

Thorn Sturgeon (*Acipenser nudiventris*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, March 2011

Revised, June 2018

Web Version, 8/29/2018



Photo: Z. Abbaszade. Public domain. Available:
<https://commons.wikimedia.org/wiki/File:Shipzaur.jpg>. (June 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Europe: Black, Azov, Caspian and Aral Sea, ascending some rivers (Danube up to Bratislava, Volga up to Kazan, Ural up to Chkalov), unknown or very rare in others. On the verge of extinction in its natural range. Extirpated in Aral basin; nearly extirpated in Black Sea basin; only occasional records from Danube and lower Volga; only a very small population remaining in Rivers Ural (Russia, Kazakhstan) and Rioni (Georgia); no natural spawning population in Iran; established in Lake Balkhash where it forms a large population [Kottelat and Freyhof 2007].”

Status in the United States

This species has not been reported as introduced or established in the United States.

From Gesner et al. (2010):

“All international trade is historical as trade was banned from 2001.”

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

Remarks

From Gesner et al. (2010):

“Red List Category & Criteria: Critically Endangered [...]”

“Even though there is no catch data it is suspected that the species has undergone a population decline of more than 90% in the past three generations (estimated at 45 years) which is expected to continue. It is believed the species is on the verge of global extinction.”

“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.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Chondrostei
Order Acipenseriformes
Suborder Acipenseroidei
Family Acipenseridae
Subfamily Acipenserinae
Genus *Acipenser*
Species *Acipenser nudiventris* Lovetsky, 1828”

From Eschmeyer et al. (2018):

“Current status: Valid as *Acipenser nudiiventris* Lovetsky 1828. Acipenseridae.”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 200 cm TL male/unsexed; [Bauchot 1987]; common length : 132 cm TL male/unsexed; [Bauchot 1987]; max. published weight: 80.0 kg [Rochard et al. 1991]”

From Vecsei et al. (2002):

“Ship sturgeon of over 100 kg have been reported but specimens over 220 cm and 80 kg are exceptional.”

Environment

From Froese and Pauly (2018):

“Marine; freshwater; brackish; demersal; anadromous [Riede 2004]; depth range 30 - 60 m [Bauchot 1987]. [...] 10°C - 20°C [Baensch and Riehl 1991; assumed to be recommended aquarium temperature range]”

From Bloesch et al. (2005):

“*Acipenser nudiiventris* is basically a diadromous species [...]. However, the species also occurs as a potamodromous form, which remains continuously in fresh water.”

Climate/Range

From Froese and Pauly (2018):

“Temperate; [...] 57°N - 36°N, 14°E - 53°E”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Europe: Black, Azov, Caspian and Aral Sea, ascending some rivers (Danube up to Bratislava, Volga up to Kazan, Ural up to Chkalov), unknown or very rare in others. On the verge of extinction in its natural range. Extirpated in Aral basin; nearly extirpated in Black Sea basin; only occasional records from Danube and lower Volga; only a very small population remaining in Rivers Ural (Russia, Kazakhstan) and Rioni (Georgia); no natural spawning population in Iran; established in Lake Balkhash where it forms a large population [Kottelat and Freyhof 2007].”

From Gesner et al. (2010):

“Native:

Azerbaijan; Georgia; Hungary; Iran, Islamic Republic of; Kazakhstan; Russian Federation; Serbia; Turkey”

“Possibly extinct:

Romania”

“It is currently known from the Caspian Sea, where it ascends only the Ural river (where it naturally reproduces) and the Sefid Rud River (where there is no natural reproduction), where 5 fish were caught in 2002 (Parandavar et al. 2009). In the Black Sea, it [*sic*] ascends the Rioni (last recorded 1997 through bycatch (Zarkua pers. comm.)). In the Danube it was last recorded in 2003 in Serbia at Apatin (released alive) and in 2005 in Mura in Hungary (killed); both these caught fish were males (Simonovic et al. 2003; Streibel pers. comm.). In Romania, according to a fisherman survey carried out between 1996-2001, 15 individuals were caught by Romanian fishermen (last scientifically recorded in 1950s) (Suciu et al. 2009) .”

Introduced

FAO (2018) reports an introduction of *Acipenser nudipectus* from the former USSR to China (Ma et al. 2003). Reason of introduction is listed as “1) fisheries” and no further information is available.

