CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

Other proposals

A. PROPOSAL:

Inclusion of all species of the order Pristiformes (sawfish) in Appendix I

B. PROPONENT:

The United States of America

C. SUPPORTING STATEMENT:

Introduction

The sawfishes comprise a very small group of cartilaginous fishes related to sharks, rays, and chimaeras *(Class Cho*ndrichthyes). The entire order/family to which they belong (Pristiformes/Pristidae) consists of only four to seven species in two genera: *Anoxypristis* White & Moy-Thomas, 1941 and *Pristis* Linck, 1790. Systematics are currently unsettled because of problems in differentiating the exact number of valid species within the genus *Pristis* (due to superficial similarities and overlapping species ranges in many places where they occur). This is exacerbated by generally poor samples of sawfishes in museum fish collections. These have often been confined only to dried rostral saws without other data on meristics, morphology or particulars of capture (Compagno and Cook, 1995). Some closely related species from quite disjunct and widely separated locations may ultimately prove not to be distinguishable from one another (i.e., *Pristis pristis* of Mediterranean and Eastern Atlantic, *Pristis microdon* of the west Indo-Pacific and *Pristis perotteti* [= *P. zephyreus*] of the Atlantic and eastern Pacific).

Due to their moderate-to-very-large body size; external anatomy (especially the long tooth-studded rostral saw); strongly k-selected life history patterns (slow growth, low fecundity [1-20 young per gestational cycle, depending on species [Oetinger, 1978 (MS thesis), Compagno et al., 1989]; late sexual maturity; long-lifespans, long gestation periods; behavior; narrow depth ranges and often restricted habitats; "oddity-value" of curios derived from them; disjunct distributions; a history of population vulnerability (based on declines and disappearances in by-catch from commercial fisheries, even in fisheries using the most primitive gear); sensitivity to habitat degradation and destruction; and difficulty of distinguishing among species where several occur sympatrically all contribute to extraordinary risks of practical extirpation in the wild in the 21st Century (see also “Additional Remarks”) . Further, though explicit data are lacking, it is probable that useable fins (dorsals, and possibly lower caudal and pelvics) may find their way into the raw feedstocks in sharkfin markets, when these animals are landed. This has been observed to occur with a related group, the "shark-fin" guitarfishes (Family Rhinidae, principally *Rhina ancylostoma*, the bowmouth guitarfish, and *Rhynchobatus* sp., the white-spotted guitarfishes or wedgefishes) (Cook and Compagno, 1994, 1996; Cook et al., 1995a).

For these reasons, which are expanded upon below, the Conference of the Parties is urged in the strongest possible terms to support inclusion of this entire order of fishes in Appendix I, pursuant to criteria set forth in Resolution Conf. 9.24, Annex 1, including one or more of the following: A (I, ii, iv, v); B (I, ii, iii, iv); C (I, ii); and D.

1. Taxonomy:

1.1 Class:Chondrichthyes
Subclass:Elasmobranchii
Superorder:Batoidimorpha (Hypotremata)

1.2 Order:Pristiformes (Rajiformes?)

1.3 Family:Pristidae

1.4-6 Species, Scientific Synonyms, and Common Names:

Anoxypristis cuspidata (Latham, 1794). Knifetooth, pointed, or narrow sawfish.

PRISTIS PECTINATA complex: Species in this group are characterized externally by narrow-based, less tapered, lighter rostral saws, with (usually) more numerous, smaller teeth (Compagno and Cook, 1995a). It may contain three valid species:

Pristis pectinata Latham, 1794. Smalltooth or wide sawfish.
Pristis zijsron Bleeker, 1851. Green sawfish.
Pristis clavata Garman, 1906. Dwarf or Queensland sawfish.

PRISTIS PRISTIS complex: Species in this group are characterized by relatively broad-based, strongly-tapered and massive saws, with few, large teeth (Compagno and Cook, 1995a). It may contain from one up to five valid species (but generally the three listed below are considered a likely number, though all may ultimately prove to be junior synonyms and possibly indistinguishable from *Pristis pristis* (Compagno and Cook, 1995a; Cook et al., 1995a) on further study, especially with new methods of DNA and gene-typing being applied (Peter Last, CSIRO Marine Laboratories; Hobart, Tasmania; AUSTRALIA, personal communication):

Pristis pristis (Linnaeus, 1758). Common sawfish.
Pristis microdon Latham, 1794. [synonymy: *Pristis leichhardti*]. Freshwater, Leichhardt's, great-tooth, largetooth sawfish. Also known as the smalltooth sawfish (in Australia).
Pristis perotteti Müller and Henle, 1841. [synonymy: *Pristis zephyreus*]. Largetooth sawfish.

