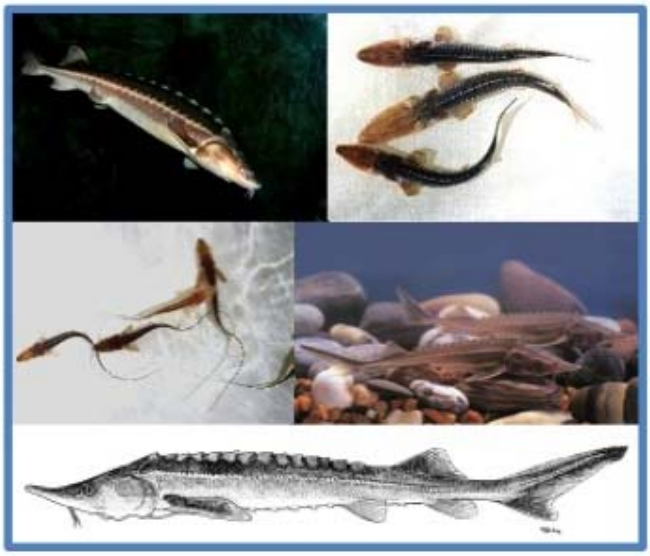
PETITION TO LIST
Fifteen Species of Sturgeon
UNDER THE U.S. ENDANGERED SPECIES ACT



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

March 8, 2012

Petitioners

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

Friends of Animals
777 Post Road, Suite 205
Darien, Connecticut 06820
203.656.1522

WILDEARTH GUARDIANS
A FORCE FOR NATURE

Friends of Animals

INTRODUCTION

WildEarth Guardians and Friends of Animals hereby petitions the Secretary of Commerce, acting through the National Marine Fisheries Service (NMFS)[1] and the National Oceanic and Atmospheric Administration (NOAA) (hereinafter referred as the Secretary), to list fifteen critically endangered sturgeon species as "threatened" or "endangered" under the Endangered Species Act (ESA) (16 U.S.C. § 1531 *et seq.*). The fifteen petitioned sturgeon species, grouped by geographic region, are:

I. Western Europe

(1) *Acipenser naccarii* (Adriatic Sturgeon)
(2) *Acipenser sturio* (Atlantic Sturgeon/Baltic Sturgeon/Common Sturgeon)

II. Caspian Sea/Black Sea/Sea of Azov

(3) *Acipenser gueldenstaedtii* (Russian Sturgeon)
(4) *Acipenser nudiventris* (Ship Sturgeon/Bastard Sturgeon/Fringebarbel Sturgeon/Spiny Sturgeon/Thorn Sturgeon)
(5) *Acipenser persicus* (Persian Sturgeon)
(6) *Acipenser stellatus* (Stellate Sturgeon/Star Sturgeon)

III. Aral Sea and Tributaries (endemics)

(7) *Pseudoscaphirhynchus fedtschenkoi* (Syr-darya Shovelnose Sturgeon/Syr Darya Sturgeon)
(8) *Pseudoscaphirhynchus hermanni* (Dwarf Sturgeon/Little Amu-Darya Shovelnose/Little Shovelnose Sturgeon/Small Amu-dar Shovelnose Sturgeon)
(9) *Pseudoscaphirhynchus kaufmanni* (False Shovelnose Sturgeon/Amu Darya Shovelnose Sturgeon/Amu Darya Sturgeon/Big Amu Darya Shovelnose/Large Amu-dar Shovelnose Sturgeon/Shovelfish)

IV. Amur River Basin/Sea of Japan/Sea of Okhotsk

(10) *Acipenser mikadoi* (Sakhalin Sturgeon)
(11) *Acipenser schrenckii* (Amur Sturgeon)
(12) *Huso dauricus* (Kaluga)

V. Siberia

(13) *Acipenser baerii* (Siberian Sturgeon)

VI. Yangtze River

(14) *Acipenser dabryanus* (Yangtze Sturgeon/Dabry's Sturgeon/River Sturgeon)
(15) *Acipenser sinensis* (Chinese Sturgeon)

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[1] NOAA Fisheries.

This petition requests rangewide listing for each sturgeon because each species is at risk of extinction throughout all or a significant portion of their respective ranges. In the alternative, this petition requests listing of any or all District Population Segments (DPS) of the fifteen species that the Secretary determines may exist.

The International Union for Conservation of Nature (IUCN)[2] lists fourteen of the petitioned sturgeon species as "critically endangered," meaning they face the highest level of extinction risk short of becoming extinct in the wild.[3] The IUCN lists the fifteenth species, *Acipenser baerii*, as "endangered," meaning it faces a very high risk of extinction in the wild.[4]

All fifteen petitioned sturgeon species are affected by similar threats: both legal and illegal exploitation for meat and/or caviar; habitat loss and degradation; dams or dam construction; water pollution; and increased competition due to habitat loss. Accordingly, it would be efficient for the Secretary to examine the fifteen species together as this petition requests. Immediate protection of all fifteen species under the ESA is both warranted and necessary to ensure their survival.

DESCRIPTION OF PETITIONERS

WildEarth Guardians is a nonprofit environmental advocacy organization that works to protect wildlife, wild places, and wild waters in the United States and beyond. The organization has more than 12,000 members and supporters in the United States and maintains offices in New Mexico, Colorado, and Arizona.

Friends of Animals is a nonprofit, international animal advocacy organization. Incorporated in the state of New York in 1957, the group advocates for the interests of animals in living free, on their own terms. Friends of Animals is maintains offices in Connecticut, New York, Washington, DC, Pennsylvania, California, and British Columbia and sponsors a variety of programs to protect, rescue, recover, and reintroduce imperiled animals, including marine species.

THE ENDANGERED SPECIES ACT AND IMPLEMENTING REGULATIONS

The Endangered Species Act of 1973 protects plants and animals that are listed by the federal government as "endangered" or "threatened" (16 U.S.C. § 1531 et seq.). The ESA defines "fish or wildlife" as "any member of the animal kingdom, including without limitation any. . . fish. . ." (16

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[2] The IUCN is the world's largest and oldest 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 around the world. See www.iucn.org/about/.

[3] See IUCN Red-List Assessment Criteria, available at www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria. See also Exhibits 1-13 and 15 (WildEarth Guardians and Friends of Animals hereby incorporate all citations and references contained in the IUCN's Species Reports for these fourteen petitioned sturgeon species (Exhibits 1-13, 15) into this petition by reference. If the Secretary does not have access to any of the incorporated citations or references contained in the fourteen IUCN Species Reports (Exhibits 1-13, 15), please contact us and we will provide copies).

[4] See IUCN Red-List Assessment Criteria, available at www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria. See also Exhibit 14 (WildEarth Guardians and Friends of Animals hereby incorporate all citations and references contained in the IUCN's Species Report for this petitioned sturgeon species (Exhibit 14) into this petition by reference. If the Secretary does not have access to any of the incorporated citations or references contained in this IUCN Species Report (Exhibit 14), please contact us and we will provide copies).

U.S.C. § 1532(8)). Each of the fifteen petitioned sturgeon species described above are recognized as taxonomically valid species of fish by the IUCN (see Exhibits 1-15). Additionally, the Integrated Taxonomic Information System (ITIS), a partnership of scientific agencies providing authoritative taxonomic information, confirms fourteen of the sturgeon species (except *Acipenser mikadoi*) as valid species. *A. mikadoi* is confirmed as a valid species by the World Registry of Marine Species (WoRMS), whose content is controlled by taxonomic experts and whose goal is to provide an authoritative and comprehensive list of names of marine organisms.

Any interested person may submit a written petition to the Secretary of Commerce requesting listing of a species as "endangered" or "threatened" under the ESA (50 C.F.R. § 424.14(a)). An "endangered species" is "any species that is in danger of extinction throughout all or a significant portion of its range" (16 U.S.C. § 1532(6)). A "threatened species" is defined as "any species 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)). "Species" includes subspecies and distinct population segments of sensitive taxa (16 U.S.C § 1532(16)).

The ESA sets forth listing factors under which a species can qualify for protection (16 U.S.C. § 1533(a)(1)):

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

A taxon need only meet one of the listing criteria outlined in the ESA to qualify for federal listing. 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)).

This petition describes multiple listing factors that are contributing to the decline of each of the fifteen sturgeon species. The IUCN has reached a similar conclusion, stating in a March 18, 2010, news release that "[e]ighty-five percent of sturgeon, one of the oldest families of fishes in existence, valued around the world for their precious roe [caviar], are at risk of extinction, making them the most threatened group of animals on the IUCN Red List of Threatened Species" (Exhibit 45). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)[5] has regulated international trade in all species of sturgeon since 1998 "owing to concerns over the impact of unsustainable harvesting of and illegal trade in sturgeon populations in the wild" (Exhibit 46 at 1).

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[5] CITES is an international agreement that member countries voluntarily adhere to, but it is legally binding on member countries in that they must use CITES as a framework to implement domestic laws to ensure that the agreement is being implemented. CITES is among the largest conversation agreements with 175 member countries. Available at www.cites.org/eng/disc/what.shtml.

One of the petitioned species, *Acipenser sturio*, was added to CITES Appendix II in 1975, and transferred to Appendix I in 1983. The remaining fourteen petitioned species were added to CITES Appendix II in April 1998, along with 23 unlisted Acipenseridae (Exhibit 50 at 1, Exhibit 51 at 1). The United States, by supporting Germany in the 1998 CITES Proposal (Prop. 10.65, Exhibit 51), recognized that the petitioned sturgeon species were threatened with extinction from exploitation. The listing was accompanied by Conf. 10.12 (Exhibit 54 at 80), which recommended conservation actions for range states, and followed by Conf. 11.13 (Exhibit 58), which introduced a universal labeling system for identification of caviar and was subsequently repealed and replaced by Conf. 12.7 (Exhibit 47), which required annual export and catch quotas be reported to the Secretariat and registration of processing and packaging plants. Conf. 12.7 noted that sturgeon have "been affected by such negative factors as illegal fishing and illegal trade, regulation of water flow and decrease in natural spawning sites" (Exhibit 47 at 1). The goal of these actions, as stated on the CITES website, was to ensure that sturgeon were harvested sustainably and preserved as a resource for future generations (Exhibit 46 at 1). However, despite the efforts of CITES and the range states, these goals are unmet and the fifteen petitioned species are declining toward extinction in the wild.

The IUCN considers all of the petitioned species to be at risk of extinction, stating that "illegal catch, overfishing, the breaking up of migratory routes, and pollution" have driven almost all species of sturgeon to the brink of extinction (Exhibit 47 at 2). The factors the IUCN uses to classify fourteen of the petitioned sturgeon as "critically endangered" and one (*Acipenser baerii*) as "endangered" are analogous to the five factors used under the ESA.[6] The IUCN's assessment is that fourteen of the petitioned sturgeon species are facing an "extremely high risk of extinction in the wild" and *Acipenser baerii* is facing a "very high risk of extinction in the wild."[7]

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[6] See 16 U.S.C. §§ 1533(a)(1)(A)-(E); IUCN Red List Assessment Criteria, available at www.iucnredlist.org/about/red-list-overview#redlist_criteria; www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria.

[7] See an explanation of the IUCN's categories and criteria at www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria.

DESCRIPTION OF STURGEON SPECIES

I. Western Europe

Figure 1. Major rivers of Europe. Source: www.worldatlas.com.

1. ***Acipenser naccarii***

a. Taxonomy

Acipenser naccarii is known by the common name "Adriatic Sturgeon" (Exhibit 1 at 2). This petition uses *A. naccarii*. The full taxonomic classification is shown in Table 1.

Table 1. Taxonomic classification for *Acipenser naccarii*.[8]

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser naccarii*

[8] All taxonomic classification tables in this petition were adapted from Integrated Taxonomic Information System (ITIS) reports unless otherwise noted. Reports are available at www.itis.gov.

b. Species Description

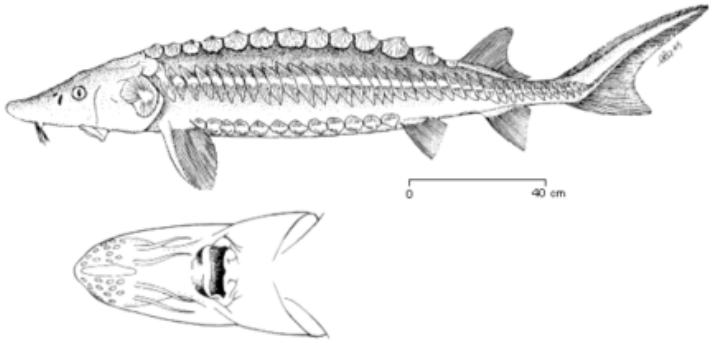

Figure 2. Sketch of *Acipenser naccarii*. Source: Exhibit 18 at 1.

A. naccarii has a moderate-length snout that is very broad and rounded at the tip (Figure 2). The species has an interrupted lower lip at the center of the mouth (Exhibit 17 at 1). Its barbells do not touch the mouth and are closer to the tip of the snout rather than the mouth (Id.). *A. naccarii* has five rows of scutes with 10-14 on the dorsal side, 32-42 on each lateral side and 8-11 on each ventral side, and no smaller plates between the dorsal and the lateral rows (Id. at 1-2). The species has an olivaceous brown back with lighter flanks and a white belly (Id. at 2).

c. Life History

A. naccarii is an anadromous species (Exhibit 1 at 5). It spawns in freshwater after a marine period of growth during which it remains near the shore (at the mouths of the rivers) at a depth of 10–40 meters (Id.). It does not enter pure marine waters (Exhibit 17 at 2). The species occurs in large rivers over muddy or sandy bottoms (Exhibit 1 at 5). Between March and May *A. naccarii* ascends rivers to spawn (Exhibit 18 at 6). Reproduction occurs between May and July (Id. at 4). Adults usually grow to 150 centimeters (~5 feet) with a maximum length of 200 centimeters (~6.5 feet) and weigh between 20-25 kilograms (~9 - ~11 pounds) (Id. at 3, see also Exhibit 17). The species feeds on other bottom-living organisms such as invertebrates and small fishes (Id. at 1).

d. Range

Figure 3. Historic range of *Acipenser naccarii.* Source: Exhibit 19.

Historically, the *A. naccarii* ranged from lagoons in Venice, Italy to the coastlines and rivers of Greece (Exhibit 1 at 3; see Figure 3). It was recorded in the rivers Adige, Brenta, Bacchiglione, Livenza, Piave, Tagliamento, and Po (including the Po delta); north to Turin; at Carignano and Carmagnola; in the Ticino and Adda rivers; along the Albanian coasts; Croatia, Bosnia-Herzegovina, and Montenegro. It was last recorded from Albania in 1997 in the Buna River (Id.). "There is evidence that the species was previously found in Greece but it is no longer known there" (Id.).

The only remaining spawning sites are at confluences of the Po River and its tributaries (Adda, Ticino, etc.) (Exhibit 18 at 4) and these sites have dwindled to an area of occupancy of less than 10 km^2 (Exhibit 1 at 2). There may be fewer than 250 wild individuals remaining (Id.).

e. Population Status and Trends

The IUCN estimates that *A. naccarii* has declined more than 80 percent (possibly 100 percent) in the past three generations, or 60 years (Exhibit 1 at 2). "In Italy the wild population is most likely

extinct as the species almost totally depends upon stocking and there is no evidence of spawning from stocked or wild individuals (the last known natural spawning probably occurred early 1980s)" (Id.). The few fish recently caught in the wild probably originated with aquaculture populations (Id.). "The population on the eastern Adriatic is… probably extinct in the wild" with no evidence of a reproducing population in Albania since 1990. Wild populations of *A. naccarii* are also possibly extinct in Croatia, Greece, Italy, Montenegro, and Serbia (Id. at 3). Artificial reproduction in fish farms has succeeded in Italy since 1988 and supports Italy's continuous restocking efforts, but evidence to confirm reproduction in the wild is lacking (Id. at 4). The species was also reintroduced in Greece but "there is no evidence that it has established a viable population" (Id.).

f. Threats

The IUCN first assessed *A. naccarii* as "vulnerable" in 1996 and elevated its ranking to "critically endangered" in 2009 (Exhibit 1 at 1). The IUCN reports that exploitation for food, either legal or illegal, is a major threat to the continued survival of this species (Id. at 5). Exploitation of pre-reproductive fish has been a particular threat. "Of approximately 2,000 specimens of *A. naccarii* fished in the Po River and sold at the fish market between 1981 and 1988, more than 80 percent of the specimens weighed less than 3.5 kg, having been taken before the reproductive phase" (Exhibit 18 at 8). The species is fished for its meat and the row is not currently consumed as caviar (Exhibit 17 at 2). Dams, particularly hydropower dams on the Po River (Isola Serafini's Dam, Piacenza), water pollution, and competition for habitat with an allochthonous species (*Silurus glanis*) also contribute to this species' decline in the wild (Exhibit 1 at 5). Dams can fragment populations and block migration routes to spawning grounds (Id.). "Without continuous re-stocking the survival of this species is doubtful as continued successful reproduction in the wild can no longer be confirmed" (Id. at 2).

Acipenser baerii, another sturgeon species (see below) was introduced in captive breeding facilities and hybridized with *A. naccarii* in Italy in the 1990s (Exhibit 31 at 4). "*A. baerii* are occasionally found in the wild [in Italy]; fish sporadically escape from rearing plants or angling ponds, or are released when they become too large for private aquaria. There is no documentation on the potential damage of the introduction of exotic Acipenseriformes and their hybrids on native species. If specimens of *A. baerii* escape to the open waters of the Po River and become an 'invasive species,' this may threaten… *A. naccarii*, a species that is on the brink of extinction" (Id., internal citations removed).

