A later study by Perez *et al.* (2009), Deep-water fisheries in Brazil: History, Status and Perspectives, continues to identify *Squatina argentina* as a secondary target-species in several fisheries. Perez *et al.* (2009) at 522.

Squatina argentina is also threatened by bycatch in the Patagonian portion of its range. A 1998 study by Van Der Molen *et al.*, By-catch of Sharks in Patagonian Coastal Trawl Fisheries, states in its abstract that Squatina argentina as commonly caught in by-catch in the north of Patagonia and concludes "[a]lthough undesirable, the by-catch of sharks is growing as a result of the increase in the fishing activities of the region, and the sustainability of shark populations in Patagonian coasts is a matter of concern." Van Der Molen *et al.* (1998), available at http://www.publish.csiro.au/paper/MF98005

Another more recent study by Cedrola et al. (2012), Bycatch of Sharks in the Patagonian Red Shrimp Fishery, also identifies *Squatina argentina* caught as bycatch in this fishery, although very few individuals have been caught at all in recent years. *See* Cedrola et al. (2012).

Inadequacy of existing regulatory mechanisms

Several of the articles discussed above express concern that the bycatch or secondary targeting of *Squatina argentina* is inadequately regulated to preserve the species. Perez & Wahrlich (2004) concludes that if *Squatina argentina* are to continue to be captured as a bycatch species in the developing monkfish fishery "limitation of fishing effort at the southernmost slope grounds of [the] Brazilian EEZ" should be considered. Perez & Wahrlich (2004) at 22. There is no evidence that such protective measures have been implemented. *See also* Van Der Molen et al. (1998), available at http://www.publish.csiro.au/paper/MF98005 ("Although undesirable, the by-catch of sharks is

growing as a result of the increase in the fishing activities of the region, and the sustainability of shark populations in Patagonian coasts is a matter of concern.").

Other natural or manmade factors affecting its continued existence

Additionally, several of the above articles indicate that the biological characteristics and slow reproduction of *Squatina argentina* make it highly vulnerable to fishing pressure and impede its potential recovery from overfishing. *Squatina argentina* "(a) tend[s] to be highly susceptible to capture by such fishing gear and (b) exhibit[s] a limited ability to recover [from] depletion." Perez & Wahrlich (2004) at 20 (internal citations omitted). "[C]onsidering that the [*Squatina argentina*] reproductive cycle may exceed one year …[and that] … in the other angel shark species occurring off southern Brazil (*S. guggenhein* and *S. oculta*) a 3-year reproductive cycle has been estimated … recruitment overfishing has been diagnosed for all of them." Perez & Wahrlich (2004) at 21-22 (internal citations omitted).

***SQUATINA GUGGENHEIM* (SPINY OR ANGULAR ANGEL SHARK)**

Population Trends

"Squatina guggenheim is endemic to the Southwest Atlantic from Rio de Janeiro, Brazil (24°S) through Uruguay to northern Patagonia, Argentina (43°S)…" IUCN (Squatina guggenheim) 2012 at 4. Between 1986-1987 and 2001-2002 the abundance of the species in southern Brazil decreased by 85%. *Id.* Argentina has also experienced a decline in landing since a peak in 1998. *Id.* Because the species range is probably composed of isolated local populations, they are especially vulnerable to local extirpations from overfishing. *Id.* at 5. Argentina has also experienced an overall decline in the species with a 58% decline in CPUEin the coastal bottom trawl fleet. *Id.* at 6.

Threats to *Squatina guggenheim*

Other natural or manmade factors affecting its continued existence

Temperature and salinity have been shown to significantly influence the spatial distribution of both male and female *Squatina guggenheim* specimens. *See* Vögler et al. 2007 at 220. Accordingly, during its status review, NMFS should consider how climate change may affect *Squatina guggenheim's* habitat in a way that may interfere with the species' breeding, feeding, and other habits and that may force the species to move into suboptimal habitat.

Squatina guggenheim's gestation lasts for about 12 months with a 2 year period before gestation begins. *See* Colonello *et al.* 2006 at 135, 138. This means that the species only gives birth once every three years. *Id.* at 138. "Cycles three years long have been observed in just four other sharks…" *Id.* at 138. This life history pattern likely evolved because of corresponding high longevity of the species, which has been measured as at least 35 years in the related *Squatina californica*. *Id.* at 138. However, with unsustainable numbers being removed from the population, this means that those individuals are replaced very slowly. Fecundity appears to be between 2-8 embryos per female. Colonello *et al.* 2006 at 135.