2. Biological Parameters:

Anoxypristis cuspidata (Latham 1974). Knifetooth, pointed or narrow sawfish.

2.1 Distribution: Indo-West Pacific from the Red Sea and Persian (Arabian) Gulf to Australia, China, Taiwan (Fowler, 1941; Blegvad and Løppenthin, 1944; Stead, 1963; Misra, 1969; Chen and Chung, 1971; Paxton et al., 1989; Last and Stevens, 1994). Also it has been recently recorded from the brackish Oriomo River in Papua, New Guinea (Taniuchi et al., 1991a). Reports from the Mahanaddi River, India (Day, 1873; Misra, 1969); the Irrawaddi River, Burma (Day, 1873); Malaysia (Stead, 1963); and Thailand (Smith, 1945;) need verification (Compagno and Cook, 1995a).

2.2 Habitat Availability: This small-moderate sized (to 350 cm; Last and Stevens, 1994) marine, euryhaline or marginal sawfish is found from inshore waters to a depth of 40 m. Availability of habitat is probably not a primary constraining factor for this species, with the caveat that pollution and other habitat degradation due to human agency appears to be a high risk for all sawfishes (Compagno and Cook, 1995a, b, c).

2.3-4Population Status and Trends: Population status is uncertain, however declining trends in observed landings of this species in SE Asian markets, where it was once considered common, have been dramatic in recent years. The George Vanderbilt Foundation (hereafter referred to as GVF) funded an extensive program of fish collection in the Gulf of Thailand from 1959-1962 preserving several specimens which now reside in museums in the United States. During the course of that program this species was a regular part of the commercial landings at such reference locations as Samut Sakhon, Thailand. In recent visits by field scientists to sample markets in the region, few specimens of the knifetooth sawfish have been recorded, and no individuals of this species were seen during trips to Thailand (1993, 1996) and Sabah, mainland Malaysia, and Singapore (1996) by the senior proposer and Dr. Leonard J.V. Compagno, Director, Shark Research Center, South African Museum, Cape Town. (See notes below for information on conservation and management.)

2.5Geographic Trends: Uncertain; however decline of landings in high-impact commercial broad spectrum fisheries that should be recruiting these animals, if they are present, tend to indicate a substantial decline in local stocks.

2.6Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack et al., 1963; Zorzi, 1995a).

2.7Threats: The principal threat to this species is from fishing (mostly incidental capture) in broad-spectrum fisheries operated for r-selected bony fishes, crustaceans and cephalopods (reference: field survey report, "Shark Fin Notes," by Cook and Compagno [2/1996] to Dr. Merry Camhi, Living Oceans Program, National Audubon Society, Islip, NY [USA]). Because of the long tooth-studded saw, this species, like all sawfish species, is disproportionately subject to incidental capture in net gear set for other species. Most fisheries occurring in the range of the knifetooth sawfish are "land-everything" operations; and everything that is landed is utilized...from high quality fish and fish products to animals better suited for reduction to fish meals due to poor post-catch handling practices. The amount of effort being invested in these fisheries is so great in the search for greater r-selected resources that continuing severe population declines of elasmobranchs like the sawfishes are to be expected. Evidence of a secondary threat from commercial fisheries activity was noted during visits to markets by Cook and Compagno in 1996: the use of dynamite (high explosives) or cyanide compounds to extract the greatest number of reef fishes with the least amount of effort. These forms of fishing are immensely destructive to reef ecosystems, including their elasmobranch predators (sharks and rays). Explosives are less immediately destructive to elasmobranchs, except for those individuals in close proximity to the charges at time of detonation (as learned by U.S. military personnel trying to clear lagoons of sharks during World War II in the Pacific [McCormack et al., 1963]). However, this type of harvesting practice is very successful in removing bony fishes (usually through rupturing of their gas bladders and consequent damage to the more delicate anatomical structures). It also effectively destroys living corals and the physical infrastructure of the reef base itself. In locations such as the Philippines and other locales in the Indo-Australian Archipelago, dramatic declines in habitability of those reefs has been observed, yielding more or less "sterilized zones."

