

A PETITION:

**REQUESTING THE SECRETARY OF COMMERCE
TO ADD SIX CRITICALLY ENDANGERED SAWFISH SPECIES
TO THE LIST OF THREATENED AND ENDANGERED SPECIES
MAINTAINED UNDER THE AUTHORITY OF
THE ENDANGERED SPECIES ACT.**

The Six Petitioned Species Are The:

- (1) Knifetooth Sawfish (*Anoxypristis cuspidata*);**
- (2) Dwarf Sawfish (*Pristis clavata*);**
- (3) Freshwater Sawfish (*Pristis microdon*);**
- (4) Common Sawfish (*Pristis pristis*);**
- (5) Narrowsnout Sawfish (*Pristis zijsron*); and**
- (6) Smalltooth Sawfish (*Pristis pectinata*) (all presently unlisted populations)**

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I. INTRODUCTION

Pursuant to the citizen petition process of the Endangered Species Act (“ESA”), 16 U.S.C. § 1531 *et seq.*, WildEarth Guardians hereby petitions the Secretary of Commerce, acting through the National Marine Fisheries Service (“NMFS”) and the National Oceanic and Atmospheric Administration (“NOAA”) (hereinafter referred to collectively as the “Secretary”), to add six critically endangered sawfish species to the list of threatened or endangered species maintained under the authority of the ESA. The six petitioned sawfish species are the: (1) Knifetooth Sawfish (*Anoxypristis cuspidata*); (2) Dwarf Sawfish (*Pristis clavata*); (3) Freshwater Sawfish (*Pristis microdon*); (4) Common Sawfish (*Pristis pristis*); (5) Narrowsnout Sawfish (*Pristis zijsron*); and (6) Smalltooth Sawfish (*Pristis pectinata*) (all presently unlisted populations).¹ This Petition requests the range-wide listing of each of the six sawfish species as threatened or endangered species pursuant to the ESA because they are threatened or endangered throughout all or a significant portion of their respective ranges. In the alternative, this Petition requests the listing as threatened or endangered species pursuant to the ESA of any District Population Segments of any of the six species the Secretary determines may exist.

The International Union for Conservation of Nature (“IUCN”)² lists each of the six petitioned sawfish species as “critically endangered.” The IUCN’s “critically endangered” assessment indicates that the IUCN believes the six petitioned species face the highest level of extinction risk, short of becoming extinct in the wild.³ The primary threats driving all six petitioned sawfish species to the edge of extinction are similar. Accordingly, it appears efficient for the Secretary to examine the six species together as this Petition requests. All six petitioned species are threatened by habitat loss and degradation resulting from human population growth

¹ A Distinct Population Segment of the Smalltooth Sawfish, *Pristis pectinata*, in U.S. waters is presently listed under the ESA. 68 Fed. Reg. 15674. This Petition seeks the range-wide listing of all populations of this species.

² According to its website, the IUCN is the world’s oldest and largest global environmental network. It is a democratic membership union with more than 1,000 government and non-governmental organization (NGO) members, and almost 11,000 volunteer scientists in more than 160 countries. Its work is supported by over 1,000 professional staff in 60 offices and hundreds of partners in public, NGO and private sectors around the world. See <http://www.iucn.org/about/>

³ See http://www.iucnredlist.org/about/red-list-overview#redlist_criteria (IUCN Red-List Assessment Criteria). See also Exhibit 1 (IUCN Species Report for the Knifetooth Sawfish, *Anoxypristis cuspidata*, assessing the species as critically endangered); Exhibit 2 (IUCN Species Report for the Dwarf Sawfish, *Pristis clavata*, assessing the species as critically endangered); Exhibit 3 (IUCN Species Report for the Freshwater Sawfish, *Pristis microdon*, assessing the species as critically endangered); Exhibit 4 (IUCN Species Report for the Common Sawfish, *Pristis pristis*, assessing the species as critically endangered); Exhibit 5 (IUCN Species Report for the Narrowsnout Sawfish, *Pristis zijsron*, assessing the species as critically endangered); and Exhibit 6 (IUCN Species Report for the Smalltooth Sawfish, *Pristis pectinata*, assessing the species as critically endangered). WildEarth Guardians hereby incorporates all citations and references contained in the IUCN’s Species Reports for the six petitioned sawfish species (Exhibits 1 through 6) into this Petition by reference. If the Secretary does not have access to any of the incorporated citations or references contained in the six IUCN Species Reports (Exhibits 1 through 6) please contact us and we will provide copies upon request. WildEarth Guardians presently believes the Secretary has ready access to this incorporated material.

and consequently increasing coastal destruction and pollution, targeted and incidental (“by-catch”) killing by the fishing industry, the international “shark” fin trade, the international curio trade in sawfish “saws,” and inadequate regulatory protections worldwide. Immediate protection of all six petitioned species under the ESA throughout their worldwide ranges is both warranted and necessary to ensure the survival of these critically endangered species. Additionally, protecting all six petitioned species worldwide will make the Secretary’s existing protection of the U.S. District Population Segment (“DPS”) of the Smalltooth Sawfish, *Pristis pectinata*, and proposed protection of the Largetooth Sawfish, *Pristis perotteti*, from the international “shark” fin and sawfish “saw” curio trades dramatically easier to enforce and consequently more effective.⁴

“To the maximum extent practicable,” the Secretary must issue an initial finding as to whether this Petition “presents substantial scientific or commercial information indicating that the petitioned action may be warranted” within 90 days of receipt. 16 U.S.C. § 1533(b)(3)(A). Through this Petition, WildEarth Guardians need not demonstrate conclusively that the listing of the six-petitioned species is warranted; rather, this Petition need only present information demonstrating that such listing *may be* warranted. *Id.* There can be no reasonable dispute that the available information, in particular the IUCN’s assessment that each of the petitioned species is critically endangered (Exhibits 1 through 6), indicates that listing of the species as either threatened or endangered *may be* warranted. Accordingly, it is entirely “practicable” for the Secretary to make a positive 90-day finding on this Petition within 90-days and to promptly commence a status review of the six species as required by 16 U.S.C. § 1533(b)(3)(B).

II. PETITIONER

Petitioner WildEarth Guardians is a non-profit environmental organization with approximately 4,500 members living throughout the United States. WildEarth Guardians’ maintains an active endangered species or biodiversity protection campaign. As part of this campaign, WildEarth Guardians works to obtain or upgrade ESA protection for a wide variety of imperiled wildlife, plants, and the ecosystems on which they depend throughout the world. WildEarth Guardians previously petitioned for the protection of the Largetooth Sawfish, *Pristis perotteti*, throughout its international range.⁵ The present Petition will help ensure WildEarth

⁴ See 68 Fed. Reg. 15674 (Final ESA listing rule for the Distinct Population Segment of Smalltooth Sawfish, *Pristis pectinata*, in U.S. Waters) and 75 Fed. Reg. 25174 (Proposed ESA listing rule for Largetooth Sawfish, *Pristis perotteti*). See also WildEarth Guardians’ comments on the Secretary’s 90-day petition finding for the Largetooth Sawfish, dated September 28, 2009, and comments on the Secretary’s proposed listing rule for the Largetooth Sawfish, dated June 21, 2010. These two documents and their attachments, previously provided to the Secretary, are incorporated herein by reference. Both comment letters discuss the threats to sawfish species posed by the international “shark” fin and sawfish “saw” curio trades and how existing and proposed protections are difficult to enforce because of the similarity of appearance in sawfish fins and saws once individual sawfish are disassembled and entered into international trade.

⁵ See 74 Fed. Reg. 37671 (positive 90-day finding on WildEarth Guardians’ Petition to list the Largetooth Sawfish, *Pristis perotteti*); 75 Fed. Reg. 25174 (proposed rule to list the Largetooth Sawfish, *Pristis perotteti* as endangered under the ESA).

Guardians’ efforts to protect the Largetooth Sawfish are more effective.⁶ Additionally, WildEarth Guardians and its members have a substantial interest in the conservation of all six presently petitioned sawfish species and their marine habitats worldwide. WildEarth Guardians and its members will be adversely affected if the Secretary declines to protect these species under the ESA.

III. THE SIX PETITIONED SAWFISH SPECIES

A. Knifetooth Sawfish, *Anoxypristis cuspidata*

1. Taxonomy

Anoxypristis cuspidata is known by the common names “Knifetooth Sawfish,” “Narrow Sawfish,” and “Pointed Sawfish.” Exhibit 1, p.1 (IUCN Report). Throughout this Petition, it is referred to as the Knifetooth Sawfish or *Anoxypristis cuspidata*. John Latham first described the species as *Pristis cuspidatus* in 1794. Exhibit 7, p.1 (Florida Museum of Natural History Species Report). In 1913, the author Hoffman renamed the genus for this species to *Oxypristis* noting differences in various morphological characters. Id. However, the name *Oxypristis* was previously used for an insect genus. Id. To avoid homonym problems, scientists added a prefix creating *Anoxypristis* in 1941. Id. Since then, the name for this species has changed only slightly, and is currently valid as *Anoxypristis cuspidata*. Id.

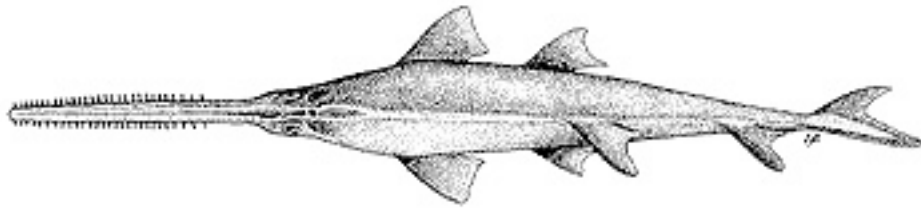
Knifetooth Sawfish Taxonomic Hierarchy⁷

Kingdom	<i>Animalia</i>
Phylum	<i>Chordata</i>
Subphylum	<i>Vertebrata</i>
Class	<i>Chondrichthyes</i>
Subclass	<i>Elasmobranchil</i>
Suborder	<i>Euselachli</i>
Order	<i>Pristiformes</i>
Family	<i>Pristidae</i>
Genus	<i>Anoxypristis</i>
Species	<i>Anoxypristis cuspidata</i>

⁶ See WildEarth Guardians comment letter on the Secretary’s proposed listing rule for the Largetooth Sawfish, *Pristis perotteti*, 75 Fed. Reg. 25174, dated June 21, 2010 at pages 5-6, requesting the Secretary to protect all six of the presently petitioned sawfish species based on their similarity of appearance to the Largetooth Sawfish. WildEarth Guardians June 21, 2010 letter has been previously provided to the Secretary and is incorporated herein by reference.

⁷ Integrated Taxonomic Information System (“ITIS”) Report. Available at: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=564306. ITIS is a partnership of scientific agencies providing authoritative taxonomic information.

2. Species Description



Knifetooth Sawfish Sketch⁸

The Knifetooth Sawfish, like all sawfishes, is a modified and elongate ray with a shark-like body and a blade-like rostrum covered in lateral, tooth-like denticles, commonly called a saw. Exhibit 7, p.2 (FMNH Report). The slender saw, which has 18-25 dorso-laterally flattened and broadened rostral teeth per side, distinguishes the Knifetooth Sawfish from other sawfishes. Id. See also Exhibit 1, p.1 (IUCN Report) (The species is distinguished from sawfish of the genus *Pristis* by the presence of a very narrow rostral saw, with 16 to 29 pairs of distinctive dagger-shaped teeth on the rostrum but no teeth along the quarter of the rostral saw nearest to the head. It also has a distinct lower caudal lobe).

Knifetooth Sawfish are gray, darker on top than on the bottom. Exhibit 7, p.3 (FMNH Report). The saw teeth are whitish in color, contrasting with the gray rostrum. Id. The fins are pale gray, often lighter than the body color. Id. In northern Australian waters, the rostral tooth count varies between 18 and 22 per side. Id. In other parts of the Indo-Pacific the species has a higher average rostral tooth count (24-25 per side). Id. Knifetooth Sawfish may have more teeth on one side of their saw than the other. Id. Inside its mouth, the Knifetooth Sawfish has many rows of blunt teeth with rounded cusps and smooth surfaces. Id.

