

Sterlet (*Acipenser ruthenus*)

Ecological Risk Screening Summary

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1 Native Range and Status in the United States

Native Range

From Gesner et al. (2010):

“This species is known from rivers draining to Black, Azov and Caspian Seas; Siberia from Ob eastward to Yenisei drainages. Its current strong holds are the Volga, Ural and Danube systems.”

From CITES (2000):

“It originally inhabited the rivers of Eurasia, being widely distributed in rivers flowing into the Caspian, Black, Baltic, White, Barents and Kara Seas and the Sea of Azov.”

Status in the United States

No reliable records of *Acipenser ruthenus* in the United States were found.

A record of *Acipenser ruthenus* for a location near Baltimore, Maryland was found (GBIF 2013). No other records indicate any *Acipenser ruthenus* within the United States. The record dates

from 1888 and cannot be determined if it is the result of a voucher specimen with the Smithsonian Institution or a misidentification.

Means of Introductions in the United States

No records of *Acipenser ruthenus* in the United States were found.

Remarks

Witkowski and Grabowska (2012) and CITIES (2000) state that *Acipenser ruthenus* may be able to hybridize with other *Acipenser* species and with Mississippi Paddlefish *Polyodon spathula*.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2017):

“*ruthenus*, *Acipenser* Linnaeus [C.] 1758:237 [Systema Naturae, Ed. X v. 1] ?Danube River. Holotype: NRM 96. Based on several sources, see Kottelat 1997:31 so 96 should be regarded as a syntype. Apparently *ruthenicus* Brusina 1902:63 is a misspelling. Species name spelled *rhutenus* by Kielsen 1835:iii. •Valid as *Acipenser ruthenus* Linnaeus 1758 -- (Berg 1948:70, Lelek 1987:51, Coad 1995:7, Artyukhin 1995:7, Zhu 1995:6, Sokolov & Tsepkin 1996:23, Chereshev 1996:599, Bemis et al. 1997:37, Kottelat 1997:31, Reshetnikov et al. 1997:726, Birstein & Bemis 1997:158, Sokolov 1998:21, Bogutskaya et al. 2001:42, Zhang 2001:29, Hanel 2003:46, Bogutskaya & Naseka 2004:24, Hanel & Lusk 2005:176, Fricke et al. 2007:21, Kottelat & Freyhof 2007:55, Eskmaeili et al. 2010:365, Mecklenburg et al. 2011:117, Ruban et al. 2011:471, Hilton et al. 2011:136, Dolgov 2013:915, Parin et al. 2014:44, Litz & Koerber 2014:5, Jouladeh-Roudbar et al. 2015:858, Çiçek et al. 2015:143, Zhang et al. 2016:45). **Current status:** Valid as *Acipenser ruthenus* Linnaeus 1758. Acipenseridae.”

From ITIS (2016):

“Taxonomic Status: Current Standing: valid

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Chondrostei
Order Acipenseriformes
Suborder Acipenseroidei
Family Acipenseridae

Subfamily Acipenserinae
Genus *Acipenser*
Species *Acipenser ruthenus* Linnaeus, 1758”

Size, Weight, and Age Range

From Froese and Pauly (2016):

“Max length: 125 cm TL male/unsexed; [Birstein 1993]; common length: 40.0 cm TL male/unsexed; [Muus and Dahlström 1968]; max. published weight: 16.0 kg [Berg 1962]; max. reported age: 20 years [Muus and Dahlström 1968]”

From CITES (2000):

“*A. ruthenus* is the smallest of all sturgeon species, usually reaching a total length of 1 m and a weight of up to 6.5 kg (Anon., 1997). The maximum age is reported to be 27 years, and sexual maturity is reached at 3-5 years in males and 5-8 years in females (Hochleithner and Gessner, 1999).”

Environment

From Froese and Pauly (2016):

“Freshwater; brackish; demersal; potamodromous [Riede 2004]; depth range 1 - ? m.”

