A Petition to List the Oceanic Whitetip Shark (*Carcharhinus longimanus*) as an Endangered, or Alternatively as a Threatened, Species Pursuant to the Endangered Species Act and for the Concurrent Designation of Critical Habitat


Oceanic whitetip shark (used with permission from Andy Murch/Elasmodiver.com).

Submitted to the U.S. Secretary of Commerce acting through the National Oceanic and Atmospheric Administration and the National Marine Fisheries Service

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[1] Defenders of Wildlife would like to thank Courtney McVean, a law student at the University of Denver, Sturm college of Law, for her substantial research and work preparing this Petition.

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I. INTRODUCTION

Petitioner, Defenders of Wildlife ("Defenders") is dedicated to the protection of all native animals and plants in their natural communities. With more than 1.2 million members, supporters, and activists, Defenders is a leading advocate for the protection of threatened and endangered species. Defenders' 2013-2023 Strategic Plan identifies sharks as one of several categories of key species whose conservation is a priority for our organization's work.[2]

Through this Petition, Defenders hereby formally requests that the Secretary of Commerce ("Secretary"), acting through the National Marine Fisheries Service ("NMFS"), an agency within the National Oceanic and Atmospheric Administration ("NOAA"), list the oceanic whitetip shark (*Carcharhinus longimanus*) as an "endangered," or alternatively as a "threatened," species under the Endangered Species Act ("ESA"). 16 U.S.C. §§ 1531–44. We request that NMFS list the species throughout its entire range. In the alternative, if NMFS finds that there are distinct population segments ("DPSs") of oceanic whitetips, we request that those DPSs be listed under the ESA. Additionally, because the ESA's definitions of both endangered and threatened species provide for listing species that are threatened or endangered "throughout all or a significant portion of [their] range," Defenders requests that, in reviewing this Petition, NMFS specifically analyze whether the oceanic whitetip is endangered or threatened throughout all or any significant portion of its range. *See* 16 U.S.C. §§ 1532(6), (20).[3] Finally, we request that NMFS designate critical habitat for the species concurrent with listing for those areas within U.S. jurisdiction. *See* 16 U.S.C. § 1533(b)(6)(C); 50 C.F.R. § 424.12. This Petition is submitted pursuant to the ESA, 16 U.S.C. § 1533(b)(3)(A), the ESA's implementing regulations, 50 C.F.R. § 424.14, and the Administrative Procedure Act, 5 U.S.C. § 553(e).

Listing the oceanic whitetip under the ESA would be consistent with the United States' ongoing recognition of threats to the species requiring conservation measures. The United States formally recognized that the oceanic whitetip is being overutilized for commercial purposes when it cosponsored a proposal to list the species under Appendix II of the Convention on International Trade in Endangered Species of Flora and Fauna ("CITES"), first in 2010 and again in 2013 (*see* E-CoP15-Prop-16 at 1-2; E-CoP16-Prop-42 at 1). The United States explained that "[t]he greatest threats to [the oceanic whitetip] worldwide are harvest for the international fin trade and bycatch, which have led to significant declines." (E-CoP16-Prop-42 at 1). Therefore, consistent with, and in furtherance of, the United States' determination that the oceanic whitetip warrants CITES listing, and in recognition of the continued and growing threats to the species, including overutilization causing unsustainable oceanic whitetip population declines, NMFS should list the oceanic whitetip under the ESA.

Defenders anticipates that, in keeping with 50 C.F.R. § 424.14(a), NMFS will acknowledge the receipt of this Petition in writing within 30 days. As fully set forth below, this Petition contains all the information requested in 50 C.F.R. §§ 424.14(b)(2)(i)–(iv) and 16 U.S.C. § 1533(e). All cited

[2] More information on Defenders' work is available on our website, https://www.defenders.org, and Defenders' 2013-2023 Strategic Plan is available at https://www.defenders.org/publications/defenders-strategic-plan-2013-2023.pdf.

[3] Should NMFS determine that oceanic whitetip DPSs do in fact exist and that those DPSs warrant ESA listing, then Defenders requests that NMFS analyze whether those DPSs represent a significant portion of the species' range such that listing of the species as a whole is appropriate.

documents are listed in the References section, electronic copies of these documents accompany this Petition, and pin cites are provided where possible.

II. GOVERNING PROVISIONS OF THE ENDANGERED SPECIES ACT

The ESA 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 . . ." *See* 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. This makes the prompt listing of species that need ESA protection of vital importance to their conservation.

A. Species and Distinct Population Segments

The ESA defines the term "species" to include "any subspecies of fish, wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 U.S.C. § 1532(16). The distinct population segment ("DPS") language from this definition allows NMFS to protect species under the ESA regionally. NMFS and the U.S. Fish and Wildlife Service ("FWS") have jointly published principles for defining a DPS. 61 Fed. Reg. 4722 (Feb. 7, 1996). In order to satisfy the DPS criteria, a vertebrate species population must be discrete from other populations of the species and significant to the species. These terms are defined as follows:

> A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions:
>
> 1. It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation.
> 2. It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

61 Fed. Reg. at 4725.

> If a population segment is considered discrete under one or more of the above conditions, its biological and ecological significance will then be considered in light of Congressional guidance . . . that the authority to list DPS's be used ". . . sparingly" while encouraging the conservation of genetic diversity. In carrying out this examination, the Services will consider available scientific evidence of the discrete population segment's importance to the taxon to which it belongs. This consideration may include, but is not limited to, the following:
>
> 1. Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon,

2. Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon,
3. Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range, or
4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

61 Fed. Reg. at 4725.

Although these guidelines are "non-regulatory" and serve only as policy guidance for the agencies, 61 Fed. Reg. at 4723, the courts have upheld this policy as a "reasonable interpretation" of ambiguous language in the ESA. *See, e.g., Maine v. Norton*, 257 F. Supp. 2d 357, 385-87 (D. Me. 2003). Therefore, NMFS should use these criteria to evaluate the two populations described in this petition, *infra*, should it decide not to list the oceanic whitetip species as a whole throughout its range.

B. Significant Portion of the Species' Range

The ESA defines an "endangered species" as any species which is "in danger of extinction throughout all or a significant portion of its range," 16 U.S.C. § 1532(6), and a "threatened species" as one which "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20). The ESA does not further define or explain the meaning of the "significant portion of its range" ("SPR") language. However, NOAA and FWS issued a final policy on the interpretation of this SPR language on July 1, 2014. 79 Fed. Reg. 37,577. According to this new policy, a portion of a species' range constitutes a "significant portion" if "the portion's contribution to the viability of the species is so important such that without the members in that portion the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range." 79 Fed. Reg. at 37,580.

Under this new definition, a species could only be listed under the SPR provision if NMFS: (1) determined that the species is neither endangered nor threatened throughout all of its range; (2) determined the specific biological importance of that portion of the species' range where it is facing threats; and (3) determined that impairment of this portion of the species' range would increase the vulnerability of the species to the threats it faces to the point that the entire species would be in danger of extinction, or likely to become so in the foreseeable future. 79 Fed. Reg. at 37,583. The courts have consistently rejected this interpretation of the SPR language because it effectively requires that the species face a "species as a whole" extinction risk, thus reading the SPR language out of the statute. When faced with an entirely similar prior interpretation of the SPR language by FWS, the United States Court of Appeals for the Ninth Circuit explained:

> If . . . the effect of extinction throughout "a significant portion of its range" is the threat of extinction everywhere, then the threat of extinction throughout "a significant portion of its range" is equivalent to the threat of extinction throughout all its range. Because the statute already defines "endangered species" as those that are "in danger of extinction throughout all . . . of [their] range," the Secretary's interpretation of "a significant portion of its range" has the effect of rendering the

> phrase superfluous. Such a redundant reading of a significant statutory phrase is unacceptable.

Defenders of Wildlife v. Norton, 258 F.3d 1136, 1145 (9th Cir. 2011).

NMFS' new SPR Policy also appears to require that the loss of the species in the portion of its range at issue result in a risk of extinction to the species throughout its entire range in order for that portion to be classified as significant. Therefore, this new interpretation is similarly inconsistent with the language of the ESA and is also in violation of the Ninth Circuit's holding in *Norton*. *See* 16 U.S.C. §§ 1532(6), (20); *Norton*, 258 F.3d at 1145. Nonetheless, as detailed below, under any reasonable interpretation of the ESA's SPR language, and even under NMFS' new overly restrictive, and likely illegal, policy, the oceanic whitetip is endangered or threatened in at least a significant portion of its range and should therefore be listed throughout its range. Defenders urges NMFS to consider this SPR issue in its review of this Petition.

C. Listing Factors

NMFS must make its determination of whether a species is endangered or threatened based solely on the following five 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; and
E. Other natural or manmade factors affecting its continued existence.

In order to be listed, a species need only face a sufficient threat under a single factor. *See Humane Soc'y of the U.S. v. Pritzker*, 75 F. Supp. 3d 1, 7 (D.D.C. 2014) *appeal dismissed sub nom.*, No. 15-5038, 2015 WL 1619247 (D.C. Cir. Mar. 17, 2015) (citing *Sw. Ctr. For Biological Diversity v. Babbitt*, 215 F.3d 58, 60 (D.C. Cir. 2000)). Any combination of threats, considered cumulatively under multiple factors, will also support listing. As discussed in detail in this Petition, the oceanic whitetip faces threats under all five of the listing factors and clearly warrants listing (*see generally* Section IV. IDENTIFIED THREATS TO THE PETITIONED SPECIES: FACTORS FOR LISTING, *infra*).

D. 90-Day and 12-Month Findings

"To the maximum extent practicable," NMFS is required to determine "whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted" within 90 days of receiving a petition to list a species. 16 U.S.C. § 1533(b)(3)(A). This is referred to as a "90-day finding." A "negative" 90-day finding ends the listing process and is a final agency action subject to judicial review. 16 U.S.C. § 1533(b)(3)(C)(ii). A "positive" 90-day finding leads to a formal, more comprehensive "status review" and a "12-month finding" determining, based on the best available science, whether listing the species is warranted, not warranted, or warranted but precluded by other pending listing proposals for higher priority species. 16 U.S.C. § 1533(b)(3)(B). "Not warranted" and "warranted but precluded" 12-month findings are also subject to judicial review. 16 U.S.C. § 1533(b)(3)(C)(ii).

NMFS' regulations define "substantial information," for purposes of 90-day petition findings, 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 a 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).

E. Reasonable Person Standard

Both the relevant case law and the language of NMFS' regulation, by setting the "reasonable person" standard for substantial information, 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. *See, e.g., Ctr. for Biological Diversity v. Morgenweck*, 351 F. Supp. 2d 1137, 1140 (D. Colo. 2004); 50 C.F.R. § 424.14(b)(1). In reviewing negative 90-day findings, the courts have consistently held that the evidentiary threshold at the 90-day review stage is much lower than the one required under a 12-month review. *See, e.g.*, *Ctr. for Biological Diversity v. Kempthorne ("CBD v. Kempthorne II")*, 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 Pritzker*, 75 F. Supp. 3d at 10-13 (holding that NMFS' decision was was arbitrary and capricious when it determined that conflicting evidence or "some level of uncertainty" was sufficient to show that the petitioner had failed to provide "substantial evidence" that listing was appropriate at the 90-day finding stage); *Moden v. U.S. Fish & Wildlife Serv.*, 281 F. Supp. 2d 1193, 1203, 1204 (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.").

In fact, courts have characterized the 90-day finding determination as a mere "threshold determination" and have held that it 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." *See Pritzker*, 75 F. Supp. 3d at 15 (quoting *Colo. River Cutthroat Trout v. Kempthorne,* 448 F. Supp. 2d 170, 176 (D.D.C. 2006)); *Morgenweck*, 351 F. Supp. 2d at 1141 (quoting 16 U.S.C. § 1533(b)(3)(A) (emphasis added)); *see also Ctr. for Biological Diversity v. Kempthorne ("CBD v. Kempthorne I")*, 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 erroneously applied "a more stringent standard" than that of the reasonable person). Accordingly, a petition does not need to establish that there is a high likelihood that a species is either endangered or threatened at the 90-day finding stage.

Moreover, as explained by the courts, NMFS must give the "benefit of the doubt" to the petitioners – and thus the species:

> The 'may be warranted' standard . . . seems to require that in cases of . . . contradictory evidence, the [agency] must defer to information that supports petitioner's position. It would be wrong to discount the information submitted in a petition solely because other data might contradict it. At [the 90-day finding] stage, unless the [agency] has demonstrated the *unreliability* of information that supports the petition, that information cannot be dismissed out of hand.

CBD v. Kempthorne I, 2007 WL 163244, at *4 (emphasis added). In fact, the court in *Pritzker* determined that NMFS' expressed need for more conclusive information was itself sufficient to suggest a reasonable person "might conclude 'a review of the status of the species concerned' was warranted." 75 F. Supp. 3d at 11. NMFS' failure to provide a positive 90-day finding and complete a status review was thus found to be arbitrary and capricious. *Id.* at 10-13.

F. Best Available Scientific and Commercial Data

NMFS is required to make an ESA listing determination for the oceanic whitetip under the listing factors based exclusively on the best *available* scientific and commercial data. *See* 16 U.S.C. § 1533(b)(1)(A); 50 C.F.R. § 424.11(b). Therefore, NMFS cannot deny listing merely because there is little information available, if the best *available* information indicates that the oceanic whitetip is endangered or threatened under any one, or any combination, of the five ESA listing factors.[4] This is particularly important during the 90-day review because, as noted above, NMFS must make a positive 90-day finding and commence a status review when a "reasonable person" would conclude, based on the *available* evidence, that listing may be warranted. *See, e.g., Morgenweck*, 351 F. Supp. 2d at 1140-41; *Pritzker*, 75 F. Supp. 3d at 10-11.

1. The International Union for the Conservation of Nature

The International Union for the Conservation of Nature ("IUCN") is the world's oldest and largest global environmental network and has become a leading authority on the environment (IUCN, Undated at 1). It is a neutral, democratic membership union with more than 1,200 government and non-governmental organization ("NGO") members, and almost 11,000 volunteer scientists and

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[4] *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'") (quoting *Kern Co. Farm Bureau v. 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."') (quoting *Oceana v. Evans*, 384 F. Supp. 2d 203, 219 (D.D.C. 2005).

experts in more than 160 countries (IUCN, Undated at 1). Its work is supported by over 1,000 professional staff in 45 offices and hundreds of partners in public, NGO, and private sectors around the world (IUCN, Undated at 1).

As part of its work, the IUCN compiles and updates the IUCN Red List, "the definitive international standard for species extinction risk . . ." (IUCN, Undated at 1). The IUCN Red List assessments are recognized internationally, are relied on in a variety of scientific publications, and are used by numerous governmental organizations and NGOs. The IUCN Red List has also been used to inform multi-lateral agreements, such as CITES, the Convention on Migratory Species, and the Convention on Biological Diversity. As a result of the scientific rigor with which Red List species extinction risk determinations are made, both NMFS and FWS have utilized IUCN data and Red List listing determinations when making ESA listing decisions even though the IUCN Red List criteria differ from the ESA's statutory requirements for listing a species as endangered or threatened. This is because the IUCN is considered a credible source of scientific data that meets the "best available science" requirement of the ESA. *See* 16 U.S.C. § 1533(b)(3)(A). NMFS' reliance on these findings is further supported by a recent study that found that, with respect to marine fish species, IUCN Red List listings were not biased towards exaggerating threat status and that IUCN Red List listings can serve as an accurate flag for relatively data-poor fisheries (Davies & Baum, 2012 at 7). In fact, based on the listing criteria that must be evaluated and applied, the IUCN Red List is an even more objective evaluation of a species' extinction risk than the more subjective narrative criteria used in the ESA listing process.

One example of NMFS' reliance on these Red List determinations comes from its decision to list the Guadalupe fur seal as a threatened species. In that decision, NMFS specifically noted that,

> 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.

50 Fed. Reg. 51,252, 51,254 (Dec. 16, 1985).[5]

Through such actions, NMFS has repeatedly recognized the IUCN Red List as a legitimate source of information on species endangerment. However, in addition to a general recognition of IUCN data and determinations as a source of the best available information on extinction risk, the Guadalupe fur seal decision is important for another reason as well. With regard to the Guadalupe fur seal,

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[5] *See also, e.g.,* 77 Fed. Reg. 26,478, 26,481 (May 4, 2012) (dwarf seahorse 90-day finding, citing IUCN reports and findings); 77 Fed. Reg. 61,556, 61,561 (Oct. 10, 2012) (Nassau grouper 90-day finding, citing IUCN reports and findings); 77 Fed. Reg. 73,220, 73,253 (Dec. 7, 2012) (proposed listing determination for 82 coral species, citing IUCN reports and findings); 77 Fed. Reg. 76,740, 76,748 (Dec. 28, 2012) ("These [IUCN Red List] listings highlight the conservation status of listed species and can inform conservation planning and prioritization."); 75 Fed. Reg. 70,169, 70,170 (Nov. 17, 2010).

NMFS noted the IUCN's "vulnerable" extinction risk determination for the species and applied the corresponding ESA listing status, "threatened."

However, NMFS has recently stated that, when a petition cites to IUCN threat classifications, NMFS "will evaluate the source of information that the classification is based upon in light of the standards on extinction risk and impacts or threats . . ." 80 Fed. Reg. 48,053, 48,055 (August 11, 2015). While Defenders certainly believes it is appropriate for NMFS to look at the underlying data, this alone is not enough. NMFS should ensure that it gives adequate weight to the opinions of the reasonable scientists who made these IUCN threat determinations as well, especially given the fact that they are often preeminent experts on the species being assessed. As such, these scientists bring nuanced opinions and personal observations that may not be available in, or obvious on the face of, the scientific articles referenced in the IUCN finding. The IUCN threat assessments are the culmination of scientific data and expert opinion and should be given weight beyond the mere citations that they include. They are each essentially scientific articles quantifying threats to species and should be treated as an additional, independent source. Defenders urges NMFS to consider the IUCN threat assessment for the oceanic whitetip in this way when making its 90-day finding for the species.

2. IUCN's Assessment of the Oceanic Whitetip

The IUCN Red List classifies the oceanic whitetip as a "vulnerable" species worldwide (*see* Baum, *et al.*, 2006 at 4). Therefore, this IUCN determination should be sufficient to at least list the species as a whole as threatened under the ESA. *See* 50 Fed. Reg. at 51,254 (Guadalupe fur seal decision). However, this Red List determination is nearly a decade old at this point, and threats to the species and population declines have continued since then (*see* Baum, *et al.*, 2006 at 5 (date of assessment is January 31, 2006); Section III. G. Population Trend, *infra*; Section IV. IDENTIFIED THREATS TO THE PETITIONED SPECIES: FACTORS FOR LISTING, *infra*). As a result, the species likely now qualifies under the more stringent ESA definition of an "endangered" species. *See* 16 U.S.C. § 1532(6). In fact, in addition to the worldwide vulnerable listing, the IUCN separately categorized the oceanic whitetips living in the Northwest and Western Central Atlantic Ocean as being "critically endangered" based on the enormous declines that the species has experienced there (Baum, *et al.*, 2006 at 5). The IUCN's "critically endangered" assessment indicates that the IUCN believes that the threats that the species is facing present "an extremely high risk of extinction in the wild." (IUCN, Undated – 2 at 13). This is the highest level of extinction risk that IUCN uses, short of extinct in the wild (*see generally* IUCN, Undated – 2 at 13). Finally, in 2015 the IUCN listed the oceanic whitetip as regionally endangered, the next highest threat category over regionally vulnerable and the category just below regionally critically endangered, in Europe (*see* Nieto, *et al.*, 2015 at 18). These separate listings underscore the serious nature of the threats the species faces and the appropriateness of ESA listing.

III. SPECIES DESCRIPTION

A. Common Name

This Petition will refer to *Carcharhinus longimanus* by the common name "oceanic whitetip" throughout. Other common names include: Brown Milbert's sand bar shark, brown shark, nigano shark, whitetip, whitetip shark, white-tip shark, and whitetip whaler (Bester, Undated at 2).

B. Taxonomy

The taxonomy of *Carcharhinus longimanus* is as follows:

Kingdom	*Animalia*
Phylum	*Chordate*
Subphylum	*Vertebrata*
Class	*Chondrichthyes*
Subclass	*Elasmobranchii*
Order	*Carcharhiniformes*
Family	*Carcharhinidae*
Genus	*Carcharhinus*
Species	*longimanus*

Figure 1. Oceanic whitetip taxonomy (Integrated Taxonomic Information System, 2015 at 1-2).

C. Physical Characteristics

The oceanic whitetip shark has a stocky build with a large rounded first dorsal fin and very long and wide paddle-like pectoral fins (Figure 2, *infra*; Compagno, 1984 at 484). The head has a short and bluntly rounded nose and small circular eyes with nictitating membranes. The upper jaw contains broad, triangular serrated teeth, while the teeth in the lower jaw are more pointed and are only serrated near the tip (Compagno, 1984 at 484). The first dorsal fin is very wide with a rounded tip, originating just in front of the rear tips of the pectoral fins. The second dorsal fin originates over or slightly in front of the base of the anal fin. The pectoral fins are very large and elongated with broadly rounded tips (Compagno, 1984 at 484). The body is grayish bronze to brown in color, but varies depending upon geographic location. The underside is whitish with a yellow tinge on some individuals (Compagno, 1984 at 484). The species also exhibits a color pattern of mottled white tips on its front dorsal, caudal, and pectoral fins with black tips on its anal fin and on the ventral surfaces of its pelvic fins (*see* Figure 2, *infra*). They usually cruise slowly at or near the surface with their huge pectoral fins conspicuously outspread, but can suddenly dash for a short distance when disturbed (Compagno, 1984 at 485). Oceanic whitetips are often accompanied by remoras, dolphin fish, and pilot fish (Bester, Undated at 4).

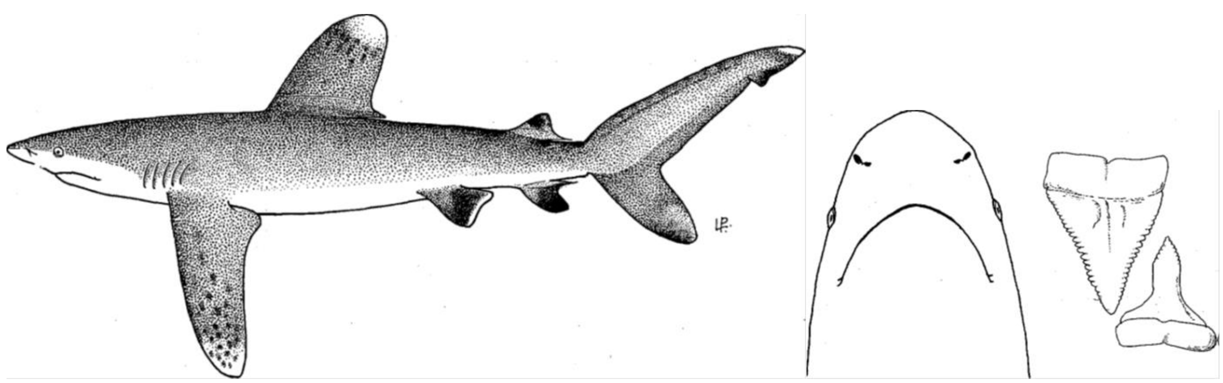

Figure 2. Sketches of oceanic whitetip (Compagno, 1984 at 484).

The oceanic whitetip can reach lengths of up to 11 to 13 feet (3.5 to 4 meters). However, most are less than 10 feet (3 meters) in length (Baum, *et al.*, 2006 at 7-8). Females reach greater maximum lengths than males (Bester, Undated at 8). The maximum recorded weight for this species is 370 pounds (167.4 kilograms) (Bester, Undated at 8). "Oceanic whitetip growth is considered slow compared to other pelagic sharks . . ." (Rice & Harley, 2012 at 4).

D. Habitat and Range

The oceanic whitetip shark is distributed worldwide in epipelagic tropical and subtropical waters between 30°N and 35°S latitude (*see* Figure 3, *infra*; Baum, *et al.*, 2006 at 6). The species spans every ocean including offshore U.S. waters. The oceanic whitetip is found in the western Atlantic Ocean from Maine in the United States South to Argentina, including the Caribbean and Gulf of Mexico. In the eastern Atlantic Ocean, it ranges from Portugal South to the Gulf of Guinea and possibly the Mediterranean Sea. In the Indo-Pacific, this species is found from the Red Sea and the coast of East Africa to Hawaii, Samoa, Tahiti, and the Tuamoto Islands. In the Eastern Pacific, this shark ranges from Southern California in the United States South to Peru, including the Galapagos Islands (Compagno, 1984 at 2).

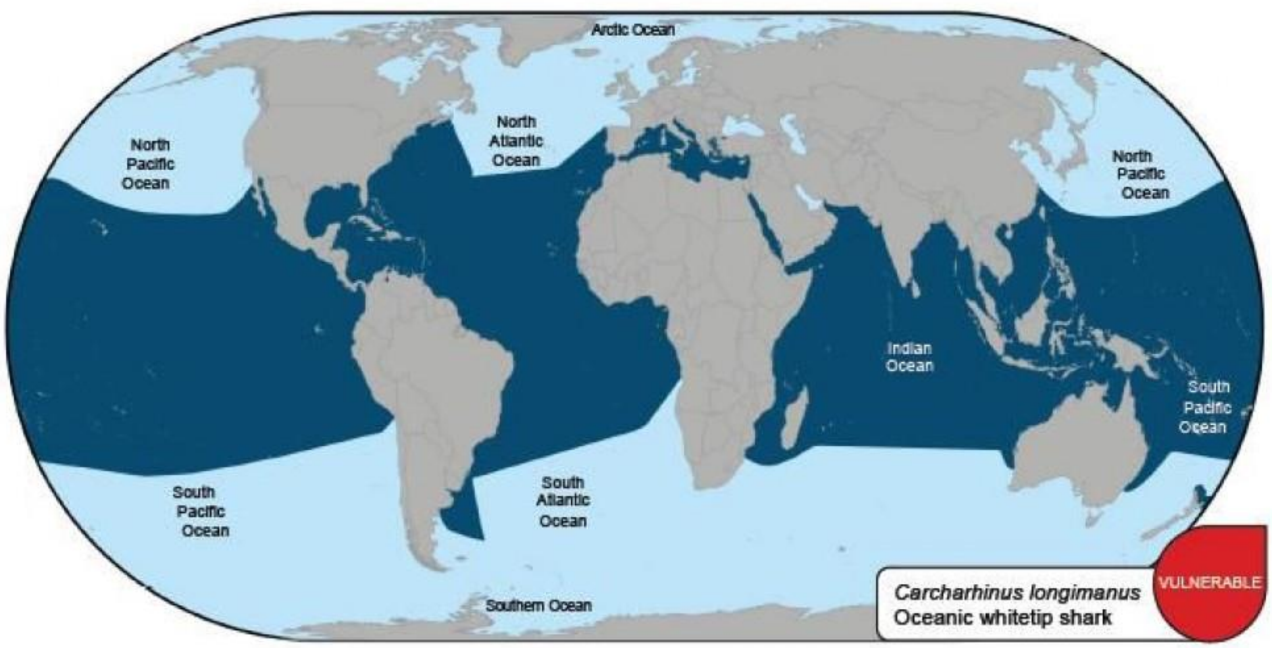

Figure 3. Global oceanic whitetip distribution (E-CoP16-Prop-42 at 3 (citation omitted)).

The oceanic whitetip shark is considered to be the only true oceanic shark of the genus *Carcharhinus* (E-CoP16-Prop-42 at 3). This shark is a surface-dwelling, oceanic-epipelagic shark and is usually found well offshore in the open ocean, on the continental shelf, or around oceanic islands in deep water areas (Bonfil, *et al.*, 2008 at 129; Compagno, 1984 at 485). However, while it inhabits deep water areas, it primarily occurs in the surface waters of those areas at less than 328 feet (100 meters) depth (FAO, 2012 at 8). Its abundance increases with distance from the continental shelf (Camhi, *et al.*, 2007 at 25; Bonfil, *et al.*, 2008 at 129).

The oceanic whitetip is commonly found in waters warmer than 68°F (20°C) (range 64-82°F, 18-28°C), although one was caught in water of 59°F (15°C). It tends to withdraw from waters that are cooling below this temperature, as in the Gulf of Mexico in winter (Compagno, 1984 at 485). Young oceanic whitetip sharks have been found well offshore along the southeastern coast of the United States suggesting that there may be a nursery in oceanic waters over this continental shelf (E-CoP16-Prop-42 at 3). Little is known about the migrations and movements of this species (Bonfil, *et al.*, 2008 at 130).

E. Feeding

Oceanic whitetips are one of the main apex predators in tropical open waters and feed primarily on oceanic teleosts and cephalopods (Bonfil, *et al.*, 2008 at 131). Their diet consists of lancetfish, oarfish, threadfins, barracuda, jacks, dolphin fish, tuna, skipjack and other scombrids, marlin, squid and occasionally stingrays, sea birds, turtles, marine gastropods, crustaceans, carrion from marine mammals, and garbage (Bonfil, *et al.*, 2008 at 131; Campagno, 1984 at 485). Although this shark is primarily solitary, it has been observed in "feeding frenzies" when a food source is present (Bester, Undated at 3).

F. Reproduction and Lifespan

The oceanic whitetip's maximum age of 13 years was determined using vertebral sections (E-CoP16-Prop-42 at 3-4; Bonfil, *et al.*, 2008 at 132), though the species may only live to a maximum of 11 years in the North Pacific (E-CoP16-Prop-42 at 17). Age at maturity ranges from 4-7 years depending on location and sex, as does size at maturity, which ranges from 66-77 inches (168-196 centimeters) total length and 57-60 inches (145-153 centimeters) fork length[6] (*see* Rice & Harley, 2012 at 4; E-CoP16-Prop-42 at 17; Beerkircher, *et al.*, 2002 at 45).

The oceanic whitetip likely has a biennial reproductive cycle, giving birth on alternate years, after a 10-12 month gestation period (*see* E-CoP16-Prop-42 at 17; Howey-Jordan, *et al.*, 2013 at 10; Compagno, 1984 at 485; Baum, *et al.*, 2006 at 7; Tambourgi, *et al.*, 2013 at 167). The species is viviparous, with eggs hatching inside the body of the female and fetuses receiving nourishment from a yolksac placenta (Compagno, 1984 at 485). Litter sizes range from 1-15 with mean litter size being 5-6 pups (Compagno, 1984 at 485; Baum, *et al.*, 2006 at 8; E-CoP16-Prop-42 at 17). The number of pups in a litter is proportional to the size of the mother with larger females having larger litters (Compagno, 1984 at 485). Each pup is approximately 24 to 25.6 inches (60 to 65 centimeters) in length at birth (Camhi, *et al.*, 1998 at Annex 2, p. 4). These facts led the United Nations Food and Agriculture Organization ("FAO") to conclude "that the [oceanic whitetip's] overall productivity level is low." (FAO, 2012 at 9; *see also* FAO, 2012 at 7; E-CoP16-Prop-42 at 4; Rice & Harley, 2012 at 2).

[6] Fork length is a method of fish measurement that classifies fish by measuring the distance from the tip of their jaw or snout with their mouth closed to the center of the fork in their tail.

Growth rate (von Bertalanffy k)	0.10 $year^{-1}$ (Combined sex, North Pacific) 0.08-0.09 $year^{-1}$ (Combined sex, SW Atlantic)	Seki *et al.* (1998) Lessa *et al.* (1999)
Size at maturity	168-196 cm TL (F; North Pacific) 175-189 cm TL (M; North Pacific) 180-190 cm TL (combined sex; SW Atlantic)	Seki *et al.* (1998) Lessa *et al.* (1999)
Age at maturity	4 years (F; North Pacific) 5 years (M; North Pacific) 6-7 years (combined sex; SW Atlantic)	Seki *et al.* (1998) Lessa *et al.* (1999)
Observed longevity	11 years (North Pacific) 13 years (SW Atlantic)	Seki *et al.* (1998) Lessa *et al.* (1999)
Gestation period	9-12 months	Seki *et al.* (1998) Lessa *et al.* (1999)
Reproductive periodicity	2 years	Seki *et al.* (1998) Lessa *et al.* (1999)
Litter size (mean)	5-6 (range=1-14)	Seki *et al.* (1998) Lessa *et al.* (1999)
Generation time (T)	10 years	Cortés *et al.* (2008)
Population growth rates (r)	0.087 year	Cortés *et al.* (2008)

Figure 4. Life history parameters of the oceanic whitetip (E-CoP16-Prop-42 at 17).

G. Population Trend

The oceanic whitetip was formerly one of the most common sharks in the ocean (*see, e.g.,* E-CoP16-Prop-42 at 5; Bonfil, *et al.*, 2008 at 135), however, as discussed below, it has undergone serious declines throughout its range. "No estimates of global [oceanic whitetip] population abundance are available. The only available stock assessment indicates that the median estimate of biomass in the Western Central Pacific in 2010 was [7,295 tons (Rice & Harley, 2012)], which would be equivalent to population numbers of the order of [200,000] individuals." (FAO, 2012 at 9). This number is very concerning because an estimated 200,000 to 1,200,000 oceanic whitetips are killed annually to support the international fin trade (Bonfil, *et al.*, 2008 at 7; E-CoP16-Prop-42 at 8; *see also* Clarke, *et al.*, 2012 at 198 (indicating that observer data suggests catches of a group of 5 so-called key shark species (blue, makos, oceanic whitetip, and silky) have averaged 2 million individuals in the Western and Central Pacific annually since the mid-1990s) (citation omitted)). As a result of this unsustainable catch, declines in catch per unit of effort ("CPUE"), biomass, and individual size are apparent in a variety of studies assessing the species' population trends. Furthermore, "[b]ecause . . . oceanic whitetip . . . sharks are [a] valuable component[] of the global trade in shark fins . . . and there are few known methods for avoiding shark catches, it is highly unlikely that declining abundance reflects intentional shifts in fishing effort away from [this] species." (Clarke, *et al.*, 2012 at 206 (internal citations omitted)). These declines in abundance are instead indicative of shrinking populations. In addition, all of the data sets used to calculate population declines began long after industrialized fishing began and none of the data sets continue to the present. As a result, all decline estimates are conservative and do not accurately capture the full extent of the species' decline from historic abundance.

Criterion	Index	Trend	Basis	Coverage	Reliability	Source
Northwest Atlantic	CPUE longline	EOD 99%	Calculated by authors, 1950s to 1990s	Gulf of Mexico	Research surveys (1950s), observers (1990s) (2)	Baum and Myers (2004)
	CPUE longline	EOD 88%	Calculated by authors, 1950s to 1990s	Gulf of Mexico	Research surveys (1950s), observers (1990s) (4–5)	Baum and Myers (2004), corrected on the basis of Driggers *et al.* (2011).
	CPUE, longline	EOD 70%	Calculated by authors, 1992–2000	Northwest Atlantic	Commercial logbook data (3)	Baum *et al.* (2003)
	CPUE longline	EOD 57%	1986–2005 CPUE logbooks	Northwest Atlantic	Commercial logbook data (3)	Cortes *et al.* (2007)
	CPUE longline	EOD 9%	1992–2005 CPUE observed sets	Northwest Atlantic	Observer programme data (4)	Cortes *et al.* (2007)
Western Central Pacific	Spawning biomass estimated from stock assessment	EOD 86%	Stock synthesis model, multiple sources of data, 1995–2010	Western Central Pacific	Assessment based on multiple sources of data (5)	Rice and Harley (2012)
	CPUE longline	EOD 90%	Calculated by the authors, 1996–2009	Western Central Pacific	Western Central Pacific	Clarke *et al.* (2012)
	CPUE longline	EOD 91.5% in deep sets, 89.6% in shallow sets	Calculated by the authors, 1995–2010	Central Pacific	Standardized CPUE from observer data (4)	Walsh and Clarke (2011)
	CPUE longline	EOD 90%	Calculated by authors, 1950s–1990s	Central Pacific Ocean	Research surveys (1950s), observers (1990s) (4–5)	Ward and Myers (2005)
	CPUE longline	EOD 76% in deep sets, 53% in shallow sets	Calculated by authors, 1995–2000 vs 2004–2006	Central Pacific Ocean	Observer data from commercial fleet (4). Shallow sets data with higher weight.	Walsh *et al.* (2009)
	CPUE longline	EOD 53%, 5%, 27%, 52% in 4 subareas	Late 1960s to mid-1990s	Central Pacific, uncorrected for depth changes	Unstandardized CPUE (3)	Matsunaga and Nakano (1999); see Table 3 of present report.
	CPUE longline	EOD 32%, 31% in 2 subareas; increases of 38%, 4% in 2 subareas	Late 1960s to mid-1990s	Central Pacific, corrected for depth changes	Unstandardized CPUE (3)	Matsunaga and Nakano (1999); see Table 3 of present report.
Eastern Pacific	CPUE, observed purse seine sets on floating objects	EOD 95%	Inspection of figure, 1994–2006	Eastern Pacific Ocean	Standardized observer data (4)	IATTC (2007a, 2007b)
Indian Ocean	CPUE longline	EOD 90%	Comparing CPUE data from survey (1987–1988) and commercial fishery (2000– 2004)	Northern Maldives	Comparison of unstandardized CPUEs from different sources (3)	Anderson, Adam and Saleem (2011); Andreson and Waheed (1990)
	CPUE longline	RRD 40% (annual rate of decline of 8%)	Inspection of figure, 2003– 2009	Indian Ocean	Standardized logbook data (4)	Semba and Yokawa (2011)
	CPUE longline	Decline 25–30% 1998–2011	Spanish commercial longline fleet	Indian Ocean	Standardized CPUE (4)	Ramos-Cartelle *et al.* (2012)

Figure 5. Decline indices for the oceanic whitetip (FAO, 2012 at 24).

1. Atlantic Ocean

While population trend information is unavailable or unclear for some of the oceanic whitetip's Atlantic Ocean range, the population trend information that does exist typically shows severe declines. This population decline information is coupled with evidence of decreasing average weight of the oceanic whitetips that are encountered, which further signals significant population declines in the Atlantic.

a. Northwest Atlantic and Gulf of Mexico

The oceanic whitetip was once described as the most common pelagic shark throughout the warm-temperate and tropical waters of the Atlantic and beyond the continental shelf in the Gulf of Mexico (E-CoP16-Prop-42 at 5 (citations omitted)). However, several sources report significant declines in abundance for oceanic whitetips in the Northwest Atlantic and Gulf of Mexico.

One study looking at logbook data for the U.S. pelagic longline fleets targeting swordfish and tuna in the Northwest Atlantic found that all sharks in this region, except the mako, "have declined by more than 50% in the past 8 to 15 years." (Baum, *et al.*, 2003 at 389 (citations omitted)). These steep declines over such a short time period are alarming because, "[a]lthough we expect declines when populations are initially exploited, the shark populations analyzed here had been exploited to varying degrees since the 1960s." (Baum, *et al.*, 2003 at 389 (citations omitted)). This study also explained that, "[b]ecause sharks have low maximum intrinsic rates of increase, compensatory responses to exploitation are limited and recovery is expected to be slow." (Baum, *et al.*, 2003 at 389-90 (citation omitted)). As for the oceanic whitetip specifically, this study found that the species declined by an estimated 70% (the 95% confidence interval is 62 to 75%) from 1992-1999, a much steeper decline than experienced by many of the other shark species assessed (*see* Baum, *et al.*, 2003 at 390 (citations omitted)).

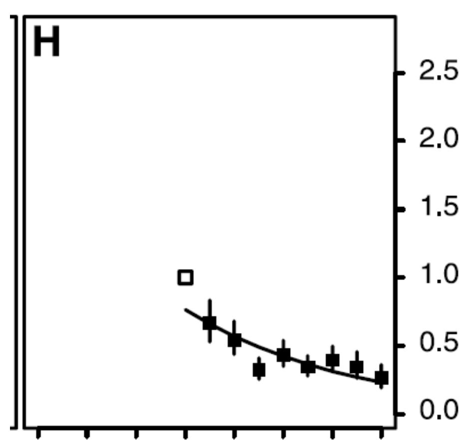

Figure 6. Declines in estimated relative abundance for oceanic whitetip. The overall trend is represented by a solid line, and individual year estimates (■± 95% CI) are shown. Relative abundance was initially set to 1 in this graph (Baum, *et al.*, 2003 at 390).

In addition to the 70% overall decline, this study also found that the oceanic whitetip declined in all but one (referred to as "Area 5") of the surveyed areas where there was sufficient data to examine population trends (*see* Figure 7, *infra*).

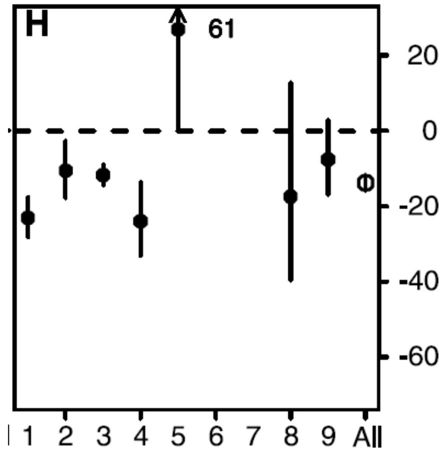

Figure 7. The estimated annual rate of change, in each area surveyed (● ± 95% CI) and in all areas combined (○ ± 95% CI), for oceanic whitetip, excluding areas with fewer than 40 observations (Baum, *et al.*, 2003 at 390).

It is unclear why Area 5 experienced an apparently increasing trend in population over the relevant time period when all other areas, both on their own and as a single unit including Area 5, were decreasing. However, even if there were an actual population increase in Area 5, it would make little difference in the overall population status of this region as a whole. This is because Area 5 represents the northern extreme of the oceanic whitetip's range in this region and is entirely located near the continental shelf (*compare* Rice & Harley, 2012 at 4 (stating that oceanic whitetips show a clear preference for waters up to 10°N latitude, "but can be found in decreasing numbers out to latitudes of 30°N . . . with decreasing abundance with greater proximity to continental shelves.") (citation omitted); Baum, *et al.*, 2006 at 7 (oceanic whitetip is commonly found in tropical and subtropical waters between 30°N and 35°S latitude); Figure 8, *infra* (showing that Area 5 is located in the nearshore mid-Atlantic coast of the United States starting at roughly 36°N latitude and that Areas 6 and 7, the only areas without sufficient, or perhaps any, oceanic whitetip catch that could be used to infer a population trend in this figure, are the only areas that are North of Area 5)). Therefore Area 5 is likely marginal oceanic whitetip habitat and likely supports a relatively small proportion of the species in its Northwest Atlantic range. The inference that the population trend results for Area 5 were based on catch of very few specimens is supported by the fact that the waters in this area are largely too cold for the oceanic whitetip and are therefore likely largely unpopulated by the species (*compare* Rice & Harley, 2012 at 4 (explain that the oceanic whitetip is "[c]ommonly found in waters warmer than 20°C, [but that] catches of [oceanic whitetips] have been reported in water temperatures down to 15°C.") (citation omitted); Figure 9, *infra* (showing average temperature in most of Area 5 as being approximately 15°C and below)).