3. Life History, Reproduction, and Growth

The Knifetooth Sawfish gathers food by using its saw in a side-to-side slashing motion to dislodge invertebrates from the substrate and to stun schooling fishes. Id. It eats squid, small fish, crabs, and shrimp. Id. In turn, the Knifetooth Sawfish falls prey to sharks, most likely the hammerhead (*Sphyrna sp.*), bull (*Carcharhinus leucas*), or copper shark (*Carcharhinus brachyurus*). Id. at 4. Saltwater crocodiles (*Crocodylus porosus*) also prey on the Knifetooth Sawfish. Id. When Knifetooth Sawfish become entangled in fishing nets they are particularly vulnerable to predation. Id. The parasites *Nonacoytle pristis* and *Neoheterocoytle darwinensis* that inhabit the gills of other sawfishes in Australia and New Guinea may also use the Knifetooth Sawfish as a host. Id.

The Knifetooth Sawfish has attained a confirmed maximum total length of about 11.5 ft in Australia, but unconfirmed reports claim much larger sizes elsewhere; such as 19.7 feet in

⁸ Exhibit 7, p. 2 (Florida Museum of Natural History Species Report for the Knifetooth Sawfish).

India and 26.2 feet in Thailand. *Id.* at 3. Like all sharks, skates, and rays, Knifetooth Sawfish employ internal fertilization for reproduction and females give birth to live young. Exhibit 7, p.3 (FMNH Report); Exhibit 1, p.2 (IUCN Report). Females nourish embryos in utero with yolk sacs providing energy for the embryos to develop into fully functional young sawfish at birth. *Id.* Females mature at 246 to 282 cm. *Id.* Reported litter sizes range from 6-23 young, each measuring between 1.5-2.5 feet in total length. *Id.* The saw teeth of young sawfish do not fully emerge, and are also covered in a sheath of tissue, until after birth so as not to injure the mother. Exhibit 7, p.3 (FMNH Report).

4. Population Status and Trends

The IUCN first assessed the Knifetooth Sawfish as endangered in 2000 and elevated its ranking to critically endangered in 2006. Exhibit 1, p.1 (IUCN Report). The IUCN's critically endangered assessment means the best available evidence indicates the species is facing an extremely high risk of extinction in the wild.⁹ The IUCN further reports that "extensive fishing and this species' K-selected life history have caused substantial reductions in abundance, the fragmentation of remaining populations and the virtual disappearance of this species from commercial catches in regions where it was once considered fairly common. Exhibit 1, p.1 (IUCN Report). "The global population of this species is considered to be much less than 80% of its former levels 30 to 50 years ago." *Id.* at 2. The IUCN concludes that populations of the Knifetooth Sawfish "are becoming increasingly rare and fragmented and all those known are severely threatened by target and bycatch fisheries and deterioration of habitats." *Id.* Accordingly, the IUCN lists the species' population trend as decreasing. *Id.* Additionally, even where still considered fairly "common," the average size of caught Knifetooth Sawfish is decreasing. See Exhibit 7, p.5 ("Preliminary data indicates that adult Knifetooth sawfish measure only about two-thirds of their former maximum size in Australian [waters], although the species remains common."). This decrease in maximum size indicates the population is under pressure and most likely on the edge of collapse.

5. Range



Historical World Distribution Map for the Knifetooth Sawfish¹⁰

⁹ See an explanation of the IUCN's categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

¹⁰ Exhibit 7, p.2 (FMNH Report).

The Knifetooth Sawfish is considered native to at least portions of the waters of Australia, Bangladesh, China, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Oman, Pakistan, Papua New Guinea, Philippines, Singapore, Somalia, Sri Lanka, Taiwan, Thailand, and Vietnam. Exhibit 1, p.2 (IUCN Report). Historically, the species was relatively common in inshore and estuarine environments in the Indo-Pacific region, from the mouth of the Suez Canal in Egypt, throughout the Red Sea, the Persian Gulf, the northern Indian Ocean, and the Indo-Australian Archipelago from Australia north to Borneo, but not in the Philippines. Id. In Southeast Asia, it was reported in the Gulf of Thailand, Cambodia, and Vietnam. Id. In eastern Asia, it was reported from China to Korea and out to the southern portion of Japan (Honshu), and the northwest corner of Taiwan. Id.

6. Habitat

The Knifetooth Sawfish is primarily a benthic species preferring sandy or muddy bottoms, but may occur over sea grass beds and other types of ocean floor. Exhibit 7, p.2 (FMNH Report). The species moves between fresh and salt water and is mostly found in near-shore areas to a depth of 40 meters (131 feet). Id. See also Exhibit 1, p.2 (IUCN Report). The Knifetooth Sawfish has been recorded in large rivers far upstream, such as in the Tachin River in Thailand. Exhibit 7, p.2 (FMNH Report).

B. Dwarf Sawfish, *Pristis clavata*

1. Taxonomy

Pristis clavata is known by the common names “Dwarf Sawfish” and “Queensland Sawfish.” Exhibit 2, p.1 (IUCN Report). Throughout this Petition, this species is referred to as the Dwarf Sawfish or *Pristis clavata*. Samuel Garman, a legendary anatomist and original official curator of fishes, amphibians, and reptiles at the Harvard Museum of Comparative Zoölogy, first described the Dwarf Sawfish in 1906. Exhibit 8, p.1 (FMNH Report). The Florida Museum of Natural History describes the taxonomy of the Dwarf Sawfish as: Order, *Pristiformes*; Family, *Pristidae*; Genus, *Pristis*; Species, *Clavata*. Exhibit 8, p.1 (FMNH Report). The IUCN describes the taxonomy of the Dwarf Sawfish as: Kingdom, *Animalia*; Phylum, *Chordata*; Class, *Chondrichthyes*; Order, *Rajiformes*; Family, *Pristidae*; Genus, *Pristis*; Species, *Clavata*. Exhibit 2, p.1 (IUCN Report).

2. Species Description

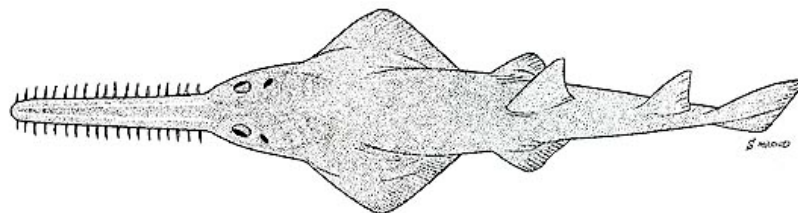


Dwarf Sawfish Photo¹¹

¹¹ Available at: <http://www.arkive.org/dwarf-sawfish/pristis-clavata/image-G66128.html>

The Dwarf Sawfish is a marine species with a shark-like body, a flattened head, and a blade-like snout, or “saw,” bearing 18-22 pairs of lateral teeth. This species can be distinguished from other sawfishes primarily by its significantly smaller average size. Exhibit 8, p.2 (FMNH Report) (detailing additional distinctions between Dwarf and other sawfish species). Additionally, it can be distinguished from sawsharks, *Pristiophorus spp.*, by its lack of barbells, ventrally located gills (versus laterally) and similarly sized rostral teeth. Id. at 1.

The dorsal body surface of the Dwarf Sawfish is olive-brown, darker on its head, and fading to whitish or yellowish ventrally. Id. at 3. The species’ fins are often lighter in color than the dorsal body surface. Id. Oral dentition of the Dwarf Sawfish is similar in both jaws; exhibiting many rows of blunt teeth with rounded cusps and smooth surfaces; and sometimes showing wear from use. Id.



(after Last and Stevens, 1994)

Dwarf Sawfish¹²

3. Life History, Reproduction, and Growth

Like other sawfish, the Dwarf Sawfish uses its saw, moving it in a side-to-side slashing motion, to dislodge invertebrates from the bottom and to stun schooling fishes. Probable food items include small fish, crabs and shrimp. Exhibit 8, p.3 (FMNH Report). Likely predators of the Dwarf Sawfish include hammerhead sharks, bull sharks, copper sharks, and saltwater crocodiles. Id. at 4. The Dwarf Sawfish may also be attacked by parasites. The newly described parasite species *Neoheterocotyle darwinensis*, lives within the gills of the Dwarf Sawfish, and is known to occur near Darwin, Australia. Id. Other parasites also likely attack the Dwarf Sawfish. See Id.

The Dwarf Sawfish is significantly smaller than other sawfish species, hence its common name. The largest specimen ever recorded was a mature male that measured approximately ten feet in length. A female, nearly seven feet in length, was found to be immature. Id. at 3.

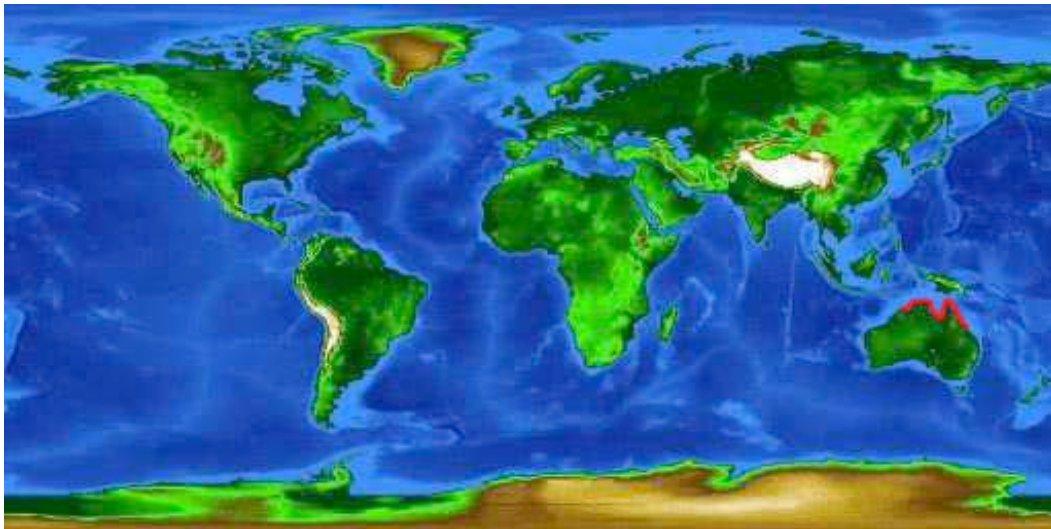
The Dwarf Sawfish reproduces using internal fertilization. Id. The species utilizes a strategy of embryo nourishment called aplacental yolk sac viviparity. Id. The embryos are nourished only by their yolk sac, which provides energy for them to develop into fully functional young sawfish in utero. Id. The yolk sac is connected to the embryo by a yolk stalk and both of these structures are fully absorbed before the young sawfish are born. Id.

¹² Exhibit 8, p.2 (FMNH Report).

4. Population Status and Trends

The IUCN first assessed the Dwarf Sawfish as endangered in 2000 and elevated its ranking to critically endangered in 2006. Exhibit 2, p.1 (IUCN Report). The IUCN's critically endangered assessment means the best available evidence indicates the species is facing an extremely high risk of extinction in the wild.¹³ The IUCN further reports that Australian populations of the Dwarf Sawfish, the only known populations, have declined significantly as a result of bycatch in commercial gillnet and trawl fisheries. Exhibit 2, p.1 (IUCN Report). The IUCN states the bycatch problem in Australia is ongoing. *Id.* Additionally, IUCN reports that if the species occurs outside of Australian waters, these waters are fished even more intensively and populations there are likely to be nearing extirpation. *Id.* The IUCN concludes that the global population of this species has decreased to significantly less than 80% of its former levels 30 to 50 years ago and that even in Australia, where bycatch pressures are less acute, the Dwarf Sawfish population will continue to decline in the absence of legal protection for this species. *Id.* at 2. The Australian Society for Fish Biology ("ASFB") has assessed the Dwarf Sawfish, *Pristis clavata*, as endangered and recommended listing this species as threatened under Australia's Commonwealth Environmental Protection and Biodiversity Conservation Act ("EPBC"). *Id.* at 3.

5. Range



Historical World distribution map for the Dwarf Sawfish¹⁴

The Dwarf Sawfish is currently only known to live in Australian waters in Northern and Northwestern Australia. Exhibit 2, p.1 (IUCN Report). It may occur, or have occurred, in nearby areas of New Guinea, Indonesia, and Malaysia, but this is unconfirmed. *Id.* See also Exhibit 8, p.1 (FMNH Report). Any historic populations outside of Australian waters are likely extirpated or nearing extirpation as a result of intensive fishing pressure. Exhibit 2, p.1 (IUCN Report).

