DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–HQ–ES–2020–0100; FF09E22000 FXES11180900000 212]

RIN 1018-BE92

Endangered and Threatened Wildlife and Plants; Endangered Species Status for Amur Sturgeon

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list the Amur sturgeon (*Acipenser schrenckii*), a fish species from the Amur River basin in Russia and China, as an endangered species under the Endangered Species Act of 1973, as amended (Act). After a review of the best scientific and commercial information available, we find that listing the species is warranted. Accordingly, we propose to list the Amur sturgeon as an endangered species under the Act. If we finalize this rule as proposed, it would add this species to the List of Endangered and Threatened Wildlife and extend the Act's protections to the species.

DATES: We will accept comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by [INSERT DATE 45 DAYS AFTER

DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically*: Go to the Federal eRulemaking Portal: *http://www.regulations.gov*. In the Search box, enter FWS–HQ–ES–2020–0100, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on "Comment Now!"

(2) *By hard copy*: Submit by U.S. mail to: Public Comments Processing, Attn: FWS–HQ–ES–2020–0100, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see **Information Requested**, below, for more information).

Document availability: This proposed rule and supporting documents, including the species status assessment (SSA) report, are available at *http://www.regulations.gov* under Docket No. FWS–HQ–ES–2020–0100.

FOR FURTHER INFORMATION CONTACT: Elizabeth Maclin, Chief, Branch of Delisting and Foreign Species, Ecological Services, U.S. Fish and Wildlife Service, MS: ES, 5275 Leesburg Pike, Falls Church, VA 22041–3803; telephone, 703–358–2171. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other concerned governmental agencies (including those in the species' range in Russia and China), Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) The species' biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns;

(d) Historical and current population levels, and current and projected trends; and

(e) Past and ongoing conservation measures for the species, its habitat, or both.

(2) Factors that may affect the continued existence of the species, which may include destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease; predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.

(4) Additional information concerning the historical and current status, range, distribution, and population size of this species, including the locations of any additional populations of this species.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened species must be made "solely on the basis of the best scientific and commercial data available."

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via *http://www.regulations.gov*, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *http://www.regulations.gov*.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *http://www.regulations.gov*.

Because we will consider all comments and information we receive during the comment period, and base our determination on the best scientific and commercial data available, our final determination may differ from this proposal. Upon consideration of new information we receive (and any comments on that new information), we may conclude based on the best scientific and commercial data available after considering all of the relevant factors that the species is threatened instead of endangered, or we may

conclude that the species does not warrant listing as either an endangered species or a threatened species.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the *Federal Register* at least 15 days before the hearing. For the immediate future, we will provide these public hearings using webinars that will be announced on the Service's website, in addition to the *Federal Register*. The use of these virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Previous Federal Actions

On March 12, 2012, the National Marine Fisheries Service (NMFS) received a petition dated March 8, 2012, from Friends of Animals and WildEarth Guardians to list the Amur sturgeon and 14 related sturgeon species as endangered or threatened species under the Act. NMFS acknowledged receipt of this petition in a letter dated April 14, 2012, and informed the petitioners that NMFS would determine, under section 4 of the Act, whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted. Although the petition was initially sent to NMFS, as a result of subsequent discussions between NMFS and the Service regarding the August 28, 1974, memorandum of understanding pertaining to "Jurisdictional Responsibilities and Listing Procedures Under the Endangered Species Act of 1973," we have determined that 10 of the 15 petitioned sturgeon species—including the Amur sturgeon—are under the jurisdiction of the Service. In April 2012, the Service notified the petitioners of this jurisdictional finding. On September 24, 2013,

we announced in the *Federal Register* (78 FR 58507) our 90-day finding that the petition presented substantial scientific and commercial information indicating that the petitioned action may be warranted for these 10 sturgeon species.

This document constitutes our review and determination of the status of the Amur sturgeon, our 12-month finding on this species as required by the Act's section 4(b)(3)(B), and our proposed rule to list this species.

Supporting Documents

We prepared a species status assessment (SSA) report for the Amur sturgeon. The SSA analysis was led by a Service biologist, in consultation with other Service staff and species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species. The Service sent the SSA report to six independent peer reviewers and received one response.

Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, ecology, and overall viability of the Amur sturgeon is presented in the SSA report (Service 2020; available at *http://www.regulations.gov*). The following discussion is a summary of the biological background on the species from the SSA report.

Taxonomy

The Amur sturgeon (*Acipenser schrenckii*) is one of 27 species of sturgeon in the family Acipenseridae (Fricke et al. 2019, not paginated). The synonyms *Acipenser schrenki* and *Acipenser schrenkii* are sometimes used, but are now considered invalid (Fricke et al. 2019, not paginated; ITIS 2019, not paginated). We are not aware of any taxonomic disputes regarding the validity of the Amur sturgeon as a species. Thus, we determined that the Amur sturgeon is a valid species for listing under the Act.

Physical Description

Amur sturgeon are large fish reaching up to 3 meters (m) (10 feet) in length and 190 kilograms (420 pounds) in weight (Zhuang et al. 2002, p. 659). They have a downward-facing mouth, cartilaginous skeleton, and a series of bony plates in rows along their back (Billard and Lecointre 2001, p. 363). Tactile barbels hang from the mouth (Billard and Lecointre 2001, p. 359). A rare brown morph of Amur sturgeon grows more slowly than the more common gray morph (Zhuang et al. 2002, p. 660). The presence of two color morphs (Zhuang et al. 2002, p. 660; Krykhtin and Svirskii 1997, p. 236) indicates some level of ecological or genetic diversity in the Amur sturgeon.

Range

Amur sturgeon live in the Amur River basin along the far eastern border between China and Russia. The species' range includes the main river, its tributaries, and the Amur Estuary. The species was historically found as far west as Nerschinsk, Russia, in the upper Shilka River (Georgi 1775 cited in Vaisman and Fomenko, p. 4) and in all major tributaries of the Amur. Amur sturgeon are rare in areas of the estuary with salinity over 7.5 parts per thousand (ppt) (Koshelev et al. 2014a, p. 1314). The species occurs at low densities in the southern (and possibly northern) Sea of Okhotsk. Very rarely, Amur sturgeon are found in the Sea of Japan (Koshelev et al. 2014a, p. 1313). The species may also be present in very small numbers in Lake Khanka in extreme southeast Russia (Ruban and Qiwei 2010, not paginated), although few authors confirm this.

Life History

Amur sturgeon are slow to mature; males require 7 to 12 years, and females 9 to 14 years, before reproducing (Novomodny et al. 2004, p. 19; Zhuang et al. 2002, p. 659). This long time to maturity can slow the species' recovery from disturbance, relative to that of species with shorter generation times. On reaching maturity, fish are between 1.1 and 1.3m (43 to 51 in) long and weigh 6 to 19 kg (13 to 42 pounds; Zhuang et al. 2002, p.

