

# *Dreissena caspia* (a mussel, no common name)

## Ecological Risk Screening Summary

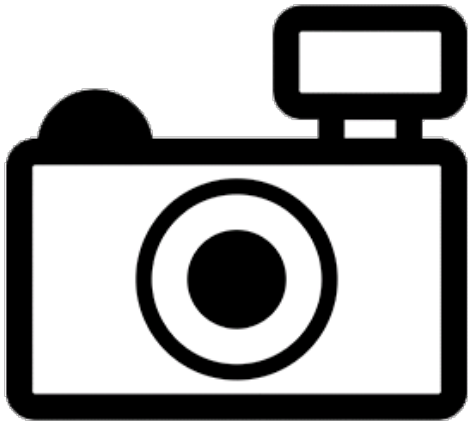
U.S. Fish & Wildlife Service, August 2020

Revised, January 2021

Web Version, 3/24/2021

Organism Type: Mollusk

Overall Risk Assessment Category: Uncertain



No Photo Available

## 1 Native Range and Status in the United States

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### Native Range

*Dreissena caspia* used to inhabit the Caspian and Aral Sea (Dumont 1998; Orlova et al. 2005; Filippov and Riedel 2009; Aladin et al. 2018). It is now presumed to be extinct.

From Filippov and Aladin (2001):

“[...] the Middle and Southern Caspian Sea [...]”

*Dreissena caspia* has been found in the fossil record throughout the Caspian Sea basin including in the sediments of the Mangyshlak Peninsula, Northern Caspian Sea (Bezrodnykh et al. 2014), Gulf of Gemlik, Southern Marmara Sea which is located presently near the Strait of Istanbul, Turkey (between 40.20°0 N, 28.40°0 E and 40.40°0 N, 29.10°0 E) (Taviani et al. 2014; Filikci et al. 2017), Cape Chauda, Black Sea (Sorokin and Babak 2011), and in the lower Volga River, Caspian Sea (Russia) (Zastrozhnov et al. 2018).

## Status in the United States

*Dreissena caspia* is presumed to be extinct. This species has not been reported within the United States and there is no indication that it is in trade within the United States.

From Arizona Office of the Secretary of State (2013):

“Mollusks listed below are considered restricted live wildlife: [...]

2. All species of the family *Dreissenidae*. Common names include: zebra and quagga mussel.”

From California Department of Fish and Wildlife (2019):

“It shall be unlawful to import, transport, or possess live animals restricted in subsection (c) below except under permit issued by the department. [...]

Restricted species include: [...]

Class Bivalvia-Bivalves: All members of the genus *Dreissena* (zebra and quagga mussels)”

From State of Nevada (2018):

“Except as otherwise provided in this section and NAC 504.486, the importation, transportation or possession of the following species of live wildlife or hybrids thereof, including viable embryos or gametes, is prohibited: [...]

Zebra and quagga mussels.....All species in the genus *Dreissena*”

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; for aquaculture (allowed only for Blue, Nile, or Mozambique tilapia, Triploid Grass Carp, or Pacific White Shrimp); or for aquatic weed control (for example, Triploid Grass Carp in private ponds). [...]

Zebra and Quagga Mussels, Family Dreissenidae

All species of genus *Dreissena*, including but not limited to *Dreissena polymorpha* (Zebra mussel)”

From Washington State Senate (2019):

“The following species are classified as prohibited level 3 species: [...]

Family Dreissenidae: All members of the genus Dreissenid [sic] except the species zebra mussel, *Dreissena polymorpha*, and the quagga mussel, *Dreissena rostriformis bugensis*.”

## Means of Introductions in the United States

This species has not been reported in the United States. It is presumed to be extinct.

## Remarks

*Dreissena caspia* is thought to have gone extinct due to the introduction of the mytilid *Mytilaster lineatus* (Gmelin, 1791), which was introduced in 1919 in the Caspian Sea from the Black Sea. *D. caspia* has not been observed or collected since the 1940's. Little information exists regarding the biology and ecology of *D. caspia*.

From Filippov and Riedel (2009):

“Two species of the zebra mussel have been described from the Aral Sea, *D. caspia* and *D. polymorpha* (see Starobogatov 1974) the assumed interspecific differences of which are not well documented, however. Soft parts have not been examined in detail and molecular data are non-existent. The shell morphological data have not been tested statistically.”

From Van der Velde (2010):

“Two species, viz. *D. elata* and *D. caspia* seem to be extinct and not observed since 1940-45. As Logvinenko and Starobogatov (1968) reported this is due to competition by the invasive mytilid *Mytilaster lineatus* (Gmelin, 1791), introduced in 1919 in the Caspian Sea from the Black Sea.”

