PETITION TO LIST THE
Whale Shark (*Rhincodon typus*)
UNDER THE ENDANGERED SPECIES ACT

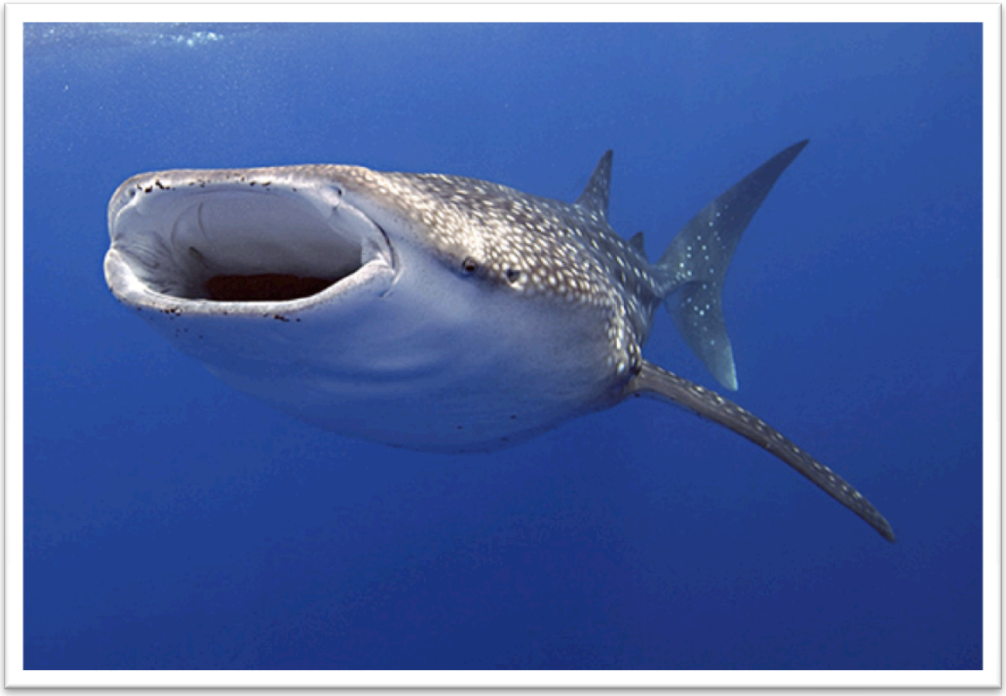

Photo: NOAA

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

Petitioner:

WildEarth Guardians
1536 Wynkoop Street, Suite 301
Denver, Colorado 80202
303.573.4898

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WILDEARTH GUARDIANS
A FORCE FOR NATURE

INTRODUCTION

WildEarth Guardians hereby formally petitions the Secretary of Commerce (Secretary), acting through the National Marine Fisheries Service (NMFS),[1] an agency within the National Oceanic and Atmospheric Administration (NOAA), to list the whale shark (*Rhincodon typus*) as "threatened" or "endangered" under the U.S. Endangered Species Act (ESA). We request that NMFS list the species throughout its range; however, in the alternative, if NMFS finds that there are Distinct Population Segments (DPS) of whale sharks, we would request that those be listed under the ESA. Additionally, we request that NMFS designate critical habitat for the species in U.S. waters or areas of the high seas that are essential to the species' survival and recovery.

The whale shark is the largest living species of fish. It is found across the globe in tropical and warm temperate oceans. Much of the whale shark's life history is either unknown or poorly understood. However, the species is known to migrate long distances, which may partially account for its global range. The International Union for Conservation of Nature (IUCN) lists the whale shark as "vulnerable" on the IUCN Red List.[2] IUCN defines a species as "vulnerable" if the best available evidence indicates that it is "considered to be facing a high risk of extinction in the wild."[3] Since the IUCN is made up of reasonable scientists and individuals, and makes its decisions based upon the best available science, its determination that the whale shark is facing a high risk of extinction should convince a reasonable person that the species may also deserve listing as "endangered" or "threatened" under the ESA.

The United States acknowledged the need to protect the whale shark when it proposed to list the species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2000.[4] Therefore, a determination on this Petition that the whale shark may not warrant protection would be inconsistent with past positions of the U.S., as expressed through CITES, and the best available science as compiled by the IUCN.

The whale shark faces four main threats. First, it has been experiencing, and likely will continue to experience, habitat destruction caused by pollution, climate change and resultant damage to coral reefs, and oil and gas development and oil spills in the Gulf of Mexico. Second, it has been, and continues to be, targeted for exploitation in commercial fishing operations in several areas around the globe, particularly in Asia. Additionally, many whale sharks are incidentally killed as bycatch, and tourism based on diving with whale sharks often disrupts the sharks' normal activities. Third, whale sharks are threatened by the inadequacy of regulatory mechanisms to protect them from overexploitation. Finally, other manmade and natural factors make the whale shark more vulnerable to exploitation and thus susceptible to precipitous population declines. These factors include: high value in international trade, susceptibility to fishing, slow rate of maturation, highly migratory nature, large seasonal congregations, and the low abundance of the species.

[1] NOAA Fisheries Service
[2] IUCN 2005 at 3-5.
[3] IUCN 2001 at 13, 20-22.
[4] CITES 2000, entire.

PETITIONERS

WildEarth Guardians is a nonprofit environmental advocacy organization that works to protect endangered and threatened species throughout the world. The organization has more than 5,000 members and over 18,000 supporters throughout the United States and in several foreign countries. It is currently focusing on marine species, including the whale shark, as part of its Wild Oceans campaign.

ENDANGERED SPECIES ACT

The ESA was enacted 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."[5] Under Section 3 of the ESA, the term "species" is defined as including "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature."[6] The ESA defines an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range . . . "[7] A "threatened species" is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."[8]

CRITERIA FOR LISTING

Section 4 of the ESA sets forth five listing factors under which a species can qualify for listing as "threatened" or "endangered":

> (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
> (B) Overutilization for commercial, recreational, scientific, or educational purposes;
> (C) Disease or predation;
> (D) The inadequacy of existing regulatory mechanisms; or
> (E) Other natural or manmade factors affecting its continued existence.[9]

A species need only meet one of these criteria to qualify for listing as "threatened" or "endangered."[10] A species is determined to be threatened or endangered "solely on the basis of the best scientific and commercial data available…"[11] Accordingly, the Secretary cannot refuse to make a listing decision even if some aspects of the species' life history are not fully

[5] 16 U.S.C. § 1531(b) (2011).
[6] Id. § 1532(16).
[7] Id. § 1532(6).
[8] Id. § 1532(20).
[9] Id.
[10] Id. § 1533(a)(1).
[11] Id. § 1533(b)(1)(A).

understood at the time of determination. The agency must rely on the best *available* scientific data; it cannot deny a species ESA protection because it wishes to have *more* scientific data.[12]

CLASSIFICATION AND NOMENCLATURE

Taxonomy. The petitioned species is *Rhincodon typus*. The full taxonomic classification is shown in Table 1.

Table 1. Taxonomy of *Rhincodon typus.* Source: ITIS undated at 1.

