

European Mudminnow (*Umbra krameri*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, October 2014

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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

“Known from Danube drainage [in Austria] [Kottelat and Freyhof 2007]. Considered extirpated in 1992 [Vilcinskas 1993]. However, this species was rediscovered also in 1992 since its reported extinction in 1975 [Wanzenböck and Spindler 1995]. Reported by Peter Adamicka (pers. comm.) that it is becoming "commercial" again and that it occurs in the side (oxbow) arms of the Danube E of Vienna.”

“Status of threat [in Austria]: Critically endangered; EU FFH Directive - II [AFMAFEWM 2011].”

“Recorded from Tisza system [in Hungary] [Kottelat and Freyhof 2007]. Status of threat: Endangered [Keresztessy 1996].”

“Occurs in the Danube River. Only in Serbia [Gerstmeier and Romig 1998].”

“Dniester River [in Ukraine].”

Froese and Pauly (2017) report *Umbra krameri* as also native to the following countries: Belarus, Croatia, Czechia, Moldova, Romania, Slovakia, and Slovenia.

From Freyhof (2013):

“The species has a scattered distribution in the Danube drainage from Vienna to the delta [Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova, Ukraine], and in the lower reaches of Dniestr drainage. [...] The species is known to have been extirpated from many locations. It is estimated that the population has declined by more than 30% in the past 10 years.”

Sekulić et al. (1998, 2013) also reports *U. krameri* from Bosnia and Herzegovina

Status in the United States

No records of *Umbra krameri* in the United States were found. No information on trade of this species in the United States was found.

Means of Introductions in the United States

No records of *Umbra krameri* in the United States were found.

Remarks

From Froese and Pauly (2017):

“In Appendix II of the Bern Convention (strictly protected fauna).”

From Freyhof (2013):

“Red List Category & Criteria: Vulnerable A2c”

“The species has been included in the national Red Lists of Slovenia, Croatia, Moldova and Austria. In Hungary, this fish is protected and local action plans have been developed.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2017):

“**Current status:** Valid as *Umbra krameri* Walbaum 1792.”

From ITIS (2014):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Protacanthopterygii
Order Esociformes
Family Umbridae
Genus *Umbra*
Species *Umbra krameri* Walbaum, 1792”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 17.0 cm TL male/unsexed; [Povz 1995]; common length : 5.0 cm TL male/unsexed; [Muus and Dahlström 1968]; max. reported age: 5 years [Kottelat and Freyhof 2007]”

Environment

From Froese and Pauly (2017):

“Freshwater; benthopelagic; pH range: 6.0 - 6.5; dH range: 5 - ?; [...]; depth range 0 - ? m. [...]; 5°C - 24°C [assumed to be water temperature range in the wild] [Povz 1995]; [...]”

“Tolerates oxygen deficit.”

Climate/Range

From Froese and Pauly (2017):

“Temperate; [...]; 49°N - 43°N, 9°E - 31°E”

Distribution Outside the United States

Native

From Froese and Pauly (2017):

“Known from Danube drainage [in Austria] [Kottelat and Freyhof 2007]. Considered extirpated in 1992 [Vilcinskis 1993]. However, this species was rediscovered also in 1992 since its reported extinction in 1975 [Wanzenböck and Spindler 1995]. Reported by Peter Adamicka (pers. comm.) that it is becoming "commercial" again and that it occurs in the side (oxbow) arms of the Danube E of Vienna.”

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Sekulić et al. (1998, 2013) also reports *U. krameri* from Bosnia and Herzegovina

Introduced

From Froese and Pauly (2017):

“Reported from Hechtmoor in Schleswig-Holstein [in Germany] [Spratte and Hartmann 1988].”

“Present in a few localities [in Poland, probably established]. Invaded small water reservoirs, slowly flowing sections of watercourses, including canals and ditches. [...] Also introduced in 1967 [originally introduced in 1921] [Grabowska et al. 2010].”

“Escape of aquarium fish probably the origin of the introduction [in 1925 in the UK]. Species disappeared after 1934.”