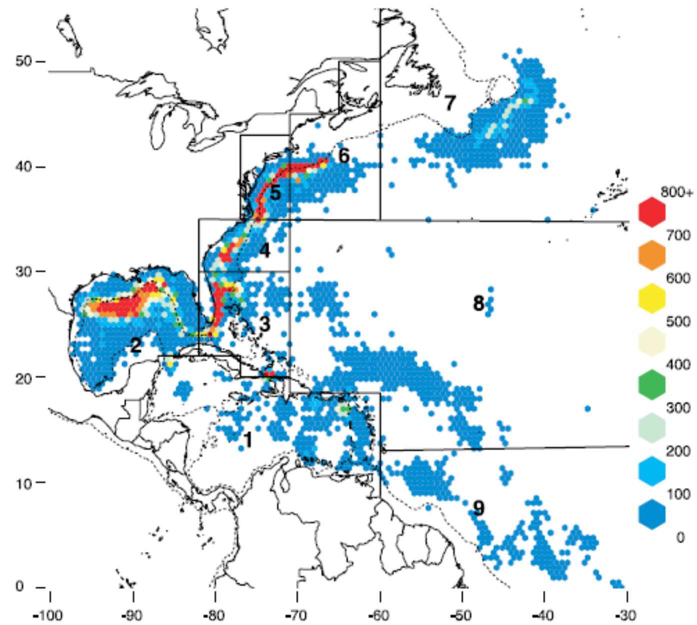

Figure 8. Map of the Northwest Atlantic areas used in Baum, *et al.*, 2003 showing the distribution of effort in the U.S. pelagic longline fishery between 1986 and 2000, categorized by number of sets. The 1000 meter coastal isobath (dotted line) is given for reference. Latitude is shown on the y-axis and indicates that Area 5 begins well above 30°N latitude (Baum, *et al.*, 2003 at 389).

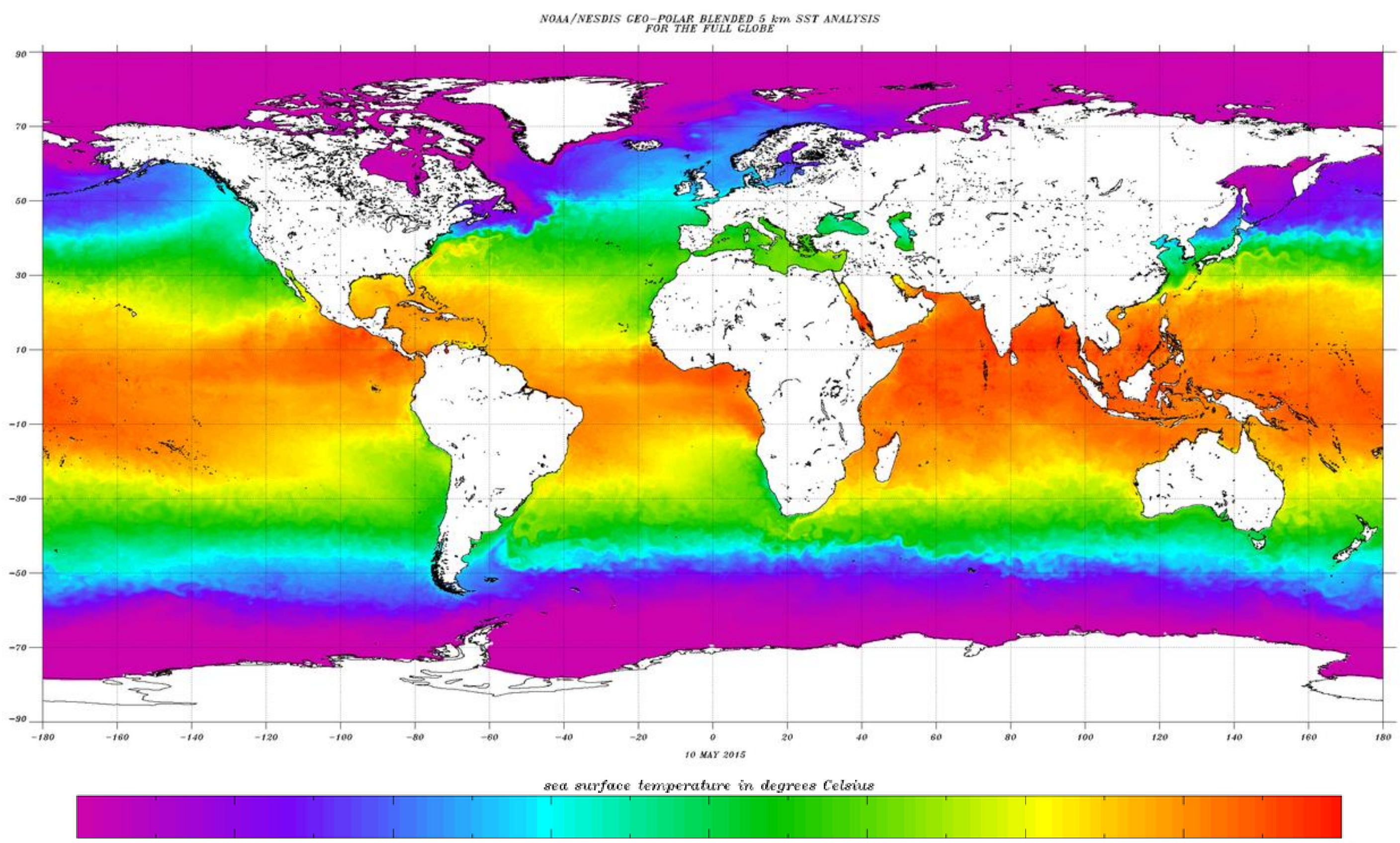

Figure 9. Sea surface temperatures in degress Celsius (http://www.ospo.noaa.gov/data/sst/contour/global_small.cf.gif).

In all likelihood, the oceanic whitetip is sparsely populated in Area 5 and the trend information was based on a small sample size. This decreases the reliability of this trend information as it can be skewed by catch of relatively few specimens. Therefore, any increase in Area 5, even if it were accurate, likely would have little effect on oceanic whitetip declines experienced in the rest of this region as it would affect a limited number of oceanic whitetips. This is evidenced by the fact that, even with Area 5's apparent population increase, the oceanic whitetip still decreased by 70% in the region as a whole. Baum, *et al.*, 2003 ultimately concluded that "overfishing is threatening large coastal and oceanic sharks in the Northwest Atlantic. The large and rapid declines [the study documented] are in addition to substantial historical reductions . . . The magnitude of the declines estimated here suggests that several sharks[, including the oceanic whitetip,] may . . . now be at risk of large-scale extirpation." (Baum, *et al.*, 2003 at 390).

A later study assessing CPUE trends in the Northwest Atlantic and Gulf of Mexico, this time based on observer data, found somewhat less extreme declines than Baum, *et al.*, 2003 (*see generally* Baum & Blanchard, 2010). This study estimated that the oceanic whitetip experienced a roughly 50% decline (95% CI: 17–70%) between 1992 and 2005 with the species being caught "on just over 5% of observed sets, with a mean catch rate of only 0.15 per 1000 hooks." (Baum & Blanchard, 2010 at 232, 235; Figure 10, *infra*).

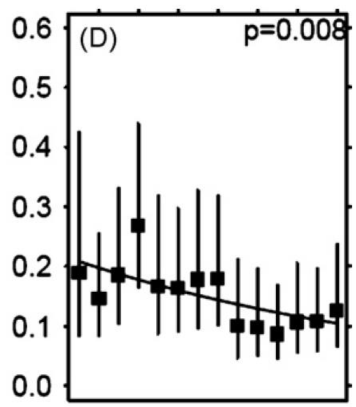

Figure 10. Estimated change in relative abundance (standardized catch per 1000 hooks) between 1992 and 2005 based on the observer data for oceanic whitetip. The overall trend is plotted as a solid line and individual year estimates (■ ±95% CI) (Baum & Blanchard, 2010 at 236).

While this study did not address earlier data sets quantitatively, it did provide information indicating that declines leading up to the covered time period were also significant (*see* Baum & Blanchard, 2010 at 237)[7] and that the 50% decline estimated was not indicative of total decline from un-fished conditions. Regardless of which decline estimate is used, it is clear that the oceanic whitetip has experienced serious recent declines in this region in addition to the historical declines that it had already experienced prior to the onset of data collection.

[7] The study cautioned that the high degree of interannual variability in individual year estimates shows that the catch rates have not been fully standardized across years (Baum & Blanchard, 2010 at 237). This indicates that there may be little reason to think that this decline estimate is more reliable than the higher decline estimate from Baum, *et al.*, 2003.

i. Northwest Atlantic

Another study looked at observer data from the U.S. pelagic longline fisheries targeting swordfish and tuna off the Southeastern United States (focusing on an area stretching from Cuba into North Carolina and excluding the majority of the Gulf of Mexico) and found decline results similar to, but even slightly larger than, those found by Baum, *et al.*, 2003 (*see* Beerkircher, *et al.*, 2002 at 40-41, 47-48). This study indicated that CPUE in this area had dropped by approximately 77% from 1992-2000 (*see* Figure 11, *infra* (indicating a CPUE of approximately 0.75 oceanic whitetips per 1,000 hooks in 1992 as compared to approximately 0.17 oceanic whitetips per 1,000 hooks in 2000)).

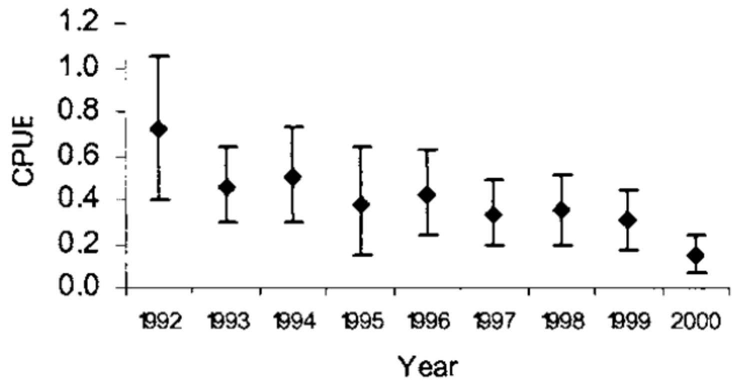

Figure 11. Estimates of yearly mean CPUE of oceanic whitetips expressed as number caught per 1,000 hooks. Vertical bars represent 95% confidence limits (Beerkircher, *et al.*, 2002 at 47).

However, fishing for the species did not begin in 1992, and this same study indicated that the average oceanic whitetip CPUE in this fishery from 1981-1983 was approximately 63% higher than for the period from 1992-2000 (*see* Figure 12, *infra*). Furthermore, because fishing has been occurring in this area since well before 1981, even these figures do not represent the true decline that the species has experienced in this region from its historical abundance.

	CPUE	
Species	1981–83	1992–2000
Silky	11.22	3.49
Dusky	0.47	1.64
Night	10.75	1.36
Blue	0.60	1.05
Unidentified	0.87	0.66
Tiger	0.60	0.64
Scalloped hammerhead	13.37	0.48
Oceanic whitetip	0.87	0.32
Sandbar	0.07	0.28
Bigeye thresher	0.67	0.20
Shortfin mako	0.00	0.19

Figure 12. Overall nominal CPUE (numbers caught per 1,000 hooks) by species of sharks caught off the Southeastern United States from 1981–83 and 1992–2000 (Beerkircher, *et al.*, 2002 at 48).

In addition to declining CPUE, this study also found that the mean lengths of both male and female oceanic whitetips (between ~39-41 inches or 100-105 centimeters fork length) was well below the average oceanic whitetip length at maturity (~57-60 inches or 145-153 centimeters fork length) (*see* Beerkircher, *et al.*, 2002 at 45; Section III. F. Reproduction and Lifespan, *supra*). This decline in size and disproportionate catch of immature individuals is another indication that the population in this area is declining and being unsustainably utilized (*see* Baum & Myers, 2004 at 140).

ii. Gulf of Mexico

In the Gulf of Mexico, between 2 and 25 oceanic whitetips were often observed following vessels during longline retrieval on exploratory surveys conducted in the 1950s (Baum, *et al.*, 2006 at 8). At that time, the oceanic whitetip was the most common shark caught by longlines in the Gulf of Mexico, accounting for 61% of all hooked sharks (Bonfil, *et al.*, 2008 at 135). However, by the late 1990s, the species accounted for only 2% of shark catches (Baum & Myers, 2004 at 142). In an attempt to quantify the oceanic whitetip's decline in the Gulf of Mexico, one study compared longline CPUE from research surveys in 1954-1957 to observed commercial longline sets from 1995-1999 and determined that the oceanic whitetip had declined by more than 150-fold, or 99.3% (95%CI: 98.3–99.8%) in the Gulf during that time (*see* Baum & Myers, 2004 at 141). In addition, the many areas where no oceanic whitetips were caught at all, or where so few were caught that there were none on average per 10,000 hooks, may indicate range contraction in the Gulf or that the species has already been extirpatedfrom some areas of the Gulf (*see* Figure 13, *infra* (areas of no catch per 10,000 hooks represented by empty hexagons with far more empty hexagons in the 1990s than in the 1950s)).

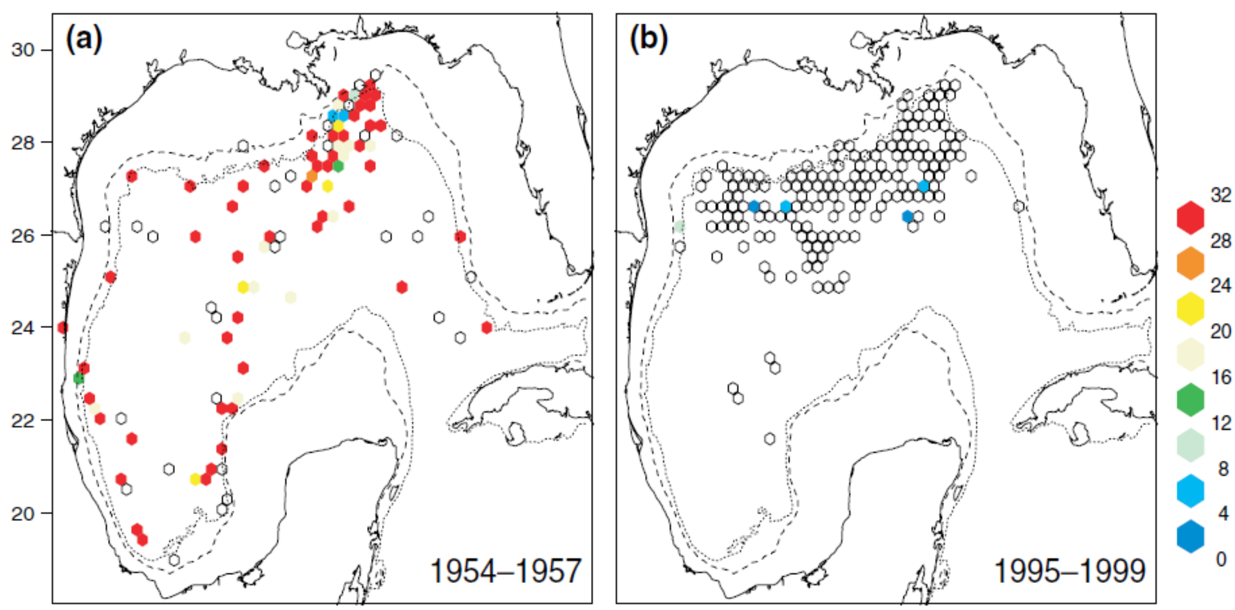

Figure 13. Map of the Gulf of Mexico showing unstandardized mean catches of oceanic whitetips per 10,000 hooks on yellowfin tuna targeted sets in the 1950s (a) and the 1990s (b). Empty hexagons are zero catch per 10,000 hooks (Baum & Myers, 2004 at 137).

In addition to CPUE declines and potential range contraction, the mean size of oceanic whitetip sharks captured in the Gulf of Mexico declined from 190 pounds (86.4 kilograms) in the 1950s to

123 pounds (56.1 kilograms) in the 1990s (Baum & Myers, 2004 at 139). This represents a greater than 35% decline in size over this time period (*see* FAO, 2012 at 13). This is important to note because decreased sizes are often observed in heavily exploited species and are indicative of population declines (*see* Baum & Myers, 2004 at 140).

This study was subsequently criticized for failing to adequately account for changes in fishing gear and depth distribution of longline sets in the study area between the data sets (*see* FAO, 2012 at 10 (citation omitted)). While the authors of Baum & Myers, 2004 continue to maintain that their estimates of CPUE decline for this time period are robust, even the "corrected" decline estimate from the study's detractor claims an 88%, or nearly tenfold, CPUE decline over this time period (*see* FAO, 2012 at 10 (citation omitted)).

In addition to this relatively long-term assessment of declining CPUE in the Gulf of Mexico, a 2007 study found a 57% decline in commercial longline CPUE for oceanic whitetips in the Gulf of Mexico from 1992-2003/05 based on logbook data and a 9% decline for that time period based on observer data (FAO, 2012 at 10 (citation omitted)). While observer data is generally more reliable, it is unclear whether the observer coverage was sufficient in this case to form a general picture of the areas where oceanic whitetips could be expected to be caught (including places, depth ranges, etc.). In addition, the data set for this study is much shorter, began long after industrialized fishing started in this area, and ended a decade ago. This study can therefore only provide a partial picture of the species' decline in the Gulf of Mexico from its historical abundance, even if it is accurate. Regardless, this study indicates that the oceanic whitetip has continued to decline in the Gulf of Mexico since the end of the Baum & Myers, 2004 data set.

iii. Northwest Atlantic and Gulf of Mexico Conclusion

Though there are a variety of oceanic whitetip population trend estimates for the Northwest Atlantic and Gulf of Mexico region, all of these estimates show that the species is experiencing an ongoing declining population trend in this region. These decline estimates led Brazil, Columbia, and the United States to conclude that

> when trends in abundance from the former analyses (1992-2000; Baum[,] *et al.*, 2003) are extrapolated back to the mid-1950s, they match the latter analysis (Baum [&] Myers, 2004) of abundance declines for oceanic whitetip shark (Baum[,] *et al.*, 2006). Thus, it is likely that the population of this low-productivity species is at least 15-20% of baseline (1950s) in the northwest Atlantic Ocean.

E-CoP16-Prop-42 at 5. This large population decline is certainly significant and further legitimizes the IUCN's critically endangered listing for oceanic whitetips in this region (*see* Baum, *et al.*, 2006 at 5).

b. Southwest and Equatorial Atlantic

Data concerning oceanic whitetip population trends in the Southwest and Equatorial Atlantic are less abundant, but there is significant evidence of declines and of substantial fishing effort that has been the source of decline in other, less data poor regions of the oceanic whitetip's habitat. In their CITES listing proposal for the oceanic whitetip, Brazil, Columbia, and the United States explained that

> Abundance of oceanic whitetip sharks appears to be patchy in the south and central Atlantic, but evidence suggests it is declining where it was formerly abundant. In equatorial waters, this was the second most abundant species caught by Brazilian longline vessels between 1992 and 1997. Oceanic whitetip sharks were present in 4.72% of tropical eastern Atlantic French and Spanish tuna purse-seine sets. [A 2004 study] reported that the Uruguayan longline fleet observer program in 1998–2003 recorded catch rates of only 0.006 sharks/1,000 hooks in Uruguayan and adjacent high seas south Atlantic waters (latitude 26°-37°, 16-23°C) and 0.09 sharks/1,000 hooks in international waters off western equatorial Africa. [This study] also reported that similarly infrequent records of individuals of the species were obtained by Brazilian and Ecuadorian Atlantic longline fleets. In the Brazilian longline tuna fleet, almost 80% of the oceanic whitetip sharks caught between 2004 and 2009 were juveniles. The species comprised less than 1% of the shark bycatch of the Japanese Atlantic longline fleet during 1995-2003, and 0.2% of the Atlantic shark catch by the Spanish fleet in 1999.

(E-CoP16-Prop-42 at 5 (citations omitted)).

Remaining sources generally appear to base catch estimates on relatively low numbers of overall catches, indicating that the species has become rare and that such catch statistics may become less accurate as they are increasingly based on lower numbers and are therefore more susceptible to statistical aberrations from additional catch of relatively few individuals (*see* FAO, 2012 at 11-12 (noting that one study based its CPUE estimate on a three year period where only 63 oceanic whitetips were caught in a total of 2,279,169 hooks in the Southwest and Equatorial Atlantic)). An example of these less reliable results is a recent study showing a small increase in oceanic whitetip CPUE in Brazilian waters from 2004-2010 (*see* Tolotti, *et al.*, 2013). The biggest issue with the CPUE trends in this study is a spike in CPUE for one year, with CPUE rising from 0.13 oceanic whitetips per 1,000 hooks in 2007 to 0.43 oceanic whitetips per 1,000 hooks in 2008, a nearly 187% increase, and then falling back to 0.15 oceanic whitetips per 1,000 hooks in 2010 (*see* Tolotti, *et al.*, 2013 at 137). However, such a "sharp" population increase is inconsistent with the life history characteristics of sharks where populations grow slowly, and, therefore, this "increase" is likely not indicative of an actual population increase (*see* Cortés, *et al.*, 2010 at 2060; *see also* Tolotti, *et al.*, 2013 at 137. The study identified several sources for its inconsistent results, including the "low number of years in the data series, and the lack of homogenous distribution of fishing effort and fishing strategy across the areas, years and quarters." (Tolotti, *et al.*, 2013 at 138). Defenders agrees with Tolotti, *et al.*, 2013 that these issues likely impacted their results. Defenders contends that the most likely source of the observed increase in CPUE was a change in fishing methods, noted by Tolotti, *et al.*, 2013 at 138, that resulted in the complete absence of a fishing strategy that was less likely to catch oceanic whitetips (the Japanese fishing strategy utilizing more deep hooks) for the final three years of the study and its prevalence at the beginning of the data set (*see* Tolotti, *et al.*, 2013 at 137-41). This removed a large source of effort with likely small catch and replaced it with effort statistically more likely to result in catch, thus making the CPUE results unlikely to reflect population trends and more likely to represent the effectiveness of the differing strategies at catching oceanic whitetips. In addition to this change in fishing strategy, the fishery was also constantly shifting target areas, allowing for targeting of relatively less exploited areas, which could further obscure localized oceanic whitetip declines (*see* Tolotti, *et al.*, 2013 at 138, 139 (noting one of the issues with the data set was "the lack of homogenous distribution of fishing effort . . . across the areas, years and quarters" and showing catch locations by year, which steadily moved southeast)). Ultimately, the study concluded that "[t]his study has shown that catch rates of the oceanic whitetip shark are very sensitive to changes in fishing strategy and gear, especially to those related with hook depth." (Tolotti, *et al.*, 2013 at 141).[8]

Where larger numbers of oceanic whitetip are still caught, decline trends appear clearer. For example, one study found that the "total catch of oceanic whitetip showed a continuous decline over the six-year period from 2000 to 2005, from about 640 [tons] to 80 [tons]," a decline of 87.5%, in the face of expansion of fishing effort by both foreign and local countries in this region (FAO, 2012 at 11-12 (citations omitted)). Therefore, reliable information indicates that the oceanic whitetip has substantially declined and is continuing to decline in the Southwest and Equatorial Atlantic.

2. Pacific Ocean

The oceanic whitetip was formerly one of the most abundant sharks in the Pacific Ocean. It constituted 28% of the total shark catch in the central tropical Pacific in the 1950s and was the most abundant open-ocean tropical pelagic shark species at the time (E-CoP16-Prop-42 at 5 (citations omitted)). It was also the second most abundant shark species, comprising 22.5% of the shark catch in the western Pacific and the third most abundant, comprising 21.3% of the shark catch, in the Eastern Pacific in 1967-68 (E-CoP16-Prop-42 at 5 (citations omitted)). However, as discussed below, the oceanic whitetip has experienced extreme declines in the Pacific Ocean. The analysis of population trends in the Pacific Ocean will be broken down into three sections (Western and Central Pacific, Hawaiian Islands, and Eastern Pacific) to reflect the differing geographic foci of the relevant population information. Defenders does not imply that each of these broad regions is a distinct population, though some may be, and instead treats the information related to trends in the Pacific this way as a practical method for organizing the various available sources of data.

a. Western and Central Pacific

Data from Hawaii, Japan, and other longline fishing fleets were included in a recent synopsis of the status of the oceanic whitetip shark in the Western and Central Pacific Ocean that demonstrated strong evidence of population decline in the region (Clarke, *et al.*, 2012; FAO, 2012 at 11). Clarke, *et al.*, 2012 concluded that

> All standardized catch-rate trends for the oceanic whitetip from Pacific longline and purse-seine fisheries we analyzed were consistent, steep, and downward. Congruent declines to near-zero catch rates in other data sets from Japan and Hawaii over the same period and the significantly smaller sizes of sharks we and others found confirm the depleted state of the oceanic whitetip population in the [western and central Pacific Ocean].

[8] An inference of species decline in this region is supported by the fact that, apart from the 2008 outlier year, the oceanic whitetip's proportion in catch as compared to other elasmobranchs in the fishery ranged from 0.8% to 3.4%, much less than the 30% proportion observed by Lessa, *et al.*, 1999 that was based on 1992-1997 records (Tolotti, *et al.*, 2013 at 39). Though these studies are not directly comparable due to differing fishing techniques, this is another source of information that is likely indicative of a decline in oceanic whitetip prevalence and of a change in species composition in this region.

(Clarke, *et al.*, 2012 at 206 (citations omitted)). This was followed by the first, and only, stock assessment for the oceanic whitetip in the Western and Central Pacific (*see* Rice & Harley, 2012). This assessment covered oceanic whitetips in the Pacific Ocean from 30°N to 30°S and from oceanic waters adjacent to the east Asian coast to 150°W, tracking the Western and Central Pacific Fisheries Commission's ("WCPFC's") area of authority (Rice & Harley, 2012 at 2, 6). "This assessment was based on standardized CPUE indices from all fisheries covered by observers between 1995 and 2010 and underwent rigorous peer review by expert participants associated with the" WCPFC (FAO, 2012 at 11). The assessment

> found that the [oceanic whitetip] is over-exploited and there is consistent evidence of declines in catch, CPUE, size composition, spawning biomass, recruitment and total biomass from 1995 to 2009. Estimated fishing mortality was found to have increased to levels far in excess of [the fishery's maximum sustained yield], the fishing mortality that can produce maximum sustainable yield ([the current fishery mortality/the fisheries' maximum sustained yield] = 6.5) and across the entire model estimated mortality values were much higher than [the fisheries' maximum sustained yield]. Estimated spawning biomass . . . was found to have declined to levels far below spawning biomass at [maximum sustained yield] ([current spawning biomass/spawning biomass at maximum sustained yield] = 0.153) and across the entire model current [spawning biomass] was much lower than [spawning biomass at maximum sustained yield].

(E-CoP16-Prop-42 at 6 (citing Rice & Harley, 2012)).

These trends are primarily due to longline catch, which has continued to experience an increase in effort in recent years, in addition to purse-seine catch, which has also experienced a large increase in effort recently, that have caused a large increase in fishery mortality over the past two decades (*see* Rice & Harley, 2012 at 5). The various sources of population decline data for oceanic whitetips in the Western and Central Pacific Ocean will be discussed in more detail below.

i. CPUE

A recent study assessing the available observer records from boats fishing in the Western and Central Pacific Ocean stated that "[l]ongline catch rates for oceanic whitetip shark declined consistently: annual values decreased by 90% from 1996 to 2009 and uncertainty in the estimates was low." (Clarke, *et al.*, 2012 at 202; *see also* FAO, 2012 at 11). This study hypothesized that the increase in CPUE early on in this dataset (*see* Figure 14, *infra*) "may have been due to progressively more species-specific recording during this period resulting from improved observer training." (Clarke, *et al.*, 2012 at 202). This makes sense because such "sharp" population increases are inconsistent with the life history characteristics of sharks where populations grow slowly, and this apparent increase is therefore likely not indicative of an actual population increase (*see* Cortés, 2010 at 2060). Omitting this observed spike would create a more consistent population trend, indicating that the population was in fact still declining at this time (*see* Figure 14, *infra*).

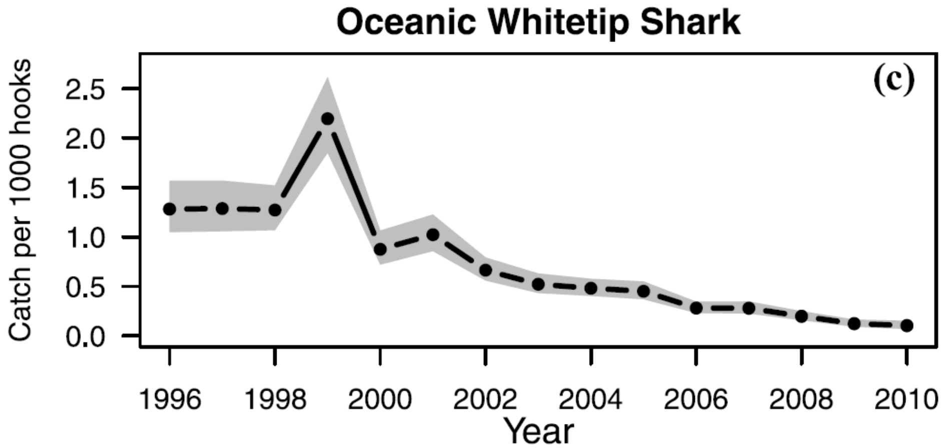

Figure 14. Standardized catch rate of oceanic whitetip sharks for longlines in the Western and Central Pacific Ocean (Clarke, *et al.*, 2012 at 203).

In addition to the aforementioned 90% overall decline statistic, the study explained that "[o]ceanic whitetip sharks declined significantly by 17% (95% CI 14% to 20%) per year . . ." in the longline catch (Clarke, *et al.*, 2012 at 202). Furthermore, while this study was unable to standardize purse-seine catches in some of the areas that it covered, it explained that the oceanic whitetip was one of only two species regularly caught in that fishery and that the species "exhibited declines that resembled those in the longline fishery." (Clarke, *et al.*, 2012 at 202; *see also* Figure 15, *infra*). As for these purse-seines, "[a]nalyses for [the oceanic whitetip] by set type . . . indicated associated sets' catch rates were approximately double those of unassociated sets." (Clarke, *et al.*, 2012 at 202).

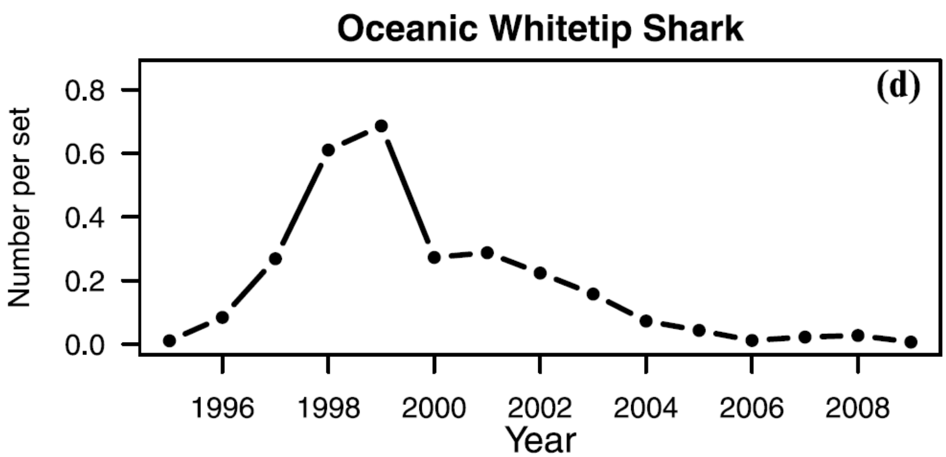

Figure 15. Catch rate of oceanic whitetip sharks for purse-seine nets in the Western and Central Pacific Ocean (Clarke, *et al.*, 2012 at 203).

The authors of this study explained that this data, in combination with other data sets available for the region indicate that the oceanic whitetip is depleted in this region (Clarke, *et al.*, 2012 at 206 (citations omitted); *see also* FAO, 2012 at 11).

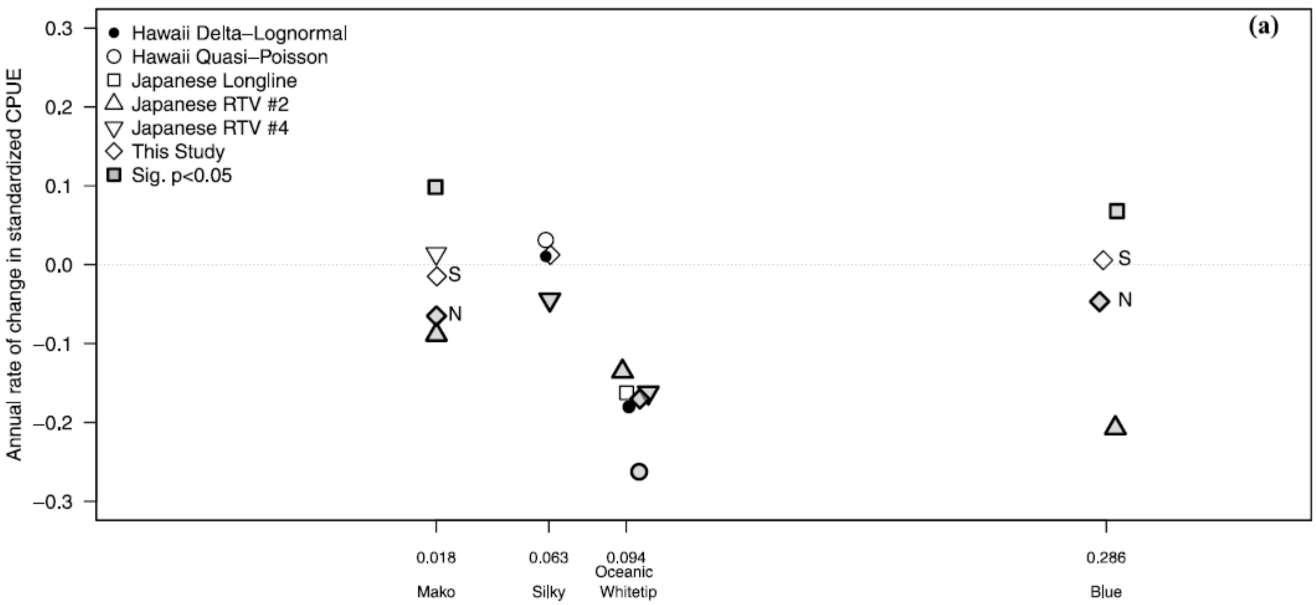

Figure 16. Trends in catch rate of Pacific oceanic sharks in the Western and Central Pacific Ocean longline and purse-seine fisheries (Clarke, *et al.*, 2012 at 204).

In addition to these recent declines, it is clear that the oceanic whitetip's decline in the Western and Central Pacific began before 1995 (*see, e.g.,* Rice & Harley, 2012 at 8-9; FAO, 2012 at 11).

> Thus, the estimated declines are highly likely to be underestimates of the historical extent of decline of oceanic whitetip. A comparison of the CPUE from shark surveys conducted in the Central Pacific between 1952 and 1995 ([2.7 oceanic whitetips per 1,000 hooks in 1958]) with a mean CPUE in 1995–2000 ([0.35–1.22 oceanic whitetips per 1,000 hooks] . . .), indicates a twofold to sevenfold decrease in CPUE prior to 1995.

(FAO, 2012 at 11 (citations omitted)). While these pre-1995 decline estimates may not be completely accurate due to potential differences in fishing gear, practices, and other factors affecting catch rates, they are instructive of the ongoing context in which these recent declines have occurred and signal that the 90% decline in CPUE from 1996-2009 does not represent the oceanic whitetip's entire population decline in this region (*see* FAO, 2012 at 11 (citation omitted)). In addition, the species has likely continued to decline in the period following this study's dataset, making the oceanic whitetip's current population numbers even more depleted in this region (*see, e.g.,* Figure 17, *infra* (indicating a general increasing trend in oceanic whitetip fishing mortality in both targeted and bycatch longlines and in associated purse-seine fishing)).

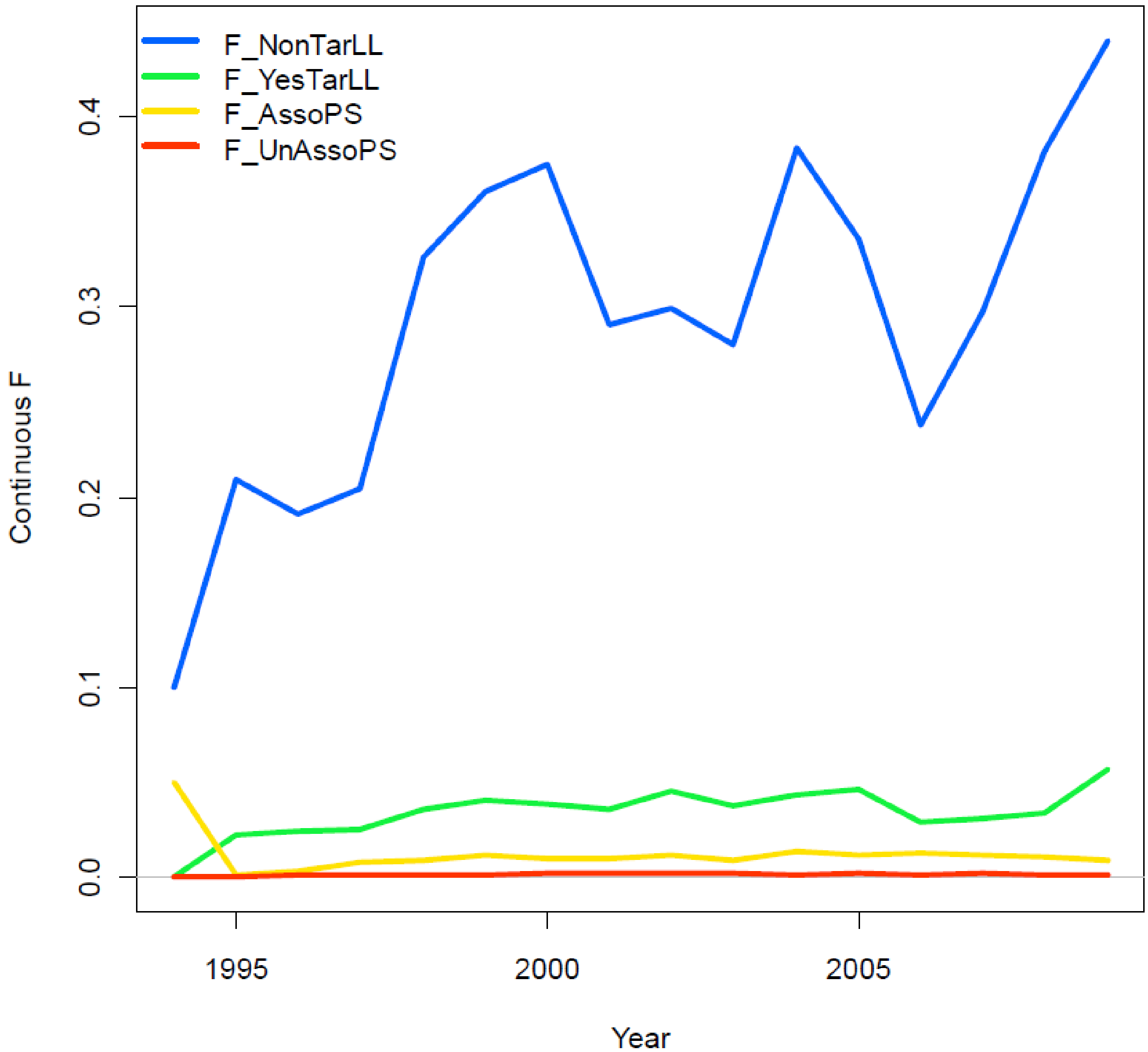

Figure 17. Estimated relative oceanic whitetip fishing mortality by fleet from 1995-2009 (Rice & Harley, 2012 at 41).

The aforementioned stock assessment of the Western and Central Pacific Ocean shows similar CPUE declines over this time period (*see generally* Rice & Harley, 2012; *see also* Figure 18, *infra*; Figure 19, *infra*).

