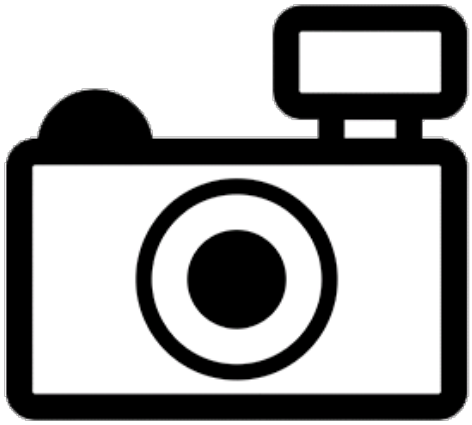
Dikerogammarus fluviatilis (an amphipod, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, January 2022
Revised, January 2022
Web Version, 10/6/2022

Organism Type: Crustacean
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From Grabowski (2022):

"Distribution […] Caspian, Ponto-Azov"

From Jażdżewska et al. (2020):

"*Dikerogammarus haemobaphes* was originally described from the brackish waters of the Caspian Sea, while Martynov (1919), based on the material from the lower Don River, described the riverine form *Dikerogammarus haemobaphes* morpha *fluviatilis* to distinguish it from the brackish water population"

From Muskó (1994):

Most of the data concern Lake Balaton and the largest river in Hungary, the Danube. In the Danube the following species have been found: […] *D. fluviatilis*, […]"

The native range of *D. fluviatilis* within the Ponto-Caspian region is a subject of debate (see Remarks).

Status in the United States

No records of *Dikerogammarus fluviatilis* in trade or in the wild in the United States were found.

Means of Introductions in the United States

No records of *Dikerogammarus fluviatilis* in the wild in the United States were found.

Remarks

Inconsistent treatment of *Dikerogammarus fluviatilis* exists in published literature with several sources rejecting the validity of the species or identifying it as *D. haemobaphes fluviatilis.* There is no single consensus in the scientific literature as a whole as to which name is correct for this species. This assessment follows World Register of Marine Species (WoRMS; Horton 2021) in treating *D. fluviatilis* as a valid species. Information attributed to *D. h. fluviatilis* found during literature searches has been included herein. The taxonomic authorities used in this ERSS are defined in the SOP for the ERSS process and can be found online (https://www.fws.gov/fisheries/ANS/species_erss.html).

From Jażdżewska et al. (2020):

"*Dikerogammarus haemobaphes* was originally described from the brackish waters of the Caspian Sea, while Martynov (1919), based on the material from the lower Don River, described the riverine form *Dikerogammarus haemobaphes* morpha *fluviatilis* to distinguish it from the brackish water population. Some authors followed this separation (e.g., Cărăuşu 1943; Cărăuşu et al. 1955) and since then the above-mentioned form has often been treated as a valid species (Straškraba 1962; Barnard and Barnard 1983; Jażdżewski and Konopacka 1988; Özbek and Özkan 2011). However, the morphological features separating *D. haemobaphes* and *Dikerogammarus fluviatilis* were extremely poorly defined by Martynov (1919), so the existence of the latter species remains unclear, and a thorough taxonomic revision was recommended (Jażdżewski and Konopacka 1988). Our study of the material molecularly assigned to the lineage A did not reveal any morphological evidence that would allow to classify it as *D. fluviatilis* or as any other species than *D. haemobaphes*."

From Konopacka et al. (2014):

"A comment is needed on *Dikerogammarus fluviatilis* Martynov, 1919, whose presence in the Dniester was reported by a few authors (Cărăuşu 1943, 1955, Dedju 1967, 1980, Jażdżewski and Konopacka 1988). Examination of the original description of that species by Martynov (1919) based on samples collected in the Don River, revealed that none of the provided features can be

used to differentiate *D. fluviatilis* from *D. haemobaphes*. Only a study of the type or topotypical material could reveal the real identity of the species in question. Thus, there is no proof that individuals from the Dniester and from the Danube defined as *D. fluviatilis* by Cărăuşu (1943, 1955) have anything in common with the species described by Martynov (1919). In consequence, we have decided to exclude *D. fluviatilis* from the checklist and treat all its records from the Dniester as belonging to *D. haemobaphes*."

From Grabowski et al. (2007):

"The freshwater populations of this species in older literature are often referred to as *D. haemobaphes fluviatilis* or even as *D. fluviatilis*. However, after some morphological studies, Konopacka (1998) retained the name *D. haemobaphes* for specimens found in Polish waters. For details see Jażdżewski (1980) and Jażdżewski and Konopacka (1988)."