Means of Introduction Outside the United States

No information available.

Short Description

From Froese and Pauly (2018):

“Dorsal spines (total): 0; Dorsal soft rays (total): 45-57; Anal soft rays: 23 - 37. Snout moderately long and pointed at tip. Lower lip continuous, not interrupted at centre. Barbels halfway between tip of snout and mouth, reaching the latter. Five rows of scutes, dorsal 11-17, lateral 49-70, but usually 55-56 on each side, ventral 10-16, with no smaller plates between dorsal and ventral rows. Color of back grey, flanks lighter, belly white.”

Biology

From Gesner et al. (2010):

“Habitat : At sea, close to shores and estuaries. In freshwater, deep stretches of large rivers. Juveniles in shallow riverine habitats. This species spawns in strong-current habitats in main courses of large and deep rivers on stone or gravel bottom.”

“Biology: Anadromous (spending at least part of its life in salt water and returning to rivers to breed), with some non-migratory freshwater populations. Males reproduce for the first time at 6-15 years, females at 12-22, with an average generation length of 15 years (but in the Danube, the

average population age has now increased and in the Caspian Sea, the average population age is decreasing because of overharvesting). In most drainages, there are two migration runs, in spring and autumn. Individuals migrating in autumn remain in the river until the following spring to spawn. Females reproduce every 2-3 and males every 1-2 years in March-May and at temperatures above 10°C. Most juveniles move to sea in their first summer and remain there until maturity. Some individuals remain in freshwater for a longer period. Feeds on a wide variety of benthic fishes, molluscs and crustaceans.”

Human Uses

From Froese and Pauly (2018):

“Fisheries: commercial; aquaculture: commercial”

From Gesner et al. (2010):

“Skin is used as leather, Caviar is used as cosmetic and medicinal purposes. The cartilage is used medicinal use, the intestine is used as sauce (food) and to produce gelatine, and the swim bladder is used as glue.”

“All international trade is historical as trade was banned from 2001.”

Diseases

From Bauer et al. (2002):

“[...] [*Cryptobia*] *acipenseris* (Joff, Lewashow, Boschenko 1926), has been reported to occur within the watersheds of the Don, Volga and Yenisei rivers, namely in *Huso huso*, *A. gueldenstaedtii*, *A. stellatus*, *A. nudiventris*, and *A. ruthenus*.”

“In 1935-1936 a tragic event caused significant mortality of this sturgeon species; a quick population decline resulted (Dogiel and Lutta, 1937; Lutta 1937, 1941). Witnesses of this mortality reported that large, diseased fish jumped on to the beaches and perished. An investigation led to the discovery that in the year prior to this specific incident (in 1934), about 90 specimens of mature Caspian Sea *A. stellatus* had been transferred to the Aral Sea in an attempt to acclimate the species there. No prophylactic measures had been employed to prevent disease transfer although [*Nitzschia*] *sturio* was known to be a common parasite of the species. It is therefore obvious that the parasite was introduced along with *A. stellatus* to the Aral Sea, severely infecting the local population of *A. nudiventris* because the native fish exhibited no immunity against this parasite.”

“Several species of the order Spathobothriidea have been found in sturgeons of Russia and adjacent countries, among them is *Bothriomonus fallax* Liihe 1900, which is documented from *H. huso*, *A. nudiventris*, *A. ruthenus*, *A. gueldenstaedtii*, *A. sturio* and *A. stellatus* in the basins of the Black, Azov and Caspian seas.”

“Aspidogastrea. One species of these worms, *Aspidogaster limacoides* Diesing 1835 - a typical parasite of cyprinid fishes, was found in *A. nudiventris* from the Aral Sea (prevalence 55%, average abundance 310 specimens per fish (Osmanov, 1971).”

“[...] *Camallanus truncatus* have been described from *A. nudiventris*, while *P. kaufmanni* (Aral Sea), *Procamallanus fulvidraconis* from *A. nudiventris* and *P. kaufmanni* (Aral Sea basin) were noted to occur in a wide range of fishes, including sturgeons in which they are very rare except for *P. fulvidraconis*, known to infect sturgeons from the Aral Sea regularly (Skrjabina, 1974).”