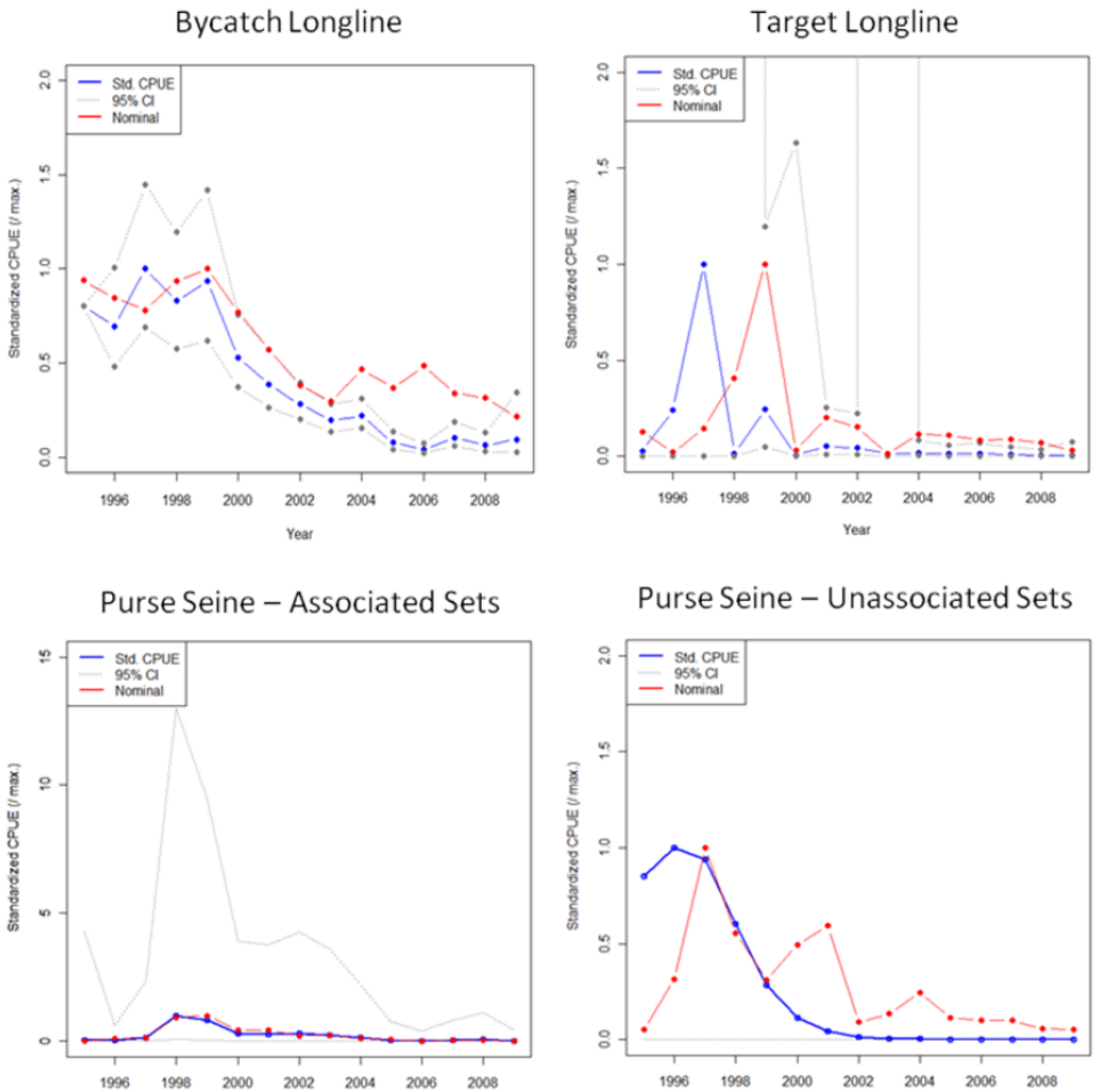

Figure 18. Standardized and nominal oceanic whitetip CPUE for each of the four fisheries covered by the Western and Central Pacific Ocean stock assessment from 1995-2009 (Rice & Harley, 2012 at 31).

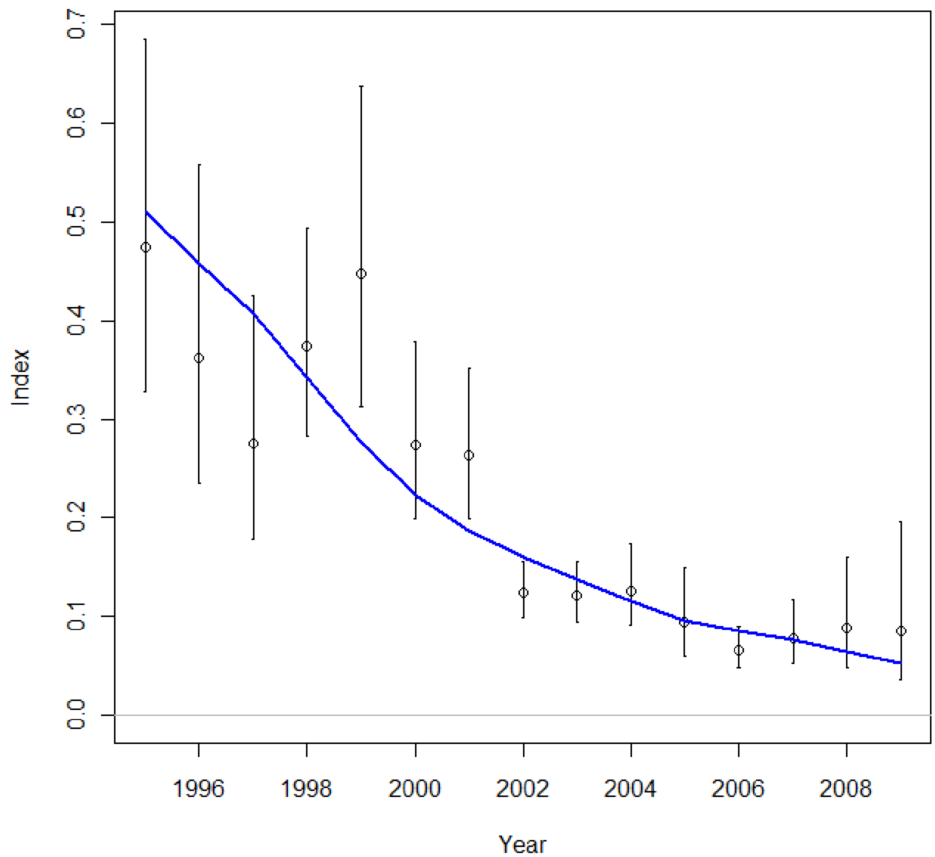

Figure 19. A comparison of the observed longline bycatch CPUE (empty circles with 95% confidence intervals) and model fit (blue solid line) from 1995-2009 (Rice & Harley, 2012 at 36).

The congruence in CPUE trends between these two studies increases the likelihood that the CPUE declines they show are accurate for the covered time periods.

ii. Biomass

In addition to CPUE data, the oceanic whitetip stock assessment for the Western and Central Pacific Ocean also contained analysis of oceanic whitetip biomass that is useful for assessing the species' population trend. This assessment found that current oceanic whitetip fishing mortality is "far in excess" of maximum sustained yield ("MSY") for the species, meaning that overfishing is occurring in the Western and Central Pacific Ocean (Rice & Harley, 2012 at 2). In fact, the fishery mortality for the Western and Central Pacific in 2010 was estimated as being 6.5 times MSY for the species (FAO, 2012 at 14). In addition, the estimated oceanic whitetip spawning biomass[9] has declined to levels "far below" MSY for the species, which indicates that the stock is overfished (Rice & Harley, 2012 at 2). There was little uncertainty in the spawning biomass MSY, and the assessment indicated

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[9] "In this assessment the term spawning biomass (SB) is a relative measure of [breeding] potential and is a unitless term of reference. It is comparable to other iterations of itself (e.g. $SB_{CURRENT}/SB_{MSY}$ but not to total biomass." (Rice & Harley, 2012 at 8). As this measure decreases it indicates reduced breeding potential.

that "spawning biomass has declined over the model period by 86%" and that the current spawning biomass is "much lower" than the spawning biomass in 1995 across all spawning biomass model runs undertaken as part of the assessment (Rice & Harley, 2012 at 2-3). In fact, some of the runs indicated declines in excess of 91% (*see* Rice & Harley, 2012 at 3). This spawning biomass was so low that it was estimated to be 15.3% of the optimal biomass at MSY (FAO, 2012 at 14). In addition to these declines, it is clear that declines began before the beginning of the data set used in this assessment (FAO, 2012 at 13). These estimates are largely in addition to those found in Ward & Myers, 2005 which found a 90% decline in biomass using generalized linear models of pelagic longline survey data from the 1950s with data collected on commercial longline vessels by at-sea observers in the 1990s between latitudes 20ºS and 20ºN and longitudes 180ºW and 120ºE (*see* Ward & Myers, 2005; E-CoP16-Prop-42 at 5), indicating that declines since the 1950s are in fact much larger than those covered by the oceanic whitetip stock assessment alone.

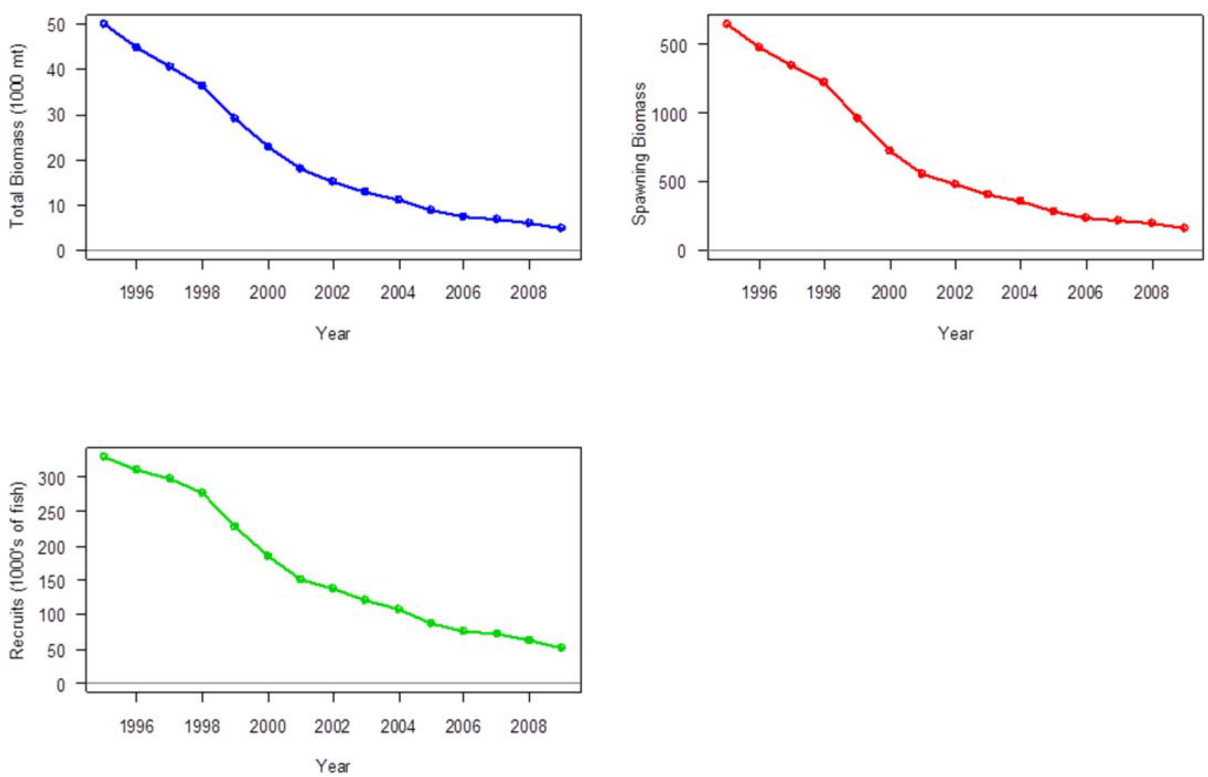


Figure 20. Estimated total biomass (top left, 1,000 metric tons), estimated spawning biomass (top right), and estimated annual recruitment (1,000's of fish) for oceanic whitetips in the Western and Central Pacific Ocean from 1995-2009 (Rice & Harley, 2012 at 39).

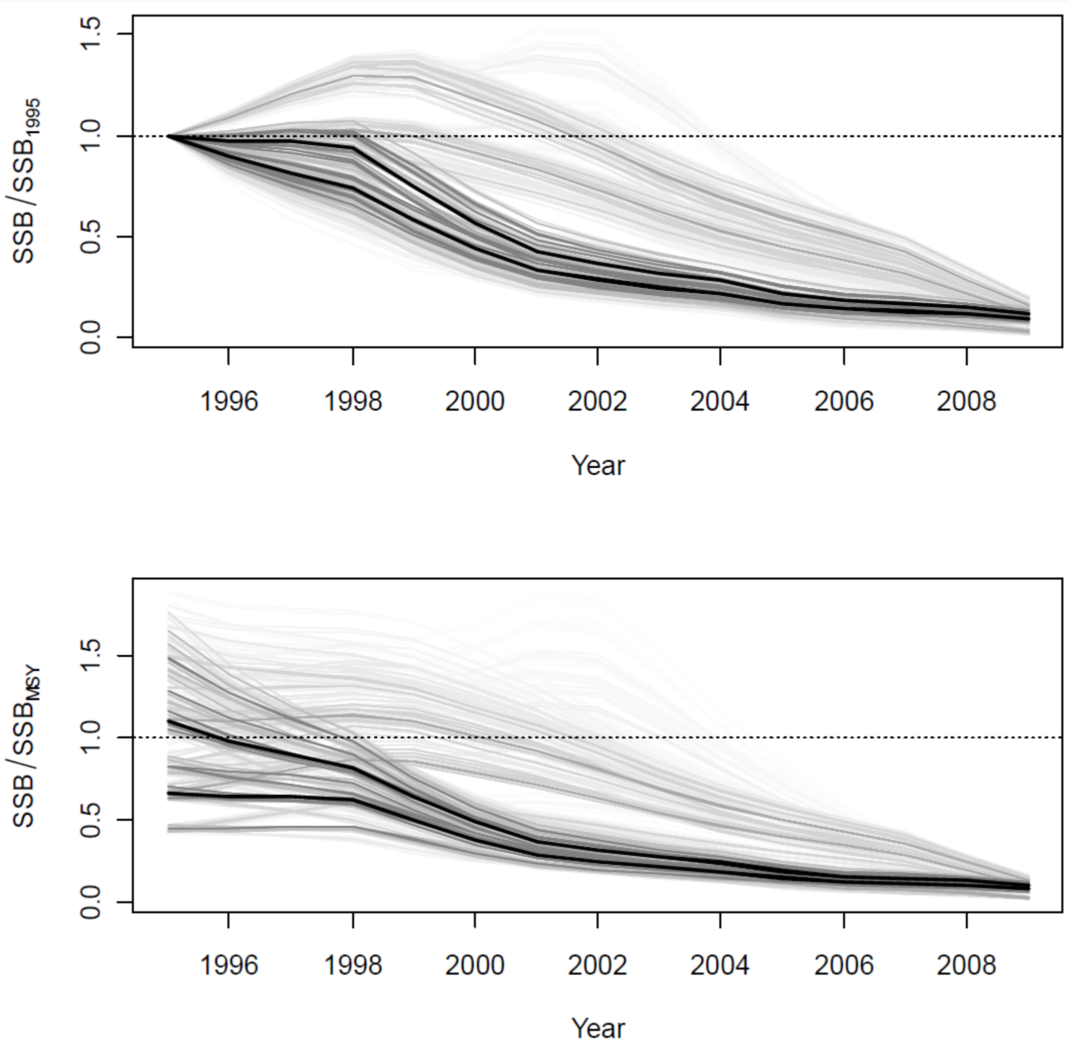


Figure 21. Changes in the spawning biomass relative to the first year of the model (1995 – top panel) and SB_{MSY} (bottom panel). Each line represents one of 648 runs from the grid and the darker the line, the higher the assigned weight (plausibility) for that model run (Rice & Harley, 2012 at 40).

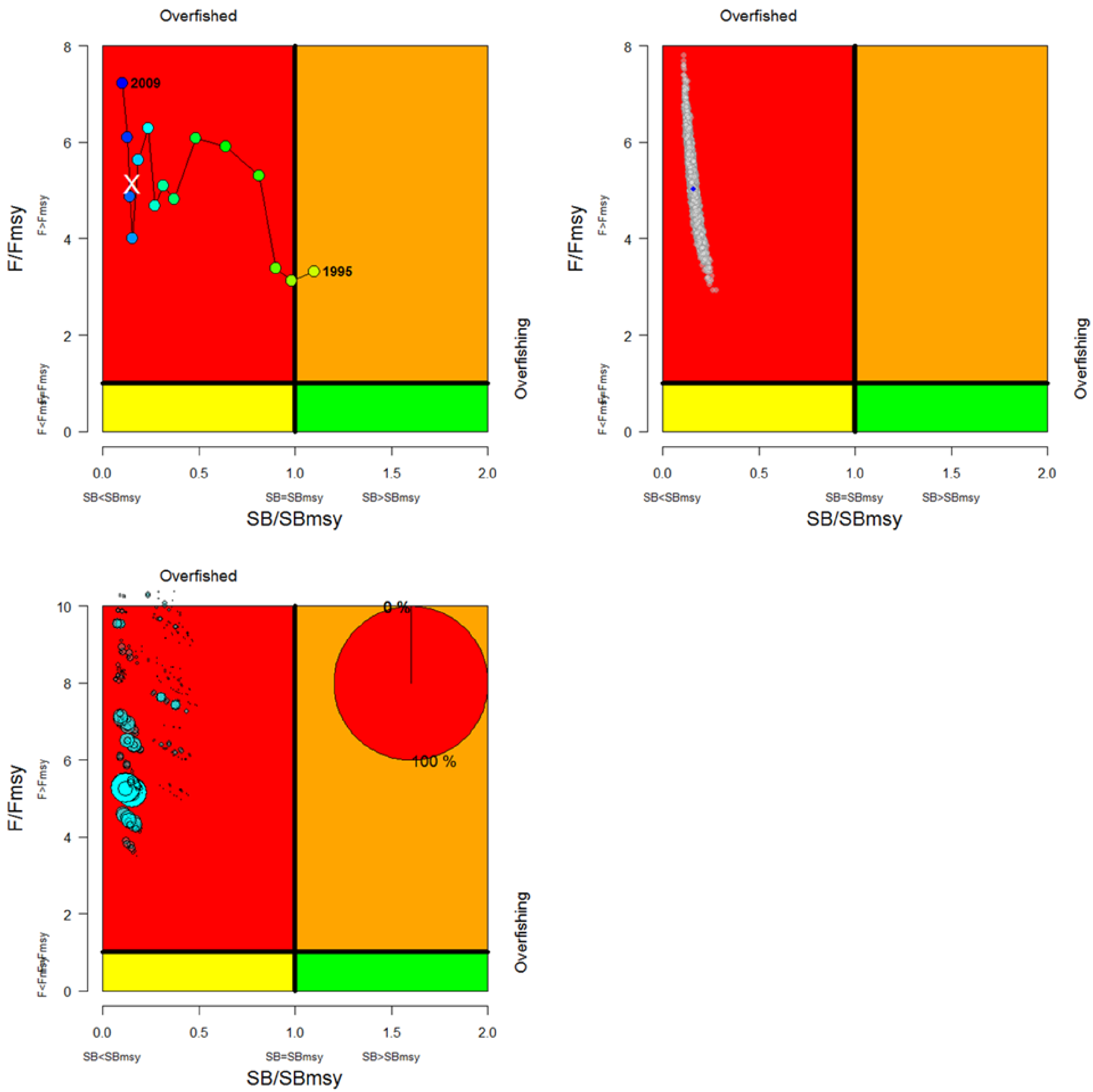


Figure 22. Kobe plots indicating annual stock status, relative to SB_{MSY} (x-axis) and F_{MSY} (y-axis) reference points. These present the reference model for the period 1995–2009 (top left panel), the statistical uncertainty for the current (average of 2005-2008) status (top right panel, blue dot indicates current estimates), and based on the current (average of 2005-2008) estimates for all 648 models in the grid (bottom panel). In the bottom panel the size of the circle is proportional to the weight (plausibility) of the model run. Note that the y-axis range differs in the last graph (Rice & Harley, 2012 at 43).

iii. Individual Size

Studies indicate that the size of individual oceanic whitetips is also declining in the Western and Central Pacific Ocean. For example, one study found that the average oceanic whitetip was slightly over 79 pounds (36 kilograms) in the 1950s, but that the average weight had dropped to just half that, slightly less than 40 pounds (18 kilograms), in the 1990s (Ward & Myers, 2005 at 840; E-CoP16-Prop-42 at 5-6). In addition, Clarke, *et al.*, 2012 noted that oceanic whitetips experienced significant declining size trends in this region (Clarke, *et al.*, 2012 at 202, 204). This smaller size of sharks found "confirm[s] the depleted state of the oceanic whitetip population in the Western and Central Pacific Ocean." (FAO, 2012 at 11; E-CoP16-Prop-42 at 5-6; Ward & Myers, 2005 at 840-41)

> Trends in a standardized measure of fish size can indicate changes in the age and size composition of the population. In particular, size is expected to decrease in harvested populations. The magnitude of such change can, in theory, provide information on the level of exploitation of a fish stock. In addition to calculating median size as an annual indicator, we compared this median size to the length at which 50% of the population reached full maturity (referred to hereafter as length at maturity) from the literature (Supporting Information). This comparison indicated whether the majority of captured sharks of each species were being caught before they were able to reproduce.

(Clarke, *et al.*, 2012 at 201 (citation omitted)).

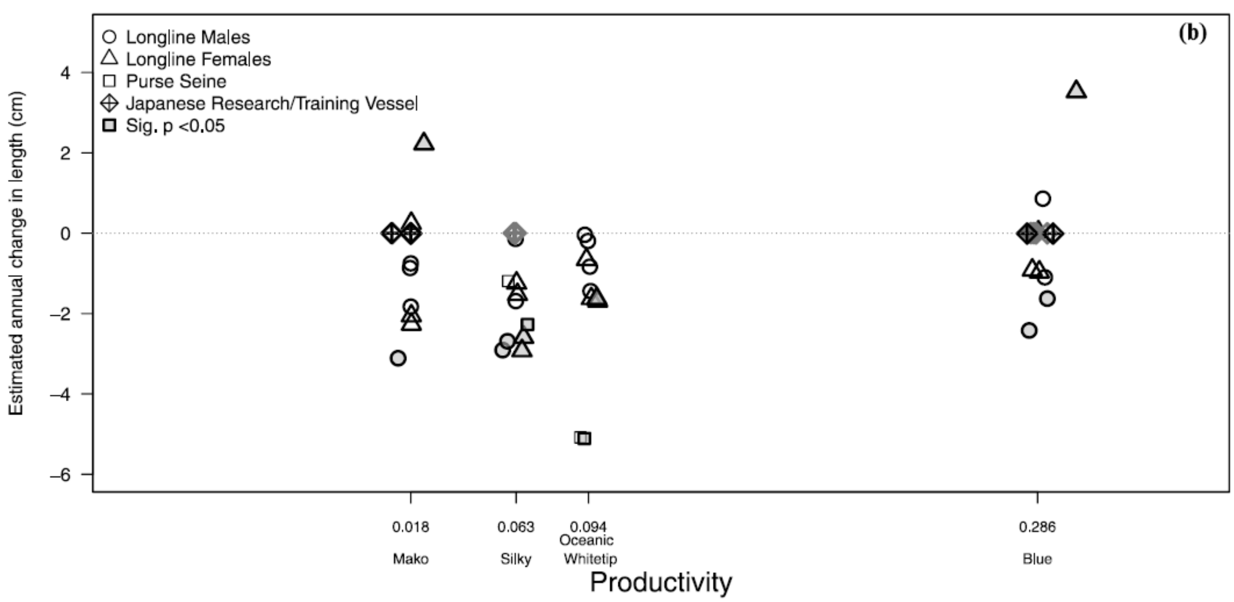


Figure 23. Trends in size of oceanic sharks in the Western and Central Pacific relative to their reproductive productivity (intrinsic rate of increase) (Clarke, *et al.*, 2012 at 204).

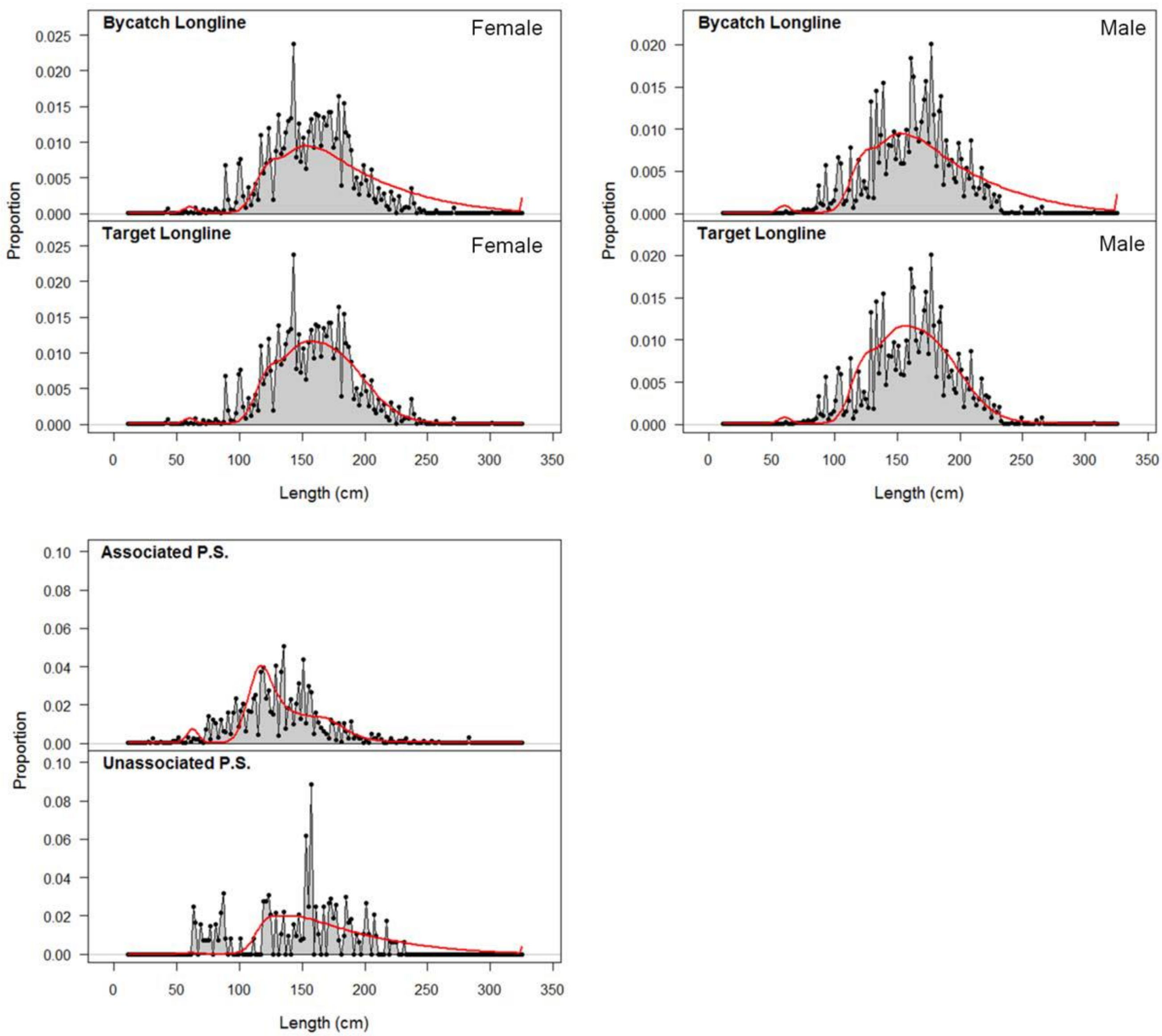


Figure 24. Predicted catch at length (red line) and observed lengths (black line and grey shaded area) with samples and predictions pooled across all years. The top four panels are for the longline fisheries (males on the right and females on the left), the bottom two panels are for the purse-seine fisheries (top associated and bottom unassociated purse seines) in which the length composition was unsexed (Rice & Harley, 2012 at 37).

In addition to decreasing average size, "[a]ll oceanic whitetip sharks sampled from purse-seine fisheries since 2000 were also immature . . ." (Clarke, *et al.*, 2012 at 202). Catch of immature specimens decreases the species' ultimate spawning biomass and will lead to further declines and imminent population collapse.

b. Hawaiian Islands

Although the Hawaiian Islands themselves are within the far eastern extreme of the area covered by the Western and Central Pacific oceanic whitetip stock assessment (*compare* Rice & Harley, 2012 at 6 (covering waters in the Pacific Ocean adjacent to the east Asian coast to 150°W and from 30°N to 30°S); Brodziak & Walsh, 2013 at 1728 (showing location of the Hawaiian Islands, with all islands being close to 20°N and 150°W)), Defenders addresses this area separately because (1) there is an even more recent study available showing CPUE trends in this smaller area (*see generally* Brodziak & Walsh, 2013); (2) this study addresses data over a slightly longer dataset (Brodziak & Walsh, 2013 at 1724 (covering 1995-2010); and (3) the study covers some more northerly and easterly waters, and is therefore not entirely geographically redundant with the Western and Central Pacific oceanic whitetip stock assessment (*compare* Brodziak & Walsh, 2013 at 1728 (assessing oceanic whitetip CPUE from the equator to 40°N and from 180°W to 140°W); Rice & Harley, 2012 at 6 (covering waters in the Pacific Ocean adjacent to the east Asian coast to 150°W and from 30°N to 30°S)).

Brodziak & Walsh, 2013 assessed observer data from the Hawaii-based pelagic longline fishery stretching from 1995-2010 in order to track CPUE of oceanic whitetips over this time period (Brodziak & Walsh, 2013 at 1724). The authors used several models in order to make an accurate assessment of the species' CPUE over time in this fishery and found that "each of the best-fitting alternative models . . . showed a highly significant decreasing trend . . . in standardized CPUE during 1995–2010. For the best-fitting . . . model, there was an annual mean decrease of about 4.1% per year ([plus/minus] 0.4%)." (Brodziak & Walsh, 2013 at 1728). While this study noted the oceanic whitetip's increased susceptibility to hooks in shallow longline sets, except when the deep sets are being deployed or hauled back and the hooks pass through the near-surface mixed layer (Brodziak & Walsh, 2013 at 1730), both deep and shallow sets experienced extreme declines (*see* Figure 25, *infra*).

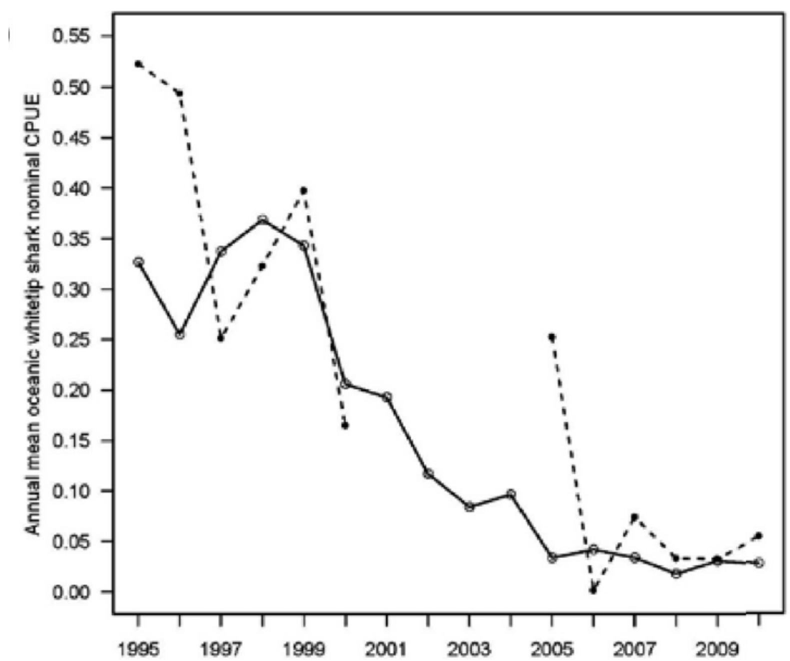


Figure 25. Oceanic whitetip catch trends in the Hawaii-based pelagic longline fishery from 1995–2010 for the deep-set sector (solid line) and shallow-set sector (dashed line). Shallow-set sector data are not plotted for 2001–2004 because the fishery was closed for all or part of these years (Brodziak & Walsh, 2013 at 1734).

Ultimately, the authors determined that the oceanic whitetip CPUE had experienced an approximately 90% decline over this short time-period and that this decline "alone would represent meaningful grounds for concern." (Brodziak & Walsh, 2013 at 1731; *see also* FAO, 2012 at 11 (citing earlier study for proposition that "[t]he mean nominal CPUE was estimated to have decreased by 91.6 percent, from 0.428 [oceanic whitetips per 1,000] hooks in 1995 to 0.036 [oceanic whitetips per 1,000] hooks in 2010. The standardized CPUE showed the same general decline trend. The annual mean nominal CPUE in the deep- and shallow-set was estimated to have decreased by 91.5 percent and 89.6 percent, respectively, over the same period.") (citation omitted)). However, when considered with the congruent Western and Central Pacific standardized CPUE declines, the geographical and species-wide extent of this decline becomes clearer (*see* Brodziak & Walsh, 2013 at 1731). While part of this congruence is due to inclusion of some of the Hawaiian longline data in the aforementioned Western and Central Pacific stock assessment, the "tuna purse seine fishery data documented a similar (79%) decrease in oceanic whitetip shark catches from 20°S to 20°N and 150°W to 130°E between 1999 and 2010." (Brodziak & Walsh, 2013 at 1731 (citation omitted)). "Furthermore, the consistent CPUE standardization results generated by a suite of . . . analyses representing different hypotheses regarding the nature of observed zero catches reinforce the inference that oceanic whitetip shark has undergone a large decrease in relative abundance on the order of 90% since the mid-1990s." (Brodziak & Walsh, 2013 at 1732). The study's authors explained that

> The similarity between our results for the Hawaii longline fishery and those from the Western Pacific Ocean indicates that the decline in relative abundance of oceanic whitetip shark has not been a localized phenomenon near Hawaii. Rather, it appears to have occurred concomitantly with declines in multiple regions of the Pacific Ocean.

(Brodziak & Walsh, 2013 at 1732). "Overall, it is clear that oceanic whitetip shark abundance has declined substantially in the Pacific." (Brodziak & Walsh, 2013 at 1732).

In addition to Brodziak & Walsh, 2013, another recent study, Walsh & Clark, 2011, also found that oceanic whitetip CPUE decreased by greater than 90% since 1995 in the Hawaii-based pelagic longline fishery (Walsh & Clark, 2011 at 9). The mean annual nominal CPUE for oceanic whitetip sharks decreased significantly from 0.428 oceanic whitetips per 1,000 hooks in 1995 to 0.036 oceanic whitetips per 1,000 hooks in 2010 (Figure 26, *infra* (top panel)). This reflects both a significant decrease in nominal CPUE on longlines with positive catch, from 1.690 oceanic whitetips per 1,000 hooks to 0.773 oceanic whitetips per 1,000 hooks, and a significant increase in longlines with zero catches, from 74.7% in 1995 to 95.3% in 2010 (*see* Figure 26, *infra* (bottom panel); Walsh & Clark, 2011 at 6)).

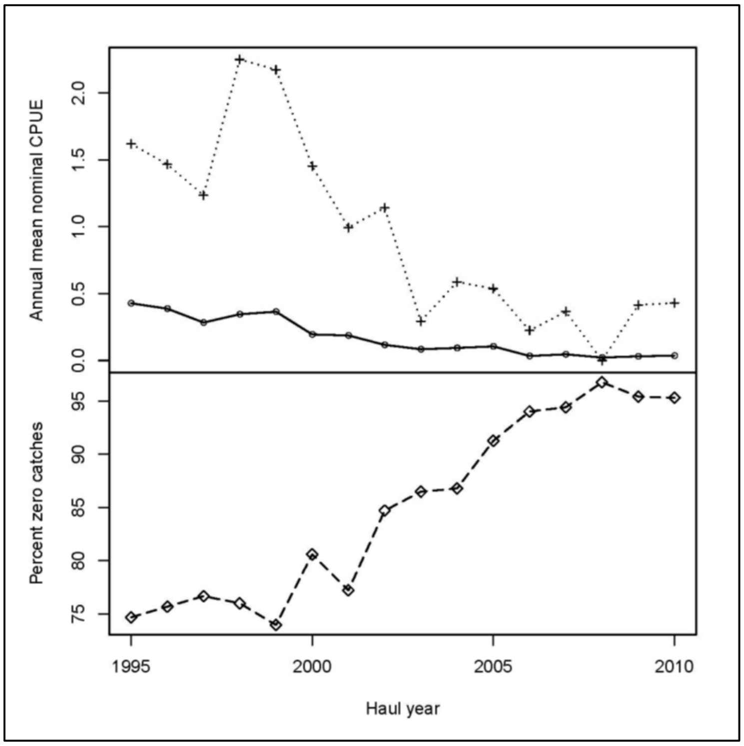


Figure 26. Oceanic whitetip annual mean nominal CPUE (upper panel - solid line), annual mean nominal CPUE on sets with positive catch (upper panel - dotted line), and percentages of zero catches (lower panel) in the Hawaii-based pelagic longline fishery from 1995–2010 (Walsh & Clark, 2011 at 33).

c. Eastern Pacific

While assessments of the oceanic whitetip's decline in the Eastern Pacific are less prevalent and wide-reaching than in the Western and Central Pacific or Hawaii, the information that does exist shows that the species has experienced large, recent, and ongoing population declines in this region. For example, observer data covering 100% of sets from the relatively short period of time where fish aggregating devices ("FADs") have been used in the Eastern Pacific purse-seine fishery indicates "that the purse seine CPUE [of oceanic whitetips] on floating objects . . . experienced an extent of decline greater than 95 percent in the Eastern Pacific between 1994 and 2006." (FAO, 2012 at 10 (citation omitted); *see also* FAO, 2012 at 14 (same); E-CoP16-Prop-42 at 6 (noting declines in these fisheries); Clarke, *et al.*, 2012 at 202 (indicating that such associated sets generally catch about twice as many oceanic whitetips as unassociated sets in the Western and Central Pacific)).

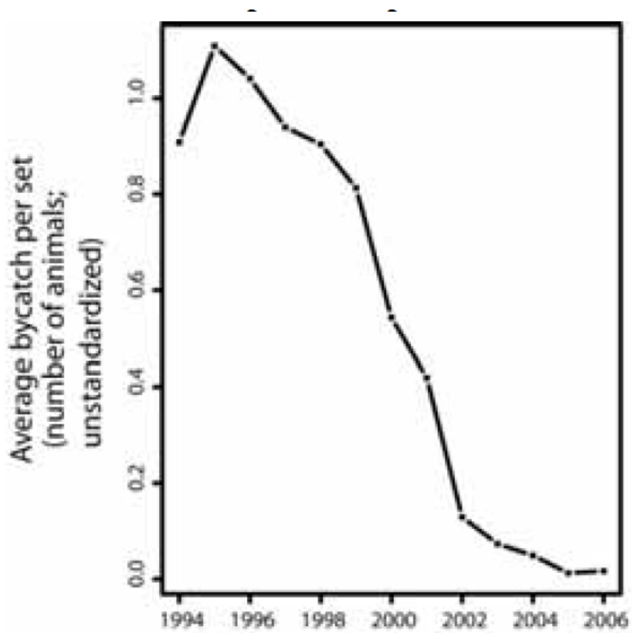


Figure 27. Unstandardized oceanic whitetip CPUE from purse-seine research surveys in the Eastern Pacific Ocean (FAO, 2012 at 28 (citation omitted)).

FAO explained that "[t]he information appears to be robust but is surprising considering the long history of longline exploitation prior to the beginning of this time series, and the relatively low removals by this fishery." (FAO, 2012 at 14). However, while surprising in its extreme character, this data is indicative of a collapsing population after years of exploitation by longline and other fisheries. Therefore, the recent oceanic whitetip population decline in this region appears to be at least as extreme as that experienced by the species in any other part of its range during this time period.

3. Indian Ocean

Indian Ocean trend data is somewhat limited. However, the trend data that does exist shows precipitous oceanic whitetip population declines. Japan developed a tuna longline fishery in the Indian Ocean in the 1950s, but catch was reported as sharks generally until species-specific reporting was implemented around 2000 (Semba & Yokawa, 2011 at 1-2). Data from 2000-2009 shows that effort in this fishery rapidly increased after 2007 (Semba & Yokawa, 2011 at 4). This was also met with increasing frequency of utilization of oceanic whitetips as a result of decreasing catch in target species (Semba & Yokawa, 2011 at 4). Ultimately, the Japanese tuna longline fleet data shows a rate of CPUE decline of 40 percent over 6 years (2003–09) (*see* FAO, 2012 at 14; *see also* FAO, 2012 at 12 (citing a later paper by Semba & Yokawa that attempted to standardize the catch data and still came to an approximately 40 percent decline in oceanic whitetip CPUE from the Japanese tuna longline fisheries in the Indian Ocean from 2000 to 2010); E-CoP16-Prop-42 at 6 (citing other sources that have found the species declining)). This equates to an 8% per year decline in CPUE (*see* FAO, 2012 at 14).

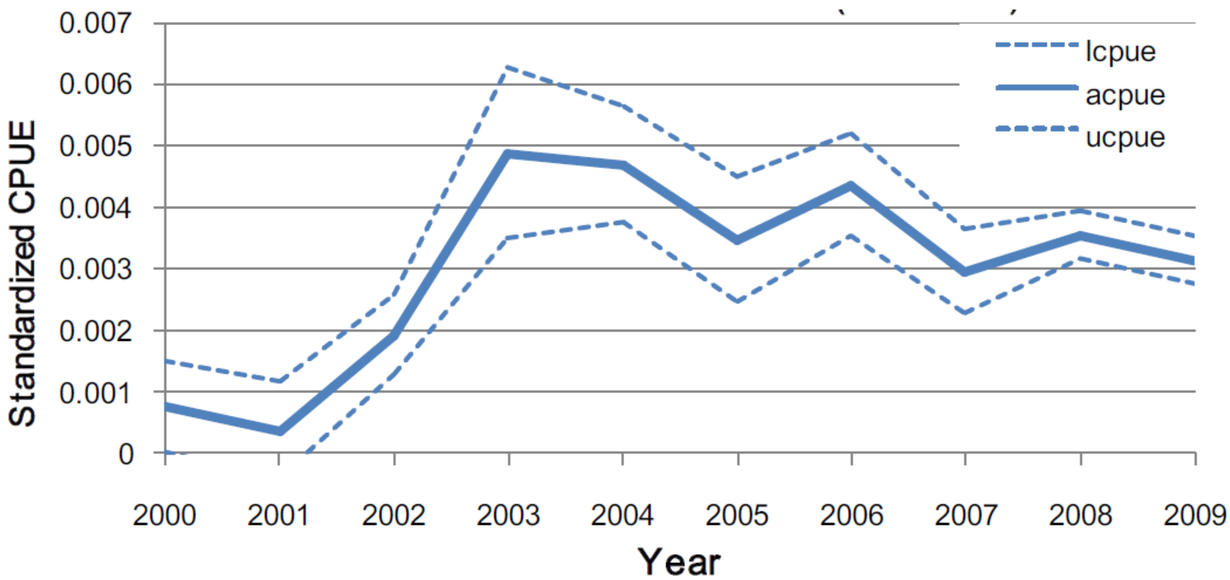


Figure 28. Trends of standardized CPUE of oceanic whitetip sharks in the Indian Ocean from 2000-2009 with 95% confidence interval (Semba & Yokawa, 2011 at 8).