From Gesner et al. (2010):

“It is a freshwater species; anadromous populations have been extirpated.”

Climate/Range

From Froese and Pauly (2016):

“Temperate; 72°N - 40°N, 12°E - 103°E”

Distribution Outside the United States

Native

From Gesner et al. (2010):

“This species is known from rivers draining to Black, Azov and Caspian Seas; Siberia from Ob eastward to Yenisei drainages. Its current strong holds are the Volga, Ural and Danube systems.”

From CITES (2000):

“It originally inhabited the rivers of Eurasia, being widely distributed in rivers flowing into the Caspian, Black, Baltic, White, Barents and Kara Seas and the Sea of Azov.”

Introduced

From Gesner et al. (2010):

“It was introduced in Pechora drainage in 1928-1950 and in Lake Ladoga basin (most likely not self-sustaining). Aquaculture has resulted in intentional and accidental introductions throughout Europe, without formation of self-sustaining populations. This species has formed self sustaining populations in reservoirs in Russia.”

From FAO (2016):

“*Acipenser ruthenus* introduced to Germany from unknown”
“Status of the introduced species in the wild: Probably not established”

“*Acipenser ruthenus* introduced to Poland from unknown”
“Status of the introduced species in the wild: Probably not established”

“*Acipenser ruthenus* introduced to Sweden from unknown”
“Status of the introduced species in the wild: Probably not established”

“*Acipenser ruthenus* introduced to France from Hungary”
Date of introduction: 1980”
“Status of the introduced species in the wild: Not established”

“*Acipenser ruthenus* introduced to USSR, Former Area of from unknown
Date of introduction: 1763”
“Status of the introduced species in the wild: Probably not established”

“*Acipenser ruthenus* introduced to Estonia from USSR, Former Area of
Date of introduction: 1980s-1990s”
“Status of the introduced species in the wild: Not established”

“*Acipenser ruthenus* introduced to Finland from USSR, Former Area of
Date of introduction: 1958”
“Status of the introduced species in the wild: Probably not established”

“*Acipenser ruthenus* introduced to China from Russian Federation”
“Status of the introduced species in the wild: Unknown”

“*Acipenser ruthenus* introduced to Netherlands from Russian Federation”
“Status of the introduced species in the wild: Not established”

“*Acipenser ruthenus* introduced to Latvia from unknown”
“Status of the introduced species in the wild: No data”

“*Acipenser ruthenus* introduced to Lithuania from unknown”
“Status of the introduced species in the wild: Probably established”

From CITES (2000):

“Germany: In the Baltic Sea river estuaries, east of Rostock (Germany), and further upstream, hybrid sturgeon specimens have been caught. They probably originate from upstream aquaculture farms and/or aquaria (“specimens that had grown too large to be kept in the private aquaria”) (Jörn Gessner, Scientist at the Institute of Freshwater Ecology and Inland Fisheries, pers. comm. to TRAFFIC Europe, 15 March 2000).

Italy: *A. ruthenus* has been introduced in captive breeding facilities in Italy in 1990s (Agroittica Lombarda and Azienda Agricola, Italian sturgeon farmers, in litt. to TRAFFIC Europe-Italy, 1999). There is no documentation on the potential damage of the introduction of exotic Acipenseriformes on local species. If specimens of *A. ruthenus* escape into the Po River, they may threaten the Adriatic Sturgeon *Acipenser naccarii*, which is on the brink of extinction.”

From Witkowski and Grabowska (2012):

“Four acipenserid fish species—*Acipenser ruthenus*; Siberian sturgeon, *A. baerii* Brandt, 1869; Danube sturgeon, *A. gueldenstaedtii* Brandt et Ratzeburg, 1833; Mississippi paddlefish, *Polyodon spathula* (Walbaum, 1792); and their hybrids— have been cultured in many pond farms (Kolman 2006), and single escapees are sporadically observed in the wild [in Poland] (Arndt et al. 2000, Keszka et al. 2008).”