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Class	Chondrichthyes
Subclass	Elasmobranchii
Superorder	Euselachii
Order	Orectolobiformes
Family	Rhincodontidae
Genus	*Rhincodon*
Species	*typus*

Common Name. *Rhincodon typus* is known by the common names "dámero" and "tiburón ballena" in Spanish, "requin baleine" in French, and "whale shark" in English.[13] Throughout this Petition the species will be referred to as "whale shark."

SPECIES DESCRIPTION

The whale shark is the largest living fish in the world. As there have been relatively few studies of whale sharks, their maximum size is uncertain. However, visual accounts and tagging studies have reported whale sharks between 17 and 18 meters (55-59 feet) in length.[14] The most commonly accepted maximum length is around 13.7 meters (45 feet).[15]

Distinguishing Characteristics. The whale shark is one of only three large filter-feeding species of shark, along with the megamouth (*Megachasma pelagios*) and basking shark (*Cetorhinus maximus*).[16] It has "a broad, flat head and truncated snout" with filter screens and numerous small teeth on its internal gill slits.[17] Whale sharks are known to have a large first dorsal fin, small second dorsal fin, and typically large pectoral fins.[18] Whale sharks are further distinguishable because their mouths are near the tip of the snout and close to the eyes.[19] The

[12] Id.
[13] ITIS undated at 1.
[14] See Compagno 2002 at 206.
[15] Id.
[16] Id. at 203.
[17] Id.
[18] Id.
[19] NOAA undated 1 at 1.

species is known for its bluish-green color and unique checkerboard pattern of white or yellow spots and horizontal and vertical stripes (Figure 1).[20]

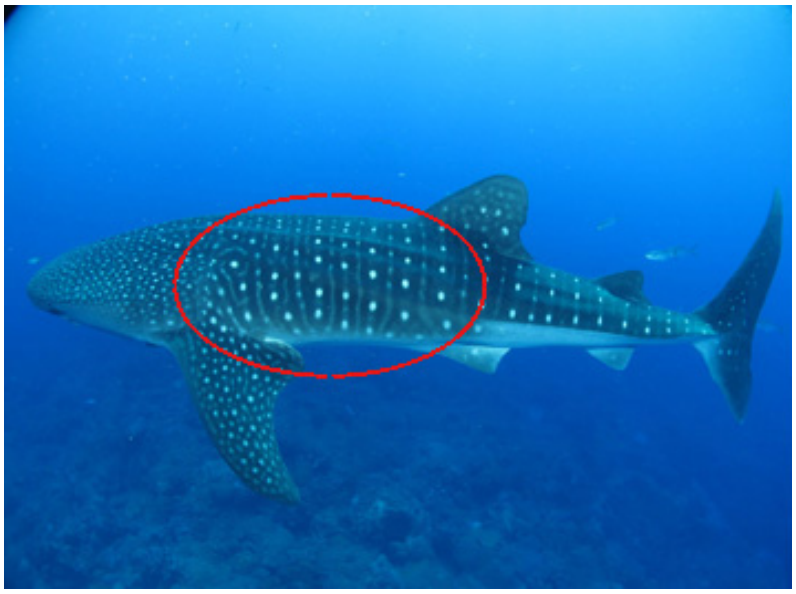

Figure 1. The whale shark's distinctive checkerboard and spotted pattern. Photo: NOAA.

GEOGRAPHIC DISTRIBUTION

"Whale sharks are found in all tropical and warm temperate seas except the Mediterranean."[21] Their range is typically between 30°N and 35°S latitude, though they have been seen as high as 41°N and 36.5°S.[22] Whale sharks are known to inhabit both deep and shallow coastal waters, and lagoons and coral reefs.[23] In the Atlantic Ocean, whale sharks are found as far north as the waters just below Nova Scotia in Canada, and as far south as central Brazil and South Africa.[24] This broad range means that whale sharks are found throughout the Caribbean, the Gulf of Mexico, and along the East Coast of the United States.[25] In the Pacific, they are found as far north as Japan and as far south as Southern Australia. The whale shark also ranges throughout the Indian Ocean, from South Africa to India and Western Australia (Figure 2).[26]

[20] Compagno 2002 at 203.
[21] IUCN 2005 at 4.
[22] Id.
[23] Compagno 2002 at 204.
[24] Id. at 203-04.
[25] Id.
[26] Id.

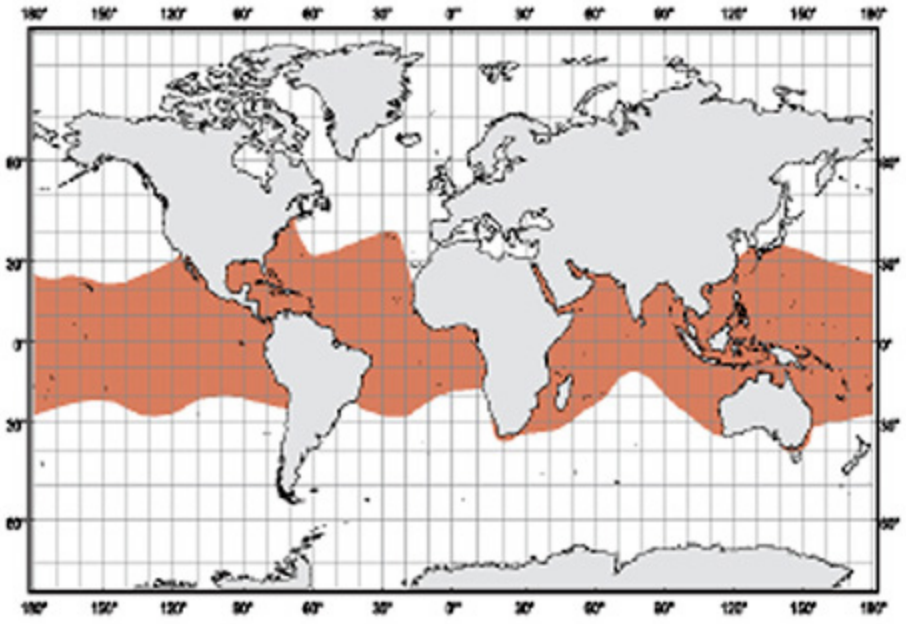

Figure 2. Global range of whale sharks.
Source: Compagno 2002 at 204.

While the whale shark has a relatively large range, it is rare throughout most of it. Rather than being found throughout the range at any one time, the whale shark is highly migratory. There are records of whale sharks migrating as far as 13,000 kilometers (km), or over 7,000 miles, from the Gulf of California, Mexico to near Tonga, in just over 37 months.[27] As a result of the migratory nature of the species, in several parts of the range the whale shark is unlikely to be present at any given time. However, there are several areas where whale sharks seem to be more concentrated. For instance, whale sharks appear to be present year-round in some areas like Taiwan, Honduras, and the Seychelles.[28] Additionally, there are consistent sightings in some areas during particular months of the year. These areas include: Australia, Belize, Chile, India, Mexico, the Philippines, and Tanzania.[29] In some areas there are also large seasonal congregations of whale sharks, presumably for feeding or breeding purposes. One such gathering, off of Isla Mujeres in the Yucatan, was documented as containing at least 420 individuals (Figure 3).[30]

[27] Eckert & Stewart 2001 at 303.
[28] IUCN 2005 at 4-5.
[29] Id.
[30] Dell'Amore 2011 at 2.