“Only one species [of Hirudinea], *Acipenserobdella volgensis* Zykoff 1903, seems to be specific for sturgeons. It was found on *A. nudiventris*, *A. ruthenus*, and *A. baerii* from the Volga, Angara and Selenga rivers.”

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

No information available.

4 Global Distribution

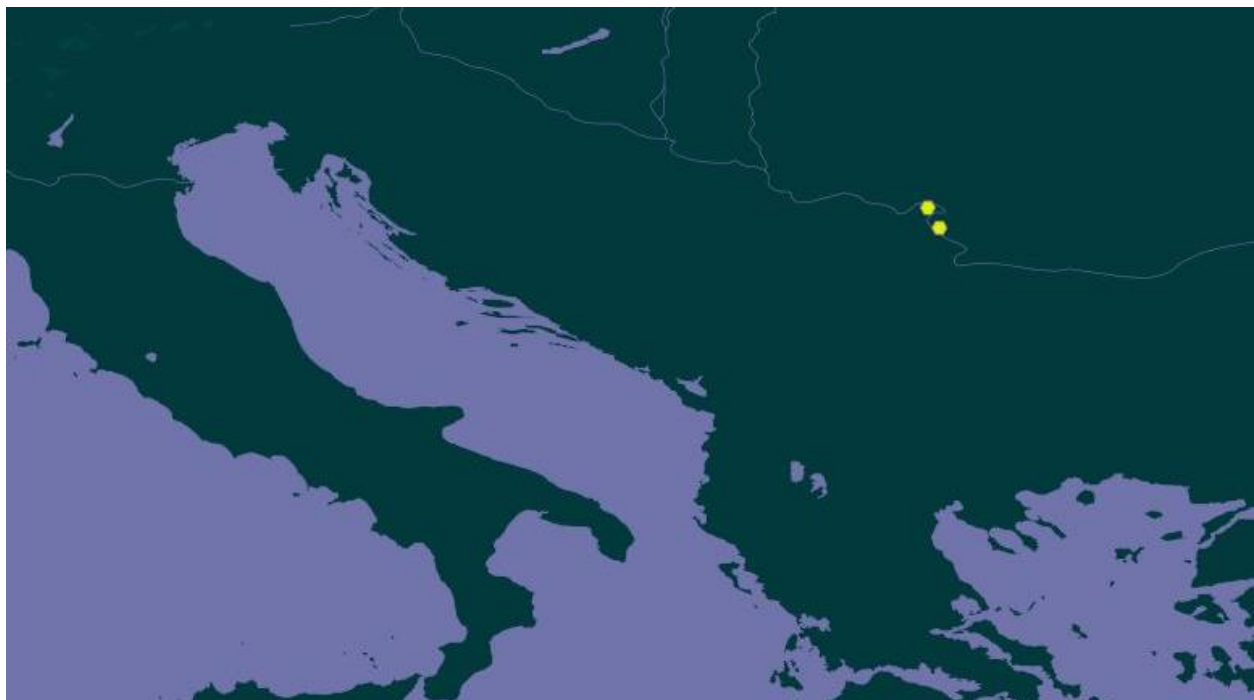


Figure 1. Known global distribution of *Acipenser nudiventris*, reported from the Danube River in Serbia. Map from GBIF Secretariat (2018).

5 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match presented here reflects only the climate suitability for *A. nudiventris* within freshwater and brackish water environments. *A. nudiventris* can also live in marine environments, and the climate matching analysis presented below cannot be used to assess marine environments.

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was 0.071, which is a medium climate match. The climate match was high in Arizona, Illinois, Indiana, Michigan, New York, Ohio, Pennsylvania, and West Virginia. The climate match was medium in Colorado, Iowa, Idaho, Maryland, Montana, New Mexico, Utah, Virginia, Vermont, and Wisconsin. All other states had a low climate match.