The status of *Umbra krameri* in Germany is unknown (Gollasch and Nehring 2006).

Means of Introduction Outside the United States

From FAO (2014):

“Reasons of Introduction: 1) accidental”

From Froese and Pauly (2017):

“Escape of aquarium fish probably the origin of the introduction [in the UK].”

Umbra krameri was introduced to Germany through the ornamental trade (Gollasch and Nehring 2006).

Short Description

From Froese and Pauly (2017):

“Differs from *Umbra pygmaea* by the lack of dark blotch at caudal base, its body and head irregularly strewn with small dark spots [*sic*], and having 33-35 scales in midlateral series [Kottelat and Freyhof 2007].”

From Arkive (2014):

“The European mudminnow is a small, freshwater fish, with a large head, rounded snout, dark brown body and a whitish belly. The sides of the body sometimes have a bluish tint, while a light stripe runs along the body and a scattering of brown spots decorate the back and sides [Povz 1995, Wanzenbock 1995]. It has a long dorsal fin and a long, rounded caudal fin [Bateman 1904]. The female European mudminnow is larger than the male [Povz 1995].”

Biology

From Froese and Pauly (2017):

“Adults inhabit small irrigation canals and slowly flowing and stagnant waters with dense vegetation [Povz 1995], usually in small ditches, oxbows, backwaters and shallow lakes [Kottelat and Freyhof 2007]. Territorial in shallow pools and swamps. They feed on larger crustacean plankton and invertebrate larvae [Povz 1995]. This species is under threat due to habitat destruction, irrigation works and disappearance of shallow ditches as suitable habitats, restrictions of river inundation, pressure from introduced fish species and chemical pollution [Povz 1995].”

From Freyhof (2013):

“The species lives at least five years, spawning for the first time at one year. It spawns in March–April, when temperatures reach 12–16°C. Eggs are laid in a nest of plant material or in a shallow depression in the bottom. Females protect the nest until the larvae leave it. It is able to breathe air and may therefore colonise habitats with very low oxygen concentrations. The species feeds on a variety of small animals.”

From Arkive (2014):

“The female selects a suitable nest site, either a spot over roots or watermoss, or a nest made of plant material in a depression at the bottom, and releases six to eight eggs at a time, which are then fertilised by one or more males. This process is repeated multiple times, with the female usually depositing a total of up to 200 eggs. After spawning, the female aggressively guards the eggs until hatching [Bohlen 1995, Povz 1995, Wanzenbock 1995].

The newly hatched larvae initially rest at the bottom or attached to various objects, and remain largely motionless except for their waving pectoral fins [Wanzenbock 1995]. About a week after the eggs have hatched, the young European mudminnows begin moving around and feeding on live food [Povz 1995], such as tiny crustaceans. At the end of the first summer, they start eating larger food items [Wanzenbock 1995]. The European mudminnow is known to feed primarily on animals found at the water’s bottom, such as small shrimps and snails, although beetles and other insects are also sometimes taken from mid-water or the surface [Wanzenbock 1995].

The mudminnow can survive in extremely low oxygen conditions due to its ability to use its swimbladder for air breathing [Povz 1995, Wanzenbock 1995], and can reportedly survive for more than two days in the winter without water [Wanzenbock 1995].”

Human Uses

From Froese and Pauly (2017):

“Fisheries: of no interest; aquarium: commercial”

Diseases

No records of OIE reportable diseases (OIE 2019) were found for *Umbra krameri*.

From Popiołek et al. (2005):

“In Europe third stage larvae of *Spiroxys contortus* were previously found in *Anguilla anguilla*, *Leuciscus idus*, *Umbra krameri*, and *Misgurnus fossilis*, among others in Hungary, Bulgaria and former Czechoslovakia (Moravec, 1994).”

Threat to Humans

From Froese and Pauly (2017):

“Harmless”

3 Impacts of Introductions

From Froese and Pauly (2017):

“Scale of impact is weak however it has displaced several species of limnophilous fishes. Wild population numbers are difficult to estimate because only a few individuals were recorded [Solarz 2005].”