Year	No. of set	No. of hook	No. of shark
2000	2,904	8,495,202	86
2001	2,824	8,617,893	6
2002	2,848	8,880,403	152
2003	1,137	3,469,751	65
2004	2,190	6,695,472	190
2005	2,249	6,962,072	156
2006	2,258	7,182,416	186
2007	3,304	10,700,051	286
2008	9,980	32,509,395	765
2009	10,535	34,278,053	645

Figure 29. The number of sets, hooks, and sharks by year used in the analysis. Note increasing effort over this time period (Semba & Yokawa, 2011 at 6).

One recent study assessing the directed shark fishery North of the Maldives indicates that the "oceanic whitetip contributed 3.5 percent of the shark catch [in this fishery] in the period 2000–04" with an average CPUE of approximately 0.14 oceanic whitetips per 100 hooks (FAO, 2012 at 12 (citation omitted)). "In comparison, data from a shark longline survey conducted in the same area in 1987–88 indicated that oceanic whitetips represented 29 percent of the shark catch" with a CPUE of 1.41 oceanic whitetips per 100 hooks (FAO, 2012 at 12 (citation omitted)). "This would represent a 90 percent decline in abundance between 1987–88 and 2000–04. Such a level of decline would be consistent with the decrease in the proportion of oceanic whitetip in the catch (from 29 percent to 3.5 percent) and also with anecdotal information reporting a marked decrease in sightings of oceanic whitetip sharks off northern and central Maldives." (FAO, 2012 at 12 (citation omitted)). The Indian Ocean Tuna Commission ("IOTC") indicated that this was likely an accurate assessment of the changes in the stock and noted that "sightings of this species in Maldives and Réunion islands [are] now quite uncommon." (FAO, 2012 at 12 (citation omitted)).

Additionally, data from the Spanish longline swordfish fleet were used to calculate that fleet's CPUE of oceanic whitetips from 1998-2011 (*see* Ramos-Cartelle, *et al.*, 2012). Ultimately, "[t]he historical trend showed large fluctuations; [but] overall, the magnitude of the decrease in CPUE was estimated to be about 25–30 percent over this period." (FAO, 2012 at 14). Because the fluctuations in this data do not match sharks' slow population increase rate, this study likely underestimates shark declines through years where the population appears to make a short-term rebound. However, even with these likely-artificial population spikes, the oceanic whitetip's decline is still apparent.

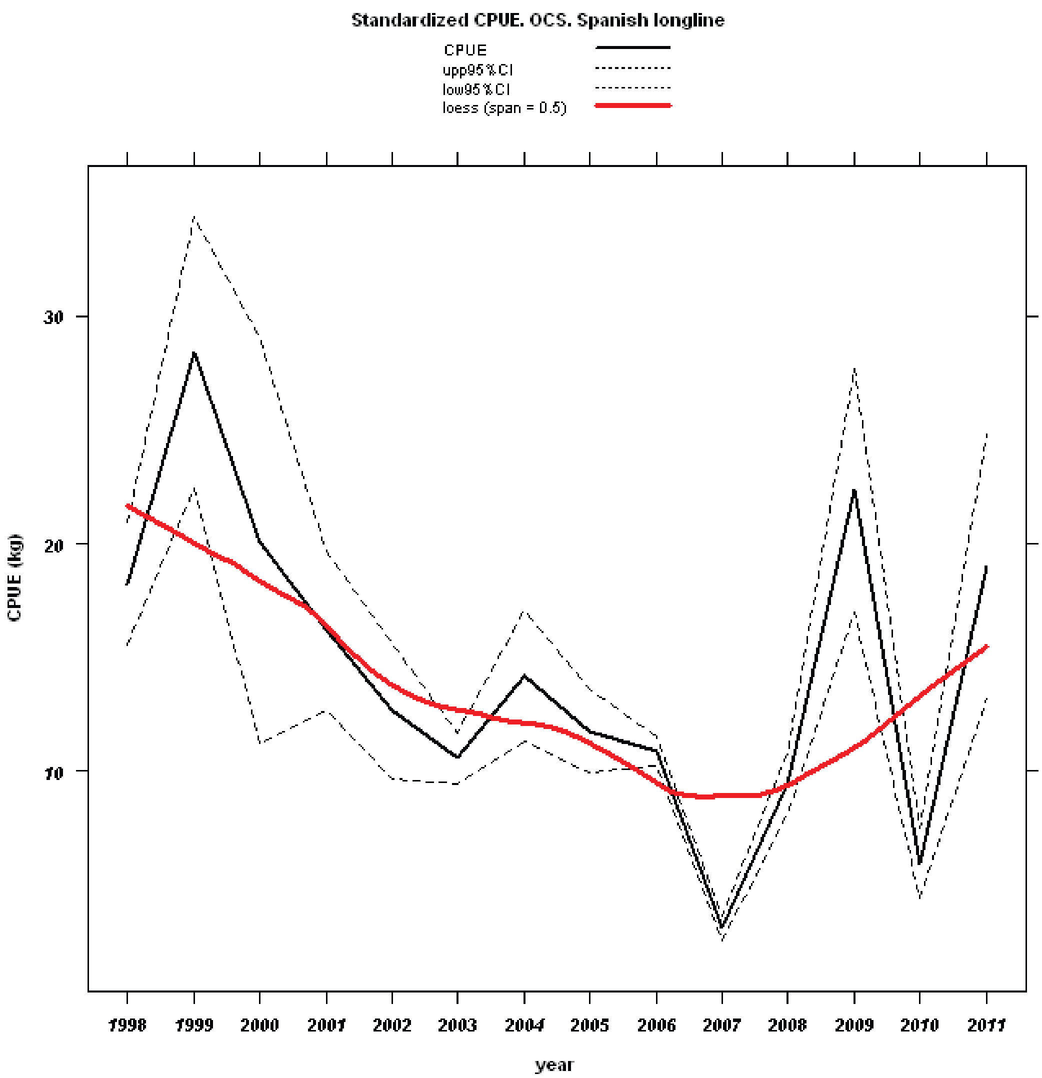


Figure 30. Estimated standardized catch rates (kilograms dressed weight), corresponding 95% confidence limits (bootstrap percentile method), and loess fit (red line) of the oceanic whitetip shark in the Spanish swordfish longline fishery from 1998-2011 (Ramos-Cartelle, *et al.*, 2012 at 15).

Finally, data on CPUE from tuna longlines in the Indian Exclusive Economic Zone ("EEZ") from 1984-2006 support the inference of a crashing oceanic whitetip stock in the Indian Ocean. While this study did not address oceanic whitetip catch rates, instead focusing on catch rates of undifferentiated sharks, it did indicate that oceanic whitetips make up 0.6% of the shark catch on

India's East coast and 4.7% of the catch in the waters around the Andaman and Nicobar Islands (delineated as "A&N waters" in Figure 31, *infra*) (John & Varghese, 2009 at 6). This study showed shark CPUE declines of 94% from the West Coast, 89% from the East Coast, and 84% from the waters around the Andaman and Nicobar Islands (*see* Figure 31, *infra*).

Year	Hooking rate (No. of shark/100 hooks)		
	West coast	East coast	A & N waters
1984	1.54	0.73	1.47
1985	1.39	1.01	1.40
1986	1.47	0.56	-
1987	1.10	1.27	-
1988	0.93	1.87	-
1989	0.54	0.85	0.89
1990	1.69	0.37	0.58
1991	2.46	0.20	0.69
1992	0.65	0.22	1.44
1993	0.75	1.28	1.97
1994	0.36	0.10	1.64
1995	0.43	0.18	0.61
1996	0.35	0.23	0.36
1997	0.35	0.33	0.29
1998	0.55	0.16	0.31
1999	0.26	0.15	0.24
2000	0.60	-	0.40
2001	0.11	0.01	0.30
2002	0.05	0.12	0.47
2003	0.10	0.10	0.28
2004	0.05	-	0.32
2005	0.14	0.10	0.37
2006	0.09	0.08	0.23

Figure 31. Numeric CPUE of undifferentiated sharks (including the oceanic whitetip) obtained in tuna longline surveys from different regions of the Indian EEZ (John & Varghese, 2009 at 8).

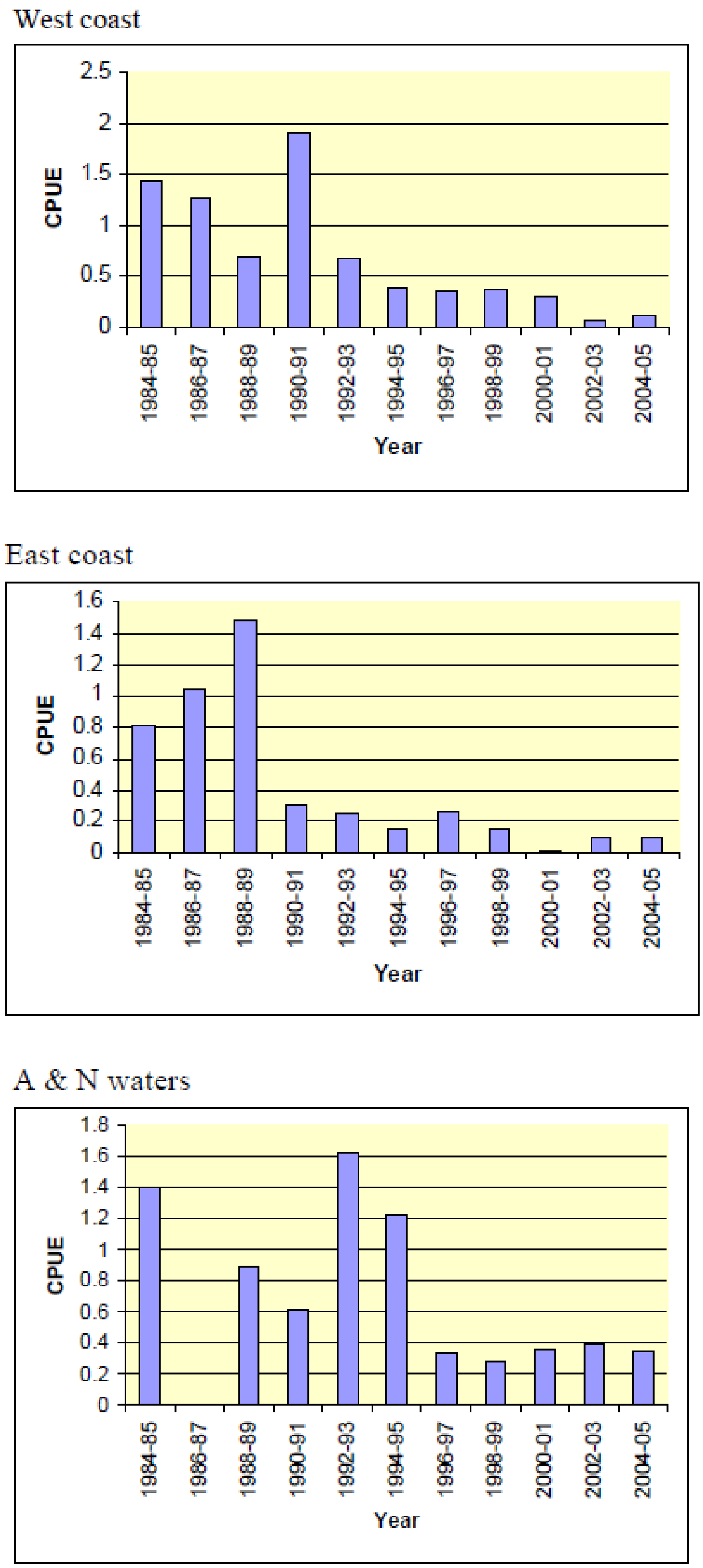


Figure 32. Trend in CPUE of sharks obtained in tuna longlines from different regions of the Indian EEZ (John & Varghese, 2009 at 9).

While the exact extent of the oceanic whitetip's decline from historical numbers in the Indian Ocean as a whole is unclear, and likely will always be somewhat unclear owing to a lack of historical records, the fact that the species is facing serious, ongoing declines in the Indian Ocean are obvious. Furthermore, because the oceanic whitetip declined to some extent before the data sets used in these CPUE assessments, and has continued since then, the presently-available population estimates under-represent the species' total declines in the Indian Ocean (*see* FAO, 2012 at 14; *see also* Semba & Yokawa, 2011 at 1-2 (noting that the Japanese longline tuna fishery began in this region in the 1950s)).

IV. IDENTIFIED THREATS TO THE PETITIONED SPECIES: FACTORS FOR LISTING

The oceanic whitetip is threatened by all five ESA listing factors. *See* 16 U.S.C. § 1553(a)(1). As discussed in Section II. F. Best Available Scientific and Commercial Data, *supra*, NMFS cannot deny listing merely because there is little information available if the best *available* information indicates that the oceanic whitetip is endangered or threatened under any one, or any combination, of the five ESA listing factors. *See* 16 U.S.C. § 1533(b)(1)(A); 50 C.F.R. § 424.11(b). The following information represents the best available science regarding the oceanic whitetip and shows that it warrants listing. *See* 16 U.S.C. § 1533(b)(3)(A). NMFS should view these threats both individually and cumulatively when assessing the oceanic whitetip's endangerment to determine whether the synergistic impact of these threats is greater than their individual additive impacts.

A. The present or threatened destruction, modification, or curtailment of its habitat or range

Oceanic whitetips are already being seriously affected by pollutants in their environment that bioaccumulate and biomagnify to tremendously high levels in their bodies. These bioaccumulation and biomagnification issues are due to the sharks' high trophic position, long life, and large size. These high pollutant loads cause a variety of negative physiological impacts in the oceanic whitetip. Because the pollution of the oceans in ongoing, this represents both a current and future threat to the oceanic whitetip's habitat. Furthermore, the impacts of these pollutants are often synergistic and will therefore have a compounded effect in excess of what their additive effects would be. Polychlorinated biphenyls ("PCBs") and dioxin are specifically assessed in this Petition. However, NMFS should consider all of the pollutants in the oceanic whitetip's habitat and their impact on the species during a status review.

The worldwide contamination of the oceans by PCBs is "of great concern due to their toxic effects on humans and wildlife. PCBs constitute a class of 209 compounds with differential biological activity and toxicity. . . ." (Storelli, *et al.*, 2003 at 1035). PCBs accumulate in the fat of sharks, are present in sharks throughout the world, and "certain, high trophic level sharks [, like the oceanic whitetip,] are likely to accumulate PCBs at potentially hazardous concentrations." (*See* Gelsleichter & Walker, 2010 at 499). These PCBs produce neurotoxic and endocrine-disrupting effects and can have serious impacts on animals that ingest them (Storelli, *et al.*, 2003 at 1035). "Due to their ability to adopt a planar configuration and induce cellular responses similar to those elicited by toxic [dioxins], a group known as the coplanar or dioxin-like PCBs . . . are believed to be largely responsible for the toxicity of technical PCB mixtures." (Gelsleichter & Walker, 2010 at 499). These dioxin-like PCBs "exert a wide range of toxic responses particularly focused on the edocrine system . . ." (Storelli, *et al.*, 2003 at 1035). "Given the differences in the toxicity of [dioxin-like

PCBs] and other PCB congeners, congener-specific analysis of PCB residues in aquatic wildlife are typically conducted to gain a better understanding of the toxic potential of these compounds. When this is performed, concentrations of individual [dioxin-like PCBs] can be adjusted by their respective [toxic equivalence factors ("TEFs")] and resulting values summed to obtain a [toxic equivaleny ("TEQ")] specifically for these compounds . . ." (Gelsleichter & Walker, 2010 at 499-502; *see also* Storelli, *et al.*, 2003 at 1037). These equivalency values make it very apparent how much more toxic the dioxin-like PCBs are than the non-dioxin-like PCBs. For example, in a study that measured PCBs in the smooth hammerhead shark, a grouping of three mono-*ortho* PCBs were at a concentration of 3.11 nanograms per kilogram (3.11 micrograms per gram) in the smooth hammerhead's liver tissue (*see* Storelli, *et al.*, 2003 at 1037). These three PCBs had a TEQ of 15.56, whereas only 0.99 nanograms per kilogram (0.99 micrograms per gram) of dioxin-like PCBs had a TEQ of 4,828.3 (*see* Storelli, *et al.*, 2003 at 1037). This means that the TEQ for the dioxin-like PCBs from this study was roughly 975 times that of the mono-*ortho* PCBs and that the average TEQ of the dioxin-like PCBs was 4,877.1.

A study looking at the pollutant composition of an amalgamated liver oil sample taken from three sharks (the oceanic whitetip, another *Carcharhinus* species (the silky shark (*Carcharhinus falciformis*)), and the nurse shark (*Ginglymostoma cirratum*)) did not assess overall PCB load, but did look at dioxins and dioxin-like PCBs in the sample (*see* Cruz-Nuñez, *et al.*, 2009 at 6). The study found very high levels of both of these pollutants in the tested liver oil (*see* Cruz-Nuñez, *et al.*, 2009 at 6). In fact, the study found that the sharks' liver oil contained 14.3 nanograms of dioxin-like PCBs per kilogram (14.3 micrograms per gram) and 3.69 nanograms of dioxins per kilogram (3.69 micrgrams per gram) (Cruz-Nuñez, *et al.*, 2009 at 6).

Dioxins	value ($ngkg^{-1}$)
Dioxins PCDD/F incl. LOQ	3.69
Dioxin-like PCBs incl. LOQ	14.3

Figure 34. Contents of dioxins in nanograms per kilogram in the undifferentiated liver oil of 3 sharks (one of which is the oceanic whitetip) caught off of Cuba (Cruz-Nuñez, *et al.*, 2009 at 6).[10]

A 2003 study assessing PCBs in the liver tissue of the smooth hammerhead shark (*Sphyrna zygaena*) found total PCB concentrations of only 17.39 nanograms per kilogram (17.39 micrograms per gram) in even its most PCB-heavy specimen and mean concentrations of only 4.26 nanograms per kilogram (4.26 micrograms per gram) (*see* Storelli, *et al.*, 2003 at 1036). While the PCB levels

[10] Cruz-Nuñez, *et al.*, 2009's conclusion that this liver oil has a "not so high" content of dioxins is a result of the study's concern with meeting seafood standards and is in no way an assessment of harmful effects to the species, which the study never considered (*see* Cruz-Nuñez, *et al.*, 2009 at 7-8 (comparing levels of dioxin to those allowed in other commercial fish oil and not discussing health effects to the sharks at all)). The study also discounted the dioxin-like PCBs saying that they could be "removed during the production by purification process." (*see* Cruz-Nuñez, *et al.*, 2009 at 8). However, this "purification process" does not relate to the sharks' well-being as it would only occur after the sharks have been killed and rendered into liver oil. Therefore, the study's conclusions as to the seriousness of the pollutant loads applies only to the consumers of the hypotehtitcal purified liver oil and not to the health of any sharks involved.

experienced by the smooth hammerhead sharks in the 2003 study were already very high, the oceanic whitetip PCB study only considered a much smaller group of PCBs, meaning that the total PCB load in the oceanic whitetips would almost certainly eclipse that found in even the most heavily-polluted smooth hammerhead from the 2003 study (*compare* Storelli, *et al.*, 2003 at 1036 (measuring 17 total PCBs in smooth hammerheads, only 3 of which (IUPAC 77, 126, and 169) are non-*ortho* (dioxin-like) PCBs); Cruz-Nuñez, *et al.*, 2009 at 6 (including only dioxin-like PCBs)). This assertion is bolstered by the fact that these dioxin-like PCBs were only present at concentrations of 0.99 nanograms per kilogram (0.99 micrograms per gram) in the liver tissue of the smooth hammerheads (*see* Storelli, *et al.*, 2003 at 1037). While these numbers are not directly comparable as the oceanic whitetip study was based on liver oil and the hammerhead study was based on liver tissue, the fact that the oceanic whitetip-containing liver oil had *over 14 times* the dioxin-like PCBs of the smooth hammerhead liver tissue is alarming (*compare* Storelli, *et al.*, 2003 at 1037; Cruz-Nuñez, *et al.*, 2009 at 6).

While Cruz-Nuñez, *et al.*, 2009 does not provide specific enough information to calculate the exact TEQ of the specific dioxins and dioxin-like PCBs found in the oceanic whitetip-containing liver oil, this information suggests that it would be immense. Studies have shown that the threshold level of dioxins for biological effects in aquatic vertebrates is 160 to 1,400 picograms TEQ per gram lipid weight and that both dioxins and dioxin-like PCBs could act in concert to meet this level (Gelsleichter & Walker, 2010 at 497). Gelsleichter & Walker, 2010 note that the smooth hammerhead exhibited a "high potential for PCB effects" because its "TEQ levels greatly exceed toxicity reference values for organism-level effects in some aquatic vertebrates." (Gelsleichter & Walker, 2010 at 502). The values that the study was referencing were the aforementioned 17.39 micrograms per gram wet weight concentration of total PCBs that had a TEQ of 4,843 picograms TEQ per gram from Storelli, *et al.*, 2003 (*see* Gelsleichter & Walker, 2010 at 501). Threshold levels of PCBs for some cell- and molecular-level effects in aquatic vertebrates, such as immunosuppression and hormonal alterations, are only ~10 to 30 parts per million (~10-30 micrograms per gram) (Gelsleichter & Walker, 2010 at 499 (citations omitted)). Therefore, these smooth hammerhead values would be well in excess of the lower threshold value. Because, as discussed above, oceanic whitetips have very high levels of PCBs, the much more toxic dioxin-like PCBs to be specific, they are also likely well above the threshold for such effects. Finally, even if this were not the case, "some biochemical or cell-level effects may be experienced by species in which low . . . PCB concentrations (i.e., 1 to 4 [micrograms per gram]) have been observed . . ." (Gelsleichter & Walker, 2010 at 499). Therefore, the PCB concentrations that the oceanic whitetip is subjected to are very likely to be eliciting negative physiological responses from the species.[11]

In addition to threats from dioxin-like PCBs, high levels of non-dioxin-like PCBs are problematic because PCBs with two or more ortho-chlorines are thought to produce neurotoxic effects (Storelli, *et al.*, 2003 at 1035). Recent laboratory animal studies also suggest that mercury neurotoxicity can be exacerbated by the presence of any PCBs whether they are dioxin-like or not (*see* Storelli, *et al.*, 2003

[11] Studies that more comprehensively assessed the species' total PCB load and/or the total TEQ of their PCB load may even exceed the threshold PCB concentration level for organism-level effects in fish and aquatic mammals (e.g., growth and reproduction), which are impaired at PCB concentrations greater than 50 micrograms per gram (*see* Gelsleichter & Walker, 2010 at 499 (citations omitted)). This would indicate even more serious effects to the species. In fact, if this PCB level were exceeded, then the species' carcasses would be considered "hazardous waste" in some countries (e.g. Canada) (Gelsleichter & Walker, 2010 at 499).

at 1035, 1037 (citations omitted)). Therefore, regardless of whether oceanic whitetips have a large amount of more chlorinated PCBs in their systems, because both PCBs and mercury appear to be present in oceanic whitetips in large amounts, the neurological threats to the species are greater than the risks posed by each toxin separately (*see* Storelli, *et al.*, 2003 at 1037; Nalluri, *et al.*, 2014 at 645 (dried oceanic whitetip fins had third highest mercury level of 11 species tested); Lyle, 1986 at 316-17 (finding total mercury concentrations that exceeded 3 milligrams per kilogram for individuals of 3 of the 11 *Carcharhinus* species evaluated, with seven of those *Carcharhinus* species exhibiting mean mercury concentrations of 0.90 milligrams per kilogram or greater, vastly exceeding seafood standards); Lyle, 1986 at 318-19 (closely-related blacktip reef shark (*Carcharhinus melanopterus*) had embryonic mercury concentrations of between 0.72 and 0.82 milligrams per kilogram before it was even born); Garcia-Hernandez, *et al.*, 2007 at 2 (closely-related dusky shark (*Carcharhinus obscurus*) in the Gulf of California exceeded the Mexican national limit for mercury in seafood (1 milligram per kilogram) and had the fourth highest mercury concentration of any of the sharks tested)). Furthermore, because some of the studies assessing mercury concentrations in oceanic whitetips and other *Carcharhinus* species are older and mercury concentrations in the ocean have increased by more than 30% in the last 20 years, it is likely that the mercury concentrations observed in those studies underestimate the amount of mercury present in these species currently (*see* Cone, 2009 at 1). This underestimation will only continue to compound into the future as mercury emissions continue, likely causing a doubling of 1995 mercury levels in the Pacific Ocean by 2050 under current mercury emission rates (*see* Cone, 2009 at 1). Finally, PCBs have also been cited as the likely cause of a variety of additional pathological changes in other marine animals including pneumonia, liver fibrosis, arthrosis, abscesses in muscles, lungs and other organs, skin lesions, reduced fertility, and heavy attacks from parasites (*see* Hammond, *et al.*, 2008). As a result of these impacts, oceanic whitetips are likely experiencing reduced individual fitness, population decline, and synergistic threats with other pollutants and parasites. Because these toxins are already present in the oceans, and will continue to be deposited there over time, PCBs and dioxin represent both present and future threats to the oceanic whitetip's habitat (*see* Gelsleichter & Walker, 2010 at 498-99 (indicating that these toxins are extremely persistent, that they still extensively contaminate aquatic sediments (forming "legacy" reservoirs of PCBs), that there is further deposition from redistribution of PCBs from terrestrial stores, and that developing countries have not universally banned their production and use)).

B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes

The main threat to the oceanic whitetip is the historical and continued catch of the species in both targeted fisheries and, more importantly, incidentally as bycatch. Even where the oceanic whitetip is caught incidentally, it is often retained due to the species' high commercial value or is finned and/or returned to the ocean dead or dying.

Oceanic whitetips are most commonly bycaught in offshore tropical tuna and swordfish longline fisheries, but are also taken incidentally in other longlines, gillnets, purse-seines, and pelagic trawls (*see* Walsh & Clark, 2011 at 2; Bonfil, *et al.*, 2008 at 134; Camhi, *et al.*, 2007 at 26). In addition, there are a few small-scale fisheries that target oceanic whitetips, including those in the Gulf of Aden, the Pacific coast of Central America, Papua New Guinea, the Maldives (historic), and other areas in the Western and Central Pacific Ocean (*see* FAO, 2012 at 7, 9, 18; E-CoP16-Prop-42 at 6). While the level of oceanic whitetip catch in these directed fisheries is currently considered "minor" when compared to bycatch in other fisheries (FAO, 2012 at 9, 18; E-CoP16-Prop-42 at 6), "targeting of pelagic sharks is increasing due to declines in traditional target species, high value of fins for most species, and/or high or rising value of meat." (Simpfendorfer, *et al.*, 2008 at 2). Therefore, directed fisheries represent an increasing threat as traditional target species continue to dwindle.

While some catch statistics are available, actual catch is likely *much* higher. This discrepancy appears to be primarily a result of illegal, unregulated, and unreported ("IUU") fishing, worth an estimated $192 million per year for sharks alone, which is adversely affecting the oceanic whitetip (*see* NMFS, 2013 at 66-69; *see also* Section IV. D. 4. RFMO Regulation, *infra*; E-CoP16-Prop-42 at 7) ("data suggests that catches reported to [the International Commission for the Conservation of Atlantic Tuna ("ICCAT")] may seriously underestimate (by 50-fold) the actual catch of this species in the Atlantic Ocean.") (citation omitted)). Therefore, while this data is useful in showing trends indicating increasing catch or decreasing CPUE, true total catch amounts are *much* higher than those reflected in fisheries statistics.

As previously indicated, the fin trade is driving both retention of bycatch and targeting of oceanic whitetips (*see, e.g.,* FAO, 2012, at 7). Much of this finning pressure is due to the fact that the oceanic whitetip is a preferred species in the Hong Kong fin markets, the largest shark fin markets in the world (*see, e.g.,* Mundy-Taylor & Crook, 2013 at 7; FAO, 2012 at 15). In fact, oceanic whitetip fins are considered part of the "first choice" category of fins and are valued at $45-85 per kilogram in Hong Kong (FAO, 2012 at 15 (citation omitted); Bonfil, *et al.*, 2008 at 136). As a result of the fin trade, the oceanic whitetip often has its fins cut off with the remainder of its carcass dumped into the ocean (Bonfil, *et al.*, 2008 at 135; Tambourgi, *et al.*, 2013 at 162). The estimated number of oceanic whitetips killed annually to support the international fin trade is between 200,000 to 1,200,000 sharks (Bonfil, *et al.*, 2008 at 7; E-CoP16-Prop-42 at 8; *see also* Clarke, *et al.*, 2012 at 198 (indicating that observer data suggests catches of a group of 5 so-called key shark species (blue, makos, oceanic whitetip, and silky) have averaged 2 million individuals in the Western and Central Pacific annually since the mid-1990s) (citation omitted)). While catch is often unreported, studies have estimated that an average of between 2,906 and 7,109 tons of oceanic whitetip would need to come from the Atlantic to supply its proportion of the international fin trade in the mid-2000s (FAO, 2012 at 9 (citation omitted)). Another study estimated annual bycatch in the Western and Central pacific between 1995-2010 to be about 129,000 oceanic whitetips, equivalent to approximately 4,730 tons, per year (FAO, 2012 at 9 (citation omitted)). This Western and Central Pacific bycatch estimate is also in line with a later stock assessment that used catch estimates ranging from 60,000 to 230,000 individuals (about 2,200–8,400 tons) (FAO, 2012 at 9 (citing Rice & Harley, 2012)).

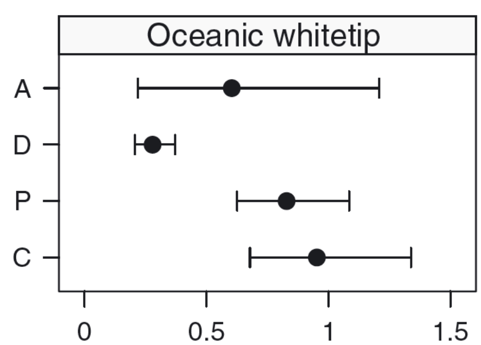


Figure 37. Estimate of oceanic whitetips utilized per year in the shark fin trade worldwide (in millions). Fin positions are abbreviated as: dorsal (D), pectoral (P), caudal (C) and all fin positions from a mixture distribution (A) (Clarke, *et al.*, 2006 – 2 at 1121).

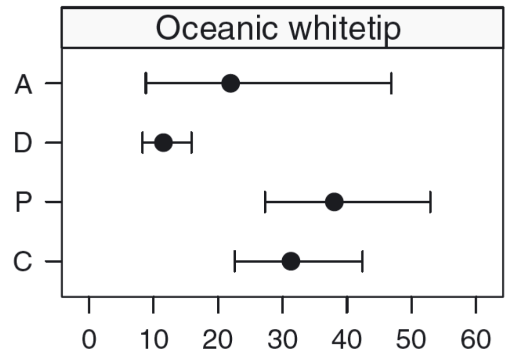


Figure 38. Estimate of annual oceanic whitetip biomass in the shark fin trade worldwide (in thousands of tons). Fin positions are abbreviated as: dorsal (D), pectoral (P), caudal (C) and all fin positions from a mixture distribution (A) (Clarke, *et al.*, 2006 – 2 at 1121).

While it is true that Asia is the primary consumer of shark fins, fin consumption is not limited to Asia alone (*see* Nalluri, *et al.*, 2014 at 644, 646 (analyzing shark fin soups from restaurants all over the United States and attributing 7 of the 50 samples to *Carcharhinus* species generally and noting that genetic testing was inconclusive as to 17 of them, some of which were likely oceanic whitetips, especially because dried oceanic whitetip fins were amongst the fins tested in this same study)). In fact, the United States is both the number 9 importer and exporter of shark fins in the world, the largest consumer of shark fins in the Western Hemisphere, and the number 7 shark-fishing country in the world overall (*see* Mundy-Taylor & Crook, 2013 at 66; Fischer, *et al.*, 2012 at 10; *see also* Figure 39, *infra*).

Figure 39: Global distribution of country-specific shark and ray landings averaged between 2003 and 2011 and mapped as a percent of the total. Landings include overseas fishing and both species-specific and non-species-specific data (e.g. "sharks, rays, skates, etc, nei" and "threshers, nei" (Davidson, *et al.*, 2015 at 4).

Not only is the U.S. one of the most important shark fishing nations in the world, but reported shark and ray landings have grown significantly in U.S. waters in recent years (*see* Figure 40, *infra*), with the U.S. reporting the second highest increase (10,698 tons more reported catch per year) in shark and ray landings from 2003-2011 and the highest increase when excluding overseas landings (Davidson, *et al.*, 2015 at 9).

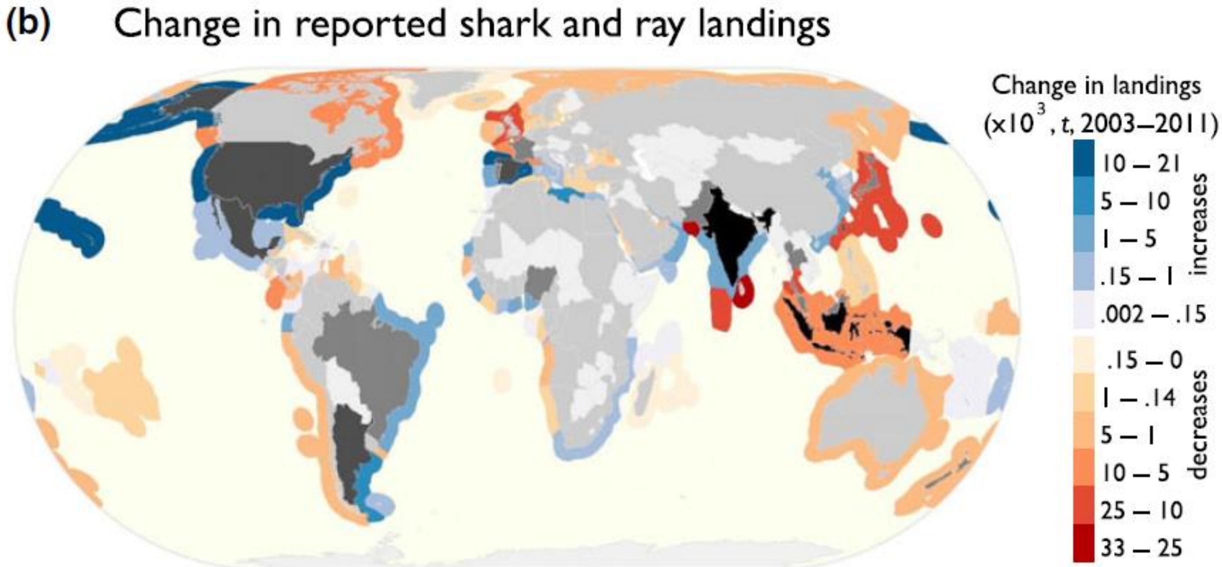


Figure 40. The difference between the averages of landings reported in 2001–2003 and 2009–2011. Mapped to the national waters that extend 200 nautical miles from the coast for visual purposes (Davidson, *et al.*, 2015 at 4).

While finning is clearly widespread, it is especially threatening to the oceanic whitetip. The available data indicates that 1.8% of the fins in the Hong Kong fin market, the largest fin market in the world, come from the oceanic whitetip (*see* Figure 41, *infra*). However, "[t]he possible presence of additional fins of these taxa within the portion of the trade that was not characterized implies that these estimates are minimums." (Shivji, 2010 at 599). Therefore, because the study at issue did not look at fins that were not characterized by a trade name, the uncharacterized fins could, and very likely would, push this proportion even higher.

Species	Common name	Meat	Fins[b]	Skin	Liver oil	Other[e]
Alopias pelagicus	Pelagic thresher	✔	✔ (2.3%)[c]	✔		
Alopias superciliosus	Bigeye thresher	✔	✔	✔		
Alopias vulpinus	Thresher	✔+	✔	✔	✔	
Carcharhinus falciformis	Silky shark		✔ (3.5%)		✔	
Carcharhinus longimanus	Oceanic whitetip shark		✔ (1.8%)	✔	✔	
Carcharodon carcharias	Great white shark		✔	✔	✔	teeth, jaws
Cetorhinus maximus	Basking shark		✔	✔	✔+	
Pteroplatytrygon violacea	Pelagic stingray					
Isurus oxyrinchus	Shortfin mako	✔+	✔ (2.7%)	✔+	✔	teeth, jaws
Isurus paucus	Longfin mako		✔		✔+	
Lamna ditropis	Salmon shark	✔	✔		✔	
Lamna nasus	Porbeagle shark	✔+	✔	✔+	✔	
Mobula spp.	Devilrays	✔				gills
Prionace glauca	Blue shark	✔	✔ (17.3%)	✔		
Rhincodon typus	Whale shark	✔	✔	✔	✔	gills
Sphyrna spp.	Hammerheads	✔	✔ (5.9%)[d]	✔+	✔+	

[a] ✔: frequently used; ✔+: preferred species, can vary regionally (from Rose 1996; Clarke *et al.* 2005).
[b] Percentage of world trade (in parentheses) is based on reported proportions in the Hong Kong shark fin market (Clarke *et al.* 2006b).
[c] Percentage for all three thresher shark species.
[d] Percentage includes three hammerhead species: smooth *Sphyrna zygaena*, scalloped *Sphyrna lewini* and great *Sphyrna mokarran*.
[e] These are the preferred species for the listed products: CITES 2002; Rose 1996; White *et al.* 2006.

Figure 41. Chart indicating that oceanic whitetip fins are among the most popular in the Hong Kong fin markets, and that oceanic whitetips are frequently used for skin and liver oil (Camhi, *et al.*, 2007 at 20; *see also* Bonfil, *et al.*, 2008 at 135 (at least 2% of shark fins in the Hong Kong market by weight); Clarke, *et al.*, 2006 at 209 (1.8% (1.6-2.1%) of shark fins in Hong Kong market)).

Though fins, and not meat steaks, are driving the majority of oceanic whitetip fishing pressure, the oceanic whitetip's meat is eaten in fresh and smoked forms in Mexico and the United States and in fresh, dried, and salted forms in the Seychelles and Sri Lanka (*see* Mundy-Taylor & Crook, 2013 at 7 (citing E-CoP16-Prop-42); E-CoP16-Prop-42 at 8). The oceanic whitetip's liver is also sometimes harvested for oil and its skin is sometimes harvested for leather (Mundy-Taylor & Crook, 2013 at 7 (citing E-CoP16-Prop-42); E-CoP16-Prop-42 at 8; *see also generally* Cruz-Nuñez, *et al.*, 2009).

While it is clear that the oceanic whitetip is often retained, many bycaught oceanic whitetips will die even where they are not retained. In this Petition, post-capture mortality refers to the probability that a species will die as a result of its interaction with fishing gear (*see* Cortés, *et al.*, 2010 at 27). This would include both mortality that has occurred by the time the species reaches the fishing vessel and mortality that occurs after the species is released, if it is indeed released and is not retained or otherwise killed. For the oceanic whitetip, several studies have assessed the former, which this Petition will refer to as primary post-capture mortality, and only one study that Defenders is aware of has discussed the latter, which this Petition will refer to as post-release mortality. While the oceanic whitetip exhibits less primary post-capture mortality than some other shark species, its mortality at this stage is still high, in part because it is an obligate ram ventilator requiring constant movement to obtain oxygen (*see* Australian Government, Department of the Environment, 2014 at 38 (oceanic whitetip is a ram ventilator, meaning that they often asphyxiate when bycaught)). In fact, it appears that 25-77% of the oceanic whitetips that are bycaught on longlines are dead by the time that they reach the ship (*see* Cortés, *et al.*, 2010 at 27, 32 (primary post-capture mortality is 77% for oceanic whitetips in Atlantic pelagic longline fishery); *see also* E-CoP16-Prop-42 at 6) (59% primary post-capture mortality for oceanic whitetips in swordfish longline fishery in southwestern Indian Ocean) (citation omitted); Simpfendorfer, *et al.*, 2008 at 4, 13 (35% of documented oceanic whitetips in the Atlantic pelagic longline fishery are either retained or released dead); Tambourgi, *et al.*, 2013 at 162 (25% of oceanic whitetips dead at capture in the United States, 32-35% dead at capture in Fiji, 34% dead at capture in the Atlantic-wide Portuguese longline fishery) (citations omitted); Camhi, *et al.*, 2007 at 27 (approximately 25% of oceanic whitetips dead on retrieval in U.S. Atlantic longline fishery) (citation omitted); Coelho, *et al.*, 2012 at 314 (34.2% of oceanic whitetips dead at capture in swordfish pelagic longline fishery in the Atlantic Ocean); *but see* Camhi, *et al.*, 2007 at 27 (8 of 8 alive in Japanese tuna longline fishery in the Atlantic, though these results are likely inaccurate due to the very small sample size considered) (citation omitted)). However, even where the oceanic whitetip is alive at capture, it is often finned and discarded or otherwise treated poorly, which increases the likelihood that it will die after it leaves the fishing vessel (*see, e.g.,* Australian Government, Department of the Environment, 2014 at 38).

The existing data on post-release mortality where the oceanic whitetip is not finned (a finned shark will certainly not survive) are from movement tracking studies (*see* Australian Government, Department of the Environment, 2014 at 38 (mentioning a tracking study that appeared to have apparently high post-release survival); Musyl, *et al.*, 2011 (assessing movement and post-release survival using tracking tags)). Unfortunately, the high post-release survival rates from such studies are likely not indicative of typical post-release survival from commercial catch and likely underestimate post-release mortality. The authors of one of these studies used tracking tags that cost roughly $4,000 each (Musyl, *et al.*, 2011 at 355). At such a high price per tag, it is unlikely that the authors would have affixed a tag to a shark that was very near death at the time of capture, thus skewing their results. In addition, the high cost of each tag likely meant that the sharks were handled more carefully than they are in a typical commercial catch scenario because they were now considered valuable cargo instead of a non-target bycatch of a fishery focused on other species (*see* Musyl, *et al.*, 2011 at 342 (indicating that the study used relatively short soak times, circle hooks, with sharks hoisted by sling and seemingly restrained gently, which would not be typical in a commercial fishery scenario)). This difference in handling can have very meaningful impacts on both primary post-capture and post-release mortality. In fact, studies suggest that handling practices can be responsible for a 20% difference in primary post-capture mortality and can have a significant effect on post-release mortality (Musyl, *et al.*, 2011 at 355 (citation omitted)). There is also evidence that the study did indeed achieve lesser mortality at both the primary post-capture and post-release stages through its handling practices because the authors found a 5.9% primary post-capture mortality rate and a 6.3% post-release mortality rate for blue sharks (*Prionace glauca*), whereas an earlier study found mortality rates of 16% and 19% respectively (*see* Musyl, *et al.*, 2011 at 355 (citation omitted)). The authors of Musyl, *et al.*, 2011 noted several practices that may have influenced the lower mortality rates that they encountered, including that the use of circle hooks likely increased both primary post-capture and post-release survival (Musyl, *et al.*, 2011 at 355-56). Other variables, including "time spent hooked on the line [(as longer times increase stress and vulnerability to predation)], fight time, leader material, fish size, and handling and discard practices can influence the at-vessel and postrelease mortality of pelagic shark species." (Musyl, *et al.*, 2011 at 342, 356 (citations omitted)).