660). Individuals can live up to 60 years (Krykhtin and Svirskii 1997, p. 236) and reproduce every 3 to 4 years (Ruban and Qiwei 2010, not paginated; Vaisman and Fomenko 2006, p. 5; Krykhtin and Svirskii 1997 p. 236).

Spawning adults migrate upstream, mostly in spring (Koshelev et al. 2014b, p. 1126; Zhuang et al. 2002, p. 659; Krykhtin and Svirskii 1997, p. 237; Wei et al. 1997, p. 245). A smaller number of reproductive fish migrate the previous fall (mid-August to late September) and overwinter on the spawning grounds (Ruban 2020, pers. comm.).

The exact distance that fish move upstream is unclear, although fish appear to spawn within the same river regions (lower, middle, upper) as those in which they spend the rest of the year (Ruban and Qiwei 2010, not paginated; Novomodny et al. 2004, p. 18). Few migrations are greater than 500 kilometers (km) (about 300 miles) in length, although some estuary fish travel 1,000 km (600 miles) or more up the river (Novomodny et al. 2004, p. 18) and may spend up to 2 years there prior to reproducing (Krykhtin and Svirskii 1997, p. 237).

Spawning occurs following migration, between May and September. Known spawning sites are primarily in the middle Amur River, including several major grounds in Luobei, Xunke, and Tongjiang counties (Wei et al. 1997, p. 245). This evidence is consistent with findings that the population of Amur sturgeon was historically greatest in this stretch of the river (Krykhtin and Svirskii 1997, p. 237).

Females can lay upwards of 1.3 million eggs in a single spawning, although the norm is between 190,000 and 300,000 eggs (Koshelev et al. 2014b, p. 1127; Zhang 1985 cited in Zhuang et al. 2002, pp. 660–661). In related sturgeon, only about 1 in 2,000 survive their first year post-hatching (Jaric and Gessner 2013, table 1; Jager et al. 2002, table 1). Thereafter, 20 to 90 percent of juvenile fish survive annually (Jaric and Gessner 2013, table 1; Jager et al. 2002, table 1). Although age-specific survival data for Amur

sturgeon in particular are not available, the species very likely has similar patterns of survival by age (Kappenmann 2020, pers. comm.).

Larvae hatch faster in warmer compared to colder water, emerging in 3 to 14 days (Krykhtin and Svirskii 1997, p. 237), then likely drift downstream. They begin feeding around 9 days post-hatching (Zhuang et al. 2003, figure 5; Krykhtin and Svirskii 1997, p. 237). After about 30 days, they metamorphose into juvenile fish of about 4 centimeters (cm) (2 inches) in length and 3 grams (0.1 ounces) in weight (Zhuang et al. 1999a and Liu et al. 2000 cited in Zhuang et al. 2002, p. 661). Juveniles feed in shallow shorelines and smaller tributaries and lakes (Zhuang et al. 2002, p. 659).

By 1 year of age, fish average approximately 30 cm (12 inches; Nikolskii 1960 cited in Zhuang et al. 2002, p. 660). Six-year-old individuals may be 90 cm (35 inches), 25-year-old fish 2 m (7 feet), and large 40-year-old fish can approach 2.5 m (8 feet; Zhang 1985 cited in Zhuang et al. 2002, p. 660).

Amur sturgeon prey on larval insects, small mollusks, crustaceans, and fish (Novomody et al. 2004, p. 19; Nikolskii 1960 and Sun et al. 2000 cited in Zhuang et al. 2002, p. 660), with geographic and age-based variation in preferred food items (Kolybov and Koshelev 2014, p. 489; Sun et al. 2000 and Nikolskii 1960 cited in Zhuang et al. 2000, p. 660; Krykhtin and Svirskii 1997, p. 236).

Population Biology

Amur sturgeon are thought to spawn primarily within the same larger river regions as those in which they feed throughout the year (Ruban and Qiwei 2010, not paginated; Novomodny et al. 2004, p. 18). Therefore, we followed the limited literature (e.g., Koshelev et al. 2014a, entire; Krykhtin and Svirskii 1997, pp. 236–238) and considered fish in four river regions to be the analysis units for our assessment of the species' status. These units are:

- Amur Estuary, inclusive of the few individuals found in the Sea of Japan and

Sea of Okhotsk;

- Lower Amur, from Khaborovsk, Russia, to the mouth of the river where it meets the estuary;
- Middle Amur, from Heihe, China, to Khaborovsk, Russia, inclusive of the Zeya and Bureya Rivers, both northern tributaries of the Amur; and
- Upper Amur, upstream of Heihe, China, inclusive of the Shilka and Argun Rivers whose confluence form the Amur headwaters.

Some fish from the Lower, Middle, and Upper Amur may enter the estuary to forage, but this is likely rare (Zhuang et al. 2003, p. 38).

We use the analysis units to describe what we determine to be regions where Amur sturgeon likely have reproduced in at least partially distinct populations, where they may face different conservation threats, and where their status may be different. Although the exact migration routes, spawning locations, delineations between, and levels of interbreeding among fish from these regions are not known, there are clearly different breeding stocks, separated by time and location. For instance, fish from the Zeya and Bureya breed in the Upper and upper Middle Amur (Krykhtin and Svirskii 1997, pp. 235–236), whereas fish from the estuary and lower river migrate upstream to breed between Luobei, Xunke, and Tongjiang counties along the lower Middle Amur (Wei et al. 1997, pp. 245).

Fish that do not reproduce in a given year do not migrate (e.g., Koshelev et al. 2014a, entire; Krykhtin and Svirskii 1997, pp. 236–238). All estuary fish that reproduce do so only after having migrated upstream into the river. Offspring from the estuary population may spend up to 2 years in the river before reproducing and returning to the estuary to mature (Krykhtin and Svirskii 1997, p. 237).

Population Size and Demography

A series of Amur sturgeon surveys conducted between 2005 and 2011 (Koshelev

et al. 2014a, pp. 1310–1314) are the most comprehensive, quantitative appraisal of the species we are aware of, for either contemporary or historical population estimates. A greater than 95 percent decline in the species' abundance was estimated between 1960 and 2010 (Ruban and Qiwei, 2010, not paginated), and sizeable populations now exist only in the Amur Estuary and Lower Amur analysis units (see table 1, below). The species is extirpated from the Upper Amur and largely so from the Middle Amur (Koshelev et al. 2014a, pp. 1313–1316). The remaining population exhibits a skewed sex ratio of 1 female per 2 males, very likely due to preferential poaching of females for caviar and use in aquaculture (Koshelev et al. 2014b, pp. 1127, 1129, and chapter 3 of the SSA for a detailed discussion of sturgeon harvesting).