4 Global Distribution



Figure 1. Known global distribution of *Umbra krameri*. Observations are reported from Poland, Czech Republic, Slovakia, Austria, Slovenia, Hungary, Croatia, Serbia, and Romania. Map from GBIF Secretariat (2017).

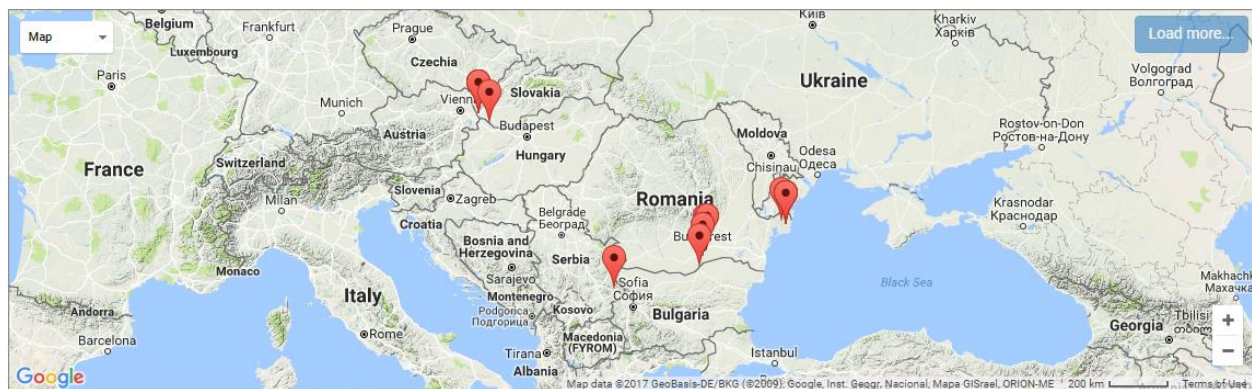


Figure 2. Additional known locations of *Umbra krameri*. Additional observations are in Serbia and Slovakia. Map from VertNet (2017).

Additional georeferenced observations in Serbia and Bosnia and Herzegovina were given in Sekulić et al. (1998, 2013).

Georeferenced points were not available for populations in Ukraine, Belarus and Moldova.

5 Distribution Within the United States

No records of *Umbra krameri* in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Umbra krameri* was high in the Great Lakes basin, just south of the basin and along the Appalachian Range. It was also high in small pockets in the Great Plains and central United States from South Dakota to Texas. It was low in the west, northern central United States, the southeast, and parts of Maine. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.186, high. (Scores of 0.103 or greater are classified as high.) Arizona, Colorado, Connecticut, Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Missouri, Montana, New Jersey, New Mexico, New York, Ohio, Pennsylvania, Vermont, Virginia, West Virginia, and Wisconsin all had high individual Climate 6 scores.