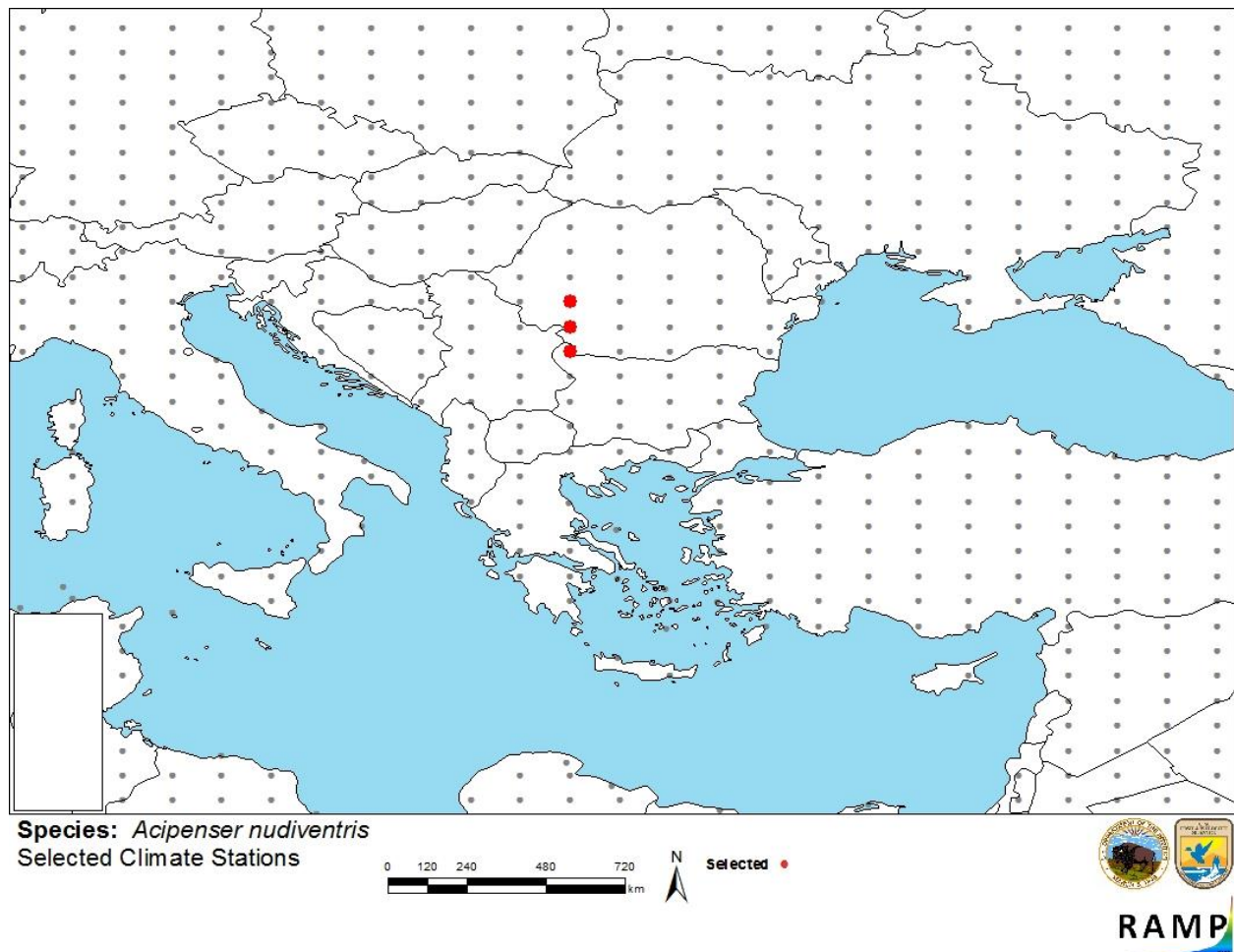


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in southeastern Europe selected as source locations (red; Romania and Bulgaria, representing occurrences on the border with Serbia) and non-source locations (gray) for *Acipenser nudiiventris* climate matching. Source locations from GBIF Secretariat (2018).