Colonello *et al.* (2006) conclude: "A reproductive cycle of 3 y[ears] translates into a mean annual fecundity of only 0.67 – 2.33. This extremely low fecundity may result in a population with low

productivity), and could be the cause of the steep decline (85% in 12 y[ears]) in abundance of *S. guggenheim* caused by fisheries of the southwest Atlantic. The pattern might be common to other angel sharks, because other species have suffered great declines in many regions.

It is clear that populations of *S. guggenheim* and other angel sharks must be monitored closely, and that the level of human-induced mortality needs to be kept very low in order to avoid further decline and to conserve the species." Colonello *et al.* 2006 at 139 (internal citations omitted).

ADDITIONAL COMMENTS ON NMFS' NEGATIVE 90-DAY FINDINGS

NMFS does not request comment on its negative 90-day findings. 78 Fed. Reg. 69390. However, Guardians and Defenders nonetheless offer the following general and specific comments on NMFS' negative 90-day findings in an effort to avoid potential litigation by giving the Agency an opportunity to change its mind. As stated at the outset, if Guardians or Defenders elects to seek judicial review of any of the negative 90-day findings in NMFS's current decision, a separate formal written notice of intent to sue will be provided to the extent required by law. *See* 16 U.S.C. § 1540(g). Here we merely comment that, as a general matter, NMFS's negative 90-day findings appear to be arbitrary and capricious and in violation of the ESA.

First, NMFS improperly required the Petition to provide information that in many cases may not exist. The ESA requires that listing decisions be based on the "best available" science. This does not mean the best possible science. NMFS criticized the Petition generally for not including population trend information and specific evidence that threats to the species were influencing their numbers. *See, e.g.*, 78 Fed. Reg. 69380 ("While the information in this introductory section is otherwise largely accurate and suggests concern for the status of sharks in general, the broad statements and generalizations of threats for all petitioned shark species and subpopulations do not constitute substantial information that listing may be warranted for any of the petitioned species or subpopulations."). Unfortunately, such information is often unavailable for rare species, particularly for species with remote and rarely studied habitats.

NMFS cannot hide behind the fact that studies it would like to see have not been conducted. Whether or not a study on population trends or specific threats to a rare species exists has no bearing on whether or not the best available science indicates the species is endangered or threatened. The IUCN, a scientifically rigorous organization that makes its determinations based on the best available science, deems all of these species critically endangered or endangered based on the best available information. If NMFS does not feel that it can take the time or lacks data to either confirm or deny the findings of endangerment made by the IUCN, then it should accept those findings. A petitioner cannot provide studies that do not exist and NMFS cannot require them. It is NMFS' responsibility to make a determination as to endangerment based on the best **available** scientific and commercial data, it is not allowed to avoid making a determination because information it believes helpful to the decision-making process does not exist.

Because the Petition's introductory materials, in combination with the individual species accounts, at the very least provide substantial information that listing "may" be warranted, NMFS' negative endangerment findings are incorrect. A Petition is not required to prove beyond a doubt that the species should be listed; it need merely "convince a reasonable person" that listing "may" be warranted. If NMFS does not believe the IUCN is comprised of "reasonable people," NMFS should provide evidence indicating that the IUCN's determinations of endangerment for the petitioned

species are in error.

Second, NMFS acted arbitrarily and capriciously in how it determined whether a species is extinct. NMFS made negative 90-day findings for *Hemitriakis leucoperiptera* and *Holohalaelurus favus* because it stated that they "may" no longer be found in the wild. *See* 78 Fed. Reg. 69382. The ESA is designed to prevent species extinction; therefore, if there is doubt as to whether the species is in fact extinct, that doubt should be extinguished before listing is denied. The benefit of the doubt should always be in the species' favor. After all, if the species is so close to extinction that NMFS cannot determine whether it still exists, then if it were found to exist, its endangerment would likely be extreme. NMFS does not explain why it made these determinations and seems to be proceeding with no standard for determining extinction at all. NMFS is required to protect species from extinction through ESA listing and, without some standardized way to determine extinction that is both scientifically defensible and provides reasonable assurances of protection to endangered species, the Agency is failing to adequately provide for the most imperiled species under its jurisdiction. NMFS' current, random approach to determining species extinction is arbitrary and capricious.