Of the 13 oceanic whitetips that Musyl, *et al.*, 2011 were able to successfully track, they did not determine that any died, though several of the tracking tags popped off before their set pop-off date, which could indicate mortality, and 3 of the oceanic whitetip tags were classified as "nonreporting," which means that their fate is unknown (*see* Musyl, *et al.*, 2011 at 344, 346, 353 (indicating that the study only confirmed one blue shark death, showing the tracking tag results for the oceanic whitetip, and indicating that the tracking tags used would automatically release before their set pop-off date if a dead shark's negatively-buoyant body sank to a predetermined depth); *but see* Musyl, *et al.*, 2011 at

353 ("Nonreporting tags, however, cannot be considered synonymous with mortality because other factors can cause failure in electronic tags [as well].") (citations omitted)). While these results are consistent with mortality, they are also consistent with tag failure and are therefore indeterminate.

Ultimately, the exact amount of mortality, both primary post-capture and post-release, that the oceanic whitetip experiences when it is bycaught and not retained in a typical commercial catch scenario is unclear. This lack of clarity is likely due to the fact that these sources of mortality are variable and are exacerbated by careless or rough handling and by the gear chosen and the fishing practices used. Musyl, *et al.*, 2011 appears to indicate that steps can be taken to improve the survival of oceanic whitetips that are captured, but it is apparent, as indicated by some of the very high primary post-capture mortality estimates referenced above, that many fishermen do not take the care necessary to reduce mortality. As a result, even where bycaught oceanic whitetips are not retained, they will often die. This means that both primary post-capture mortality and post-release mortality further endanger the oceanic whitetip beyond just retention and/or finning. Because the species is very susceptible to several types of fishing gear, the bycatch mortalities that the species would face, even if all captured specimens were discarded, would remain very high (*see* IOTC, 2013 at 23 (the oceanic whitetip was assessed as the fifth most susceptible species to longline gear and the most susceptible to purse-seine gear by the IOTC); Cortés, *et al.*, 2010 at 32 (fifth most susceptible to pelagic fisheries of 12 Atlantic Ocean shark species); Murua, *et al.*, 2013 at 15 (fourth most vulnerable in ICCAT based on Euclidean distance). Therefore, the deaths of bycaught individual oceanic whitetips that do not result from their retention are an additional overutilization threat to the species.

ICCAT fleet	Species											Effort
	BTH	BSH	ALV	LMA	OCS	PST	POR	SPL	SMA	FAL	SPZ	
USA	5	5	2	4	5	3	5	3	4	5	4	274.6
Venezuela	3	4	1	5	3	5	6	7	5	4	7	67.3
Brazil	4	3	5	3	4	1	6	2	3	3	2	226.3
Uruguay	6	6	3	6	6	4	3	5	6	6	6	3.0
Portugal	2	2	5	2	2	5	2	4	2	2	3	429.4
Namibia	7	7	5	7	6	5	4	6	7	6	5	22.8
Combined	1	1	4	1	1	2	1	1	1	1	1	10 531.6

Figure 42. Vulnerability rankings for eleven species in six Atlantic fisheries with smaller numbers indicating higher risk. Oceanic whitetips are abbreviated "OCS" and effort is expressed in millions of hooks from 1950-2005 (Cortés, *et al.*, 2010 at 32).

The overutilization threat discussed in this section is the primary driver of the oceanic whitetip population declines discussed in Section III. G. Population Trend, *supra*. While population trend data is not available throughout the oceanic whitetip's range, where it is available it shows extreme declines over short periods of time. Furthermore, all, or nearly all, of the data sets available do not have information on the species' historical abundance and therefore underestimate the decline that the oceanic whitetip has experienced from its historical numbers. This makes the observed declines far more alarming as, although declines are expected when a population is first exploited, these populations have already been exploited for decades before the analyzed data sets began (*see* Baum, *et al.*, 2003 at 389 (citations omitted)). In addition, the data sets do not extend to the present and therefore cannot take account of declines that have occurred after the covered time periods. This is particularly problematic as many of the fisheries that have been causing these declines have continued to increase their effort in recent years, thereby likely further reducing the oceanic whitetip populations in the waters that they target. As a result, even the large declines shown for various oceanic whitetip populations in various studies present a conservative estimate of the species' actual declines from overfishing.

Finally, the decreasing population trend has also led to a decrease in the size of individuals that are caught (*see, e.g.,* Clarke, *et al.*, 2012 at 204 (decreasing size in the Western and Central Pacific)). As a result, the oceanic whitetips that are now caught are all, or nearly all, immature (*see* Clarke, *et al.*, 2012 at 202 ("All oceanic whitetip sharks sampled from purse-seine fisheries [in the Western and Central Pacific] since 2000 were also immature . . ."); Beerkircher, *et al.*, 2002 at 45 (U.S. pelagic longline fisheries targeting swordfish and tuna off the Southeastern United States found mean lengths of catch well below size at maturity, with more than 95% of catch consisting of immature individuals); E-CoP16-Prop-42 at 5 (almost 80% of individuals caught from 2004-2009 in Brazilian longline tuna fleet are juveniles) (citations omitted); Tolotti, *et al.*, 2013 at 141 ("majority" of catches in the Southwest and Equatorial Atlantic are juveniles); Tambourgi, *et al.*, 2013 at 164-65 (80.5% of females and 72.4% of males caught in the Southwest and Equatorial Atlantic from 2003-2010 were juveniles); NMFS, 2013 at 66 (in West Africa, "both pregnant and juvenile shark species may be fished, with shark fins from fetuses included on balance sheets at landing areas."); Rice & Harley, 2012 at 5 (Western and Central Pacific fisheries predominantly take juveniles)). Catch of individuals before they have an opportunity to reproduce reduces the species' ability to replace lost individuals and hampers its ability to recover from population declines. This catch of immature individuals is therefore an unsustainable practice that exacerbates the overutilization threat that the oceanic whitetip is experiencing. In addition, where the heavy catch of juveniles is focused in certain parts of the oceanic whitetip's range, this indicates that fishing in these areas is likely impacting places that are important for juvenile development, which is also problematic (*see, e.g.,* E-CoP16-Prop-42 at 4, 7 (discussing prevalence of immature individuals in the Columbian Caribbean and that this catch is likely impacting "development areas for the species.")). At this juvenile capture rate, population collapse appears imminent.

The United States formally recognized the overutilization threat to the oceanic whitetip in 2010 when it co-sponsored a proposal to list the species under Appendix II of CITES and again in 2013 when it co-sponsored another proposal to list the oceanic whitetip under Appendix II (*see* E-CoP15-Prop-16 at 1-2; E-CoP16-Prop-42 at 1). The United States explained that "[t]he greatest threats to this species worldwide are harvest for the international fin trade and bycatch . . ." (E-CoP16-Prop-42 at 1), and indicated that the catch of oceanic whitetips is unsustainable (USFWS, 2013 at 1). Therefore, consistent with, and in furtherance of, the United States' determination that the oceanic whitetip faces a significant extinction threat from trade, and in recognition of the continued and growing threat of overutilization causing unsustainable oceanic whitetip population declines, NMFS should list the oceanic whitetip under the ESA based on listing Factor B alone.

Region	Details of fishery	Source of information

Atlantic Ocean	• **Bycatch** in tuna and swordfish longline fisheries
	• **Brazil, Mexico, Spain, St. Lucia** and **the US** have reported catches to ICCAT. Data reported to ICCAT considered likely to under-represent Atlantic Ocean catches.
	• Comprise a greater proportion of **bycatch** in tropical than temperate waters.
	Examples of bycatch:
	• South and Central Atlantic:
	  ○ **Brazilian** longline fisheries
	  ○ **Uruguayan** longline fishery
	• Eastern Atlantic:
	  ○ **French** and **Spanish** tuna purse-seine fisheries in Eastern tropical Atlantic.
	• Northwest Atlantic:
	  ○ **US**-flagged longline vessels.
	• Western Atlantic:
	  ○ Oceanic longline industrial fisheries in the **Colombian Caribbean**.
		CITES CoP16 Proposal; Clarke (2008); FAO (2013b); Hazin *et al.* (2008).

Pacific	• **Bycatch** in tuna longline and purse seine fisheries:
	  ○ **US** and **Japanese** longline fishing fleets in the **Western and Central Pacific** ocean.
	  ○ **North** and **South Pacific**.
	• Evidence that taken in small-scale **targeted fisheries**, e.g.
	  ○ **Papua New Guinea**
	  ○ Pacific coast of **Central America**
	  ○ Likely in other areas of the **Western Central Pacific.**
		Bonfil and Abdallah (2004); CITES CoP16 Proposal; Clarke (2011); FAO (2013b); Rice and Harley (2012).

Indian Ocean	• **Bycatch** in tuna (and swordfish) longline and purse seine fisheries:
	  ○ Tuna fishery in the **Maldives**.
	  ○ **French** and **Spanish** tuna purse seine fleets in the **Western Indian Ocean**.
	  ○ Swordfish longline fishery in the **South-western Indian Ocean**.
	  ○ **Japanese** longline fishery targeting tuna.
	• Evidence that taken in small-scale **targeted fisheries**, e.g.
	  ○ **Gulf of Aden**
	  ○ **Maldives** (taken in commercial shark longline fishery targeting reef and pelagic sharks)
		Anderson *et al.* (2011); Bonfil and Abdallah (2004); FAO (2013b); Rice and Harley (2012).

Figure 43. Details of known oceanic whitetip fisheries (Mundy-Taylor & Crook, 2013 at 9).

1. Atlantic Ocean

The oceanic whitetip is primarily caught in tuna and swordfish longline fisheries in the Atlantic Ocean (*see* Figure 43, *supra*; Mundy-Taylor & Crook, 2013 at 9). However, it is also caught by tuna purse-seines (*see* Figure 43, *supra*; Mundy-Taylor & Crook, 2013 at 9).

> Only Brazil, Mexico, Spain, St. Lucia and the United States have reported catches to ICCAT and, as indicated by [fisheries studies], these data are likely inaccurate and therefore may under-represent the magnitude of catches in the Atlantic Ocean.

(E-CoP16-Prop-42 at 7 (internal citations omitted); *see also* E-CoP16-Prop-42 at 7) ("data suggests that catches reported to ICCAT may seriously underestimate (by 50-fold) the actual catch of this species in the Atlantic Ocean.") (citation omitted)). The reason that catch data is so problematic is that IUU catch is very common in the Atlantic, accounting for 37% of the catch off the coast of

West Africa for example, the highest regional estimate of illegal fishing worldwide (NMFS, 2013 at 67 (citations omitted); *see also* Mundy-Taylor & Crook, 2013 at 89 (citation omitted)). Mexico (in the Gulf of Mexico) and Brazil (in the southwest Atlantic) have also been documented undertaking significant IUU fishing activities, including extensive illegal fishing of sharks, that threaten the ability of fisheries managers to provide for sustainable fisheries in the Atlantic (*see* NMFS, 2013 at 68-69 (internal citations omitted)).

Both the legal and IUU fishing activities occurring in the Atlantic have caused, and continue to cause, the oceanic whitetip to experience significant population declines wherever population trend information is available. As a result, both legal and IUU fishing represent serious overutilization threats to the oceanic whitetip in the Atlantic Ocean.

a. Northwest Atlantic and Gulf of Mexico

The oceanic whitetip was once described as the most common pelagic shark throughout the warm-temperate and tropical waters of the Atlantic and beyond the continental shelf in the Gulf of Mexico (E-CoP16-Prop-42 at 5 (citations omitted)). However, the fisheries in this region of the Atlantic have caused significant declines in oceanic whitetip abundance here.

The oceanic whitetip is primarily caught as bycatch in tuna and swordfish longlines in this region, with reported catch in U.S.-Flagged longline vessels (*see* Figure 43, *supra*; Mundy-Taylor & Crook, 2013 at 9). A large proportion of these longline vessels' catch is composed of sharks, with elasmobranchs accounting for 15% of their catch in the waters off the Southeastern United States from 1992-2000 (Beerkircher, *et al.*, 2002 at 43). 8,526 oceanic whitetip were recorded as captured in logbooks for the U.S. pelagic longline fleets targeting swordfish and tunas in the Northwest Atlantic during this same time period (Baum, *et al.*, 2003 at 391).[12] Of the oceanic whitetips caught in the pelagic longline fishery off the Southeastern United States from 1992-2000, observer data showed that 24.4% were retained, 14.5% were discarded dead, and 61.1% were released alive (Beerkircher, *et al.*, 2002 at 44). However, this catch status refers only to the status of the species when it was brought alongside the boat and does not track mortalities occurring after it has been released (post-release mortalities) (Beerkircher, *et al.*, 2002 at 44).

[12] This number likely underestimates actual total catch as it is based only on logbook data, but is useful to show that the species is caught in large number in this area.

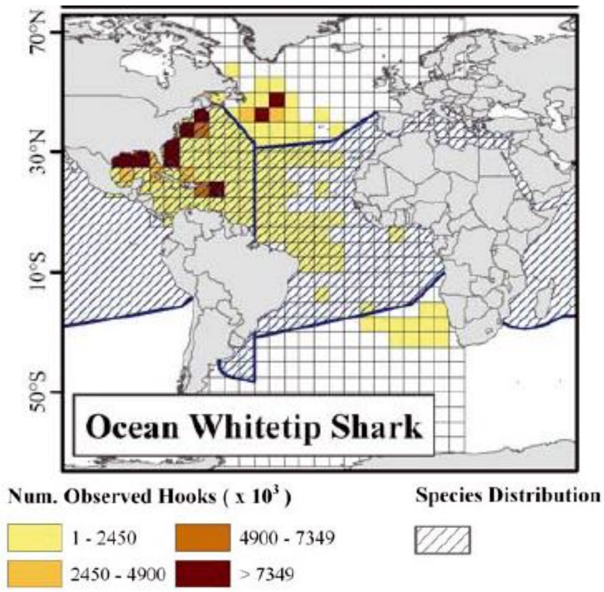


Figure 44. Spatial distribution of the oceanic whitetip superimposed on the effort distribution of the U.S. pelagic longline fleet (Cortés, *et al.*, 2010 at 30).

Despite having been exploited in this region since the 1950s and 1960s, the oceanic whitetip has experienced significant declines in these waters in the past two decades (*see* Section III. G. 1. a. Northwest Atlantic and Gulf of Mexico, *supra*). This is particularly alarming because, although declines are expected when a population is first exploited, this population had already been exploited for decades before the analyzed data sets began (*see* Baum, *et al.*, 2003 at 389 (citations omitted)). Therefore, even the large population decline estimates available for this region underestimate the oceanic whitetip's decline from its historical abundance (*see, e.g.,* Baum & Blanchard, 2010 at 237; Figure 12, *supra* (indicating that CPUE decrease had been ongoing since the early 1980s off the southeastern coast of the United States)). In addition to decreases in the number of individuals, there is also evidence that the species may have experienced range contraction in this region, indicating localized extirpations in previously-occupied habitat (*see* Figure 13, *supra*).

In addition to decreases in population numbers and range contraction, oceanic whitetips have also been decreasing in size in this region, indicating unsustainable catch (*see* Baum & Myers, 2004 at 139 (greater than 35% decline in mean weight from 1950s to 1990s in the Gulf of Mexico)). This is important to note because decreased sizes are often observed in heavily exploited species and are indicative of population declines (*see* Baum & Myers, 2004 at 140). However, this decreasing average size also means that these fisheries now disproportionately catch immature oceanic whitetips. One study assessing the U.S. pelagic longline fisheries targeting swordfish and tuna off the Southeastern United States found that the mean lengths of both male and female oceanic whitetips (between ~39-41 inches or 100-105 centimeters fork length) were well below the average oceanic whitetip length at maturity (~57-60 inches or 145-153 centimeters fork length) (*see* Beerkircher, *et al.*, 2002 at 45; Section III. F. Reproduction and Lifespan, *supra*). In fact, this study found that greater than 95% of the observed catch consisted of immature individuals (Beerkircher, *et al.*, 2002 at 45). Catch of individuals before they have an opportunity to reproduce reduces the species' ability to replace lost individuals and hampers its ability to recover from population declines. This catch of immature individuals is therefore an unsustainable practice that exacerbates the overutilization threat that the oceanic whitetip is experiencing in this region. In fact, it likely indicates that population collapse is imminent.

		Actual measurements (cm)		All measurements (cm)			
Species	Sex	*n*	FL	*n*	FL	Length at maturity (cm)	Citation
Silky	M[1]	375	103	440	107	186	Bonfil et al., 1993
	F[1]	461	101	591	107	192–203	
Dusky	M[1]	163	117	224	119	231	Natanson et al., 1995
	F[1]	148	116	220	125	235	
Night	M[1]	222	109	243	111	156–160	Hazin et al., 2000
	F[1]	181	109	212	113	168–173	
Blue	M	N/A[2]	N/A	22	198	183	Pratt, 1979
	F	N/A	N/A	58	189	185	
Tiger	M[1]	N/A	N/A	21	211	258	Branstetter et al., 1987
	F[1]	N/A	N/A	47	198	263–267	
Scalloped hammerhead	M	24	150	43	156	139	Branstetter et al., 1987
	F[1]	34	146	71	173	194	
Oceanic whitetip	M[1]	24	105	34	100	145–153	Lessa et al., 1999
	F[1]	27	105	44	100	145–153	
Sandbar	M[1]	26	142	36	149	150	Sminkey and Musick, 1995
	F	10	145	19	156	150	
Bigeye thresher	M	N/A	N/A	21	192	172	Moreno and Moròn, 1992
	F[1]	N/A	N/A	16	190	208	
Shortfin mako	M	38	186	39	186	179	Stevens, 1983
	F[1]	21	177	22	175	258	

[1] Indicates species/gender whose mean lengths were below reported maturity size.
[2] N/A = not available.

Figure 45. Mean fork lengths ("FL") of sharks observed in the pelagic longline fishery off the Southeastern United States from 1992–2000. Length-at-maturity values are taken from the cited literature (Beerkircher, *et al.*, 2002 at 45).

While the recorded overutilization of the oceanic whitetip in this region indicates cause for concern, this region is also subject to significant IUU catch. This catch is difficult to monitor and quantify and represents an additional overutilization threat to the species in these waters and an additional challenge for management of the species.

> In the U.S., reports of IUU fishing by Mexico, a top shark fishing nation accounting for nearly 4.1% of the global shark catch, has been ongoing for the past decade. Since the mid-1990s, the United States Coast Guard . . . has documented Matamoros Mexican vessels illegally fishing in the area surrounding South Padre Island, Texas. The Mexican IUU fishermen use gillnet and longline gear for shark and red snapper, which are believed to be more prevalent in the U.S. EEZ off Texas than in the Mexican EEZ near Matamoros. The sharks, the majority of which are blacktips and hammerheads, are finned and the fins sold. Based on data from 2000-2005, [one study] estimated that Mexican fishermen are illegally catching anywhere from 3 to 56% of the total U.S. commercial shark quota, and between 6 and 108% of the Gulf of Mexico regional commercial quota.

(NMFS, 2013 at 68 (internal citation omitted)). Though this threat may have decreased to some degree in recent years, it is likely to continue at some level into the future and, even if it were to cease entirely, its effects will be ongoing as this species is slow to replace lost individuals (*see* Section IV. E. 1. K-Selected, *infra*).

Ongoing commercial overutilization is a threat to the oceanic whitetip in the Northwest Atlantic and Gulf of Mexico. This overutilization continues to threaten the species with extirpation and qualifies it for listing under the ESA.

b. Southwest and Equatorial Atlantic

The oceanic whitetip is extensively caught in both longlines and purse-seines in the Southwest and Equatorial Atlantic (E-CoP16-Prop-42 at 5 (citations omitted)). As a result, data indicates that the species has experienced both historic and recent population declines that have removed the majority of individuals from these waters (*see* Section III. G. 1. b. Southwest and Equatorial Atlantic, *supra*). Now the species appears to be sparsely populated in most parts of this region (E-CoP16-Prop-42 at 5 (citations omitted)).

The overall heavy catch of oceanic whitetips is exacerbated by the fact that the vast majority of individuals caught in this region are juveniles (*see* E-CoP16-Prop-42 at 4, 5, 7 (citations omitted); Tolotti, *et al.*, 2013 at 141). In fact, "[i]n the Brazilian longline tuna fleet, almost 80% of the oceanic whitetip sharks caught between 2004 and 2009 were juveniles." (E-CoP16-Prop-42 at 5 (citations omitted)). Catch of individuals before they have an opportunity to reproduce reduces the species' ability to replace lost individuals and hampers its ability to recover from population declines. This catch of immature individuals is therefore an unsustainable practice that exacerbates the overutilization threat that the oceanic whitetip is experiencing in this region. In addition, this heavy catch of juveniles in certain parts of this region indicates that fishing in these areas is likely impacting areas that are important for juvenile development, which is also problematic (E-CoP16-Prop-42 at 4, 7 (discussing prevalence of immature individuals in the Columbian Caribbean and that this catch is likely impacting "development areas for the species.")).

While the recorded overutilization of the oceanic whitetip in this region indicates cause for concern, this region is also subject to significant IUU catch.

> In the [waters off the coast of West Africa], fishing occurs year-round, including during shark breeding season, and, as such, both pregnant and juvenile shark species may be fished, with shark fins from fetuses included on balance sheets at landing areas. Many of the state-level management measures in this region also lack standardization at the regional level which weakens some of their effectiveness. For example, Sierra Leone and Guinea both require shark fishing licenses, however these licenses are much cheaper in Sierra Leone, and, as a result, fishers from Guinea fish for sharks in Sierra Leone. Also, although many of these countries have recently adopted FAO recommended National Plans of Action – Sharks, their shark fishery management plans are still in the early implementation phase, and with few resources for monitoring and managing shark fisheries, the benefits to sharks from these regulatory mechanisms have yet to be realized.

(NMFS, 2013 at 66). In addition to these West African countries, Brazil has also been the site of unsustainable shark fishing practices and has had trouble enforcing fisheries measures that would benefit sharks in the past and is therefore also a likely source of significant IUU catch (*see* E-CoP16-Prop-43 at 19). While data is limited in other parts of this region, limited resources in many of these countries indicate that similar issues are likely to exist there as well. As a result, unsustainable fishing practices, including significant IUU catch, are common in this region. These practices exacerbate the already-serious overutilization threat that the oceanic whitetip experiences in the Southwest and Equatorial Atlantic.

2. Pacific Ocean

The oceanic whitetip was formerly one of the most abundant sharks throughout the Pacific Ocean, but it has since experienced severe population declines as a result of overutilization (*see* Section III. G. 2. Pacific Ocean, *supra*). Overutilization of oceanic whitetips is extensive in the Pacific Ocean due in large part to the fact that the Pacific supports the world's largest industrial tuna fleet (*see* Camhi, *et al.*, 2007 at 16 (citation omitted)). "Pelagic sharks are taken in large numbers in longline fisheries targeting tunas, swordfish, and marlin, but there is also a significant shark bycatch (especially of . . . oceanic whitetip *Carcharhinus longimanus* sharks) in tuna purse-seine fisheries." (Camhi, *et al.*, 2007 at 16 (citations omitted)). "On the basis of longline catch-rate data, Bonfil (1994) estimated that over 7,200 oceanic whitetips ([equivalent to 145 tons]) were taken annually in the North Pacific and another 540,000 ([equivalent to 10,800 tons]) in the Central and South Pacific in the late 1980s." (Camhi, *et al.*, 2007 at 26). In addition to this incidental catch, there is evidence of targeted oceanic whitetip fishing in these waters as well (*see, e.g.,* Rice & Harley, 2012 at 3, 5). "Pacific Ocean records of pregnant females and newborn oceanic whitetip sharks are concentrated between 20° North latitude and the equator, from 170° East longitude to 140° West longitude." (E-CoP16-Prop-42 at 4; *see also* Camhi, *et al.*, 2007 at 26 (stating that the Central Pacific (150°W to 180°W) just North of the equator (10°N) serves as a pupping ground for oceanic whitetip sharks)). As a result, catch of oceanic whitetips in that area is likely to be particularly destructive to the species.

a. Western and Central Pacific

The greatest impact on the Western and Central Pacific oceanic whitetip stock is attributed to bycatch from the longline fishery, with lesser impacts from target longline activities[13] and purse-seining (Rice & Harley, 2012 at 3). 2010-2012 catch data indicates that over 20 WCPFC members, cooperating non-members, and participating territories (collectively "CCMs") have recorded oceanic whitetip sharks in their catch (Clarke, *et al.*, 2014 at 11). However, there are likely additional nations that catch the species in the Western and Central Pacific as well because some records are available only generically as "sharks," with no further species identification; are not reported because the catch was discarded; or are not reported merely because of pervasive underreporting in logbooks (*see* Clarke, *et al.*, 2014 at 11; *see also* Brodziak & Walsh, 2013 at 1723).

[13] "Observer records do indicate that some targeting has occurred historically in the waters near Papua New Guinea, and given the high value of shark fins (especially those of [oceanic whitetips]) and low level of observer coverage (annual average coverage has been <1% from 2005-2008), it is likely that targeting does occur in other areas." (Rice & Harley, 2012 at 5 (internal citation omitted)).

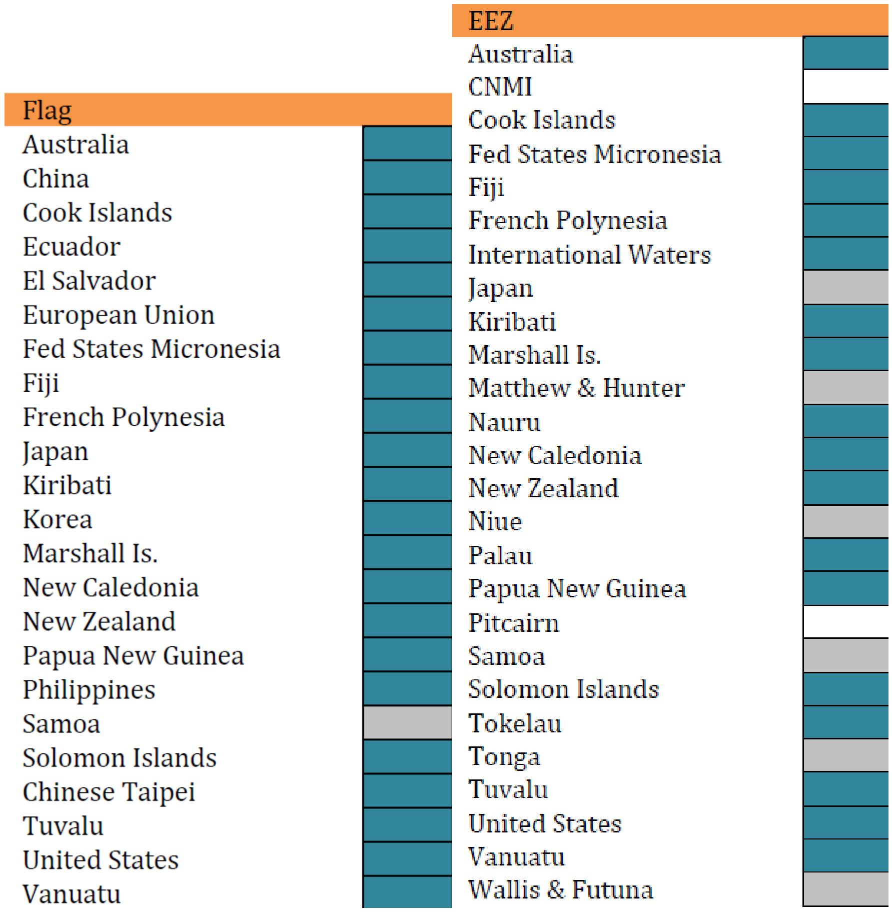


Figure 46. Flag States catching oceanic whitetips and the location (EEZ or International Waters) of catch for 2010-2012. Dark shading indicates that the oceanic whitetip is present in the observer dataset (longline and/or purse-seine); light shading indicates the species is present in the logsheet dataset only (longline operational, longline aggregate and/or purse-seine) (Clarke, *et al.*, 2014 at 10).

The large impact of tuna longliners in particular in this fishery is due to the fishery's overall extensive effort (Rice & Harley, 2012 at 5). As a result of this large amount of effort, a recent stock assessment of oceanic whitetips in this region indicated that fishing mortality has increased to levels far in excess (6.5 times) what is sustainable and that overfishing is therefore occurring (Rice & Harley, 2012 at 2). In addition, estimated spawning biomass has declined to levels far below spawning biomass at maximum sustained yield (the point at which there would be an equilibrium), indicating that the stock is overfished (Rice & Harley, 2012 at 2). Estimated spawning biomass declined by 86% from 1995-2009 (Rice & Harley, 2012 at 2-3; *see also* Clarke, *et al.*, 2012 at 202 (longline CPUE of oceanic whitetips decreased by 90% from 1996-2009, with a 17% decline per year, and estimates of uncertainty were low)). Assessment of unstandardized results from the purse-seine fishery in this region indicate similar declines, with the CPUE of associated sets being roughly twice that of unassociated sets (Clarke, *et al.*, 2012 at 202). Finally, the existing biomass was estimated to be just 15.3% of the optimal level (FAO, 2012 at 14 (discussing results of Rice & Harley, 2012)). These decline estimates are "the most reliable estimate" of the extent of the oceanic whitetip's decline in this region (FAO, 2012 at 13). However, in addition to this observed decline, further declines of unknown magnitude already occurred prior to the data set used in the stock assessment (FAO, 2012 at 13).

Based on the data in the oceanic whitetip stock assessment, the median estimate of oceanic whitetip biomass in the Western Central Pacific in 2010 was 7,295 tons, which would be equivalent to a population of roughly 200,000 individuals (FAO, 2012 at 9 (citing Rice & Harley, 2012)). However, observer data suggests catches of a group of 5 so-called key shark species (blue, makos, oceanic whitetip, and silky) have averaged 2 million individuals in the Western and Central Pacific annually since the mid-1990s (Clarke, *et al.*, 2012 at 198 (citation omitted)) and that an estimated 200,000 to 1,200,000 oceanic whitetips are killed annually throughout the world to support the international fin trade (Bonfil, *et al.*, 2008 at 7; E-CoP16-Prop-42 at 8). These statistics shows the massive overutilization that this K-selected species is facing (*see* Section IV. E. 1. K-Selected, *infra*). However, even these high numbers likely underestimate oceanic whitetip mortality in the Western and Central Pacific as most observer coverage is focused on EEZs whereas fishing is broadly distributed in this region (Clarke, *et al.*, 2012 at 199). "As a corollary, there is little or no information on the shark catches of major fleets belonging to China, Taiwan, Japan, and Korea when they fish in their own EEZs or on the high seas." (Clarke, *et al.*, 2012 at 199).

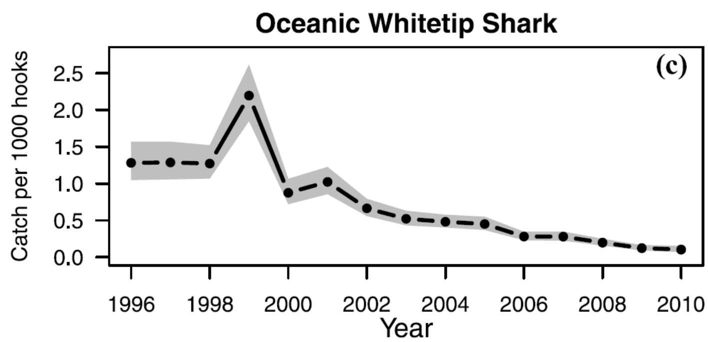


Figure 47. Standardized catch rate of oceanic whitetip sharks for longlines in the Western and Central Pacific (Clarke, *et al.*, 2012 at 203). Increases at the beginning of the data set are likely due to "progressively more species-specific recording during this period resulting from improved observer training." (Clarke, *et al.*, 2012 at 202).

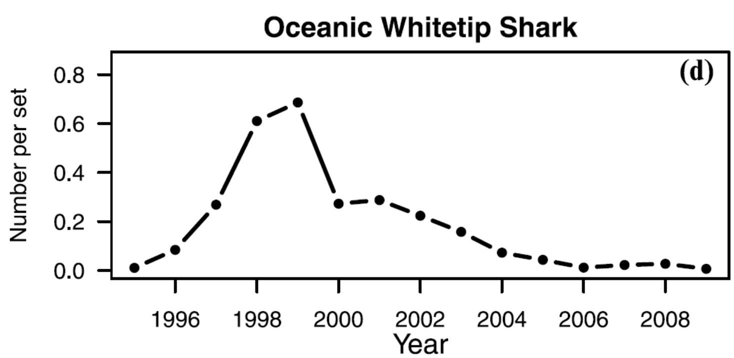


Figure 48. Catch rate of oceanic whitetip sharks for purse-seine nets in the Western and Central Pacific (Clarke, *et al.*, 2012 at 203). Again, increases at the beginning of the data set are likely due to "progressively more species-specific recording during this period resulting from improved observer training." (Clarke, *et al.*, 2012 at 202).

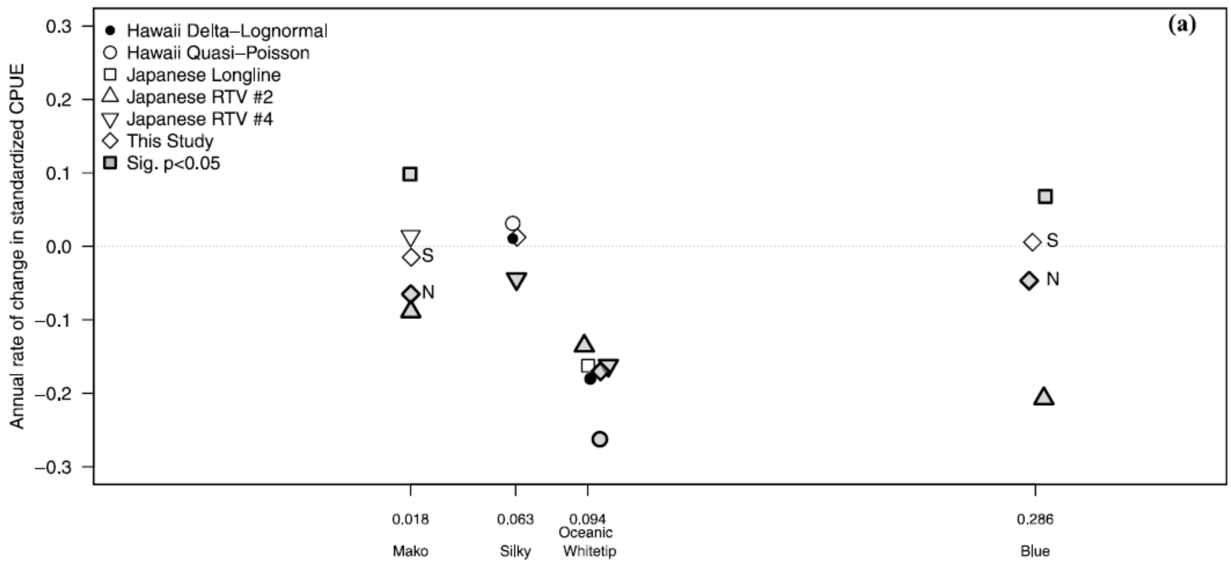


Figure 49. Trends in catch rate of Pacific oceanic sharks in the Western and Central Pacific longline and purse-seine fisheries (Clarke, *et al.*, 2012 at 204).

Clarke, *et al.*, 2012 concluded that

> All standardized catch-rate trends for the oceanic whitetip from Pacific longline and purse-seine fisheries we analyzed were consistent, steep, and downward. Congruent declines to near-zero catch rates in other data sets from Japan and Hawaii over the same period and the significantly smaller sizes of sharks we and others found confirm the depleted state of the oceanic whitetip population in the [Western and Central Pacific Ocean].

(Clarke, *et al.*, 2012 at 206). Furthermore, because oceanic whitetips are a valuable components of the global trade in shark fins and there are few known methods for avoiding shark catches, "it is highly unlikely that declining abundance reflects intentional shifts in fishing effort away from the[] species." (*See* Clarke, *et al.*, 2012 at 206 (citation omitted)).

Part of the reason that declines have been so severe in this region is that finning is pervasive and is capable of removing far more sharks from the ocean far more quickly than if the entire large carcass were retained. Despite the 2007 WCPFC ban on finning, actual numbers of sharks finned or otherwise retained in the longline fishery does not appear to have changed and remains very high (Clarke, *et al.*, 2012 at 204-06). Clarke, *et al.*, 2012 explains that

> The proportion of sharks finned in the longline fishery in 2008 (48%), the first full year after the WCPFC finning prohibition was agreed on, was lower than 2007 (53%) but higher than 2006 (40%), the year before the measure was agreed on . . . Data for 2009, suggest finned sharks accounted for 43% of sharks that were recorded by observers. In 2010 less finning was recorded but shark retention (keeping dead sharks in whole form) increased such that overall mortality remained stable.

(Clarke, *et al.*, 2012 at 204-06). While the purse-seine fishery had a decreasing finning trend and an increasing discard trend for sharks generally after the finning measure was agreed on, these trends were different as applied to the oceanic whitetip, which was usually finned and not retained in the purse-seine fishery (Clarke, *et al.*, 2012 at 206; *see also* Figure 50, *infra*).

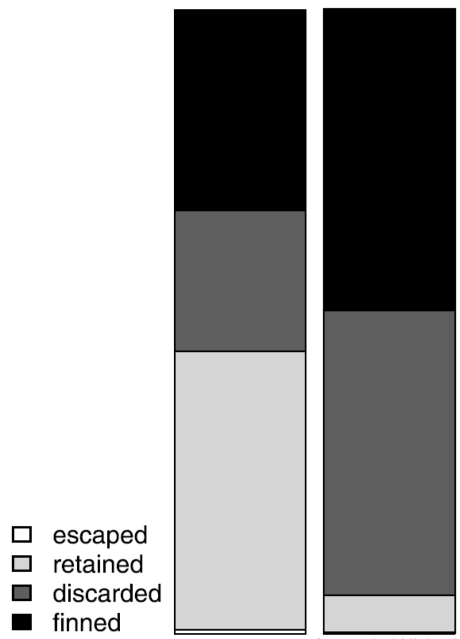


Figure 50. Fate of oceanic whitetips as recorded by observers from 1995 through 2010 for the Western and Central Pacific Ocean for longline (left) and purse-seine (right) fisheries (Clarke, *et al.*, 2012 at 207).

Not only do the longline and purse-seine fisheries take far too many individuals, but they also predominantly remove juvenile oceanic whitetips (*see* Rice & Harley, 2012 at 5 (longline); E-CoP16-Prop-42 at 7 (longline) (citing Rice & Harley, 2012); Clarke, *et al.*, 2012 at 201 (purse-seine); *see also* Section III. G. 2. a. iii. Individual Size, *supra*). In fact, Clarke, *et al.*, 2012 compared the available size data to the length at which 50% of the population reached full maturity to assess whether the oceanic whitetip was being caught before it was able to reproduce and concluded that *all* oceanic whitetips sampled from the purse-seine fisheries were immature since 2000, meaning none of the bycaught individuals were capable of reproduction (Clarke, *et al.*, 2012 at 201-02). Catch of individuals before they have an opportunity to reproduce reduces the species' ability to replace lost individuals and hampers its ability to recover from population declines. This catch of immature individuals is therefore an unsustainable practice that exacerbates the overutilization that the oceanic whitetip is experiencing in this region. Because these sharks are being caught before they have the opportunity to reproduce, population collapse is likely imminent.

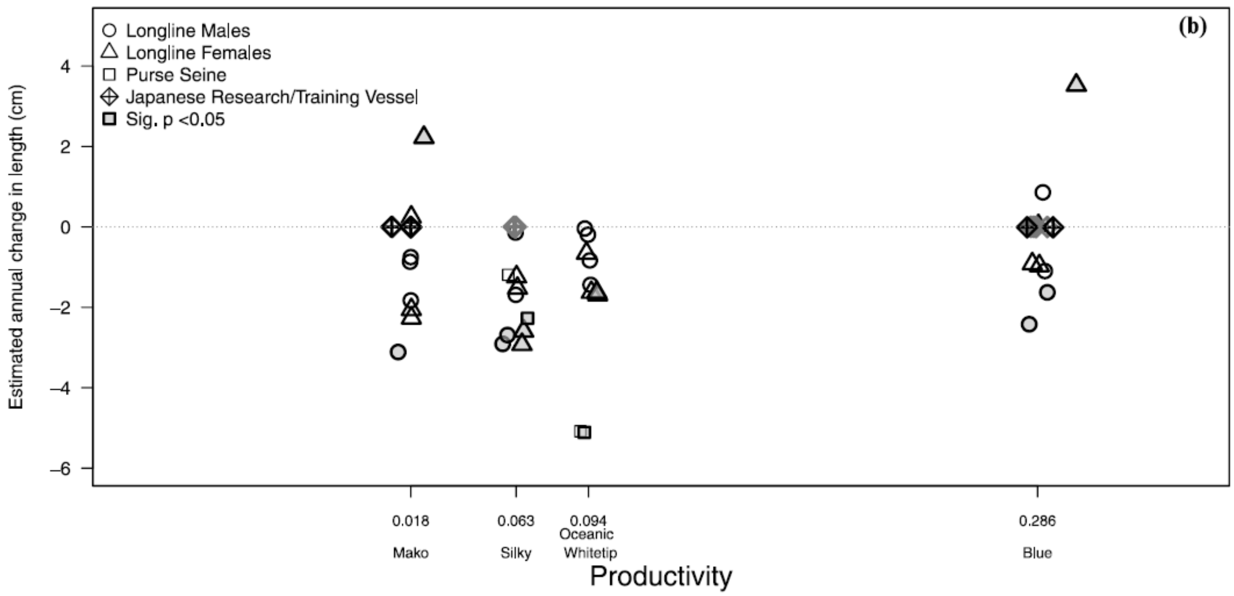


Figure 51. Trends in size of Pacific oceanic sharks in the Western and Central Pacific relative to their reproductive productivity (intrinsic rate of increase) (Clarke, *et al.*, 2012 at 204).