Cyanide has been introduced in aquatic habitats through two mechanisms: intentional directed fishing efforts and careless or accidental spillage of compounds used in cyanide heap-leach mining operations and various types of industrial processes. Some species of this order have been negatively impacted by cyanide spills, i.e., *P. microdon* in the [now virtually biotically-sterilized] Fly River basin of Papua, New Guinea (Tyson Roberts, Bangkok, Thailand, personal communication, Feb. 1996) and, potentially, *P. pectinata* in the lower Essequibo River, Guyana (Aug. 1995; source: *EarthWeek*).

Pristis pectinata Latham, 1794. Smalltooth sawfish.

2.1Distribution: The geographic range of the *P. pectinata* may be greater than for other species in the family Pristidae. In the Eastern Pacific it occurs of Ecuador and possibly off southern Mexico; in the Western Atlantic from North Carolina south to the Gulf of Mexico and beyond as far south as Brazil (but it has been reported as far north as New York and as far south as Uruguay and northern Argentina); in the Eastern Atlantic from Morocco to southern Angola and possibly northern Namibia; the Mediterranean Sea; and in the Indo-West Pacific from eastern South Africa, Mozambique and Madagascar, from the Red Sea to Myanmar (formerly Burma), the Philippines and off northern Australia (Fowler, 1936, 1941; Beebe and Tee-Van, 1941; Bigelow and Schroeder, 1953; Wallace, 1967; Misra, 1969; Krefft and Stehmann, 1973; Penrith, 1978; Compagno et al., 1989; Stehmann, 1990; Last and Stevens, 1994; Adams and Wilson, in press [1996]). It has been recorded in freshwater habitats in Florida in the St. Johns River; several states in the lower Mississippi River drainages of the southern United States; Lake Nicaragua and the Rio San Juan, Nicaragua; the Arato and San Juan Rivers, Colombia; Essequibo River, Guyana; lower reaches of the Amazon River up to Para (Belem), Brazil; Faleme River, Mali or Senegal; Saloum River, Senegal; Hooghly River (at Calcutta) and the Ganges estuaries, India (Fowler, 1936, 1941; Bigelow and Schroeder, 1953; Thorson, 1974, 1976a, 1982; Thorson et al., 1966).

2.2Habitat Availability: This very large-bodied and wide ranging euryhaline sawfish is less-adapted to freshwater than members of the *Pristis pristis* complex. It is found from the lower drainages of rivers and estuaries out to depths of about 25 m (Compagno and Cook, 1995a; Adams and Wilson, in press [1996]). Availability of habitat is probably not a primary constraining factor for this species, with the caveat that pollution and other habitat degradation due to human agency appears to be a high risk for all sawfishes (Compagno and Cook, 1995a, b, c).

2.3-4Population Status and Trends: Though this species is wide-ranging, its distribution is highly disjunct. Further, it has suffered severe declines in several regions where it was formerly a common part of the local aquatic fauna, i.e., the eastern U.S. (Adams and Wilson, in press [1996]), and off eastern Africa (Leonard Compagno, Shark Research Center, South African Museum, personal communication, 1996). It is also reported to have largely disappeared from the waters around Sri Lanka (Julio Moron, personal communication, 1994); and it has virtually disappeared from waters of the Philippines (Leonard Compagno, Shark Research Center, South African Museum, personal communication, Oct.-Nov. 1995). (See notes below on conservation and management).

2.5Geographic Trends: Decline of landings in high-impact, broad-spectrum commercial fisheries that should be recruiting these animals, if they are present, tend to indicate a substantial decline in local stocks. Further, the disappearance of this species from Sri Lankan and Philippine waters indicates a serious reduction in some areas where it once occurred.

2.6Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack et al., 1963; Zorzi, 1995a).