From Lattuada et al. (2020):

“Some species like *Dreissena caspia* and *Dreissena elata* might have gone extinct (Wesselingh et al., 2019). Exact ranges remain unknown and reliable information on abundances are sparse for many mollusk species.”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From MolluscaBase (2020):

“Current status: accepted”

Kingdom Animalia  
Phylum Mollusca  
Class Bivalvia  
Subclass Autobranchia  
Infraclass Heteroconchia  
Subterclass Euheterodonta  
Superorder Imparidentia  
Order Myida  
Superfamily Dreissenoidea  
Family Dreissenidae  
Genus *Dreissena*  
Species *Dreissena caspia* (Eichwald, 1855)

## Size, Weight, and Age Range

From Van der Velde et al. (2020):

“Dimensions – max. L 7.4 mm, H 22.7 mm.”

From Filippov and Riedel (2009):

“[...] the maximum length of *D. caspia* is 17mm, the H/L ratio ranged from 0.38 to 0.68 and the W/L ratio varied from 0.3 to 0.56.”

## Environment

From Orlova et al (2005):

“[...] *D. (Dreissena) caspia* (Eichwald 1855) inhabited the coastal zone of the Caspian Sea proper (salinity of 7 –13%) prior to the 1960s, thereafter having gone extinct via displacement by *Mytilaster lineatus* (Gmelin 1791), an invasive Mediterranean mytilid species (Starobogatov and Andreeva 1994).”

From Van der Velde et al. (2020):

“The species was most abundant at depths up to 40m (Logvinenko and Starobogatov, 1969), and in a salinity range between 2 and 8 psu (Bogutskaya et al., 2013).”

## Climate

No information available.

## Distribution Outside the United States

### Native

*Dreissena caspia*, presumed to be extinct, used to be found in the Caspian and Aral Sea.

### Introduced

This species is presumed to be extinct. This species has not been reported outside of its native range.

## Means of Introduction Outside the United States

This species is presumed to be extinct, and has not been reported outside of its range native.

## Short Description

From Van der Velde et al. (2020):

“Elongate, somewhat flat *Dreissena* with rounded margins; keel low or absent resulting in rounded cross-profile. The semidiameter is initially located at the dorsal margin but in sub adult stages crosses to the ventral margin. In adult stages, the semidiameter becomes less pronounced and is located in the middle of the shell. The posterodorsal margin is broadly rounded (and not

subangular as in *D. elata*), the posterior margin is rounded and the anterior margin is straight to slightly round. The hinge platform is flat and solid.”

Filippov and Riedel (2009) reported that the soft parts of *Dreissena caspia* have not been examined in detail and molecular data are non-existent. The shell morphological data has not been tested statistically. They reported in *D. caspia*, a keel is pronounced and in *D. polymorpha* it is not.

## **Biology**

From Van der Velde et al. (2020):

“*Dreissena caspia* is a filter feeder that used to be common all over the Caspian Sea but is now possibly extinct (Bogutskaya et al., 2013).”

## **Human Uses**

No information available.

## **Diseases**

**No records of OIE-reportable diseases (OIE 2021) were found for *Dreissena caspia*.** No information available.

## **Threat to Humans**

No information available.

## **3 Impacts of Introductions**

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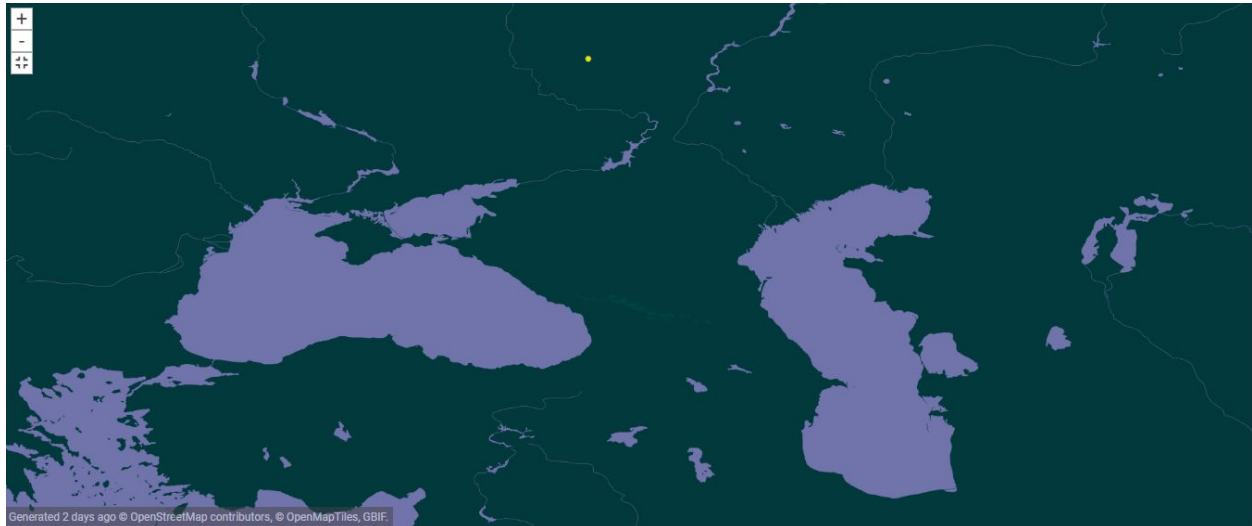
This species is presumed to be extinct and was not reported outside of its native range; therefore, impacts of introductions are unknown.