Table 1.—Population estimates for Amur sturgeon analysis units, 2005–2011.

Population	Most Recent Condition
Amur Estuary	Extant; ~264,000 fish > 1 year old; surveys 2005–2011
Lower Amur	Extant; ~25,000 fish > 1 year old; higher density closer to the estuary
Middle Amur	Extirpated from the Songhua, Nen, Zeya, and Bureya Rivers and nearly so from the entire unit
Upper Amur	Very likely extirpated, including from the Argun and Shilka Rivers

Note: Sources for the information in this table are Koshelev et al. 2014a, pp. 1312–1316; Cai et al. 2013, p. 150; Simonov and Dahmer 2008, p. 129; and Novomodny et al. 2004, p. 18.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an "endangered species" or a "threatened species." The Act defines an "endangered species" as a species that is in danger of extinction throughout all or a significant portion of its range, and a "threatened species" as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an "endangered species" or a "threatened species" because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term "threat" to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term "threat" includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term "threat" may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an "endangered species" or a "threatened species." In determining whether a species meets either definition, we must evaluate all identified threats by considering the species' expected response and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and

conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an "endangered species" or a "threatened species" only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data available regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent a decision by the Service on whether the species should be proposed for listing as an endangered or threatened species under the Act. It does, however, provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS–HQ–ES–2020–0100 on *http://www.regulations.gov*.

To assess the Amur sturgeon's viability, we used the three conservation-biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more resilient and redundant a species is and the more representation it has, the more likely it is to sustain populations over time, even under changing

environmental conditions. Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best scientific and commercial information available to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

Overfishing and the Trade in Amur Sturgeon Caviar and Meat

Unsustainable harvest for caviar and meat consumption is the foremost threat to the Amur sturgeon (Vaisman and Fomenko 2006, entire; Zhuang et al. 2002, p. 659). Both domestic and international demand fuel the market for these products and are a primary reason that 85 percent of sturgeon species are listed as critically endangered or extinct in the wild on the International Union for the Conservation of Nature's Red List (note that while informative the Red List has no legal effect and uses different standards for inclusion than does the Act; Rachler and Reinartz 2017, p. 1).

The threat posed by overfishing is despite both Russian and Chinese prohibition of open commercial fishing and trade of the Amur sturgeon. In China, permits have been

required since 2001 (Harris and Shiraishi 2018, pp. 46–47; Wang and Chang 2006, p. 48) and the country's law enforcement efforts limit poaching in Chinese territory (Simonov and Dahmer 2008, p. 130; Novomodny et al. 2004, p. 24). In Russia, the commercial Amur sturgeon fishery has been banned since 1984 and was previously limited or closed by a series of temporary regulations as early as the 1920s (Harris and Shiraishi 2018, p. 9). However, since 1991 Russian state-sanctioned harvests (so-called "test fishing" or "controlled catches"), purportedly for population monitoring, have likely been used as cover for continued fishing and commercial sale (Vaisman and Fomenko 2006, pp. *v*, 9–18; CITES 2001, p. 35). There is no restriction on the sale of caviar produced from fish caught in test fishing and it is likely that test fishing quotas are regularly exceeded (Vaisman and Fomenko 2006, p. 10). Overall, fishing bans (Wang and Chang 2006, p. 51; Xinhuanet, June 11, 2002) have not been successful at protecting or restoring the species, given the long history of overexploitation and ongoing harvests, both illegal (see below) and state-sanctioned.

Prior to the current set of fisheries regulations, legal overharvest caused a greater than 99 percent decline in the volume of Amur sturgeon caught in Russia between 1891 and 1948 (Kryukov 1894 cited in Krykhtin and Svirskii 1997, pp. 231–232). Fishing records from China similarly indicate that overfishing has caused massive population declines in the Amur sturgeon (Wang and Chang 2006, p. 45). After a peak of 461 mt (508 t) in 1981, the Chinese catch declined precipitously to an average of just less than 120 mt (130 t) between 1996 and 2002, with just 50 and 25 mt (55 and 28 t) caught in the final 2 years (Vaisman and Fomenko 2006, table 6). Overall, the species' population declined by greater than 95% between 1960 and 2010 (Ruban and Qiwei 2010, not paginated).

In the 1990s and early 2000s, the Amur sturgeon was by far the most commonly traded sturgeon species in China (Zhu et al. 2008, p. 31). Although this demand was

largely fulfilled with captive-bred fish, the large-scale use of wild-caught Amur sturgeon as broodstock in aquaculture contributed to a crash in Amur sturgeon populations (Simonov and Dahmer 2008, p. 129 and figure 3.4; Wei no date, p. 1). By 2017, some residents of the Amur region within China reported that the fish's population was so low that it could not support a profitable fishery (Harris and Shiraishi 2018, p. 46).

The Amur sturgeon was included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1998, along with all other species in the order Acipenseriformes not previously listed under Appendix I (CITES 1997a, pp. 80–84; CITES 1997b, pp. 171; Ruban and Qiwei 2010, not paginated; Wang and Chang 2006, p. 48). Both range countries, Russia and China, are Parties to CITES, as is the United States. CITES Parties adopted a series of recommendations to improve regulation of the international sturgeon trade (Harris and Shirashi 2018, pp. 19–22), including reporting of scientifically based quotas for any legal wild-caught sturgeon (CITES 2015, entire; CITES 2010, entire) and a caviar-labeling system to verify its legal origin (CITES 2015; 50 CFR 23.71; USFWS OLE 2008).

Since the inclusion of all sturgeon species in the CITES Appendices in 1998, the proportion of caviar in international trade reported to be of captive-bred origin has climbed from near zero to near 100 percent (CITES Trade database cited in Harris and Shiraishi 2018, p. 25; UNEP-WCMC 2008 p. 31). Since 2011, no quotas for wild-caught Amur sturgeon have been reported to CITES, indicating that no wild-caught Amur sturgeon can be legally traded internationally until quotas are reestablished. This is in line with the existing bans on commercial fishing in Russia and China. Still, some wild-sourced caviar is very likely traded internationally using fraudulent labels or without reporting (UNEP-WCMC 2012, pp. 22). The sale of caviar and meat with mislabeled origin, species, or both makes enforcement difficult (Harris and Shiraishi 2018, Table 9) and it is very challenging for enforcement officials to confidently differentiate wild from

captive-bred caviar (e.g., DePeters et al. 2013, pp. 130–131; Czesny et al. 2000, pp. 147–148). Domestic sale of caviar (including in the United States, China, and Russia) is not subject to CITES labeling requirements, likely facilitating trade in wild-sourced products (Harris and Shiraishi 2018, p. 54; Vaisman & Fomenko 2006, p. 20). In addition, legitimate CITES labels and containers are resold for use in concealing transport of illegal caviar (van Uhm and Siegel 2016, p. 81).