The abundance of juveniles in the Western and Central Pacific catch is likely due to the fact that most of the adults have already been removed by overfishing and other threats. This is evidenced by data indicating a decreasing oceanic whitetip size trend in the region (*see* Clarke, *et al.*, 2012 at 204). This decreasing size trend is significant because

> Trends in a standardized measure of fish size can indicate changes in the age and size composition of the population. In particular, size is expected to decrease in harvested populations. The magnitude of such change can, in theory, provide information on the level of exploitation of a fish stock.

(Clarke, *et al.*, 2012 at 201). This decrease in size is another indicator that the species is being unsustainably overutilized in this region.

In addition to legal catch, the Western and Central Pacific Ocean is also subjected to rampant IUU fishing. In fact, 34% of all of the catch in this region is estimated to be from IUU fishing (NMFS, 2013 at 68 (citation omitted)). There is evidence that Indonesia, the top shark fishing nation in the world, undertook at least some of its IUU fishing activities in and around Australia's EEZ in the western Pacific (NMFS, 2013 at 66-67; *see also* Figure 58, *infra*). However, Indonesian fishermen have since moved their efforts to other waters, having depleted the available sharks around Australia (NMFS, 2013 at 67). These other waters likely include, at least in part, other areas in the western Pacific due to their relative proximity to Indonesia and Indonesia's history of targeting this area. It is also likely that Indonesia will resume its extensive IUU fishing of already-fished areas if stocks improve (*see* NMFS, 2013 at 67 (indicating that decrease in IUU fishing is related to decrease in available fish) (citation omitted)). In addition to Indonesian IUU fishing,

> in 2007, a Taiwanese-flagged tuna boat was seized in Palau for IUU fishing and had 94 shark bodies and 650 fins onboard. In 2008, a Chinese-flagged fishing vessel was arrested by the Federated States of Micronesia . . . National Police for fishing within

> [its] EEZ. Based on the number of fins found onboard, there should have been a corresponding 9,000 bodies, however only 1,776 finned shark bodies were counted.

(NMFS, 2013 at 68).

> [Additionally, in 2012,] thousands of pounds of shark products were confiscated in the Marshall Islands, with the Marshall Islands Marine Resource Authority fining a Japanese tuna transshipment vessel $125,000 for having sharks on board in a designated shark sanctuary. In Palau, a Taiwanese vessel was spotted by Palau law enforcement officials fishing and finning sharks in its protected waters, and was fined $65,000 and banned from Palauan waters for a year. Unfortunately, like most of these Pacific Island countries, Palau is small, and patrolling its large oceanic territory is difficult without adequate resources. Currently, Palau has only one patrol boat to enforce fishing regulations in 604,000 [square kilometers (roughly 233,206 square miles)] of ocean waters.

(NMFS, 2013 at 69 (citations omitted)). This prevalence of IUU fishing in the Western and Central Pacific is an additional, ongoing overutilization threat to the oceanic whitetip.

b. Hawaiian Islands

Oceanic whitetips are incidental bycatch in the Hawaii-based pelagic longline fishery (*see* Brodziak & Walsh, 2013 at 1724). Analysis of standardized CPUE in this fishery from 1995-2010 determined that all models show a "highly significant decreasing trend" with the best-fitting model showing an annual mean decrease of 4.1% per year (Brodziak & Walsh, 2013 at 1728). Due to its tendency to stay in shallower portions of the water column, the oceanic whitetip was much more vulnerable to shallow longline sets than to deep sets (Brodziak & Walsh, 2013 at 1730). However, the species would likely be increasingly susceptible to deep sets during their deployment and when they are hauled back as hooks pass through the near-surface mixed layer (Brodziak & Walsh, 2013 at 1730). Ultimately, the study determined that fishing pressure in this region had caused ~90% oceanic whitetip declines and that the concordance of this decline data with that found in the Western and Central Pacific Ocean indicates a Pacific-wide decline caused by overfishing (*see* Brodziak & Walsh, 2013 at 1731-32). The study also implied that much of this decline may be to supply the shark fin trade, even though finning was banned in the Hawaii-based longline fishery in the early 2000s (Brodziak & Walsh, 2013 at 1732).

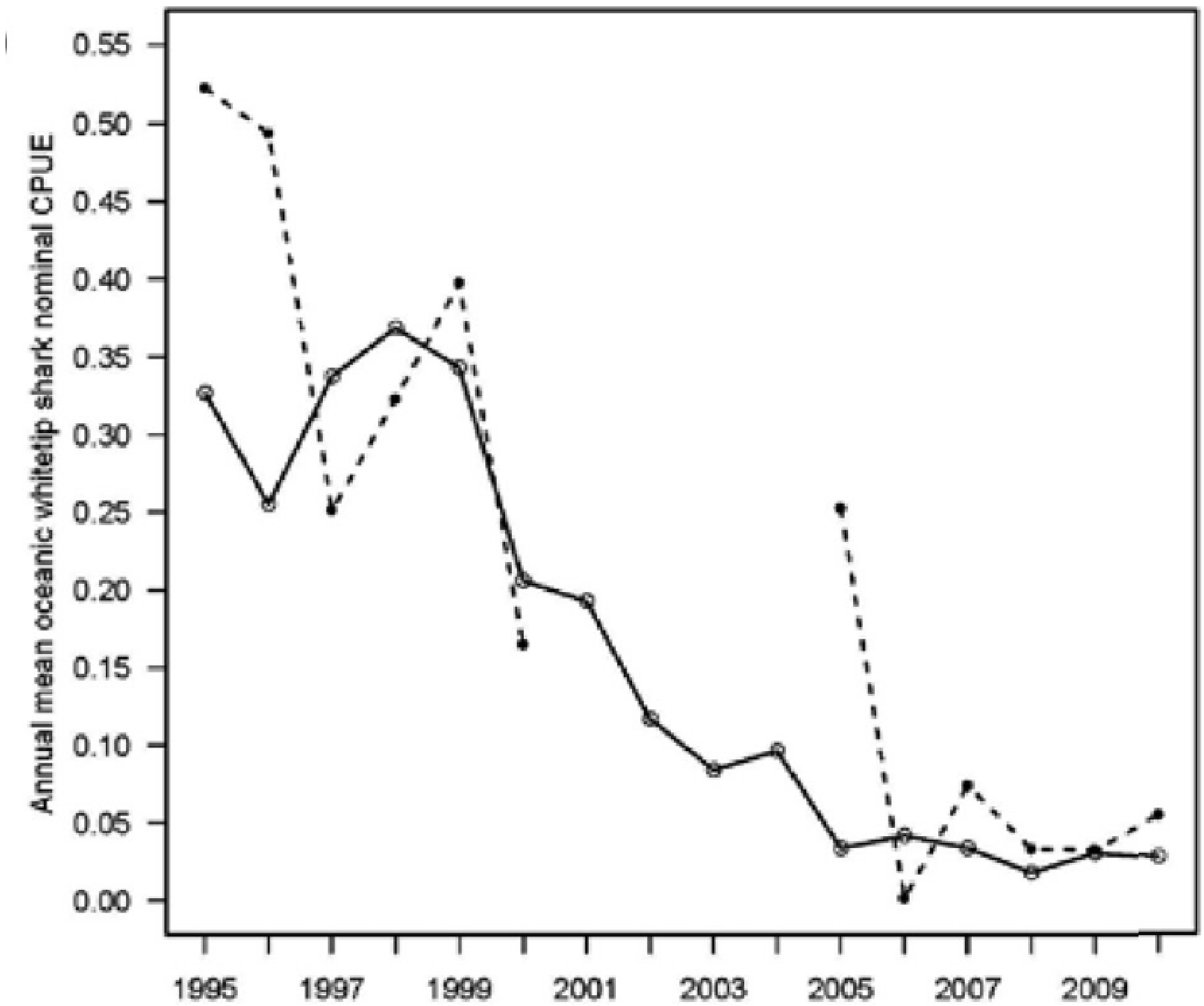


Figure 52. Oceanic whitetip shark catch trends in the Hawaii-based pelagic longline fishery in 1995–2010 for the deep-set sector (solid line) and shallow-set sector (dashed line). Shallow-set sector data are not plotted for 2001–2004 because it was closed all or part of these years (Brodziak & Walsh, 2013 at 1734).

In addition to Brodziak & Walsh, 2013, another recent study, Walsh & Clark, 2011, also found that oceanic whitetip CPUE decreased by greater than 90% since 1995 in the Hawaii-based pelagic longline fishery (Walsh & Clark, 2011 at 9). This study found both a significant decrease in nominal CPUE on longlines with positive catch and a significant increase in longlines with zero catches, indicating population decreases and possible range contraction (*see* Figure 53, *infra*; Walsh & Clark, 2011 at 6)).

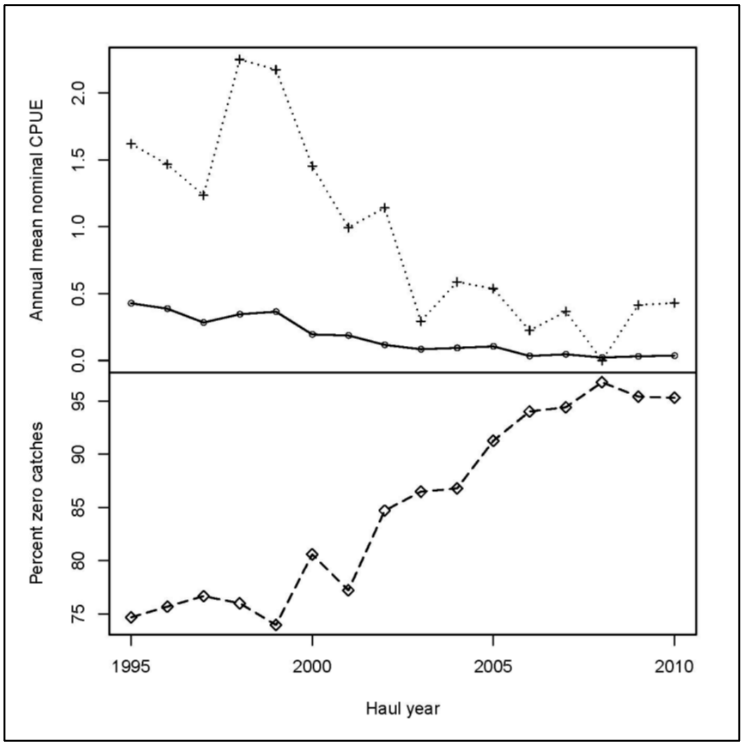


Figure 53. Oceanic whitetip shark annual mean nominal CPUE and percentages of zero catches in the Hawaii-based pelagic longline fishery from 1995–2010. The upper panel presents the annual mean nominal CPUE (solid line) and the annual mean nominal CPUE on sets with positive catch (dotted line). The lower panel presents annual percentages of zero oceanic whitetip shark catches (Walsh & Clark, 2011 at 33).

Fishing pressure in the area around the Hawaiian Islands has thus caused significant and ongoing oceanic whitetip declines. However, the oceanic whitetip's decline began well before the data sets used in these studies and therefore even these large declines underestimate the species' losses from an un-fished state. The ongoing overutilization of the species in this area is unsustainable and is a threat to the species' ongoing existence.

c. Eastern Pacific

> According to the Inter-American Tropical Tuna Commission [("IATTC")], oceanic whitetip sharks are most often taken as bycatch by ocean purse-seine fisheries [in the Eastern Pacific]. Information collected by observers between 1993 and 2004 indicates oceanic whitetip sharks make up 20.8% of the total shark bycatch. Total observed numbers over the 11-year period indicated that 32,000 [oceanic whitetip] sharks were caught in combined dolphin, unassociated, and floating object purse-seine sets.

(E-CoP16-Prop-42 at 7). Oceanic whitetip sharks are the second most commonly bycaught shark in this fishery (Camhi, *et al.*, 2007 at 26 (citation omitted)). The oceanic whitetip is also taken in relatively small-scale directed fisheries on the Pacific coast of Central and South America (*see* Figure 43, *supra*; Mundy-Taylor & Crook, 2013 at 9; NMFS, 2013 at 69).

This fishing pressure has caused massive declines in oceanic whitetip abundance in a very short time period. For example, observer data covering 100% of sets from the relatively short period of time where FADs have been used in the purse-seine fishery indicate "that the purse seine CPUE on floating objects of oceanic whitetip experienced an extent of decline greater than 95 percent in the Eastern Pacific between 1994 and 2006." (FAO, 2012 at 10 (citation omitted); *see also* FAO, 2012 at 14 (same); E-CoP16-Prop-42 at 6 (noting declines in these fisheries); Clarke, *et al.*, 2012 at 202 (indicating that such associated sets generally catch about twice as many oceanic whitetips as unassociated sets in the Western and Central Pacific)).

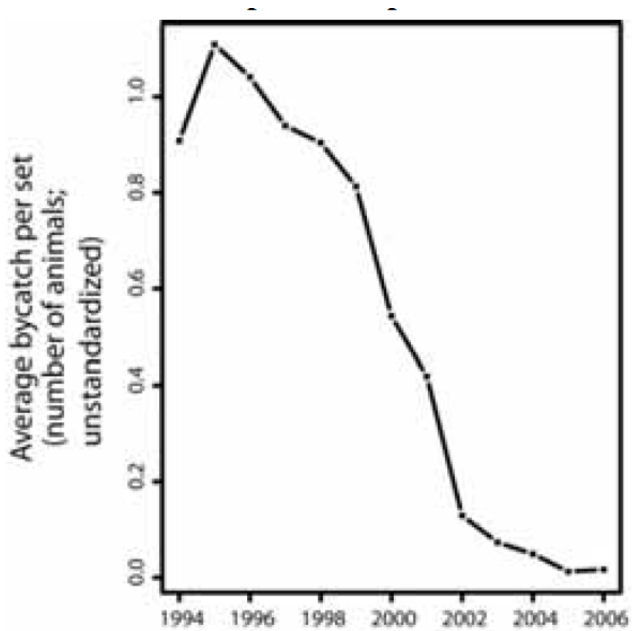


Figure 54. Unstandardized oceanic whitetip CPUE from purse-seine research surveys in the Eastern Pacific Ocean (FAO, 2012 at 28 (citation omitted)).

FAO explained that "[t]he information appears to be robust but is surprising considering the long history of longline exploitation prior to the beginning of this time series, and the relatively low removals by this fishery." (FAO, 2012 at 14). However, while surprising in its extreme character, this data is indicative of a collapsing population after years of decimation by longline and other fisheries. Therefore, the oceanic whitetip population decline caused by overfishing in this region appears to be at least as extreme as that experienced by the species in any other part of its range.

The fishery in this region also partially overlaps an area of the Pacific Ocean where pregnant females and newborn oceanic whitetips are concentrated (*see* E-CoP16-Prop-42 at 4 (indicating that this area is between 20°N latitude and the equator, from 170°E to 140°W longitude)). Therefore, this purse-seine activity may disproportionately impact the species at these vital life history stages, further reducing the sustainability of the fishery. NMFS should consider the extent to which pregnant females and newborns are impacted by fishing in these areas when making its endangerment determination.

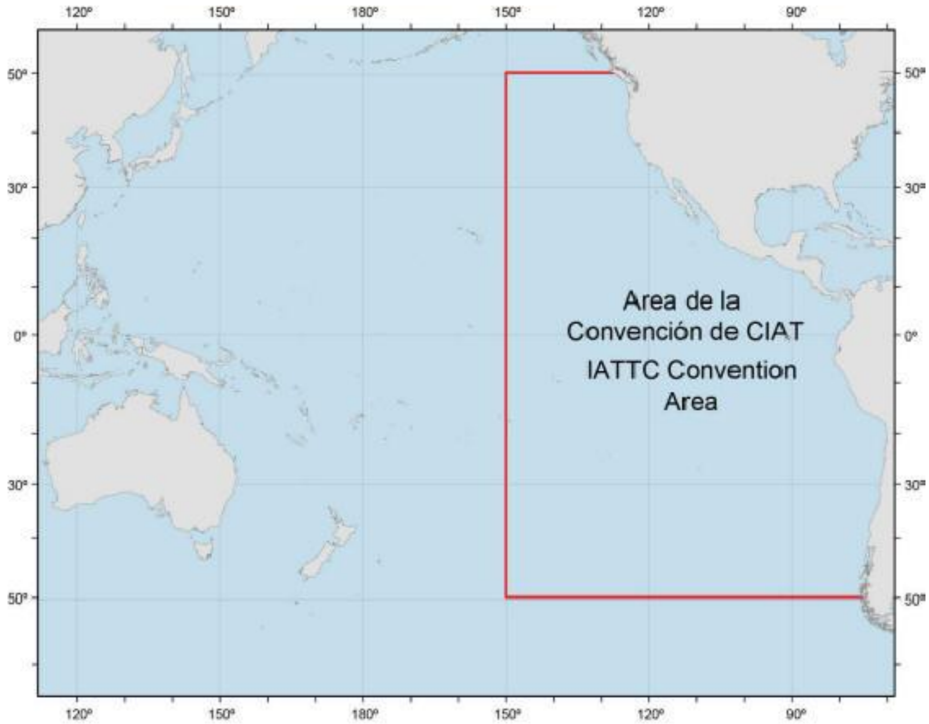


Figure 55. Map of IATTC area of jurisdiction (https://www.iattc.org/EPOmap.htm), which partially overlaps with the concentration of pregnant females and newborn oceanic whitetips in the Pacific Ocean (*see* E-CoP16-Prop-42 at 4).

In addition to legal catch occurring in these waters, high levels of IUU fishing have also been reported in the Eastern Pacific off the coasts of Central and South America (NMFS, 2013 at 69).

> In the [Eastern Tropical Pacific], there is evidence of illegal fishing by both local fisherman and industrial longliners within many of the marine protected areas. For example, in Cocos Island National Park, off Costa Rica, a "no take" zone was established in 1992, yet populations of [scalloped hammerheads] continued to decline by an estimated 71% from 1992-2004. In Ecuador, concern over illegal fishing around the Galapagos Islands prompted a 2004 ban on the exportation of fins but only resulted in the establishment of new illegal trade routes and continued exploitation of . . . sharks. In 2007, a sting operation by the Ecuadorian Environmental Police and the Sea Shepherd Conservation Society resulted in a seizure of 19,018 shark fins that were being smuggled over the border on buses from Ecuador to Peru. The fins were believed to come from protected sharks in the Galapagos Islands. More recently, in November 2011, Colombian environmental authorities reported a large shark massacre in the Malpelo wildlife sanctuary, an area [with frequent shark sightings]. The divers counted a total of 10 illegal Costa Rican trawler boats in the wildlife sanctuary and estimated that as many as 2,000 sharks may have been killed for their fins.

(NMFS, 2013 at 69). The prevalence of IUU fishing in this area, in addition to substantial reported, legal catch, exacerbates the overutilization threat to the oceanic whitetip in the Eastern Pacific Ocean.

3. Indian Ocean

The oceanic whitetip is taken in large numbers by a range of fisheries in the Indian Ocean, including target fisheries and bycatch in tuna and swordfish pelagic longline fisheries and purse-seines (*see* Camhi, *et al.*, 2007 at 26; IOTC, 2008 at 155; Mundy-Taylor & Crook, 2013 at 9). Until very recently (*see* IOTC, 2013 – 2 at 3), catch of oceanic whitetips was not reported to the IOTC (E-CoP16-Prop-42 at 7; IOTC, 2008 at 155), and it is unclear what level of compliance new reporting requirements have had thus far. However, catch data can be derived from various studies.

A 1993 study in the Maldives "reported that oceanic whitetip sharks taken commercially by shark longliners and as bycatch by tuna fisheries represented 23% of all sharks caught." (E-CoP16-Prop-42 at 7). Another study indicated that oceanic whitetips were 29% of the shark catch in a longline survey in the Maldives in 1987-1988, but that they had been reduced to a mere 3.5% of the shark catch in the directed shark fishery there by 2000-2004, which is consistent with the 90% population decline estimate that the study came to for this time period (*see* FAO, 2012 at 12 (citation omitted)). The oceanic whitetip was the second most important shark species in both the directed and bycatch fisheries in the Maldives, but the directed shark fishery was closed in 2009 and shark exports were banned in 2010 (Camhi, *et al.*, 2007 at 17). However, despite this closure, "sightings of this species in Maldives and Réunion islands [are] now quite uncommon." (FAO, 2012 at 12 (citation omitted)). There also appears to be at least one additional target fishery in the Indian Ocean in the Gulf of Aden (Mundy-Taylor & Crook, 2013 at 9). Though the degree to which it exploits the oceanic whitetip is unclear.

In addition to these target fisheries, the oceanic whitetip is likely opportunistically targeted by other fishermen in the Indian Ocean as both Indonesia (the largest shark fishing nation in the world) and India (the second largest shark producing country in the world) fish extensively in these waters and are responsible for a combined total of over 20% of the world's total shark catch (*see* NMFS, 2013 at 66; Mundy-Taylor & Crook, 2013 at 3; Fischer, *et al.*, 2012 at iv).[14] In the Indian EEZ, in order to keep up with demand,

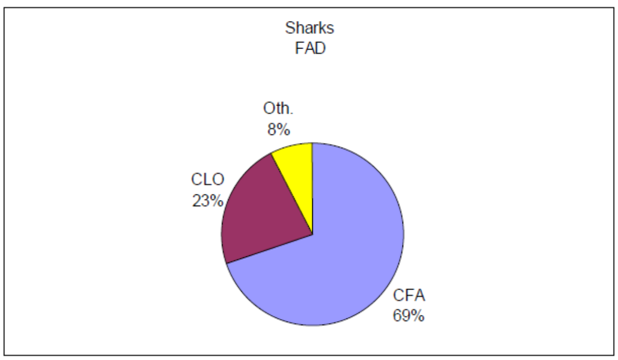
> additional fish production has been achieved by extending the fishing effort beyond the traditional fishing grounds and by diversification of the fishing effort as well. In view of the very high export potential of shark fins and also the abundance of sharks in the inshore and offshore areas, exploitation of deep sea sharks attracted many . . . fishermen to concentrate on this lucrative fishery.

(Balasubramanian, *et al.*, 1992 at 10). This increase in effort has resulted in crashing populations with John & Varghese, 2009 showing shark CPUE declines of 94% from India's West Coast, 89% from India's East Coast, and 84% from the waters around the Andaman and Nicobar Islands from 1984-2006 (*see* Figure 31, *supra*). This study indicates that oceanic whitetips make up 0.6% of the shark catch on India's East coast and 4.7% of the catch in the waters around the Andaman and

[14] Many of the other top shark fishing nations also have shorelines on the Indian Ocean and also likely exert heavy fishing pressure there (*see, e.g.,* Fischer, *et al.*, 2012 at iv (including Indian Ocean countries of Indonesia, India, Pakistan, Malaysia, Thailand, Sri Lanka, Iran, Australia, and Yemen amongst the top 26 shark-fishing countries, as well as other countries that likely have fleets targeting these waters)).

Nicobar Islands in the tuna longline fishery, and therefore the species has likely faced a congruent decline (*see* John & Varghese, 2009 at 6).

Japanese longline records from 1967-1968 indicate that the oceanic whitetip shark comprised 3.4% of the Indian Ocean shark catch by longline vessels targeting tuna (E-CoP16-Prop-42 at 7-8 (citations omitted)). In addition, the oceanic whitetip shark is present in 16% of French and Spanish tuna purse-seine nets in the western Indian Ocean (E-CoP16-Prop-42 at 7-8 (citations omitted)). Oceanic whitetips are also take taken in the drift gillnet and/or longline fisheries of Sri Lanka, "once a major shark-fishing nation, whose reported landings have rapidly declined since 2003." (Camhi, *et al.*, 2007 at 17 (citation omitted)). Data from the Spanish tropical purse-seine fleet indicates that the oceanic whitetip is caught in both the free school and FAD sets in the Indian Ocean (Delgado de Molina, *et al.*, 2007 at 6). Shark bycatch is observed to be as much as 33% of the bycatch by weight for FADs (2004) and 95% of the bycatch by weight (2003) for free school fishing from this fleet (Delgado de Molina, *et al.*, 2007 at 10). Because effort is increasing in both free school and FAD sets in this fishery, the impact on oceanic whitetips can only be expected to continue growing along with it (*see* Figure 56, *infra*; Figure 57, *infra*).



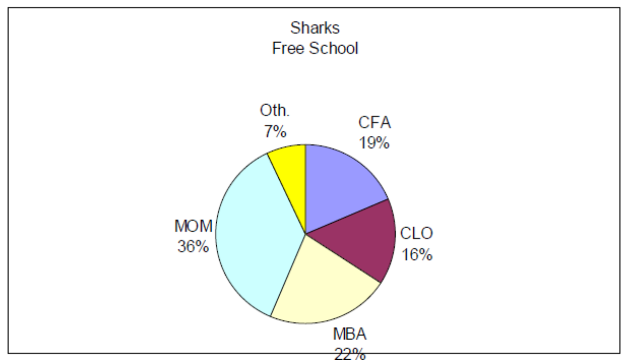


Figure 56. Graphs analyzing data from 2003-2006 for the Spanish tropical purse-seine fleet and showing that 23% of sharks bycaught in FADs and 16% of sharks bycaught in free school fishing are oceanic whitetips ("CLO") (Delgado de Molina, *et al.*, 2007 at 11). Note that these figures represent numbers, not weight, in contrast to the discussion above.

	Total Fishery Sets			
	2003	2004	2005	2006
Free School	1869	2363	3047	2911
FAD	1932	1884	2768	3333
Total	3801	4247	5815	6244

Figure 57. Number of sets per fishing mode and total sets placed by the Spanish tropical purse-seine fleet operating in the Indian Ocean from 2003-2006 (Delgado de Molina, *et al.*, 2007 at 4).

These data indicate that oceanic whitetips are caught as a significant proportion of the catch in the Indian Ocean, both as target and bycatch species and both as a proportion of the shark catch and as a proportion of the overall catch. However, in addition to legal catch, the Indian Ocean is also subjected to rampant IUU catch. In particular, Indonesia, which is the largest shark fishing nation in the world, fishes extensively in these waters and has no restrictions pertaining to shark fishing (NMFS, 2013 at 66). "In fact, Indonesian small-scale fisheries, which account for around 90% of the total fisheries production [in the Indian Ocean], are not required to have fishing permits, nor are their vessels likely to have insulated fish holds or refrigeration units, increasing the incentive for shark finning by this sector." (NMFS, 2013 at 66 (internal citations omitted)). As a result of the fishermen's lack of oversight, much, likely at least 44%, of their shark fishing effort in this region remains unreported (NMFS, 2013 at 66). Unsustainable fishing practices have been forcing Indonesian fishermen to continually seek areas that have not yet been depleted in this region before moving on when the fishery inevitably declines there (NMFS, 2013 at 66).

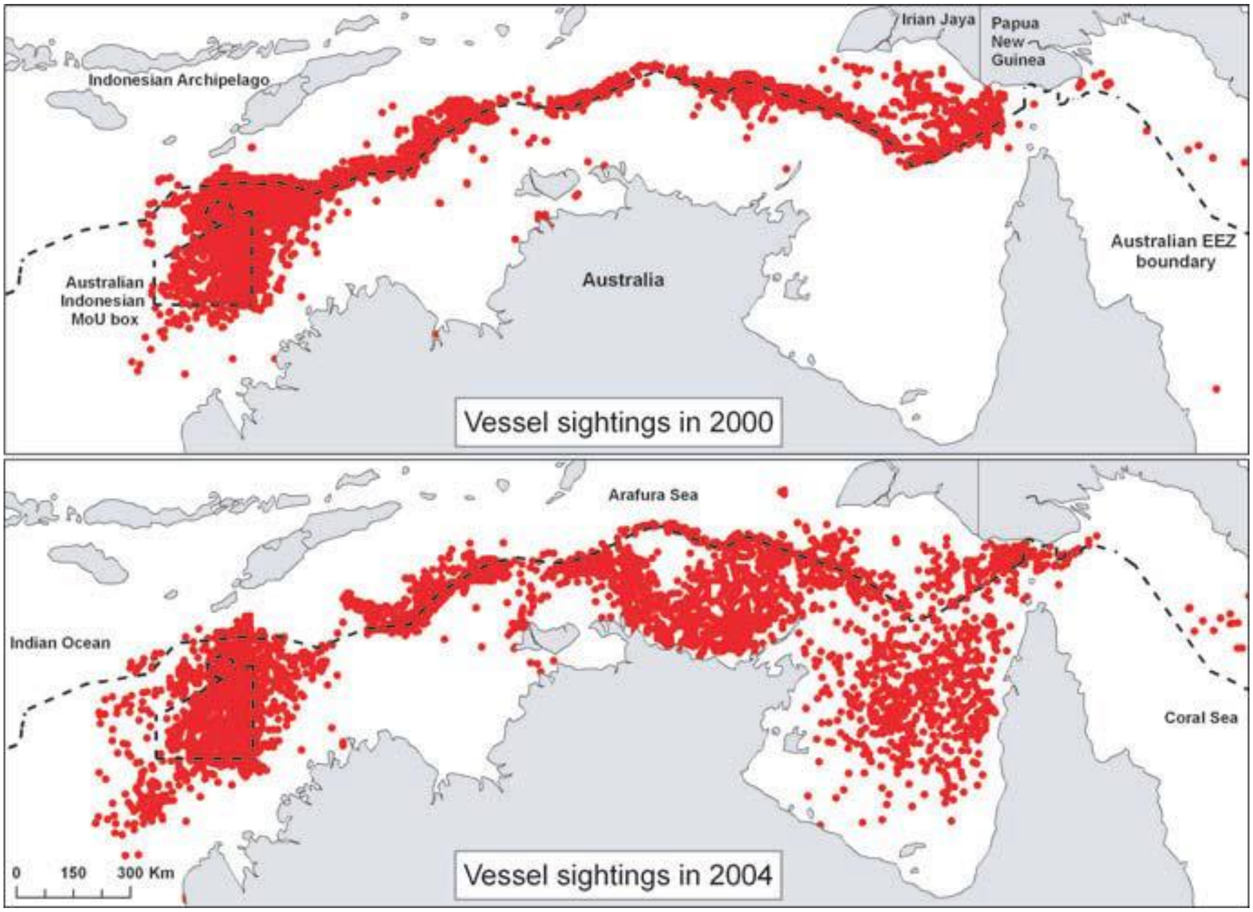


Figure 58. Sightings of IUU fishing vessels bordering and within the Australian EEZ in 2000 and 2004, with most occurring in the Indian Ocean (NMFS, 2013 at 67 (citation omitted)).

In addition to Indonesian IUU fishing activities,

> In 2008, off the coast of Africa, a Namibian-flagged fishing vessel was found fishing illegally in Mozambican waters, with 43 [metric tons] of sharks and 4 [metric tons] of shark fins onboard. In 2009, a Taiwanese-flagged fishing trawler was found operating illegally in the South Africa EEZ with 1.6 [metric tons] of shark fins onboard without the corresponding carcasses. Also in 2009, 250 trawlers were found to be poaching sharks in coastal areas in the Bay of Bengal with the purpose of smuggling the sharks to Myanmar and Bangkok by sea. There are also reports of traders exploiting shark populations in the Arabian Gulf due to the lack of United Arab Emirates enforcement of finning regulations.

> In Somalia, it is estimated that around 700 foreign-owned vessels are operating in Somali waters without proper licenses, and participating in unregulated fishing for highly-valued species like sharks, tunas, and lobsters.

(NMFS, 2013 at 68 (citation omitted)).

Ultimately IUU fishing accounts for *32% of all catch in the Indian Ocean* (NMFS, 2013 at 68 (citation omitted); *see also* IOTC, 2008 at 155 ("It appears that significant catches of sharks have gone unrecorded in several countries.")). "Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights." (IOTC, 2008 at 155). As a result, unsustainable practices are occurring virtually unchecked in the Indian Ocean and are threatening the oceanic whitetip.

Piracy in the western Indian Ocean is also affecting catch by displacing and concentrating fishing effort to the southern and eastern Indian Ocean (IOTC, 2013 at 70). "It is therefore unlikely that catch and effort on oceanic whitetip sharks will decline in these areas in the near future, and may result in [localized] depletion." (IOTC, 2013 at 70).

The fishing pressures on the oceanic whitetip led the IOTC to determine that "[t]he available evidence indicates considerable risk to the stock status at current effort levels . . . , [and that] maintaining or increasing effort will probably result in further declines in [oceanic whitetip] biomass, productivity and CPUE." (IOTC, 2013 at 70). Unfortunately, the available data indicates that effort is indeed increasing (Semba & Yokawa, 2011 at 4 (data from 2000-2009 shows that effort in the Japanese tuna longline fishery rapidly increased after 2007)). This increase in effort has been met with increasing frequency of utilization of oceanic whitetips as a result of decreasing catch in target species (Semba & Yokawa, 2011 at 4). This increase in both effort and utilization of bycatch led to a CPUE decline of 40 percent over 6 years (2003–09) from the Japanese longline fleet that is active in this region (*see* FAO, 2012 at 14; *see also* FAO, 2012 at 12 (citing a later paper by Semba & Yokawa that attempted to standardize the catch data and still came to an approximately 40% decline in oceanic whitetip CPUE from the Japanese tuna longline fisheries in the Indian Ocean from 2000 to 2010); E-CoP16-Prop-42 at 6 (citing other sources that have found the species declining)). This equates to an 8% per year decline in CPUE (*see* FAO, 2012 at 14). Because this trend is likely to continue as traditionally targeted species continue to decline, the oceanic whitetip is likely to continue experiencing similar, or perhaps even increasing, declines as a result of this growing overutilization threat.

Year	No. of set	No. of hook	No. of shark
2000	2,904	8,495,202	86
2001	2,824	8,617,893	6
2002	2,848	8,880,403	152
2003	1,137	3,469,751	65
2004	2,190	6,695,472	190
2005	2,249	6,962,072	156
2006	2,258	7,182,416	186
2007	3,304	10,700,051	286
2008	9,980	32,509,395	765
2009	10,535	34,278,053	645

Figure 59. The number of sets, hooks, and sharks caught by year used in the analysis of the Japanese longline fleet operating in the Indian Ocean. Note the increasing effort over this time period with enormous increases at the end of the data set (Semba & Yokawa, 2011 at 6).

C. Disease or Predation

At least some oceanic whitetip sharks are infected with highly pathogenic *Vibrio harveyi* (*see* Zhang, *et al.*, 2009). This bacterium is known to cause deep dermal lesions, gastro-enteritis, eye lesions, infectious necrotizing enteritis, vasculitis, and skin ulcers is vertebrate marine species (Austin & Zhang, 2006 at 120). *Vibrio harveyi* is considered to be more serious in immunocompromised hosts (Austin & Zhang, 2006 at 119), and therefore may be acting synergistically with the high pollutant loads that the oceanic whitetip is experiencing to create an increased threat to the species (*see* Section IV. A. The present or threatened destruction, modification, or curtailment of its habitat or range, *supra*). The extent of the effects of this pathogen on the oceanic whitetip should be considered by NMFS during a status review.

D. The Inadequacy of Existing Regulatory Mechanisms[15]

A recent study found that existing regulatory mechanisms have thus far failed to adequately protect sharks and that "[o]verfishing, rather than improved management, was the key driver of [modest] declines in shark and ray landings." (Davidson, *et al.*, 2015 at 13). This was due to the fact that most of these mechanisms "are not yet legally binding, far from comprehensive, lacked clear implementation guidelines, operated with vague wording and lacked compliance monitoring." (Davidson, *et al.*, 2015 at 16). The mechanisms that exist to protect the oceanic whitetip, where they offer species-specific protections beyond the generally-applicable protections that this recent study found were thus far ineffective, are also inadequate to protect the species. These various inadequate regulatory mechanisms are discussed below.

[15] IUU fishing is prevalent throughout the world (*see* NMFS, 2013 at 66-69). As a result, this IUU fishing will reduce the adequacy of every regulatory mechanism that may protect the oceanic whitetip. NMFS should thus consider the effect of this IUU fishing on the adequacy of each regulatory mechanism whether it is explicitly addressed in the section discussing that regulatory mechanism or not.

1. Shark Finning Bans

At least 21 countries, the European Union, the Organización del Sector Pesquero y Acuícola del Istmo Centroamericano ("OSPESCA"), and nine Regional Fisheries Management Organizations ("RFMOs"), including ICCAT in 2004, the IOTC in 2005, the IATTC in 2005, the Commission for the Conservation of Southern Bluefin Tuna in 2008, and the WCPFC in 2010, have implemented shark finning bans (*see* E-CoP16-Prop-42 at 9; Dulvy, *et al.*, 2008 at 474). However, the strict enforcement that is necessary for these measures to be effective is often lacking, thus hampering the efficacy of these bans (*see* Dulvy, *et al.*, 2008 at 474; Camhi, *et al.*, 2007 at 34-35). For example, "[c]ases of illegal fishing and shark finning that still occur in these places, such as Malpelo,[Columbia,] indicate the need for measures to prevent countries from importing fins that were obtained illegally." (E-Cop16-Prop-43 at 20). Also, where RFMOs or international or regional agreements are concerned, implementation of the bans is often not mandatory or enforceable, leading to continued finning even where a ban is in place. For example, the WCPFC ban allows coastal states to apply alternative measures to the fin ban in their national waters, thus allowing them to circumvent the ban in the waters that are most subject to observer coverage (Clarke, *et al.*, 2012 at 206). This loophole may be part of the reason that "[a]s of October 2010, of the 32 WCPFC members only half had confirmed they were fully implementing the finning prohibition. Only 11 provided specific confirmation of [any ban implementation], and few of these reported the degree of compliance." (Clarke, *et al.*, 2012 at 206). As a result, "although some reduction in the proportion of sharks finned appears to have occurred in the [WCPFC] purse-seine fishery, there is little evidence that the proportion of sharks finned in the longline fishery has been reduced since the WCPFC measure was adopted." (Clarke, *et al.*, 2012 at 206).

Most countries and RFMOs use fin-to-carcass weight ratios as a means to ensure compliance with finning bans, which are difficult, costly to enforce, and vary between fleets (Dulvy, *et al.*, 2008 at 474; E-Cop16-Prop-43 at 20; Clarke, *et al.*, 2012 at 198 (assessing the weaknesses in one such RFMO fin ratio)). In addition to these difficulties, the upper end of the ratio creates loopholes that "potentially enable fishermen to fin sharks without exceeding the ratio limit." (Dulvy, *et al.*, 2008 at 474). Though this particular loophole has been closed in the United States with the passage of the Shark Conservation Act of 2010 and the abolishment of the fin-to-carcass ratio in favor of a policy requiring that sharks are landed with their fins attached, statements from NOAA's Office of Law Enforcement are useful in showing the difficulty that fin-to-carcass ratios pose to enforcement personnel in the many jurisdictions where they still exist. Citing Special Agent Paul Raymond of NOAA's Office of Law Enforcement, Abercrombie, *et al.*, 2005 noted that, "[a]lthough shark finning . . . is illegal in US waters, it is suspected that some fishermen may be finning incidentally caught [sharks with high value fins] and keeping just their fins for their high value, while retaining carcasses from different shark species with higher value flesh but lower value fins. . ." (Abercrombie, *et al.*, 2005 at 786 (citing personal comments from Special Agent Paul Raymond of NOAA's Office of Law enforcement)). By retaining high value fins from oceanic whitetips and high value carcasses for meat from other sharks, fishermen are able to continue finning while maximizing profits and avoiding fin bans. Therefore, even where these finning bans exist, there are often opportunities to avoid their regulation and/or to harvest oceanic whitetip sharks in unsustainable numbers to satisfy market demands.

Additionally, finning bans only "prohibit the retention of shark fins on board vessels without the corresponding carcasses" and do not prohibit landing the entire shark and finning it once it is on land (Dulvy, *et al.*, 2008 at 474, 475). As a result, even where perfectly enforced, finning bans cannot halt overfishing of sharks that happens where the carcasses are landed before being finned (Dulvy, *et al.*, 2008 at 474; *see also* Clarke, *et al.*, 2012 at 198). Finning bans are thus unable to remove the incentive to take these species through directed fishing efforts and through bycatch retention in order to satisfy the market demand for their resultant products. Furthermore, while retention-based weaknesses of finning bans are important to note, even where bycaught individuals are released and not finned or otherwise retained, many oceanic whitetips will still die as a result of being caught (*see* Section IV. B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes, *supra*) (discussing likely high primary post-capture mortality and post-release mortality of oceanic whitetips)). As a result, oceanic whitetips will often die as a result of capture, even where they are not retained. Therefore, initial capture, and not only retention, must also be avoided. Finally, these bans only help to avoid overutilization threats and do nothing to address the other threats that the oceanic whitetip faces. While Defenders applauds finning bans, encourages their continuing proliferation, and believes that they do reduce market demand for shark fins, they primarily address issues of cruelty and waste and are not a sufficient mechanism on their own to protect shark species, like the oceanic whitetip, that are facing a variety of exceptionally serious threats (*see* Dulvy, *et al.*, 2008 at 474).

2. Other National and Local Measures

Defenders strongly supports national and local measures for the conservation of sharks, and is in fact petitioning for one in the present case by requesting that NMFS list the oceanic whitetip under the ESA. However, none of the measures that are currently in place are adequate to protect the oceanic whitetip and displace the need for ESA protections.