Figure 3. Gathering of whale sharks off of Isla Mujeres in the Yucatan. Photo: Smithsonian Institute.

HABITAT REQUIREMENTS

Typically, whale sharks inhabit both deep ocean waters and more shallow coastal waters. Ocean temperature within the tropical or temperate ranges appears to be the primary habitat indicator. However, some studies have shown that whale sharks gather seasonally in certain areas and that "shallow waters near the mouths of some rivers and estuaries could constitute feeding or breeding/birthing grounds."[31] The U.S. proposal to list the whale shark under Appendix II of CITES stated; "[v]irtually nothing is known about what may make these areas important to the whale sharks, i.e., nature of utilization, water quality, concentrations of plankton, temperature range, current patterns, weather, or sea state."[32] Whale shark habitat requirements need further analysis. However, such studies are unnecessary for purposes of ESA listing because the determination is based only upon the best *available* data.

LIFE HISTORY

There is a significant amount of scientific uncertainty regarding the age potential of whale sharks. One study estimates that whale sharks may live as long as 100 years.[33] A more conservative estimate places whale shark longevity at around 60 years.[34] While it is acknowledged that whale sharks are long-lived, it is clear that more studies are needed to determine *how* long-lived.

[31] CITES 2000 at 1-2.
[32] Id. at 2.
[33] Compagno 2002 at 206.
[34] See Martins & Knickle undated at 6.

Reproduction. The whale shark is ovoviviparous, meaning that embryos develop inside eggs which female sharks carry until giving live birth.[35] The gestation period for whale sharks is unknown, but it has been hypothesized that they reproduce every other year.[36] There is very little information about whale shark litter sizes apart from one report where a female whale shark was found carrying around 300 embryos in varying states of maturity.[37] Several were fully mature and about to be born.[38]

Even assuming that litter sizes are around 300, large litter size is probably an indication of the relatively low rate of survival for newborn whale sharks. Newborn whale sharks are not only too small to fend off most predators, but they are also too large to go unnoticed by them. Other sharks and orcas are known to attack smaller whale sharks, and the remains of small whale sharks have been found in both a blue marlin and a blue shark.[39]

Available information suggests that certain places, including near Taiwan, may serve as birthing areas for whale sharks.[40] This is where scientists found the female whale shark that was carrying around 300 embryos.[41] Based on information obtained from this litter and other studies, newborn whale sharks are estimated to measure between 58 and 64 centimeters (~2 feet) (Figure 4).[42] Whale sharks likely do not reach sexual maturity until 21 years of age.[43] Such a long time between birth and sexual maturity could possibly explain the relative rarity of the species, as it may be uncommon for individuals to reach sexual maturity.

Figure 4. Newborn whale shark in the Philippines. Photo: World Wildlife Fund.

[35] Compagno 2002 at 205.
[36] Id.
[37] See Joung et al. 1996 at 220.
[38] Id.
[39] IUCN 2005 at 6.
[40] Martins & Knickle undated at 7.
[41] Joung et al.1996 at 220.
[42] Id.
[43] IUCN 2005 at 6.

Diet. The whale shark is a filter-feeder, and feeds on a wide variety of plankton and nektonic organisms.[44] Due to this food preference, whale sharks have been known to migrate to areas as the amount of plankton and small organisms increase.[45] In addition to plankton, observers have also reported whale sharks consuming small crustaceans, squid, and some fish such as sardines, anchovies, mackerel, and even small tunas and albacore.[46] The other two filter-feeding sharks, the megamouth (*Megachasma pelagios*) and basking shark (*Cetorhinus maximus*), require forward motion to filter water and ingest food.[47] The whale shark, in contrast, "is able to hang vertically in the water and suction feed by closing its gill slits and opening its mouth"[48] (Figure 5).

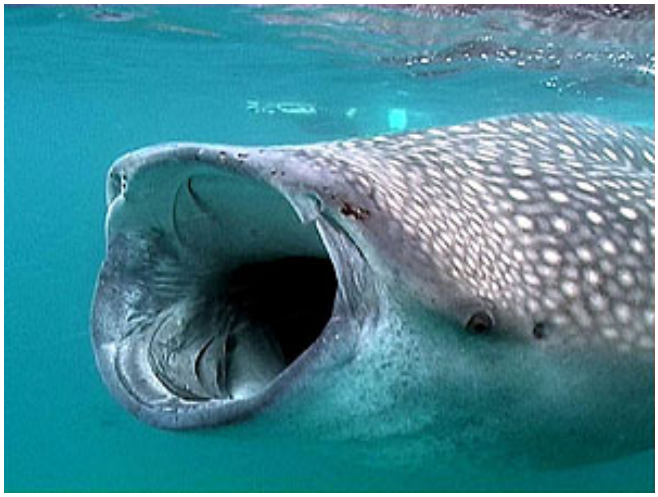

Figure 5. Whale shark feeding.
Photo: Florida Museum of Natural History.

ECOLOGICAL ROLE

Relatively little is known about the whale shark's role in the oceanic ecosystem when compared with other large ocean animals like whales and other shark species. However, as the U.S. CITES proposal stated, "[a]s the world's largest fish and a planktivore, the whale shark can be assumed to play a significant role in the structure and dynamics of the nearshore and estuarine ecosystems that it frequents."[49]

HISTORIC AND CURRENT POPULATION STATUS AND TRENDS

There are no current estimates as to the population of whale sharks. However, scientists agree that the species has a relatively low abundance.[50] While it is entirely possible that there are subpopulations of whale sharks within each ocean or region, the relative scarcity of information

[44] Compagno 2002 at 205.
[45] Id.
[46] Id.
[47] IUCN 2005 at 6.
[48] Id.
[49] CITES 2000 at 2-3.
[50] Compagno 2002 at 208.

on the species and its highly migratory nature make it difficult to know for sure whether such subpopulations exist. Despite a shortage of data regarding population numbers, the IUCN lists the whale shark as "vulnerable" because of its low abundance and the likelihood that its numbers will continue to decline.[51] The IUCN further lists the whale shark population as "currently decreasing."[52] However, because of the lack of information regarding population numbers it is difficult for IUCN to know if the species' status should be changed from vulnerable to endangered. The United States was obviously mindful of the vulnerability of the species when it proposed its listing under Appendix II of CITES in 2000.[53]

The biggest reason for the global decline of the whale shark is commercial fishing. Whale sharks are susceptible to being accidently caught in purse, drift, and gillnet fisheries.[54] Aside from these accidental catches, whale sharks are targeted, mainly using harpoons, and are intentionally captured in purse seine nets by fishers targeting tuna and other smaller fish that school under them. India, the Maldives, Pakistan, the Philippines, and Taiwan are among several countries that either have harpooned in the recent past or continue to harpoon whale sharks.[55]

There are several reasons for the commercial exploitation of whale sharks. First, the price of products from whale sharks has increased, making it more lucrative for fishers to target the species.[56] Second, whale sharks, like many other species of shark, are targeted for their fins, and, because whale shark fins are so large, it can be especially lucrative for fin fishers to target whale sharks. Third, fishers target whale sharks because the sharks' tendency to spend much of their time near the surface of the water makes them easy targets.[57] Finally, whale sharks are targeted commercially because they present an easy transition for former whale-hunters as most whale species are now protected.[58] It is easy for former whale-hunters to hunt whale sharks because it involves almost identical processes.