2.7Threats: See general comments for the knifetooth sawfish above. In addition, this species has long been favored for live displays in public aquaria (i.e., eastern U.S., Europe and South Africa). Primarily this was because it was readily available in the past. However, these animals appear to have variable captive life expectancies, resulting in frequent need to replace lost specimens. Leonard Compagno (South African Museum) notes that it may be getting more difficult for aquaria to obtain display specimens (personal communication, 1996). It is reported by the staff of Underwater World Aquarium, Sentosa Island, Singapore, that they do not try to display any species of sawfishes in their elasmobranch-rich aquarium environments due to a variety of factors that make successful maintenance unreasonable

(Michele Tan, Education Officer, UWA, personal communication, Feb. 1996). Its saws are prized for the curio trade internationally.

Pristis clavata Garman, 1906. Dwarf or Queensland sawfish.

2.1Distribution: The smallest (to 140 cm) and most range-restricted of the sawfishes, seems only to be found from nearshore and estuarine waters of northern Australia. It has also been reported up to 10 km up in the Pentecost River, but it is unknown if this species penetrates into truly freshwater systems (Grant, 1978; Ishihara et al., 1991; Taniuchi et al., 1991b; Last and Stevens, 1994; Compagno and Cook, 1995a). It is possibly more widely distributed in the Indo-Pacific Region, but verification is currently lacking (Last and Stevens, 1994; Peter Last, CSIRO, Hobart, Tasmania, Australia; personal communication, 1995). One record reported by Bigelow and Schroeder (1953) from the Canary Islands (east-central Atlantic Ocean) is apparently erroneous (Last and Stevens, 1994).

2.2Habitat Availability: This species is confirmed from shallow-water habitats from Cairns (northeastern Australia) to the Kimberley Coast (northern Western Australia). It is common over mudflats in the Gulf of Capenteria. It also occupies brackish riverine and estuarine habitats (Last and Stevens, 1994).

2.3-4Population Status and Trends: Uncertain. However, this species' apparently very small range may place it at disproportional risk (see notes below for information on conservation and management).

2.5 Geographic Trends: Uncertain.

2.6 Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack et al., 1963; Zorzi, 1995a).

2.7Threats: Because of its extremely restricted "known" range and depth of occurrence, it potentially stands at risk of accidental and incidental mortality in areas where commercial fishery activities co-exist. The Australian government is apparently considering protecting sawfishes in its jurisdictional waters. Little is known of this species' potential distribution outside Australia. However, it might have been confused in other locales with the larger, *Pristis pectinata*, which in many characteristics it resembles, and with which it overlaps in the Gulf of Carpenteria (Last and Stevens, 1994).

Pristis zijsron Bleeker, 1851. Green sawfish.

2.1Distribution: This giant (5 m TL to, possibly, 7.3 m TL) Indo-West Pacific sawfish has a marine range from South Africa to the Persian (Arabian) Gulf, Indian subcontinent, Indonesia, Australia and Viet Nam and generally through the Indo-Australian Archipelago (Fowler, 1941; Blegvad and Løppenthin, 1944; Smith, 1945; Bigelow and Schroeder, 1953; Stead, 1963; Misra, 1969; Grant, 1972; Paxton et al., 1989; Cook and Compagno, 1995a; Last and Stevens, 1994). There are freshwater records from Thailand, possibly in the Tachin River and Songkhla Lake (Cook and Compagno, 1994); Malaysia, Indonesia (including Borneo at Bandjermassing); and on Java and Ternate Islands; in Australia from Queensland in Lake Macquarie, and from New South Wales in the Clarence River (Fowler, 1941; Smith, 1945; Stead, 1963; Grant, 1972; Paxton et al., 1989; Last and Stevens, 1994; Cook and Compagno, 1995a).

2.2Habitat Availability: Inshore from estuarine environments out to at least 40 m depth. It also is found in brackish waters of near ocean lakes (Songkhla) and riverine environments. Habitat does not seem to be a constraining factor for this species which is widely, if disjunctly distributed.

2.3-4 Population Status and Trends: Uncertain at this time, though it is captured for a variety or products (see below) and occasionally by sportsmen in Southern Africa (Compagno et al., 1989; Last and Stevens, 1994).

2.5 Geographic Trends: Uncertain.

2.6 Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack *et al.*, 1963; Zorzi, 1995a).

2.7Threats: The principal potential threat to this species is incidental capture in broad-spectrum, high-impact commercial fisheries for traditional r-selected species. Its large saw has been utilized in international curio trade.