2. ***Acipenser sturio***

a. Taxonomy

Acipenser sturio is known by the common names "Atlantic Sturgeon," "Baltic Sturgeon," and "Common Sturgeon" (Exhibit 2 at 2). This petition uses *A. sturio*. The full taxonomic classification is shown in Table 2. The archaeological record of *A. sturio* suggests that it colonized the Baltic Sea around 3,000 years ago from the North Sea (Id.). However, the species vanished from the Baltic Sea around 800 years ago (Id.). Climatic changes about 100 years ago (the Little Ice Age) might have caused introgression with *Acipenser oxyinchus*, also referred to as the "Atlantic Sturgeon" (Id.).

Table 2. Taxonomic classification for *Acipenser sturio*.

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser sturio*

b. Species Description

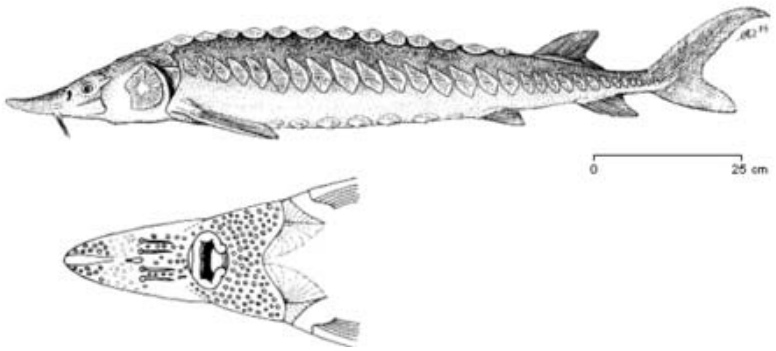

Figure 4. Sketch of *Acipenser sturio*. Source: Exhibit 20 at 1.

A. sturio is a large species that can grow to 5 meters (~16.5 feet) and weigh up to 120 kilograms (~264.5 pounds) (Exhibit 20 at 2). It has "an olive-black upper body and a white belly" (Id.). The species has an elongated body with a narrow-tipped snout and a mouth that is interrupted at the center of the lower lip and lacks teeth (Id., see Figure 4). It relies on highly sensitive barbells on the lower jaw to detect its prey, which is then sucked up into the mouth (Id.). *A. sturio* lacks scales and instead has five rows of scutes (bony platelets) on the dorsal, lateral and ventral sides (Id. at 6). *A. sturio* is a slow-growing species that can live up to 100 years (Id. at 2).

c. Life History

A. sturio can tolerate a wide range of salinities (Exhibit 20 at 7). *A. sturio* is an amphihaline and potamodromous fish, meaning it spends most of its life in salt water (close to the coast) but migrates to spawn in fresh waters like large rivers or estuaries (Exhibit 20 at 2). Juveniles can be found both in estuaries and in the sea. While living at sea the species frequents coastal areas that have a soft bottom and feeds on crustaceans, mollusks, worms, and small fishes (Id.). It is a solitary fish that sexually matures between 7-9 years of age (Id.). However, the reproductive phase begins later, with males reproducing for the first time at 10-12 years and females at 14-18 years (Exhibit 2 at 4). Reproduction likely occurs between April and July at two-year intervals for males and 3-4 year intervals for females (Id.). The distance of the spawning migration appears to depend on the water level, with distances of 1000 kilometers (~621.4 miles) or more reached during a high water year (Id.). Females will produce 800,000 – 2,400,000 sticky, dark eggs during a spawning period (Exhibit 20 at 2). Egg-laying is usually done at a depth of 2-10 meters (~6.5-~33 feet) in large rivers or estuaries that have gravel or sandy bottoms—the eggs adhere to the bottom (Id.). Once hatched,

juveniles will migrate downstream and "are present in upper estuary at one year old" (Exhibit 2 at 4). Juveniles make a slow descent to the sea and enter after a 2-3 year migration (Id.). "For the next 4-6 years, they leave the sea to enter the lower estuary at summer time" (Id.).

d. Range

Figure 5. Historic range of *Acipenser sturio*. Source: Exhibit 2 at 2.

A. sturio is presently restricted to a single reproductive population that breeds in the Garonne River in France (Exhibit 2 at 1). The species was historically abundant in the North and Baltic seas, the English Channel, and most European coasts of the Atlantic Ocean, the Mediterranean Sea and the Black Sea (Id., see Figure 5). The species is now regionally extinct in Belgium, Denmark, Germany, Italy, the Netherlands, Norway, Portugal, Spain, Tunisia and the United Kingdom (Id.).

e. Population Status and Trends

The overall population of *A. sturio* is decreasing (Exhibit 2 at 4). "There has been more than a 90 percent population decline in the past 75 years based mainly on loss of habitat, along with pollution and exploitation" (Id. at 2). The species was "an important commercial fish until the beginning of the 20th century" (Id. at 3). However, no natural reproduction has been recorded since 1994 (Id.). The current wild, native population consists of approximately 20-750 adults, but there are more individuals present from stocking efforts (7,000 in 2007, 80,000 in 2008, and 46,000 in 2009) (Id.). The first-generation 2007 population is expected to start reproducing in 2014 (Id.). The survival rate of these recent releases is currently unknown, however the survival rate for a previous restocking effort in 1995 was only 3-5 percent (Id. at 4).

f. Threats

A. sturio is highly vulnerable to exploitation due to its life history and the age it must reach before it can reproduce (10-12 years for males, 14-18 years for females) (Exhibit 20 at 14). *A. sturio* is prized for its flesh and its caviar, making exploitation a threat to the continued existence of the species

(Id.). *Acipenser sturio*, was added to CITES Appendix II in 1975, and transferred to Appendix I in 1983 (Exhibit 50 at 1). The development of river systems, particularly for hydroelectric dams, has also negatively impacted the population because adults are unable to return to their natal rivers to breed (Exhibit 20 at 14). "This species now remains in just one location, where 27 spawning grounds (less than 10 km^2) remain potentially accessible... As this species continues to be caught as bycatch, the population is still decreasing" (Exhibit 2 at 2). It is estimated that bycatch from gill net and trawling at sea took around 200 fish per year (Id. at 3). "Bycatch is the major threat and the extraction of gravel in the Garonne is a potential threat to the species. Dam construction, pollution and river regulation have led to loss and degradation of spawning sites" (Id. at 4).

"In December 1999 several thousand juvenile and several hundred gravid females [of *Acipenser baerii*] escaped into the Gironde River (Bordeaux region) during two storms. The survival of the escaped fish and their effect on the wild population of *A. sturio* are unknown. However, the introduction of new pathological germs, food competition in case of acclimatization of the exotic specimens, and hybridization with *A. sturio* must be taken into consideration" (Exhibit 31 at 4, internal citations removed).

II. Caspian Sea/Black Sea/Sea of Azov

General Information

> The major feeding sites of sturgeons are located in the northern Caspian and, when the northern part of the sea is covered with ice during autumn and winter seasons, sturgeons migrate to the middle and southern Caspian. During the spring and summer seasons the major part of the population returns to the north. Fish that have reached sexual maturity migrate to the larger rivers, primarily the Volga (70 per cent) and Ural Rivers (about 25 per cent), and to the Terek and Kura Rivers (5 per cent). The Persian sturgeon *Acipenser persicus* inhabits the southern part of the Caspian Sea and rarely occurs in other parts of the sea and rivers. The northern Caspian supports the major commercial stocks, namely 70 per cent of the Russian sturgeon *A. gueldenstaedtii*, 57 per cent of the stellate sturgeon *A. stellatus* and 65 per cent of the beluga *Huso huso*. Sturgeons are harvested in rivers using seine nets. Sea harvesting is banned in Azerbaijan, Kazakhstan and Russian Federation. In the first half of the 20th century, the size of the sturgeon stock depended on natural reproduction in rivers and the volume of harvest. More than 35,000 tons of sturgeons were harvested from the Caspian Sea at the beginning of the century and from 1920 to 1990 the annual tonnage of fish harvested varied from 10,000 to 28,000 metric tons, producing about 90 per cent of the world catch of sturgeons. In the second half of the 20th century, natural reproduction decreased drastically because of hydroelectric development in the rivers of the basin. For example, spawning areas in the Volga River were reduced from 3,390 ha to 430 ha, and the Terek and Kura Rivers could hardly be used for spawning. The decrease in natural reproduction also resulted from a reduction of the river flow, a drop in seawater level and increasing pollution from industrial and agricultural origins.

(Exhibit 52 at 2).

> Monitoring of the state of sturgeon stocks in the sea has been conducted by the Caspian Fisheries Research Institute (KaspNIRKh) for more than 50 years, most recently with the participation of Azerbaijan and Kazakhstan. According to the data collected, the total

number of sturgeons in the sea in 1999 reached 52.3 million individuals, subdivided as follows: 9.3 million beluga, 29.2 million Russian sturgeons and 13.8 million stellate sturgeons. Since 1987 the total number has declined by a factor of two and a half, with the commercial stock reduced to one third, and the spawning population has decreased by a factor of 15. The number of sturgeons entering spawning grounds in the Volga River has decreased by a factor of more than 13 times. The main cause of this drastic decline in adult sturgeon stocks is the illegal sea harvest. This illegal harvest is believed to exceed legal catches several times over, and is conducted most intensively along the western coast of the Caspian Sea.

(Id. at 3).

Figure 6. The Black Sea, Sea of Azov, Caspian Sea, and major rivers. Source: www.geographicguide.net.

3. ***Acipenser gueldenstaedtii***

a. Taxonomy

Acipenser gueldenstaedtii is known by the common names "Russian Sturgeon," "Azov-Black Sea Sturgeon," and "Danube Sturgeon" (Exhibit 8 at 2; Exhibit 21 at 1; Exhibit 22, Description tab). This petition uses *A. gueldenstaedtii*. The full taxonomic classification is shown in Table 3.

Table 3. Taxonomic classification for *Acipenser gueldenstaedii.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser gueldenstaedii*

b. Species Description

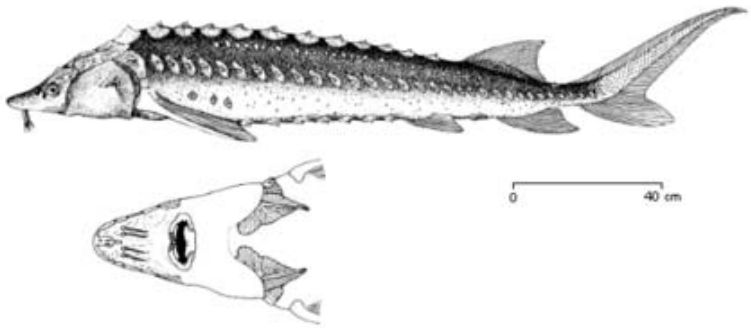

Figure 7. Sketch of *Acipenser gueldenstaedtii*. Source: Exhibit 21 at 1.

There are both freshwater and anadromous populations of *A. gueldenstaedtii* (Exhibit 21 at 1). Freshwater populations existed in the Danube and Volga – both are now extinct (Exhibit 8 at 4). The species has an interrupted lower lip and has five rows of scutes on its dorsal, lateral and ventral sides with smaller bony plates between the dorsal and ventral rows (Exhibit 21 at 4). The species has a short, broad snout that comprises less than 60 percent of the head and is rounded at the tip (Exhibit 22, Description tab; see Figure 7). The species' barbels are close to the tip of the nose, do not touch the mouth, and are not fringed (Id.). *A. gueldenstaedtii* has an olivaceaous gray coloring on its back with light flanks and a white belly (Id.).

c. Life History

At sea *A. gueldenstaedtii* lives mostly in shallow coastal or estuarine zones (Exhibit 8 at 4). Freshwater populations inhabit the deeper depths of large rivers with moderate to swift currents. The species lives in freshwater during the larval and juvenile stages (Id.). It eats benthic mollusks, crustaceans and small fish (Id. at 5).

A. gueldenstaedtii has a complicated spawning migration with runs in both the autumn and the spring (Exhibit 8 at 4). Individuals that run in spring enter freshwater just before spawning and tend to stay in the lower reaches of the river, only reaching 320 – 650 kilometers (~199 to ~404 miles) upstream (Id.). Individuals that run in autumn migrate over the winter and spawn in the spring about 900 – 1200 kilometers (~599 to ~746 miles) upstream (Id.). Males generally mature and reproduce between 9-13 years of age and females generally mature and reproduce between 10-16 years of age (Id.). Spawning occurs every 2-3 years for males and every 4-6 years for females, from April to June (Id.). The generational length of *A. gueldenstaedtii* is believed to be 15 years under natural conditions, but anthropogenic pressures have created generation lengths that range from 12 years in the Caspian to 20 years in the Danube (Id.). Spawning occurs in strong currents in large, deep rivers with a stone or gravel bottom (Id.). Once the eggs are hatched the larvae drift on the currents (Id.). Juveniles move to shallow waters before migrating out to sea during their first summer (Id. at 4-5). Juveniles will remain at sea until they mature (Id. at 5).

d. Range

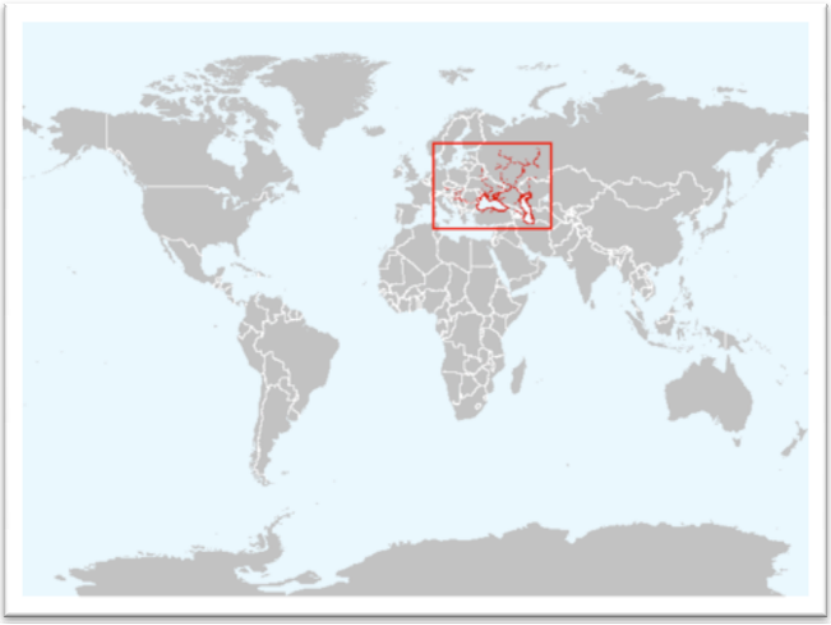

Figure 8. Historic range map of *Acipenser gueldenstaedtii*. Source: Exhibit 8 at 3.

A. gueldenstaedtii is native to Azerbaijan, Bulgaria, Georgia, Iran, Kazakhstan, Moldova, Romania, Russia, Serbia, Turkey, Turkmenistan, and Ukraine (Figure 8); however it is regionally extinct in Austria, Croatia and Hungary (Exhibit 8 at 3). *A. gueldenstaedtii* was historically found in the Caspian, Black, and Azov Sea basins (Id.). Currently, the species is only known in the Caspian Sea, where it spawns in the Ural and Volga rivers, and the Black Sea, where it spawns in the Danube and Rioni (the last recorded spawning in the Rioni occurred in 1999) (Id.). The species is restocked in the Sea of Azov, but reproduction in the adjoining Kura is debatable (Id.).

e. Population Status and Trends

A. gueldenstaedtii was once populous in the Black Sea but is now very rare because nearly all spawning sites have been destroyed by dam construction, with the exception of the lower Danube

River (Exhibit 8 at 2). Likewise, the population in the Caspian Sea has lost 70 percent of its spawning habitat since the 1950s, mainly due to hydroelectric development (Id.). "The last natural population still migrates up the Danube and the Rioni (last recorded in Rioni in 1999), where the sturgeons are heavily overfished and poached. The Caspian populations are also under massive pressure from overfishing and loss of spawning habitats. Almost all migrating spawners are poached below the Volgograd dam. The Ural river still has spawning individuals" (Id.). In total, the wild population of *A. gueldenstaedtii* has declined an estimated 90 percent in the past 45 years (Id.). Global catch declined by 98 percent between 1992 and 2007 (Id. at 4).

f. Threats

Nearly all *A. gueldenstaedtii* spawning habitat in the Black Sea has been destroyed by dam construction, with the exception of the lower Danube River (Exhibit 8 at 2). Likewise, the population in the Caspian Sea has lost 70 percent of its spawning habitat since the 1950s, mainly due to hydroelectric development (Id.). "The Ural is now the only river in the basin with unregulated flow. Flow regulation of the Kuban River has led to the loss of 140,000 ha, and damming of the river Don has removed 68,000 ha spawning ground. For example, in the Yugoslavian section of the Danube, the annual catch dropped from 14,636 kg in 1983 to 1,636 kg in 1985 (a decline of just under 90 percent), this is believed to be due to the construction of the Djerdap (Irongate) II dam which was constructed in 1984, leaving no accessible spawning grounds for the species in the upstream reaches and in former Yugoslavia" (Exhibit 21 at 12, internal citations removed).