IDENTIFIED THREATS TO THE PETITIONED SPECIES: CRITERIA FOR LISTING

The whale shark meets four of the criteria for listing identified under ESA Section 4 (in bold):

> **A. The present or threatened destruction, modification, or curtailment of its habitat or range;**
> **B. Overutilization for commercial, recreational, scientific, or educational purposes**;
> C. Disease or predation;
> **D. The inadequacy of existing regulatory mechanisms; or**
> **E. Other natural or manmade factors affecting its continued existence.**[59]

[51] IUCN 2005 at 3-4.
[52] Id. at 5.
[53] CITES 2000, entire.
[54] IUCN 2005 at 8.
[55] Id. at 7.
[56] CITES 2000 at 2, 3.
[57] Compagno 2002 at 208.
[58] Id.
[59] 16 U.S.C. § 1533(a)(1).

First, growing human populations, anthropogenic climate change, and oil and gas development and consequent oil spills in the Gulf of Mexico are currently destroying whale shark habitat, and will likely continue to do so in the future. Second, commercial fishing poses the largest threat to the species, though recreation also poses threats. Third, the current regulatory mechanisms in individual countries, under Appendix II of CITES, and in the Parties to the Nauru Agreement (PNA) purse seine ban are inadequate to protect whale sharks, primarily because of either lax standards, limited geographical scope, or lack of enforcement. Finally, several other natural and manmade factors are contributing to the decline of the species. These other factors include: slow growth rates, delayed sexual maturity, small abundance, the relative ease of hunting whale sharks, and the synergistic effects of multiple threats.

The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range (Criterion A)

Growing Human Populations. Human populations have a substantial negative effect on shark habitat, particularly human populations located near the coasts. "Contemporary sharks occur mostly where human population density is low."[60] As coastal human populations grow, the negative effects on whale shark habitat will increase.

Worldwide, approximately 2.5 billion people live within 100 km of the coastline.[61] However, by 2020 an astonishing 75% of the expanding human population is expected to live within just 60 km of the coastline.[62] The negative impacts of this trend are exacerbated by the fact that impacts from this population growth do not occur linearly. Increased economic growth in coastal cities is a major cause of ocean habitat destruction. With growth comes an increase in consumption and development. This is reflected in an increase in construction projects, some of which occur on reef communities; dredging of harbors and shipping channels; dumping of waste, run-off pollution and increased sedimentation; deforestation; and increased tourism. Research indicates that sharks around populated coastal areas are both smaller and less numerous, and that human population is also negatively correlated with the total number of fish present.[63] The coasts around virtually all urban areas are "beset by a pattern of pollution and over-development."[64] "Coastal urban areas dump increasing loads of toxic wastes into the sea. In fact, waters around many coastal cities have turned into virtual cesspools, so thick with pollution that virtually no marine life can survive."[65]

This urban pollution is contributing to increasing "dead zones" – areas where dissolved oxygen content is so low that no marine life, apart from microorganisms, can live. A 2007 study identified 200 of these dead zones, an increase of 51 in just four years.[66] These dead zones are not only becoming more numerous; they are expanding "due mainly to high nutrient pollution levels brought in by rivers and streams and washed off coastal land."[67] One striking example is

[60] Ward-Paige et al. 2010 at 6.
[61] Burke et al. 2011 at 21.
[62] Knip et al. 2010 at 2 (citation omitted).
[63] Griffin et al. 2008 at 2.
[64] Hinrichsen Undated at 2.
[65] Id. at 4.
[66] Id. at 5.
[67] Id.

the Gulf of Mexico dead zone, the world's second largest, which has now reached the size of the state of New Jersey at 21,000 square kilometers.[68] These human population-related dangers pose real threats to whale sharks, which rely on coastal areas and inhabit the Gulf of Mexico. Since whale sharks have been shown to gather in the "shallow waters near the mouths of some rivers and estuaries [that] could constitute feeding or breeding/birthing grounds," dead zones, typically located at the mouths of rivers, pose a particular problem to whale sharks by impacting habitat essential to the species at pivotal life stages.[69]

Furthermore, climate change is expected to magnify these coastal pollution problems. For example, "[d]ue to water circulation and oceanic volume changes, estuarine and coastal systems are predicted to experience . . . increased eutrophication, hypoxia, and anoxia."[70] "More intense rains wash more fertilizer and sewage into coastal waters, and this runoff triggers algal blooms and consequent poisoning of fish and humans."[71] This will cause new dead zones to emerge and already-existing dead zones to expand in the mouths of rivers and estuaries – potentially in habitat that whale sharks rely on.

Coral reefs have already been exhibiting significant levels of deterioration due to anthropogenic impacts, and scientists believe that upwards of 70% of tropical and semi-tropical coral reefs, areas very important to whale sharks, may be lost within the next 40 years.[72] The Caribbean, an area with important whale shark habitat, has been particularly hard hit; four-fifths of their coral reefs disappeared by 2003 with no signs of improvement since then.[73] This damage to important coral reef habitat is already having profound impacts on shark populations. A recent University of Miami study found that reef shark numbers around populated islands, those where anthropogenic effects would be strongest, had dropped by more than 90% compared to those at the most pristine reefs.[74] The researchers found that "[t]he pattern – of very low reef shark numbers near inhabited islands – was remarkably consistent, irrespective of ocean conditions or region."[75] In short, as human population, including human population located near coasts and coral reefs, continues to increase, sharks, especially those that depend on fragile coastal ecosystems like the whale shark, will continue to lose habitat. This loss of habitat puts whale sharks at greater risk of extinction.

Anthropogenic Climate Change. Climate change will not only effect whale shark habitat by exacerbating the effects of human-caused pollution, it will negatively impact whale shark habitat directly as well. "Global climate change is impacting and will likely increasingly impact marine and estuarine fish and fisheries."[76] "Extremes in environmental factors, such as elevated water temperature, low dissolved oxygen or salinity, and pH, [all impacts predicted with anthropogenic climate change,] can have deleterious effects on fishes."[77] As global climate change progresses,

[68] Id.
[69] See Id.; CITES 2000 at 1-2.
[70] Roessig et al. 2004 at 258 (citations omitted).
[71] Id. at 269 (citation omitted).
[72] Hinrichsen undated at 2; Compagno 2002 at 204.
[73] See Hinrichsen undated at 3; Compagno 2002 at 203-04.
[74] Nadon 2012 at 1.
[75] Id. at 2.
[76] Roessig et al. 2004 at 269.
[77] See Id. at 257 (citations omitted).

these environmental factors will continue to deteriorate, rendering more and more habitat unsuitable for whale sharks.