From Zięba et al. (2010):

“This also seems apparent in the rise in sightings of starlet *Acipenser ruthenus* Linnaeus, 1758, which is only known to have been sighted once prior to 2000; since then, there have been at least two recent confirmed reports (Table 1), one in the River Frome, Dorset [England] and one in Blacksmith’s Pond, Pirton, Hertfordshire [England]. But, reports by anglers for *Acipenser* spp. (<http://www.wildaboutbritain.co.uk/forums/water-life-forums/9165-sturgeon-british-waters.html>) suggest a much greater number (Britton and Davies 2006b).”

Means of Introduction Outside the United States

From FAO (2016):

“Reasons of Introduction: 1) aquaculture”

“Reasons of Introduction: 1) angling/sport”

“Reasons of Introduction: 1) diffused from other countries”

From CITES (2000):

“They probably originate from upstream aquaculture farms and/or aquaria (“specimens that had grown too large to be kept in the private aquaria”) (Jörn Gessner, Scientist at the Institute of Freshwater Ecology and Inland Fisheries, pers. comm. to TRAFFIC Europe, 15 March 2000).”

Short Description

From Froese and Pauly (2016):

“Dorsal spines (total): 13; Dorsal soft rays (total): 28; Anal spines: 9; Anal soft rays: 14 - 18. Back and flanks are beige. Five rows of scutes: 12-17D, 57-71L, 10-19V. Ventrals and laterals are very light-colored, nearly white. Narrow and pointed snout with four long and fringed barbels. Inferior lip clearly slit [Keith and Allardi 2001]. Can be diagnosed from congeners in Europe by having 56-71 lateral scutes, first dorsal scute not fused with head, barbels fimbriate, lower lip interrupted in middle and 11-27 gill rakers [Kottelat and Freyhof 2007].”

Biology

From Froese and Pauly (2016):

“A fluvial fish which inhabits rivers and their tributaries [Vostradovsky 1973]. Occurs in large rivers, usually in the current and in deep water. Moves to flooded areas to feed [Kottelat and Freyhof 2007]. Chiefly potamodromous [Lucas et al. 2001]. Like other sturgeons, it aggregates in bottom holes in winter and exhibits little activity. In spring, when ice breaks, it rises from the bottom holes and moves upstream for spawning [Berg 1962]. Spawns in habitats with strong-current on gravel, rarely on gravel-sand bottom or in flooded sites. Juveniles stay in riverine habitats during their first summer. Classified as endangered species. Anadromous populations are now extirpated; local populations are still surviving in most parts of range [Kottelat and Freyhof 2007].”

From Gesner et al. (2010):

“The Sterlet is found in large rivers, usually in the current and in deep water. As water level rises, it moves to flooded areas to feed. It spawns on gravel in strong-current habitats.”

“Males reproduce for the first time at 3-5 years, females at 5-8 (Siberian populations mature later: males at 7-9 years, females at 9-12 years). The average reproductive age is about 10 years, but in the Danube this is lower (seven years) due to intensive fisheries. Females reproduce every 1-2 years and males every year in April-June when the temperature rises above 10°C. This species is largely sedentary; undertaking only short spawning migrations (322 km reported from Danube). There was a migratory population with large-growing individuals in Volga until end of 19th century, feeding in the northern Caspian Sea and moving upriver in autumn. The Sterlet feeds on a wide variety of benthic insect larvae and molluscs.”

Human Uses

From Froese and Pauly (2016):

“Fisheries: commercial; aquaculture: commercial; aquarium: public aquariums”

From Gesner et al. (2010):

“Skin and as a leather. Caviar is used as cosmetic and medicinal purposes. Cartilage used medicinal use. Intestine use as sauce (food) and to produce gelatine. Swim bladder used as glue. Approximately 25% taken from the wild, 75% from captive breeding.”

