

***Rutilus aula* (a fish, no common name)**

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, May 2020
Revised, June 2020
Web Version, 2/8/2021

Organism Type: Fish
Overall Risk Assessment Category: High



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https://commons.wikimedia.org/wiki/File:Rutilus_aula.jpg. (June 2020).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2020):

“Europe: Adriatic basin from Soca to Po drainages (Italy, Switzerland, Slovenia) and small coastal streams at Zadar, Croatia.”

From Freyhof (2011):

“Restricted to the Padua-Venetian region in northern Italy, including the southern part of Switzerland. [...] It is also described in the Adriatic Basin of Slovenia and locally in Croatia [...].”

Status in the United States

No records of *Rutilus aula* in trade or in the wild in the United States were found.

All species of the *Rutilus* genus, including *R. aula*, are on Mississippi’s Prohibited Species list. From Mississippi Secretary of State (2019):

“All species of the following animals and plants have been determined to be detrimental to the State's native resources and further sales or distribution are prohibited in Mississippi. No person shall import, sell, possess, transport, release or cause to be released into the waters of the state any of the following aquatic species or hybrids thereof.”

Rutilus aula falls within Group I of New Mexico’s Department of Game and Fish Director’s Species Importation List (New Mexico Department of Game and Fish 2010). Group I species “are designated semi-domesticated animals and do not require an importation permit.” With the added restriction of “Not to be used as bait fish.”

All species of the *Rutilus* genus, including *R. aula*, are on Texas’ Invasive, Prohibited and Exotic list.

From Texas Parks and Wildlife (2020):

“The organisms listed here are legally classified as exotic, harmful, or potentially harmful. No person may possess or place them into water of this state except as authorized by the department. Permits are required for any individual to possess, sell, import, export, transport or propagate listed species for zoological or research purposes; [...].”

Means of Introductions in the United States

No records of *Rutilus aula* in trade or in the wild in the United States were found.

Remarks

Both the current valid name *Rutilus aula* and the former name *Leucos aula* were used in the information search.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al (2020), *Rutilus aula* (Bonaparte 1841) is the current valid name for this species. It was originally described as *Squalius aula* (Bonaparte 1841) and has also been described as *Leucos aula* (Bonaparte 1841) by Froese and Pauly (2020).

From ITIS (2020):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Rutilus*
Species *Rutilus aula* (Bonaparte, 1841)

Size, Weight, and Age Range

From Froese and Pauly (2020):

“Max length : 26.0 cm TL male/unsexed; [Carosi et al. 2017]; max. reported age: 7 years [Kottelat and Freyhof 2007]”

Environment

From Froese and Pauly (2020):

“Freshwater; benthopelagic; pH range: 7.2 - 8.0; dH range: 12 - 25. [...] 8°C - 24°C [Baensch and Riehl 1995] [assumed to be the recommended aquarium temperature]”

Climate

From Froese and Pauly (2020):

“Temperate”

Distribution Outside the United States

Native

From Froese and Pauly (2020):

“Europe: Adriatic basin from Soca to Po drainages (Italy, Switzerland, Slovenia) and small coastal streams at Zadar, Croatia.”

From Freyhof (2011):

“Restricted to the Padua-Venetian region in northern Italy, including the southern part of Switzerland. [...] It is also described in the Adriatic Basin of Slovenia and locally in Croatia [...]”

Introduced

From Froese and Pauly (2020):

“Widely introduced in Italy.”

From Freyhof (2011):

“Introduced in most lakes of central and southern Italy [...]”

Means of Introduction Outside the United States

Information on the means of introduction outside the United States for *Rutilus aula* could not be found.

Short Description

From Froese and Pauly (2020):

“Dorsal soft rays (total): 12; Anal soft rays: 12. *Leucos aula* is distinguished from all congeners by having a middle lateral band and a smaller head length, which in fish of comparable size is less than 4.5 times in the SL, except *L. panosi*, and more than 4.0 times in the others species. It further differs by having 12 modal scales around caudal peduncle (vs. 14) [Bianco and Ketmaier 2014]. It can be diagnosed from its congeners in Apennine Peninsula by having the following characters: dorsal and anal fins with 9½ branched rays; 36-42 (usually 38-39) scales along lateral line; mouth subterminal; pelvic, pectoral and anal fins greyish; eye red in life; conspicuous dark brown midlateral stripe from eye to caudal fin base [Kottelat and Freyhof 2007].”

Biology

From Froese and Pauly (2020):

“Found in canals, swamps, lakes and streams with slow current and dense vegetation [Kottelat and Freyhof 2007]. Prefers to inhabit lakes and still waters of rivers; does not thrive in moderately to fast flowing rivers [Bianco and Ketmaier 2014]. Lives in groups. Omnivorous, feeding mainly on insect larvae, other invertebrates, algae and aquatic macrophytes. Spawns in small groups composed of one female and several males. Deposits eggs on aquatic vegetation [Kottelat and Freyhof 2007]. Age at first maturity is 1+ or 2+ for males and 2+ for females; maximum age observed is 7+ years [Bianco and Ketmaier 2014].”