Currently, the exact consequences of climate change for the oceans are not well understood, but the "hypothesis that coral reef communities are among the first to show signs of adverse climate change-related effects has been widely stated in the literature."[78] Coral reefs form important whale shark habitat, and their continued destruction will have deleterious consequences for the species.[79] To begin with, "[c]orals are, quite obviously, central to coral reef ecosystems."[80] "To date, the study of potential effects of global climate change and inter-annual variation on coral reef communities have focused almost entirely on hermatypic (reef-building) corals, including 'bleaching' events."[81] "Coral bleaching occurs when the photosynthetic symbionts of corals (zooxanthellae) become increasingly vulnerable to damage by light at higher than normal temperatures. The resulting damage leads to the expulsion of these important organisms from the coral host. Corals tend to die in great numbers immediately following coral bleaching events, which may stretch across thousands of square kilometers of ocean."[82] These bleaching events have been increasing both in terms of intensity and extent due to worldwide anthropogenic climate increases and will continue to cause severe damage to coral reefs.[83]

However, coral bleaching caused directly by oceanic temperature increase is not the only threat to coral reefs exacerbated by climate change. Certain coral diseases, harmful bacteria, and fungi may also become more prevalent due to climate change and cause further damage to this important whale shark habitat.

> Three coral pathogens (*Aspergillus sydowii*, *Vibrio shiloi*, and Black Band Disease) grow well at temperatures close to or exceeding probable host optima, suggesting that their population sizes would increase in warmer waters. Certain bacteria (e.g., *V. shiloi*) cause bleaching of certain coral species (e.g., *Oculina patagonica*), while fungi grow optimally at temperatures that coincide with thermal stress and bleaching in corals. This may lead to a co-occurrence of bleaching and infection . . . [T]he leftover dead coral surfaces can become colonized by macroalage, which support the proliferation of toxic dinoflagellates.[84]

Mass blooms of such dinoflagellates can cause destructive effects including toxic red tides.[85] Therefore, increased ocean temperatures mean a plethora of increased threats to corals, the reef ecosystems that depend on them, and the sharks, including whale sharks, that depend on those ecosystems.

"Ultimately the only clear solution to this threat will be a concerted and successful global effort

[78] Id. at 263, 265 (citations omitted).
[79] See Compagno 2002 at 204.
[80] Hoegh-Guldberg 2006 at 3.
[81] Roessig et al. 2004 at 263 (citations omitted).
[82] Hoegh-Guldberg 2006 at Executive Summary.
[83] Id.
[84] Roessig et al. 2004 at 269 (internal citations omitted).
[85] Latz Laboratory undated at 2.

to reduce atmospheric greenhouse gas emissions and to stabilize atmospheric concentrations [of those gases] somewhere around or below current levels."[86] So far, the U.S. has not been part of this solution. The U.S. Fish and Wildlife Service acknowledges this shortcoming in its "warranted but precluded" finding for the meltwater lednian stonefly, which is primarily threatened by climate change:

> The United States is only now beginning to address global climate change through the regulatory process (e.g., Clean Air Act). We have no information on what regulations may eventually be adopted, and when implemented, if they would address the changes in meltwater lednian stonefly habitat that are likely to occur in the foreseeable future. Consequently, we conclude that existing regulatory mechanisms are not adequate to address the threat of habitat loss and modification resulting from the environmental changes due to climate change to the meltwater lednian stonefly in the foreseeable future.[87]

With global temperatures already rising, no imminent solution to global climate change, and the negative effects on whale shark habitat that the lack of such a solution allows, there is both present and threatened destruction, modification, and curtailment of the whale shark's habitat and range due to climate change.

The Deepwater Horizon Oil Spill and Continued Oil Drilling in the Gulf of Mexico. The recent Deepwater Horizon oil spill has degraded the whale shark's "critical" Gulf of Mexico habitat, and continued oil exploration and drilling foretell a future threat of similar catastrophes.[88] As a result of the Deepwater Horizon spill, "[a] suite of pollutants – liquid and gaseous petroleum compounds plus chemical dispersants – poured into ecosystems that had already been stressed by overfishing, development and global climate change."[89] The timing and location of the spill couldn't have been worse; it occurred during "peak season for whale sharks in the Gulf: May through September." The spill occurred in the vicinity of as many as a third of the area's tracked specimens.[90]

With over 4.9 million barrels (205.8 million gallons) spilled from April 10, 2010 to July 15, 2010 when the well was capped,[91] scientists believe the Deepwater Horizon spill has caused, and will continue to cause, physical and behavioral changes, as well as displacement, in whale sharks.[92] Whale sharks using this important habitat may experience a variety of long-term negative effects; absorbing toxic dispersants used to remove oil; suffocating from oil-clogged gills; or negative effects associated with ingesting contaminated prey.[93] Scientists are studying the whale shark for fatal and non-fatal impacts from the oil spill, including effects on fertility and the

[86] Burke et al. 2011 at 31.
[87] FWS 2011 at 18684, 18694.
[88] Shark Diver 2010 at 1.
[89] Peterson et al. 2011 at 3.
[90] Shark Diver 2010 at 1; Handwerk 2010 at 2.
[91] Hoch 2010 at 1; Welch 2010 at 1.
[92] Handwerk 2010, entire.
[93] Id. at 2-3.

immune system.[94] With such impacts likely, it seems clear that the effects of the spill will impact whale sharks and their habitat for years to come.

Unfortunately, the Deepwater Horizon spill is probably not as isolated an occurrence as most would hope. In the wake of this disaster, the U.S. has continued to lease vast swathes of the Gulf for oil drilling, even going so far as to sell literally hundreds of new leases for drilling before the Deepwater Horizon spill had even been capped.[95] The omnipresent drilling activity in this area makes it very likely that there will be more spills in the future, and some may even be as, or more, catastrophic than the Deepwater Horizon spill. The Deepwater Horizon spill has caused destruction and modification of the whale shark's Gulf of Mexico habitat. Any future spills would clearly further degrade this habitat (or any other areas of whale shark habitat where they may occur for that matter), and the high probability that such a spill will occur adds an additional threat of destruction to this crucial whale shark habitat.

Combined Threats to Gulf of Mexico Whale Shark Habitat. A number of the threats mentioned above have converged on a specific area of critical whale shark habitat in the Gulf of Mexico. The enormous Gulf of Mexico dead zone has made a large swath of the Gulf uninhabitable for the species. Climate change and resulting increased rain in the Mississippi River basin will likely lead to increased pollution and expansion of the dead zone – combined with an increasing human population in the basin, this threat is likely to be even more severe than it would be due to climate change effects alone. Lastly, continued oil and gas development threaten this already stressed system even further.