Exploitation has been and continues to be one of the most serious threats to this species. "In 1997, the estimated volume of the Moscow sturgeon meat market was three times the annual catch quotas for all sturgeon species" (Exhibit 31 at 25). The IUCN expects that exploitation for caviar will result in the extinction of the natural wild population and the immediate future of the species will depend upon stocking efforts (Id.). Even with massive restocking efforts by Russia and Iran, fisheries are still declining, especially in the Caspian. Global catch declined by 98 percent between 1992 and 2007 (Id. at 4). Despite the decline of *A. gueldenstaedtii*, poaching appears to be increasing (Id. at 5). "Enforcement of legislation regulating the fishery for the species appears to be lacking. In the Caspian Sea and Sea of Azov the illegal sturgeon catch for all species was evaluated to be 6 to 10 times the legal catch" (Id.). Marine and freshwater bycatch is also a threat (Id.).

Oil and industrial waste pollution, and habitat loss due to human activity also threaten *A. gueldenstaedtii* (Exhibit 8 at 5). "High levels of pollution have posed a serious threat to sturgeons in both the Caspian and Black Sea basins. Studies have shown that high levels of toxins, from oil and other industrial waste, have altered hormonal balance, disturbed metabolism and increased the number of hermaphroditic fish. However, since the break up of the Soviet Union, heavy industry and resulting discharges have decreased allowing water quality to improve" (Exhibit 31 at 22). Oil fields may affect spawning and feeding grounds in the northern area of the Caspian. The central Caspian is threatened by radioactive contamination from a nuclear reactor (Id. at 24)

4. ***Acipenser nudiventris***

a. Taxonomy

Acipenser nudiventris is known by the common names "Ship Sturgeon," "Bastard Sturgeon," "Fringebarbel Sturgeon," "Spiny Sturgeon," and "Thorn Sturgeon" (Exhibit 9 at 2). This petition uses *A. nudiventris*. The full taxonomic classification is shown in Table 4.

Table 4. Taxonomic classification for *Acipenser nudiventris.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser nudiventris*

b. Species Description

Figure 9. Photograph of *Acipenser nudiventris*. Source: Exhibit 23 at 1.

A. nudiventris has a moderately long snout that is pointed at the tip with a lower lip that is continuous and not interrupted at the center (Exhibit 23 at 4). The species has barbels halfway between the tip of the snout and mouth (Id.). It has five rows of scutes on the dorsal, lateral and ventral sides, but has no smaller plates between the dorsal and ventral rows (Id. at 4-5). It has a gray coloring on the back with lighter flanks and a white belly (Id. at 5, see Figure 9).

c. Life History

A. nudiventris is anadromous, although there are some non-migratory freshwater populations (Exhibit 9 at 4). *A. nudiventris* lives close to shores and estuaries when at sea (Id.). In freshwater the mature individuals live in the deeper depths of large rivers and juveniles live in shallow riverine habitats (Id.). "This species spawns in strong-current habitats in main course of large and deep rivers on stone or gravel bottom" (Id.). It generally feeds on a variety of benthic fishes, mollusks and crustaceans (Id.). *A. nudiventris* has the highest relative fecundity of any sturgeon species (Id.). Males reproduce for the first time at 6-15 years old and females reproduce at 12-22 years old (Id.).

The average generation length is 15 years, but in the Danube, the average population age has increased and in the Caspian Sea, the average population age is decreasing due to heavy human exploitation (Id.). Males reproduce every 1-2 years and females reproduce every 2-3 years between March and May at temperatures above 10°C (50°F). There are two migratory runs for spawning, one in spring and another in autumn (Id.). Individuals that migrate in autumn remain in the river until spring to spawn (Id.). Juveniles generally move to the sea their first summer and remain there until maturity; some individuals remain in fresh water for a longer period (Id.).

d. Range

Figure 10. Range map of *Acipenser nudiventris*. Source: Exhibit 24.

A. nudiventris historically occurred in Azerbaijan, Georgia, Hungary, Iran, Russia, Serbia, and Turkey (Exhibit 9 at 3, see Figure 10). It is possibly extinct in Romania (Id.). The species has been recorded from the Black, Azov, Caspian, and Aral seas and the Danube, Bratislava, Volga, Kaza, Ural, Chkalov, Don, Kuban, and Rioni rivers (Id. at 2). In the 1960s the species was introduced to Lake Balkhash in Kazakhstan, the upper Illi River in China, and the Syr-Darya River in the Aral basin (Id.). The largest population is the introduced occurrence in Lake Balkhash (Id.).

e. Population Status and Trends

"[*A. nudiventris*] is known from the Black, Aral and Caspian seas. However, it is extirpated from the Aral Sea, nearly extirpated in the Black Sea basin and there are only occasional records from lower Volga. The only remaining population occurs in the rivers Ural (Russia, Kazakhstan) and possibly the Rioni (Georgia - last recorded 1997 through bycatch; there are no recent surveys), and possibly the Safid Rud (seven individuals recorded in 2002) in Iran. In Europe, it is thought that few individuals exist in the Danube - indeed it is considered possibly extinct" (Exhibit 9 at 2). In the Caspian Sea, *A. nudiventris* migrates up the Ural River (a naturally reproducing population), and possibly the Safid Rud River (where it does not naturally reproduce) (Exhibit 9 at 3). The largest population is in Lake Balkash, which is beyond the species' known range and to which the fish were artificially introduced for commercial purposes (Id. at 1). Even though catch data is lacking, it is suspected that the species has declined over 90 percent in the last 45 years and is on the verge of global extinction (Id.).

f. Threats

"Over-harvesting, bycatch, and illegal fishing (poaching) along with dams, water abstraction, and drought, has led to the loss of spawning habitats/ground and has caused massive population declines [of *A. nudiventris*]. In the Caspian Sea and Sea of Azov the illegal sturgeon catch for all species was evaluated to be 6 to 10 times the legal catch" (Exhibit 9 at 4).

> Since the 1950s, almost all spawning rivers for this species, with the exception of the Ural River, have been dammed for hydroelectric power production and almost all the spawning grounds of the Sea of Azov, the Caspian and the Black Sea region have been lost. Consequently, the species' range has been drastically reduced. In addition, pollution has been rapidly increasing since 1979, the main sources being oil, industrial waste and agricultural chemicals and almost all spawning rivers are now heavily polluted… In the former Soviet Union and Iran, strict sturgeon fishery legislation had been in effect for decades until the emergence of the three new independent States in the Caspian Sea basin in 1992. Current information suggests that amendments of previous regulations and/or adoption of new legislation are now in effect in most new range States in the Caspian Sea, as well as in the Black Sea (including the Danube River) and the Sea of Azov basins. In the latter, Bulgaria, Romania and Ukraine are the most important sturgeon fishing nations. However, enforcement measures appear to be lacking and numerous experts as well as government officials have reported an increasing pressure of illegal fishing practices and criminal activities surrounding the caviar trade in much of the range.

(Exhibit 31 at 45, internal citations removed).

Transfers of *Acipenser stellatus* carrying a nematode parasite from the Caspian Sea into the Aral Sea contributed to the extirpation of *A. nudiventris* in the Aral Sea in the late 1960s. Hybridization with other sturgeon species, particularly *A. stellatus*, is also a threat (Exhibit 9 at 4).

5. ***Acipenser persicus***

a. Taxonomy

Acipenser persicus is known by the common name "Persian Sturgeon" (Exhibit 7 at 2). This petition uses *A. persicus*. The full taxonomic classification is shown in Table 5. The species was once considered a subspecies of *Acipenser gueldenstaedtii* (Russian Sturgeon) (Id.). Research in 1973 found morphological, immunological, biological, and reproductive differences between the two sturgeon (Id.). Additional research to find a molecular marker to differentiate the two is ongoing (Id.).

Table 5. Taxonomic classification for *Acipenser persicus.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser persicus*

b. Species Description

Figure 11. *Acipenser persicus* in a hatchery. Source: Exhibit 36 at 1.

A. persicus resembles *Acipenser gueldenstaedtii* but is bulkier and more elongated, with a larger head that comprises 17.6 percent of the total length of the body (Exhibit 36 at 1). It has four barbels located closer to the end of the snout than the mouth (Id.). The species has scutes on its dorsal, lateral, and ventral sides, 31-50 dorsal fin rays, and 16-30 anal fin rays (Id.). It has dark blue to black coloring with white starry bony platelets on its back and a white belly (Id., see Figure 11).

c. Life History

A. persicus is an anadromous species (Exhibit 7 at 2). It lives in coastal and estuarine zones when at sea and spawns in large, deep rivers with strong currents and stone or gravel bottoms (Id. at 4). *A. persicus* feeds on a variety of benthic mollusks, crustaceans and small fish (Id.). The species has an average generation length of 14 years and it does not spawn every year (Id.). Males reach maturity at 7-9 years of age and females at 9-12 years, with a 3-6 year interval between spawning for females (Exhibit 36 at 2). Migration for spawning begins between April and May, but some individuals may enter rivers at other times of the year (Exhibit 7 at 4). "Spawning takes place in June-August when the temperature rises above 16°C. In the southern Caspian basin, the Persian Sturgeon spawns in April-September but reproduction is interrupted from June to August when temperature rises above 25°C" (Id.). There is a second spawning run between September and October in the southern Caspian basin (Id.). Juveniles inhabit riverines during their first summer before migrating out to sea, where they remain until maturity (Id.).

d. Range

Figure 12. Range map for *Acipenser persicus*. Source: Exhibit 7 at 3.

A. persicus is known from the Caspian basin and is most abundant in the southern part (Exhibit 7 at 3). The species historically ascended all the rivers around the Caspian Sea, but now only ascends the lower sections of the Volga and Ural rivers, and possibly the Terek and Kura rivers (Id.). *A. persicus* is native to Azerbaijan, Iran, Russia and Turkmenistan (Id., see Figure 12).

e. Population Status and Trends

Long term stocking of *A. persicus* has made it "difficult to distinguish a decline of the wild population" (Exhibit 7 at 2). But it is estimated that the wild population has declined more than 80 percent over the past 42 years, "as all the wild populations have almost disappeared, apart from the

restocked individuals from Iran" (Id.). Commercial exploitation of this species is only legal in Iran, and it is estimated that 80 percent of Iranian catch is stocked individuals. The Iranian population continues to decline, however. "Iranian catch data shows that there has been between 54-56 percent decline from 1960/65 to 2006; the catch has continued to decline since 2006 but data is not yet available for this time period. The decline in catch does reflect a decline in abundance even though there are fisheries regulations and a reduction in catch effort" (Id. at 3, internal citations removed).

f. Threats

The primary factor in the decline of *A. persicus* is exploitation (Exhibit 7 at 5). "Overfishing at sea for caviar will soon cause extinction of natural populations" (Id. at 2). "In the Caspian Sea, the illegal sturgeon catch for all species was evaluated to be 6 to 10 times the legal catch. Bycatch is also a threat to the species in both rivers and the Caspian Sea" (Id. at 5, internal citations removed). Dams have made some spawning sites inaccessible, and pollution from agricultural and domestic waste degrade spawning habitat (Id.). Oil and industrial pollution has also affected feeding areas (Id.).

6. ***Acipenser stellatus***

a. Taxonomy

Acipenser stellatus is known by the common names "Stellate Sturgeon," "Star Sturgeon," and "Starry Sturgeon" (Exhibit 10 at 2; Exhibit 33 at 1). This petition uses *A. stellatus*. The full taxonomic classification is shown in Table 6.

Table 6. Taxonomic classification for *Acipenser stellatus.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser stellatus*

b. Species Description

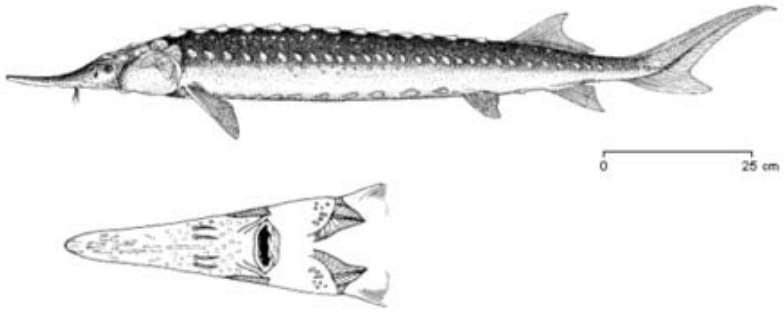

Figure 13. Sketch of *Acipenser stellatus*. Source: Exhibit 33 at 1.

A. stellatus has a long snout that is pointed at the tip with a lower lip interrupted at the center (Exhibit 33 at 5, see Figure 13). Its barbels are short and closer to the tip of the snout than the mouth (Id.). It has five rows of scutes covering the dorsal, lateral and ventral side with smaller, star-shaped bony plates and even smaller grains between the rows of main scutes (Id.). The species has a dark gray to black coloring on the back with lighter flanks and a white belly (Id.).

c. Life History

A. stellatus is an anadromous species; it is found at sea, in coastal or estuarine zones, foraging on clayey sandy bottoms or in the middle and upper water column (Exhibit 10 at 5). It reaches maturity at 6-7 years for males and 7-8 years for females with a generational length of 10 or more years (Id.). The species migrates for spawning when the river reaches higher temperatures (9-16°C (48.2-60.8°F) is required for spawning), making their migration later in the year than other sturgeon species (Id.). There are two migration peaks during spring and autumn (Id.). The species "spawns in strong-current habitats in the main course of large and deep rivers, on stone or gravel bottoms" (Id.). *A. stellatus* can also spawn on flooded riverbanks, on sand or sandy clay bottoms (Id.). They require constant hydrological conditions for spawning because fluctuations can cause high egg mortality (Id.). Males spawn every 2-3 years and females every 3-4 years during April through September (Id.). "Males remain at spawning sites no longer than six weeks and females only 10-12 days," with spent individuals migrating back to the sea (Id.). The yolk-sac larvae remain pelagic for 2-3 days (Id.). Juveniles live in shallow riverine habitats until they "migrate to a sea during their first summer and remain there until maturity" (Id.). When at sea, the species feeds on a variety of crustaceans, mollusks, and benthic and pelagic fish (Id.).

d. Range

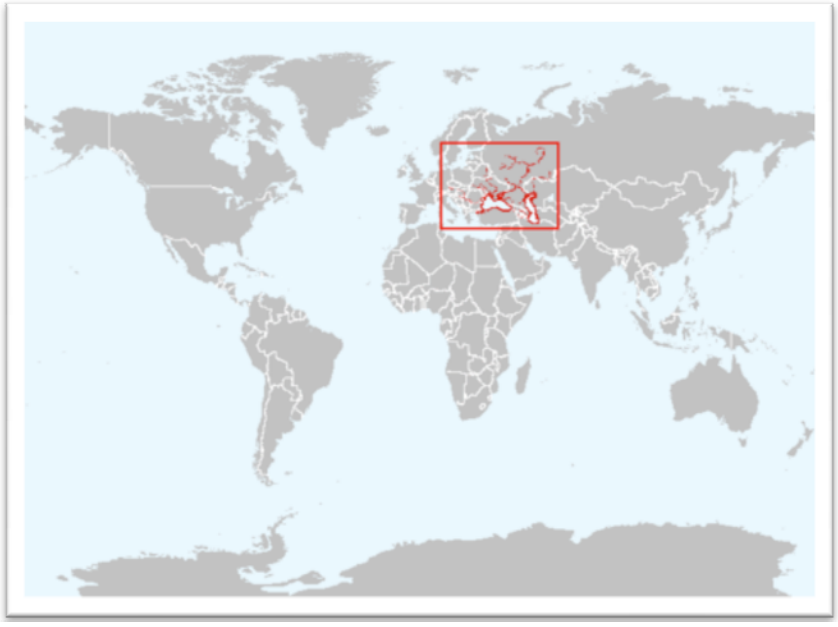

Figure 14. Range map for *Acipenser stellatus*. Source: Exhibit 10 at 3.

A. stellatus was historically known from the Caspian, Black, and Azov seas with rare recordings in the Aegean Sea (Exhibit 10 at 2, see Figure 14). The species is known to spawn in the Volga, Ural,

Terek, Sulak, Kura, Don, Danube, and Kuban rivers (Id.). The species is most abundant in the Caspian Sea (Id. at 3). *A. stellatus* is native to Azerbaijan, Iran, Kazakhstan, Moldova, Romania, Russia, Serbia, Turkey, Turkmenistan, and Ukraine, with uncertain presence in Georgia and possible extinction in Greece (Id.).

e. Population Status and Trends

The total population of *A. stellatus* is declining (Exhibit 10 at 5). The species has declined an estimated 80 percent (possibly close to 100 percent) during the past 30-40 years (Id. at 2), and is expected to continue to decline (Id.). "Catch data shows massive declines across the species' range with a 98 percent decline between 1980 and 2007 in the Caspian Sea, and a 72.5 percent in four years (2002-2005) in Romania (Danube)" (Id.). It is estimated that 100 percent of the population in the Sea of Azov and 50 percent of the Caspian Sea population are from stocking (Id. at 3-4).

The Caspian Sea population is heavily exploited; almost all migrating spawning individuals are poached below the Volgograd dam (Id. at 2). "In 2008 the agreed catch quota for *A. stellatus* for all Caspian Sea countries in 2008 was set at 204 tonnes, including commercial and scientific catch; the quota has not been met" (Id. at 4). Spawning individuals entering the lower Volga have decreased from a peak of 230,000 between 1986 and 1990 to 50,000 between 1998 and 2002 (a decline of 78 percent), and this decline is expected to continue (Id.). Migrating individuals in the Ural have declined 92 percent from 1979 to 2001 with an estimated number of 1,050,000 migrating individuals in 1979 to 87,400 migrating individuals in 2001 (Id.). There is still a high concentration of *A. stellatus* in an area off the island of Ogurchinskii in the southern Caspian Sea, but the population is significantly reduced form the 1991 population.