Third, NMFS discounts the importance of considering a species' rarity in determining whether it is endangered or threatened within the meaning of the ESA. *See, e.g.*, 68 Fed. Reg. 69381 ("As mentioned previously, rarity does not necessarily mean that a species is threatened or in danger of extinction."). The Petition did not state that any species' rarity alone justifies listing. However, the Petition does maintain that a species' rarity shows an increased susceptibility to extinction from the loss of individuals and means that it is less likely that there is a robust body of scientific information for the species. To determine otherwise is to de facto deny listing to any sufficiently rare species.

By way of example, some additional specific criticisms and objections to several of NMFS' negative 90-day findings for some of the species at issue are provided below. Again, Guardians and Defenders encourage NMFS to reconsider its negative 90-day findings.

Carcharhinus borneensis

NMFS found that *Carcharhinus borneensis* was not threatened with extinction largely because fishing records did not indicate a declining population and because it constituted 9% of shark landings in one small area off the coast of Borneo. *See* 78 Fed. Reg. 69380. Being "common," as NMFS claims, in this small area is not equivalent to being a common species. After all, the last remaining specimen of a species would be common in whatever small area that traced its movements. Furthermore, evidence that this species makes up 9% of shark landings in this one area does not necessarily make it common depending on frequency of overall shark landings. While fishing records in Borneo may not be sufficient to show decline in the species' numbers, there is no evidence offered as to the accuracy, or even existence, of such records. This type of reasoning shows NMFS willingness to rely on less than certain science and draw conclusions from lack of information when it can do so to the detriment of a species. Finally, NMFS cites some fishing gear, methods, and area restrictions present in Malaysia as being sufficient regulatory mechanisms to protect the species. *Id.* However, there is no information on whether the areas covered by these restrictions overlap with *Carcharhinus borneensis'* range and whether any of these restrictions are subject to adequate, or indeed any, enforcement to ensure their efficacy. Vague, generalized references to regulatory mechanisms that may have no actual beneficial effect for petitioned species is insufficient to show that regulatory mechanisms are, in fact, adequate to protect the species.

Haploblepharus kistnasamyi

NMFS begins by acknowledging that *Haploblepharus kistnasamyi* is a rare species known from only three specimens, likely endemic to a small area. *See* 78 Fed. Reg. 69381. If, as NMFS contends, "more sampling and data [are needed] to understand the species' life history and ecology," then how can NMFS determine that the species is not threatened with extinction? *See id.* at 69382. Because the species is only known from three specimens, NMFS' requirement here that the Petition show the species is responding in a negative fashion to the very clear threats identified in the Petition presents the petitioner with an impossible task. *See id.* How is a petitioner to show any population trends when so few specimens have ever been located? NMFS uses the sighting of several juvenile sharks that may possibly be members of this species as evidence that the species is not endangered. However, it is unclear whether these juveniles are in fact members of the species, how much this new discovery would expand the species' range, what this would imply for population numbers, and whether these areas also face the same threats as the habitat that has already been identified for the species. *See id.* These data deficiencies leave little certainty as to the effect these unidentified juveniles would have on this species' endangerment and require, at the very least, serious consideration by NMFS. Rarity alone may not be a reason to list a species under the ESA, but rarity combined with a restricted range where a variety of serious threats exist does provide a reason to at least undertake the more serious consideration required during a 12-month status review. The negative 90-day finding here represents a failure of NMFS to adequately engage with the science and extinguish uncertainty to protect imperiled species. By requiring the level of proof that it does for making a positive 90-day finding for a species this rare, NMFS ensures that rare and poorly studied species such as *Haploblepharus kistnasamyi* can never be listed.

Hemitriakis leucoperiptera

The Petition for *Hemitriakis leucoperiptera* experiences resistance from NMFS similar to that experienced by that for *Haploblepharus kistnasamyi*. Namely it is denied a positive 90-day finding largely because its rarity prevents anyone from offering the population and life history information NMFS requires. *Id.* However, NMFS also states that, because the species has not been seen in over 50 years, that it is likely extinct. *Id.* However, no information is provided by NMFS on whether there have been surveys looking for the species, whether those surveys have been exhaustive, or whether such a lack of sightings is uncommon for a species that has been seen so infrequently for the entirety of its known existence. Without such information, and some standard under which NMFS judges extinction, this determination is arbitrary, capricious, and in violation of the ESA.