Diseases

From Bailly (2008):

“Host of *Ascarophis ovotrichura* (Skrjabin, 1924) (parasitic: endoparasitic)
Capillospirura argumentosa (Skryabina, 1966) (parasitic: endoparasitic)
Cystoopsis acipenseris Wagner, 1867 (parasitic: endoparasitic)
Dichelesthium oblongum (Abildgaard, 1794) (parasitic: ectoparasitic)
Paraergasilus rylovi Markevich, 1937 (parasitic: ectoparasitic)
Piscicapillaria (Lomakinela) tuberculata (Linstow, 1914) Moravec, 1982 (parasitic: endoparasitic)”

Threat to Humans

From Froese and Pauly (2016):

“Harmless”

3 Impacts of Introductions

From CITES (2000):

“If specimens of *A. ruthenus* escape [from captivity] into the Po River [Italy], they may threaten the Adriatic Sturgeon *Acipenser naccarii*, which is on the brink of extinction.”

It is important to note, however, that no impacts of introduced populations have been documented.

4 Global Distribution



Figure 1. Known global distribution of *Acipenser ruthenus*. Map from GBIF (2013).

Location near Baltimore, Maryland was not used as a source point for the climate match. No other records indicate any *Acipenser ruthenus* within the United States. The record dates from 1888 and cannot be determined if it is the result of a voucher specimen with the Smithsonian Institution or a misidentification.



Figure 2. Global distribution of *Acipenser ruthenus*. Map from Froese and Pauly (2016).

Locations in Germany or France were not used as source points. Populations in those countries are not considered established by other sources (FAO 2016).

Locations in southeastern Europe were used as source points as they are within the Danube River basin (CITES 2000; Gesner et al. 2010).

5 Distribution Within the United States

No reliable records of *Acipenser ruthenus* in the United States were found.

A record of *Acipenser ruthenus* for a location near Baltimore, Maryland was found (GBIF 2013). No other records indicate any *Acipenser ruthenus* within the United States. The record dates from 1888 and cannot be determined if it is the result of a voucher specimen with the Smithsonian Institution or a misidentification.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match was high around the Great Lakes, pockets of the Great Plains, and the Northeast. It was medium for much of the rest of the country except for Florida, the Gulf Coast, and the west coast where the match was low. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the Continental U.S. was 0.335, high.