Following the inclusion of the Amur sturgeon in CITES Appendix II in 1998, there was a notable increase in illegal Russia-to-China transport of caviar and meat (Vaisman and Fomenko 2006, p. 24). Fertilized eggs were also confiscated in transit from Russia to China and very likely destined for use in aquaculture (Harris and Shiraishi 2018, p. 40; Vaisman and Fomenko 2006, p. 24).

The Amur River was identified in 2018 as one of the most concerning regions for sturgeon poaching globally (Harris and Shiraishi 2018, p. 12) and an estimated 95 percent of spawning Amur sturgeon are harvested annually (Simonov and Dahmer 2008, p. 47; note: this is 95 percent of the approximately one quarter of all adults that spawn annually, not of all adults in the population). Illegal sturgeon harvesting has been widespread, intense, and sometimes sophisticated, with up to 750 metric tons (mt) (830 U.S. tons (t)) of Amur sturgeon harvested illegally (Erickson et al. 2007, p. 31) and up to 1,000 poachers detained in Russia annually (all sturgeon species, not just Amur sturgeon; Vladivostok News, June 24, 2003). Organized and sometimes violent crime units control the harvest of Amur sturgeon in Russia, especially in the vicinity of Khabarovsk (Vaisman and Fomenko 2006, p. 19; Krykhtin and Svirskii 1997, p. 237), and fishing impacts have been especially intense on the Middle Amur spawning grounds (Krykhtin

and Svirskii 1997, p. 237). As a result, the species became markedly less common in the early 2000s (Vaisman and Fomenko, 2006, p. 16).

Although the caviar resulting from test fishing was legal for sale in Russia, between 90 and 100 percent of domestically sold Amur sturgeon was believed to be illegally caught in recent years (Harris and Shiraishi 2018 p. 33; Vaisman and Fomenko 2006, p. 22). Nearly every market stall in the city of Khaborosk sold illegally sourced caviar, and one could place an advance order for up to several metric tons of sturgeon meat (potentially several hundred smaller fish) (Vaisman and Fomenko 2006, p. 20). In 2018, Khabarovsk residents indicated that sturgeon products remained easy to find on the black market (Harris and Shiraishi 2018, p. 40). Russian law does not provide for punishments strong enough to deter poaching (Musing et al. 2019, p. 20; Harris and Shiraishi 2018, p. 40; Erickson et al. 2007, p. 30; Vaisman and Fomenko 2006, p. 18), most arrests led to dismissal of the case before prosecution due to a pardon or the expression of remorse by defendants (Vaisman and Fomenko 2006, p. 17), and Russia remains the largest consumer of Amur sturgeon (Vaisman and Fomenko 2006, pp. iv–vii).

Illegal international trade in Amur sturgeon products adds to the threat faced by the species. About 8 percent of 17 mt (19 t) of Amur sturgeon caviar arriving in the United States between 2000 and 2019 was determined to be illegal and was seized before import (CARS 2020, not paginated; CITES and UNEP-WCMC 2019). However, because of the very nature of illegal trade, its volume cannot be fully captured by the available data. Nonetheless, the United States has been the largest importer of sturgeon and sturgeon products (all *Acipenser* species) since 1998 (Harris and Shiraishi 2018, p. 26; UNEP-WCMC 2012, p. 22). At least through the mid-2000s, illegal import of sturgeon products to the United States was common among major caviar retailers (Wyler and Sheikh 2013, p. 10; Service 2005, p. 7). Most seized caviar was confiscated because of

violations of CITES requirements (e.g., incorrect label design, missing information, or misidentified species), and some purportedly captive-sourced caviar is likely wild-sourced product misrepresented as of farmed origin (Irving 2021, pers. comm.).

Nearly 3.8 mt (4.2 t) of Amur sturgeon caviar were imported into the European Union between 1998 and 2006 (UNEP-WCMC 2008, p. 31), representing 19 percent of the total reported exports from China and Russia (Engler and Knapp 2008, table 3). Between 2007 and 2015, Belgium alone imported almost 3 mt (3.3 t) of Amur sturgeon—mostly as caviar—and over 14.5 mt (15.9 t) of kaluga-Amur sturgeon hybrid products (Musing et al. 2018, p. 37). Most French vendors said that wild-sourced caviar is no longer available, although one said it could be obtained on the black market (Harris and Shiraishi 2018, p. 45).

A growing trade in sturgeon-containing cosmetics has opened newer markets, especially in Japan (Harris and Shiraish 2018, p. 68), where poached Amur sturgeon products were reported to be continuously available in the mid-2000s (Vaisman and Fomenko 2006, p. 23) and where illegal sturgeon-containing cosmetics were seized in large volumes in 2016 (Harris and Shiraishi 2018, p. 59).

In summary, there is abundant evidence that heavy fishing pressure has for several decades put severe strain on Amur sturgeon populations. The black-market trade and the laundering of wild-caught fish and caviar into the legal market for captive-bred products has continued to negatively affect the species in the wild despite the CITES requirements for international trade in Amur sturgeon. More detail on the harvest and trade of the Amur sturgeon is available in the SSA report.

Dams

The main stem of the Amur River remains one of the largest undammed rivers in the world (GRanD 2019, not paginated; Lehner et al. 2011, pp. 494–502; Simonov and Dahmer 2008, p. 185), but repeated proposals to build dams there have occurred for at

least 70 years (Simonov and Markina 2010, not paginated). The construction of dams blocks migration routes between Amur sturgeon feeding grounds (downstream) and spawning grounds (upstream); in several major tributaries of the Amur, this has stopped reproduction (Zhuang et al. 2016, p. 66; Wu et al. 2015, pp. 839–842; Gessner et al. 2010, not paginated). Dams can also increase sediment and pollution concentrations, limiting sunlight that benefits egg development and reducing the adhesion of eggs to the substrate (Li et al. 2012, p. 557).

The Russian state hydrological plan for the Amur region does not include development of hydropower dams on the river's main stem, and little regional demand exists for additional electrical capacity on the Russian side of the river (Simonov 2016, not paginated). However, proposals still exist for as many as 13 dams on the Amur River or the Shilka River, its source (Simonov et al. 2019, figure 2).

Some Russian water-management agencies are now promoting flood control for property protection in the Amur floodplain, and Chinese institutions remain interested in future hydropower development as the much larger human population on their side of the river demands electricity (Simonov 2016, not paginated). Construction of any dam on the Lower or lower Middle Amur main stem would be catastrophic for Amur sturgeon by hindering or preventing connectivity (Simonov and Dahmer 2008, pp. 193–196). The Khingansky-Taipinggou Dam, proposed for the Middle Amur, would have severe hydrological impacts on the river, creating a complete barrier to migrating fish (Simonov and Egidarev 2018, pp. 9–10). Until recently, prevailing economic and social conditions made it unlikely that Chinese and Russian counterparts would agree to advance such a project in the next several years (Simonov and Egidarev 2018, p. 10); however, recently thawing China-Russia relations (Chen 2019, pp. 62–64) could now lead to further discussion and construction of a main stem dam.