Pristis perotteti Müller and Henle, 1841. Largetooth sawfish.

2.1 Distribution: This large-bodied (to at least 5.7 and possibly 6.1 m; but < 4.3 meters in Lake Nicaragua; Oetinger, 1978 [MS thesis]; Cook et al., 1995a, b) species is found in the warm-temperate to tropical Atlantic and Eastern Pacific. In the Eastern Pacific it is recorded from Mazatlan, Mexico (Gulf of California [Sea of Cortez] south to Guayaquil, Ecuador; in the Western Atlantic it is reported from Texas and occasionally Florida south to central Brazil; and in the Eastern Atlantic from Gibraltar to Angola and possibly in the western Mediterranean Sea (Fowler, 1936, 1941; Beebe and Tee-Van, 1941; Bigelow and Schroeder, 1953; Krefft and Stehmann, 1973; Stehmann and Burkel, 1984; Stehmann, 1990; Compagno and Cook, 1995a; Adams and Wilson, in press [1996]). Freshwater record include Pacific Panama (Tuyra, Culebra and Tilapa Rivers), as well as from Balboa, Rio Grande at Miraflores, Rio Chucunaque and Lago Bayano; Lake Nicaragua and Rio San Juan, Nicaragua; Goascoran River between El Salvador and Honduras; Lake Yzabal and Rio Dulce, Guatemala; San Juan River and, possibly, Magdalena River, Atlantic Colombia; from the Amazon River mouth at Manacapuru up to 1340 km upriver, Brazil; Faleme River, Mali or Senegal; Saloum River, Senegal; Gambia; Geba River at Bafata, Guinea-Bissau (Boulenger, 1909, 1916; Fowler, 1936, 1941; Beebe and Tee-Van, 1941; Bigelow and Schroeder, 1953; Gunter, 1957; Thorson, 1976a; Thorson et al., 1966b; Dahl, 1971; Thorson, 1974, 1982; Oetinger, 1978 [MS thesis]; Daget, 1984; Vasquez-Montoya and Thorson, 1982; Compagno and Cook, 1995a; Cook et at., 1995a, b).

2.2 Habitat Availability: This very large species is strictly confined bathymetrically and areally to from the intertidal to < 10 m depth in both marine and freshwater environments. Though not precisely known, it probably spends most of its time on or near the bottom. However, it has been observed in captivity and the wild swimming quite near the surface for extended periods of time (Bigelow and Schroeder, 1953; Cook et al, 1995a, b). As with other species inhabiting riverine and lacustrine (lake) environments, populations of this species in freshwater environments are constrained by a number of factors that do not appear to have a substantial effect on their marine counterparts. These include: physically constraining environments that strictly limit the ability of freshwater species to evade capture in even the most primitive of fishing efforts. Several types of gear can be used in these waters that would be impractical in marine fisheries. This also increases the difficulty species have in avoiding pollutants (including toxic by-products associated with illegal drug manufacturing in South America and Asia and petroleum products dumped into aquatic environments as a result of terrorist attacks [Magdalena and Atrato Rivers, Colombia] or as a result of wars [Viet Nam and Iraq] DeSylva and Michel, 1974; Wood, 1993; Compagno and Cook, 1995a) or habitat alteration and degradation (everywhere; Compagno and Cook, 1995a). Freshwater environments are also, by their very nature, subject to greater fluctuations in physical and chemical conditions, including water temperatures, water levels, silt loads, seasonal salinities, dissolved mineral loads; oxygen-saturation levels, etc. Freshwater habitats are more marginal habitats with fewer suitable niches for elasmobranchs than

counterparts in the marine environment. Therefore, even minor alteration or degradation of these habitats probably has a much greater immediate effect than on elasmobranchs in marine ecosystems (Compagno and Cook, 1995a, b, c). One additional factor may negatively impact freshwater elasmobranchs that ordinarily is not considered important to their marine counterparts: loss of prey species due to overfishing and habitat degradation, especially in the case of those localized populations that are relatively stenotrophic in their feeding behavior. The extent of this phenomenon is not well understood (Compagno and Cook, 1995a).