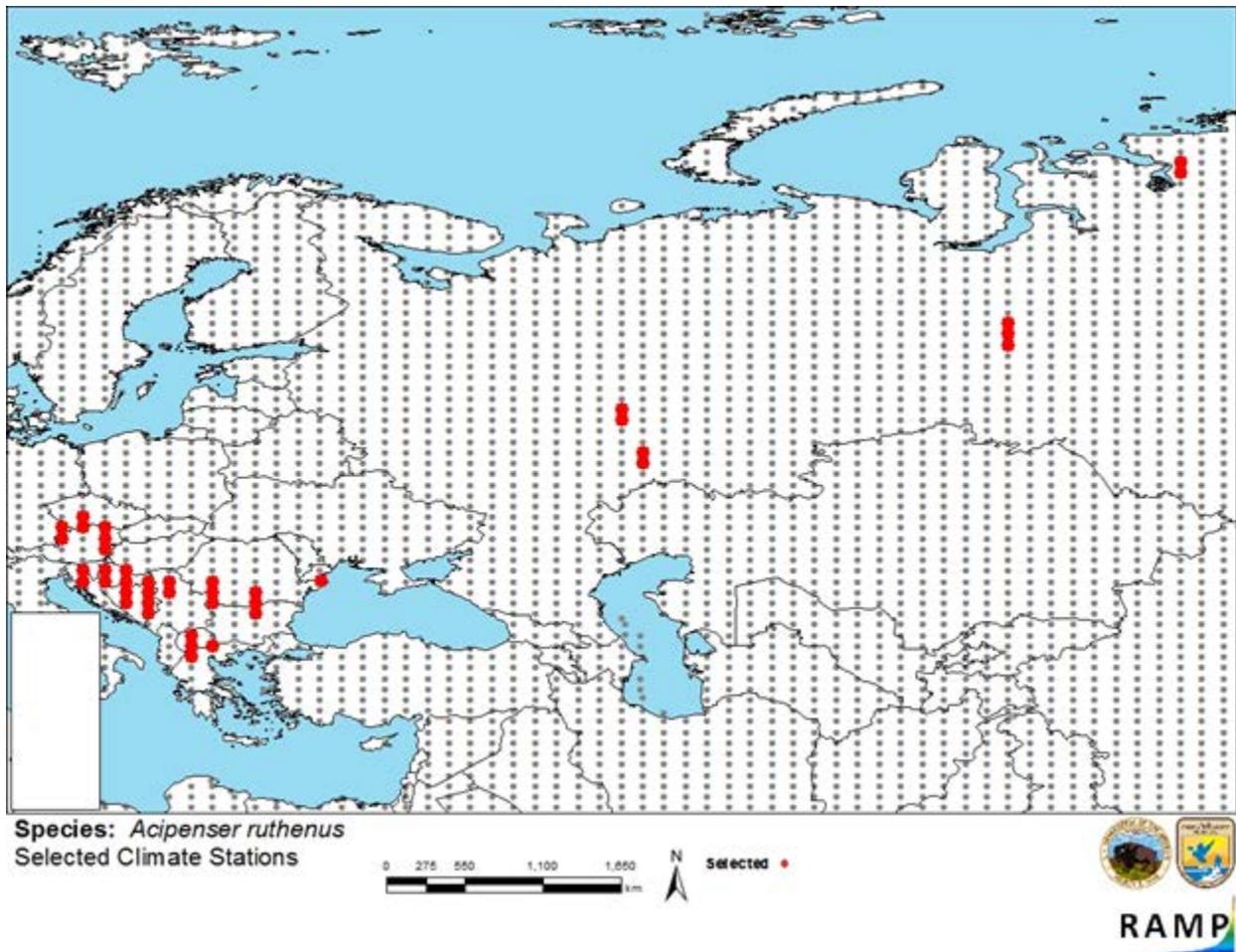


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Acipenser ruthenus* climate matching. Source locations from CITIES (2000), Gesner et al. (2010), GBIF (2013), FAO (2016), and Froese and Pauly (2016).