While the Amur itself remains free-flowing, approximately 100 dams dot its tributaries (Simonov et al. 2019, p. 4). Many of these are small and the impacts of smaller dams on Amur sturgeon are uncertain, but they more likely than not prevent connectivity along stretches of several tributaries and have likely contributed to the species' decline.

Several tributaries also have larger dams; in all such cases, Amur sturgeon have been extirpated from these rivers due in large part to the inability of Amur sturgeon to pass over or around the dams. The Songhua River, a major tributary in the lower section of the Middle Amur, is interrupted by the Baishan, Hongshi, and Xiao Fengman dams (GRanD 2019, not paginated; Lehner et al. 2011, pp. 494–502), which are approximately 150, 50, and 150 m tall, respectively. The Nierji Dam on the Nen River was built in 2006, after the Amur sturgeon was extirpated from this tributary (Lehner et al. 2011; GRanD 2019, not paginated), but because it blocks the route taken by Nen River spawners, its presence would make any restoration efforts there difficult.

Farther upstream, the Zeya and Bureya Rivers are interrupted by dams built in 1975 and 2003, respectively (GRanD 2019, not paginated; Simonov et al. 2019, p. 4; Lehner et al. 2011, pp. 494–502). These two large hydroelectric dams are 115 and 140 m high (Lehner et al. 2011, pp. 494–502), and have the greatest ecological impacts of any of the dams in the Amur basin (Simonov and Dahmer 2008, p. 191). They block Amur sturgeon migrations and destroyed downstream wetlands (Simonov and Egivdarev 2008, p. 192), contributing substantially to the extirpation of the species from these rivers (Koshelev et al. 2014a, pp. 1313, 1316; Krykhtin and Svirskii 1997, p. 237). Another dam downstream of the existing Bureya impoundment began operating in 2017 (Simonov et al. 2019, p. 4) and its presence and effect on the river further limits the potential to restore sturgeon to the Bureya River by making yet a longer stretch of river inaccessible to Amur sturgeon.

Sturgeon are slower swimmers with large bodies; therefore, both fish elevators and fish ladders have been relatively ineffective at allowing sturgeon to transit around dams (Billard and Lecointre 2001, p. 380). For the Amur sturgeon, fish passageways made to allow travel through or around dams must include resting pools between fast velocity runs and must be wider than the maximum tail-beat width during swimming (Cai et al. 2013, p. 153). However, we have no information indicating that such structures are built into dams in the Amur basin, and the best scientific and commercial information available shows that the Amur sturgeon is unable to traverse the larger existing dams constructed in the Amur basin, limiting its range to stretches of river below existing large dams and contributing to its decline. Remaining available spawning grounds are substantially reduced compared to their historical extent.

Pollution

Pollution of the Amur basin has likely contributed to the decline of the Amur sturgeon, given the volume and extent of pollution in the Amur basin, the susceptibility of the species to pollutants, and reports of large-scale fish kills in polluted river reaches (Simonov and Dahmer 2008, pp. 47, 212–236; Zhang 1985 cited in Zhuang et al. 2003, p. 38). Extensive human settlements, agriculture, and industry—especially but not exclusively in China—all pollute the Amur River and its tributaries with petrochemicals, heavy metals, and persistent organic pollutants such as polychlorinated biphenyls (PCBs) (Jiang et al. 2016, p. 537; Meng et al. 2016, pp. 1– 5). Many Amur River fish, including the single Amur sturgeon sampled, contained copper, chromium, arsenic, and mercury (Jiang et al. 2016, p. 540, table 2).

In the late 1990s and early 2000s, pollution in the Lower Amur was considered at an emergency level, and mass fish kills were not uncommon (Erickson 2007, p. 30; Jen 2003, p. 3). Sewage, domestic animal feces, pesticides, petrochemicals, heavy metals, and industrial pollutants including PCBs (Jiang et al. 2016, p. 537; Meng et al. 2016, pp.

1–5; Kondratyeva et al. 2012, p. 186), as well as eutrophication (the process by which waters lose oxygen following extreme plant growth triggered by excessive nutrient inputs) due to fertilizer runoff, all damaged the river basin's ecosystems (Erickson 2007, p. 30; Jen 2003, pp. 2–3).

In the Middle Amur analysis unit, the Zeya and Bureya catchments were substantially polluted with mercury, cadmium, and lead as of 2005 (Kondrat'eva et al. 2013, p. 131). In addition, these two river basins are home to more than 30 reservoirs storing heavily polluted wastewater and mining residues. The potential for future failure of the smaller dams that contain these reservoirs and the consequent release of toxic pollutants into the river system poses a high risk to remaining habitats suitable for Amur sturgeon (Simonov and Dahmer 2008, p. 191).

In 2001, 100 million mt (110 million t) of wastewater containing 2,500 mt (2,800 t) of organic chemicals, 80 mt (88 t) of oil products, more than 1,000 mt (1,100 t) of nitrogenous waste, and 2.5 mt (2.8 t) of phenols were discharged into the Amur from Blagoveschensk, Russia at the boundary of the Middle and Upper Amur (Simonov and Dahmer 2008, p. 2016). In the Upper Amur, including the Shilka, Amgun, and Argun Rivers, illegal gold mining causes sedimentation and turbidity, hampering sturgeon reproductive success (Pacific Environment 2016, not paginated; Egidarev and Simonov 2015, pp. 900, 906–907).

Historically, the Songhua River in the Middle Amur has been the most contaminated tributary (Kondratyeva et al. 2012, p. 185); the Amur sturgeon is extirpated from this river, very likely in part due to pollution (Cai et al. 2013, p. 150; Simonov and Dahmer 2008, p. 129; Novomodny et al. 2004, p. 18). Two industrial accidents at Jilin City, China, contaminated the Songhua (and eventually the Amur River, 1,000 km (600 miles) downstream) in 2005 and 2010. They released a combined 600 mt (660 t) of methyl chloride, trimethyl chloride, nitrobenzene, benzene, aniline, chloroform,

chlorobenzene, and other chemicals into the Songhua (Kondratyeva et al. 2012, p. 186; The Guardian, November 25, 2005). Concentrations of these chemicals were as high as 600 times the government-accepted levels (Kondratyeva et al. 2012, p. 186) and were later detected in fish tissues, including those of Amur sturgeon (Kondratyeva et al. 2012, pp. 187–189; Levshina et al. 2009, table 1, p. 779). Also in the Songhua, heavy metals leach into the river from nearby mines (Jen 2003, p. 4), and fish tissues have PCB concentrations up to 10,000 times those in the sediment (Li et al. 1989 cited in Meng et al. 2016, p. 5). Some Amur River fish are even said to smell of chemicals (Simonov and Dahmer 2008, p. 225).