¹³ See an explanation of the IUCN's categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

¹⁴ Exhibit 8, p.2 (FMNH Report).

6. Habitat

The Dwarf Sawfish inhabits coastal and estuarine habitats in tropical Australia, particularly over mudflats in the Gulf of Carpentaria. It may also travel some distance up rivers, almost into freshwater. Exhibit 2, p.2 (IUCN Report). See also Exhibit 8, p.2 (FMNH Report). Dwarf Sawfish have been found as far as 6.2 miles upstream in the Pentecost River, Western Australia. Exhibit 8, p.2 (FMNH Report).

C. Freshwater Sawfish, *Pristis microdon*

1. Taxonomy

Pristis microdon is known by the common names “Freshwater Sawfish,” “Largetooth Sawfish,” “Leichhardt’s Sawfish,” “Smalltooth Sawfish,” “Common Sawfish,” “Greattooth Sawfish,” and “Wide Snouted Sawfish.” See Exhibit 3, p.1 (IUCN Report); Exhibit 9, p.1-2 (FMNH Report). Throughout this Petition it is referred to as the Freshwater Sawfish or *Pristis microdon*.

The Freshwater Sawfish, *Pristis microdon*, is sometimes confused with the Largetooth Sawfish, *Pristis perotteti*. The IUCN reports the two may not be distinct species but may be subspecies or distinct population segments of the same species. Presently, the two species are distinguished not by morphology, which is indistinguishable, but by geographic range.¹⁵ Exhibit 3, p.1 (IUCN Report); Exhibit 9, p.3 (FMNH Report). This issue may not be resolved if the species are not recovered from the edge of extinction to do the difficulty of obtaining specimens. Exhibit 3, p.1 (IUCN Report).

Freshwater Sawfish Taxonomic Hierarchy¹⁶

Kingdom	<i>Animalia</i>
Phylum	<i>Chordata</i>
Subphylum	<i>Vertebrata</i>
Class	<i>Chondrichthyes</i>
Subclass	<i>Elasmobranchii</i>
Suborder	<i>Euselachli</i>
Order	<i>Pristiformes</i>
Family	<i>Pristidae</i>
Genus	<i>Pristis</i>
Species	<i>Pristis microdon</i>

¹⁵ Accordingly, WildEarth Guardians has previously requested the Secretary to protect all *Pristis* sawfish species due to their similarity of appearance to *Pristis perotteti*, see notes 4 & 6 *supra*, this argument applies with the most force to *Pristis microdon*.

¹⁶ Integrated Taxonomic Information System (“ITIS”) Report. Available at: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=160812

2. Species Description

The Freshwater Sawfish, like all sawfishes, is a highly modified, elongate ray with a shark-like body and a blade-like snout (“rostrum” or “saw”) covered with lateral tooth-like denticles. Exhibit 9, p.3 (FMNH Report). The species has broad nostrils with large nasal flaps, high and pointed dorsal fins, and a small but distinct caudal fin lower lobe. Exhibit 3, p.2 (IUCN Report). The dorsal surface is uniformly yellowish-grey or brown with yellowish-brown outer fin margins and the ventral surface is dirty cream. Exhibit 9, p.3 (FMNH Report). The rostral teeth are dirty cream or yellow, contrasting with the darker hue of the dorsal rostral surface. Id.

The Freshwater Sawfish is distinguished from sawsharks by its dorso-laterally compressed body, ventrally located gills, large size, lack of barbells, similarly-sized rostral teeth, and preference for shallow water habitats. Id. Compared to other sawfishes (except the Largetooth Sawfish, *Pristis perotteti*), the Freshwater Sawfish has particularly massive rostral teeth. Id. The species has 14-23 evenly spaced rostral teeth per side, which may number more on one side of the saw than the other and males typically have a greater average tooth count per side than females regardless of geographic region. Id. Males also may have a slightly longer saw than females of the same total length. Id.

3. Life History, Reproduction, and Growth

Like other sawfish, the Freshwater Sawfish uses its saw to uncover or stun prey such as marine catfish (*Arius graeffei*), cherabin (*Macrobrachium rosenbergii*), shrimp, and small fishes. It may also eat freshwater prawn species such as *Macrobrachium australiense*, *M. rosenbergi*, and *M. handschii*. Exhibit 9, p.4 (FMNH Report). Adult Freshwater Sawfish have few natural enemies, though small individuals may fall prey to sharks or saltwater crocodiles. Id. at 5. When entangled in fishing nets, Freshwater Sawfish become more vulnerable to predation. Id. Several species of parasites also attack the Freshwater Sawfish. Id.

Also like other sawfish, Freshwater Sawfish reproduce by internal fertilization and utilize a strategy of embryo nourishment called aplacental yolk sac viviparity. Id. at 4. The minimum age at maturity is unknown but preliminary evidence suggests that it may take as many as 20 years before an individual can reproduce. Id. at 5. Size at maturity for females is about 10 feet total length. Id. Males of the species mature at about 8.2 feet in length. Id. Based on studies of the morphologically identical Largetooth Sawfish (*Pristis perotteti*), the gestation period of the Freshwater Sawfish is probably about five months and the species is capable of producing litters every other year. Id. A litter size of four young has been reported, but litter size may range up to ten young. Id. Like with other sawfish the young are probably born tail first and the saw teeth do not develop until after birth to protect the mother. Id. The saw is also covered in a sheath of tissue until after birth. Id. Freshwater Sawfish are capable of giving birth in freshwater, far up rivers and contiguous lakes. Id.

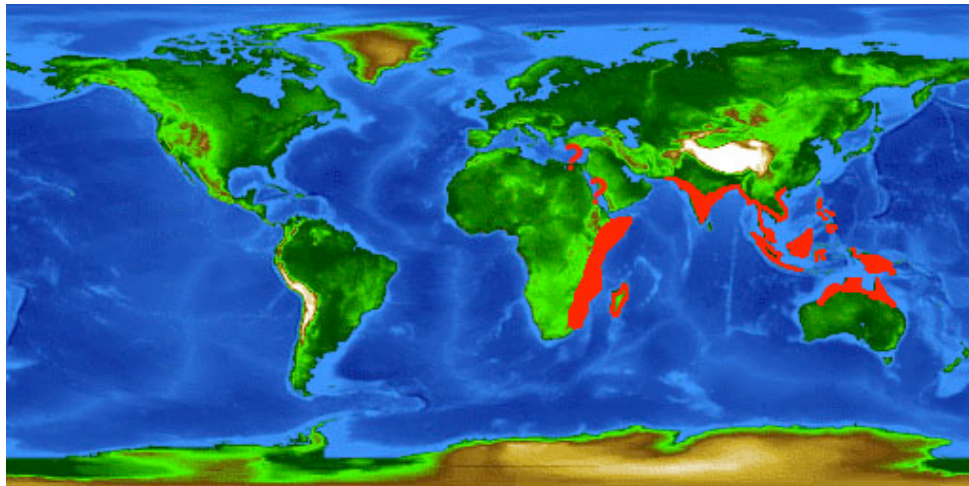
Freshwater Sawfish can attain a maximum size of at least six meters (19.7 feet) total length. Id. at 4. Larger stated maximum sizes up to seven meters (23 feet) are unconfirmed. Id. Three mature males collected off Durban, Africa measured between 12.3 and 12.9 feet and weighed 397-415 pounds. Id. In a 1991 study, a mature male Freshwater Sawfish taken in Papua New Guinea and measuring 3.6 meters (11.8 feet) in length was calculated to have an age

of 44 years and immature male measuring 2.5 meters (8.1 feet) was calculated to be 16 years old. However, other scientists question these results. Id.

4. Population Status and Trends

The IUCN first assessed the Freshwater Sawfish as endangered in 1996 and again in 2000. Exhibit 3, p.1 (IUCN Report). Presumably later in 2000, the IUCN increased its threat assessment to critically endangered. Id. The IUCN maintained its critically endangered assessment again in 2006. Id. The IUCN's critically endangered assessment means the best available evidence indicates the species is facing an extremely high risk of extinction in the wild.¹⁷ The IUCN further reports that populations of the Freshwater Sawfish are becoming increasingly rare and fragmented and that all known populations are severely threatened by targeted fisheries and bycatch as well as habitat deterioration. Id. at 2. Many populations have been extirpated or nearly extirpated from large areas of their former range, with no or only very few observations reported in most range states since the 1960s, although the species was once reported as common in many inshore waters at the end of the 19th century and early 20th century. Id. The IUCN concludes the species' population trend is decreasing. Id.

5. Range



Historical World distribution map for the Freshwater Sawfish¹⁸

The historical range of the Freshwater Sawfish extended from southern Africa to Southeast Asia and the Indo-Australian Archipelago, including Australia and the Philippines. Exhibit 3, p.1 (IUCN Report). The species is reported as native to coastal waters and inland rivers in Australia, Bangladesh, Cambodia, India, Indonesia (Kalimantan, Sumatra), Malaysia (Sabah), Mozambique, Myanmar, Papua New Guinea, Philippines, South Africa, Sri Lanka, and Thailand. Id. at 2. Freshwater Sawfish, as the name implies, also historically ranged in inland freshwater bodies including the Zambezi River (east Africa), 40 miles up the Mahanudde River (India), 38.5 miles up the Menam Chao Phya River (Thailand), the Mekong River below Khone

¹⁷ See an explanation of the IUCN's categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

¹⁸ Exhibit 9, p.2 (FMNH Report).

Falls (Thailand and Laos), the Fly River and Lake Murray (Papua New Guinea), and the Daly, Gilbert, and Sepik rivers (northern Australia). Exhibit 9, p.2 (FMNH Report).

6. Habitat

Like the Largetooth Sawfish, *Pristis perotteti*, of the Americas, the Freshwater Sawfish occurs far up rivers and in freshwater lakes throughout its range. Exhibit 3, p.2 (IUCN Report). The species, *Pristis microdon*, is a euryhaline (able to withstand great variances in salinity). *Id.* The populations of the species in northern Australia seem to prefer freshwater habitats during the wet season between December and March and estuaries, bays, and coastal marine habitats during the dry season between May and October. Exhibit 9, p.2 (FMNH Report). Mature individuals may also utilize deeper offshore marine habitats, at least seasonally. *Id.* The species apparently breeds in freshwater. Exhibit 3, p.2 (IUCN Report). Freshwater Sawfish can often be found occupying the same waters as bull sharks, *Carcharhinus leucas*, pointing to similar habitat preferences of these species. *Id.* See also, Exhibit 9, p.2 (FMNH Report).

D. Common Sawfish, *Pristis pristis*

1. Taxonomy

The Common Sawfish, *Pristis pristis*, is a currently valid taxon, first identified by John Linnaeus, Swedish botanist, physician, and zoologist, in 1758. Exhibit 4, p.1 (IUCN Report). The species is synonymous with *Squalus pristis* (Linnaeus, 1758). It is commonly known as the Common Sawfish and is referred to as such throughout this Petition. See Id.

Common Sawfish Taxonomic Hierarchy¹⁹

Kingdom	<i>Animalia</i>
Phylum	<i>Chordata</i>
Subphylum	<i>Vertebrata</i>
Class	<i>Chondrichthyes</i>
Subclass	<i>Elasmobranchii</i>
Suborder	<i>Euselachli</i>
Order	<i>Pristiformes</i>
Family	<i>Pristidae</i>
Genus	<i>Pristis</i>
Species	<i>Pristis pristis</i>

¹⁹ Integrated Taxonomic Information System (“ITIS”) Report. Available at: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=160810

2. Species Description

This species is a sketchily-known large sawfish that was once common in the Mediterranean and Eastern Atlantic. Exhibit 4, p.1 (IUCN Report). It is extirpated from the Mediterranean and European portions of its range and is severely depleted in Africa. *Id.* It is misnamed as “common” because it is quite rare. *Id.* Mature specimens are generally lacking in collections, small specimens are rare and isolated saws attributed to this species may be misidentified members of *Pristis microdon*. *Id.* at 1-2. All sawfishes are ovoviviparous, but little else is known of the reproductive biology of the Common Sawfish. *Id.* Its size at maturity is unknown, but its maximum length is about five meters. *Id.* at 2. Virtually all aspects of its biology could benefit from additional field collections and museum research. *Id.*

3. Life History, Reproduction, and Growth

Deducing from studies of better known sawfish, the Common Sawfish is ovoviviparous. Exhibit 10, pp. 5-6 (Encyclopedia of Life). The young are born with the saw enclosed in a sheath to protect the female sawfish while giving birth. *Id.* at 6. Sawfish feed on small schooling fish, crustaceans, and other bottom-dwelling animals. *Id.* They use the saw to attack prey, moving it in a side-to-side motion. *Id.* Sawfish spend much of their time lying on the bottom, breathing, not through their gills, but through large holes located behind the eyes, called spiracles. *Id.* The Common Sawfish reaches a maximum size of approximately five meters. Exhibit 4, p.2 (IUCN Report).