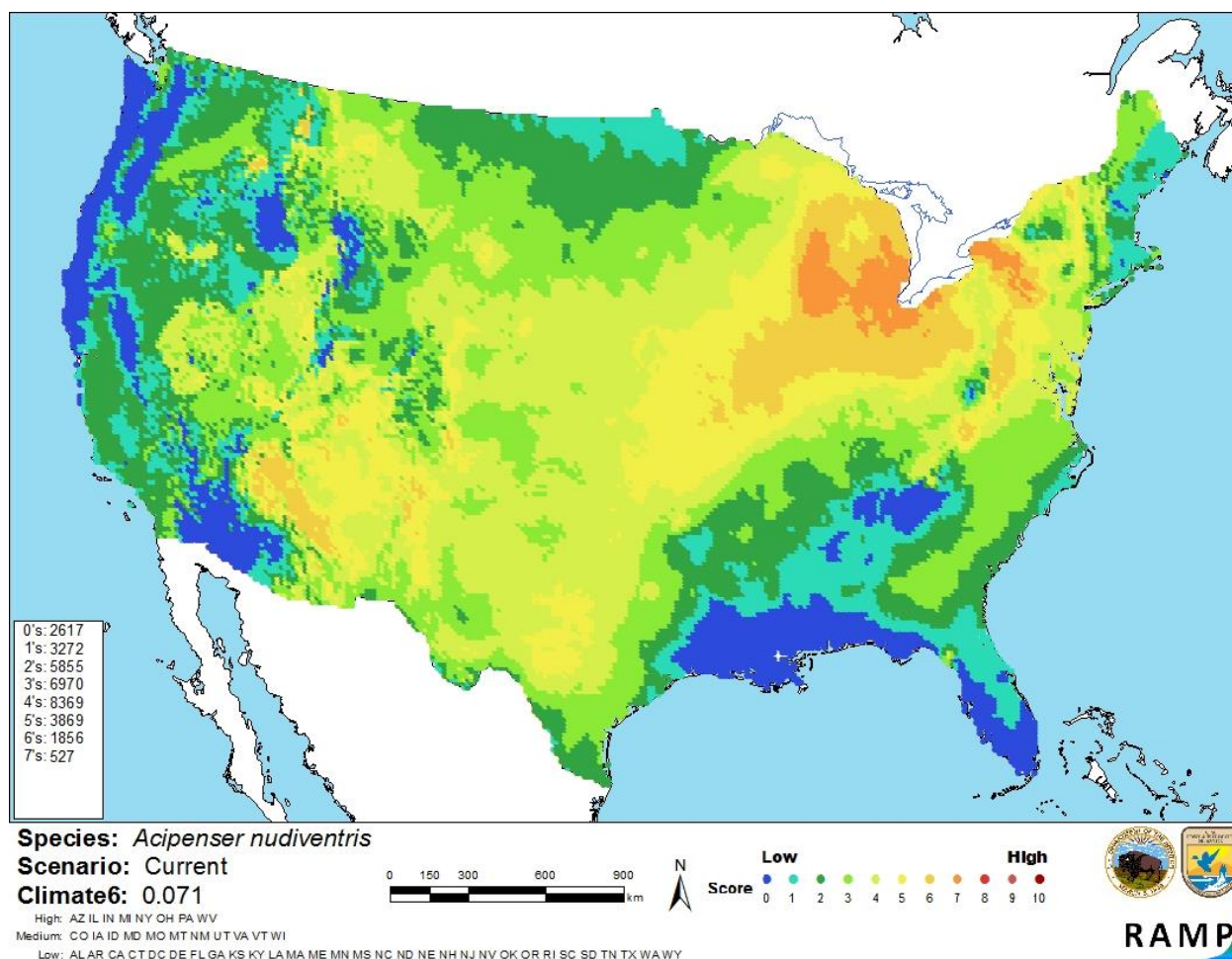


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Acipenser nudiiventris* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0= Lowest match, 10= Highest match. Counts of climate match scores are tabulated on the left.

The “High”, “Medium”, and “Low” climate match categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 < X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

There is adequate information available about the biology of *Acipenser nudiiventris*. Due to population declines, its current range is uncertain. Information is also lacking on impacts of introductions of this species: it has been reported as introduced to China, but no information is available about this introduction. Because of this, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Acipenser nudiiventris, the Thorn Sturgeon, is a migratory species native to the Black, Azov, Caspian, and Aral Seas. It is listed as Critically Endangered by the IUCN, and it has been extirpated from much of its original native range. It has been intentionally introduced to China, but the status of this introduction is unknown. This species has a medium climate match with the contiguous United States, considering only freshwater habitats. Some *A. nudiiventris* populations complete the life cycle in exclusively freshwater environments, while others spend part of the life cycle in a marine environment. RAMP (Sanders et al. 2018) was not developed for use in assessing climate match for marine species so the climate match in a marine environment cannot be assessed with an ERSS. Because of a lack of a demonstrated history of invasiveness, the certainty of this species' risk assessment is low. The overall risk assessment category is therefore uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

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10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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