The last natural population in the Black Sea is heavily exploited when it migrates up the Danube River. Very few spawning individuals remain in the Black Sea (Id. at 2). The wild population in the Black Sea decreased 72.5 percent from 2002 to 2005, halting commercial catch in 2006 (Id. at 4).

f. Threats

The population decline in *A. stellatus* is primarily due to legal and illegal exploitation for meat and caviar (Exhibit 35 at 1-2). "Overfishing will soon cause extinction of the natural populations" (Exhibit 10 at 2). *A. stellatus* is considered one of the three most important species for caviar (Exhibit 35 at 1-2). According to CITES data, caviar from *A. stellatus* represented the largest portion of caviar from all Acipenseriformes traded internationally *circa* 1998 (Exhibit 31 at 71). "In the Caspian Sea and Sea of Azov the illegal sturgeon catch for all species was evaluated to be 6 to 10 times the legal catch" (Exhibit 35 at 1-2). The Caspian Sea population is heavily exploited; almost all migrating spawning individuals are poached below the Volgograd dam (Exhibit 10 at 2).

"In the former Soviet Union and Iran, strict legislation regarding sturgeon fisheries had been in effect for decades until the emergence of three new independent States in the Caspian Sea Basin in 1992 (Azerbaijan, Kazakhstan and Turkmenistan). Current information suggests that amendments of previous regulations and/or adoption of new legislation are now in effect in most new range States in the Caspian Sea as well as in Black Sea (including the Danube River) and Sea of Azov basins. In the latter, Bulgaria, Romania and Ukraine are the most important sturgeon fishing nations. However, enforcement measures appear to be lacking and numerous experts as well as government officials have reported an increasing pressure of illegal fishing practices and criminal

activities surrounding the caviar trade in most of the range" (Id., internal citations removed). Even though restocking occurs, maintaining stocks by aquaculture is insufficient to compensate for the damage to and decline of natural reproduction caused by exploitation (Exhibit 35 at 7). An added difficulty is that, unlike other sturgeon, mature *A. stellatus* are difficult to keep in ponds or hatcheries, so restocking efforts depend on the wild population. Overfishing has prevented hatcheries from capturing enough mature individuals to maintain broodstocks, and as a consequence stocking has severely decreased in the Caspian (Exhibit 10 at 6). "In the mid 1990s, open sea fishing in the Caspian and reputedly high levels of illegal catch served to reduce the number of mature sturgeons to such a level that the Volgograd hatcheries in the Russian Federation were unable to collect mature fish to stock the hatcheries" (Exhibit 31 at 74). No wild mature females have been collected from the Azov Sea (for stocking programs) since 2004 (Exhibit 33 at 13).

Dams also threaten the species by preventing the fish from reaching spawning habitat. The Volgograd dam led to a 40 percent loss of spawning sites in the Volga River (Exhibit 35 at 1-2). The Iron Gate Dams and Don River Dam on the upper and middle Danube River have also caused the loss of many *A. stellatus* spawning sites (Id.). The species is considered extirpated from the upper and middle Danube since the construction of the Iron Gate Dams (Exhibit 10 at 6). "The Don River dam removed 68,000 ha of spawning ground and flow regulation in the Kuban led to the loss of 140,000 ha of spawning grounds" (Exhibit 35 at 1-2).

Pollution and competition for food with introduced fish (Mnemiopsis) are also major threats to *A. stellatus* (Id.). "[P]ollution has far exceeded maximum permissible concentrations in the Volga River and the northern Caspian Sea. However, since 1991 the intensity of industrial development decreased, leading to an improvement in water-quality. The rise of the sea level of the Caspian now threatens to engulf lakes of pollutants along the shore line" (Exhibit 31 at 74, internal citations removed). "In 1990, 55,000 sturgeon were found dead on the shore of the Sea of Azov as the result of pollution" (Exhibit 35 at 1-2).

III. Aral Sea and Tributaries (endemics)

Figure 15. The Aral Sea, Amu Darya River, and Syr Darya River.
Source: Wikimedia Commons.

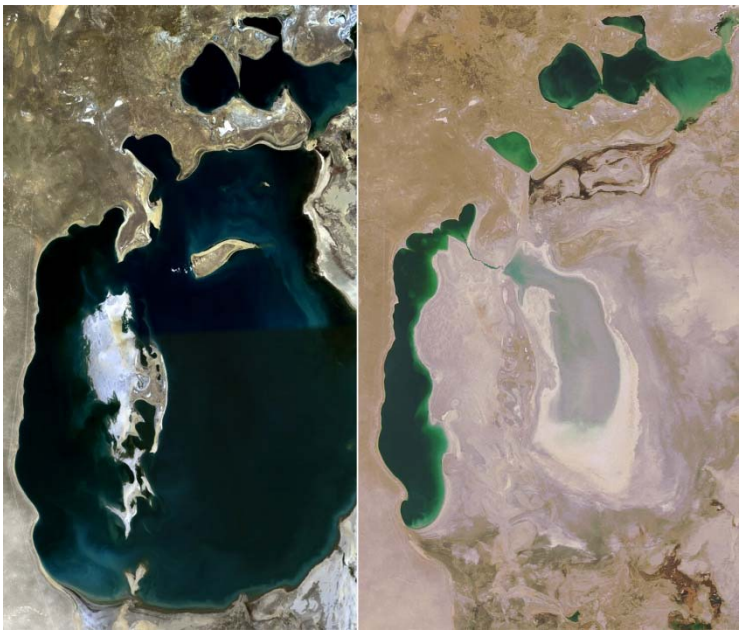

Figure 16. The Aral Sea in 1989 (left) and 2008 (right) as shown by NASA imagery.
Source: Wikimedia Commons.

7. ***Pseudoscaphirhynchus fedtschenkoi***

a. Taxonomy

Pseudoscaphirhynchus fedtschenkoi is known by the common names "Syr-darya Shovelnose Sturgeon" and "Syr Darya Sturgeon" (Exhibit 11 at 2). This petition uses *P. fedtschenkoi*. The full taxonomic classification is shown in Table 7.

Table 7. Taxonomic classification for *Pseudoscaphirhynchus fedtshenkoi.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Scaphirhynchinae
Genus	Pseudoscaphirhynchus
Species	*Pseudoscaphirhynchus fedtshenkoi*

b. Species Description

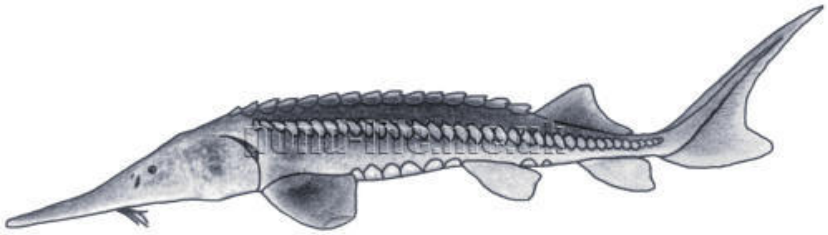

Figure 17. Sketch of *Pseudoscaphirhynchus fedtshenkoi*. Source: Exhibit 30 at 1.

P. fedtshenkoi has a long, flat, shovel-like snout (Exhibit 30 at 1, see Figure 17). It has no spines on the head or snout. The species has 15-22 dorsal scutes, 37-46 lateral scutes, and 6-11 ventral scutes (Id.). Individuals can reach up to 65 centimeters (~2.1 feet) in length and pectoral fins are upturned at the ends (Id.). It has a gray to black coloring on its back and a white belly (Id.).

c. Life History

P. fedtshenkoi is a potamodromous species, meaning it can live in fresh and brackish water (Exhibit 31 at 1). Little information is available on the habitat of *P. fedtshenkoi* due to a lack of current reports (Exhibit 11 at 3). "The species is thought to be able to feed in the Aral Sea (historically) but is adapted to live in freshwater" (Id.). Mature *P. fedtshenkoi* are benthophagous and feed mostly on midge larvae (Id.). "The generation length for this species is unknown, but it is estimated to be between 8 to 10 years" (Id.). Spawning is thought to take place during late April (Id.).

d. Range

Figure 18. Distribution map for *Pseudoscaphirhynchus fedtshenkoi*. Source: Exhibit 30 at 1.

P. fedtshenkoi is endemic to the Syr Darya River and is found in the middle and lower reaches from the Kara Darya River downstream (Exhibit 11 at 2, see Figure 18). The species may be extinct in its historic range in Kazakhstan, Tajikistan, and Uzbekistan (Id.).

e. Population Status and Trends

There have been no records or reports of *P. fedtshenkoi* since the 1960's and it is suspected to be extinct (Exhibit 11 at 3). Surveys are needed to confirm this and the IUCN recommends establishing protected areas in sites where remnant populations might still exist (Id. at 4).

f. Threats

The greatest threat to *P. fedtshenkoi* is the disappearance of the Aral Sea, which shrunk by more than 60 percent from 1973 to 2000 and continues to shrink (Id. at 3, see Figure 16). The sea is now hypersaline and "contains no fishes apart from in a small reservoir in the northeast of the Sea" (Id.). "The Syr Darya River has not reached the sea since 1975 due to large levels of water extraction and damming" (Id.). Agricultural pollution has also affected water quality (Id.).

8. ***Pseudoscaphirhynchus hermanni***

a. Taxonomy

Pseudoscaphirhynchus hermanni is known by the names "Dwarf Sturgeon," "Little Amu-Darya Shovelnose," "Little Shovelnose Sturgeon," and "Small Amu-dar Shovelnose Sturgeon" (Exhibit 4 at 2). This petition uses *P. hermanni*. The full taxonomic classification is shown in Table 8.

Table 8. Taxonomic classification for *Pseudoscaphirhynchus hermanni.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Scaphirhynchinae
Genus	Pseudoscaphirhynchus
Species	*Pseudoscaphirhynchus hermanni*

b. Species Description

Figure 19. Photograph of *Pseudoscaphirhynchus hermanni*. Source: Exhibit 25 at 1.

P. hermanni is the smallest of the sturgeon species reaching only 27 cm (~10.6 in) and weighing 0.5 kg (~1.1 lb) (Exhibit 26 at 1). The species has a long, flat, shovel-nosed snout (Id.). It has rows of scutes on the dorsal, later and ventral sides as well as rays on the doral and anal fins (Id.). The species has four barbels that are closer to the mouth than the end of the snout, the outer barbels being twice the length of the inner ones (Id.). *P. hermanni* has a range of dark brown coloring on its back and has a white belly (Id., see Figure 19).

c. Life History

"The habitat and ecology of [*P. hermanni*] are practically unknown" (Exhibit 4 at 3). Mature *P. hermanni* are benthophagous and feed mostly on midge larvae (Id.). Very little is known about *P. hermanni*'s breeding habits (Exhibit 26 at 2) and the location of spawning sites is uncertain (Exhibit 4 at 2). The generation length is estimated at 3-8 years (Id.).

d. Range

Figure 20. Range map for *Pseudoscaphirhynchus hermanni*. Source: Exhibit 26 at 1.

P. hermanni is known only from the middle of the Amu Darya (Exhibit 4 at 2). It was extirpated from the Aral Sea and the lower Amu Darya River due to of water abstraction (Id.).

e. Population Status and Trends

Although little information is available on *P. hermanni*, "it is suspected that there has been a population decline of more than 80 percent in the past 3 generations" based on available data and on the status of a similar species, *P. kaufmanni*, with which it shares its range (Exhibit 4 at 2). *P. hermanni* is believed to to occur in less than 500 km of river (Id.). *P. hermanni* is very rare; the last confirmed specimens were caught in April 1996 after no recorded captures for 15 years (Id. at 3).

f. Threats

There are current unconfirmed reports of local fishermen catching *P. hermanni* (Exhibit 4 at 2). Poaching remains a threat (Id.). However, the greatest threat to *P. hermanni* is water depletion in the Amu Darya River due to dam construction and water extraction for irrigation. The river has not reached the Aral Sea since 1982 (Id.). Environmental changes from the disappearance of the Aral Sea also impact this species (Exhibit 26 at 1). The Aral Sea shrunk by more than 60 percent from 1973 to 2000 and continues to shrink (Exhibit 11 at 3, see Figure 16). The sea is now hypersaline and "contains no fishes apart from in a small reservoir in the northeast of the Sea" (Id.). In addition, there are high levels of pollution in the Amu Darya River, mainly from agricultural runoff (Exhibit 4 at 2), and *P. hermanni* is sensitive to chemicals in the water (Exhibit 26 at 1).

9. ***Pseudoscaphirhynchus kaufmanni***

a. Taxonomy

Pseudoscaphirhynchus kaufmanni is known by the common names "False Shovelnose Sturgeon," "Amu Darya Shovelnose Sturgeon," "Amu Darya Sturgeon," "Big Amu Darya Shovelnose," "Large

Amu-dar Shovelnose Sturgeon," and "Shovelfish" (Exhibit 5 at 2). This petition uses *P. kaufmanni*. The full taxonomic classification is shown in Table 9.

Table 9. Taxonomic classification for *Pseudoscaphirhynchus kaufmanni.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Scaphirhynchinae
Genus	Pseudoscaphirhynchus
Species	*Pseudoscaphirhynchus kaufmanni*

b. Species Description

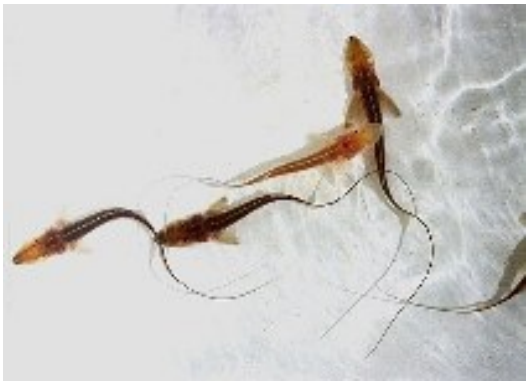

Figure 21. Photograph of *Pseudoscaphirhynchus kaufmanni*. Source: Exhibit 27 at 1.

P. kaufmanni has a shield-shaped head with a broad, shovel-like snout that is completely flat on the lower surface (Exhibit 28 at 1, see Figure 21). The species has small eyes and a small mouth that has divided upper and lower lips (Id.). It has two pairs of evenly placed barbels that are not fringed and 2-4 spines on the snout (Id.). The upper side of *P. kaufmanni* is extended with a long filament and the body has 10-14 dorsal scutes, 30-38 lateral scutes, 6-10 ventral scutes and 4-6 flat scutes between anal and ventral fins and 1-4 scutes posterior to the anal fin (Id.). The species has a grey to black coloring on its back and a white belly (Id.). It is a smaller sturgeon species with an average length of 23.6 cm (~9.3in) and weight of 100.2 grams (~3.5 oz) in data from 1989-1991 (Exhibit 5 at 4). The size and weight of individuals has declined: in 1965-1966, the maximum size was 75 cm and maximum weight was 2 kg; the average body length was 37 cm and the average weight, 241 g (Id.).

c. Life History

P. kaufmanni is a freshwater species but it can tolerate some salinity (Exhibit 5 at 4). *P. kaufmanni* lives in the shallow, muddy waters of rivers that have a fast, turbulent current and sandy or stone-pebble bottoms at a depth of 1-1.5 meters (~3.3 feet - ~4.9 feet) (Id.). Their diet is comprised of small fish and insect larvae (Id.). The species' generational length is estimated at 10 years but the average age is declining (Id.). In the 1960s the average age was between 3-6 years, but by the late 1980s fish 3-4 years of age comprised 78.4 percent of existing populations (Id.). Spawning occurs

from late March to early May in water temperatures ranging from 14-16°C (57.2-60.8°F) (Id.). Males mature at 5-7 years and females mature at 6-8 years with intervals between spawning lasting 4-5 years (Id.).

d. Range

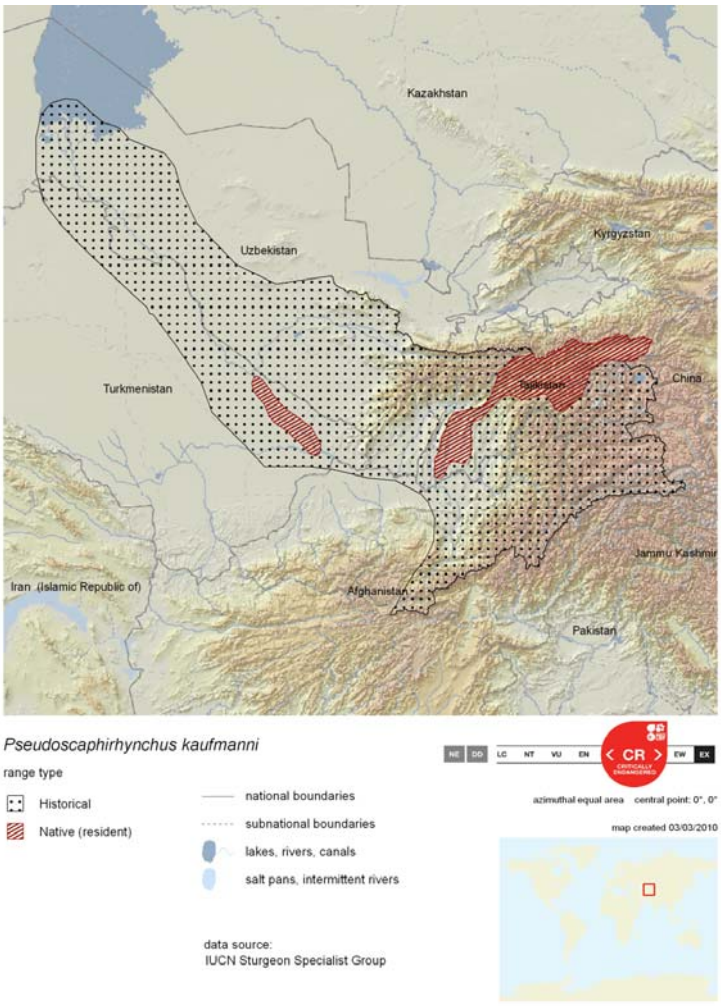

Figure 22. Range map for *Pseudoscaphirhynchus kaufmanni*. Source: Exhibit 29.