4. Population Status and Trends

The IUCN first assessed the Common Sawfish as endangered in 1996. Exhibit 4, p.1 (IUCN Report). It elevated its risk assessment to critically endangered in 2000 and maintained this assessment in 2005. *Id.* The IUCN’s critically endangered assessment means the best available evidence indicates the species is facing an extremely high risk of extinction in the wild.²⁰ The IUCN further reports that the Common Sawfish, though once actually “common” in the Mediterranean and Eastern Atlantic, is now extirpated from the Mediterranean and European portions of its range and is severely depleted in Africa. Exhibit 4, p.1 (IUCN Report). IUCN reports the species population trend as decreasing. *Id.*

5. Range

Historically, the Common Sawfish ranged in the Mediterranean and Eastern Atlantic, from Portugal south to Angola and possibly Namibia. *Id.* Today it is extirpated from the Mediterranean and European portions of its historic range. *Id.*

The Common Sawfish has been reported in freshwater in the Faleme River in Mali or Senegal and the Gambia River in Gambia. *Id.* The IUCN lists the Common Sawfish as a native species of Angola, Benin, Cameroon, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea-Bissau, Liberia, Morocco, Nigeria, Panama, Portugal, Senegal, Sierra Leone, Togo, and Western Sahara. *Id.*

²⁰ See an explanation of the IUCN’s categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

6. Habitat

Like other sawfish the Common Sawfish inhabits nearshore marine and freshwater habitats. See generally Exhibit 4 (IUCN Report); Exhibit 10 (Encyclopedia of Life).

E. Narrowsnout Sawfish, *Pristis zijsron*

1. Taxonomy

Pristis zijsron is known by the common names “Narrowsnout Sawfish,” “Green Sawfish,” “Longcomb Sawfish,” and “Longsnout Sawfish.” See Exhibit 5, p.1 (IUCN Report); Exhibit 11, p.1 (FMHN Report). Throughout this Petition, this species is referred to as *Pristis zijsron* or the Narrowsnout Sawfish.

Narrowsnout Sawfish Taxonomic Hierarchy²¹

Kingdom	<i>Animalia</i>
Phylum	<i>Chordata</i>
Subphylum	<i>Vertebrata</i>
Class	<i>Chondrichthyes</i>
Subclass	<i>Elasmobranchii</i>
Suborder	<i>Euselachli</i>
Order	<i>Pristiformes</i>
Family	<i>Pristidae</i>
Genus	<i>Pristis</i>
Species	<i>Pristis zijsron</i>

2. Species Description

The Narrowsnout Sawfish is the largest sawfish species. Exhibit 5, p.2 (IUCN Report). It can grow to at least five meters, and possibly over 7.3 meters (24 feet), in length. *Id.* It also has the longest saw of any sawfish species, ranging up to 1.66 meters (5.4 feet) in length. Exhibit 11, p.2 (FMNH Report). Its rostral tooth count varies between 23 and 37, but is more typically between 25 and 34 per side. *Id.* It often has more teeth on one side of the saw than the other. *Id.* Additional characteristics used to distinguish the Narrowsnout Sawfish from other sawfish species are found in Exhibit 11, pp. 2-3 (FMNH Report).

²¹ Integrated Taxonomic Information System (“ITIS”) Report. Available at: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=564305

3. Life History, Reproduction, and Growth

Like other sawfish species, the Narrowsnout Sawfish uses its saw in a side-to-side slashing motion to dislodge invertebrates from substrate and to stun schooling fishes. Exhibit 11, p. 3 (FMNH Report). Prey species likely include small schooling fishes, squid, crabs, and shrimp. Id. at 4. The Narrowsnout Sawfish has few natural enemies. Id. However, a part of a large Narrowsnout Sawfish was found in a tiger shark, Galeocerdo cuvier, caught on the Great Barrier Reef. Id. Other predators may include bull sharks and saltwater crocodiles. Id. Like other sawfish species, the Narrowsnout Sawfish is more vulnerable to predation when caught in nets. Id. Many parasites also infest the Narrowsnout Sawfish including nematodes, protozoans, and trematodes but the effects of these parasites are unknown. Id. Likely areas of parasite inhabitation include the skin, gills, and digestive tract. Id. This species is particularly susceptible to heavy infestation of trematodes in captivity, which cause apparent discomfort to the sawfish. Id.

This species, like all sawfishes, employs internal fertilization for reproduction and utilizes aplacental yolk sac viviparity. Id. Males may use their saws during mating battles. Exhibit 5, p.2 (IUCN Report). The minimum length at maturity for male and female Narrowsnout Sawfish has not been established; however, males reach maturity at less than 4.3 meters (14.1 feet) in total length and a post-partum female Narrowsnout Sawfish measuring 3.8 meters (12.5 feet) has been recorded from the Gulf of Carpentaria, Australia. Exhibit 11, p. 4 (FMNH Report). Parturition is thought to occur during the wet season (December – March) in the Northern Territory, Australia. Id. Females give birth to live young, which measure 24 to 43 inches at birth and are probably born tail-first. Id. The saw teeth of young sawfish do not fully emerge, and are also covered in a sheath of tissue, until after birth so as not to injure the mother. Id. Young sawfishes' rostral teeth reach their full size proportionate to the size of the saw soon after birth. Id.

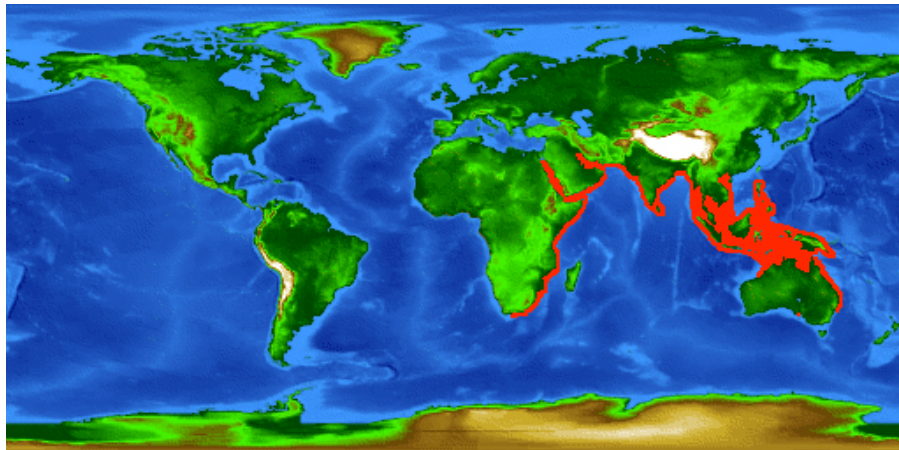
As stated above, the Narrowsnout Sawfish is the largest sawfish species. Exhibit 5, p.2 (IUCN Report). It can grow to at least five meters, and possibly over 7.3 meters (24 feet), in length. Id. It also has the longest saw of any sawfish species, ranging up to 1.66 meters (5.4 feet) in length. Exhibit 11, p.2 (FMNH Report).

4. Population Status and Trends

The IUCN first assessed the Narrowsnout Sawfish as endangered in 2000 and elevated its risk assessment to critically endangered in 2006. Exhibit 5, p. 1 (IUCN Report). The IUCN's critically endangered assessment means the best available evidence indicates the species is facing an extremely high risk of extinction in the wild.²² The IUCN reports the Narrowsnout Sawfish was formerly common in Indo-West Pacific inshore marine habitats and also in freshwater. Exhibit 5, p. 1 (IUCN Report). The IUCN further reports that while no additional information is available on the species' original population size or abundance, it has undergone a significant contraction of its range and a huge decline in abundance in areas where it is still reported to occur. Id. at 2. All known populations are now very seriously depleted and records of captures have become extremely infrequent over the last 30 to 40 years. Id. at 1.

²² See an explanation of the IUCN's categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

5. Range



Historical World distribution map for Narrowsnout Sawfish²³

The Narrowsnout Sawfish originally ranged from South Africa to the Persian Gulf, the Indian subcontinent, Southeast Asia, and the Indo-Australian Archipelago. Exhibit 5, p. 1 (IUCN Report). See also Exhibit 11, p. 1-2 (FMNH Report). Freshwater records exist from Thailand, possibly in the Tachin River and Songkhla Lake (where the species has not been recorded for many years), Malaysia, Indonesia (Kalimantan at Bandjermassing, Java and Ternate Islands), and in Australia from Queensland in Lake Macquarie, and New South Wales in the Clarence River. Exhibit 5, p.1 (IUCN Report). The IUCN lists the species as native to Australia (New South Wales, Queensland), Cambodia, China, India, Indonesia (Java, Kalimantan), Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Papua New Guinea, Somalia, South Africa, Sri Lanka, Thailand, and Vietnam. Id. at 2.

The IUCN reports the Narrowsnout Sawfish has suffered a significant contraction in its range. Id. at 1. Contraction of the range of this species has been reported in Australia, where it once occurred at least as far south as Sydney, but is now virtually extinct in New South Wales and is very rarely found south of Townsville, and in South Africa, where it is no longer resident in areas such as Lake St. Lucia. Id. See also Exhibit 11, p. 2 (FMNH Report) (“The green [Narrowsnout] sawfish no longer appears to be common anywhere in its range.”).

6. Habitat

The Narrowsnout Sawfish inhabits muddy bottom shallow waters and enters estuaries. Exhibit 5, p.2 (IUCN Report). It has been reported in inshore marine waters to a depth of at least 40 meters, in brackish water (in estuaries and coastal lakes), and in rivers. Id. See also Exhibit 11, p.2 (FMNH Report) (reporting the species prefers waters of five meters (16.4 feet) in depth or less, although it may occasionally be found in deeper water and in the open sea). The Narrowsnout Sawfish is known to occur in freshwater in Indonesia, including Borneo, Java, and Ternate; in Australia, including the Gilbert and Walsh rivers; and possibly inland Thailand. Exhibit 11, p.2 (FMNH Report). It has been recorded in the Northern Territory of Australia more than 150 miles from the sea. Id.

²³ Exhibit 11, p. 2 (FMNH Report).

F. Smalltooth Sawfish, *Pristis pectinata*

1. Taxonomy

Pristis Pectinata is known by the common names “Smalltooth Sawfish,” “Wide Sawfish,” “Common Sawfish,” “Smalltooth Common Sawfish,” and “Comb Shark.” See Exhibit 6, p.1 (IUCN Report); Exhibit 12, p.2 (FMNH Report). Throughout this Petition it is referred to as *Pristis Pectinata* or the Smalltooth Sawfish. This species was first described in 1794 as *Pristis pectinatus*; but this name has been changed to the currently valid *Pristis Pectinata* due to a gender issue with the original. Exhibit 12, p.2 (FMNH Report). Synonyms appearing in literature include *Pristis serra*, *Pristis granulose*, *Pristis acutirostris*, *Pristis leptodon*, *Pristis megalodon*, *Pristis occa*, *Pristis woermanni*, *Pristis evermanni*, and *Pristis anandalei*. Id.

Smalltooth Sawfish Taxonomic Hierarchy²⁴

Kingdom	<i>Animalia</i>
Phylum	<i>Chordata</i>
Subphylum	<i>Vertebrata</i>
Class	<i>Chondrichthyes</i>
Subclass	<i>Elasmobranchii</i>
Suborder	<i>Euselachii</i>
Order	<i>Pristiformes</i>
Family	<i>Pristidae</i>
Genus	<i>Pristis</i>
Species	<i>Pristis Pectinata</i>

2. Species Description

Smalltooth Sawfish have a flattened shark-like body and wing-like pectoral fins. Exhibit 12, p.3 (FMNH Report). Dorsally, the Smalltooth Sawfish is brown or bluish gray with a white underside. Id. at 4. The Smalltooth Sawfish’s most distinctive feature is its snout or rostral saw that extends to approximately 25% of its body’s total length. Id. at 3. The saw of the Smalltooth Sawfish contains 25-32 pairs of rostral teeth that are smaller than those of the Largetooth Sawfish. Id. at 4.