2.3-4Population Status and Trends: The status of this species has been toward severe decline in the past thirty-five years, especially with the decimation of populations in Lake Nicaragua and the Rio San Juan of Nicaragua (fisheries); Lago Bayano, Panama; Lake Yzabal and the Rio Dulce, Guatemala (physical alteration of environment through introduction of dams that barred free transit to the sea) (Thorson et al., 1966; Thorson, 1974, 1976, 1980, 1982a, 1982b, 1987; Vasquez-Montoya and Thorson, 1982; Taniuchi, 1992; Tanaka, 1994). The trend for this species in most locales where it is found is toward decline or extirpation. Local populations may range from vulnerable to critically endangered (Compagno and Cook, 1995a; Cook et al., 1995a, b).

2.5 Geographic Trends: Its decline and virtual disappearance from many locales where it was once considered moderately common to common, including Lake Nicaragua, Rio San Juan and Lake Bayano, indicate substantial loss in areas where it formerly occurred.

2.6 Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack et al., 1963; Zorzi, 1995a).

2.7 Threats: See general notes for knifetooth sawfish above. In addition, this species is at very high risk from both (directed and incidental) fishery activities and from habitat modification, primarily hydropower dam-building and water impoundment projects (that tend to isolate individuals in the reproductive stock from one another and prevent free transit of this species into formerly available habitats). Its saws are highly prized in the curio trade internationally.

Pristis microdon Latham, 1794. Freshwater, Leichhardt's, great-tooth, largetooth sawfish. (Also called smalltooth sawfish in Australia).

2.1 Distribution: This very large species (> 7 m TL, but in Australia only to ~ 2 m TL; Last and Stevens, 1994) of sawfish is found marine waters of the Indo-West Pacific Region from Sri Lanka and the east coast of India to New Guinea, the Philippines and Australia (Fowler, 1941; Bigelow and Schroeder, 1953; Wallace, 1967; Misra, 1969; Paxton et al., 1989; Last and Stevens, 1994; Compagno and Cook, 1995a). Freshwater records include rivers in South Africa; Mozambique and Zimbabwe (Shire, Zambezi, Sabi and Lundi Rivers); India (Ganges and Bramaputra Rivers); Thailand (in the Chao Phraya at Nantaburi and above Paknam); Malaysia (Perak River, and possibly the Tembeling and Linggi Rivers); Cambodia [Kampuchea] (in Grand Lac), Philippines (Lake Najaun on Mindoro Island); Indonesia (Indragiri River near Rengat, Sumatra), Bandjermassing (Borneo); the Fly River system, Sepik River, Laloki River, and Lake Murray of Papua, New Guinea; and Gilbert, Mitchell, Daly, and Victoria Rivers, Teoganini Creek, the Ord, Fitzroy, Lynd, Walsh, Palmer and Alligator Rivers of Australia [if *P. leichhardti* is considered as a synonym of *P. microdon*] (Boulenger, 1909; Annandale, 1909; Fowler, 1941; Smith, 1945; Bigelow and Schroeder, 1953; Boesemann, 1953; Alfred, 1962; Stead, 1963; Jubb, 1967; Munro, 1967 Misra, 1969; Grant, 1972; Roberts, 1978; Taniuchi, 1979; Thorson, 1982; Kottelat, 1985; Taniuchi and Shimizu, 1991; Taniuchi et al., 1991a, b; Last and Stevens, 1994; Compagno and Cook, 1995a). Also Cook and Compagno observed saws from recent landings of this species on the central Kinabatangan River, Sabah, Borneo (Malaysia) (Cook and Compagno, 1996).

2.2 Habitat Availability: This species is predominantly found in freshwater environments throughout its range. See *Pristis perotteti* account for general caveats about freshwater sawfishes. The following additional notes are applicable specifically to *P. microdon*. In a number of locations in southeast Asia this sawfish is now absent from freshwater habitats in which it was once considered common. This includes the Chao Phraya River, Thailand, where it has not been reported for the last 30 years. It is believed to have declined at least in part due to fishery activity on the river, imposition of water impoundment and flood control dams, siltation from excessive logging in the uplands and poor agriculture practices, as well as introduction of a variety of hypertoxic pollutants in association with increasing industrial development along the river (Cook and Compango, 1994; Compagno and Cook, 1995a, b, c). In the Fly River basin this species and most everything else seem to have been extirpated by recent prodigious spills of "drummed" cyanide that is routinely being ferried upriver on barges for use in heap-leach mining operations (Tyson Roberts, Bangkok, Thailand, personal communication, 2/1996). These represent extreme examples of a more widespread problem that has resulted in a substantial loss of previously available habitat. Potentially, habitat along the South Alligator River in the Northern Territory, Australia is at potential risk of loss due to increased interest in mining uranium from the Kakadu National Park (Compagno and Cook, 1995a).