From Aldridge (2013):

"Historically, there has been some confusion with the identity of the *Dikerogammarus* spp. across Europe. *D. haemobaphes* appears to be synonymous with *Dikerogammus* [sic] *fluviatilis* (Jazdzewski, 1980). Molecular studies by Muller et al. (2002) has confirmed the taxonomic status of three distinct species: *D. haemobaphes*, *D. villosus*, *D. bispinosus*."

Copilaș-Ciocianu and Sidorov (2021) indicates the taxonomic status of *Dikerogammarus fluviatilis* as "doubtful."

Additional information for *Dikerogammarus fluviatilis* was available in languages other than English. That information was not accessible to the assessors and was not included in the screening.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Horton et al. (2021):

"Animalia (Kingdom) > Arthropoda (Phylum) > Crustacea (Subphylum) > Multicrustacea (Superclass) > Malacostraca (Class) > Eumalacostraca (Subclass) > Peracarida (Superorder) > Amphipoda (Order) > Senticaudata (Suborder) > Gammarida (Infraorder) > Gammaridira (Parvorder) > Gammaroidea (Superfamily) > Gammaridae (Family) > *Dikerogammarus* (Genus) > *Dikerogammarus fluviatilis* (Species)"

"Status accepted
Rank Species"

Size, Weight, and Age Range

No information on size, weight, and age range was found for *Dikerogammarus fluviatilis.*

Environment
Copilaș-Ciocianu and Sidorov (2021) report that *Dikerogammarus fluviatilis* is a euryhaline species found in a minimum depth of 0 and a maximum depth of 15 (unit inferred to be meters, but not specified in table).

Climate
No information on climate requirements was found for *Dikerogammarus fluviatilis*.

Distribution Outside the United States
Native
From Grabowski (2022):

"Distribution […] Caspian, Ponto-Azov"

From Jażdżewska et al. (2020):

"*Dikerogammarus haemobaphes* was originally described from the brackish waters of the Caspian Sea, while Martynov (1919), based on the material from the lower Don River, described the riverine form *Dikerogammarus haemobaphes* morpha *fluviatilis* to distinguish it from the brackish water population"

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The native range of *D. fluviatilis* within the Ponto-Caspian region is a subject of debate (see Remarks).

Introduced
No records of introductions were found for *Dikerogammarus fluviatilis*.

Means of Introduction Outside the United States
No records of introductions were found for *Dikerogammarus fluviatilis*.

Short Description
From Copilaș-Ciocianu and Sidorov (2021):

"- Pleosome segments flat […]"

"Urosomal tubercles low […]"

"Crawler. Body is slender and generally smooth, antennae are long and slender, coxal plates shallow, pereopods slender, short to medium, gnathopods generally strong, and uropods long […]."

"Typically, these taxa [crawlers] are strongly sexually dimorphic, males possessing very large second gnathopods, relatively long antennae and slender bodies with shallow coxal plates."

Biology

From Copilaș-Ciocianu and Sidorov (2021):

"Ecomorph […] crawler"

"The crawler ecomorph is the second-most encountered in Ponto-Caspian amphipods, characterizing species living on coarse or fine substrate, often in shallow water."

From Straškraba (1969):

"In *Dikerogammarus haemobaphes fluviatilis*, observations showed ability to dig in the bottom mainly during the daytime and to swim freely, up to 1.5 m above the bottom, during the evening."

Human Uses

No information on human uses was found for *Dikerogammarus fluviatilis*.

Diseases

No records of OIE-reportable diseases (OIE 2021) were found for *Dikerogammarus fluviatilis*. No information available on diseases associated with *Dikerogammarus fluviatilis.*

Threat to Humans

No information available on threat to humans.

3 Impacts of Introductions

No records of introductions were found for *Dikerogammarus fluviatilis*; therefore there is no information on impacts of introduction.

4 History of Invasiveness

The information available for *Dikerogammarus fluviatilis* describes its distribution as "Caspian, Ponto-Azov" (Grabowski 2022). It was originally described as a riverine species (Jażdżewska et al. 2020), but no further information was available to determine which drainages in this geographic region represent the native range of *D. fluviatilis.* No records of introduction were found, therefore the history of invasiveness is classified as No Known Nonnative Population.