Smalltooth Sawfish have ten to twelve rows of oral teeth. Id. The upper jaw contains approximately 88-128 teeth and the lower jaw has 84-176 teeth. Id. The teeth are rounded anteriorly and have a blunt cutting posterior edge. Id. Dermal denticles are also present and vary in both size and shape on the head, fins, trunk, and saw. Id. at 5. The saws of newborns are void of denticles but by the time the animal reaches 4.5 feet in length, the saw is completely covered. Id.

²⁴ Integrated Taxonomic Information System (“ITIS”) Report. Available at: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=160809

3. Life History, Reproduction, and Growth

Like other sawfish, the Smalltooth Sawfish feeds by swinging its saw from side to side, impaling prey fishes on the sawteeth. Id. at 6. The fish are then scraped off the teeth by rubbing them on the ocean floor so that the sawfish can consume them. Id. Small Smalltooth Sawfish are susceptible to predation by sharks. Id. at 7.

Sawfishes are ovoviviparous, producing embryos that mature internally and are nourished by a yolk sac. Id. at 6. The gestation of the Smalltooth Sawfish is believed to last a year. Id. Litters consist of 15 to 20 pups. Id. Increased catch records of gravid females and juveniles in late spring and early autumn suggest the Smalltooth Sawfish gives birth during the warmer summer months. Id. at 6-7. Over parts of its range, where the water is warm throughout the year, the Smalltooth Sawfish may have a continual reproductive cycle. Id. at 7. Females in Africa have been recorded moving into the safety of estuaries to give birth. Id. The saws of the pups are fully developed, but malleable and sheathed at birth to prevent injury to their mother. Id.

The Smalltooth Sawfish is large 5.5 to 7.6 meter is total length. Exhibit 6, p.2 (IUCN Report). Because it grows slowly, it is believed to mature late and large individuals are thought to be very old. Id. The four-generation period could be 100 years or more. Id. Size at maturity is estimated to be 3.2 meters. Id. Maximum life span is estimated to be 40 to 70 years and generation times are approximately 27 years. Id. The annual rate of population increase is estimated as .08 to .13. Id. The population doubling time is consequently estimated between 5.4 and 8.5 years under ideal conditions with no fishery mortality, no population fragmentation, no habitat modification, and no inbreeding depression. Id. The life history of the species makes any significant level of fishing unsustainable. Id. Recovery from any population decline is necessarily slow. For example, it would take decades for a Smalltooth Sawfish population to recovery to the point where extinction risk is low. Id.

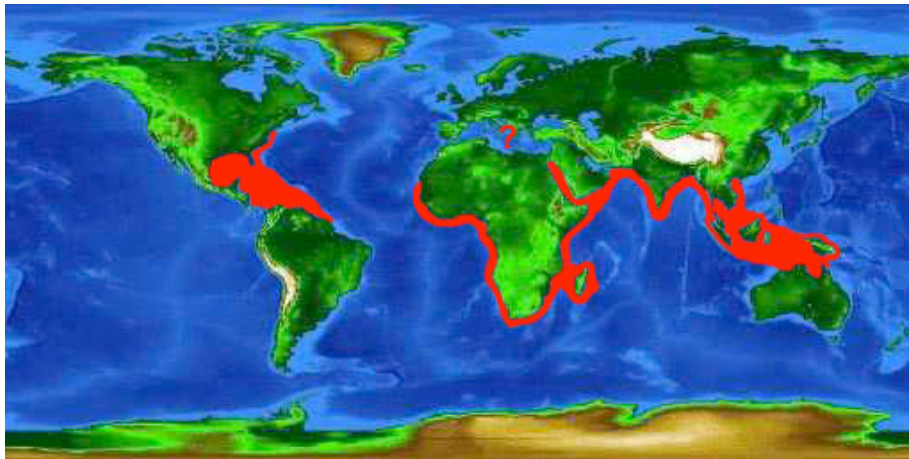
4. Population Status and Trends

The IUCN first assessed the Smalltooth Sawfish as endangered in 1996 and again in 2000. Id. at 1. Later in 2000 and again in 2006, the IUCN increased its risk assessment to critically endangered. Id. The IUCN's critically endangered assessment means the best available evidence indicates the species is facing an extremely high risk of extinction in the wild.²⁵ Populations are becoming increasingly rare and fragmented and all those known are severely threatened by targeted fisheries and bycatch and by deterioration of habitat. Exhibit 6, p.2 (IUCN Report). Many populations have been extirpated or nearly extirpated from large areas of their former range, with no or only very few observations reported in most range states since the 1960s. Id. Formerly, Smalltooth Sawfish were reportedly common in many inshore waters at the end of the 19th and early 20th century. Id. The Smalltooth Sawfish is apparently extinct in the Mediterranean and likely also in the Northeast Atlantic. Id. at 1. Historic reports of this species outside of the Atlantic are now considered to have been misidentifications of other *Pristis* species. Id.

²⁵ See an explanation of the IUCN's categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

The IUCN reports that scientists who have examined the reduction of Smalltooth Sawfish populations in the United States concluded that both population and range have been severely reduced. Id. at 2. In the late 19th Century, one fisherman reported catching 300 sawfish in his nets in the Indian River Lagoon in Florida. Id. Today, the Smalltooth Sawfish is apparently extirpated from this important site. Id. The portion of the population that used to disperse north along the eastern coast of the United States as far as New York may have been completely lost. Id. Bycatch rates in Louisiana shrimp trawlers declined steeply during the late 1950s and early 1960s and no Smalltooth Sawfish have been reported since the 1970s. Id. Overall, the Gulf of Mexico population is severely reduced, with isolated and very small populations totaling a couple thousand individuals remaining off Florida and perhaps venturing to adjacent waters, compared to estimates of hundreds of thousands in the late 1800s. Id. Though a Distinct Population Segment of Smalltooth Sawfish is now protected under the ESA in United States waters off Florida, other remaining populations are not protected and remain at risk of imminent extinction.²⁶ Id. Accordingly, the IUCN reports the population trend for the Smalltooth Sawfish as decreasing. Id.

5. Range



Historical World Distribution Map for the Smalltooth Sawfish²⁷

The Smalltooth Sawfish was originally possibly the most widespread *Pristis* species. Exhibit 6, p. 1 (IUCN Report). In the Western Atlantic it ranged at least from North Carolina, through the Gulf of Mexico, to Brazil. Id. However, other reports extend this range northward and southward from New York to Uruguay and northern Argentina. Id. In the Eastern Atlantic it ranged from the Mediterranean Sea, where it is now extirpated, southern Portugal and Morocco to southern Angola, and possibly Namibia. Id. See also Exhibit 12, p.2 (FMNH Report) (including the Indian ocean and Western Pacific in the species range).

The IUCN reports that the Smalltooth Sawfish is possibly less well adapted to freshwater than other *Pristis* species. Exhibit 6, p.1 (IUCN Report). Nonetheless, the Smalltooth Sawfish

²⁶ As mentioned at the outset this Petition seeks the listing of all presently unlisted populations of the Smalltooth Sawfish throughout its world-wide range.

²⁷ Exhibit 12, p. 2 (FMNH Report).

has been recorded in freshwater in large rivers in the United States, Nicaragua, Columbia, Guyana, Brazil, Mali and Senegal. Id.

The IUCN lists the species as native to Angola, Aruba, Belize, Benin, Brazil, Cameroon, Cape Verde, Columbia, Congo, Cote d'Ivoire, Cuba, Equatorial Guinea, French Guiana, Gabon, Gambia, Ghana, Gibraltar, Guinea, Guinea-Bissau, Guyana, Israel, Jamaica, Lebanon, Liberia, Mauritania, Mexico, Morocco, Namibia, Nicaragua, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Africa, Suriname, Syria, Togo, Trinidad and Tobago, United States, Venezuela, and Western Sahara. Id. at 2.

The Smalltooth Sawfish has been wholly or nearly extirpated from large areas of its original range in both the North Atlantic (Mediterranean, U.S. Atlantic seaboard, and Gulf of Mexico) and in the Southwest Atlantic. Id. at 1. Remaining populations are small and fragmented as a result of the species absence from significant parts of its historic range. Id.

6. Habitat

The Smalltooth Sawfish inhabits tropical and warm temperate coastal ocean waters. Juveniles use very shallow water, but adults occur to depths of over 100 meters. Id. at 2. The species spends most of its time on or near the seabed, but occasionally swims at the surface. Id. There are many records from coastal lagoons, estuarine environments, and the lower, brackish water drainages of rivers. Id.

IV. CRITERIA FOR ESA LISTING

A. The Six Petitioned Species Are Valid Species Under the ESA

The Endangered Species Act, 16 U.S.C. §§ 1531 - 1544, allows any species of fish or wildlife or plants to be listed under the provisions of the act. Section 3(8) of the ESA defines "fish or wildlife" to mean "any member of the animal kingdom, including without limitation any ... fish,..." 16 U.S.C. § 1532 (8) (Emphasis added). Each of the six-petitioned sawfish: (1) Knifetooth Sawfish, *Anoxypristis cuspidata*; (2) Dwarf Sawfish, *Pristis clavata*; (3) Freshwater Sawfish, *Pristis microdon*; (4) Common Sawfish, *Pristis pristis*; (5) Narrowsnout Sawfish, *Pristis zijsron*; and (6) Smalltooth Sawfish, *Pristis pectinata* (all presently unlisted populations) are "fish." More importantly, as detailed above, though the IUCN states the genus *Pristis* is taxonomically chaotic, it does recognize each of these six species as a valid species. See Exhibits 1-6 (IUCN Reports).²⁸ Additionally, the Integrated Taxonomic Information System ("ITIS"), a partnership of scientific agencies providing authoritative taxonomic information, contains reports showing *Anoxypristis cuspidata*, *Pristis microdon*, *Pristis pristis*, *Pristis zijsron*, and *Pristis pectinata* as valid species. See discussion Section III, *supra*.²⁹

²⁸ The IUCN further states that efforts to resolve the uncertainty regarding the true number of valid species in the genus *Pristis* will be hampered by the difficulty of obtaining specimens or samples for research because the species are so increasingly rare. See Exhibits 2-3, 5-6 (IUCN Reports).

²⁹ The ITIS is available at: <http://www.itis.gov/>

B. The Six Petitioned Species Qualify as Threatened or Endangered Species

The ESA defines an “endangered” species as one “in danger of extinction throughout all or a significant portion of its range.” 16 U.S.C. § 1532(6). A “threatened” species is 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). A “species” is defined to include “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.” Id. § 1532(16).

The Secretary is required to list as either threatened or endangered any species facing extinction due to any one, or any combination of, the following five factors:

- (A) the present or threatened destruction, modification, or curtailment of the species’ 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 the species’ continued existence.

16 U.S.C. §§ 1533(a)(1)(A)-(E).

The Secretary’s decision whether to list a species is limited solely to consideration of these five factors. In considering these factors, the Secretary must use only “the best available scientific and commercial information regarding a species’ status, without reference to possible economic or other impacts of such determination.” 50 C.F.R. § 424.11(b).

Guardians believes, as discussed below, that all five of the ESA listing factors are contributing to the decline of the six petitioned sawfish species. Indeed, the IUCN has already reached an entirely similar conclusion.

Some species are affected by a combination of all these factors. For example, all seven species of sawfish (family Pristidae) are listed as Critically Endangered. These large unusual rays (sometimes in excess of 7 m long) are slow-growing, and populations are often isolated, with little migration between areas. They have long flattened snouts (or saws) edged with tooth-like serrations. This saw makes them extremely susceptible to bycatch in almost any fishing gear and they are also targeted for their very high value saws and fins.