Holohalaelurus favus

NMFS recognizes *Holohalaelurus favus'* limited range, its prevalence in the 1960s and early 1970s, and its lack of sightings since the early 1970s. *Id.* NMFS then discusses a few surveys in this species' area of occurrence that failed to locate the species. *Id.* Based on this incomplete information, and proceeding based on no standard, NMFS determined that the species cannot be listed because it is likely extinct. *Id.* However, NMFS offers no evidence that these surveys were comprehensive throughout the species' likely range and also admits that the species has been collected at least once since 1972. *Id.* NMFS does not state when this collection occurred, but the closer to the present it did occur, the less likely that the species is extinct. Like the extinction determination made for *Hemitriakis leucoperiptera*, NMFS' determination of *Holohalaelurus favus'* extinction is arbitrary, capricious and in violation of the ESA.

Lamiopsis temmincki

NMFS' conclusion that there is no population trend information for *Lamiopsis temmincki* is disingenuous. It states that the species was once common on a portion the west coast of India, but is now found only in low numbers. *Id.* at 69384. NMFS also admits that the species is found only in low numbers throughout its entire range. *Id.* It is unclear what information NMFS thinks is missing. It is clear that the species has declined in abundance where historical information is available and that it is rare throughout its range, indicating likely declines, or at least vulnerable populations, elsewhere. In a seeming attempt to make the species appear more common, NMFS states that it is the 10th most landed shark off of Mukah. *Id.* However, in its negative 90-day finding for *Carcharhinus borneensis*, NMFS states that *Carcharhinus borneensis* is the third most commonly caught shark off of Mukah, but that it only represent 9% of the catch. *Id.* at 69380. NMFS does not state what percentage of the catch *Lamiopsis temmincki* represents, but the information for *Carcharhinus borneensis* (9% of the catch for the third most commonly caught shark) indicates that it must be extremely low (for the 10th most commonly caught shark). NMFS also recognizes that this fish is taken and utilized for a variety of products in India, Pakistan, Sarawak and Kalimantan. *Id.* at 69384. NMFS therefore admits at least some of the threats identified in the Petition, that the only areas where population trend information is available show a significant population decline, and that the species is rare in the rest of its range. To admit this and still make a negative 90-day finding, regardless of how it views the other threat identified by the Petition, is arbitrary, capricious, and in violation of the ESA.

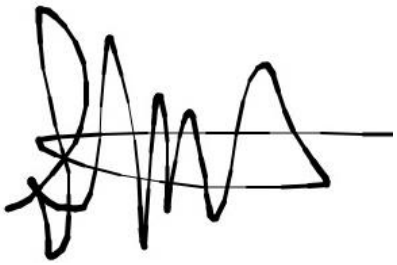
Squatina Formosa

For *Squatina Formosa*, NMFS admits that the species is found in fish markets, that it is hard to identify due to its similarity of appearance to other angel sharks in the region, and that this difficulty of identification is the likely cause of a lack of fishing records for the species (even though its presence in the fish markets indicates that it is certainly being caught). *Id.* at 69388. However, NMFS then criticizes the Petition for not providing "information on catch numbers, population status, or abundance trends for the species." *Id.* NMFS rejects the Petition's use of surrogate data on these threats to make up for the misidentification issues that exist for this species. *Id.* NMFS admits that fishing pressure is intense in this species' habitat, but balks at using the best available science to extrapolate the threat to this species based on that information. *See id.* NMFS' analysis does not lead to the conclusion that this species is not threatened with extinction, rather it leads to the conclusion that NMFS would require studies that do not exist and improvements in fisher-identification of the species which have not occurred. Furthermore, while bottom trawl bans in certain waters would possibly provide some level of protection to the species, it is not clear if they overlap with *Squatina Formosa's* occupied range, that they are enforced, that they provide suitable gear restrictions to prevent catch of *Squatina Formosa*, or that, if they do overlap with *Squatina Formosa's* occupied range, that they do so in a sufficient degree to provide adequate protection. These restrictions therefore may have little, or indeed no, effect on the threats to this species and NMFS' contention otherwise reflects its unwillingness to give these species the benefit of the doubt and actively implement the ESA.

Thank you for this opportunity to comment on the 90-day finding on the Petition to list 19 species and 3 subpopulations of sharks as threatened or endangered species under the ESA. If you have any questions concerning these comments, have difficultly reviewing any of the accompanying scientific

articles, or desire further information on any of the issues raised, please do not hesitate to contact Guardians and Defenders using the contact information in the signature blocks below.

Sincerely,



Stuart Wilcox
Associate Attorney
WildEarth Guardians
1536 Wynkoop Street, Suite 301
Denver, CO 80202
swilcox@wildearthguardians.org
720-331-0385

Senior Staff Attorney
Defenders of Wildlife
6439 E. Maplewood Ave.
Centennial, CO 80111
720-301-3843
Email: jtutchton@defenders.org