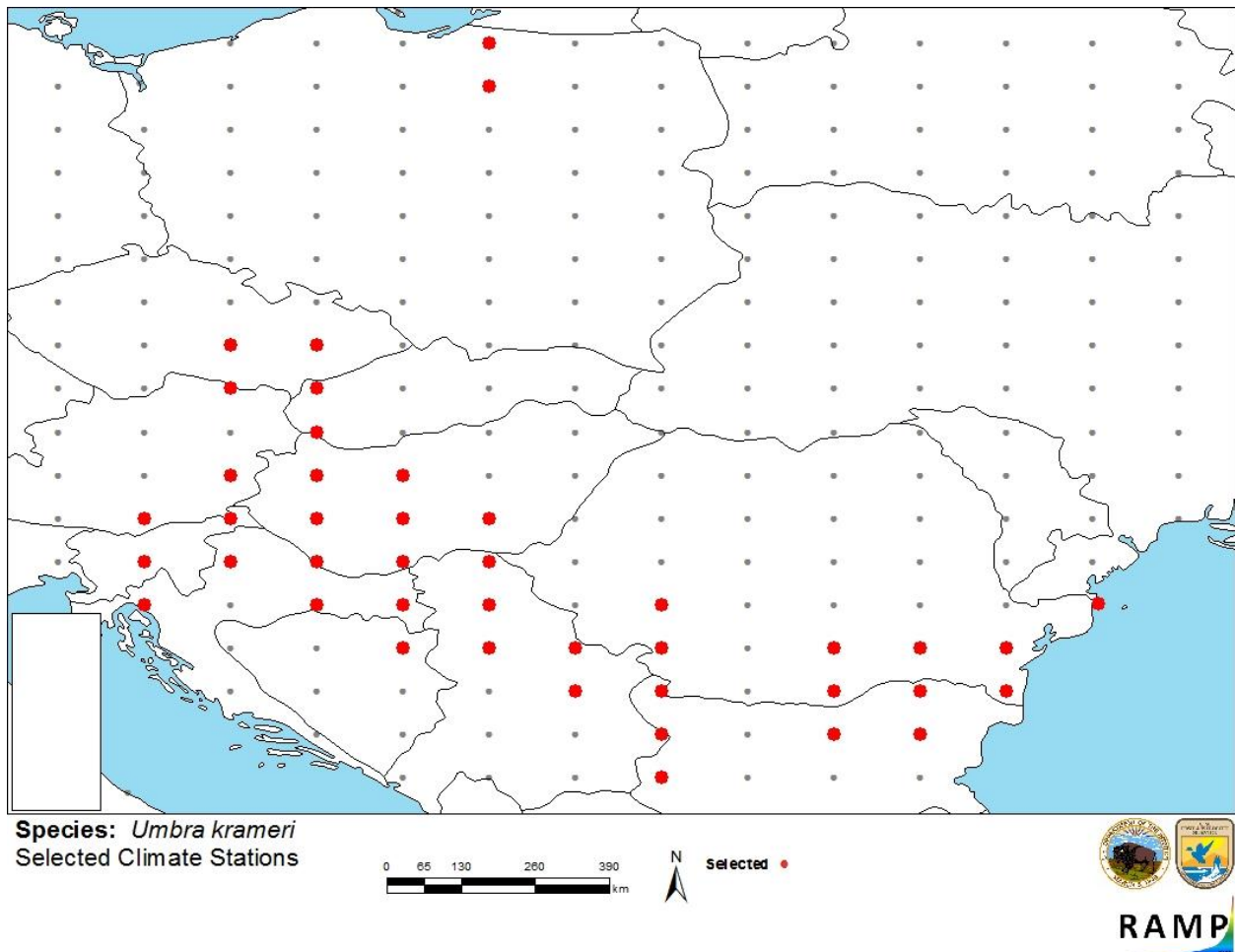


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations in Europe selected as source locations (red; Poland, Czech Republic, Austria, Slovakia, Slovenia, Hungary, Croatia, Bosnia and Herzegovina, Serbia, Romania, Bulgaria, Ukraine) and non-source locations (grey) for *Umbra krameri* climate matching. Source locations from Sekulić et al. (1998, 2013), Froese and Pauly (2017), GBIF Secretariat (2017), and VertNet (2017). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