Exhibit 13, p. 80 (Wildlife in a Changing World: An Analysis of the 2008 IUCN Red List of Threatened Species, Edited by Jean Christophe Vie, Craig Hilton-Taylor, and Simon N. Stuart (IUCN, 2009)). The “seven species of sawfish” discussed by the IUCN as being critically

endangered include all six of the petitioned species³⁰, the seventh, is the Largetooth Sawfish, *Pristis perotteti*, which the Secretary has previously proposed to list as endangered in response to a prior petition from Guardians. See 75 Fed. Reg. 25174 (proposed rule to list the Largetooth Sawfish, *Pristis perotteti* as endangered under the ESA). The “combination of all these factors” referenced by the IUCN as leading to the critically endangered status of all six petitioned sawfish species is entirely analogous to the five listing factors used under the ESA.³¹ Indeed, the IUCN’s critically endangered assessment as to the status of the six petitioned sawfish species, standing alone, is likely a sufficient basis upon which the Secretary should determine this Petition presents “substantial scientific or commercial information indicating that the petitioned action may be warranted.” See 16 U.S.C. § 1533(b)(3)(A). The IUCN is certainly a well-respected source of scientific information.³² The IUCN’s critically endangered assessment means the best available evidence indicates the six species are facing an extremely high risk of extinction in the wild.³³ Accordingly, the Secretary should promptly issue a positive 90-day finding for the six petitioned species under 16 U.S.C. § 1533(b)(3)(A), and commence a status review pursuant to 16 U.S.C. § 1533(b)(3)(B).

Moreover, there is an additional basis for the Secretary to grant Guardians’ Petition and list the six-petitioned species before even addressing the ESA listing factors. As Guardians has previously called to the Secretary’s attention in its June 21, 2010 comment letter on the proposed rule to list the Largetooth Sawfish, *Pristis perotteti*, 75 Fed. Reg. 25174, Section 4 of the ESA, 16 U.S.C. § 1533(e) provides that the Secretary may “treat any species as an endangered species or threatened species even though it is not listed pursuant to this section” if he finds three factors are satisfied. See 16 U.S.C. § 1533(e) (A), (B), and (C).

³⁰ See Exhibit 1 (IUCN Species Report for the Knifetooth Sawfish, *Anoxypristis cuspidata*, assessing the species as critically endangered); Exhibit 2 (IUCN Species Report for the Dwarf Sawfish, *Pristis clavata*, assessing the species as critically endangered); Exhibit 3 (IUCN Species Report for the Freshwater Sawfish, *Pristis microdon*, assessing the species as critically endangered); Exhibit 4 (IUCN Species Report for the Common Sawfish, *Pristis pristis*, assessing the species as critically endangered); Exhibit 5 (IUCN Species Report for the Narrowsnout Sawfish, *Pristis zijsron*, assessing the species as critically endangered); and Exhibit 6 (IUCN Species Report for the Smalltooth Sawfish, *Pristis pectinata*, assessing the species as critically endangered). As mentioned above, WildEarth Guardians hereby incorporates all citations and references contained in the IUCN’s Species Reports for the six petitioned sawfish species (Exhibits 1 through 6) into this Petition by reference. If the Secretary does not have access to any of the incorporated citations or references contained in the six IUCN Species Reports (Exhibits 1 through 6) please contact us and we will provide copies upon request. WildEarth Guardians presently believes the Secretary has ready access to this incorporated material.

³¹ See 16 U.S.C. §§ 1533(a)(1)(A)-(E); IUCN Red List Assessment Criteria, available at: http://www.iucnredlist.org/about/red-list-overview#redlist_criteria.

³² According to its website, the IUCN is the world’s oldest and largest global environmental network. It is a democratic membership union with more than 1,000 government and non-governmental organization (NGO) members, and almost 11,000 volunteer scientists in more than 160 countries. Its work is supported by over 1,000 professional staff in 60 offices and hundreds of partners in public, NGO and private sectors around the world. See <http://www.iucn.org/about/>

³³ See an explanation of the IUCN’s categories and criteria at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

First, the Secretary must determine that “such species so closely resembles in appearance, at the point in question, a species which has been listed . . . that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species.” 16 U.S.C. § 1533(e)(A). The six sawfish species included in this Petition easily meet this first criteria. A United States Distinct Population Segment of the Smalltooth Sawfish, *Pristis Pectinata*, is presently listed. 68 Fed. Reg. 15674 (Final ESA listing rule for the Distinct Population Segment of Smalltooth Sawfish, *Pristis pectinata*, in U.S. Waters). The Secretary has proposed listing the Largetooth Sawfish, *Pristis perotteti*. 75 Fed. Reg. 25174. The Secretary’s proposed rule to list the Largetooth Sawfish acknowledges that taxonomic identification and distinction between the seven recognized sawfish species (including the six species at issue in this Petition), particularly between the three species in the largetooth group is difficult. 75 Fed. Reg. at 25176. The proposed rule also acknowledges that commercial trade in sawfish products is a threat to the Largetooth Sawfish. 75 Fed. Reg. at 25181. This commercial trade is also a threat to the previously listed U.S. Distinct Population Segment of Smalltooth Sawfish. *Id.* Members of the presently listed population of Smalltooth Sawfish, *Pristis Pectinata*, in U.S. waters are identical in appearance to the unlisted populations of the same species included in this Petition. Additionally, the presently listed Smalltooth Sawfish population and proposed for listing Largetooth Sawfish closely resemble in appearance the six species included in this Petition. Sawfish products are generally traded after the animal has been disassembled – normally into saws, meat, and fins. See 75 Fed. Reg. at 25181. Thus, many identification clues, such as fin placement, are unavailable to enforcement personnel. Additionally, some species are commonly differentiated by location. See 75 Fed. Reg. at 25176. Indeed, the Freshwater Sawfish, *Pristis microdon*, and the Largetooth Sawfish, *Pristis perotteti*, cannot be distinguished by morphology, which is indistinguishable, but only, by geographic range. Exhibit 3, p.1 (IUCN Report); Exhibit 9, p.3 (FMNH Report). Location of capture information is generally not available to enforcement personnel when, for example, fins are traded internationally, or saws sold over internet sites such as eBay. Indeed, as the Secretary’s proposed rule for the Largetooth Sawfish recognizes some species are only conclusively differentiated by DNA analysis performed by experts. See 75 Fed. Reg. at 25176. Accordingly, enforcement personnel will have substantial difficulty attempting to differentiate between listed and unlisted species – particularly with respect to Internet based sales of sawfish products such as saws in the curio trade. The photograph provided on the following page illustrates this point.



Photo available at:

http://www.regionalnrm.qld.gov.au/about_new/news_events_publications/news/vor/2007_may/s_cg_story2.html

Guardians notes the only readily visually distinguishable “saw,” that of the Freshwater Sawfish, *Pristis microdon*, would be indistinguishable from that of the proposed for listing Largetooth Sawfish, *Pristis perotteti*. See Exhibit 3, p.1 (IUCN Report); Exhibit 9, p.3 (FMNH Report) (the Freshwater Sawfish, *Pristis microdon*, and the Largetooth Sawfish, *Pristis perotteti*, cannot be distinguished by morphology, which is indistinguishable, but only by geographic range). Additionally, Guardians notes that without reference to the narrower saws of the other species for side-by-side comparison, the wider saw of the Freshwater Sawfish might not be visually distinguishable at all by unassisted enforcement personnel.

Returning to ESA Section 4's three criteria that must be satisfied in order for the Secretary to determine to "treat any species as an endangered species or threatened species even though it is not listed pursuant to this section," 16 U.S.C. § 1533(e), the second criteria provides the Secretary must determine that "the effect of this substantial difficulty is an additional threat to" the already listed species. 16 U.S.C. § 1533(e)(B). Again, both the proposed for listing Largetooth Sawfish and already listed Distinct Population Segment of Smalltooth Sawfish easily satisfy this second criteria. As mentioned above, the Secretary's proposed listing rule for the Largetooth Sawfish identifies commercial trade as a threat to the species. 75 Fed. Reg. at 25181. This commercial trade is also a threat to the previously listed U.S. Distinct Population Segment of Smalltooth Sawfish. *Id.* See also Exhibit 13, p. 80 (Wildlife in a Changing World, IUCN 2009) (all seven critically endangered sawfish species are targeted by fisheries for their very high value saws and fins); and Exhibits 1-6 (IUCN Reports) (listing commercial trade as a threat to the six petitioned sawfish species). The proposed rule for the Largetooth Sawfish, 75 Fed. Reg. 25174, further explains how the difficulty of differentiating between sawfish saws or even individual saw "teeth" makes trade bans, such as eBay's, less effective. Accordingly, the substantial difficulty in differentiating among the parts of various sawfish species in commercial trade is obviously an additional threat to the already listed DPS of the Smalltooth Sawfish and the proposed for listing Largetooth Sawfish.

The third, and final criteria the Secretary must find is satisfied under 16 U.S.C. § 1533(e) to treat a presently unlisted species as listed under the ESA provides the Secretary must determine if "such treatment of an unlisted species will substantially facilitate the enforcement and further the policy of the Act." 16 U.S.C. § 1533(e)(C). Again, the answer is obvious. If enforcement personnel only have to identify whether a fin, saw, or tooth comes from a sawfish rather than whether it comes from a listed member of the United States Distinct Population Segment of the Smalltooth Sawfish (or the to be listed Largetooth Sawfish) enforcement will be much easier and more effectively. For example, if all sawfish species were listed, enforcement personnel could readily determine that any sales of sawfish products on Internet auction sites such as eBay or other Internet trading sites like Craig's List, constituted violations of 16 U.S.C. § 1538. Under the status quo, however, enforcement personnel must actually examine a sawfish product, perhaps perform DNA analysis to determine its species, and, in the case of the listed Distinct Population Segment of Smalltooth Sawfish, determine the location of its take before they can act to enforce the ESA. Enforcement of a complete ban on trade in the parts of all sawfish species, as contemplated under this Petition, would make enforcement substantially more effective. More effective enforcement in turn, furthers the policy of the ESA.

Accordingly, Guardians urges the Secretary to determine that all seven sawfish species identified as critically endangered by the IUCN: (1) Knifetooth Sawfish, *Anoxypristis cuspidata*; (2) Dwarf Sawfish, *Pristis clavata*; (3) Freshwater Sawfish, *Pristis microdon*; (4) Common Sawfish, *Pristis pristis*; (5) Narrowsnout Sawfish, *Pristis zijsron*; (6) Smalltooth Sawfish, *Pristis pectinata*; and Largetooth Sawfish, *Pristis perotteti*, should be protected worldwide and listed based on their similarity of appearance.

Guardians now returns to its discussion of the five ESA listing factors for each of the six species included in this Petition.

C. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

All six petitioned sawfish species have suffered dramatic range curtailment. See Exhibits 1-6 (IUCN Reports); See also Exhibit 14, pp. 1-2 (Convention of International Trade in Endangered Species of Wild Fauna and Flora (“CITES”), Fourteenth Meeting of the Conference of the Parties, The Hague, Netherlands, 3-15 June, 2007, Consideration of Proposals for Amendment of Appendices I and II, Proposal by Kenya and the United States for the inclusion of all species in the family *Pristidae* in Appendix I of CITES) (hereinafter “2007 CITES Proposal”).³⁴ Indeed, all six species are considered extirpated from significant portions of their range. Id. The remaining habitat of all six petitioned sawfish species is also threatened with further destruction and modification. Id. The 2007 CITES Proposal, Exhibit 14, co-authored by the United States, identifies habitat degradation and loss as a primary threat to the continued survival of the *Pristis* family stating: “The continued development of coastal zones has resulted in substantial loss or modification of these habitats through agricultural and urban development, commercial activities, dredge-and-fill operations, boating, erosion, and diversions of freshwater run-off.” Exhibit 14, p. 7 (2007 CITES Proposal).

Reports show that human modification and destruction of sawfish habitat is especially detrimental to the last remaining populations of sawfish species in Australia where manmade barrages and weirs have severely restricted sawfish movements. Exhibit 15 (MESA 2008). Human activities such as land clearing, which increases sediment runoff, use of fertilizers, that increase nutrient runoff, use of pesticides, that reduce health and cause death of marine organisms, and urban and industrial development resulting from increasing human population and industrial activities continue to destroy the best remaining sawfish habitat in Australia. Id.