## **4 History of Invasiveness**

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*Dreissena caspia* has not been observed or collected since the 1940's and is therefore presumed to be extinct. It was not previously reported to be found outside of its native range in the Caspian Sea. There is no indication that this species was in trade. Due to no reported introductions, the history of invasiveness for this species is classified as No Known Nonnative Population.

## 5 Global Distribution



**Figure 1.** Known global distribution of *Dreissena caspia*. Only one observation is reported from an area northeast of the Black Sea. A coordinate error was identified for this occurrence and it was not included in the climate matching analysis. Map from GBIF Secretariat (2020).



**Figure 2.** Formerly known global distribution of *Dreissena caspia*. *D. caspia* was last reported in the Caspian Sea (represented here by the red pin) in the 1940's where it was reportedly widespread (Dumont 1998; Orlova et al. 2005; Filippov and Riedel 2009; Aladin et al. 2018). Map from Google (2021).

*D. caspia* is presumed to be extinct but used to be common throughout the Caspian and Aral Sea. It was last reported in the Caspian Sea in the 1940's. It has been reported in the Caspian, Aral, and Black Sea fossil record. Due to a lack of current georeferenced distribution data for this species, its previously known widespread distribution in the Caspian Sea was used to select source points for climate matching analysis (Dumont 1998; Filippov and Aladin 2001; Orlova et al. 2005; Filippov and Riedel 2009; Aladin et al. 2018). Black and Aral Sea distribution data was not used as it was based in the fossil record.

## 6 Distribution Within the United States

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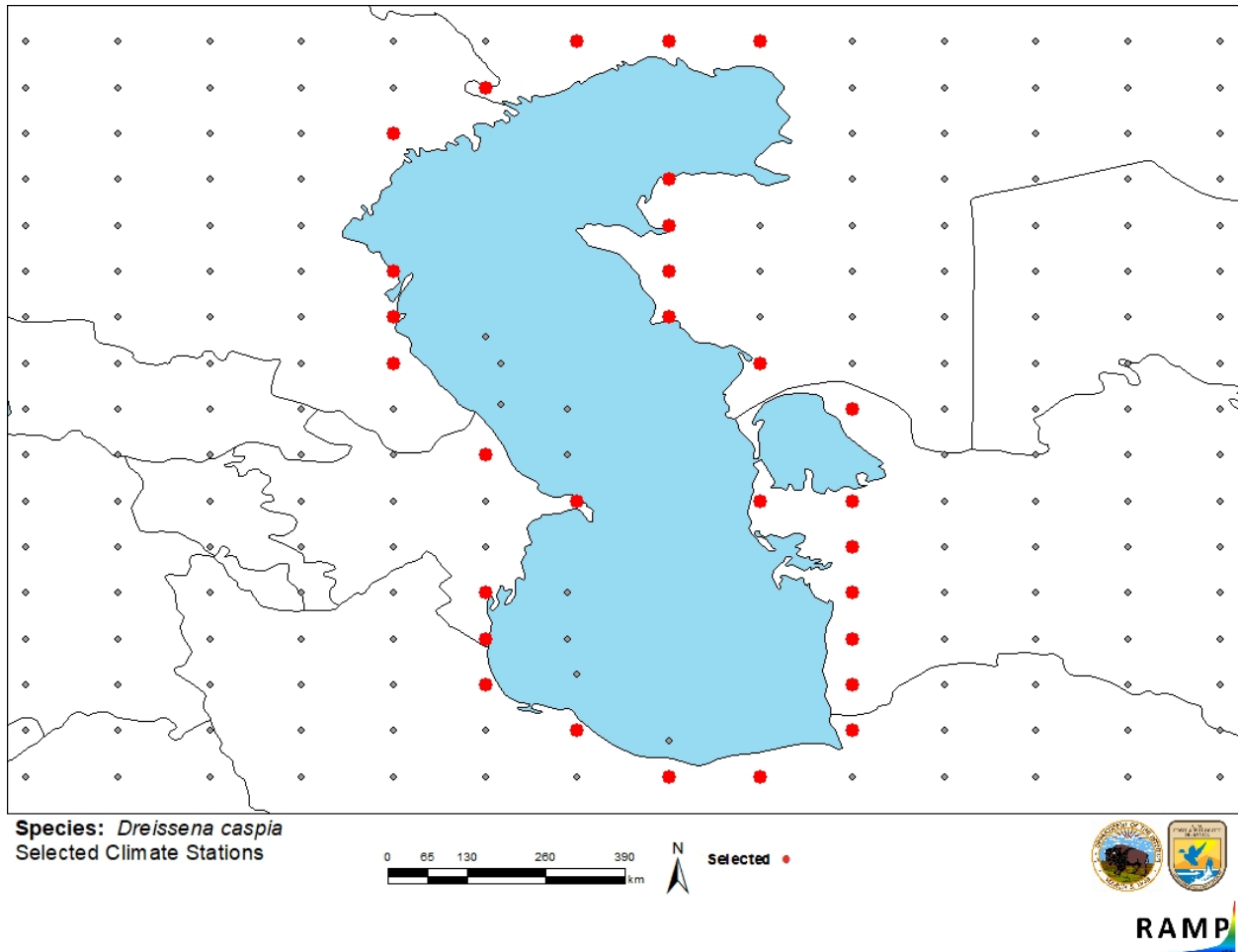
This species has not been reported within the United States.