The impacts of pollution on wild Amur sturgeon have not been well-studied, but their life history and some laboratory studies indicate they are likely quite susceptible. Because the Amur sturgeon is a river bottom species, it is exposed to pollutants that accumulate in sediments and in its bottom-dwelling prey (Kasymov 1994 cited in He et al. 2017, p. 10; Kondrat'eva et al. 2013, p. 129; Kocan et al. 1996, p. 161). Larvae and small juveniles may be especially sensitive to petrochemicals polluting the Amur (Kondratyeva and Stukova 2009, p. 46; Bickham et al. 1998, pp. 514–515; Kocan et al. 1996, p. 163), although extrapolating results from laboratory trials to impacts on wild fish is not straightforward (Tabak et al. 2002, table 3; Bickham 1998, pp. 514–515).

Comprehensive toxin concentration data from around the basin and knowledge of the concentration thresholds at which Amur sturgeon are affected are unavailable, and field studies definitively linking population declines to pollution also do not exist, to our knowledge. However, sturgeon are, at least at their early life stages, sensitive to polycyclic aromatic hydrocarbons (PAHs), one class of petrochemicals polluting the Amur (Kondratyeva and Stukova 2009, p. 46; Tabak et al. 2002, table 3; Bickham et al. 1998, pp. 514–515; Kocan et al. 1996, p. 163;). Methyl mercury, another pollutant found

in the Amur basin, interferes with sturgeon growth and reproduction and can even cause direct mortality (Depew et al. 2012, table 2; Webb et al. 2006, pp. 447–450).

The future trajectory of water quality in the Amur basin is uncertain, but possibly improving as wastewater and industrial waste treatment capacity have been developed since the early 2000s (Meng et al. 2016, pp. 4–5, table 1). Mercury concentrations in Amur River sediments have declined since the 1990s, likely due to a Russian economic slowdown that limited industrial emissions (Kot et al. 2009, p. 133). In addition, human populations of most Chinese industrial cities in the region are shrinking, as cost-efficient raw materials are exhausted and industry declines (Duhalde et al. 2019, not paginated).

Climate Change

When and how progressing climate change will affect the species is uncertain. Air temperatures in the region are rising (see the SSA report for a detailed analysis), and all species have a thermal maximum; for example, the closely related Yangtze sturgeon becomes stressed above 23 degrees Celsius (°C) (Chang et al. 2017, p. 1449). On the other hand, warmer water can speed the maturation of Amur sturgeon (Krykhtin and Svirskii 1997, p. 237) and so may have short-term positive impacts on the species, but we cannot currently estimate their magnitude or at what point increasing water temperature stops being beneficial. We also do not have information on the water temperatures Amur sturgeon experience at present or reliable projections of what the water temperatures are likely to be in the future. Indirect effects of warming temperatures may impact the Amur sturgeon as climate change progresses. For example, between 1955 and 2014, the average annual duration of ice cover in the Amur basin decreased by 7 days per decade, and the maximum ice thickness decreased by 17 cm (6.7 inches; Vuglinsky and Valantin 2018, p. 83; Ohshima et al. 2016, pp. 10–11). This potentially exposes Amur sturgeon to fishing pressure for a greater proportion of the year.

Other Threats and Conservation Measures

Hybridization, disease, and predation presently constitute lesser or negligible threats to the viability of the Amur sturgeon and are addressed in more detail in the SSA report (Service 2020, pp. 28–29). Although very little information is available on the genetic structure of wild Amur sturgeon populations, representation of the species would be diminished if its genome were diluted by hybridization with escaped captive-bred fish or other sturgeon species. From a fitness perspective, hybridization can erase locally adaptive features that evolved over evolutionary time, and from a conservation-management perspective, muddled genomes make DNA-based identification of traded specimens more difficult (Ludwig 2006, pp. 6). That said, we are not aware that wild Amur sturgeon have been documented hybridizing with fish escaped from aquaculture facilities yet (Osipov 2020, pers. comm.). However, the presence of over 1200 sturgeon farms across the whole of China (Bronzi et al. 2017, pp. 260) and confirmed escapes and releases of hybrid fish created in aquaculture suggests it is likely to occur soon, if it has not already (Boscari et al. 2017, pp. 250). The best scientific and commercial information available shows that disease and predation do not presently pose a threat to the viability of the Amur sturgeon.

The primary conservation effort targeting recovery of the Amur sturgeon is the release of captive-bred fish into wild habitats, but these activities are not sufficient to restore wild populations and must employ sound genetic management to avoid the potential impacts of hybridizing maladapted captive-bred fish with wild ones. Whereas some experts have suggested 10 to 11 million fish would need to be released annually to successfully replenish the species (Krykhtin and Gorbach 1994 cited in Koshelev et al. 2014a, p. 1316), no more than 10 percent of this volume has been released, on average, in years since restocking began in 1988 (Simonov and Dahmer 2008, p. 130; Wei et al. 2004, p. 330; Zhuang et al. 2002, p. 361; Qiuzhi and Dajiang 1994, p. 67). As of the early 2000s, 99 percent of the Amur sturgeon produced by China’s aquaculture industry

(approximately 15 million fish per year) (Wei et al. 2011, figure 2) were sold for meat or caviar (Simonov and Dahmer 2008, p. 131; Wei et al. 2004, p. 330).

We are not aware of any studies that have tracked the growth or reproductive success of Amur sturgeon released from captive-breeding operations. However, when releases do occur, they almost always use very young fish, 30 to 45 days old and weighing in the range of 1 to 5 grams (0.1 ounces). In other sturgeon species, no more than 1 in 2,000 fish survive their first year, although survival rates are much higher thereafter (Jaric and Gessner 2013, table 1; Jager et al. 2002, table 1). If hatcheries grew fish to a larger size before release, their survival and population recovery may improve (Koshelev et al. 2009 and Mikhailova 2004 cited in Koshelev et al. 2014a, p. 1316, scenario 3 in chapter 5 of the SSA, figures 5.2 and 5.3, tables 5.3 and 5.4).

Current Condition

We assessed the current status of the Amur sturgeon in light of the species' demographic and habitat requirements for maintaining low-risk levels of resilience, redundancy, and representation. Resilience is a population-level metric; therefore, we only scored its present levels for the three analysis units where Amur sturgeon are extant (Amur Estuary, Lower Amur, and Middle Amur). The species is extirpated from a large portion of its range, including the entire Upper Amur unit and several major tributaries.