For instance, "French Polynesia (2006), Palau (2003, 2009), the Maldives (2010), Honduras (2011), the Bahamas (2011), Tokelau (2011) and the Marshall Islands (2011) [have all enacted legislation] prohibiting shark fisheries throughout their [EEZs]." (E-Cop16-Prop-42 at 9). However, while these fishing bans are commendable starts, they can only offer protection in these limited areas and will suffer enforcement related issues as long as a market for oceanic whitetip products exists. Where shark finning is prohibited in national EEZs, illegal fishing and finning still occur with these nations typically having little ability to effectively enforce their prohibitions (*see* NMFS, 2013 at 68-69). For instance, Palau has caught at least one violator of its shark fishing ban, but it only has one patrol boat to enforce its fishing regulations in roughly 233,206 square miles of ocean; a Sisyphean task for enforcement personnel (NMFS, 2013 at 69). In addition to enforcement issues, fishing bans do not stop incidental capture of sharks, which is often fatal for the oceanic whitetip (*see* Section IV. B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes, *supra*) (discussing high primary post-capture mortality and post-release mortality of oceanic whitetips)). Therefore, steps must be taken to stop the initial capture of oceanic whitetips and not just directed fishing or their ultimate retention. In addition, because the oceanic whitetip is a pelagic species, measures that only protect the species in a country's EEZ while typically be of little conservation utility.

"Other countries have protected areas where shark fishing is prohibited, such as Isla del Coco in Costa Rica, Isla Malpelo in Colombia, the Galapagos Islands in Ecuador, the Banc d'Arguin National Park in Mauritania and the Marine Protected Areas in Guinea-Bissau." (E-Cop16-Prop-42 at 9). However, while Defenders also commends these protected areas, they also can only offer protection in these limited areas and will suffer enforcement related issues as long as a market for oceanic whitetip products exists. Examples of illegal fishing, shark finning, and ongoing shark population declines have been documented in various protected areas including Isla del Coco off Costa Rica, Isla Malpelo off Columbia, and the Galapagos Islands off Ecuador (NMFS, 2013 at 68-69).

In addition to these shark-specific protected areas, there are also many more general marine protected areas ("MPAs") that offer varying levels of protection to sharks. However, while these MPAs are vital to marine biodiversity conservation, they cannot be assumed to be sufficient regulatory protections for overexploited species and, indeed, in most cases are entirely insufficient, even on a local level, to protect the oceanic whitetip. "In general usage, MPA is a broad umbrella term for 'any area of intertidal or sub-tidal terrain, together with its overlying waters, and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.'" (Breen, *et al.*, 2015 at 75 (citation omitted)). While MPAs, where adequately enforced, may offer some level of protection from initial capture, such localized protections can indirectly cause harm to species if impacts to biodiversity are merely displaced (*see* Baum, *et al.*, 2003 at 391). "In some models, for example, undesirable effects of MPAs can occur, such as the redistribution of fishing effort to previously pristine habitats . . ." (Breen, *et al.*, 2015 at 80 (citation omitted)). "Clearly [then], if [MPAs] are to be effective, their placement is of critical importance . . ." (*see* Baum, *et al.*, 2003 at 391). However, "MPAs are often the conservation of a political opportunity rather than any unique biological feature and rarely has sufficient science come into the planning." (Dulvy, 2013 at 359 (citation omitted)). The idea is often to "get what you can where you can annoy as few people as possible." (Dulvy, 2013 at 359 (citations omitted)). Therefore, "MPAs are alluring because there is no apparent need for science to guide their designation because the concept of ring-fencing or banking biodiversity is intuitive to anyone, hence easy to sell as the least-complicated 'magic bullet' solution." (Dulvy, 2013 at 359 (citation omitted)). This lack of careful siting is a significant weakness of MPAs and reduces their conservation value.

The level of protection in MPAs also varies from nearly complete no entry zones to areas of only partial protection (e.g. MPAs that focus only on benthic species or only limiting one type of fishing gear or activity) (Devillers, *et al.*, 2014 at 2, 7 (citation omitted); Dulvy, 2013 at 359). In fact, "[m]any marine protected areas are not sanctuaries in the sense that the animals inside are safe from fishing (and other damaging activities) . . . and this important subtlety is often not readily apparent to the general public." (Dulvy, 2013 at 359). Currently only a small percentage of MPAs are no take zones, estimated as covering only 0.1% of the world's oceans, and thus the majority still allow some degree of exploitation (Devillers, *et al.*, 2014 at 2, 7 (citation omitted)). As a result, "MPA effectiveness can be variable, depending on the objectives of management, appropriateness of zoning, and levels of compliance, and marine ecosystem types are very unevenly represented within MPAs." (Devillers, *et al.*, 2014 at 2 (citation omitted)). Where oceanic whitetips are present in MPAs still allowing some exploitation, their safety cannot be assured.

MPAs have been largely restricted to national waters, mostly covering continental shelves and equivalent areas (Devillers, *et al.*, 2014 at 2 (citation omitted)). In fact, only 0.17% of MPAs are on the high seas (Devillers, *et al.*, 2014 at 7 (citation omitted)). There has been a recent trend in creating large, remote MPAs, which raises questions about whether this type of MPA is sufficient to protect global marine biodiversity (Devillers, *et al.*, 2014 at 2 (citation omitted)). While these large, remote MPAs may overlap the oceanic whitetips habitat to some degree depending on their siting, the majority of MPAs, located in nearshore habitat, will likely cover little of the species' habitat given that oceanic whitetip abundance increases with distance from the continental shelf (*see* Camhi, *et al.*, 2007 at 25; Bonfil, *et al.*, 2008 at 129). However, even these new, large MPAs are unlikely to have significant effect on fishing pressure for oceanic whitetips because they are generally designed to avoid impacting extractive uses of the oceans. Marine reserves are residual where their location intentionally mirrors areas that are least appealing for extractive uses, including fishing (Devillers, *et al.*, 2014 at 4 (citation omitted)). "Residual reservation arises from an implicit or explicit policy of locating MPAs to minimize the opportunity costs to those people engaged in extractive uses of the land and sea, even though many of the important threats to . . . marine biodiversity arise from those extractive uses." (Devillers, *et al.*, 2014 at 4 (citation omitted)). This risks the perverse outcome that "protection avoids the more heavily used and costly areas (in financial and/or political terms) and is not afforded to biodiversity most in need of protection." (Devillers, *et al.*, 2014 at 5 (citation omitted)). Current large MPAs show a clear bias towards protecting areas that are already subjected to below-average fishing pressure (Devillers, *et al.*, 2014 at 8, 17 (citation omitted)). As such, they will have little effect on catch, even if it is possible to somehow police restrictions in these massive areas of the ocean (Devillers, *et al.*, 2014 at 16 ("Too often, the establishment of protected areas is seen as equivalent to effective protection, and very often this conflation of ideas is mistaken. Protected areas fail in their basic purpose to the extent that they are residual to extractive uses. A strong focus on minimizing the opportunity costs of MPAs, combined with limited biological data and highly generalized conservation objectives, entails the considerable risk of pushing 'protection' into residual parts of the ocean.")).

While effective MPAs can be extraordinarily successful, "there are surprisingly few clear examples of MPA success." (Dulvy, 2013 at 359 (citations omitted)).

> For example, in Italian waters, only three out of 15 MPAs had effective enforcement, which resulted in significant improvements in predator density above that of control areas. Similarly, the necessity of effective enforcement was underscored in the Great Barrier Reef Marine Park where only the most strictly protected no-entry zones (Preservation Zone, 'pink' reef) had the highest shark abundance; by comparison Marine National Park 'green' zoned reefs which allowed fishing boats to anchor but they are not legally allowed to fish were ineffective compared with control areas.

(Dulvy, 2013 at 359-60 (citations omitted)).

Where MPAs offer little or no additional protection, they can actually facilitate additional reductions in biodiversity. This is because, where these MPAs offer insufficient protections, they become "paper parks," "promis[ing] much hope but . . . deliver[ing] little more than a false sense of security or veneer of success." (Dulvy, 2013 at 359; *see also* Breen, *et al.*, 2015 at 79). "One possible risk is that the paper park alone is perceived to be a conservation success, in terms of protecting species and sustaining fisheries. After all why do we need more conservation when there is an MPA there already?" (Dulvy, 2013 at 360 (citation omitted); *see also* Devillers, *et al.*, 2014 at 22 ("[R]eaching targets defined by the extent of MPAs, or even targets related to representation of marine features, can give governments, NGOs and the public a false sense of achievement for conservation, with potentially perverse outcomes for marine biodiversity.")). Therefore, to the extent that these MPAs are unsuccessful, they may actually represent a net conservation loss for oceanic whitetips.

It does not appear that presently-protected areas are designed to protect the oceanic whitetip specifically, and, to the extent that they do not cover the species' range, may actually cause additional harm by redirecting fishing pressure into the species' habitat or by assuaging concerns over threats to the species (*see* Breen, *et al.*, 2015 at 76 ("while there are a large number of MPAs aimed at protecting benthic habitats and site attached fish species, there are very few examples of MPAs designed to protect [highly migratory fish species].") (citation omitted)). The underrepresentation of MPAs designed to protect oceanic whitetips and other highly migratory species "could be because, historically, MPAs have been thought to be ineffective for such mobile species. Indeed, some studies have shown that, compared to their efficacy for benthic or sedentary species, mobile species do not benefit from MPAs to the same degree." (Breen, *et al.*, 2015 at 76 (citations omitted)). A large part of the issue is that studies have indicated that "rather than the overlap between occupied area and the MPA, it is the time spent inside an MPA that is an important factor for the success of [highly migratory fish species]." (Breen, *et al.*, 2015 at 78 (citation omitted)). Therefore, unless the MPA covers a place where the species is stationary for a period of time (e.g. by protecting spawning grounds, nursery areas, or aggregation sites), then it may offer comparatively little protection to species that will otherwise pass through the area quickly (*see* Breen, *et al.*, 2015 at 78 (citations omitted)). Connectivity of MPAs is also important for highly migratory species (*see* Breen, *et al.*, 2015 at 78), and the haphazard manner in which many MPAs are designed does not reliably facilitate this value (*see* Dulvy, 2013 at 359). Therefore, even if an MPA were effective for largely-sedentary species, most will be ineffective at protecting oceanic whitetips for long periods of time. These complications counsel for creation of additional MPAs with strong protections as a complement to other regulatory mechanisms and against reliance on MPAs alone as a means to restore and protect biodiversity in general and oceanic whitetips in particular.

The various enforcement, and other, issues that countries have had protecting sharks on national and local levels indicate the need for measures to prevent countries, including the United States, from providing financial incentives to capture and kill oceanic whitetips. Only by removing the financial incentive to harvest sharks can their overexploitation be avoided. By listing the oceanic whitetip under the ESA, the United States can help protect the species in its waters; prevent importation of the species into, and exportation of the species out of, the country; and take other actions, such as recovery planning, which will provide a conservation benefit to the species. The existing national and local regulatory protections currently in place for the species, some of which are discussed below, do not adequately provide these crucial benefits. Though these regulatory mechanisms often implicate the concerns addressed in this introductory section (Section IV. D. 2. Other National and Local Measures), repetition of these issues will be largely omitted, and instead should be treated as incorporated by reference, to avoid redundancy.

a. Columbia

Columbia has a general finning ban and has banned targeted shark fishing in the Columbian Caribbean islands (E-CoP16-Prop-42 at 9). However, neither of these practices addresses the issue of bycatch or of directed shark fishing outside of the limited protected areas, and neither offers any species-specific protection that is tailored to protecting the oceanic whitetip. In addition fisheries operating in Columbian waters have been documented taking juveniles and may be impacting likely development areas for the species (E-CoP16-Prop-42 at 4, 7). Finally, any protections in Columbia are likely to be met with enforcement difficulties as the country is already serving as an illegal trade route for illegal Ecuadorian shark fins and is experiencing illegal fishing and shark finning even in its protected areas (*see* E-Cop16-Prop-43 at 20-21; NMFS, 2013 at 69).

b. United States

The United States has a patchwork of measures that protect the oceanic whitetip to varying degrees. However, none of these measures are adequate to protect the species. In addition, where protection strategies focus on prohibiting retention instead of avoiding catch, oceanic whitetips will continue to suffer from post-capture mortality that will hamper the effectiveness of these efforts. First, there is a combined quota of 488 metric tons for the oceanic whitetip and nine other species as part of the pelagic complex of the Highly Migratory Species ("HMS") Fisheries Management Plan ("FMP") (*see* E-CoP16-Prop-42 at 9; Cortés, 2002 at 1165; Camhi, *et al.*, 2007 at 21). NMFS has proposed leaving this 488 metric ton dressed weight limit in place for the 2016 fishing season in addition to maintaining the lack of regional quotas. 80 Fed. Reg. 49,974, 49,977 (August 18, 2015). This regulation is inadequate because it does not address the species individually. As a result, all, or none, of the 488 tons of sharks from this quota could be oceanic whitetips. This does not offer any degree of certainty that harvest of oceanic whitetips will be sustainable. Indeed, for a species that has faced such serious threats in the region, a zero catch limit is likely the only appropriate limit available (*see* Australian Government, Department of the Environment, 2014 at 49 (determining any oceanic whitetip catch is likely to be detrimental to the species and that no exports should be allowed)). In addition, this quota only applies in the Atlantic and Gulf of Mexico in federal waters and would therefore not apply to oceanic whitetips caught off the Pacific Coast, in the Caribbean, in any of the U.S. Pacific Island Territories, in state waters, or in international waters or other countries' EEZs. This is a problematic loophole, especially considering the massive declines the species has experienced in many of these exempted areas (*see, e.g.,* III. G. 2. b. Hawaiian Islands, *supra*). Finally, it appears that catch is well below the maximum limit. *See* 80 Fed. Reg. at 49,980 (stating that, as of July 17, 2015 catch of the amalgamated pelagic species that includes oceanic whitetip was only at 10% of its 2015 quota levels). While this may at first seem positive, it likely indicates that the quota is so high that it does not provide any actual regulatory protection. Accordingly, it does not restrict fishing practices and will allow the oceanic whitetip to continue to decline.

In addition to the pelagic species quota, on August 11, 2011, in lieu of amending the HMS FMP, NMFS published a final rule to implement the ICCAT prohibitions, discussed further below, relating to the oceanic whitetip. 76 Fed. Reg. 53,652. This regulation prohibits certain fisheries managed by NMFS from retaining, transshipping, landing, storing, or selling oceanic whitetip sharks. *Id.* at 53,653. The primary issue with this regulation is its limited scope. The regulation was designed to affect only "Atlantic HMS commercially-permitted vessels that have PLL gear on board, and . . . recreational fishermen fishing with a General Category permit participating in an HMS tournament or those fishing under an HMS Angling or Charter/ Headboat permit when tuna or tuna-like species are also retained." *Id.* at 53,653.

> NMFS did not propose to prohibit retention in all HMS recreational fisheries because there is a recreational fishery targeting sharks that is not associated with ICCAT fisheries. NMFS did not propose to prohibit the retention of oceanic whitetip . . . from bottom longline, gillnet, or commercial handgear because, while these gears target sharks, they are not used in association with ICCAT fisheries.

Id. Therefore, both recreational and commercial fisheries can continue to take the oceanic whitetip, both as a directed and bycatch species, in the Atlantic. Recreational fishermen would still be able to retain one oceanic whitetip greater than 54" fork length per vessel per trip as long as they were not also retaining tuna and tuna-like species. *Id.* at 53,653-55. In addition, as with the HMS FMP quota discussed above, this regulation only applies in the Atlantic and Gulf of Mexico in federal waters and would therefore not apply to oceanic whitetips caught off the Pacific Coast, in the Caribbean, in any of the U.S. Pacific Island Territories, in state waters, in international waters, or in another country's EEZ. *See* 76 Fed. Reg. at 53,654 (applying only to U.S. ICCAT fisheries, "which are considered to be fisheries that target tuna and tuna-like species" in the Atlantic and Gulf of Mexico). Like the aforementioned quota, this is a problematic loophole, especially considering the massive declines the species has experienced in many of these exempted areas (*see, e.g.,* Section III. G. 2. b. Hawaiian Islands, *supra*).

The second major issue with the HMS FMP amendment is that, not only does this regulation still allow fish dealers to buy and sell oceanic whitetips, it also relies on fish dealers to enforce its prohibitions. *See* 76 Fed. Reg. at 53,654 ("Dealers are currently, and would continue to be, responsible for ensuring that they are purchasing oceanic whitetip . . . sharks or shark products from vessels that are authorized to land them."). As a result, fish dealers now must assess what type of gear is present on the boats that catch the oceanic whitetips that are offered for sale. This is an impossible task if the dealer cannot see the ship or if the shark is transferred to another boat after it is caught. In addition, this places the enforcement burden on a party that benefits each time it can sell an additional oceanic whitetip. This type of a "fox guarding the hen house" enforcement scheme is much weaker than one where a neutral regulator, such as NMFS, can ensure compliance with the law. Even where the fish dealers are honest, as will likely be the case in most situations, they are not ideally situated to assess compliance with this regulation.

The third major weakness with this HMS FMP amendment is that, by NMFS' own estimation, it is only expected to affect about 50 oceanic whitetips per year, the number that were retained annually from 2005-2009. *See id.* NMFS also estimates that the regulation will only result in 39 additional oceanic whitetip live releases per year. *Id.* However, the basis for even this limited benefit is unclear as NMFS states that, based on observer data, only 55% of oceanic whitetips in this fishery are alive when they reach the vessel, which would make the maximum number of possible live releases roughly 27-28 assuming that live oceanic whitetips are not preferentially retained. *See id.* at 53,655. This also does not take account of individual sharks that die after being released, which likely drives the number of oceanic whitetip individuals spared as a result of this amendment even lower. NMFS further explains that the minor economic hardship from this retention decrease may result in "minor, beneficial ecological impacts from fishermen having to release these sharks through the increased number of sharks that are released alive as a result of the prohibition." *Id.* at 53,654. This regulation, even if it performs as NMFS expects, will therefore provide very limited protections to the oceanic whitetip and will be insufficient to repair the damage to this heavily impacted stock.

Finally, this regulation only sought to comply with the ICCAT ban, discussed in Section IV. D. 4 b. ICCAT, *infra*, and did not attempt to enlarge it in any way. *See id.* at 53,653. As such, it really does not represent an additional protection for the species, except to the extent that it may improve accountability. Because it has many loopholes that unscrupulous fishermen and fish dealers could use to circumvent its limited protections, it does not seem to offer very much additional accountability. As a result, it is an inadequate regulatory mechanism to protect the oceanic whitetip and may, in fact, offer the species no protection in addition to the protection that the species was already receiving under the ICCAT ban.

NMFS also released a final rule aimed at complying with the WCPFC's regulation of oceanic whitetip catch (*see* Section IV. D. 4. c. WCPFC, *infra*), which implements those provisions for certain

U.S. vessels fishing in the WCPFC Convention Area. 80 Fed. Reg. 8807 (February 19, 2015). However, in addition to the weaknesses noted generally in Section IV. D. 4. C., *infra*, the limitations of this protection are similar to those with NMFS' implementation of the ICCAT limitations on oceanic whitetip catch. First, if the boat is not engaged in commercial fishing for highly migratory species, then the restrictions do not apply. *See* 80 Fed. Reg. at 8808, 8810. This means that all other fisheries can continue to catch and retain oceanic whitetips. These protections also only apply in the WCPFC Convention Area. *See* 80 Fed. Reg. at 8808. Therefore, they represent necessarily localized protection. In the absence of any action to protect these sharks, NMFS estimates that there would be retention of approximately 4 oceanic whitetip per year in the purse seine fishery, 33 oceanic whitetips per year in the longline fisheries, 9 sharks (undifferentiated between silky and oceanic whitetip sharks) per year in the Hawaii troll fishery, 2 sharks (undifferentiated between silky and oceanic whitetip sharks) per year in the Guam troll fishery, 0.3 sharks (undifferentiated between silky and oceanic whitetip sharks) per year in the American Samoa troll fishery, 0 oceanic whitetips per year in the Northern Mariana Islands troll fishery. 80 Fed. Reg. at 8812. While there may be additional retention reductions in addition to these estimates, and while Defenders appreciates that this change is expected to potentially take the annual retention of 37-48.3 retentions of oceanic whitetips to 0, this is still a relatively small reduction in total catch. There is also the issue that, because this rule was merely meant to implement the WCPFC limitations it offers little in the way of additional protection beyond the insufficient protections embodied in the WCPFC rule (*see* IV. D. 4. c. WCPFC, *infra*).

c. State and Pacific Island Territory Shark Fin Trade Bans

In addition to the U.S. federal shark finning ban, ten U.S. states and three U.S. Pacific Island Territories have implemented additional shark fin bans, with proposed legislation pending in several other states (Shark Stewards, Undated at 1; *see also generally* Herskovitz, 2015). These laws differ from the U.S. federal ban in that they do not ban the landing of shark fins, as that is regulated by the Federal Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801-84; they instead ban possession, sale, offer for sale, trade, or distribution of shark fins in most circumstances (*see generally* Shark Stewards, Undated). However, while these laws are necessary to protect sharks, they are not sufficient to do so. The reason that these laws are inadequate is that they only affect intrastate trade in shark fins. They do not target the other drivers of oceanic whitetip endangerment, including bycatch, and do not affect intrastate or interstate commerce in states that have not enacted such bans. They also often contain a variety of exceptions that dilute their protections and decrease the uniformity amongst the bans. Therefore, while these shark fin bans are an excellent step forward, they only offer piecemeal, incidental, and uncertain protection to the oceanic whitetip and are therefore inadequate to protect the species.

3. International Regulation

"In general, . . . international fisheries managers continue to view sharks as bycatch rather than target species requiring management, despite the fact that the high value of shark fins is widely acknowledged as a major driver of shark mortality." (Clarke, *et al.*, 2012 at 198 (citations omitted)). The few exceptions to this rule that apply to the oceanic whitetip are discussed below. However, these limited international regulatory mechanisms are inadequate to protect the oceanic whitetip.

a. United Nations Convention on the Law of the Sea

The oceanic whitetip is listed on Annex I, Highly Migratory Species, of the United Nations Convention on the Law of the Sea ("UNCLOS") (Baum, *et al.*, 2006 at 9; E-CoP16-Prop-42 at 9). This means that the sharks should be subject to its provisions concerning fisheries management in international waters (Baum, *et al.*, 2006 at 9). However, little progress has been made in this regard (Baum, *et al.*, 2006 at 9). Therefore, the species does not receive any tangible protection under the UNCLOS. Furthermore, even if management were in place, the United States has not signed this treaty.[16]

b. CITES

In March 2013, at the 2013 CITES Conference of the Parties Meeting in Bangkok, Thailand, the CITES Parties agreed to increase protections for five commercially exploited shark species, including the oceanic whitetip, by listing them under Appendix II (*see generally* CITES, 2013). The United States was a co-sponsor of the oceanic whitetip's listing, and in fact co-sponsored another proposal to list the oceanic whitetip, together with Palau, three years earlier in 2010 (*see* CITES, 2013 at 1-2; NMFS, 2013 – 2 at 1; E-CoP15-Prop-16 at 2). The fact that the United States co-sponsored two proposals to list the oceanic whitetip demonstrates both its leadership on protecting the species and its view that the species is threatened with extinction and needs protection. Though Defenders applauds this listing and the United States' leadership on this issue, the Appendix II listing offers insufficient protection to the oceanic whitetip as it still allows trade in the species and does not protect the oceanic whitetip from the other threats that is faces.

An Appendix II listing is NOT a trade ban and instead acts as a regulation on the trade of the species that does occur. Appendix II listing simply requires that exporting countries provide a permit that states that the exported oceanic whitetip carcasses, fins, etc. came from sustainably harvested populations (*see* FAO, 2012 at 17). This is problematic because there is currently no clear standard for these so-called "non-detriment findings," which are used to determine whether killings of covered species would threaten sustainable populations (*see generally* CITES, Undated). Even if there were some way to determine what a sustainable population means it would be difficult to demonstrate a sustainable oceanic whitetip population because of the amalgamated, or entirely absent, catch records and the lack of population assessments for the species throughout most of its range (*see generally* Section III. G. Population Trend, *supra*; Section IV. B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes, *supra*). Additionally, because all of the populations that have been subject to harvest to date have been harvested in an unsustainable manner and these non-detriment findings are being made and exports are still occurring, it is apparent that these non-detriment findings are not functioning in the case of the oceanic whitetip (*see generally* Section III. G. Population Trend, *supra*; Section IV. B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes, *supra*).

> Development of [a non-detriment finding] requires appropriate scientific capacity, biological information on the species, and a framework for demonstrating that exports are based on sustainable harvests. The quality of [non-detriment findings] is reviewed by the Scientific Committees of CITES (Animals and Plants Committees) and within individual parties, but perhaps with variable degrees of robustness and/or

[16] *See* http://www.un.org/depts/los/reference_files/chronological_lists_of_ratifications.htm.

> validity. Currently, the Western Central Pacific is the only region that has developed a stock assessment model for the species (Rice [&] Harley, 2012), which can be used to assess population status and sustainable harvests in the region. Other less-data-intensive methods would have to be applied in other parts of the species range.

(FAO, 2012 at 17). Due to the lack of adequate scientific capacity in many CITES member countries, the lack of adequate population and other biological information relating to the oceanic whitetip, and the lack of a standardized frameworks for making non-detriment findings, these determinations will necessarily be inconsistent and unreliable.

In addition, there are several loopholes that can be used to avoid adequately protecting CITES-listed species, particularly when there is an illegal market for those species. Part of the problem is that Appendix II only requires a permit for exports of species listed therein. Therefore, it does not require a country to demonstrate that domestically-consumed oceanic whitetips came from sustainable populations (*see* CITES, Undated – 2 at 1-2). Furthermore, the fact that only an export permit, and not an import permit, is required for international trade means there is one less level of scrutiny that those wishing to smuggle oceanic whitetip products internationally must meet (*see* CITES, Undated – 2 at 1-2). Thus, fishermen from one country could kill oceanic whitetips in international waters and take them directly to any importing country. If they were to do so without returning to their country of origin they would completely avoid any permitting procedure under Appendix II of CITES. Because many countries catch oceanic whitetips in international waters, this loophole may have serious impacts on the species (*see* Figure 46, *supra* (showing nations that report catch of oceanic whitetips in both international waters and within their EEZs)). Furthermore, in addition to countries that are not parties to CITES, and are therefore not bound by its restrictions, at least three CITES parties, Guyana, Japan (world's number 10 shark catching nation (Fischer, *et al.*, 2012 at iv), number 7 exporter, and number 18 importer, of fresh and frozen shark meat (Mundy-Taylor & Crook, 2013 at 4, 65)), and Canada (world's number 21 shark catching nation (Fischer, *et al.*, 2012 at iv), number 8 exporter of fresh and frozen shark meat, and number 10 importer of shark fins (Mundy-Taylor & Crook, 2013 at 65, 66)), entered reservations to the oceanic whitetip's listing and will therefore be exempt from even the limited requirements contained therein (*see* CITES, 2014 at 2; Clarke, *et al.*, 2014 at 5).

Even if the oceanic whitetip were listed under a more restrictive Appendix I listing, CITES does not represent an adequate replacement for ESA listing. NMFS acknowledged the insufficient effect of Appendix I listings in its determination for the listing of the largetooth sawfish under the ESA, when it stated that illegal foreign trade of the species continued "in spite of the CITES listing and national laws, due to lack of enforcement." 76 Fed. Reg. 40,822, 40,832 (July 12, 2011); NOAA, Undated at 3.

Finally, Because CITES only focuses on trade threats, it offers insufficient protection from the other, non-trade threats that the oceanic whitetip faces including, most importantly, bycatch.

4. RFMO Regulation

"In general . . . international fisheries managers continue to view sharks as bycatch rather than target species requiring management, despite the fact that the high value of shark fins is widely acknowledged as a major driver of shark mortality." (Clarke, *et al.*, 2012 at 198 (citations omitted)). This has meant that RFMO's have traditionally provided little protection for shark species and that these protections have generally been inadequate where they do exist. This is the case for the oceanic whitetip as well. However, recently multiple RFMOs have adopted protections for oceanic whitetips "that would have a positive impact on the stock recovery if they are implemented effectively. In principle, these regulations could reduce mortality or at least improve monitoring of shark catches but compliance with these management measures is likely to be variable." (FAO, 2012 at 19).

Figure 60. Map of RFMO waters, with each RFMO regulating individually and having differing, or no, regulatory protections for the oceanic whitetip (http://www.fao.org/fishery/topic/2940/en).

While these measures may be more effective at preventing shark mortality than finning bans, gear retrieval and other measures that reduce bycatch and bycatch mortality provide the best benefits (Clarke, *et al.*, 2012 at 207 (citation omitted)).

> In longline fisheries, the likelihood of asphyxia or depredation before the gear is retrieved and mortality after release as a result of onboard handling and hook removal techniques varies among species. In purse-seine fisheries, the potential for live release of sharks depends on the length of time they have been confined in the net, water temperature, individual species tolerance of stress, position in the brailer (i.e., the dip net used to scoop fish from the purse seine), and many other factors. It would therefore not be correct to assume that no retention will result in no mortality, and in some cases mortality rates would be expected to remain high . . .

(Clarke, *et al.*, 2012 at 207 (internal citations omitted)). While the existing measures will provide some level of protection where they are actually followed, they will not affect fishing practices and therefore will be unable to avoid what is likely the largest threat to the oceanic whitetip, bycatch mortality. In addition, they do not cover all fisheries or all fishing strategies that take place in areas that are geographically coextensive with the RFMOs' areas of authority. These measures are briefly discussed individually below with particular emphasis on current IUU fishing activities occurring in the RFMOs' areas of authority. The impact of IUU fishing is very high with an annual value for shark catch alone of $192 million worldwide (NMFS, 2013 at 68 (citation omitted)). Therefore, this IUU fishing will hamper the enforcement of any measures that the RFMOs promulgate.

a. IOTC

In May 2013, the IOTC agreed to ban the retaining on board, transshipping, landing, or storing of the oceanic whitetip by vessels under their jurisdiction (IOTC, 2013 – 3 at 20). However, in addition to the weaknesses in these RFMO measures discussed in Section IV. D. 4. RFMO Regulation, *supra*, this region is subject to extensive IUU fishing (*see* NMFS, 2013 at 66-67). In particular, Indonesia, which is the largest shark fishing nation in the world, fishes extensively in these waters and has no restrictions pertaining to shark fishing (NMFS, 2013 at 66). "In fact, Indonesian small-scale fisheries, which account for around 90% of the total fisheries production [in the Indian Ocean], are not required to have fishing permits, nor are their vessels likely to have insulated fish holds or refrigeration units, increasing the incentive for shark finning by this sector." (NMFS, 2013 at 66 (internal citations omitted)). This means that much, likely at least 44%, of their shark fishing effort in this region remains unreported (NMFS, 2013 at 66). These unsustainable fishing practices have been forcing Indonesian fishermen to move their fishing efforts around this region, depleting areas and then moving on (NMFS, 2013 at 66). This nomadic fishing brought these Indonesian IUU fishermen to waters North of Australia in 2001, with a peak in spotted IUU fishing vessels occurring in late 2005 and early 2006 (NMFS, 2013 at 66-67). "Since 2006, there has been a decline in IUU fishing in Australian waters, thought to be due to exhaustion of stocks in easily accessible regions near the Australian EEZ . . ." (NMFS, 2013 at 67 (citation omitted)). However, it is likely that Indonesia will resume its extensive IUU fishing of already-fished areas if stocks improve (*see* NMFS, 2013 at 67 (indicating that decrease in IUU fishing is related to decrease in available fish) (citation omitted)).

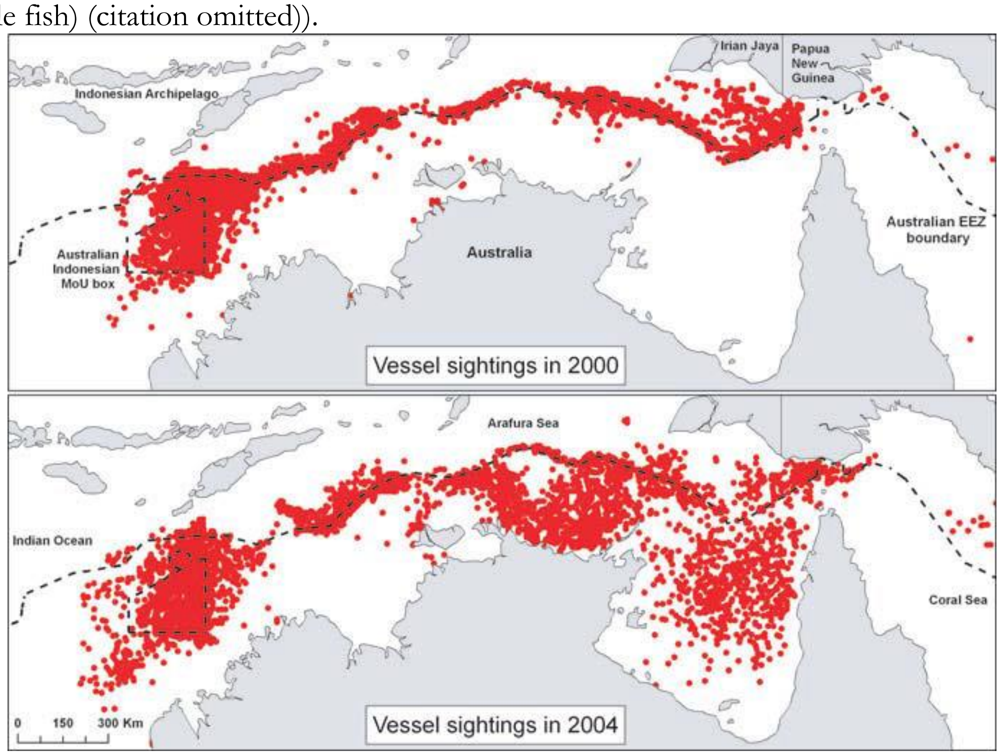


Figure 61. Coastwatch sightings of IUU foreign fishing vessels bordering and within the Australian EEZ in 2000 and 2004, with the majority of sightings occurring in the Indian Ocean (NMFS, 2013 at 67 (citation omitted)).

In addition to this illegal Indonesian catch, there is evidence of other IUU catch in the Indian Ocean.

> In 2008, off the coast of Africa, a Namibian-flagged fishing vessel was found fishing illegally in Mozambican waters, with 43 [metric tons] of sharks and 4 [metric tons] of shark fins onboard. In 2009, a Taiwanese-flagged fishing trawler was found operating illegally in the South Africa EEZ with 1.6 [metric tons] of shark fins onboard without the corresponding carcasses. Also in 2009, 250 trawlers were found to be poaching sharks in coastal areas in the Bay of Bengal with the purpose of smuggling the sharks to Myanmar and Bangkok by sea. There are also reports of traders exploiting shark populations in the Arabian Gulf due to the lack of United Arab Emirates enforcement of finning regulations.
>
> In Somalia, it is estimated that around 700 foreign-owned vessels are operating in Somali waters without proper licenses, and participating in unregulated fishing for highly-valued species like sharks, tunas, and lobsters.

(NMFS, 2013 at 68 (citation omitted)).

In fact, IUU fishing accounts for an estimated 32% of the total catch in the Indian Ocean (NMFS, 2013 at 68). This prevalence of IUU fishing in the IOTC's area of jurisdiction indicates that the IOTC will likely have significant difficulty curtailing ongoing oceanic whitetip exploitation in the Indian Ocean, thereby decreasing the certainty that its regulation of retention will be effective.

b. ICCAT

The oceanic whitetip is very frequently caught in gillnets, and is frequently caught in pelagic longlines and purse-seines, in ICCAT's area of jurisdiction (E-CoP16-Prop-42 at 9). "In response to these catch concerns, ICCAT banned retention on board, [transshipping], landing, storing, selling or offering for sale any part or whole carcass of oceanic whitetip sharks in fisheries covered by the ICCAT Convention." (E-CoP16-Prop-42 at 9 (citing ICCAT Recommendation 10-07)). However, ICCAT's restrictions only apply to vessels using longlines to catch tuna and tuna-like species. *See* 76 Fed. Reg. at 53,653. Therefore, this prohibition will not affect oceanic whitetips caught by additional types of gear,[17] even if they are caught within the area that would otherwise be part of ICCAT's jurisdiction.

In addition to these fishing gear and area related limitations, extensive IUU fishing has been reported in ICCAT's jurisdiction (*see, e.g.,* Mundy-Taylor & Crook, 2013 at 89 ("Data reported to ICCAT [related to catch of oceanic whitetips is] considered likely to be inaccurate and to underrepresent Atlantic Ocean catches.") (citation omitted); E-CoP16-Prop-42 at 7) ("data suggests that catches reported to ICCAT may seriously underestimate (by 50-fold) the actual catch of this species in the Atlantic Ocean.") (citation omitted)). In West Africa, this IUU fishing accounts "for around 37% of the region's catch, the highest regional estimate of illegal fishing worldwide." NMFS, 2013 at 67 (citations omitted)). These pirate industrial fishing vessels used prohibited fishing

[17] Though oceanic whitetips are most commonly bycaught in offshore tropical tuna and swordfish longline fisheries, they are also taken incidentally in other longlines, gillnets, purse-seines, and pelagic trawls (*see* Walsh & Clark, 2011 at 2; Bonfil, *et al.*, 2008 at 134; Camhi, *et al.*, 2007 at 26).

gear, refused to stop for patrols, attacked local fishermen and destroyed their gear, and fled to neighboring countries to avoid sanctions (NMFS, 2013 at 67-68 (citation omitted)).

> Due to a lack of resources, many West African countries are unable to provide effective or, for that matter, any enforcement, with some countries even lacking basic monitoring systems. These deficiencies further increase the countries' susceptibility to IUU fishing, resulting in heavy unregulated fishing pressure and likely overexploitation of their fisheries.

(NMFS, 2013 at 68).

In addition to IUU fishing in Africa, IUU fishing has also been reported from Mexico and Brazil in ICCAT's jurisdiction.

> In the U.S., reports of IUU fishing by Mexico, a top shark fishing nation accounting for nearly 4.1% of the global shark catch, has been ongoing for the past decade. Since the mid-1990s, the United States Coast Guard . . . has documented Matamoros Mexican vessels illegally fishing in the area surrounding South Padre Island, Texas. The Mexican IUU fishermen use gillnet and longline gear for shark and red snapper, which are believed to be more prevalent in the U.S. EEZ off Texas than in the Mexican EEZ near Matamoros. The sharks, the majority of which are blacktips and hammerheads, are finned and the fins sold. Based on data from 2000-2005, [a study] estimated that Mexican fishermen are illegally catching anywhere from 3 to 56% of the total U.S. commercial shark quota, and between 6 and 108% of the Gulf of Mexico regional commercial quota.

(NMFS, 2013 at 68 (internal citations omitted)).

> In Belém, Brazil, in May 2012, the Brazilian Institute of Environmental and Renewable Natural Resources (IBAMA) seized around 7.7 [metric tons] of illegally obtained dried shark fins intended for export to China. A few months later, IBAMA confiscated more than 5 [metric tons] of illegal shark fins in Rio Grande do Norte, suggesting current regulations and enforcement are not adequate to deter or prevent illegal shark finning. In fact, it is estimated that illegal fishing constitutes 32 percent of the Southwest Atlantic region's catch (based on estimates of illegal and unreported catch averaged over the years of 2000 – 2003).

(NMFS, 2013 at 69 (internal citations omitted)).

This prevalence of IUU fishing in ICCAT's area of jurisdiction indicates that ICCAT will likely have significant difficulty curtailing ongoing oceanic whitetip exploitation in the Atlantic Ocean, thereby decreasing the certainty that its regulation of retention will be effective.

c. WCPFC

"The WCPFC recently adopted a measure that prohibits retention, [transshipping], storing or landing of oceanic whitetip sharks and calls for release with as little harm as possible (implemented January 2013)." (Clarke, *et al.*, 2014 at 8 (citing CMM 2011-04); *see also* Rice & Harley, 2012 at 15; E-

CoP16-Prop-42 at 9). The WCPFC stock assessment stated that "[i]t is not clear if this [retention ban] will be sufficient and we recommend an examination of existing observer data to see if further direct mitigation measures can be identified." (Rice & Harley, 2012 at 15).

> WCPFC [members, cooperating non-members, and participating territories ("CCMs")] self-report on their compliance with these [conservation and management measures ("CMMs")] in their [annual reports] . . . While compliance against a large number of the WCPFC's CMMs is assessed each year, due to time constraints the annual meeting of the Technical and Compliance Committee does not necessarily present compliance findings for all active CMMs.

(Clarke, *et al.*, 2014 at 9). This may create a lack of accountability that hampers enforcement of this regulation. In addition, the lack of public scrutiny of CCMs' compliance with these measures creates additional uncertainty that this measure will be implemented effectively (*see* Clarke, *et al.*, 2014 at 9).

In addition to concerns over effectiveness and enforcement, the threat of IUU fishing in the WCPFC's jurisdiction is very real. In fact, 34% of the Western and Central Pacific Ocean catch is estimated to be from IUU fishing (NMFS, 2013 at 68 (citation omitted)). There is evidence that Indonesia, the top shark fishing nation in the world, undertook at least some of its IUU fishing activities in and around Australia's EEZ in the western Pacific (NMFS, 2013 at 66-67; *see also* Figure 61, *supra*). However, Indonesia has since moved on to other waters, having depleted the available sharks around Australia (NMFS, 2013 at 67). These other waters likely include, at least in part, western Pacific waters due to their relative proximity to Indonesia and Indonesia's history of targeting such waters. It is also likely that Indonesia will resume its extensive IUU fishing of this area if stocks improve (*see* NMFS, 2013 at 67 (indicating that decrease in IUU fishing is related to decrease in available fish) (citation omitted)). In addition, to Indonesian IUU fishing,

> In the Western Pacific, in 2007, a Taiwanese-flagged tuna boat was seized in Palau for IUU fishing and had 94 shark bodies and 650 fins onboard. In 2008, a Chinese-flagged fishing vessel was arrested by the Federated States of Micronesia (FSM) National Police for fishing within the FSM's EEZ. Based on the number of fins found onboard, there should have been a corresponding 9,000 bodies, however only 1,776 finned shark bodies were counted.

(NMFS, 2013 at 68).

> [Additionally, in 2012,] thousands of pounds of shark products were confiscated in the Marshall Islands, with the Marshall Islands Marine Resource Authority fining a Japanese tuna transshipment vessel $125,000 for having sharks on board in a designated shark sanctuary. In Palau, a Taiwanese vessel was spotted by Palau law enforcement officials fishing and finning sharks in its protected waters, and was fined $65,000 and banned from Palauan waters for a year. Unfortunately, like most of these Pacific Island countries, Palau is small, and patrolling its large oceanic territory is difficult without adequate resources. Currently, Palau has only one patrol boat to enforce fishing regulations in 604,000 [square kilometers (roughly 233,206 square miles)] of ocean waters.