## 7 Climate Matching

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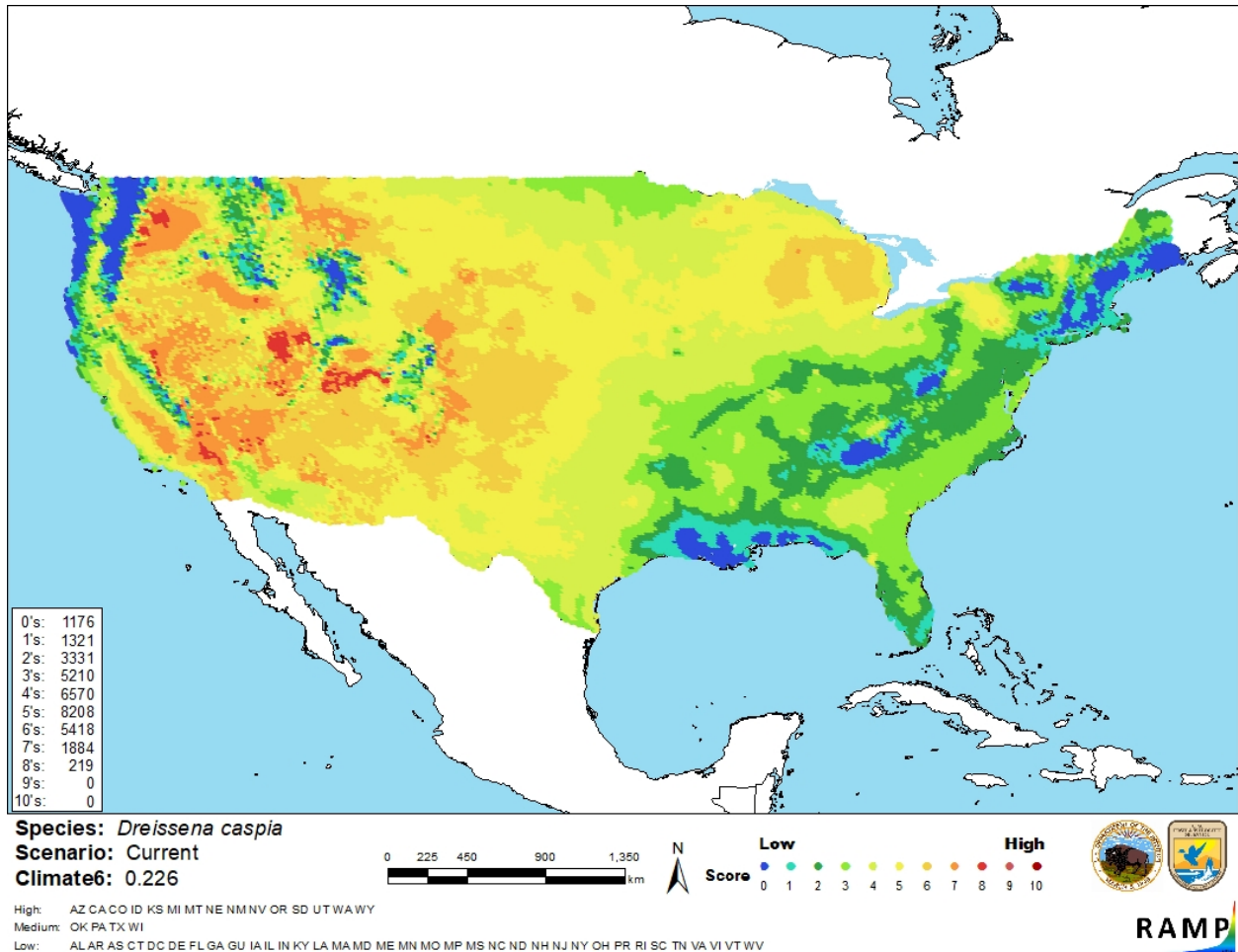
### Summary of Climate Matching Analysis