As noted above, dead zones throughout the world are expanding "due mainly to high nutrient pollution levels brought in by rivers and streams and washed off coastal land."[96] Of particular relevance to the whale shark is the Gulf of Mexico dead zone, which has become the second largest in the world at an incredible 21,000 square kilometers,[97] the size of the entire state of New Jersey.[98] This dead zone starts at the mouth of the Mississippi River and extends westward to the upper Texas coast.[99] The main causes of the dead zone – increased fertilizer runoff from agriculture (especially corn) and increased sewage from growing populations in the Mississippi River basin – show no signs of abatement and the nutrients responsible for these dead zones are increasing in the Mississippi River.[100]

Climate change will serve to increase the dead zone's expansion rate as increased rains wash more fertilizer and sewage into the Gulf, triggering the algae blooms that cause these severely oxygen-deficient areas to develop.[101] To make matters worse, "[t]he [Gulf of Mexico] dead zone appears to be reaching a 'tipping point' where the system is becoming increasingly sensitive to nutrient inputs… and climate change exacerbates the problem as it

[94] Hueter and Gelsleichter 2010 at 11.
[95] See, e.g., Sheppard 2010 at 1.
[96] Hinrichsen undated at 5.
[97] Id.
[98] Id.
[99] Bruckner Undated at 1.
[100] See Times-Picayune 2012, entire.
[101] See Roessig et al. 2004 at 269 (citation omitted).

warms water and increases intense storms."[102] With no solution to climate change evident in the near future, the present levels of farming and sewage from populations in the Mississippi River basin will likely cause an increase in the size of the Gulf of Mexico dead zone even if they remain constant. Their impact will, however, likely be even more severe as fertilizer use and sewage both increase.

As described in detail above, the Deepwater Horizon oil spill and continued oil and gas drilling and exploration pose an ongoing threat to Gulf of Mexico whale shark habitat. The Deepwater Horizon oil spill occurred in an area characterized by scientists as "critical" Gulf of Mexico whale shark habitat, and impacted as many as a third of the tracked whale shark specimens in the Gulf.[103] Despite the Deepwater Horizon catastrophe, the U.S. has continued to lease vast swathes of the Gulf for oil drilling.[104] In 1979, the Ixtoc I spill occurred leaking between 10,000 and 30,000 barrels of oil per day for nearly 10 months:[105] Deepwater Horizon was not the first massive oil spill to happen in the Gulf of Mexico, and it will likely not be the last. As long as the Gulf of Mexico is exploited for its oil reserves there is an obvious, credible, and ongoing threat that another oil spill will happen and that more whale shark habitat will be destroyed as a consequence. Continued habitat destruction in the Gulf of Mexico is severe, ongoing, and imminent due to these multiple, intersecting threats.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes (Criterion B)

Commercial Fishing. The bulk of whale shark overutilization is the result of commercial fishing (Figure 6). The United States acknowledged the threat of commercial fishing with regard to whale sharks when it proposed inclusion of the whale shark in Appendix II of CITES.[106] The most recent commercial fishing figures for whale sharks indicate that fishing for the species is common in several countries. Indian fishers landed about 1,000 whale sharks in 1999, most of which were exported to Taiwan, Malaysia and other Asian countries.[107] The whale shark is heavily fished in Taiwan where the demand for whale shark meat (called "tofu shark" because of its texture) is high.[108] High demand has resulted in increasing prices, which in turn results in additional fishing.[109]

Not only is the whale shark targeted by commercial fishing, it also suffers from bycatch from gill nets, purse seine nets, and fish traps set by fishers targeting other fish.[110] As a result of both incidental and purposeful fishing, the whale shark population has declined. For example, in Taiwan, between 250 and 272 whale sharks were caught in 1995.[111] However, a mere six years

[102] Times-Picayune 2012 at 6.
[103] Shark Diver 2010 at 1; Handwerk 2010 at 2.
[104] See, e.g., Sheppard 2010 at 1.
[105] NOAA undated 3 at 1.
[106] CITES 2000 at 3, 4.
[107] Id. at 4.
[108] IUCN 2005 at 7.
[109] See CITES 2000 at 2, 3.
[110] Compagno 2002 at 207.
[111] IUCN 2005 at 7.

later, in 2001, only 89 whale sharks were caught in Taiwan.[112] This represents a decrease of between 60% and 70%, despite the increase in Taiwanese demand and thus likely fishing pressure.[113] These figures suggest that fewer whale sharks are found in this area. Such scarcity in this area is particularly significant because this is the same place thought by scientists to be a relatively large birthing area.[114] If the whale sharks being caught in this area are pregnant females, the loss of even one could significantly impact the ability of the species to maintain its already small and dwindling population.

Figure 6. A whale shark being butchered.
Photo: © World Entertainment News Network.

Taiwan is not the only country to experience whale shark scarcity. For example, in the Philippines, despite increased fishing efforts, there was a 29% decrease in whale sharks caught in 1997.[115] Ultimately, this observed decrease led the Philippines to institute a fishing ban on the species.[116] However, because of the high values of whale shark flesh and fins and the decline in whaling, the fear is that "whale sharks could be targeted in international waters by long-range fishing vessels run like miniature whale factory ships and using small 'killer' boats, harpoon-guns, light helicopters or microlight aeroplanes as spotters, and even remote sensing from satellites to fish these sharks."[117] Countries such as Pakistan use whale shark liver oil to treat boats, representing yet another targeted fishing pressure on the species.[118]

In what is essentially a hybrid of the targeted fishery and bycatch fishery, the tuna purse seine net fishery also captures large numbers of whale sharks both intentionally and unintentionally, often with fatal consequences. Purse seine net fishing involves setting a large net around a large fish

[112] Id.
[113] Id.
[114] Martins & Knickle undated at 7.
[115] Id.
[116] Id.
[117] Compagno 2002 at 208.
[118] See IUCN 2005 at 7.

or mammal in order to catch the smaller fish that gather underneath them.[119] This practice has been used extensively to capture tuna that school under whale sharks and led to the reported deaths of at least 50 whale sharks in 2010 and 19 in 2011 alone.[120] Even this large number is almost certainly lower than the actual total number of immediate fatalities because "there were likely many other cases that went unreported."[121] Immediate fatalities are not the only dangers associated with purse seine net fishing. In other species subject to purse seine net fishing, this practice causes capture myopathy.[122] The captured animals experience acute, intense stress during the fishing event.[123] Studies indicate that this stress may lead to "long-term sequelae such as vascular and muscle lesions, reproductive failure, or reduced survival."[124] The effects of permanent injuries, reproductive failure, and reduced survival on a K-selected[125] species like the whale shark are obvious and unacceptable, yet purse seine net fishing continues. Though there have been some recent inroads made (see "The Inadequacy of Existing Regulatory Mechanisms (Criterion D)"), those changes are not sufficient in terms of geographic scale, enforcement, or parties involved to fully stop this threat to whale sharks.

Human population growth will only intensify the threat of fishing. Demand for the "tofu shark" has already grown, as evidenced by increasing prices, which in turn result in additional fishing.[126] The United Nations Population Division predicts an increase of over 3 billion people worldwide by 2100, raising the total human population to over 10 billion people.[127] If left unchecked, this population growth will further increase fishing pressure on whale sharks.