Human Uses

From Froese and Pauly (2020):

“Fisheries: of no interest; gamefish: yes”

Diseases

No records of OIE-reportable diseases (OIE 2020) were found for *Rutilus aula*.

According to Poelen et al. (2014) *Dactylogyrus rutili* and *Gyrodactylus gasterostei* are parasites of *Rutilus aula*.

Threat to Humans

From Froese and Pauly (2020):

“Harmless”

3 Impacts of Introductions

From Froese and Pauly (2020):

“There are introduced populations locally responsible for extirpation of *Rutilus rubilio* [Kottelat and Freyhof 2007].”

From Bianco (1995):

“It [*Rutilus rubilio*] has vanished from several lakes in central Italy as result of transfers of *Rutilus aula* and other more lacustrine cyprinids (Bianco & Taraborelli, 1985).”

4 History of Invasiveness

Rutilus aula has been recorded as introduced and wide spread in Italy. Although, no information could be found on the means of introduction. Despite that, the history of invasiveness is still ranked High because in the areas it did become established it was responsible for the regional extinction of *Rutilus rubilio*. The statements available regarding this impact seems to be clear, however, the supporting information from referenced material was not available in English.

5 Global Distribution



Figure 1. Known global distribution of *Rutilus aula*. Observations are reported from Italy, Switzerland, Slovenia, and Croatia. Map from GBIF Secretariat (2020). The point located in the ocean off the east coast of Italy was not included in the climate match because this species is not found in marine environments.

6 Distribution Within the United States

No records of *Rutilus aula* in the wild in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

The contiguous United States had a mostly medium to low climate match. Areas of high match could be found around the Great Lakes region and along the coast of the northeast. Additional patches of high match could be found along the Appalachian Mountains and stretching west from the middle of that range. Areas of low match were located along the West Coast and in peninsular Florida. There were also patches throughout much of the Rocky Mountains, in the southwest, and a large area of the northern Great Plains States. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.132, high (scores above 0.103, inclusive, are classified as high). The following States had low individual Climate 6 scores: Alabama, Arizona, California, Colorado, Florida, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Montana, North Dakota, Nebraska, New Mexico, Nevada,

Oregon, South Dakota, Texas, Utah, Wisconsin, and Wyoming. The following states had medium individual Climate 6 scores: Georgia, Idaho, New Hampshire, Oklahoma, South Carolina, Vermont, and Washington. All other States received high individual Climate 6 scores.