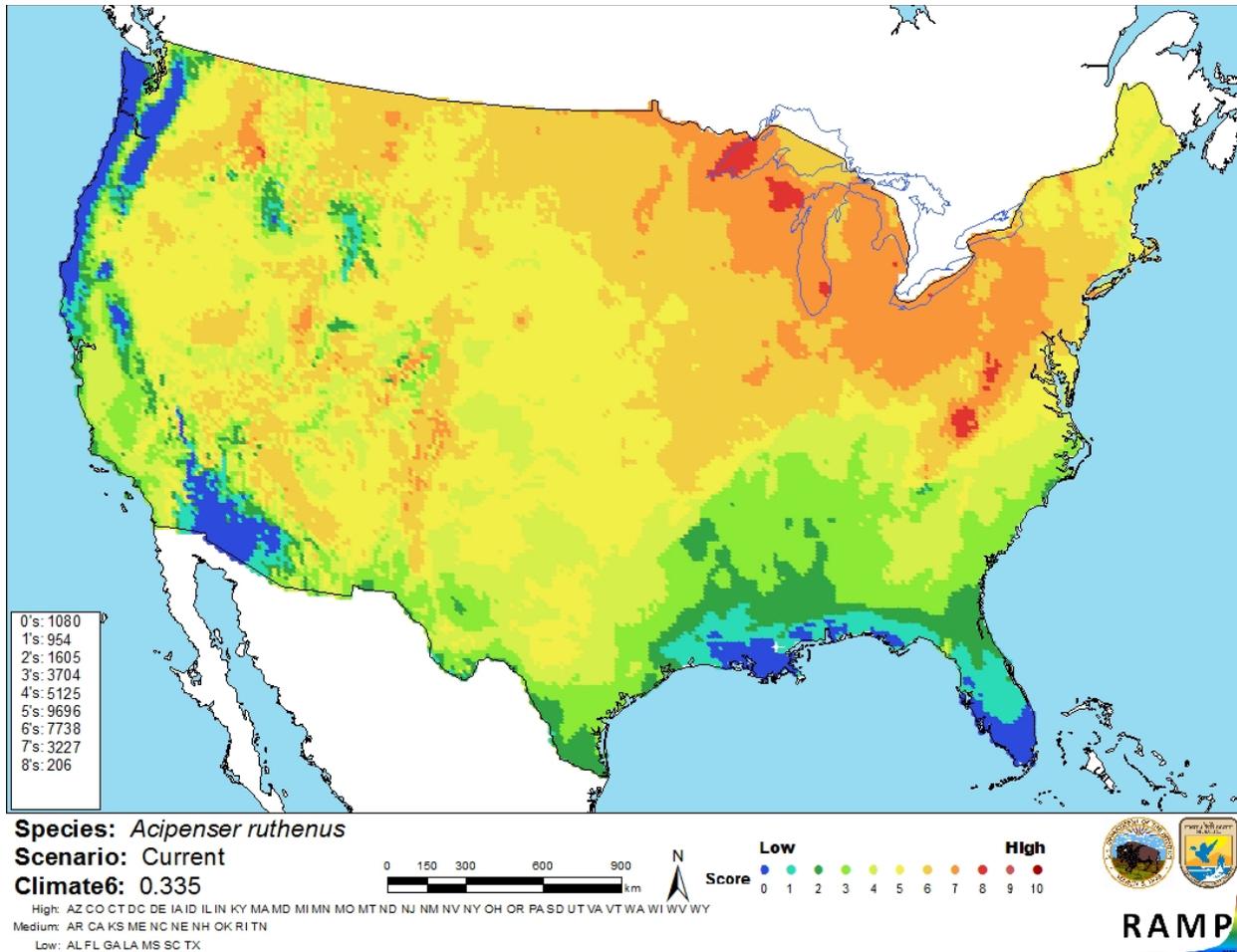


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Acipenser ruthenus* in the contiguous United States based on source locations reported by CITIES (2000), Gesner et al. (2010), GBIF (2013), FAO (2016), and Froese and Pauly (2016). 0= Lowest match, 10=Highest match.”

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
$0.000 \leq X < 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

The certainty of assessment is medium. There was adequate ecological and biological information available for *Acipenser ruthenus*. Many records of introductions were found. Some introductions resulted in established populations. This species is transported widely for

aquaculture to produce meat and caviar which can make records of introduction sometimes confusing. No records of demonstrated impacts from successful introductions were found.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness for *Acipenser ruthenus* is not documented. *Acipenser ruthenus*, like many of the sturgeons, is an extremely popular fish for human consumption, either for meat or caviar. For this reason it is being farmed in many places throughout Europe. Introductions have occurred in parts of Europe due to escapees, but no known impacts from these escapees have been reported. The climate match is high. The areas of greatest climate match are around the Great Lakes and Northeast. If this species was to be introduced into the Great Lakes there is the potential for competition with the threatened Lake Sturgeon *Acipenser fulvescens*. The certainty of assessment is medium. The overall risk assessment category is uncertain. There is a history of introductions, usually the result of some intentional activity such as stocking for aquaculture, but there are no records of adverse impacts from those introductions.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information** *Acipenser ruthenus* may be able to hybridize with native species of *Acipenser*.
- **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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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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