Recreational Fishing. Whale sharks are also subject to overutilization for recreational purposes. Divers are increasingly traveling to various locations throughout the world to dive with whale sharks.[128] As the U.S. proposal to list whale sharks under CITES in 2000 stated: "Tourist industries based on seasonal occurrences of migratory whale sharks now exist in Thailand, Australia, South Africa, Seychelles, Mozambique, Honduras and the Maldives and are likely to appear in yet other areas."[129] These tourist industries include whale shark watching, but also often entail diving with the whale sharks (Figure 7). The species is particularly desirable for such diving-based tourism because it "is generally considered harmless despite its size, and moderate-sized to very large individuals have been repeatedly approached closely by divers and have been touched, ridden and otherwise contacted by them without the sharks reacting aggressively."[130] Such utilization may at first appear harmless to the sharks, but the constant pressure put on individual sharks by divers may result in continual harassment, which could

[119] AFP 2012 at 2.
[120] Id.
[121] Id.
[122] See generally Edwards 2007.
[123] Id. at 224.
[124] Id.
[125] The whale shark is a K-selected species because it is a large, long-lived species that reproduces infrequently and experiences a long delay in reaching sexual maturity. Such a life history pattern makes it more vulnerable to extinction when the species loses individual members. This is explained more fully in "Other Natural or Manmade Factors Affecting its Continued Existence (Criterion E): Reproduction and maturity," below).
[126] See CITES 2000 at 2, 3.
[127] United Nations Population Division 2011 at 1.
[128] Id. at 207.
[129] CITES 2000 at 3.
[130] Compagno 2002 at 207.

easily disrupt the normal life cycles of the species and drive whale sharks away from aggregation sites.[131] Since little is known about why these aggregation sites are important to whale sharks, there could be unexpected negative impacts to whale shark feeding, mating, birthing, or other crucial events that could have dramatic negative effects on the species.

Figure 7. Diver with whale shark.
Photo: Oceana.org © 2010 Tony Rath.

Ecotourism involving whale sharks has become a significant moneymaker for the relevant countries. For example, diving with whale sharks was determined to be worth between $3-5 million in Seychelles in 1996.[132] Even more impressive is that between 1993 and 2002, the number of people swimming with whale sharks in Western Australia grew from 1,000 to 5,000, resulting in an annual estimated income of $12.8 million as of 2000.[133] The profits realized by these countries mean that diving with whale sharks is bound to expand both in terms of scale and location if the species is not adequately protected.

Congress set forth a definition of what constitutes harassment of marine mammals in the MMPA; it stated that harassment is, "any act of pursuit, torment, or annoyance which… has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."[134] Because the whale shark is a fish and not a mammal it is not protected by the MMPA, despite the fact that its behavior closely resembles that of large whales.

Some countries and dive operations attempt to minimize harassment of whale sharks by setting clear guidelines for divers, such as not touching the sharks.[135] However, the increasing number of diving tourists will result in increases in the harassment and pressure the whale sharks currently experience, particularly in the many areas where such tourist activities have become popular and the areas where dive operators have opted not to create whale shark interaction guidelines. Furthermore, such voluntary approaches do not offer suitable protection to whale

[131] Id.; Martins & Knickle undated at 5.
[132] IUCN 2005 at 8.
[133] See Id.; Compagno 2002 at 208.
[134] 16 U.S.C. § 1362(18)(A).
[135] See DOEC undated, entire.

sharks and are inappropriate for a species facing serious pressures to its continued existence. They are not regulatory measures and have no force of law.

The Inadequacy of Existing Regulatory Mechanisms (Criterion D)

A few countries have promulgated regulatory measures to protect whale sharks; however, such measures are often ineffective or lack enforcement. For example, the Philippines banned fishing of whale sharks in 1998, yet illegal fishing still takes place and the associated products are exported to countries where demand exists.[136] Furthermore, the United States made its position known when it proposed that the whale shark be added to CITES Appendix II in 2000.[137] Though this proposal was ultimately not approved by CITES (the whale shark was instead added to Appendix II of CITES after a 2003 joint proposal made by Philippines and India), this action shows that the U.S. is well aware of the perilous situation of whale shark and the need for additional regulation.[138] However, CITES listing itself offers insufficient protection as it simply requires that exporting countries demonstrate that the exported whale shark carcasses came from sustainable populations.[139] This is problematic because there is currently no clear standard for so-called "non-detriment findings" used to determine whether killings of covered species would threaten sustainable populations.[140] Even if there were some way to determine what a sustainable population means, it would be difficult to demonstrate a sustainable whale shark population because of the elusive and migratory nature of the species.[141]

There is relatively little that can be done to enforce CITES' requirements, particularly when there is an illegal market for whale sharks. 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 like Taiwan to demonstrate that domestically consumed whale sharks came from sustainable populations.[142] Furthermore, the fact that only an export permit, and not an import permit, is required for international trade means one less level of scrutiny.[143] Thus, fishers from one country could harpoon whale sharks 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. Additionally, CITES, while very inclusive, does not cover every nation, and, even if it did, Iceland, Indonesia, Japan, Norway, and South Korea all made reservations as to the whale shark's inclusion in Appendix II.[144] Therefore, the protections offered by CITES in this case are not universal, thus further undercutting the effectiveness of the measures taken. The ease of circumventing CITES demonstrates the inadequacy of this listing for protecting whale sharks. NMFS acknowledged the unsatisfactory effect of even the more restrictive 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

[136] IUCN 2005 at 7.
[137] CITES 2000, entire.
[138] IUCN 2005 at 9.
[139] Id.
[140] CITES undated 2 at 1.
[141] IUCN 2005 at 4-5.
[142] CITES undated 1 at 1-2.
[143] Id.
[144] See CITES undated 3, entire; CITES 2003 at 1.

species continued "in spite of the CITES listing and national laws, due to lack of enforcement."[145]

Only a handful of the 100 or more countries where the whale shark is found have listed the species as protected.[146] These countries include Australia, Honduras, the Maldives, and the Philippines.[147] However, the migration of whale sharks makes these regulations ineffective because they cannot be enforced once the whale sharks leave protected waters. The U.S. has also instituted some protection for the whale shark in the form of the Consolidated HMS Fishery Management Plan. Under this plan, whale sharks are prohibited from being fished in U.S. waters in the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.[148] Yet this regulation does nothing to protect the species in U.S waters in the Pacific Ocean or in other areas of the world and does not address unintentional catches. Whale sharks are also not protected from harassment that may interrupt important life cycle events in U.S. waters since they receive no protection from the MMPA.[149] If the U.S. deems it necessary to regulate a portion of the species, it should regulate the entire species. This is especially true of highly migratory species like the whale shark that may face population-level threats from fishing in seemingly unrelated areas. Therefore, the United States should commit to protecting the whale shark under the ESA in *all* U.S. waters that it inhabits.

The Parties to the Nauru Agreement (PNA) and the Western and Central Pacific Fisheries Commission (WCPFC), which includes the United States, recently agreed to stop setting purse seine nets around whale sharks in the western and central Pacific.[150] However, this limited protection is not effective. This is because it only binds a limited number of countries (those that are parties to the agreement); it only applies in the limited area of the PNA's waters and does not control setting purse seine nets around whale sharks in other areas; it does not cover whale sharks that are unintentionally caught in purse seine nets; and it is unclear whether there will be sufficient enforcement to stop even intentional captures.