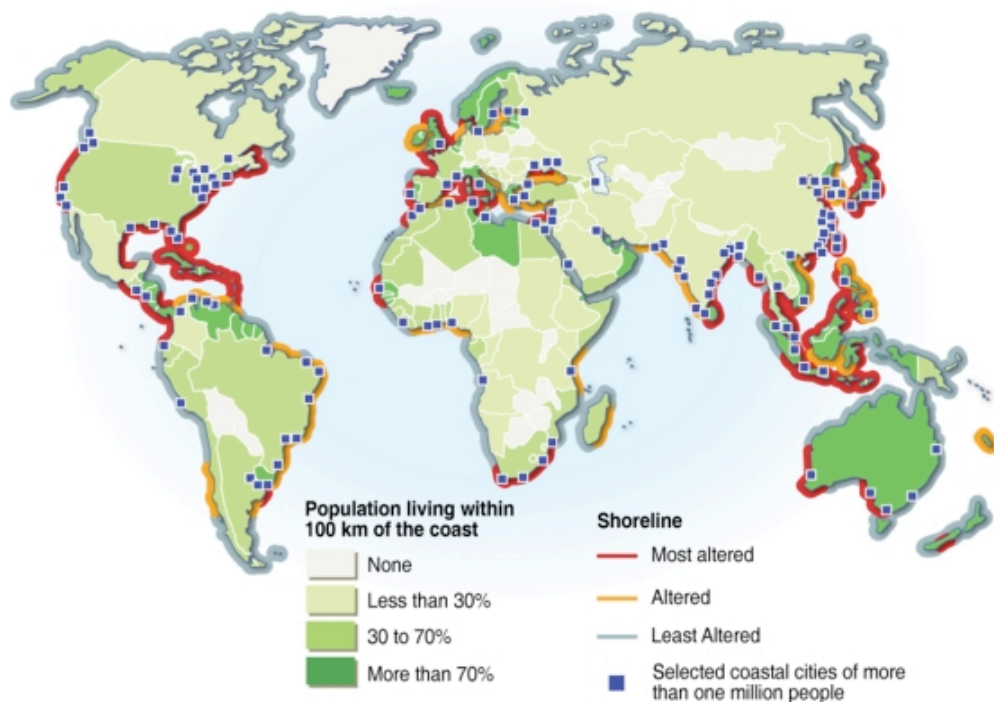
Little more needs to be said to establish that the six petitioned sawfish species are direly threatened by the loss of habitat. Indeed, just three years ago in its 2007 CITES Proposal, Exhibit 14, the United States aptly summarized the threats posed to all six petitioned sawfish species under this ESA listing factor:

The habitat of species in the family *Pristidae* has been degraded or modified throughout their ranges by agriculture, urban development, commercial activities, channel dredging, boating activities, and the diversion of freshwater run-off. Degradation and modification of habitat is likely one of the primary reasons for the decline in abundances of species in the family *Pristidae* and their contracted distribution worldwide. Although migration patterns are generally unknown, the construction of dams and weirs and serious pollution can make transits through rivers and estuaries impossible. The shallow coastal, brackish and freshwater habitats of species in the family *Pristidae* are often associated with high levels of human activity, which may result in degradation or loss of habitat through pollution and coastal or riverine developments, including mangrove clearance, canal development and construction of seawalls. Populations in fresh water and estuaries are particularly affected by constraints on availability of suitable habitat because of deteriorating water quality. Examples include the effects of mining operations, such as the cyanide spill in the Fly River (Papua New Guinea), several South American river catchments, and dam construction on the Chao Phraya River, Thailand.

³⁴ 2007 CITES Proposal, Available at: <http://www.cites.org/eng/cop/14/prop/e14-p17.pdf>.

Exhibit 14, p.4 (2007 CITES Proposal) (international citations omitted).³⁵ See also, Exhibits 1-6 (IUCN Reports) (discussing threats to the six petitioned species from habitat modification and destruction).

In sum, the broad-ranging problem of the destruction of the coastal habitats needed by the six petitioned sawfish species resulting from human population growth and its consequent unavoidable impacts is perhaps best illustrated by a comparison of the map below, showing the percentage of the human population living near the coast and the resulting destruction of natural coastal habitats, with the historic range maps for each of the six petitioned sawfish species provided above. The while the extent of overlap largely speaks for itself, it is worth noting the problem is particularly acute in the Caribbean and Gulf of Mexico, Europe and the Mediterranean, and in the Indo-Pacific, the core of the historic range of the six-petitioned species.



Coastal population and altered land cover in coastal zones (100 km of coastline).³⁶

³⁵ WildEarth Guardians hereby incorporates all citations and references contained in the 2007 CITES Proposal, Exhibit 14, into this Petition by reference. Because the United States was a co-author of the 2007 CITES Proposal, Guardians believes the Secretary already possesses or has ready access to this material. However, if the Secretary does not have access in his files to the citations and references contained in the 2007 CITES Proposal, please contact us and we will provide copies upon request.

³⁶ Map provided by GRID-Arendal, an official United Nations Environmental Program (UNEP) collaborating center. Available at: <http://maps.grida.no/go/graphic/coastal-population-and-altered-land-cover-in-coastal-zones-100-km-of-coastline> ("Coastal areas with high population densities are those with the most shoreline degradation or alteration. Densely

As the Secretary is aware from a report issued by the National Oceanic and Atmospheric Administration (“NOAA”) the threat of growing human populations to coastal ecosystems is expected to continue to increase: “As the global population continues to increase and demographic shifts toward coastal areas persist, even greater pressures will be placed on nearshore resources to satisfy human desires for food, culture, tourism, recreation and profit.” Exhibit 16, p. 16 (The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008, NOAA Technical Memorandum NOS NCCOS 73). As a result all six of the petitioned sawfish species are threatened by the present and threatened destruction, modification, and curtailment of their habitat and range. The Secretary has previously reached this precise conclusion. Exhibit 14 (2007 CITES Proposal). No different determination should result from this Petition. The Secretary should grant the present Petition on the basis of this one ESA listing factor alone, nonetheless, WildEarth Guardians continues its discussion of the other listing factors below.

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

As the Secretary is well aware, Sawfish, including the six-petitioned species, are used for a large variety of purposes. In its 2007 CITES Proposal, the United States has already summarized the many uses to which humans subject the six-petitioned sawfish species. There is no reason to expand upon these ample findings which are set forth below:

Species in the family Pristidae are utilized for a wide variety of products, the most important of which are the toothed rostra, fins and meat. Among the most common products is the rostrum. Rostra have long been a favorite marine curio (Migdalski, 1981), with large rostra commanding impressive prices (McDavitt, 1996). Rostra are sometimes decorated with elaborate designs or grotesque faces. These folk art rostra are sometimes fashioned into elaborate sheaths for knives. Rostra of these species are also utilized as ceremonial weapons in the folk religion of Chinese Taipei. McDavitt (1996) reported that rostra of species in the family Pristidae are also used in traditional medicine in Asia and in Mexico City. Rostra are dried and powdered, and then infused into a medicinal tea, which is used to treat “whooping cough, bronchitis, laryngitis, and diseases of the respiratory tract in general” (Charvet-Almeida, 2002; Watson, 2004).

Asian shark fin soup is one of the most expensive food items in the world (Vannuccini, 1999). Because of their large fins with high fin needle content, fins of species in the family Pristidae are highly valued for shark fin soup. Although few fin dealers advertise the type of fins they trade, one Hong Kong vendor designates two trade names used for Pristidae fins: *huang jiao* (described in English as “saw shark”) and *mian qun* (labeled as “yellow shovel nose”) in English. Fins of species in the family Pristidae also have appeal for traditional Asian medicine. Foods made from certain wild species like those in the family Pristidae are deemed strengthening (Anderson, 1988). Pristidae fins, in particular,

populated areas close to seas are also the most attractive for a lot of economic activity. The graphic shows the proportion of the population that lives within 100 km of the coast, for each of the world's nations and where there are coastal zones with high degree of human alteration (compared to 'natural' landcover”).

are listed in one major Chinese materia medica guide as a food that can combat *xulao*, a chronic disease marked by diminished vital energy, lethargy, and weakened body resistance (Anonymous, 1983).

Rostral teeth of species in the family Pristidae have been the preferred material used to manufacture artificial spurs on Peruvian fighting cocks (Cogorno Ventura, 2001). The rostral teeth are mostly obtained from Brazil, Ecuador, Panama and various Caribbean countries. Charvet-Almeida (2002) and McDavitt and Charvet-Almeida (2004) determined that rostra find their way into the international cockfighting market from Brazil. Rostral teeth of species in the family Pristidae have been favored over other natural spur materials (such as deer antler, sea turtle shell, sea-lion teeth, mammal bones, and stingray spines), because systematic testing revealed that teeth of species in the family Pristidae were more durable and have a sufficiently porous surface to cause greater body damage to the opponent (McDavitt and Charvet-Almeida, 2004).

Products of species in the family Pristidae are also utilized for medicinal purposes. Three products of species in the family Pristidae are listed as *materia medica* in traditional Chinese medicine: liver, ova and bile (Han and Xu, 1992), as well as the rostra (McDavitt, 1996). The bile of species in the family Pristidae is thought to remove phlegm and diminish inflammation from such conditions as fall injuries, rheumatoid arthritis, and cholecystitis (inflammation of the gall bladder) (Anonymous, 1983). Shark flesh is utilized as a general tonic, shark skin for blood and heart problems, and shark bile to heal sore throats (Read, 1939).

Species in the family Pristidae are highly prized as exhibit animals in public aquaria because of their charismatic nature (McDavitt, 1996).

Exhibit 14, pp. 7-8 (2007 CITES Proposal).³⁷ See also Exhibits 1-6 (IUCN Reports).

Similarly, the Secretary is well aware that fishing, both intentionally targeted at the six-petitioned species, or as bycatch with sawfish being opportunistically taken, is the primary threat to these species. Again, there is no need to paraphrase the prior opinion of the United States on this issue:

The principal threats to these species are from fishing (formerly targeted, but now mostly incidental capture) in broad-spectrum fisheries. Their long tooth-studded saw makes species in the family Pristidae extraordinarily vulnerable to entanglement in any sort of net gear. There have been some large-scale fisheries targeting species in the family Pristidae: in Lake Nicaragua in the 1970s, in the southeastern United States in the 19th and early 20th centuries, and possibly in Brazil from the 1960s to 1980s (bycatch is still landed in this range country). Populations are now so depleted that commercial targeting

³⁷ As noted above, WildEarth Guardians hereby incorporates all citations and references contained in the 2007 CITES Proposal, Exhibit 14, into this Petition by reference. Because the United States was a co-author of the 2007 CITES Proposal, Guardians believes the Secretary already possesses or has ready access to this material. However, if the Secretary does not have access in his files to the citations and references contained in the 2007 CITES Proposal, please contact us and we will provide copies upon request.

of most stocks of species in the family Pristidae is no longer cost-effective, although they are still targeted opportunistically in some regions if located. Despite being primarily a bycatch, fish in the family Pristidae are usually retained, just as they were in former target fisheries, because of the very high value of their products.

Although bycatch mortality is now the primary threat to species in the family Pristidae, in some regions directed fisheries remain, primarily for the public and private aquarium fish trade, and there are indications that species in the family Pristidae are at times targeted opportunistically for the shark fin trade. There is also evidence that demand for *Pristidae rostra* in Chinese Taipei may be driving some directed fishing for species in the family Pristidae. It is estimated that 23,000 spirit mediums in Chinese Taipei require Pristidae snouts as part of their ceremonial equipment, despite the emergence of metal replicas (McDavitt and Charvet-Almeida, 2004). In the north of Brazil, Charvet-Almeida (2002) reported a limited market for meat, rostra and rostral teeth of fish in the family Pristidae.

Exhibit 14, p. 7 (2007 CITES Proposal) (internal cross-references omitted). See also Exhibits 1-6 (IUCN Reports) (detailing fishing threats to each of the six-petitioned species).

International trade in sawfish parts is a major threat to the continued existence of the six-petitioned species. Again, the United States has already issued a compelling opinion on this threat:

Opportunistic trade in parts of species in the family Pristidae has been observed in southeast Asia (Musick and McMillan, 2002), Hong Kong SAR (Parry-Jones, 1996), the United Republic of Tanzania (Barnett, 1997), Brazil (Charvet-Almeida, 2002), and Madagascar (Cooke, 1997). Ongoing daily trade in rostra of species in the family Pristidae occurs on eBay and other online auction houses (McDavitt and Charvet-Almeida, 2004). Overall, the annual trade in rostra of species in the family Pristidae through eBay alone was estimated at over 200 rostra sold per year, with a value of more than USD 25,000, with approximately 37% of the eBay sales representing international trade (McDavitt and Charvet-Almeida, 2004). Organized curio trade in rostra of species in the family Pristidae has recently been reported in Brazil (Charvet-Almeida, 2002; McDavitt and Charvet-Almeida, 2004). According to the US Fish and Wildlife Service's import/export trade data, 163 Pristidae rostra were imported in the last five years. It is estimated that 90–180 large rostra are purchased annually by Asian buyers from the main fish market in northern Brazil, presumably for the curio trade (McDavitt and Charvet-Almeida, 2004). Local artisans in Brazil sometimes decorate medium-sized Pristidae rostra (usually *Pristis perotteti*) for sale to tourists. Overall, an estimated 1,000–1,500 small- to medium-sized rostra are sold per year from this same market for a variety of purposes (McDavitt and Charvet-Almeida, 2004).