2.3-4Population Status and Trends: This species has declined markedly in several locations including those noted in the previous paragraph. This combined with largely unregulated fisheries in fresh water through out the region and fewer observations, supports the belief among many field biologists that this species is declining in the wild. Recent collection efforts to gather specimens for aquaria in continental Europe has led the Australian government to consider protecting all species of sawfishes occurring there (Cook et al., 1995a).

2.5 Geographic Trends: There has been a substantial reduction in the distribution for this species as a result of the cyanide damage to the Fly River, water impoundment dams and hydropower construction in several nations, and planned for several more nations where this species may utilize freshwater habitats (Tyson Roberts, Bangkok, Thailand, personal communication, 2/1996).

2.6 Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack et al., 1963; Zorzi, 1995a).

2.7 Threats: Threats are about equally divided between human development and consequent habitat modification/degradation and fisheries activity.

Pristis pristis (Linnaeus, 1758). Common sawfish.

2.1 Distribution: This large sketchily-known sawfish is recorded in the marine environment from the western Mediterranean Sea and Eastern Atlantic from Portugal to Angola, and possibly Namibia (Fowler, 1936; Bigelow and Schroeder, 1953; Krefft and Stehmann, 1973; Stehmann and Burkel, 1984; Stehmann, 1990; Compagno and Cook, 1995a). There are freshwater records from Mali or Senegal in the Faleme River; Senegal in the Saloum River; and possible Gambia in the Gambia River.

2.2 Habitat Availability: A shallow water species found from freshwater environments out to at least 25 m depth. Little is known of this species.

2.3-4Population Status and Trends: Uncertain.

2.5 Geographic Trends: Uncertain.

2.6 Role of the Species in Its Ecosystem: The role of all sawfishes (regardless of species) is similar where they occur, i.e., larger-bodied, k-selected apex or near-apex predators, feeding on a variety of small-medium size bony fishes (which they stun by slashing with their tooth-studded saws as they swim through schools and aggregations), or by using their saws to "root" invertebrates and buried fish from the substrate (Breder, 1952; Bigelow and Schroeder, 1953; McCormack et al., 1963; Zorzi, 1995a).

2.7 Threats: Presumably the conditions that threaten other species of the *Pristis pristis* complex also apply to this species as well.

3. Utilization and Trade:

Not all species of sawfishes are equally utilized in all areas where they occur, however trade for the following species is known to exist now or has existed in the recent years before stocks became depleted:

Rostral Saws: Both domestic and international trade have been observed for rostral saws from *Anoxypristis cuspidata*, *Pristis pectinata*, *Pristis zijsron*, *Pristis perotteti*, *and Pristis microdon*. Although markets tend to be opportunistic rather than organized (Cooke, 1996), saws can have high value as a curio. When available, they are usually found for sale in seashell and marine curiosity shops.

Meat (for human consumption): *Anoxypristis cuspidata*, *Pristis pectinata*, *Pristis zijsron*, *Pristis perotteti*, *Pristis microdon*. At various locations throughout Latin America, Africa, Oceania and Asia, where the respective species occur they are fished for food (Thorson, 1976a; Last and Stevens, 1994; S.F. Cook and M. Oetinger, personal observations [routinely noted prior to the 1990's]).

Oil: *Anoxypristis cuspidata*, *Pristis zijsron*, *Pristis perotteti*. National and international markets. The liver oils of these three species have been used for cosmetics, medicines, high temperature-resistant lubricants, in soap-making, leather tanning, and production of rudimentary weather change predicting devices (oil turns cloudy during weather changes; McCormack et al., 1963).

Traditional medicines: Rostra are used to manufacture traditional medicines in China. Many apothecary shops there have recently been found to have baskets of small *Anoxypristis cuspidata* rostra among the animal medicines (M. McDavitt, pers. comm.).