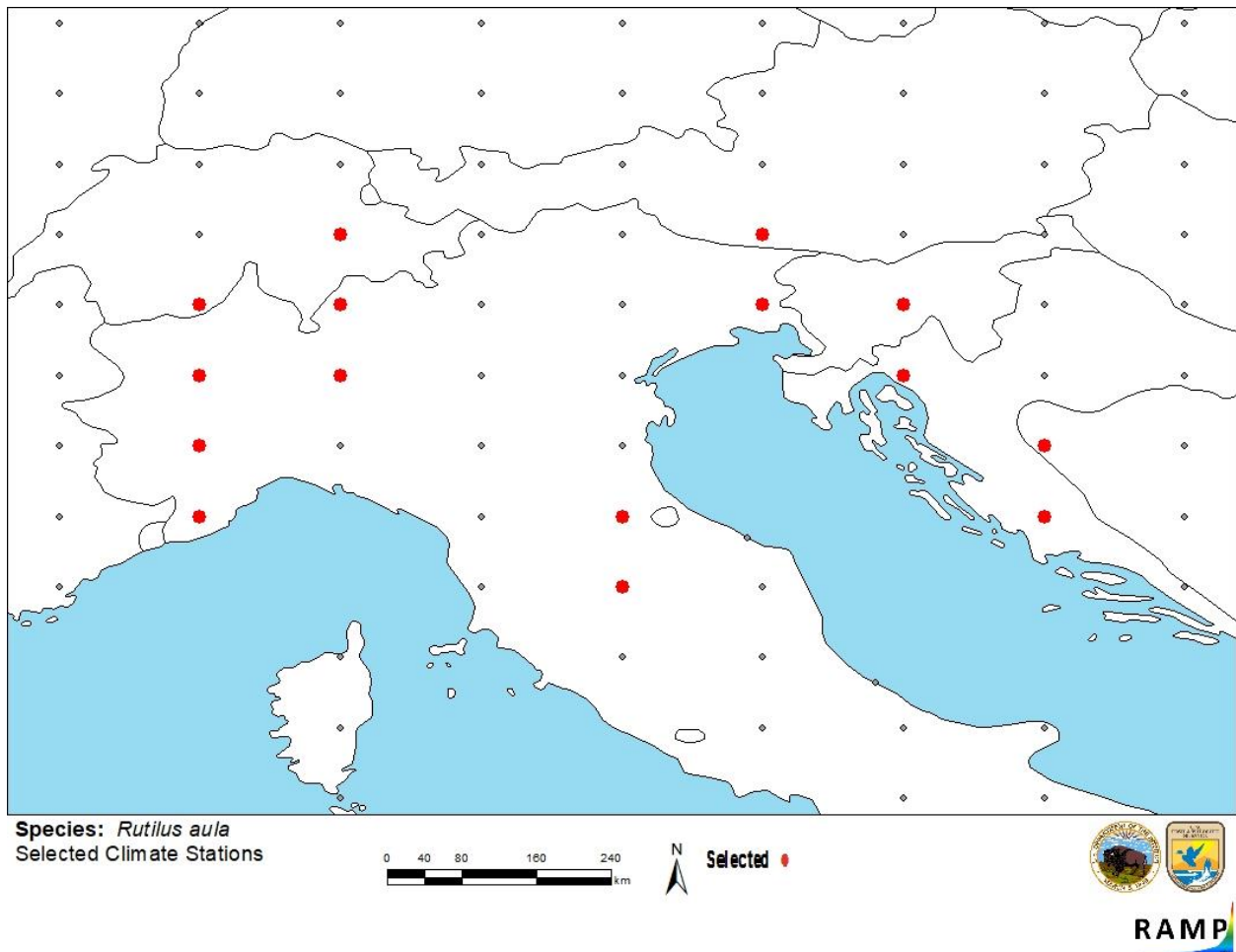


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in southern Europe selected as source locations (red; Italy, Switzerland, Slovenia, Croatia) and non-source locations (gray) for *Rutilus aula* climate matching. Source locations from GBIF Secretariat (2020). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