High-resilience units are those in a self-sustaining condition and experiencing little, if any, risk of extirpation; they have relatively higher abundance of adult females, connectivity between feeding and spawning grounds, high water quality, and fish survive to reproduce multiple times. Moderate-resilience units are unlikely to be self-sustaining and are experiencing some level conservation threat that could eventually lead to extirpation. Low- and very-low-resilience units are not self-sustaining, due to ongoing conservation threats; they may become extirpated, perhaps rapidly in the case of very low-resilience units. Highly redundant species have a large number of populations, which

safeguards against rare, localized catastrophic events. Representation is a measure of the species' capacity to adapt to changing environments.

The species as a whole is estimated to have experienced a population decline of greater than 95 percent between 1960 and 2010 (Ruban and Qiwei 2010, not paginated). However, using a 1960 baseline underestimates actual historical declines in the species' abundance because intense fishing occurred at least as early as the 1890s (Koshelev et al. 2016, p. 240; Vaisman and Fomenko 2006, p. 11). Sizeable populations now exist only in the Amur Estuary and Lower Amur analysis units (Koshelev et al. 2014a, pp. 1313–1316). The species has a skewed sex ratio of 1 female per 2 males, very likely due to preferential poaching of females for caviar and use in aquaculture (Koshelev et al. 2014b, pp. 1127, 1129), and the largest fish—which are also the most reproductively valuable—have been removed from the population (Koshelev et al. 2014a, table 5).

Our assessment of the resilience of each of the three extant analysis units indicates that none are in self-sustaining condition (see table 2, below). Only the Amur Estuary unit has even moderate resilience. Details of how we determined overall resilience from the four demographic- and habitat-based criteria in table 2, below, can be found in the SSA report.

Table 2.—Current resilience of the three extant Amur sturgeon analysis units.

Resilience Criteria	Amur Estuary	Lower Amur	Middle Amur
Number of reproductive females	~28,860	~425	Nearly extirpated
Water quality to support prey availability and sturgeon health	• Receives water pollution from all upstream reaches, including the heavily polluted Songhua and Lower Amur • May impact sturgeon health and prey abundance	• Heavy industrial presence and human population density • Likely impacts sturgeon health and prey abundance	• Songhua River includes the most polluted sections of the Amur basin • The medium-sized cities of Heihe and Blagoveschensk deposit sewage and industrial waste into this reach of the Amur • Likely impacts sturgeon health and prey abundance

Survival to reproduce multiple times	• High fishing pressure • Estimated 95 percent of spawning fish captured annually • Size of captured fish and proportion of fish that are large females are declining • Limits average fecundity	• High fishing pressure • Estimated 95 percent of spawning fish captured annually • Size of captured fish and proportion of fish that are large females are declining • Limits average fecundity	• Few reproductive fish present • Fishing pressure is likely still very high for any fish present
Connectivity between spawning and feeding grounds	No dams. Fish can move into the main stem of the river to reach spawning grounds.	No known barriers to connectivity.	Songhua, Nen, Zeya, and Bureya River dams prevent fish from reaching spawning sites. Main stem remains without obstructions.
Current Resilience	**Moderate**	**Low**	**Very low**

Note: Sources for the information in this table are Koshelev et al. 2014a, pp. 1310–1316; Koshelev et al. 2014b, p. 1127; Cai et al. 2013, p. 150; Ruban and Qiwei 2010, not paginated; Simonov and Dahmer 2008, p. 47; Novomodny et al. 2004, p. 18; and others provided in the SSA report's detailed discussion of current condition.

Amur sturgeon redundancy is considerably reduced compared to its historical level, which was never high, given that the species is endemic to a single large river system. One of four units (the Upper Amur) is extirpated, and the Middle Amur unit is on the brink of extirpation, too. The Amur sturgeon has been extirpated from several major tributaries (e.g., the Zeya and Bureya) within the Middle and Lower Amur units. Despite the species' low redundancy, we assess that its geographically dispersed nature, across a several-hundred km stretch of the Lower Amur and Estuary, means that complete extinction of the population due to a single catastrophic event is unlikely, at present.

We have very little information about the contemporary population genetic structure of wild Amur sturgeon, making it difficult to fully assess the species' representation. However, we can assess that the variety of ecological settings inhabited by Amur sturgeon is at least somewhat reduced in the last century as the geographic range of the species has contracted to primarily the Lower Amur and Amur Estuary, now excluding the Upper Amur, as well as the Zeya, Bureya, and Songhua Rivers, all tributaries of the Amur. In turn, we expect that adaptive potential of the species is also lower than before, although we cannot quantify this at present.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the species. To assess the current and future condition of the species, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

Determination of Amur Sturgeon's Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an "endangered species" or a "threatened species." The Act defines an "endangered species" as a species in danger of extinction throughout all or a significant portion of its range, and a "threatened species" as a species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether a species meets the definition of an "endangered species" or a "threatened species" because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we find that existing threats to the Amur sturgeon—primarily overfishing, loss of connectivity due to dams, and pollution—have caused and will continue to cause a decline in the species' viability through reduction of resilience, redundancy, and representation. For the four historical analysis units, one is extirpated, and the remaining three are not self-sustaining. The species is already extirpated from much of its historical range, including most upstream portions of the Amur basin and several major tributaries where dams block access to spawning grounds and migration routes (Factor A). The Middle Amur unit is on the brink of being the second unit extirpated. Thus, a relatively small portion of the historical range now accounts for most of the remaining Amur sturgeon, increasing the species' susceptibility to stochastic and catastrophic events.

Fish throughout the range experience very intensive fishing pressure, estimated at 95 percent of spawning fish annually (Factor B). This includes fish in the present relative stronghold of the species, the Amur Estuary analysis unit, because they migrate into the river to breed, where they are heavily fished.

Existing conservation measures are Russian and Chinese fishery regulations, the national laws and regulations (Russia, China, U.S., and other CITES Parties) for implementing CITES requirements for international trade in the Amur sturgeon, and limited restocking of wild populations using captive-bred Amur sturgeon. These measures are currently inadequate to stop population declines (Factor D). Organized networks for corrupt and illegal trade of Amur sturgeon caviar and meat, and sometimes involving government officials, create challenges for law enforcement (Vaisman and Fomenko 2006, pp. 14–18). Moreover, it is difficult for even scrupulous law-enforcement agencies to discern between captive-bred and wild-sourced caviar at the point of sale or import. This makes control of illegal harvest and trade challenging (Factors B and D).