Since none of these animals has been regulated internationally or under CITES in the past, there has been no way to establish illegal trade practice trends.

Actual trade impacts of a negative nature have been observed in many fisheries for this group, perhaps one of the best examples occurred in Nicaragua in the period between the early 1960s up through the present, with the exception of a period of time in the early 1980s when the government implemented the very first (but not long-lived) program to conserve sawfishes ever tried. Fisheries for sawfishes and bull sharks, *Carcharhinus leucas*, completely decimated the stocks in Lake Nicaragua and the San Juan River (Thorson 1976a, b; 1980; 1982; 1987; Compagno and Cook, 1995a). From abundant stocks when Thorson first began his work on the lake (1963) to the present (1994), both species virtually disappeared from the area (Taniuchi, 1992; Tanaka, 1994).

Due to their life history patterns (strongly k-selected) the elasmobranchs do not lend themselves to being "farmed" for commercial purposes. Among other reasons, most species are difficult and expensive to keep in captivity and their growth is so slow that raising them to a marketable size is economically unfeasible. Also, because of delayed maturation and a poor record of reproducing in captivity, captive propagation is not presently a viable commercial option.

Conservation and Management

With the exception of a short-lived attempt by Nicaragua to manage sawfishes in the early 1980s (Thorson, 1987), no other management protocols have been implemented or attempted. No other fishery management programs appear to have been developed or emplaced in other nations.

5. Information on Similar Species:

All seven species in the Order Pristiformes; Family Pristidae are included within the main body of this proposal. There are no significant similarity-of-appearance problems with other species.

6. Other Comments:

Copies of an earlier draft of this proposal were sent to 72 range states for comment. Responses were received from six Parties. The government of the Philippines supported the proposal. The government of the Dominican Republic took no position but provided anecdotal information that indicated similar declines there as reported in this proposal. The government of Mexico was unable to draw a conclusion as to eligibility for Appendix I, based on available information from that country. Australia stated that the populations of its two species were not believed to be threatened and recommended that the proposal deal with each species individually. The government of Colombia felt that more convincing documentation of historical declines in landings needs to be presented before Colombia could support an Appendix I listing. to Japan opposed the proposal on the grounds that there are not enough data to show convincingly that the sawfish are eligible for Appendix I.

7. Additional Remarks:

Evidence for population declines. Because of their sparse populations and broad distributions, sawfish are not amenable to quantitative population studies, either locally or globally. Therefore the data on which this proposal is based is largely anecdotal. However, there is a broadly consistent pattern across species, from most areas for which information has been reported, of declining representation of sawfish in commercial fishery by-catch. The trend is for relatively large (or at least reliable) catches prior to the 1960's, followed by a steep decline in the 1960's and 1970's, then very infrequent, if any, records into the 1980's and to the present. This pattern is particularly evident in southeast Asia. The declines coincide in some areas with the proliferation of gillnet fisheries worldwide; however, the declines in the United States began before that time. Sawfish are extremely vulnerable to entanglement in gillnets and usually cannot be removed alive (Tyson Roberts, pers. comm., fide Sarah Fowler).

Roberts and Warren (1994) report that sawfish caused considerable damage to gillnets in the lower Mekong River over 10 years ago. Only one was reported landed therein 1993, however. The capture of a large sawfish in Malaysia in 1996 was such an extraordinary event that the photograph of the fish appeared in several national newspapers (S. Fowler, pers. comm.). In Sri Lanka, four species of sawfishes were relatively common 50-60 years ago; none have been seen on the west coast for about 40 years (Shark News, Vol. 1, 1994). Similarly, sawfish appear to have completely disappeared from the Mediterranean, where two or three species formerly occurred (S. Fowler, pers. comm.). According to Sid Cook (Argus-Mariner Consulting Scientists) all seven species of sawfish have been noted to be rarer or absent in by-catch in recent years. In Thailand, New Guinea, and the Atlantic coast of the United States, there have been no records for the past 10-30 years in freshwater and estuarine habitats where the species used to be frequent. In Lake Nicaragua, there have been few records since the fishery collapsed in the 1970's.

8. References:

***NOTE**: This list contains both literature cited in the proposal text and additional references on the general nature and problems that affect sustainability of elasmobranch fisheries.*

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