P. kaufmanni is endemic to the Amu Darya River (Exhibit 28 at 1). Historically, *P. kaufmanni* populated the Amu Darya from the upper reaches to the delta (Exhibit 5 at 2-3, see Figure 22). The species is native to Turkmenistan and Uzbekistan and there is an uncertain presence in Afghanistan and Tajikistan (Id. at 3). Only two populations remain, in the middle reaches of the Amu Darya River and in the Vakhsh River tributary (Id. at 2).

e. Population Status and Trends

The overall population of *P. kaufmanni* is decreasing (Exhibit 5 at 4). The species was abundant in the 1970s; there has been an estimated 80 percent population decline in the past 30 years (Id.). "It has been extirpated from the Aral Sea and lower Amu Darya due to water abstraction" (Id.). It is believed to occur in less than 500 km of river (Id. at 2).

f. Threats

Water removal due to dams and irrigation, pollution, and poaching are important threats to the species (Exhibit 5 at 2, 4). "[*P. kaufmanni*] occurs exclusively in fast-running turbid waters. It is thought that the low levels of water in the Amu Darya from the middle 1970s until the late 1980s decreased the flow velocity and the size of river beds, preventing migration of [*P. kaufmanni*] from the middle to the lower reaches of the Amu Darya River" (Id. at 4-5). "It has been extirpated from the Aral Sea and lower Amu Darya due to water abstraction" (Id. at 4). The Aral Sea shrunk by more than 60 percent from 1973 to 2000 and continues to shrink (Exhibit 11 at 3, see Figure 16). The sea is now hypersaline and "contains no fishes apart from in a small reservoir in the northeast of the Sea" (Id.). There are high levels of pollution in the Amu Darya River, mainly from agricultural runoff (Exhibit 5 at 4), and the species is "[a]pparently sensitive to oxygen content in the water, changes in its chemical content, and to pollution" (Exhibit 27 at 2). The reproductive rate of *P. kaufmanni* is very low (Exhibit 5 at 3).

IV. Amur River Basin/Sea of Japan/Sea of Okhotsk

Figure 23. Major rivers of the Amur River Basin. Source: Wikimedia Commons.

10. *Acipenser mikadoi*

a. Taxonomy

Acipenser mikadoi is known by the common name "Sakhalin Sturgeon" (Exhibit 13 at 2). This petition uses *A. mikadoi*. The species was thought to be conspecific with the North American Green Sturgeon (*Acipenser medirostris*), but its taxonomic status is now clarified and it is recognized as a distinct species (Id.). The full taxonomic classification is shown in Table 10.

Table 10. Taxonomic classification for *Acipenser mikadoi*. Source: Exhibit 37 at 1.

Order	Acipenseriformes
Family	Acipenseridae
Genus	Acipenser
Species	*Acipenser mikadoi*

b. Species Description

Figure 24. Sketch of *Acipenser mikadoi*. Source: Exhibit 38 at 3.

A. mikadoi has lower lip that is split down the middle and four barbels that are nearer to the mouth than the tip of its snout (Exhibit 38 at 1, see Figure 24). The species has "8-12 dorsal scutes, 25-30 lateral scutes, 7-11 ventral scutes, 29-41 dorsal fin rays and 18-28 anal fin rays" (Id.). *A. mikadoi* can grow up to 2.5 meters (8.2 feet) in length and weigh up to 150 kilograms (330.7 pounds); it has olive to dark green coloring on its back and a "yellowish green-white" belly with an "olive-green stripe on side between the lateral and ventral scutes" (Id.).

c. Life History

A. mikadoi is a benthic feeding species and lives in higher salinity waters than other sturgeon in its range (Exhibit 13 at 3). "Estuaries are thought to be the nursery grounds for the species" (Id.). The species feeds mainly on shrimp, crabs, worms, amphipods, isopods, sand lances, and other fish (Exhibit 38 at 3). *A. mikadoi* has an estimated generation length of 15 years and reaches maturity between 8-10 years of age (Exhibit 13 at 4). "[*A. mikadoi*] spawn in June-July in the Tumnin River and April and May in the rivers of Hokkaido" (Id.). Spawning occurs at water temperatures of 7.2-11.5°C (45-52.7°F) and juveniles migrate to the sea in the fall of the same year they were spawned (Exhibit 41 at 3).

d. Range

Figure 25. Range Map for *Acipenser mikadoi*. Source: Exhibit 13 at 3.

A. *mikadoi* is historically native to the northwest Pacific Ocean in Japan and Russia. It has an uncertain presence in China, South Korea, and North Korea (Exhibit 13 at 2). "It is found at sea, throughout the Sea of Okhotsk, in the Sea of Japan as far east as the eastern shore of Hokkaido, Japan, along the Asian coast as far south as Wonsan, North Korea, and to the Bering Strait on the coast of the Kamchatka Peninsula" (Id.). During migration the species historically ascended Russian coastal rivers (the Suchan, Adzemi, Koppi, Tumnin, Viakhtu, and Tym Rivers) and the Ishikari and Teshio Rivers of Japan (Id.). It was also known from mouths of small rivers of the Asian far east and Korean Peninsula, as well as the Amur River, and rivers of the Sakhalin Island (Exhibit 39 at 2). Now, the species spawns persistently only in the Tumnin River (Id.).

e. Population Status and Trends

The overall population of *A. mikadoi* is decreasing and has been declining over the past century (Exhibit 13 at 3). "Current population estimates range from ten to thirty adults entering the Tumnin River for spawning annually" (Id.). Over the past 45 years there has been an estimated 80 percent decline in wild, mature individuals (Id. at 2). "It was common in the fish markets of Japan in the 1950s and now only a few specimens are found per year" (Id.).

f. Threats

The Tumnin is the only known spawning location for the species and illegal poaching during the migration run is contributing to population decline (Exhibit 13 at 2). This population could vanish within the next 10-15 years (Id. at 4). Bycatch from trawling off the coast is also a threat (Id.). Pollution from agriculture, oil production, and mining is degrading habitat quality (Id. at 2).

11. ***Acipenser schrenckii***

a. Taxonomy

Acipenser schrenckii is known by the common name "Amur Sturgeon" (Exhibit 3 at 2). The species has two morphs – brown and gray – but the morphological, genetic, or ecological relationship between these two morphs has not been examined (Id.). This petition refers to the whole species as *A. schrenckii*, unless otherwise noted. The full taxonomic classification is shown in Table 11.

Table 11. Taxonomic classification for *Acipenser schrenckii*.

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser schrenckii*

b. Species Description

Figure 26. Photograph of *Acipenser schrenckii*. Source: Exhibit 34 at 1.

A. schrenckii have four fringed barbels halfway between the end of the snout and the mouth. (Exhibit 35 at 1). The species' lower lip is split down the middle and it has "11-16 dorsal scutes, 32-47 lateral scutes, 7-16 ventral scutes, 38-53 dorsal fin rays and 20-35 anal fin rays" (Id.). *A. schrenckii* can reach 3 meters (9.8 feet) in length and weigh 190 kilograms (418.8 pounds) (Id.). *A. schrenckii* has a gray-brown back and a pale belly (Id., see Figure 26).

c. Life History

A. schrenckii is a freshwater species with a generation length ranging from 12 to more than 45 years (Exhibit 3 at 3). *A. schrenckii* live in all types of benthic habitats in rivers and lakes (Id.). Males reach maturity at 7-8 years of age and females at 9-10 years of age (Exhibit 35 at 2). "Spawning periodicity is 4-5 years in females and 3-4 years in males" (Exhibit 34 at 4). Migration for spawning occurs in autumn and spawning takes place between May and July on pebble or stony river bottoms

at a water temperature between 15-20°C (59-68°F) (Exhibit 35 at 2). "The maximum reported age for [*A. schrenckii*] is 65 years" (Id.). During spawning it inhabits rivers with strong currents and gravel or sandy-gravel bottoms (Id.). The species feeds on insect larvae, crustaceans, and small fish (Exhibit 35 at 2).

> [*A. schrenckii*] form local stocks, and it appears that an entire life cycle of each stock occurs in constrained segments of the Amur River, with the fish found in the lower reach of the Amur River utilizing the estuarine waters. Brown morphs are rare and restricted to the middle and lower reaches of the Amur River… and grow more slowly than do the grey ones. There are a few small local concentrations of brown morph. While the [grey morphs] are found in the estuary, middle, and lower reaches of Amur River, and the Zeya-Bureya lowlands, [they are] believed to be on the brink of extinction. The grey morph's mainstem populations seem to constitute a single stock dependent on each other for viability, the Zeya-Bureya lowlands populations appear to be independent of these populations. Meanwhile, in the upper middle Amur River, between Heihe and Qingdeli, fish of the same age are larger than stocks in the lower middle reach, and the spawning individuals in the lower middle reach are older than those in the upper middle reach.

(Exhibit 3 at 2, internal citations removed).

d. Range

Figure 27. Range map for *Acipenser schrenckii*. Source: Exhibit 3 at 3.

A. schrenckii is native to China and Russia, inhabiting the Amur River basin from the estuary to the upper reaches. It is found in tributaries of the Shilka, Onon, Argun, Nerch, Sungari, Nonni, and Ussuri Rivers, with a rare occurrence possible in Lake Khanka (Exhibit 3 at 2-3, see Figure 27).

e. Population Status and Trends

The overall population of *A. schrenckii* is decreasing (Exhibit 3 at 3). "At the turn of the century the

highest volumes of *A. schrencki* [sic] were caught in the middle Amur River where both brown and grey morphs of the species occur" (Exhibit 31 at 66). Total tonnage caught in the Amur River basin declined from 607 tons in 1891 to 14 tons in 2006 (Exhibit 3 at 3). Continued fishing pressure has reduced the species numbers an estimated >95 percent in the past ~50 years (Id. at 2). Government records from China indicate that sturgeon catches (including both *A. schrenckii* and *Huso dauricus*) on the Chinese side of the Amur River peaked in 1987 at 452 tons, dropped to 136 tons in 1997 and then increased to 149 tons in 1998 and 141 tons in 1999 (Exhibit 31 at 66).

f. Threats

Legal and illegal exploitation and environmental pollution threaten the continued existence of this species (Exhibit 3 at 4).

> Unlike many of the large rivers in the region, the Amur has not been affected by construction of hydroelectric dams. However, it is feared that hydroelectric dams would restrict access to many spawning sites. The river has been polluted by oil products, mineral fertilizers and by-products of gold mining operations. Agricultural pollution downstream from towns is increasing from both the Russian and Chinese sides. The effects of pollution on sturgeon have not been studied. The main threat appears to be overexploitation, particularly in the middle Amur (Heilong) River, where both Chinese and Russian fisherman are operating… Current information suggests that amendments of previous regulations and/or adoption of new legislation are in effect in both range States. However, enforcement measures appear to be lacking and numerous experts as well as government officials have reported increasing pressure from illegal fishing practices and criminal activities such as sturgeon poaching and black markets which occur in a large part of the range.

(Exhibit 31 at 66, internal citations removed).

12. ***Huso dauricus***

a. Taxonomy

Huso dauricus is known by the common name "Kaluga Sturgeon" (Exhibit 6 at 2) or "Great Siberian Sturgeon" (Exhibit 31 at 97). This petition uses *H. dauricus*. The full taxonomic classification is shown in Table 12.

Table 12. Taxonomic classification for *Huso dauricus.*

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Huso
Species	*Huso dauricus*

b. Species Description

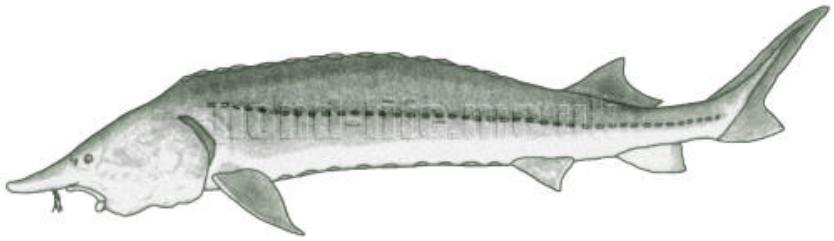

Figure 28. Sketch of *Huso dauricus*. Source: Exhibit 33 at 3.

H. dauricus is one of the world's largest freshwater fishes, with mature individuals exceeding 5.6 meters in length (~18.4 feet) and 1 ton in weight. An individual can live for over 80 years (Exhibit 31 at 98). *H. dauricus* has a crescent-shaped mouth with flat barbells (Exhibit 32 at 1, see Figure 28). The species has 10-16 dorsal scutes, 8-12 ventral scutes, 43-57 dorsal fin rays, and 26-35 anal fin rays (Id.).

c. Life History

H. dauricus is a semi-anadromous species, spending some of its life in salt water but most of its life in freshwater (Exhibit 6 at 3). *H. dauricus* inhabits all types of benthic habitats in the large river and lakes of the Amur River basin (Id.). Young enter the Sea of Okhotsk during the summer (Exhibit 31 at 97). One-year-old juveniles feed on invertebrates but after 3-4 years switch to feeding on adult fish. Cannibalism is common (Id. at 98). The species has a generation length of 20 or more years and has spawning intervals of 4-5 years for females and 3-4 years for males (Exhibit 6 at 3-4). Females mature at 14-23 years of age, and males mature at 14-21 years of age (Exhibit 32 at 2). Spawning occurs from May through July at water temperatures of 12-20°C, over pebble deposits in the main riverbed (Id.). "There are four recognized populations of [*H. dauricus*]; one in the estuary and coastal brackish waters of the Sea of Okhotsk and Sea of Japan; the second in the lower Amur; the third in the middle Amur and the fourth in the lower reaches of the Zeya and Bureya rivers. The estuary population is divided into freshwater and brackish water morphs" (Id. at 1).

d. Range

Figure 29. Range map for *Huso dauricus*. Source: Exhibit 32 at 1.

H. dauricus historically inhabited the entire Amur River from its estuary to its uppermost sections and its tributaries, including the Shilka, Onon, Argun, Nerch, Sungari, Nonni, Ussuri, and Neijian Rivers (Exhibit 6 at 2, see Figure 29). Young individuals appeared in the Sea of Okhotsk and the Sea of Japan. The species is native to China and Russia (Id.).

e. Population Status and Trends

H. dauricus has been in sharp decline in both stock and recruitment since the nineteenth century, with an 80 percent decline in population from the late 1800s to 1992 (Exhibit 6 at 2). "Official catch records of *H. dauricus* in the Russian Federation and the former USSR dropped from 595 [tons] in 1881 to 61 [tons] in 1948, and was 89 [tons] in 1996… Between 1993 and 1997, meat of *H. dauricus* was observed for sale both in markets and in shops in Khabarovsk, Komsomolsk-on-Amur, Nikolayevsk-on-Amur and Vladivostok. Official records in China indicate that the combined annual catches of [*A. schrenckii*] and *H. dauricus* fluctuated inconsistently since the 1950s" (Exhibit 31 at 99, internal citations removed). In the last fifteen years the species has continued to decline and the average age of *H. dauricus* is decreasing due to poaching for caviar (Exhibit 6 at 2).

f. Threats

H. dauricus population decline is primarily due to exploitation (Exhibit 32 at 2). The average age of the species is decreasing due to poaching for caviar (Exhibit 6 at 2). Poaching results in most females reproducing only once during their lifespan (Id.). Sexually mature fish account for only 2-3 percent of the population (Exhibit 32 at 2). "As a result of the species' late maturation and generally low reproductive rate, the population decline is expected to continue, especially in the middle Amur" (Exhibit 31 at 98).

> In contrast to most large rivers, the Amur River has not been dammed. However, the revival of certain dam construction plans would threaten to block access to a great number of spawning sites. Investigations on ovaries by Svirskii showed that a parasite *Polypodium hydroforme* decreased the fecundity of *H. dauricus* by approximately 19 percent. In addition,

water pollution (heavy metals, oil products, phenol, mineral fertilizers and gold mining by-products) in the Amur has increased in recent years from both the Russian and Chinese banks. However, studies of the effects of pollution on sturgeon have not been undertaken. Information provided suggests that amendments to previous regulations and/or adoption of new legislation are in effect in both range States, China and the Russian Federation. However, enforcement measures appear to be lacking and numerous experts as well as government officials have reported increasing pressure from illegal fishing practices and criminal activities around sturgeon poaching and black markets that have been reported in a large part of the range.

(Exhibit 31 at 98-99, internal citations removed).

V. Siberia

Figure 30. Map of Siberia showing the Ob, Irtysh, and Lena rivers and Lake Baikal. Source: www.lib.utexas.edu.

13. ***Acipenser baerii***

a. Taxonomy

Acipenser baerii is known by the common name "Siberian Sturgeon" (Exhibit 14 at 2). "According to Ruban (1997), at present the Siberian sturgeon consist of three subespecies: the nominal *A. baerii baerii* Brandt, 1869 from the Ob river basin, *A. baerii baicalensis* Nikolskii, 1896 from the Lake Baikal basin, and *A. baerii stenorrhynchus* Nikolskii, 1896 from other Siberian waters" (Exhibit 44 at 3). This petition refers to the entire species as *A. baerii*. The full taxonomic classification is shown in Table 13.

Table 13. Taxonomic classification for *Acipenser baerii*.