(NMFS, 2013 at 69 (citations omitted)). This prevalence of IUU fishing in the WCPFC's area of jurisdiction indicates that the WCPFC will likely have significant difficulty curtailing ongoing oceanic whitetip exploitation in the Pacific Ocean, thereby decreasing the certainty that its regulation of retention will be effective.

d. IATTC

In 2011, the IATTC banned "[r]etaining on board, [transshipping], landing, storing, selling or offering for sale any part or whole carcass of oceanic whitetip sharks . . . in fisheries covered by . . . the IATTC." (E-CoP16-Prop-42 at 9 (citing IATTC Resolution C-11-10)). However, "[h]igh levels of IUU fishing have also been reported off Central/South America . . ." (NMFS, 2013 at 69).

> In the [Eastern Tropical Pacific], there is evidence of illegal fishing by both local fisherman and industrial longliners within many of the marine protected areas. For example, in Cocos Island National Park, off Costa Rica, a "no take" zone was established in 1992, yet populations of [scalloped hammerheads] continued to decline by an estimated 71% from 1992-2004. In Ecuador, concern over illegal fishing around the Galapagos Islands prompted a 2004 ban on the exportation of fins but only resulted in the establishment of new illegal trade routes and continued exploitation of scalloped hammerhead sharks. In 2007, a sting operation by the Ecuadorian Environmental Police and the Sea Shepherd Conservation Society resulted in a seizure of 19,018 shark fins that were being smuggled over the border on buses from Ecuador to Peru. The fins were believed to come from protected sharks in the Galapagos Islands. More recently, in November 2011, Colombian environmental authorities reported a large shark massacre in the Malpelo wildlife sanctuary, an area [with frequent shark sightings]. The divers counted a total of 10 illegal Costa Rican trawler boats in the wildlife sanctuary and estimated that as many as 2,000 sharks may have been killed for their fins.

(NMFS, 2013 at 69). This prevalence of IUU fishing in the IATTC's area of jurisdiction indicates that the IATTC will likely have significant difficulty curtailing ongoing oceanic whitetip exploitation in the Pacific Ocean, thereby decreasing the certainty that its regulation of retention will be effective.

E. Other Natural or Manmade Factors Affecting its Continued Existence

1. K-Selected

Oceanic whitetips have an increased susceptibility to extinction because they are a "K-selected" or "K-strategy" species (they are a large, long-lived, slow-growing, low productivity species that reproduces infrequently, invests significant energy in the young they do produce, and experiences a long delay in reaching sexual maturity) (*see* Goble & Freyfogle, 2010 at 1058-60; Section III. C. Physical Characteristics, *supra* (oceanic whitetips can reach up to 13 feet in length and weigh up to 370 pounds); Section III. F. Reproduction and Lifespan, *supra* (oceanic whitetips reach sexual maturity from 4-7 years old, live until around 11-13, and females have a gestation period of 10-12 months with reproduction occurring every two years through viviparous reproduction and producing few pups); *see also* FAO, 2012 at 8-9; E-CoP16-Prop-42 at 4; Rice & Harley, 2012 at 2).

> K-strategy species are more extinction prone than are r-strategy species. The very efficiency with which K-strategy species exploit their environment is a liability *during periods of rapid or chaotic change.* The larger body size of individuals of a K-strategy species - while giving an advantage in interspecific competition and in defense against predators and allowing individuals to exploit a larger area - means that there are fewer individuals . . . At the same time, lower reproduction rates make it more difficult both for the species to recover if its population becomes depressed and for it to adapt to a changed environment because fewer offspring contain less genetic variability. Thus, the very "fittedness" of K-strategy species to a particular environment - which is advantageous during periods of stability - becomes a serious handicap when the habitat changes more rapidly than genes can be substituted in a population - and in species that reproduce slowly, genes are substituted slowly.

(Goble & Freyfogle, 2010 at 1059-60 (emphasis in original)).

Oceanic whitetips are currently experiencing the type of rapid, chaotic change that makes their K-selected life history pattern a liability. This is because oceanic whitetips are being fished and removed from their habitat and otherwise harmed at a rate greater than they can replenish their numbers (*see, e.g.,* Section III. G. Population Trend; Section IV. B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes, *supra*). As a result of these pressures, many of the oceanic whitetip's physical attributes and reproductive adaptations have gone from being beneficial to creating increased risk of species extinction. For instance, oceanic whitetip recruitment is hindered by the fact that they are large, long-lived, reach sexual maturation late in life, and reproduce infrequently, producing relatively few pups per litter (*see* Tambourgi, *et al.*, 2013 at 167; Section III. C. Physical Characteristics, *supra* ; Section III. F. Reproduction and Lifespan, *supra*). This type of life history pattern means that the species does not replenish itself as quickly as smaller, shorter-lived, r-selected species and is, therefore, more vulnerable when individuals are removed from the population or species reproduction is otherwise disrupted. Additionally, removal of individuals may be especially problematic because it may mean removing individuals before they have a chance to propagate. This is what is happening to the oceanic whitetip as, in many fisheries where oceanic whitetips are targeted or incidentally bycaught, the majority of the catch is juveniles (*see* Section IV. B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes, *supra* (discussing disproportionate catch of oceanic whitetip juveniles in various fisheries and the issues associated with this type of catch)). Removing the individuals before they can reproduce means that there is a substantial risk that the population will rapidly collapse.

"Overall the biology of [oceanic whitetips], in particular[] its fecundity, indicates that it is likely to be a species with low resilience to fishing – even among shark species – and minimal capacity for compensation." (Rice & Harley, 2012 at 4). Ecological risk and productivity assessments determined that this species ranks fifth in susceptibility to pelagic fisheries among 12 other Atlantic Ocean species (Cortés, *et al.*, 2010 at 32; IOTC, 2013 at 23 (fifth most susceptible to longline gear)). It has also been ranked as the fourth most vulnerable shark in ICCAT based on Euclidean distance and the most susceptible to purse-seine gear by the IOTC (*see* Murua, *et al.*, 2013 at 15; IOTC, 2013 at 23). Therefore, the oceanic whitetip's K-selected life history pattern is also contributing to its endangerment.

Parameter	Information	Productivity	Source
Intrinsic rate of increase	General (r_{2M}): 0.067	Low	Smith *et al.* (1998)
	General: 0.067 (from λ = 1.069)	Low	Cortes (2008)
	Western/Central Pacific: 0.11 (from λ = 1.117)	Low	Cortes (2002)
Age at maturity	Southwest Atlantic: Males: 6–7 years Females: 7–8 years	Medium	Lessa, Marcante and Paglerani (1999)
	West Pacific: 4–5 years (both sexes)	Medium	Seki *et al.* (1998)
	Southwest Indian Ocean 6–7 years (both sexes)	Medium	Bass *et al.* (1973)
Natural mortality	Western Central Pacific: 0.18 (0.12–0.32)	Low	Rice and Harley (2012)
von Bertalanffy K	Southwest Atlantic: 0.099 based on observed lengths	Low	Lessa, Marcante and Paglerani (1999)
	Northwest Atlantic: 0.04–0.09	Low	Branstettar (1990)
	West Pacific: 0.103	Low	Seki *et al.* (1998)
Generation time	General: 10 years	Low/Medium	Cortes *et al.* (2008) cited in proposal
	General: 11.1 years	Low	Cortes (2008)
	Atlantic: 10.4 years	Low	Cortes *et al.* (in press)
	Western/Central Pacific: 7 years	Medium	Cortes (2002)

Figure 62. Factors related to oceanic whitetip low productivity (FAO, 2012 at 23).

2. Synergistic Effects

The synergistic effects of aforementioned threats could conspire to cause the extinction of oceanic whitetips. "Like interactions within species assemblages, synergies among stressors form self-reinforcing mechanisms that hasten the dynamics of extinction." (Brook, *et al.*, 2008 at 457 (internal citations omitted)).

The oceanic whitetip is already at risk as a low-fecundity or K-selected species, rendering it more vulnerable to synergistic impacts of multiple threats.

> Traits such as ecological specialization and low population density act synergistically to elevate extinction risk above that expected from their additive contributions, because rarity itself imparts higher risk and specialization reduces the capacity of a species to adapt to habitat loss by shifting range or changing diet. Similarly, interactions between environmental factors and intrinsic characteristics make large-bodied, long-generation and low-fecundity species particularly predisposed to anthropogenic threats given their lower replacement rates.

(Brook, *et al.*, 2008 at 455 (internal citations omitted)). Therefore, the synergistic impacts of multiple threats to the oceanic whitetip may increase the extinction pressure that it faces.

V. DISTINCT POPULATION SEGMENTS

Analysis of oceanic whitetip populations indicates that the Atlantic Ocean oceanic whitetips are separate from the rest of the species' range and that the Atlantic Ocean population and Pacific/Indian Oceans population qualify for protection as DPSs according to the ESA.

A. Discreteness

The two populations of oceanic whitetips described above are distinct. Firstly, these populations are markedly separate from each other as a result of multiple types of barriers that separate the different populations. Secondly, these populations are delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, and regulatory mechanisms exist.

While the oceanic whitetip is an oceanic species that has been observed traveling relatively long distances (*see* Howey-Jordan, *et al.*, 2013 at 10; Rice & Harley, 2012 at 4), it exhibits a number of factors that would preclude individuals in the Atlantic from mixing with other populations and vice-versa. Likely the primary factor limiting the species' movement between these two populations is the oceanic whitetip's constant presence in waters so warm that they preclude migration far enough North or South to allow for mixing. As previously discussed, the oceanic whitetip is commonly found in waters warmer than 68°F (20°C) (range 64-82°F, 18-28°C), with only one record of an oceanic whitetip caught in 59°F (15°C) waters (Compagno, 1984 at 485). It tends to withdraw from waters that are cooling below this temperature, as in the Gulf of Mexico in winter (Compagno, 1984 at 485), and therefore avoids cooler waters year-round. As a result, the oceanic whitetip shows "a clear preference for the open ocean water between 10°S and 10°N, but can be found in decreasing numbers out to latitudes of 30°N and 30°S with decreasing abundance with greater proximity to continental shelves." (Rice & Harley, 2012 at 4 (citations omitted)). As a result, the species' preferred temperature range, latitudinal range, and scarcity near continental shelves precludes their passage South of Africa or South America or North of Asia or North America, which would be the species' only possible routes for connecting these discrete populations (*see* Figure 63, *infra*; Figure 64, *infra*; Figure 65, *infra*).

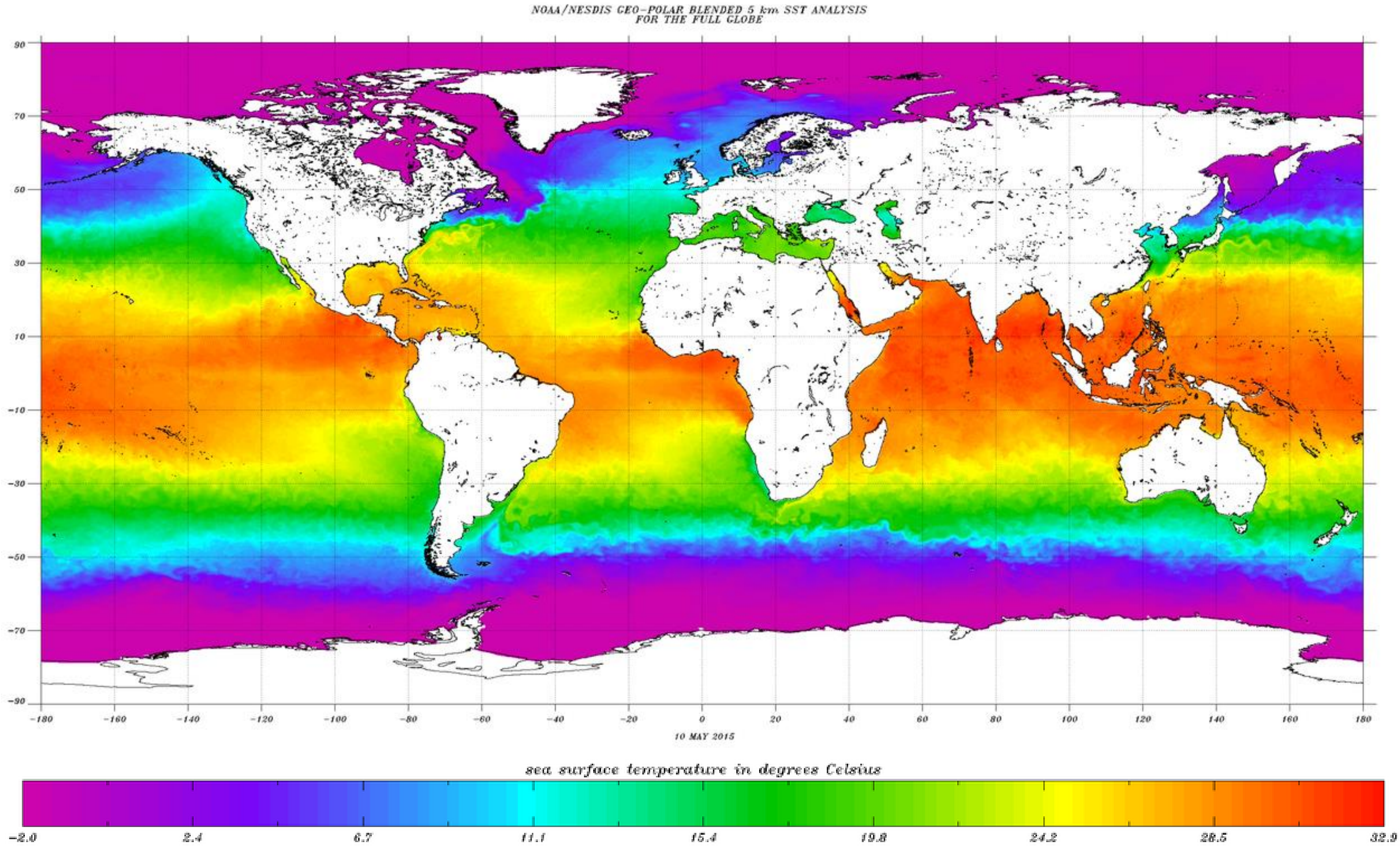


Figure 63. Representation of global sea surface temperatures in degrees Celsius that is useful in visually showing why the two oceanic whitetip populations are separate (http://www.ospo.noaa.gov/data/sst/contour/global_small.cf.gif).

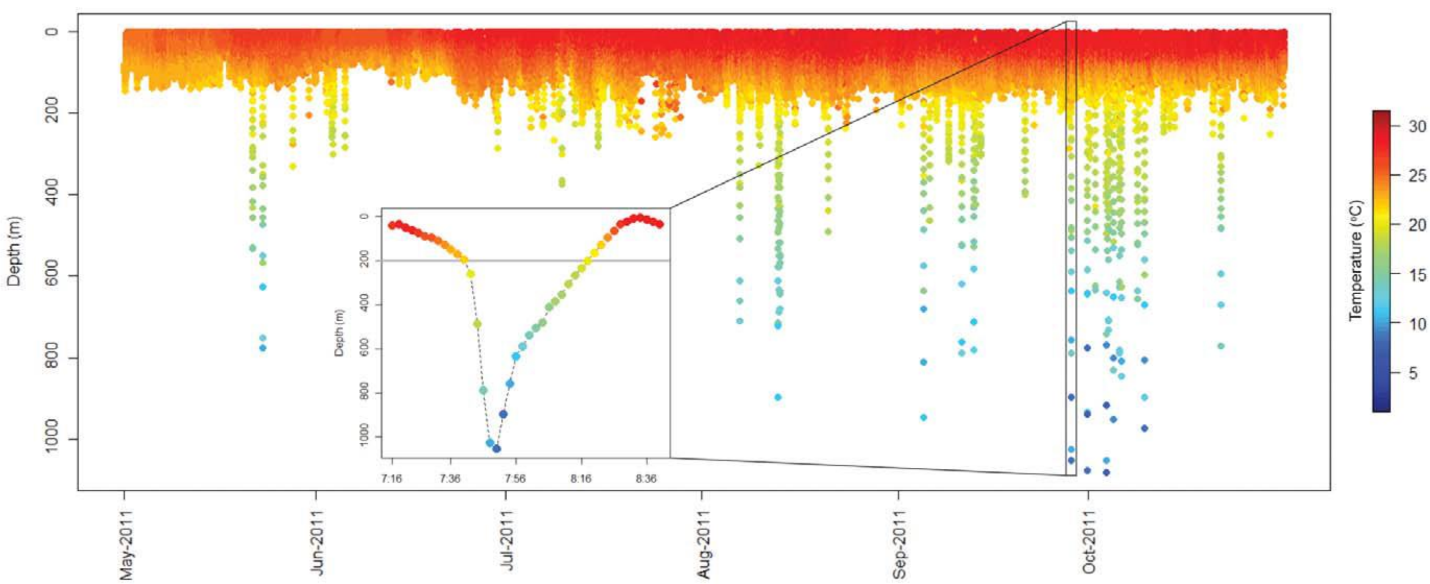


Figure 64. Chart of time-series depth (meters) data with time-paired temperature (°C) data from a recovered oceanic whitetip tracking tag deployed for six months. Inset depicts an example of a typical dive profile (Howey-Jordan, *et al.*, 2013 at 9).

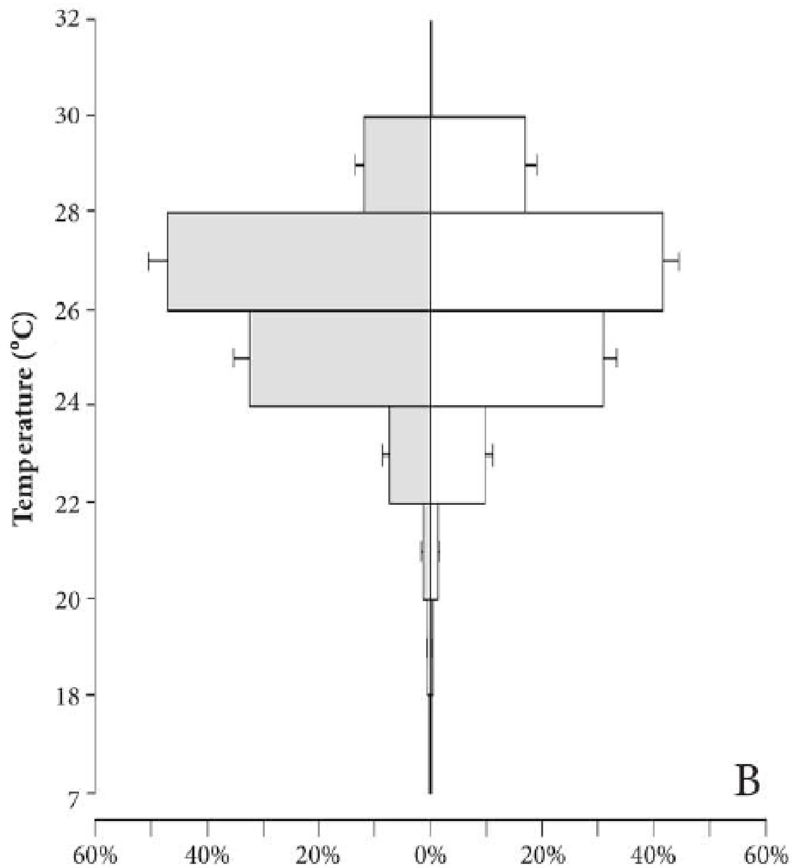


Figure 65. Percent records for temperature (night records are depicted in gray and day records are depicted in white) in tracked oceanic whitetips (Howey-Jordan, *et al.*, 2013 at 9) showing clear preference for warm waters with only occasional usage of waters below 20°C (68°F) during occasional, short dives below the thermocline (Howey-Jordan, *et al.*, 2013 at 8, 10-11).

There is no evidence that any oceanic whitetips, either on an individual basis or on a more significant population-wide basis, ever mix between these populations and the species known distribution ends well before getting close to going North or South of the relevant land barriers (*see* Figure 66, *infra*).

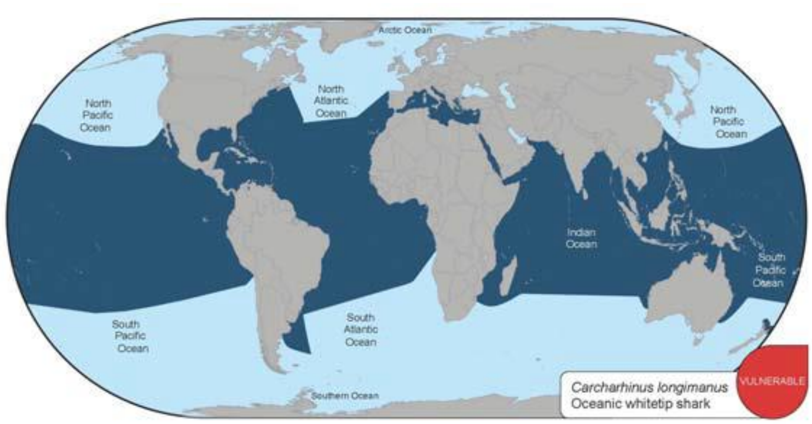


Figure 66. Map of the oceanic whitetip's worldwide range (E-CoP16-Prop-42 at 3).

Additionally, though the oceanic whitetip undertakes significant movements, it exhibits strong site fidelity. This means that, although the species may cover long distances, it typically stays close to, or returns close to, its capture location and does not undertake long-distance, permanent relocations.

A recent tracking study in the Bahamas found that

> Ultimately, tagged individuals moved maximum linear distances ranging from 290.36–1939.88 [kilometers] from their tagging location and made overall movements of 1810.01–7941.08 [kilometers] (i.e., the total length of the track). This compares well with tag-recaptures in the Atlantic, previous satellite tracking in the Pacific, and further highlights the highly migratory nature of at least some oceanic whitetips.

(Howey-Jordan, *et al.*, 2013 at 10). However, although this study showed that the species undertook significant migrations, it also found that the species never went very far from its capture location and eventually returned to an area that was at least in relatively close proximity to its capture location.

> Oceanic whitetips generally exhibited maximum displacement from [their capture location] 50–140 days after tagging (end of June through September), after which all but one . . . individual headed back to the central Bahamas. All individuals tracked for longer than 90 days were 28–331 [kilometers] from [their capture location] when their tags popped-off, possibly indicating the beginning stages of a return to the tagging location. Supporting this, one individual . . . was photographed by scuba divers on two occasions during 23–24 April 2012, within 6.5 [kilometers] of the tagging site.

(Howey-Jordan, *et al.*, 2013 at 10; *see also* Figure 67, *infra*; Figure 68, *infra* Figure 69, *infra*; Figure 70, *infra*).

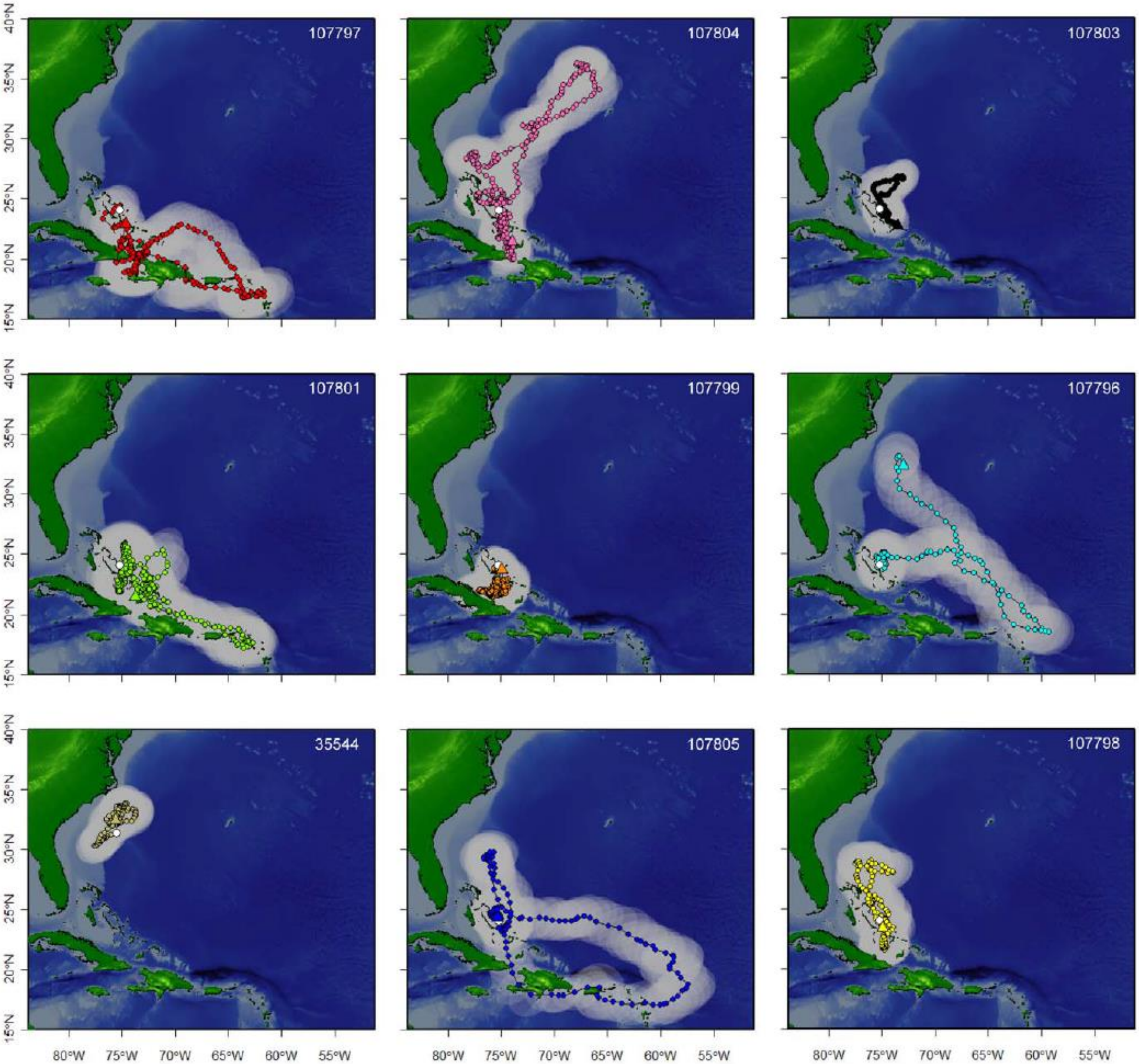


Figure 67. Tracking data for nine oceanic whitetips showing regional fidelity (Howey-Jordan, *et al.*, 2013 at 6).

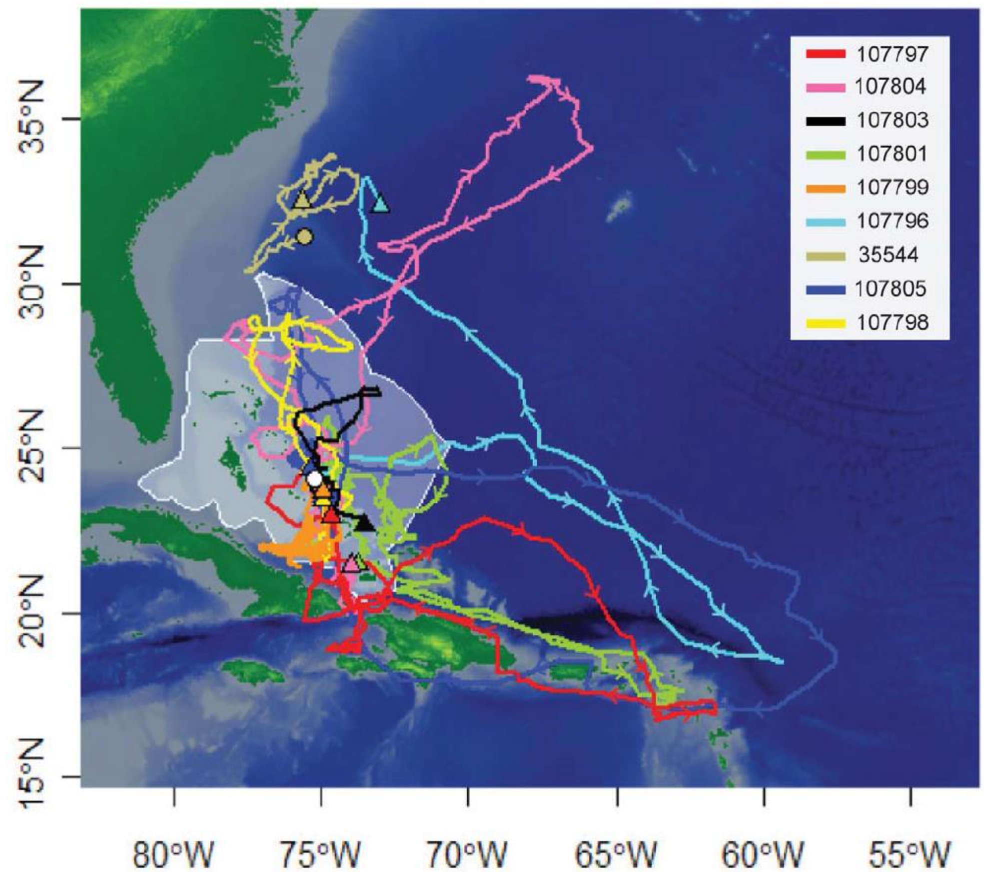


Figure 68. Tracking data for nine oceanic whitetips showing regional fidelity (Howey-Jordan, *et al.*, 2013 at 5).

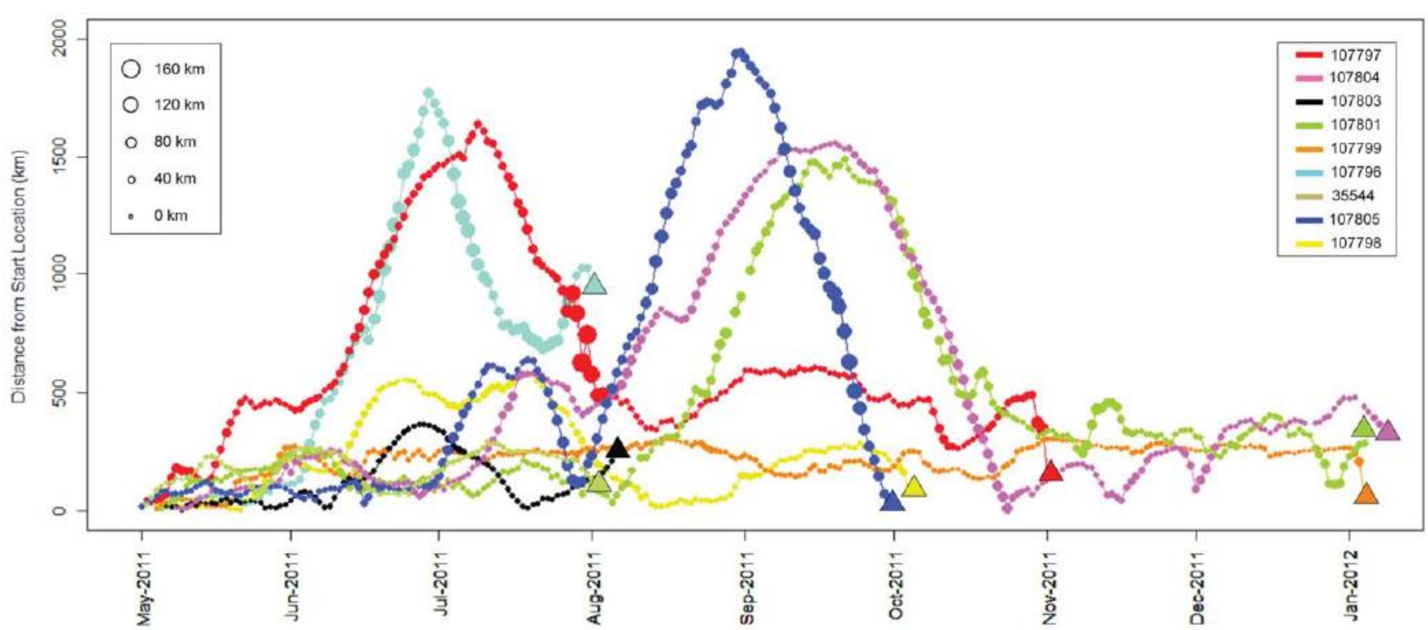


Figure 69. Chart showing distance from start location (km) by date for nine oceanic whitetip sharks with triangles representing the tags' pop-off locations (Howey-Jordan, *et al.*, 2013 at 8).

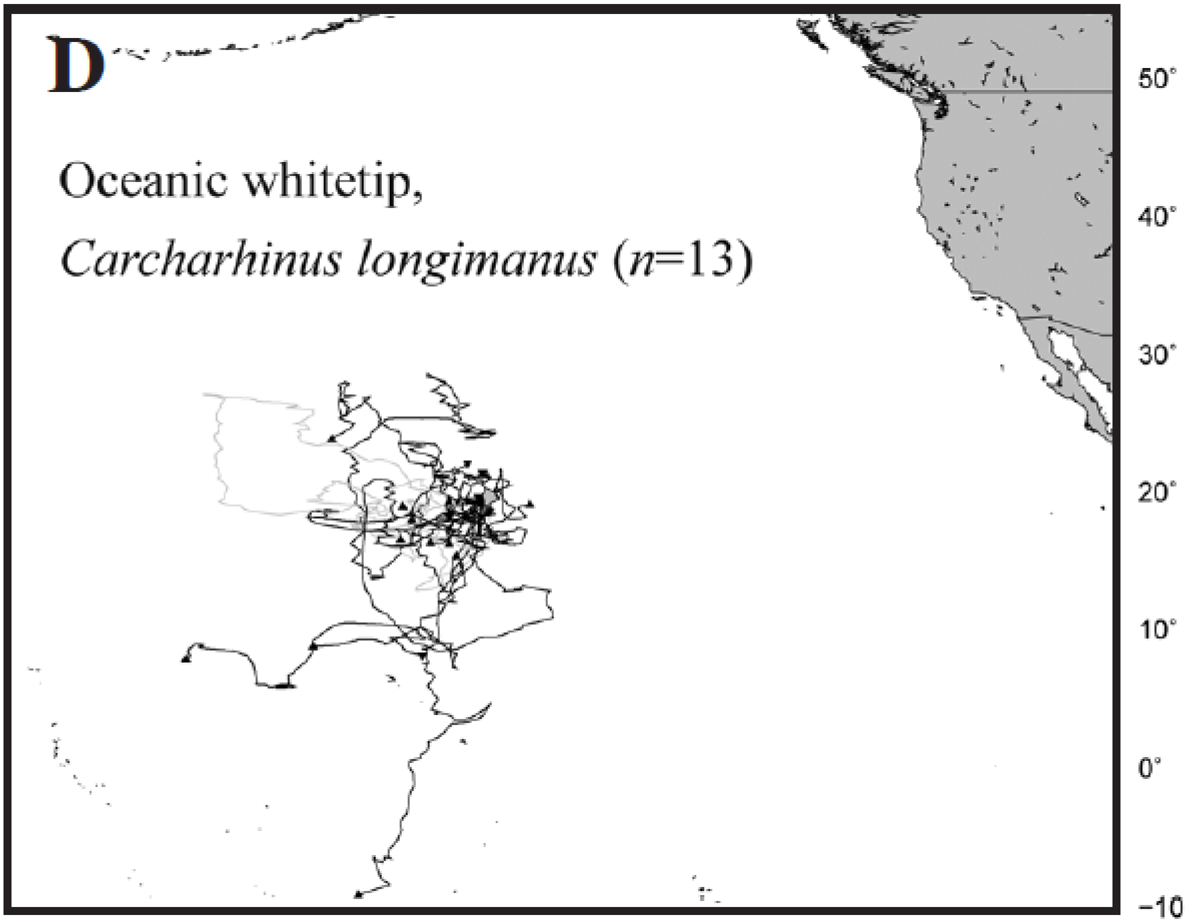


Figure 70. Most probable tracks for tagged oceanic whitetips tagged and released in the central Pacific (female movements shown in gray) (Musyl, *et al.*, 2011 at 349).

The authors of Howey-Jordan, *et al.*, 2013 took this tendency to return to their capture locality as evidence of philopatry, defined as "the return of individuals to their birthplace, home range, or another adopted locality." (Howey-Jordan, *et al.*, 2013 at 10 (citation omitted)). The authors also explained that this was, to their knowledge, "the first evidence of philopatry in this highly mobile pelagic species." (Howey-Jordan, *et al.*, 2013 at 10).

As a result of the various barriers to oceanic whitetip movement and their tendency to remain in, or return to, the same general area, it is very likely that there is no genetic exchange between the Atlantic Ocean oceanic whitetips and those residing in the rest of the species' range. Therefore, even though the species undertakes relatively large movements, those movements are not consistent with connecting these two populations in any way. As a result of this apparent total lack of genetic exchange between the populations, they meet the discreteness requirement to be considered DPSs.

In addition to the separation of these populations, the oceanic whitetip's global range also extends across many international governmental boundaries and across waters regulated by many RFMOs (*see* Figure 60, *supra*; Figure 66, *supra*). The international character of the species' range was recognized in a tracking study explain that

> Five of the sharks tagged in The Bahamas made transboundary movements, spending time in waters managed by different countries (U.S.A., Cuba, and several of the windward Caribbean islands) or the high seas that are managed by the United Nations. This illustrates why it is essential for international regulatory bodies to coordinate conservation efforts for this species across multiple jurisdictions. The total area of ocean used by this group of sharks over the study period was vast, 16,422.11 [square kilometers], highlighting how recently enacted landing prohibitions under ICCAT requires nations to monitor fishing activity over large areas. It is difficult to envision how countries that have limited capacity to monitor their fleets or foreign fleets fishing in their EEZ would be able to effectively enforce the landing moratorium on oceanic whitetips.

(Howey-Jordan, *et al.*, 2013 at 11).

This broad range results in differences in control of exploitation, management of habitat, conservation status, and regulatory mechanisms. These differences are described in much more detail in Section IV. D. The Inadequacy of Existing Regulatory Mechanisms, *supra*, which is incorporated by reference here instead of restated. These differences are significant because the biggest threat to the species is overutilization for commercial purposes, which can continue unabated in the face of inadequate regulatory mechanisms. Because the various international, national, regional, and RFMO regulations relevant to the species exist throughout the aforementioned populations, and because exploitation in these populations varies, they both meet the discreteness requirement for designation of a DPS for this reason as well.

B. Significance

Both populations of oceanic whitetips are biologically and ecologically significant. Figure 66, *supra*, shows that the loss of the oceanic whitetip from either of these identified populations would "result in a significant gap in the range of the taxon." *See* 61 Fed. Reg. at 4725. While the species has a widespread range, there is no genetic connectivity between the Atlantic Ocean oceanic whitetips and those living in the remainder of the species' range (*see* Section V. A. Discreteness, *supra*). Therefore, it is unlikely that the Atlantic Ocean would be recolonized by the other population if the oceanic whitetip were extirpated there, or vice-versa. Each of these populations is a significant proportion of the oceanic whitetip's total population, and the loss of either one of the populations would result in a significant gap in the range of the oceanic whitetip. As a result, the populations discussed herein also satisfy the significance requirement for DPS listing.

Because both of the oceanic whitetip populations are sufficiently discrete and significant, these populations both qualify as DPSs under the ESA. Additionally, both DPSs meet multiple ESA listing factors, discussed *supra*. Consequently, both of the DPSs warrant listing as "endangered," or alternatively as "threatened," under the ESA. However, with the large area that each of these DPSs covers, it is difficult to understand how a listing of one of these DPSs would not also require listing the species in its entirety. Therefore, NMFS should additionally consider whether threats to the oceanic whitetip in one or both of these populations are such that the threats cover a "significant portion of its range," and, if so, then Defenders requests that NMFS list the species throughout its range in accordance with the ESA. *See* 16 U.S.C. §§ 1532(6), (20) (requiring only that the relevant species qualify for listing in all or a "significant portion of its range" to be listed worldwide).

VI. Critical Habitat

This Petition requests that NMFS designate critical habitat for the oceanic whitetip in U.S. waters concurrently with a final ESA listing. *See* 16 U.S.C. § 1533(b)(6)(C). The definitions of the terms "critical habitat" and "conservation" indicate that, in designating critical habitat, NMFS must consider the species' ultimate recovery, and not just survival, as a primary purpose of critical habitat designation. *See* 16 U.S.C. § 1532(5)(A) (defining critical habitat to include both occupied and unoccupied habitat that is "essential for the *conservation* of the species.") (emphasis added); 16 U.S.C. § 1532(3) (defining "conservation" as "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are longer necessary."). Accordingly, the critical habitat designation for the oceanic whitetip should include all of the area currently or potentially inhabited by the species, including the oceanic waters along the southeastern coast of the United States where young oceanic whitetips have been found as this area may represent an offshore nursery area (*see* E-CoP16-Prop-42 at 4 (citations omitted)), and a sufficient amount of other potentially suitable habitat in U.S. waters, to allow the species to recover from its endangered, or threatened, status.

VII. Conclusion

The oceanic whitetip merits listing as an endangered, or alternatively as a threatened, species under the ESA. The species is declining throughout its entire range or a significant portion of its range and continues to face overwhelming threats from targeted fishing and bycatch (both retained and as a result of their high post-capture mortality rate). The oceanic whitetip also faces threats from large pollutant loads that are degrading its habitat and that likely cause or exacerbate a variety of negative physical impacts on the species. In addition, these high pollutant loads may decrease immune system functioning and consequently increase infection of oceanic whitetips by parasites. The oceanic whitetip currently receives inadequate regulatory protections throughout its range and requires ESA listing to ensure its survival. Without adequate protection, the species' limiting life history characteristics will, in combination with the other threats discussed, likely cause the oceanic whitetip's extinction. Defenders therefore requests that NMFS list the oceanic whitetip throughout its range as an endangered, or alternatively as a threatened, species under the ESA. If NMFS determines that certain populations of the species qualify as DPSs, but that the species does not qualify as endangered or threatened throughout all or a significant portion of its range, then Defenders requests that NMFS list those DPSs as either endangered, or alternatively as threatened, DPSs under the ESA. Should NMFS list the species, then Defenders requests that NMFS concurrently designate critical habitat for the species in U.S. waters as required by law.

On behalf of Defenders, thank you for your time and attention to this Petition, and we look forward to hearing from you shortly. If you have any questions, please feel free to reach us through the contact information contained in the signature blocks below.

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