CITES requirements (e.g., labeling and quota systems) are not applicable to domestic trade, further hampering law-enforcement efforts to control the sale of wild-caught Amur sturgeon in Russia, where the majority of Amur sturgeon products are consumed (Vaisman and Fomenko 2006, pp. iv–vii; Factors B and D). Pollution is also a widespread threat to the Amur sturgeon's habitat and health (Factor A) and is not well regulated (Factor D).

The species is endemic to a single large river basin and is extirpated from much of its historical range already (lost redundancy). At present, no population has the resilience to be self-sustaining. Among the remaining three extant populations, one has moderate resiliency (Amur Estuary), one has low resiliency (Lower Amur), and one has very low resiliency (Middle Amur). Overfishing and dams have reduced the viability of the Amur sturgeon across its distribution. The vast decrease in population abundance is very likely associated with a decrease in genetic diversity (representation) and adaptive potential. Restocking efforts are not currently sufficient to stop declines in resilience and overall abundance. Thus, after assessing the best scientific and commercial information available, we conclude that the Amur sturgeon currently lacks sufficient resiliency, redundancy, and representation for its continued existence to be secure. We therefore determine that the Amur sturgeon is in danger of extinction throughout all of its range. The species does not fit the statutory definition of a threatened species because it is currently in danger of extinction, whereas threatened species are those in danger of extinction in the foreseeable future.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. We have determined that the Amur sturgeon is in danger of extinction throughout all of its range and accordingly did not undertake an

analysis of any significant portion of its range. Because the Amur sturgeon warrants listing as endangered throughout all of its range, our determination is consistent with the decision in *Center for Biological Diversity* v. *Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020), in which the court vacated the aspect of our Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014) that provided that the Service and NMFS do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range.

Determination of Status

Our review of the best scientific and commercial information available indicates that the Amur sturgeon meets the definition of an endangered species. Therefore, we propose to list the Amur sturgeon as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and encourages and results in conservation actions by Federal, State, Tribal, and local agencies, foreign governments, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section

7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

An "action" that is subject to the consultation provisions of section 7(a)(2) is defined in our implementing regulations at 50 CFR 402.02 as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." With respect to this species, there are no "actions" known to require consultation under section 7(a)(2) of the Act. Given the regulatory definition of "action," which clarifies that it applies to activities or programs "in the United States or upon the high seas," the Amur sturgeon is unlikely to be the subject of section 7 consultations, because the entire life cycle of the species occurs in freshwater and nearshore marine areas outside of the United States unlikely to be affected by U.S. Federal actions. Additionally, no critical habitat will be designated for this species because, under 50 CFR 424.12(g), we will not designate critical habitat within foreign countries or in other areas outside of the jurisdiction of the United States.

Section 8(a) of the Act (16 U.S.C. 1537(a)) 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 or threatened species in foreign countries. Sections 8(b) and 8(c) of the Act (16 U.S.C. 1537(b) and (c)) authorize the Secretary to encourage conservation programs for foreign

listed species, and to provide assistance for such programs, in the form of personnel and the training of personnel.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any species listed as an endangered species. In addition, it is unlawful to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) endangered wildlife within the United States or on the high seas. It is also illegal to possess, sell, deliver, carry, transport, or ship, by any means whatsoever any such wildlife that has been taken illegally. Certain exceptions apply to employees of the Service, NMFS, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits for endangered wildlife are codified at 50 CFR 17.22, and general Service permitting regulations are codified at 50 CFR part 13. With regard to endangered wildlife, a permit may be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities. The Service may also register persons subject to the jurisdiction of the United States through its captive-bred-wildlife (CBW) program if certain established requirements are met under the CBW regulations (50 CFR 17.21(g)). Through a CBW registration, the Service may allow a registrant to conduct certain otherwise prohibited activities as part of conservation breeding activities that enhance the propagation or survival of the affected species: take; export or re-import; deliver, receive,

carry, transport or ship in interstate or foreign commerce, in the course of a commercial activity; or sell or offer for sale in interstate or foreign commerce. A CBW registration may authorize interstate purchase and sale only between entities that both hold a registration for the taxon concerned. The CBW program is available for species having a natural geographic distribution not including any part of the United States and other species that the Director has determined to be eligible by regulation. The individual specimens must have been born in captivity in the United States. There are also certain statutory exemptions from the prohibitions, found in sections 9 and 10 of the Act. For example, a limited exemption from the prohibitions on import and export is available under section 9(b)(1) for a specimen of fish or wildlife which was held in captivity or in a controlled environment on the date the species is listed under the Act, provided that such holding and any subsequent holding or use of the fish or wildlife was not in the course of a commercial activity.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. Based on the best available information, the following actions are unlikely to result in a violation of section 9, if these activities are carried out in accordance with existing regulations and permit requirements; this list is not comprehensive:

(1) Take of the Amur sturgeon in its native range in China and Russia; and

(2) Trade in the Amur sturgeon and its products that is both outside the United States and conducted by persons not subject to U.S. jurisdiction (although this activity would still be subject to CITES requirements).

Based on the best available information, the following activities may potentially result in a violation of section 9 of the Act if they are not authorized in accordance with applicable law; this list is not comprehensive:

(1) Import into the United States of the Amur sturgeon and its products, including fish originating from the wild or captive-bred, without obtaining permits required under Section 10 of the Act and without following applicable CITES requirements at 50 CFR part 23.

(2) Export of the Amur sturgeon and its products, whether originating from the wild or captive-bred, from the United States without obtaining permits required under Section 10 of the Act and without following applicable CITES requirements at 50 CFR part 23.

Separate from its proposed listing as an endangered species, as a CITES-listed species, all international trade of Amur sturgeon by persons subject to the jurisdiction of the United States must also comply with CITES requirements pursuant to Section 9(c), (g) of the Act and 50 CFR Part 23. Applicable wildlife import/export requirements established under Section 9(d)-(f) of the Act, the Lacey Act Amendments of 1981 (16 U.S.C. 3371, et seq.), and 50 CFR Part 14 must also be met for Amur sturgeon imports and exports. Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to Mary Cogliano, Chief of the Branch of Permits (mary_cogliano@fws.gov).

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244).

References Cited

A complete list of references cited in this rulemaking is available on the Internet at *http://www.regulations.gov* and upon request from the Branch of Delisting and Foreign Species (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are staff members of the Service's Branch of Delisting and Foreign Species.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361-1407; 1531-1544; and 4201-4245, unless otherwise noted.

2. Amend § 17.11(h) by adding an entry for "Sturgeon, Amur" to the List of Endangered and Threatened Wildlife in alphabetical order under FISHES to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
* * * * * * *				
FISHES				
* * * * * * *				
Sturgeon, Amur	*Acipenser schrenckii*	Wherever found	E	[*Federal Register* citation when published as a final rule]
* * * * * * *				

Martha Williams,

Principal Deputy Director,

Exercising the Delegated Authority of the Director,

U.S. Fish and Wildlife Service.

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