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser baerii*

b. Species Description

Figure 31. Sketch of *Acipenser baerii*. Source: Exhibit 44 at 1.

A. baerii has a varying snout length which can comprise anywhere from 33.3-61 percent of its head (Exhibit 44 at 1, see Figure 31). The species has smooth or slightly fringed barbels on its snout and its gill membranes are joined to the isthmus (Id.). It has 10-12 ventral scutes, 32-62 lateral scutes, and 7-16 ventral scutes (Id.). Juveniles have sharply tipped scutes, but these disappear in adulthood (Id.). The species has smaller bony plates that are scattered between the rows of scutes (Id.). The coloration of the species varies from light gray to dark brown on its back and white to yellow on the belly (Id.). *A. baerii* have been known to reach 2 meters (~6.56 feet) in length and 210 kilograms (~463 pounds), but they generally do not reach more than 65 kilograms (~143.3 pounds) (Id. at 2). In the Lena and Kolyma Rivers, *A. baerii* are usually much smaller, around 16 kilograms (~35.3 pounds) (Id.).

c. Life History

A. baerii is a semi-anadromous species (Exhibit 44 at 2) that lives in many types of freshwater benthic habitats in large rivers and lakes (Exhibit 14 at 4). There are two forms in the Siberian River basins: a semi-migratory form that remains in estuaries or river deltas for feeding and makes an upstream migration to spawn, and a more sedentary form that is generally resident in one locality and is considerably less numerous than the migrating form (Exhibit 44 at 2). *A. baerii* feeds mainly on benthic organisms including chironomid larvae and river amphipods, isopods, and polychaetes (Exhibit 31 at 5). During the day they remain at deeper depths and sometimes congregate at the bottom of lakes (Exhibit 44 at 2). In Lake Baikal they are found at a depth of 20-50 meters, but they may descend as deep as 100-150 meters. They are most numerous in the middle and downstream sections of rivers (Id.). They enter brackish water and travel into the bays of the Arctic Ocean (Id.). The species has generational length of 25-30 years with spawning occurring every 2-3 years for males and every 3-5 years for females (Exhibit 14 at 4). Spawning occurs between June and July in the middle and lower reaches of large rivers, in habitats with strong currents over stone or gravel bottoms (Id.) and at a water temperature of 9-18°C (Exhibit 44 at 2). “The average age at maturity for females is 11 (in Lena River) to 22 (in Lake Baikal), and 9-19 years for males” (Id.). *A. baerii* may live up to sixty years (Exhibit 31 at 3).

d. Range

Figure 32. Range map for *Acipenser baerii*. Source: Exhibit 14 at 3.

Historically, *A. baerii* was native to China, Kazakhstan, Mongolia, and Russia (Exhibit 14 at 3, see Figure 32). The species was extirpated from China's Irtysh River in the 1950s, but a small population remains in the Xin Jiang province due to stocking (Id.). The species has the highest populations in the Ob, Yenisei, and Lena rivers in Siberia (Id.). *A. baerii* was historically known from "all Siberian rivers draining to the Kara, Laptev, and East Siberian seas: basins of the Ob, Taz, Yenisei, Pyasina, Khatanga, Anabar, Olenyek, Lena, Yana, Indigirka, Alazeya (rarely), and Kolyma rives, Lake Baikal (the Yenisei River basin) and rivers flowing to the lake – the Selenga, Barguzin, and Upper Angara" (Id.).

e. Population Status and Trends

The *A. baerii* population is decreasing (Exhibit 14 at 4). Between the 1930s and the 1990s, annual commercial catch in the Ob River basin, which contains ~80 percent of the global population of *A. baerii*, declined 99.5 percent (Id. at 2), from 1,410 tons in the 1930s to 11 tons in 1997 (Exhibit 31 at 3). The Yenisei River commercial catch decreased 97.5 percent in ~60 years, from 504 tons in 1934, to 16 tons in the late 1990s, to 10-12 tons in the 2000s (Exhibit 14 at 3, Exhibit 31 at 3). The Lena River commercial catch decreased 94.5 percent in ~50 years, from 190 tons in 1943, to 13-20 tons in the late 1990s, to 10 tons in the 2000s (Exhibit 14 at 3-4, Exhibit 31 at 3). "The stock decline started in the 1930s, when demand was significantly high, and continues to decline" (Exhibit 14 at 2). The total global population decline is estimated at 50-80 percent over the past 60 years, and the decline is expected to continue (Id.). "The populations inhabiting the Ob-Irtysh basin and Lake Baikal are included in the Russian Federation Red Book, with stocks having declined throughout the country" (Exhibit 31 at 3-4).

f. Threats

The decline of *A. baerii* is primarily due to legal and illegal exploitation and to dam construction for

hydroelectric power (Exhibit 14 at 2). Forty percent of the spawning habitat in the Ob-Irtysh River has been lost due to construction of the Novosibirsk, Ust'-Kamengorsk and Shul'binsk hydroelectric power stations. The Yenisei River and Lena River populations have been similarly affected, losing 500-600 km and 300 km of habitat respectively (Exhibit 31 at 5). Water pollution from mining is thought to have sterilized female fish and caused other abnormalities of the reproductive system in 80-100 percent of females in the populations present in the Ob and Kolyma rivers, leading to a decline in reproduction (Exhibit 14 at 2). "The development of oil extraction facilities and the use of pesticide in agriculture in the [Yenisei] River have polluted Siberian rivers… In the 1980s, oil and petroleum products in the Ob River exceeded permissible levels by a factor of ten. Many Siberian rivers are contaminated by radioactive substances and eastern Siberian rivers are polluted by the gold mining industry" (Exhibit 31 at 5, internal citations removed). *A. baerii* is slow to recover population numbers because of late maturity and lengthy intervals between spawning; restoration, even through restocking measures, will take several generations (Exhibit 14 at 2).

A. baerii is one of the most commercially valuable fishes in Siberia. The populations are considered "overfished" in Lake Baikal and the Yenisei River (Exhibit 44 at 3). High levels of poaching are reported from the main sturgeon rivers of Siberia (the Ob and Yenisei) (Exhibit 14 at 4). "Law enforcement appears to be lacking and numerous experts as well as high position officers claim that the wild population is highly threatened by increasing illegal fishing and trade in caviar in a large part of the range" (Exhibit 31 at 5).

VI. Yangtze River

Figure 33. Map of China showing the Yangtze River and East China Sea. Source: geography.howstuffworks.com.

14. ***Acipenser dabryanus***

a. Taxonomy

Acipenser dabryanus is known by the common names "Yangtze Sturgeon," "Dabry's Sturgeon," and "River Sturgeon" (Exhibit 15 at 2). This petition uses *A. dabryanus*. The full taxonomic classification is shown in Table 14.

Table 14. Taxonomic classification for *Acipenser dabryanus*.

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser dabryanus*

b. Species Description

Figure 34. Photograph of *Acipenser dabryanus*. Source: Exhibit 41 at 1.

A. dabryanus has many bony plates on the skin with "8-13 dorsal scutes, 26-39 lateral scutes and 9-13 ventral scutes" (Exhibit 40 at 1). The species has its gill membranes joined to the isthmus (Id.). It has a short, pointed snout with two pairs of barbels in the belly of the snout and lips with small papilla (Exhibit 41 at 1). The average length of *A. dabryanus* is 31.8 centimeters (~1.04 feet); the longest recorded was 250 centimeters (~8.2 feet) (Id.). "The body colour above the lateral row of scutes is dark gray, brown-gray, or yellow-gray; the rest of the body is milky white. In young individuals, the lateral row of scutes is a distinct demarcation line" (Exhibit 40 at 1, see Figure 34).

c. Life History

A. dabryanus lives only in freshwater habitat (Exhibit 15 at 3). "It usually inhabits the middle and lower layers of the water and prefers slow moving water that is rich in humus, and feeds on demersal organisms (those that live at or near the bottom of a body of water)" (Id.). Young fish often remain in sandy shallows and feed almost entirely on zooplancton and oligochaetes (Exhibit 40 at 2). Older individuals eat primarily oligochaetes and small fishes, such as gobiids, as well as

chironomids, odonates and aquatic plants (Id.). They prefer sublitoral areas, 10-20 meters from the riverbank, with water depths of 8-10 meters (Id.). *A. dabryanus* are more active at night than during the day (Id.). *A. dabryanus* is a relatively small sturgeon species (Exhibit 15 at 3) with the most common length at around 32 cm (Exhibit 41 at 1). The species has two spawning runs, one in the spring between March and April and the other in the fall between October and December in the upper section of the Yangtze River (Exhibit 15 at 3-4). "Its key spawning reach is between Maoshui and Heijang" (Id. at 4). They swim upstream to spawn during spring floods; their eggs are sticky and firmly adhere to stones (Exhibit 40 at 2). Males mature at 4-7 years and females mature at 6-8 years (Id.).

d. Range

Figure 35. Range map for *Acipenser dabryanus*. Source: Exhibit 15 at 3.

A. dabryanus is native to China and historically inhabited the upper and middle sections of the Yangtze River and the tributaries of the Ming, Tuo Jialing, Xiang, and Han rivers as well as the large lakes attached to the Yangtze River system (Exhibit 15 at 2, see Figure 35). The species is currently restricted to the upper section of the Yangtze River and its tributaries: the Ming, Tuo, Jialing, Xiang, and Han rivers in the Sichuan Province (Id.).

e. Population Status and Trends

The total population of *A. dabryanus* is declining (Exhibit 15 at 3) and the naturally occurring population is very small; it is possible the species only survives in the wild due to stocking (Id. at 2). Since 2007, more than 5,000 individuals have been released into the upper reaches of the Yangtze River for stock rehabilitation, but there is no evidence that stocked animals are reproducing in the wild (Id.). *A. dabryanus* is now restricted to the upper section of the Yangtze River in the Sichuan Province after being extirpated from the lower reaches of the river (Id.). The species was historically important for commercial fisheries in the Yangtze River, but during the late twenthieth century overfishing and habitat degradation caused the population to decline (Id.). "Incidental catch data between 1982 and 2008 indicate that since 1982 only tens of specimens are being captured

annually" (Id.). None have been captured below the Gezhouba Dam since 1995 (Id. at 3). "The stock has dropped markedly during the past 20 to 30 years and now the production is so small and scattered that no exact account of total production is reported" (Id.).

f. Threats

The species has very low population resilience, with the minimum time to achieve a doubling of the population estimated to exceed 14 years (Exhibit 41 at 2).

> This species has historically experienced unsustainable levels of fishing. Furthermore, mesh sizes of fishing nets have reduced, thereby capturing young, especially during the periods when many juveniles concentrate to feed. Fishing effort and intensity has also increased in the past, for example in the Neijiang reach of the Tuo River there were only 500 fishing boats in 1950s, but this number increased to about 2000 by 1985. In the Leshan Reach of the Ming River, drift gill nets are crowded together from day to night. The primary traditional fishing season in the main stream of Yangzte River is between March and August, with more than 30 percent of the catch processed between April and May. However, this is also spawning season of *A. dabryanus*, therefore spawning stock are particularly vulnerable to capture. Furthermore, the construction of the Gezhouba Dam in 1981 and the Three Gorges Dam in 2003 have caused major adverse effects to the habitat of this species and have resulted in a reduction in the area of occurrence of this species, which is now restricted to the upstream river, above the dams. More recently, the construction of the Xiangjiaba Dam in 2008 is situated in the middle of this species spawning reach and therefore is expected to adversely affect the population through habitat fragmentation and associated habitat degradation. Additionally pollution from increasing human development affects the entire Yangtze basin. Much untreated wastewater discharges into the river each year. Water quality is also affected by run-off caused by deforestation of the upper Yangtze Valley.

(Exhibit 15 at 4, internal citations removed).

15. *Acipenser sinensis*

a. Taxonomy

Acipenser sinensis is known by the common name "Chinese Sturgeon" (Exhibit 12 at 2). The species is divided into two populations: the Pearl River Chinese Sturgeon and the Yangtze River Chinese Sturgeon (Id. at 1). The Pearl River Chinese Sturgeon spawns in spring and is close to extinction (Id.). The Yangtze River Chinese Sturgeon population spawns in the fall and has a presence below the Gezhouba Dam (Id.). There is disagreement about the taxonomy of the two populations (Id.). This petition refers to the populations collectively as *A. sinensis* unless otherwise noted. The full taxonomic classification is shown in Table 15.

Table 15. Taxonomic classification for *Acipenser sinensis*.

Order	Acipenseriformes
Suborder	Acipenseroidei
Family	Acipenseridae
Subfamily	Acipenserinae
Genus	Acipenser
Species	*Acipenser sinensis*

b. Species Description

Figure 36. Photograph of *Acipenser sinensis*. Source: Exhibit 12 at 1.

A. sinensis is a large species reaching up to 5 meters (16.4 feet) in length and weighing up to 450 kilograms (~992 pounds) (Exhibit 42 at 1). They have "10-17 dorsal scutes, 29-45 lateral scutes, 11-17 ventral scutes, 50-66 dorsal fin rays, and 32-40 anal fin rays" (Id.). The species has gray-black coloring on its back, red-brown or gray coloring on its sides, and a white belly (Id., see Figure 36). "The maximum reported age for [*A. sinensis*] is 50 years" (Id. at 2).

c. Life History

A. sinensis is anadromous; juveniles live in estuaries and near coastlines and migrate upriver when they become sexually mature (Exhibit 12 at 4). Males reach sexual maturity at 8-18 years of age and females at 13-28 years of age (Exhibit 42 at 2). Adults reach the mouth of the Yangtze River between June and July and reach the middle of the river in September or October where they spawn and overwinter (Exhibit 12 at 4), spawning the following October-November at water temperatures of 15-20^{o}C (Exhibit 42 at 2). "The roe is very large and it sinks and sticks to gravel until hatching" (Exhibit 12 at 4). The larvae hatch after 4-6 days at 16.5-18^{o}C and juveniles remain in the river for a year before migrating to the sea (Exhibit 42 at 2). Before the Gezhouba Dam was constructed the migration distance of *A. sinensis* was as long as 2,500-3,300 kilometers (Exhibit 12 at 4). "Currently, there is just one remaining spawning ground, which is situated below the Gezhouba

Dam" (Id. at 2). *A. sinensis* feed on aquatic insect larvae, shrimps, crustaceans, and fishes (Exhibit 42 at 3).

d. Range

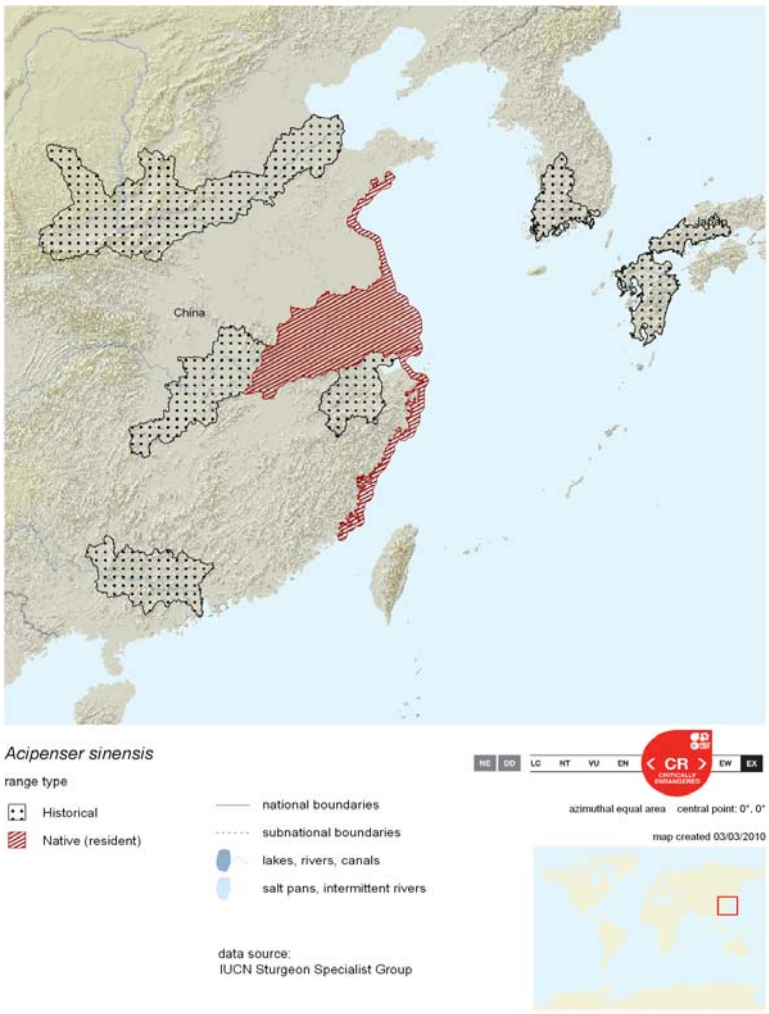

Figure 37. Range map for *Acipenser sinensis*. Source: Exhibit 43.