5 Global Distribution

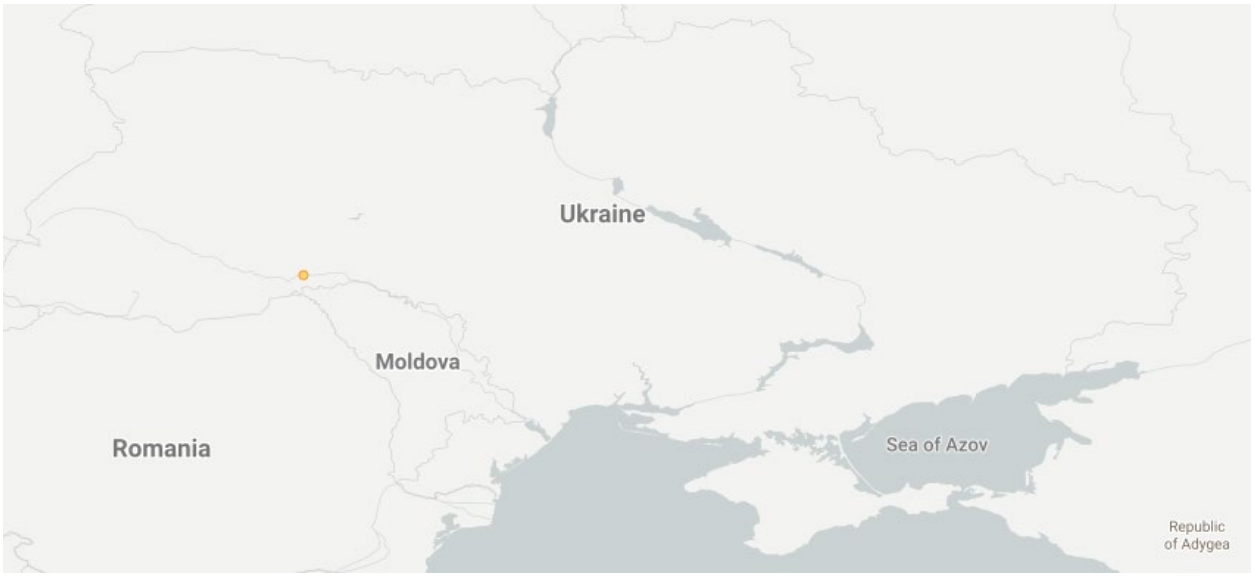

Figure 1. Known global distribution of *Dikerogammarus fluviatilis*. One observation is reported from the Dniester River, Chernivtsi Oblast, Ukraine. Map from GBIF Secretariat (2022).

6 Distribution Within the United States

No records of *Dikerogammarus fluviatilis* in the wild in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Dikerogammarus fluviatilis* in the contiguous United States was generally medium to medium-high, particularly in the central portion of the United States–an area spanning the Great Lakes basin, the Great Plains, and into the Southwest. There were smaller isolated areas of high match in Appalachia and the Interior West. Much of the eastern, southeastern, and western regions had a low climate match. The overall Climate 6 score (Sanders et al. 2021; 16 climate variables; Euclidean distance) for the contiguous United States was 0.41, high (scores greater than or equal to 0.103 are classified as high). The following States had high individual Climate 6 scores: Arizona, Colorado, Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Montana, North Dakota, Nebraska, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, Utah, Virginia, Vermont, Wisconsin, West Virginia, and Wyoming. The climate match was medium in Idaho, Maryland, Maine, New Hampshire, Nevada, Oregon, and Washington. All other States had low individual scores.