The climate match for *Dreissena caspia* to the contiguous United States was mostly medium. There were areas of high match in the Rocky Mountains and in interior California. Areas of low match covered much of the eastern seaboard and southeast, the Gulf Coast and much of the Pacific Northwest. There were a few small patches of low match in the Rocky Mountains. Everywhere else had a medium match. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.226, high (scores of 0.103 or greater are classified as high). The following States had high individual Climate 6 scores: Arizona, California, Colorado, Idaho, Kansas, Michigan, Montana, Nebraska, New Mexico, Nevada, Oregon, South Dakota, Utah, Washington, and Wyoming. Oklahoma, Pennsylvania, Texas, and Wisconsin all had medium individual Climate 6 scores. The remaining States had low individual climate scores. The climate match was based on a verbal description of the reported range because no georeferenced points were available. The climate match does not account for salinity tolerance. Species establishment will require both a suitable climate and the availability of aquatic habitat with appropriate salinity (see Environment, above).



**Figure 3.** RAMP (Sanders et al. 2018) source map showing weather stations in the Caspian Sea region selected as source locations (red; Azerbaijan, Georgia, Iran, Kazakhstan, Russia, and Turkmenistan) and non-source locations (gray) for *Dreissena caspia* climate matching. Source locations from verbal range descriptions in Dumont (1998), Filippov and Aladin (2001), Orlova et al. (2005), Filippov and Riedel (2009), and Aladin et al. (2018).





**Figure 4.** Map of RAMP (Sanders et al. 2018) climate matches for *Dreissena caspia* in the contiguous United States based on source locations reported by Dumont (1998), Filippov and Aladin (2001), Orlova et al. (2005), Filippov and Riedel (2009), and Aladin et al. (2018). 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
$\geq 0.103$	High

## 8 Certainty of Assessment

*Dreissena caspia* is presumed to be extinct and has not been observed or collected since the 1940's. There was little information available regarding the biology and ecology of *Dreissena caspia*. Most of the information available for *Dreissena caspia* was based on fossil record data.

No georeferenced occurrences were available for climate matching, so climate stations were selected based on verbal descriptions of the reported range. Further, the climate match does not account for salinity tolerance. Species establishment will require both a suitable climate and the availability of aquatic habitat with appropriate salinity (see Environment, above). No information was available on invasiveness because *D. caspia* is not known to have been introduced outside its native range. The certainty of assessment is low due to lack of information and because the climate match does not account for salinity tolerance.

## 9 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Dreissena caspia* was a mussel native to the Caspian Sea. It has not been collected or observed since the 1940's. It is presumed to be extinct due to competition by the invasive mytilid *Mytilaster lineatus*, which was introduced in the Caspian Sea from the Black Sea. Most of the data regarding this species comes from the fossil record. This species has not been reported outside of its native range. History of invasiveness is No Known Nonnative Population. The climate match for the contiguous United States was high. Much of the central and western United States had a medium to high match. The climate match does not account for salinity tolerance. Species establishment will require both a suitable climate and the availability of aquatic habitat with appropriate salinity. The certainty of assessment is low due to the limited information about the species range and salinity requirements. The overall risk assessment category for *D. caspia* 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: This species is believed to be extinct**
- **Overall Risk Assessment Category: Uncertain**

## 10 Literature Cited

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**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

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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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