A. sinensis is native to the northwest Pacific Ocean with a historical presence in China, Japan, North Korea, and South Korea (Exhibit 12 at 3, see Figure 37). In China, the species historically occurred in the Yellow, Yangtze, Pearl, Mingjiang and Qingtang rivers, but is now extirpated from all of these rivers except for the middle and lower reaches of the Yangtze (Id. at 2). At sea *A. sinensis* occurs close to the shores of the Yellow and East China seas (Id.).

e. Population Status and Trends

The overall population of *A. sinensis* is decreasing; there has been an estimated 97.5 percent decline in the spawning population over a 37-year period (Exhibit 12 at 4). The species was a major commercial resource in the 1960s, but by the end of the 1970s yearly catch declined to 500 fish (Id. at 3). The average size of the spawning population declined from ~10,000 in the 1970s to ~2,200

individuals in the early 1980s (Id. at 4). Recent surveys between 2005 and 2007 show the total spawning population to be 203-257 individuals (Id.).

f. Threats

Habitat fragmentation, alteration, destruction, and changes to hydrological conditions, mainly due to dam construction, have significantly affected this species. The construction of the Gezhouba Dam in 1981 blocked the species' access to the upper section of the Yangtze River (Exhibit 12 at 5). The completion of the Three Gorges Dam in 2003 has further impacted the species by lowering the water level of the Yangtze River in fall and winter and affecting the water temperature (Id.).

This species is historically "overfished," and takes a long time to recover due to its long life and slow sexual maturation (Id.). Fry can be captured by traditional Chinese fishing methods (drift nets in the river and set nets at the river mouth) (Id.).

Pollution is a potential problem: "[s]ynthetic chemicals in water could contribute to the population decline of this species by significantly decreasing both the quality and quantity of eggs and spawning frequency of fish" (Id.). "[P]ollution from increasing human development affects the entire Yangtze basin. Much untreated wastewater discharges into the river each year. Water quality is also affected by runoff caused by deforestation of the upper Yangtze Valley (Exhibit 15 at 4, internal citations removed).

IDENTIFIED THREATS TO THE PETITIONED SPECIES: CRITERIA FOR LISTING

All fifteen petitioned species are threatened by two or more ESA listing factors (see Table 16). In 2001, the CITES Commission on Environmental, Economic, and Social Policy reported that "[t]here are four main causes for [the decline of sturgeon stocks]. The first is over-fishing and illegal fishing, a symptom of poor management. The second is habitat destruction, especially because of blocked rivers and waterways linking the open seas to inland spawning grounds. The third is environmental pollution – mostly because of urban, industrial, and mining effluents and waste. The fourth is the presence of competing alien species, for instance the *mnemiopsis* jellyfish that was introduced a few years ago from the Black Sea in the ballast water from oil tankers visiting the Caspian" (Exhibit 48 at 2). All of these threats and others are discussed in more detail below and in the descriptions of individual species.

Table 16. Endangered Species Act listing factors threatening the fifteen petitioned sturgeon species.

Species	(Factor A) Present and Threatened Destruction, Modification, or Curtailment of Habitat or Range	(Factor B) Overutilization	(Factor C) Disease or Predation	(Factor D) Inadequacy of Existing Regulatory Mechanisms	(Factor E) Other Natural or Manmade Factors	Status of Wild Population
(1) *Acipenser naccarii*	**Dams,** *pollution*	**Exploitation for meat**			**Slow reproductive rate, competition, removal of pre-reproductive individuals, single remaining spawning site, small population,** *hybridization with or other impacts from introduced A. baerii, Allee effect*	80-100 percent decline. Likely extinct in the wild
(2) *Acipenser sturio*	**Dams,** *gravel extraction, pollution*	**Exploitation for meat and caviar, bycatch**			**Slow reproductive rate, single remaining spawning site, small population,** *hybridization with or other impacts of introduced A. baerii*	90 percent decline. 20-750 adults
(3) *Acipenser gueldenstaedtii*	**Dams, pollution**	**Exploitation for meat and caviar, bycatch**		**Lack of enforcement**	*Allee effect*	90-98 percent decline. Very rare
(4) *Acipenser nudiventris*	**Dams, pollution**	**Exploitation, bycatch**	**Parasite**	**Lack of enforcement**	**Drought, hybridization with other sturgeon species,** *Allee effect*	90 percent decline. Likely on verge of extinction
(5) *Acipenser persicus*	**Dams, pollution**	**Exploitation for caviar, bycatch**		**Lack of enforcement**	*Allee effect*	80 percent decline. Very rare
(6) *Acipenser stellatus*	**Dams, pollution**	**Exploitation for meat and caviar**		**Lack of enforcement**	**Species is difficult to breed in captivity, competition with introduced Mnemiopsis,** *Allee effect*	80-100 percent decline. 87,400 migrating individuals in the Ural in 2001
(7) *Pseudo-scaphirhynchus fedtschenkoi*	**Dams, pollution, water abstraction, disappearance/ hypersalinity of Aral Sea**	*Exploitation*			**Small population, lack of information**	May be extinct in the wild
(8) *Pseudo-scaphirhynchus hermanni*	**Dams, pollution, water abstraction, disappearance/ hypersalinity of Aral Sea**	*Exploitation*			**Small population, small range**	>80 percent decline. Very rare

Table 16 (continued). Endangered Species Act listing factors threatening the fifteen petitioned sturgeon species.
#

Species	(Factor A) Present and Threatened Destruction, Modification, or Curtailment of Habitat or Range	(Factor B) Overutilization	(Factor C) Disease or Predation	(Factor D) Inadequacy of Existing Regulatory Mechanisms	(Factor E) Other Natural or Manmade Factors	Status of Wild Population
(9) *Pseudo-scaphirhynchus kaufmanni*	**Dams, pollution, water abstraction, hydrological changes, disappearance/ hypersalinity of Aral Sea**	**Exploitation**			**Low reproductive rate, small population, small range**	80 percent decline. Very rare
(10) *Acipenser mikadoi*	**Pollution**	**Exploitation, bycatch**			**Single remaining spawning site, small population**	80 percent decline. 10-30 spawning adults
(11) *Acipenser schrenckii*	**Pollution**	**Exploitation**		**Lack of enforcement**		>95 percent decline
(12) *Huso dauricus*	**Pollution**	**Exploitation for caviar**	*Parasite*	**Lack of enforcement**	**Removal of reproductive individuals, slow maturation, low reproductive rate, decrease in average age**	80 percent decline
(13) *Acipenser baerii*	**Dams, pollution**	**Exploitation**		**Lack of enforcement**	**Slow maturation, low rate of reproduction**	50-80 percent decline
(14) *Acipenser dabryanus*	**Dams, pollution**	**Exploitation**			**Small population**, *removal of pre-reproductive individuals, low reproductive rate*	Very rare – may only persist due to stocking
(15) *Acipenser sinensis*	**Dams,** *pollution*	**Exploitation**			**Single remaining spawning site, small population, slow maturation,** *removal of pre-reproductive individuals*	97.5 percent decline. 203-257 individuals

Bold: confirmed threats#

Italics: potential threats

Note that this table likely under-represents threats due to lack of information on some species.#

(Factor A) Present and Threatened Destruction, Modification, or Curtailment of Habitat or Range

All fifteen petitioned sturgeon species have suffered dramatic curtailment of range (see Exhibits 1-15; Exhibit 48 at 1). All fifteen species have been extirpated from significant portions of their range (Id.). Their remaining habitat is threatened with further destruction and modification (Id.). The number of spawning sites for sturgeon have drastically decreased (see Exhibit 47 at 1).

The damming of rivers is a huge threat to the continued survival of all the petitioned sturgeon with the exception, at least at present, of those in the Amur River basin. The majority of the petitioned sturgeon species are anadromous fish, and those that are not live and spawn solely in freshwater. These species depend on uninterrupted rivers to migrate and reach spawning sites. The IUCN noted the effects of dams on sturgeon, stating that "as they are a migratory group of species, the damming of rivers over Europe, Asia, and North America over the past century has led to many sturgeon species losing access to vast areas of their spawning grounds" (Exhibit 45 at 2). Current and planned dams in Europe, Russia, and Asia have seriously curtailed the range of sturgeon, denying them access to spawning sites or extirpating them from their migratory routes. Water abstraction and hydrological changes associated with dam construction have destroyed or reduced the quality of spawning sites. The severity of this problem is perhaps best illustrated by Figure 32, which shows the existing major dams and major dams currently planned or under construction throughout the world. The highest number of planned or dams under construction are in China and are located in habitat used by petitioned sturgeon in Asia. Russia and Europe also have a high concentration of dams within the range of petitioned sturgeon in those regions.

The three species endemic to the Aral Sea and its tributaries (*Pseudoscaphirhynchus fedtschenkoi, Pseudoscaphirhynchus hermanni,* and *Pseudoscaphirhynchus kaufmanni*) are particularly affected by the consequences of river damming and water abstraction. These species (in particular *P. fedtschenkoi*, which may already be extinct) are facing possible extinction because the Aral Sea has shrunk 60 percent from 1973-2000 and continues to shrink (Exhibit 6 at 2). The shrinking of the Aral Sea has created dead zones across the area and concentrated and exposed "dangerous heavy metals in the lake bed, devastating fish stocks and wildlife, and creating disease and malnutrition in the region" (Exhibit 48 at 17).

All fifteen petitioned species are or are likely to be affected by pollution, generally from agricultural runoff or mining. Pollution has caused mass death, reduced reproduction, mutations, and other detrimental effects in a variety of sturgeon species. The exploitation of natural gas and oil in the Caspian Sea is a looming threat to the remaining Caspian Sea sturgeon populations (Exhibit 48 at 16-18).

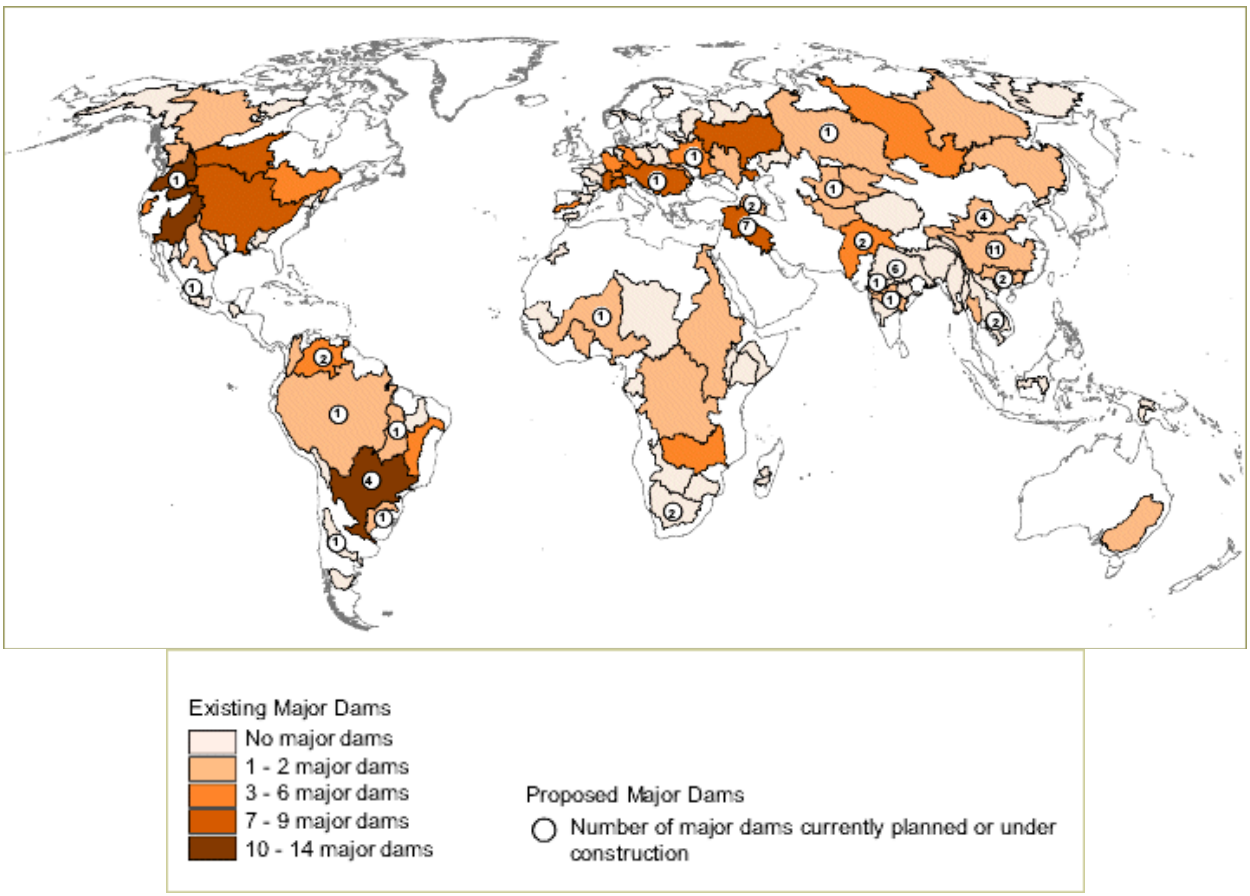

Figure 32. Major dam projects throughout the world. Source: Exhibit 49.

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

Sturgeon are highly commercial species hunted for their caviar and meat. In its 1998 CITES Proposal, Germany, with the support of the United States, summarized the many uses to which humans subject sturgeon species (Exhibit 51). These findings apply to all the petitioned species, either because species are targeted for capture, or have similar appearance to those that are caught.

> The status of the populations of almost all sturgeon species currently gives reason for major concern. The Sturgeon Specialist Group of the IUCN Species Survival Commission undertook a full assessment of the conservation status of all sturgeon species. The results of this evaluation (included in the 1996 IUCN Red List of Threatened Animals) show, that at the global level, 23 of the 25 species of the family *Acipenseridae* and both species of the closely related family *Polyodontidae* are classified as threatened, 7 as Critically Endangered, 10 as Endangered and 10 as Vulnerable. The situation with the subspecies or subpopulations is more severe: of 22 individual subspecies or populations, 2 are Extinct, 2 are Critically Endangered, and 4 are Vulnerable; only one of these is not yet considered threatened. This evaluation thus indicates that the sturgeons and paddlefishes are as a group at serious risk of extinction in the near future. Indeed, it has been suggested by some experts that the sturgeons' only chance for survival may be in captivity.

> One major reason for the drastical [sic] decline of the sturgeon stocks within the last decade is overfishing, including unprecedented levels of poaching. Sturgeons are extremely vulnerable to overfishing because of their late maturity (between 6 and 25 years, depending on the species and sex) and because the individuals of several species are not spawning every year. Poaching drastically increased within the last years stimulated by the high demand and the high prices for sturgeon products, i.e. caviar, and represents one of the major threats to the survival of sturgeons.
>
> The most valuable sturgeon product in trade on the international market is the highly priced caviar made of the oocytes (unfertilized eggs) of mature females. Mainly three sturgeon species (*Acipenser gueldenstaedtii*, *Acipenser stellatus* and *Huso huso*) are commercially exploited for their caviar, worldwide estimated as delicacy. However, according to experts and traders, the world caviar trade is undergoing a major crisis. While the sturgeon stocks are further depleted, the demand for caviar currently exceeds the actual supply by far. Thus, the general shortage of caviar of the three commercial sturgeon species already led to replacements by caviar from other sturgeon species (e.g. *Acipenser baerii*, *Acipenser nudiventris*, *Acipenser schrenckii*) which are in trade in mislabeled and falsely declared lots. The uncontrolled trade in caviar, including poaching and uncontrolled overfishing, will lead to a further reduction of the sturgeon stocks.
>
> Only international efforts can slow the precipitous decline in sturgeon stocks worlwide [sic]. A strict regulation of the exploding trade in sturgeon products, i.e. caviar, is likely to benefit the sturgeon populations as well as the consumers of sturgeon products.

(Exhibit 51 at 2. See also Exhibits 1-15).

The United States, by supporting Germany in the 1998 CITES Proposal (Prop. 10.65), recognized that the fifteen petitioned sturgeon species were threatened with extinction due to exploitation for commercial purposes.

Unfortunately, despite listing under CITES, and resulting increased regulatory oversight and cooperative conservation efforts in many range states, the legal and illegal caviar trade is still decimating these species (see Exhibits 1-15). Over a decade ago, the CITES Commission on Environmental, Economic, and Social Policy suggested that, despite conservation measures in place, sturgeon stocks could not be recovered without a moratorium on fishing, particularly in the Caspian. “The mass release of fingerlings of endangered species, the freeing of the waterways between the sea and the spawning grounds are crucial steps [for conservation], as is the drastic curbing of pollution sources. None of these, however, is likely to produce significant results in the short run without bracing for a very long moratorium on sturgeon fishing, especially for the endangered species, to last at least for a couple of decades, which is the period of time required for small sturgeon to reach full maturity and reproductive age. It should be noted that while there may be apprehension in some of the [Caspian range state] governments about such a drastic measure given the competitive international environment (in the meantime, some of the aquaculture farms in Europe and elsewhere are likely to produce more caviar than some of the Caspian states), there is no choice about the measure. Damage is already done, and without these measures the sturgeon fishery will be lost anyway” (Exhibit 48 at 2). No moratorium on take has been forthcoming, however.

In 2007, TRAFFIC noted that "[a]lthough what little is known about the illegal caviar trade is often anecdotal or based on reported seizures and convictions, the black market in caviar is clearly thriving and smugglers use sophisticated methods, indicating the possibility of links with organized crime groups. According to estimates by experts from the Caspian region, the annual illegal catch of sturgeons 2004–2006 for all Caspian States was around 10,000–12,000 [tons] and in the Russian Federation it is estimated that 2700 [tons] of sturgeons were caught illegally in the Caspian Sea in 2004, equivalent to the production of around 550 [tons] of caviar. It is believed the majority of such caviar is absorbed by the domestic market rather than entering international trade. However, large seizures continue to take place in international trade: almost 14 [tons] of illegal caviar was reported seized by European authorities, 2000–2005" (Exhibit 53 at 2).