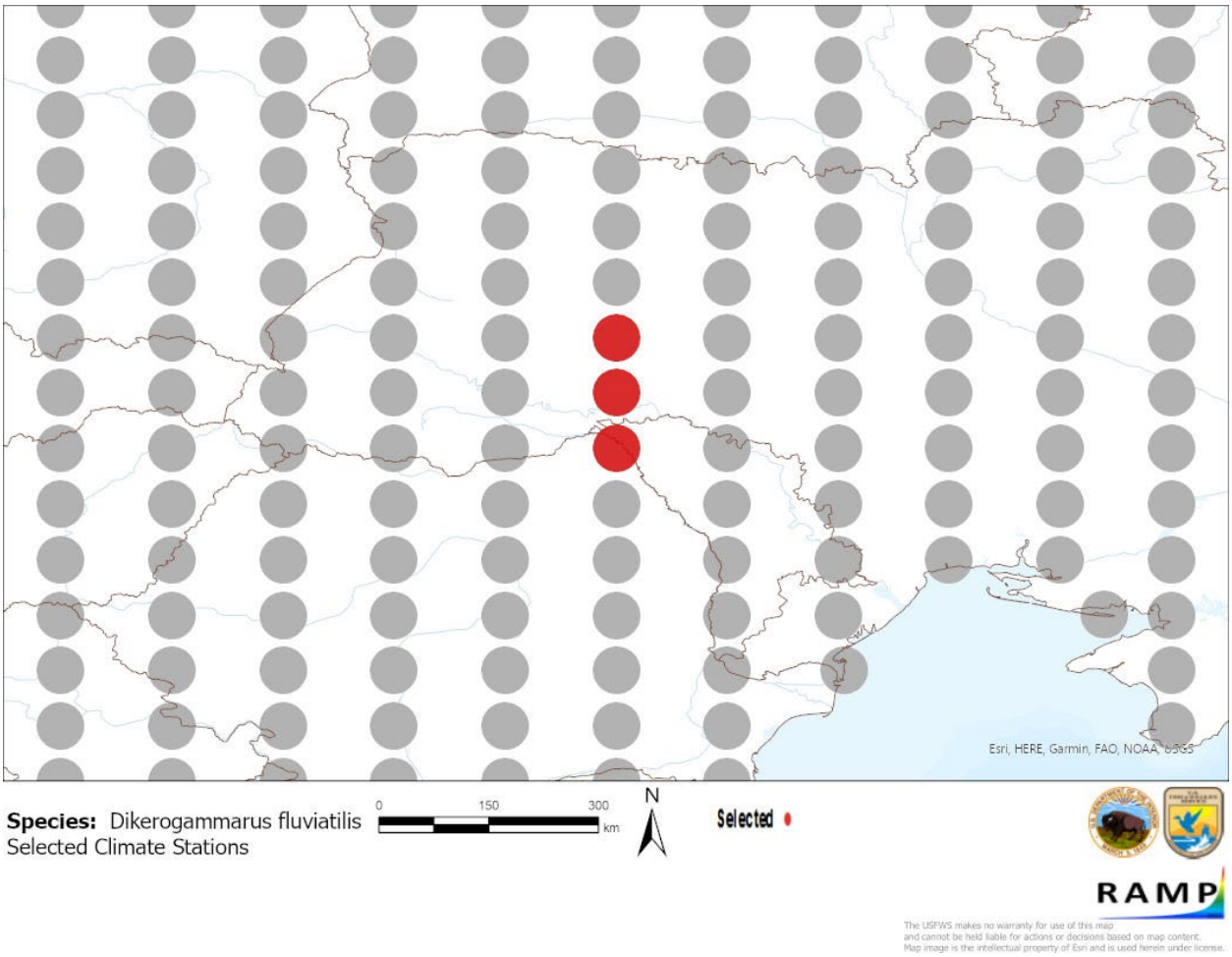

Figure 2. RAMP (Sanders et al. 2021) source map showing weather stations in eastern Europe selected as source locations (red; Ukraine, Moldova, Romania) and non-source locations (gray) for *Dikerogammarus fluviatilis* climate matching. Source locations from GBIF Secretariat (2022). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