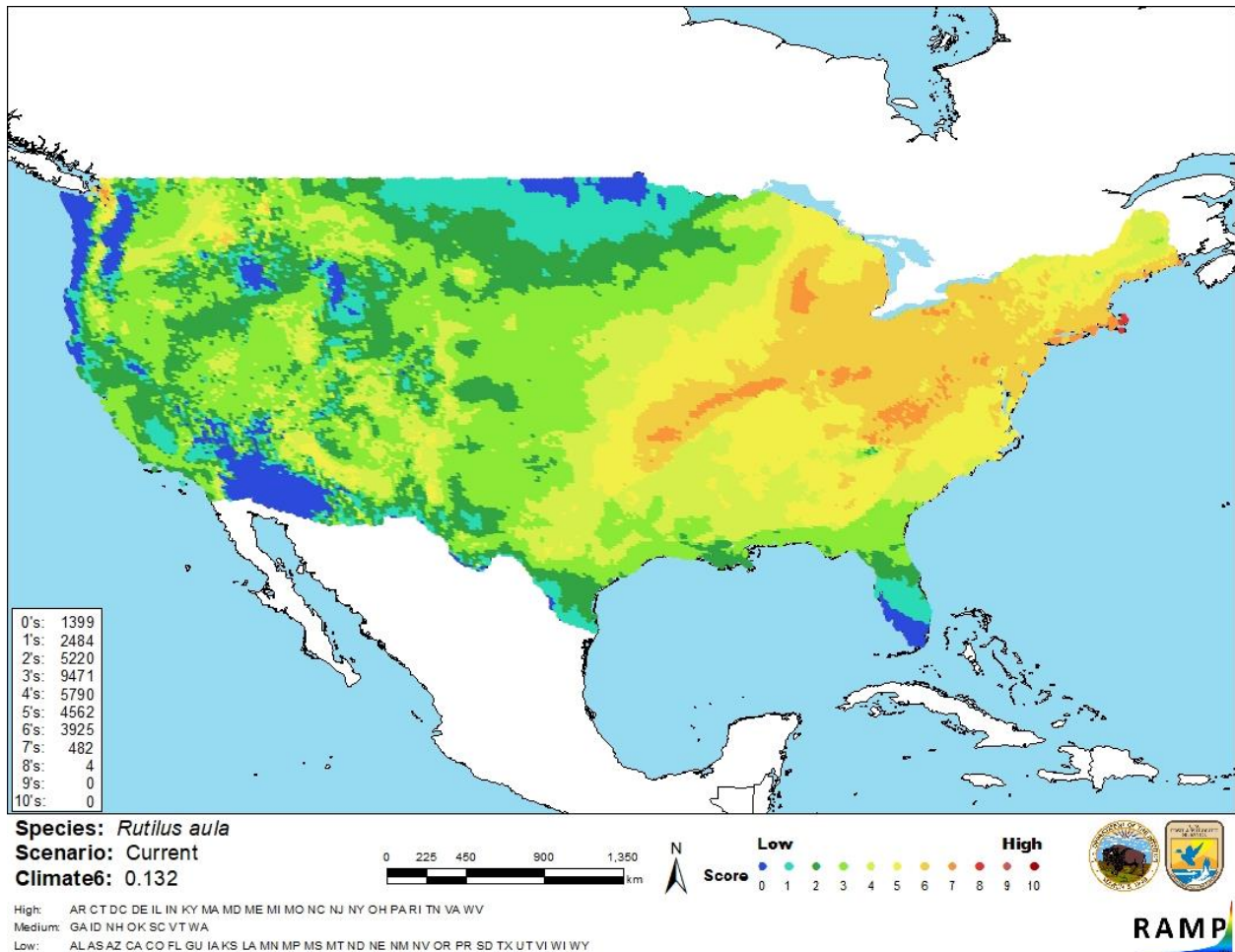


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Rutilus aula* in the contiguous United States based on source locations reported by GBIF Secretariat (2020). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

Very little information could be found on the biology, description, and environment of *Rutilus aula*. It has been documented outside of its native range but the means of its introductions could not be found. There are statements documenting negative impacts of *Rutilus aula* in its introduced range, however, the supporting information is not available in English. Due to the

lack of information available on the species except for the documented negative impacts and the lack of supporting information in English, the certainty of assessment is low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Rutilus aula is a cyprinid native to the Adriatic basin from the Soca to the Po river drainages. *Rutilus aula* has not been recorded as being used for commercial purposes but is recognized as a game fish. This species has been introduced outside of its native range into central and southern Italy but information on how it got there could not be found. Even though the means of introduction could not be found, it was documented as causing the local extirpation of *Rutilus rubilo* in its introduced range. Because of this negative impact, the history of invasiveness is High. The overall Climate 6 score for *Rutilus aula* was also High. Much of the contiguous United States had a low to medium match with areas of high match located around the Great Lakes and New England coast. The overall certainty of assessment is Low due to a lack of information on the species itself and a lack of supporting impact information in English. The overall risk assessment category for *Rutilus aula* is High.

Assessment Elements

- **History of Invasiveness (Sec. 4): High**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information:** No additional remarks.
- **Overall Risk Assessment Category: High**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

Bianco PG. 1995. Mediterranean endemic freshwater fishes of Italy. *Biological Conservation* 72:159–170.

Fricke R, Eschmeyer WN, van der Laan R, editors. 2020. Eschmeyer’s catalog of fishes: genera, species, references. California Academy of Science. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (May 2020).

Freyhof J. 2011. *Rutilus aula*. The IUCN Red List of Threatened Species 2011: e.T19781A136587909. Available: <https://www.iucnredlist.org/species/19781/136587909> (June 2020).

Froese R, Pauly D, editors. 2020. *Leucos aula* (Bonaparte, 1841). FishBase. Available: <https://www.fishbase.de/summary/Leucos-aula.html> (June 2020).

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- [ITIS] Integrated Taxonomic Information System. 2020. *Rutilus aula* (Bonaparte, 1841). Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=639653#null (June 2020).
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- New Mexico Department of Game and Fish. 2010. Director's species importation list. Santa Fe, New Mexico: New Mexico Department of Game and Fish. Available: http://www.wildlife.state.nm.us/download/enforcement/importation/information/Directors-Species-Importation-List-08_03_2010.pdf (November 2020).
- [OIE] World Organisation for Animal Health. 2020. OIE-listed diseases, infections and infestations in force in 2020. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2020/> (June 2020).
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- Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.
- Texas Parks and Wildlife. 2020. Invasive, prohibited and exotic species. Austin, Texas: Texas Parks and Wildlife. Available: https://tpwd.texas.gov/huntwild/wild/species/exotic/prohibited_aquatic.phtml (November 2020).

11 Literature Cited in Quoted Material

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.

- Baensch HA, Riehl R. 1995. *Aquarien atlas*. Band 4. Melle, Germany: Mergus Verlag GmbH, Verlag für Natur-und Heimtierkunde.
- Bianco PG, Ketmaier V. 2014. A revision of the *Rutilus* complex from Mediterranean Europe with description of a new genus, *Sarmarutilus*, and a new species, *Rutilus stoumboudae* (Teleostei: Cyprinidae). *Zootaxa* 3481:379–402.

Carosi A, Ghetti L, Lorenzoni M. 2017. Length-weight relationships of three fish species from Piediluco Lake, Italy. *Journal of Applied Ichthyology* 33:1287–1289.

Kottelat M, Freyhof J. 2007. *Handbook of European freshwater fishes*. Berlin: Publications Kottelat, Cornol and Freyhof.