Several published sources verify that fins of species in the family Pristidae are indeed regarded as high quality in the shark fin trade (e.g., Anon. 1983; Bentley 1996; Cooke 1997; SOA, 2002). Historically, Day (1878) observed Pristidae fins being exported from India to China, and Day (1889) lists species of Pristidae among seven species found in Malaysian shark fin markets. Species of Pristidae in the United States were commonly caught in the Big Pine Key shark fishery of the 1920s; a worker at this shark camp stated

that Pristidae fins attained the highest value in the Asian trade (Young & Mazet, 1933). The lucrative market for meat and fins was the primary driving force for the *Pristis perotteti* fishery in Lake Nicaragua, which virtually extirpated species in the family Pristidae from this area (Davies 1976; Thorson 1982). More recently, Cooke (1997) has found fins of species in the family Pristidae among the four commonly exported species from Madagascar. Currently, both *huang jiao* and *mian qun* are common names for Pristidae in the fin trade, and both appear in a published list of the approximately 40 fin types recognized by Hong Kong traders (Vannuccini, 1999). Given their quality and increasing scarcity, large fins can command spectacular prices. For example, Fowler (1998) reported that in 1997 observers in Sandakan, Malaysia, discovered *Pristis zijsron* fins for sale in a Chinese shop, the largest of which was offered for approximately USD 3,000.

International trade is also known to occur in Peruvian cockfighting spurs. From the mid-1970s until today, rostral teeth of species in the family Pristidae have been the preferred material used to manufacture artificial spurs for Peruvian cockfighting (Cogorno Ventura, 2001). The rostral teeth are mostly obtained from Brazil, Ecuador, Panama, and various Caribbean countries. Depending on the species used, and assuming all rostral teeth in the rostral saw are used, one rostrum could now have a retail value of between USD 2,000 and USD 7,000. Currently, a Peruvian website offers both finished spurs and raw rostral teeth of species in the family Pristidae for the international market. In Brazil, small or damaged Pristidae rostra obtained as local bycatch are sold in markets as a treatment for asthma (Charvet-Almeida, 2002; McDavitt and Charvet-Almeida, 2004).

Species in the family Pristidae have historically commanded high prices in the aquarium trade, and they continue to be very valuable. A Pristidae specimen in the Vancouver Aquarium in 1986 was valued at USD 10,000 (Harper, 1986). Juvenile *Pristis microdon* imported from “freshwater Indonesia” by one Canadian dealer in the late 1990s were priced at USD 5,000 per animal (Biotope Imports, pers. comm. to M. McDavitt, 1999). In 2000, fish in the family Pristidae were given an estimated worth of approximately USD 1,000 per foot (NMFS, 2000). An Australian exporter regularly sells fish in the family Pristidae to public aquaria worldwide. In 2005, *Pristis zijsron* and *Pristis microdon* sold for USD 1,650 per foot, and *Pristis clavata* sold for USD 1,750 per foot (Lyle Squire, Jr., pers. comm. to M. McDavitt, 2005). According to the US Fish and Wildlife Service’s import/export trade data, 26 live fish in the family Pristidae were imported into the United States over the last five years.

...

There is evidence from some countries that demand for rostra and fins, which are the most valuable parts and derivatives of Pristidae that enter international trade, continues to drive Pristidae fisheries. Demand for fish in the family Pristidae for the aquarium trade also drives some fisheries, particularly in northern Australia. Even when incidentally caught in other fisheries, the high price and demand for Pristidae parts precludes any interest in releasing the animals unharmed.

Exhibit 14, pp. 8-10 (2007 CITES Proposal). See also Exhibits 1-6 (IUCN Reports) (detailing threats to each of the six-petitioned species from international trade).

In sum, the United States has previously recognized that the six-petitioned sawfish species are threatened with extinction by overutilization for commercial, recreational, scientific, and educational purposes. This same conclusion that prompted the United States to seek the listing of all critically endangered sawfish species under Appendix I of CITES, now, through this Petition, compels the Secretary to list these species under the ESA.

E. Disease or Predation

Natural predation, from sharks and crocodiles, and disease, from parasitic infections, was not responsible for the dramatic decline in the populations of the six-petitioned species. See Section III, *supra* (detailing natural predators of the six-petitioned species and potential parasitic infections). However, entanglement in fishing nets subjects even large sawfish to increased predation. *Id.* More importantly, given the extremely low remaining populations of the six-petitioned sawfish species, natural predation and disease may now be a significant threat to remaining populations. The Secretary should fully analyze this potential threat during the status review sought by this Petition.

F. Inadequacy of Existing Regulatory Mechanisms

In its 2007 CITES Proposal, Exhibit 14, the United States stated:

Very few range countries have enacted legislation specifically to protect species in the family Pristidae or manage their fisheries. The Nicaraguan Government imposed a temporary moratorium on targeted fishing for fish in the family Pristidae in Lake Nicaragua in the early 1980s (Thorson, 1982), only after the population collapsed following intensive fishing in the 1970s. The aim was to allow the population to recover, but no such recovery has occurred (McDavitt, 2002). Indonesia enacted legislation to protect species in the family Pristidae (and five other freshwater fish species) in Lake Sentani, West Papua, following severe depletion of populations in a gill-net fishery (Compagno *et al.*, 2006b). All Australian populations of species in the family Pristidae are listed as Vulnerable or Endangered, either under Australia's Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC) or by the Australian Society for Fish Biology (ASFB). The EPBC lists *Pristis microdon* as a Protected species and Vulnerable in Queensland. The other three Australian species may be nominated for protection as 'at Conservation-risk'. *Pristis clavata* and *Pristis zijsron* are assessed as Endangered by the ASFB and *Anoxypristis cuspidata* as Vulnerable (Daley *et al.*, 2002, Pognoski *et al.*, 2002). Environment Australia was petitioned to list all species in the family Pristidae on the Endangered Species List. India's Ministry of Environment and Forests has protected species in the family Pristidae under the Wildlife Protection Act (WPA) since 2001.

Exhibit 14, p. 10 (2007 CITES Proposal).

Nothing has significantly changed with respect to the six-petitioned species. Though the species are now listed under Appendix I of CITES, this protection is only loosely enforced. For example, in his proposed rule to list the Largetooth Sawfish, *Pristis perotteti*, the Secretary explained, the listing of the species on CITES Appendix I, only prohibited international, but not

domestic trade. 75 Fed. Reg. 25174, 25181. Additionally, the Secretary found illegal foreign trade in sawfish parts may be ongoing in spite of CITES listing and national laws due to the lack of enforcement and the high value of sawfish parts. 75 Fed. Reg. 25174, 25182.

More importantly, CITES listing, does not protect habitat for any of the six-petitioned species. See e.g. 75 Fed. Reg. 25174, 25182 (Proposed listing rule for Largetooth Sawfish finding despite CITES listing, Largetooth Sawfish habitat is inadequately protected). As the United States found in its 2007 CITES Proposal, aside from the United States' protection of Smalltooth Sawfish habitat, "no habitat protection measures have been identified specifically for species in the family Pristidae." Exhibit 14, p. 11 (2007 CITES Proposal). Again, nothing has significantly changed. As he did in his proposed listing rule for the Largetooth Sawfish, the Secretary should determine the six-petitioned species are not adequately protected from trade by either their listing on CITES Appendix I, or any national laws. The even more glaring inadequacy of existing regulatory mechanisms to protect the six-petitioned species is the complete absence of any international, or outside the United States, national habitat protection measures for these species. In the end, perhaps the most effective indictment of all current regulatory mechanisms is the IUCN's continuing assessment that all six-petitioned species are critically endangered. Exhibits 1-6 (IUCN Reports). Whatever the global community might be doing to protect the six-petitioned species, it is not working. Their listing under the ESA is warranted.

G. Other Natural of Manmade Factors Affecting the Species Continued Existence

All six petitioned sawfish species exhibit naturally slow population growth rates. "Studies on the biological characteristics of Pristidae are rare, but those studies that have examined age, growth, and reproduction suggest that this taxon has very low productivity." Exhibit 14, p. 3 (2007 CITES Proposal). See also Exhibits 1-6 (IUCN Reports). This characteristic makes all six petitioned species extremely vulnerable to any level of fishing.

These low intrinsic rates of population increase are associated with the life-history strategy known as "K-selection." K-selected animals are usually successful at maintaining relatively small, persistent population sizes in relatively constant environments. Consequently, species in the family Pristidae are not able to respond effectively to additional and new sources of mortality. Musick (1999) and Musick *et al.* (2000) noted that intrinsic rates of increase below 10 percent (0.1) were low, and make a species particularly vulnerable to excessive mortalities and rapid population declines, after which recovery may take decades.

Exhibit 14, p. 3 (2007 CITES Proposal). See also Exhibits 1-6 (IUCN Reports). Accordingly, it will be extremely difficult and take decades to recover sawfish populations that have been subjected to excessive mortality from fishing or other causes. This makes any immediate change in the extinction risk faced by the six-petitioned species extremely unlikely.

Additionally, because the six-petitioned species already have such low population numbers they are increasingly vulnerable to extirpation from stochastic events. For example, populations of the Freshwater Sawfish, *Pristis microdon*, in the Fly River system of Papua-New

Guinea were apparently wiped out by recurrent, massive cyanide spills from heap-leach mining operations. Exhibit 3, p. 3 (IUCN Report).

Finally, populations of the six-petitioned species have reached such critically low numbers in much of each species' range that they are threatened by the possibility that male and female sawfish may no longer encounter each other with significant frequency for successful breeding.

V. CONCLUSION

In sum, this Petition asks the Secretary to take an action he knows is warranted. The exact threats to the continued survival of the six-petitioned species that drove the United States to seek their listing on Appendix I of CITES, compel their listing under the United States own ESA. See Exhibit 14 (2007 CITES Proposal). A failure to do so is hypocritical. All six petitioned species are threatened by habitat loss and degradation resulting from human population growth and consequently increasing coastal destruction and pollution, targeted and incidental ("by-catch") killing by the fishing industry, the international "shark" fin trade, the international curio trade in sawfish "saws," and inadequate regulatory protections worldwide. Immediate protection of all six petitioned species under the ESA throughout their worldwide ranges is both warranted and necessary to ensure the survival of these critically endangered species. Additionally, protecting all six petitioned species worldwide will make the Secretary's existing protection of the U.S. District Population Segment ("DPS") of the Smalltooth Sawfish, *Pristis pectinata*, and proposed protection of the Largetooth Sawfish, *Pristis perotteti*, from the international "shark" fin and sawfish "saw" curio trades dramatically easier to enforce and consequently more effective.

Accordingly, this Petition requests the range-wide listing of each of the six sawfish species: (1) Knifetooth Sawfish, *Anoxypristis cuspidata*; (2) Dwarf Sawfish, *Pristis clavata*; (3) Freshwater Sawfish, *Pristis microdon*; (4) Common Sawfish, *Pristis pristis*; (5) Narrowsnout Sawfish, *Pristis zijsron*; and (6) Smalltooth Sawfish, *Pristis pectinata* (all presently unlisted populations) as threatened or endangered species pursuant to the ESA because they are threatened or endangered throughout all or a significant portion of their respective ranges. In the alternative, this Petition requests the listing as threatened or endangered species pursuant to the ESA of any District Population Segments of any of the six species the Secretary determines may exist.

Through this Petition, WildEarth Guardians need not demonstrate conclusively that the listing of the six-petitioned species is warranted; rather, this Petition need only present information demonstrating that such listing *may be* warranted. 16 U.S.C. § 1533(b)(3)(A). There can be no reasonable dispute that the available information, in particular the IUCN's assessment that each of the petitioned species is critically endangered (Exhibits 1 through 6), indicates that listing of the species as either threatened or endangered *may be* warranted. Accordingly, it is entirely "practicable" for the Secretary to make a positive 90-day finding on this Petition within 90-days and to promptly commence a status review of the six species as required by 16 U.S.C. § 1533(b)(3)(B).

Respectfully Submitted,

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