Other Natural or Manmade Factors Affecting its Continued Existence (Criterion E)

Several other factors, both natural and manmade, contribute to the declining population and endangerment of whale sharks. These factors include aspects of whale shark behavior that make them exceptionally susceptible to fishing; the late reproduction, maturity, and longevity issues associated with the species; and the synergistic effects of multiple threats to whale shark existence.

Susceptibility to Fishing. Whale sharks are relatively rare. If a species is rare to begin with, every individual taken out of the population drives the species that much closer to extinction. Taking 1,000 individual whale sharks in a given year from a single area, as was done recently in

[145] NOAA 2011b at 40822, 40832; NOAA undated 2 at 3.
[146] CITES 2000 at 4.
[147] Id.
[148] NOAA 2011ax at 2-3.
[149] See "Overutilization for Commercial, Recreational, Scientific, or Educational Purposes (Criterion B): *Recreational Overutilization*" above.
[150] AFP 2012 at 1-2.

India, can cripple the population.[151] The size of whale sharks and their tendency to remain near the ocean's surface both contribute to their overexploitation.[152] Since they are the largest fish in the ocean, it is inherently easier to spot whale sharks than other fish. Moreover, whale sharks habitually stay near the surface of the ocean as they feed or bask in the warmer surface waters.[153] This combination of factors increases whale shark visibility and makes it much easier for fishers to harpoon whale sharks than many other species. Lastly, whale sharks predictably gather in certain areas, whether for breeding or feeding.[154] Such congregations have been observed containing up to 420 individuals.[155] A large, predictable gathering of whale sharks makes it much easier for the species to be overfished in those areas and, as a highly migratory species, overfishing in one area will not have merely local results.

Reproduction, Maturity, and Longevity. Whale sharks are also vulnerable to extinction in part because they are a K-selected or K-strategy species (they are a large, long-lived species that reproduces infrequently and experiences a long delay in reaching sexual maturity).[156]

> 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.[157]

Whale sharks are currently experiencing the type of rapid, chaotic change that makes their K-selected life history pattern a liability. This is because whale sharks are not only losing habitat, but also being fished and removed from their remaining habitat at a rate greater than they can replenish their numbers.[158] As a result of these pressures, many of the whale shark's physical attributes and reproductive adaptations have gone from being beneficial to creating increased risk of species extinction. For instance, whale shark recruitment is hindered by the fact that they are large, live longer than most shark species, reach sexual maturation late in life, and reproduce infrequently.[159] This type of life history pattern means that the species does not replenish itself

[151] See CITES 2000 at 2, 3, 4.
[152] Compagno 2002 at 208.
[153] Id. at 207.
[154] Id. at 206.
[155] Dell'Amore 2011 at 2.
[156] See Goble & Freyfogle 2010 at 1058-60; Compagno 2002 at 206; IUCN 2005 at 6.
[157] Goble & Freyfogle 2010 at 1059-60 (emphasis in original).
[158] See "The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range (Criterion A)" above; "Overutilization for Commercial, Recreational, Scientific, or Educational Purposes (Criterion B)" above.
[159] See Compagno 2002 at 206; IUCN 2005 at 6.

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. This difficulty is exacerbated by the fact that the largest whale sharks are both the whale sharks most commonly targeted by fishers for the greatest economic return and those most likely to be sexually mature. The whale shark's age at sexual maturity (estimated to be 21 years) makes it impossible for younger whale sharks to replace larger individuals because they are not yet sexually mature, thus making it very difficult for the population to replenish itself.[160] This is made even more problematic as reproductive individuals that have been removed by fishers may never be replaced at all, since many juvenile whale sharks will never reach sexual maturity due to their susceptibility to predation by other sharks, orcas, and predatory fish species.[161] Removing the only members of a species that are capable of reproduction means there is a substantial risk that the population will rapidly collapse.

Synergistic Effects. The synergistic effects of aforementioned threats could conspire to cause the extinction of whale sharks. "Like interactions within species assemblages, synergies among stressors form self-reinforcing mechanisms that hasten the dynamics of extinction."[162]

The combination of threats to the whale shark and its habitat could cause a greater and faster reduction in the remaining population than might be expected from simply the additive impacts of the threats. "[H]abitat loss can cause some extinctions directly by removing all individuals over a short period of time, but it can also be indirectly responsible for lagged extinctions by facilitating invasions, improving hunter access, eliminating prey, altering biophysical conditions and increasing inbreeding depression. Together, these interacting and self-reinforcing systematic and stochastic processes play a dominant role in driving the dynamics of population trajectories as extinction is approached."[163]

The whale shark 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."[164]

CONCLUSION

In 2000, the United States proposed that the whale shark be included in Appendix II of CITES.[165] The U.S. further acknowledged their need for protection by prohibiting the fishing of whale sharks in Atlantic U.S. waters under the Consolidated HMS Fishery Management Plan and by

[160] See IUCN 2005 at 6.
[161] See Id.
[162] Brook et al. 2008 at 457 (internal citations omitted).
[163] Id. at 453 (internal citations omitted).
[164] Id. at 455 (internal citations omitted).
[165] CITES 2000, entire.

agreeing to the ban on setting purse seine nets around whale sharks in the western and central Pacific.[166] What was obvious then remains obvious now – the whale shark needs further regulatory protection to ensure the survival and recovery of the species. The IUCN also realized this need when it classified the whale shark as "vulnerable," which means the best available evidence indicates that the species is "considered to be facing a high risk of extinction in the wild."[167] Similarly, the ESA defines "endangered species" as, "any species which is in danger of extinction throughout all or a significant portion of its range," and "threatened species" as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."[168] Listing the whale shark under the ESA would provide essential protection for this species by protecting shark populations in U.S. waters; prohibiting the import or export of whale shark products in the United States; and providing financial, technical and law enforcement assistance for international conservation efforts.[169]

REQUESTED DESIGNATION

WildEarth Guardians hereby petitions the National Marine Fisheries Service within the National Oceanic and Atmospheric Administration to list the whale shark (*Rhincodon typus*) as an "endangered" or "threatened" species pursuant to the Endangered Species Act and to list any DPS NMFS may find to exist as well. This listing action is warranted, given that whale sharks are threatened by four of the five ESA listing factors.

Petitioner also requests that critical habitat be designated for this species concurrent with final ESA listing. Critical habitat should protect the areas most important to the whale shark's survival, such as breeding grounds and coastal areas including areas under U.S. jurisdiction along the Atlantic Coast from Maine to Florida; in the Gulf of Mexico and the Caribbean Sea; and waters around Hawaii, American Samoa, Northern Marianas Islands, Puerto Rico, and the Virgin Islands, and areas of the high seas that are essential to the species' survival and recovery.

[166] See NOAA 2011a at 2-3; AFP 2012 at 1-2.
[167] IUCN 2001 at 20.
[168] 16 U.S.C. § 1532(6); 16 U.S.C. § 1532(19).
[169] 16 U.S.C. § 1537(a).

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