In 2011, CITES appeared pessimistic about efforts to control illegal trade, stating:

> It is several years since the Secretariat received any information from sturgeon range States about poaching or illegal trade. The Secretariat's enforcement-related staff, who not so long ago devoted very significant amounts of time in assisting the combating of illegal trade in caviar, now spend hardly any time on this matter. Whilst the Secretariat is aware that seizures of illegal-origin caviar continue to take place, those it learns of appear to be in countries of transit or destination and are much smaller than in previous years. From time to time, it learns of suspicious advertisements of caviar on the Internet and brings these to the attention of relevant Parties. Caviar, however, continues to be a very expensive commodity and demand for it does not appear to have lessened. A kilogram of high-quality caviar retails in Geneva for almost USD 10,000.
>
> Despite the best efforts of the CITES community, it appears that the goal of legal and sustainable harvest of caviar, especially in its historical centre of the Caspian Sea, to a level anywhere near what was achieved in the past, appears unattainable for the present. It was noted in the Antalya workshop that the current domination of aquaculture in caviar supply may soon make it difficult for caviar from wild sturgeon populations to find a place in the international market. This reduces the incentives for conservation of wild stocks. Crime, corruption, and a lack of political will have perhaps created bigger obstacles to sturgeon recovery than any physical obstructions which prevent fish accessing their traditional spawning grounds.

(Exhibit 55 at 2-3).

(Factor C) Disease or Predation

Disease and natural predation do not currently appear to affect most of the petitioned species. However, due to their small population sizes and limited ranges, a stochastic event or disease outbreak could lead to extinction. Pollution due to agriculture, mining, oil operations, and other sources increases the potential impact of disease on the species and itself can lead to reduced fitness. Given the low numbers of the fifteen petitioned species, disease from pollution, or from parasites in the cases of *Acipenser nudiventris* and *Huso dauricus*, could be a significant threat for the remaining populations, especially combined with the effects of legal and illegal exploitation of the species. The Secretary should fully analyze this potential threat during a status review.

(Factor D) Inadequacy of Existing Regulatory Mechanisms

Despite listing under CITES, there remains an overall decline in wild sturgeon populations, with rampant poaching and habitat destruction among the main causes (see Exhibits 47 and 51; see also Exhibits 1-15). CITES did not institute a moratorium on the trade of the fifteen petitioned species even after it recognized the need for their conservation. Indeed, the CITES Resolution Conf. 12.7 in a sense encourages trade of these endangered species by setting labeling standards for shipping caviar (Exhibit 47; Exhibit 58).

Many of the countries inhabited by petitioned sturgeon species presently lack the resources and personnel to enforce regulatory standards instituted by CITES or the home country to prevent species declines, particularly in the Caspian Sea region. In reference to the Caspian Sea stocks, the IUCN states that "the geographical unevenness in fisheries and law enforcement controlling this resource [sturgeon] are contributing to its decline, as poaching has increased the illegal catch" (Exhibit 48 at 7). In 2001, CITES recommended "with the full agreement of the Caspian States a plan of action that will ensure control over the trade in sturgeon products, improve enforcement efforts and facilitate cooperative management" (Exhibit 52 at 1). The results are described in the 2004 final rule listing the Beluga sturgeon, *Huso huso*, as "threatened":

> In 2001, based on recommendations from the CITES Animals Committee, the so-called ''Paris Agreement'' was developed during the 45th meeting of the CITES Standing Committee (SC 45 Doc. 12.2). By accepting the conditions of the Paris Agreement, the Caspian Sea range countries of Azerbaijan, Kazakhstan, and the Russian Federation made commitments to further the conservation of Caspian Sea sturgeon stocks. All sturgeon harvest was suspended during the fall fishing season of 2001, proscribed under Stage 1 of the agreement. Further actions under Stage 1, to be completed before July 20, 2001, included declaration of all stocks of specimens intended for export, and restriction of exports in 2001 to the amounts of declared stocks, provided the 2001 export quotas were not exceeded. Under Stage 2 of the agreement, the range countries were required to undertake a comprehensive survey of sturgeon stocks, develop science-based catch and export quotas, and assess illegal trade and fisheries enforcement needs in the region. Stage 2 was to be implemented prior to December 31, 2001. Stage 3 actions, to be implemented prior to June 20, 2002, included:
>
> - Establishment of a long-term stock- assessment survey program to be used as the basis for future management of sturgeon stocks;
> - A request to the Food and Agriculture Organization of the United Nations (FAO) for advice concerning operations of regional fisheries management organizations, management of shared fish resources, and dealing with unregulated fisheries;
> - Adoption of a collaborative basin- level fisheries management plan for Caspian Sea sturgeon, as the basis for sustainable harvest for commercial exports;
> - Significantly increased efforts to combat illegal harvest and trade;
> - Regulation of domestic trade;
> - Establishment of further research priorities;
> - Making sturgeon samples available for DNA testing;
> - Implementation of the caviar labeling system (Resolution Conf. 11.13, now repealed and replaced by Resolution Conf. 12.7); and
> - Submission of a funding proposal to the Global Environmental Fund (GEF) or other

> donors for rehabilitation of sturgeon stocks, hatcheries, and restocking programs, including support for stock assessments, marking systems, identification of specimens in trade, public awareness, and enforcement.
>
> Several significant goals of Stage 3 have yet to be achieved. Conservation actions taken under CITES to date, however, have focused needed attention on the problems facing sturgeon stocks, improved export documentation, helped to increase beluga sturgeon populations, concentrated attention on the need for sound hatchery and release programs in the range countries, and initiated the lengthy process necessary to improve the status of all sturgeon species, including the beluga sturgeon.

(Exhibit 59 at 21427-21428).

The "Paris Agreement" does not protect those sturgeon species outside the Caspian region. Furthermore, the health of most wild sturgeon populations, including those in the Caspian region, has not improved. Perhaps the most effective indictment of all current regulatory mechanisms is the IUCN's categorization of fourteen of the petitioned sturgeon species as "critically endangered" and one, *A. baerii*, as "endangered" (Exhibits 1-15, see also Exhibit 45). The IUCN believes, as of its most recent assessment of these species in 2010, that all fifteen petitioned species face a high likelihood of extinction in the wild (Id.), and was sufficiently concerned to release a statement in 2010 announcing that sturgeon are the most threatened group of animals on the Red List (see Exhibit 45). Dr. Phaedra Doukakis, member of IUCN's Sturgeon Specialist Group and Senior Research Scientist at the Institute for Ocean Conservation Science at Stony Brook University, stated that "[i]t's time to seriously consider ending fishing in the Caspian Sea region and in other areas where species are classified as Critically Endangered" (Exhibit 45 at 1).

Legal and illegal exploitation is driven by demand, and the CITES listings do not address demand but rather attempt to control and regulate supply. CITES does not protect sturgeon habitat from destruction, especially due to the damming of rivers (see Exhibits 1-15; see also Exhibit 51). The current regulatory scheme is failing these species.

(Factor E) Other Natural or Manmade Factors

Competition with Invasive Species. The comb jelly *Mnemiopsis leidyi* was introduced to the Black Sea in the 1980s with ballast water from North American estuaries and soon spread to the Caspian (Exhibit 48 at 4). "[B]y the end of 2000, *Mnemiopsis* [in the Caspian] became engaged in a phase of exponential increase, reaching a biomass of 150 g m^2. The animals, a little smaller than in the Black Sea, form swarms that swim around looking for food. Apparently, where they appear, fish vacate the area, and thus kilka [a collective term for schools of clupeids] catches started dropping even before *Mnemiopsis* was omnipresent. The food of the comb jelly consists of about everything it can catch, including zooplankton and the floating eggs of kilka. It is thus capable of inflicting a double blow to kilka: by competing for the same resources, and by preying on its egg. By late 2001, the Caspian will be emptied of the main pelagic crustaceans, the onychopods, and *Mnemiopsis* locally overshot a biomass of 1 kg m^2, an amazing growth rate" (Id.). The collapse of the food base threatened kilka and the higher trophic-level predators that depend on them, such as the Caspian seal (Id. at 5) and likely sturgeon as well. Another, larger comb jelly, *Beroe* sp., was introduced as a *Mnemiopsis* predator, which was successful in that the population of *Mnemiopsis* decreased to 0.5 kg m^2. The disadvantage is that one invasive jelly is being replaced with another (Id.).

Low Reproductive Rates. Sturgeon generally have slow population growth rates because of slow sexual maturation and non-annual reproduction. The IUCN has noted that "sturgeon can live up to 100 years and do not reproduce annually, which means they take many years to recover from any population declines" (Exhibit 45 at 2). These characteristics make sturgeon extremely vulnerable to any level of exploitation. "[I]nteractions between environmental factors and intrinsic characteristics make large-bodied, long-generation, and low-fecundity species particularly predisposed to anthropogenic threats given their lower replacement rates" (Exhibit 57 at 455). Sturgeon life history characteristics also make them particularly vulnerable to the Allee effect. Some sturgeon populations have reached such critically low levels that male and female sturgeon may have trouble reaching spawning sites or even encountering each other with enough frequency for successful breeding. The frequency of successful breeding may be further reduced as many species do not breed annually and females usually breed less frequently and at different intervals than males.

Small Population Size. Sturgeon species, particularly those with extremely low population sizes, are particularly vulnerable to stochastic events (such as storms, floods, oil spills, etc.) that could destroy their remaining habitat and/or cause local extirpation and ultimately extinction. "Population size matters; small populations are more likely to go extinct as a result of chance effects (known as the small population paradigm)" (Exhibit 57 at 455). The U.S. Fish and Wildlife Service has often recognized small population size as a threat to species' persistence.[9]

Synergistic Effects. Any or all of the aforementioned threats could work synergistically to cause the extinction of any petitioned sturgeon species. "Like interactions within species assemblages, synergies among stressors form self-reinforcing mechanisms that hasten the dynamics of extinction. Ongoing habitat destruction and fragmentation are the primary drivers of contemporary extinctions, particularly in the tropical realm, but synergistic interactions with hunting, fire, invasive species and climate change are being revealed with increasing frequency" (Exhibit 57 at 457).

The combined effects of threats of habitat loss, legal and illegal exploitation, and other factors such as disease and low reproductive rates could cause a greater reduction in sturgeon populations than would be expected from simply the additive impacts of the threats. "[H]abitat loss can cause some extinctions directly by removing all individuals over a short period of time, but it can also be indirectly responsible for lagged extinctions by facilitating invasions, improving hunter access, eliminating prey, altering biophysical conditions and increasing inbreeding depression. Together, these interacting and self-reinforcing systematic and stochastic processes play a dominant role in driving the dynamics of population trajectories as extinction is approached" (Exhibit 57 at 453).

Sturgeon are already at risk due to small population sizes and life history characteristics, and are especially vulnerable to the synergistic impacts of other threats. "Traits such as ecological specialization and low population density act synergistically to elevate extinction risk above that expected from their additive contributions, because rarity itself imparts higher risk and specialization reduces the capacity of a species to adapt to habitat loss by shifting range or changing diet. Similarly, interactions between environmental factors and intrinsic characteristics make large-

[9] See, for examples, candidate assessment forms for *Porzana tabuensis* (spotless crake, April 2010), *Eumops floridanus* (Florida bonneted bat, March 2010), *Vagrans egistina* (Mariana wandering butterfly, April 2010), *Gallicolumba stairi* (friendly ground-dove, March 2010), *Eremophila alpestris strigata* (streaked horned lark, April 2010), and *Hyla wrightorum* (Arizona treefrog, April 2010) (Available at ecos.fws.gov/tess_public/pub/SpeciesReport.do?listingType=C&mapstatus=1).

bodied, long-generation and low-fecundity species particularly predisposed to anthropogenic threats given their lower replacement rates" (Exhibit 57 at 455).

> [O]nly by treating extinction as a synergistic process will predictions of risk for most species approximate reality, and conservation efforts therefore be effective. However challenging it is, policy to mitigate biodiversity loss must accept the need to manage multiple threatening processes simultaneously over longer terms. Habitat preservation, restoring degraded landscapes, maintaining or creating connectivity, avoiding overharvest, reducing fire risk and cutting carbon emissions have to be planned in unison. Otherwise, conservation actions which only tackle individual threats risk becoming half-measures which end in failure, due to uncontrolled cascading effects.

(Exhibit 57 at 459).

IMPORTANCE OF LISTING

Listing foreign species provides "increased awareness of listed species, research efforts to address conservation needs, or funding for in-situ conservation of the species in its range countries. The ESA also provides for limited financial assistance to develop and manage programs to conserve listed species in foreign countries, encourages conservation programs for such species, and allows for assistance for programs, such as personnel and training."[10] "Section 8(a) of the Act authorizes the provision of limited financial assistance for the development and management of programs that the Secretary of the Interior determines to be necessary or useful for the conservation of endangered species in foreign countries. Sections 8(b) and 8(c) of the Act authorize the Secretary to encourage conservation programs for foreign endangered species, and to provide assistance for such programs, in the form of personnel and the training of personnel" (Exhibit 59 at 21436). Such resources would be particularly useful in the Caspian Sea region, where lack of enforcement of existing laws is a threat to resident sturgeon populations. Most importantly, listing these sturgeon under the ESA would address the issue of demand for caviar within the United States, a driver of illegal trade.

In 2004, the Beluga Sturgeon, *Huso huso*, was listed as "threatened" under the ESA. "According to the 2002 stock-assessment survey, the beluga sturgeon population in the Caspian Sea has increased from 7.6 million fish in 1998 to 11.6 million fish" (Exhibit 59 at 21428) (although the IUCN recently reclassified the Beluga Sturgeon as "critically endangered").[11] The sturgeon for which we request protections in this petition face similar, if not worse situations, and some are much closer to the brink of extinction. For most of the petitioned species the population numbers are unknown but they are considered very rare. Species with recorded population numbers range from only 10-30 spawning individuals (*A. mikadoi*) to ~87,400 migrating individuals (*A. stellatus*) (see Table 16). The U.S. Fish and Wildlife Service stated in its final listing rule for *H. huso* that "[a] threatened listing will reinforce the need to continue the positive actions taken since the listing, and encourage range countries to further develop and implement conservation measures for all wild sturgeon populations, including the beluga sturgeon" (Exhibit 59 at 21427). "Threatened" or "endangered" listing of other sturgeon species, especially in the face of continued population declines, will continue the positive work begun with CITES and the listing of *H. huso*.

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[10] USFWS, "Foreign Species | Overview" (webpage). Available at www.fws.gov/endangered/what-we-do/international-activities.html; viewed Sept. 25, 2011.

[11] See www.sciencedaily.com/releases/2010/03/100318113241.htm.

There is no question that the petitioned species need and deserve listing under the ESA. Similar to *H. huso*, "[m]any of the threats to the species remain… and will remain into the foreseeable future" (Exhibit 59 at 21428), despite other conservation measures in place:

> While we recognize the important role CITES has played in the improvement of trade controls and other conservation measures for sturgeon conservation, a number of unresolved issues remain. …[T]he conditions of the Paris Agreement encouraged commitments between most of the Caspian Sea range countries to further the conservation of Caspian Sea sturgeon stocks. Stage 1 measures were completed by July 20, 2001, as required. Primary measures undertaken for the completion of Stage 2 were to be finished prior to December 31, 2001, and Stage 3 actions were to be implemented prior to June 20, 2002. Several significant goals of Stage 3 have not been accomplished, as of publication of this notice. Our listing determination will strengthen and promote complete implementation of the Paris Agreement recommendations, for the conservation of all Caspian Sea sturgeon species. *As the largest importer of beluga sturgeon caviar, the United States can reinforce and increase the focus on conservation measures currently under way and influence the implementation of future management actions for the species.*

(Exhibit 59 at 21430, emphasis added).

Listing the petitioned sturgeon, like listing *H. huso*, "can positively affect international trade and management of the species by reinforcing conservation measures already in place" (Exhibit 59 at 21430). Listing would strengthen regulations within the United States by requiring an ESA permit for importation and exportation of specimens of these fifteen species. In addition, "Sections 4(d) and 9 of the Act, and implementing regulations found at 50 CFR 17.31… set forth a series of prohibitions and exceptions that generally apply to all threatened wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (within U.S. territory or on the high seas), import or export, ship in interstate commerce in the course of a commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally" (Exhibit 59 at 21436).

CONCLUSION

All fifteen of the petitioned species are threatened by two or more Endangered Species Act listing factors (see Table 16). These threats are recognized by CITES with the listing of all these species in CITES Appendices I or II. However, listing under CITES and conservation efforts in sturgeon range states have been inadequate to stem the dramatic declines of these species. As the first signatory to CITES, the United States has a responsibility to do everything in its power to conserve species listed under the treaty. Listing the petitioned sturgeon under the ESA would make a measurable difference in their conservation. Immediate protection of all fifteen petitioned species under the ESA throughout their worldwide ranges is both warranted and necessary to ensure the survival of these critically endangered species.

Accordingly, this petition requests rangewide listing of the fifteen sturgeon species (1) *Acipenser naccarii*; (2) *Acipenser sturio*; (3) *Acipenser gueldenstaedtii;* (4) *Acipenser nudiventris*; (5) *Acipenser persicus*; (6) *Acipenser stellatus*; (7) *Pseudoscaphirhynchus fedtschenkoi*; (8)

Pseudoscaphirhynchus hermanni; (9) *Pseudoscaphirhynchus* kaufmanni; (10) *Acipenser mikadoi*; (11) *Acipenser schrenckii*; (12) *Huso dauricus*; (13) *Acipenser baerii*; (14) *Acipenser dabryanus*; and (15) *Acipenser sinensis* as "threatened" or "endangered" species pursuant to the ESA. In the alternative, this petition requests the listing as "threatened" or "endangered" any Distinct Population Segments of any of the fifteen species the Secretary determines may exist.

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