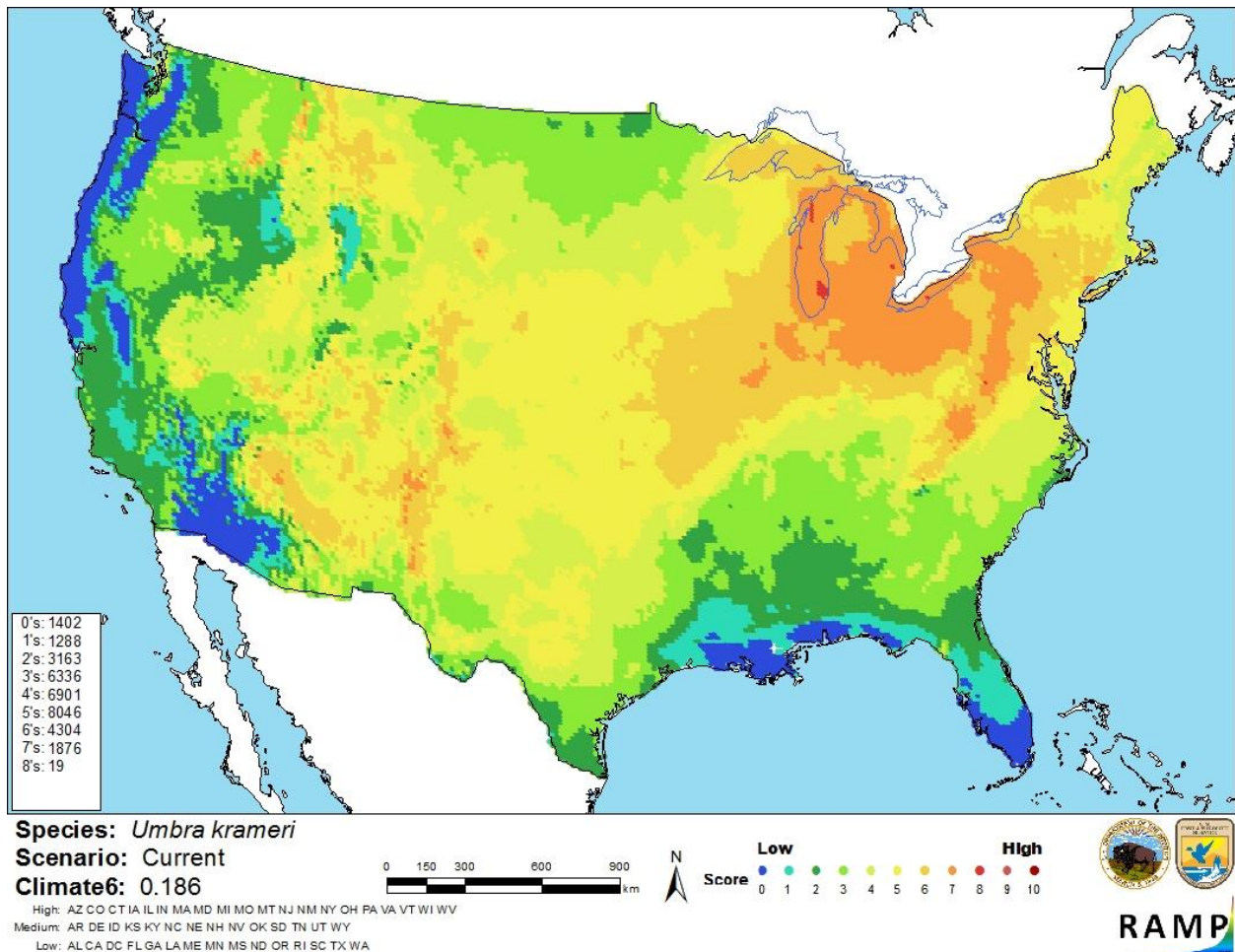


Figure 6. Map of RAMP (Sanders et al. 2014) climate matches for *Umbra krameri* in the contiguous United States based on source locations reported by Sekulić et al. (1998, 2013), Froese and Pauly (2017), GBIF Secretariat (2017), and VertNet (2017). 0 = Lowest match, 10 = Highest match.

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 this assessment is low. An adequate amount of biological and ecological information was found for *Umbra krameri*. A few records of introductions and possible established populations were found. A single record of an impact was found but the record provided no details, so it was insufficient to use to determine history of invasiveness.

8 Risk Assessment

Summary of Risk to the Contiguous United States

European Mudminnow, *Umbra krameri*, is a fish found in large river systems of Eastern Europe. The history of invasiveness is none documented. There are a few records of introduction from the 1920s and 1960s. Only the introduction in Poland may have resulted in established populations. A single record in FishBase indicates a possible negative impact, but does not provide enough information to be able to determine the scientific validity of that claim. The native populations of *Umbra krameri* have been in significant decline and it is listed as protected in many of the countries in its native range. The climate match is high, especially around the Great Lakes area. The certainty of assessment is low due to lack of information about the impacts of the established population. The overall risk category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information** *Umbra krameri* is protected under Appendix II of the Bern Convention.
- **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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