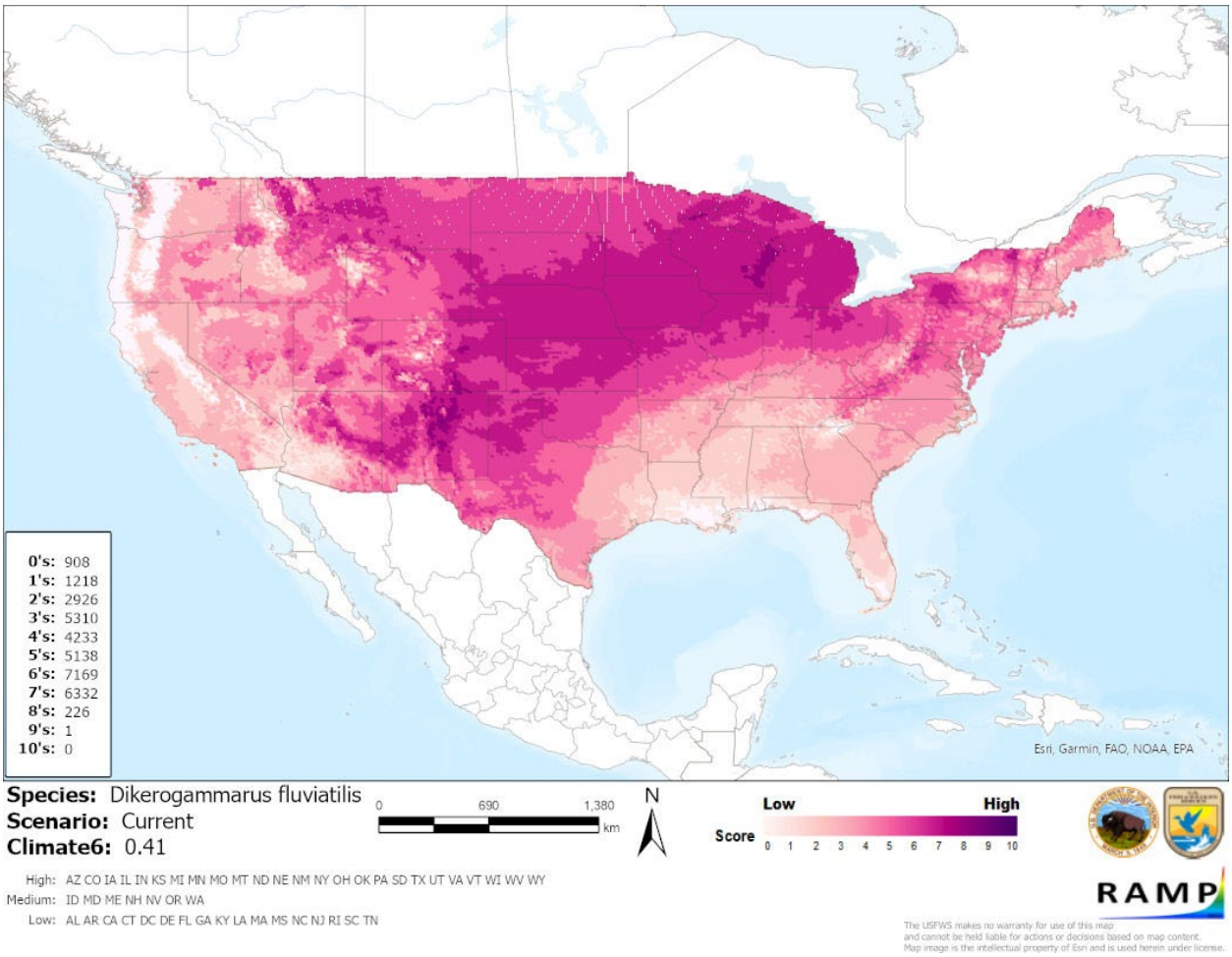

Figure 3. Map of RAMP (Sanders et al. 2021) climate matches for *Dikerogammarus fluviatilis* in the contiguous United States based on source locations reported by GBIF Secretariat (2022). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of this assessment is Low. There is little detailed information available describing the native range of *Dikerogammarus fluviatilis.* The climate matching analysis is based on just one georeferenced occurrence and may underestimate potential climate matches with the contiguous United States. The validity of this species has been called into question by several

authors; noting that some reported occurrences of *D. fluviatilis* may be *D. haemobaphes*, as the two species have unclear distinguishing characteristics and may be synonymous.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Dikerogammarus fluviatilis is an amphipod from riverine environments in the Ponto-Caspian region of Eurasia. There is little detailed information on the native range of this species, and no reports of introduced populations. Therefore, the history of invasiveness for *D. fluviatilis* is classified as No Known Nonnative Population. *D. fluviatilis* has a high climate match with the contiguous United States. Much of the contiguous United States has a high or medium match, including the Great Lakes basin, the Great Plains, and portions of the Southwest, Appalachia and the Interior West. However, this match is based on a single reported occurrence. There is significant taxonomic uncertainty, with some sources identifying this taxon as a full species, others as a subspecies (*D. haemobaphes fluviatilis*), and other sources rejecting the taxon entirely. This ERSS is specific to information available for *Dikerogammarus fluviatilis* and *D. h. fluviatilis*. The certainty of assessment is Low based on taxonomic uncertainty and scarcity of georeferenced locations. Further information is needed to adequately assess the risk this species poses to the contiguous United States. The overall risk assessment category is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information:** Validity as a species has been questioned. Several sources consider *Dikerogammarus fluviatilis* to be synonymous with *D. haemobaphes*.
- **Overall Risk Assessment Category: Uncertain**

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.

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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.

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