

Caspian Monkey Goby (*Neogobius pallasii*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, June 2019

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Photo: K. Abbasi. Licensed under CC BY-SA 3.0. Available:
https://commons.wikimedia.org/wiki/File:Neogobius_pallasii.jpg. (June 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

“Europe and Asia: Caspian basin; common in Volga drainage, upriver to Moscow.”

According to Froese and Pauly (2019), *N. pallasii* is native to the countries of Russia and Kazakhstan.

Neilson and Stepien (2011) report *N. pallasii* as native to the Caspian Sea basin in Azerbaijan. Esmaeili et al. (2014) report *N. pallasii* as native to the Caspian Sea basin in Iran.

Status in the United States

This species has not been reported as introduced or established in the United States. There is no indication that this species is in trade in the United States.

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

Remarks

A previous version of this ERSS was published in 2014.

From Neilson and Stepien (2011):

“Both genetic and morphological data strongly supported two species of monkey gobies that were formerly identified as subspecies: *N. fluviatilis* in the Black Sea basin, Don and Volga Rivers, and the Kumo-Manych Depression, and *Neogobius pallasii* in the Caspian Sea and Volga River delta. Genetic origins of introduced *N. fluviatilis* populations indicated a common invasion pathway shared with other introduced Ponto-Caspian fishes and invertebrates.”

From Grabowska (2014):

“The monkey goby [*Neogobius fluviatilis*] is considered to be one of the most successful fish invaders in European inland waters in recent decades (Copp et al., 2005).”

Neogobius pallasii has only recently been declared as a species separate from *Neogobius fluviatilis* (Neilson and Stepien 2011). This has led to difficulties in distinguishing the introductions and impacts of the two species. This risk assessment will only document information clearly assigned to *Neogobius pallasii*, although it should be noted that *Neogobius fluviatilis* is considered invasive in Europe (Grabowska 2014).

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Catalogue of Life (2019):

“Kingdom Animalia
Phylum Chordata
Class Actinopterygii
Order Perciformes
Family Gobiidae
Genus *Neogobius*”

“Accepted scientific name: *Neogobius pallasii* (Berg, 1916) (accepted name)”

“Synonyms: *Gobius fluviatilis pallasii* Berg, 1916 (synonym)
Neogobius fluviatilis pallasii (Berg, 1916) (synonym)”

From Fricke et al. (2019):

“Current status: Valid as *Neogobius pallasii* (Berg 1916). Gobiidae: Gobiinae.”

Size, Weight, and Age Range

From Froese and Pauly (2019):

“Max length : 20.0 cm SL male/unsexed; [Kottelat and Freyhof 2007]”

“Lives up to 3 years.”

Environment

From Froese and Pauly (2019):

“Freshwater; benthopelagic.”

Climate/Range

From Froese and Pauly (2019):

“Temperate”

Distribution Outside the United States

Native

From Froese and Pauly (2019):

“Europe and Asia: Caspian basin; common in Volga drainage, upriver to Moscow.”

According to Froese and Pauly (2019), *N. pallasii* is native to the countries of Russia and Kazakhstan.

Neilson and Stepien (2011) report *N. pallasii* as native along the Caspian Sea coast of Azerbaijan. Esmaeili et al. (2014) report *N. pallasii* as native to the Caspian Sea basin in Iran.

Introduced

From Mitrofanov and Mamilov (2015):

“In the mid-1950s [...] Caspian Monkey Goby (*Neogobius pallasii* (Berg, 1916)) [...] formed permanent populations in the Aral Sea. During the last short-term field survey in 2002 three Goby species were found in the Small Aral Sea and Syr Darya delta [Uzbekistan]: Caucasian Dwarf Goby, Caspian Round Goby, and Caspian Monkey Goby.”

Means of Introduction Outside the United States

From Mitrofanov and Mamilov (2015):

“In the mid-1950s, an attempt to introduce two gray mullet species from the Caspian Sea failed and mullets did not establish in the Aral Sea. However, [...] six gobiid species became established: Caucasian Dwarf Goby (*Knipowitschia caucasica* Berg, 1916), Caspian Round Goby (*Neogobius melanostomus affinis* Eichwald, 1831), Caspian Syman (*Ponticola*

eurystomus (Kessler, 1877)), Gorlap (*Ponticola gorlap* Berg, 1949), Caspian Monkey Goby (*Neogobius pallasii* (Berg, 1916)), and Caspian Tubenose Goby (*Proterorhinus nasalis* (De Filippi, 1863)) formed permanent populations in the Aral Sea.”

Short Description

From Froese and Pauly (2019):

“This species is distinguished from its congeners entering freshwater in the Caspian Sea basin by the following characters: first branched ray of second dorsal about as long as penultimate ray; nape completely scaled; pelvic-disc fraenum with small rounded lobes and the length is less than 1/6 of width at base; pelvic disc reaching 90-100% of distance between its origin and anus; scales in midlateral series 55-63 + 2-3; in juveniles at least, posterior part of first dorsal with black spot [Kottelat and Freyhof 2007].”

Biology

From Froese and Pauly (2019):

“Occurs in lagoons and lakes, large- to medium- size rivers, on sand or mud bottom; usually on open sand or sand-shell bottom. [...] Spawns for the first time at 1 year, rarely at 2. Spawns in April-September. Individual females may repeat spawning during a season. Adhesive eggs are deposited on stones, shells and aquatic plants and are guarded by males until hatching. Feeds on a wide variety of invertebrates (mainly crustaceans and insect larvae) and small fish [Kottelat and Freyhof 2007].”

Human Uses

From Froese and Pauly (2019):

“Is the most important commercial species of goby in the Caspian Sea [Berg 1965].”

Diseases

Pazooki et al. (2011) report the following parasites of *Neogobius pallasii*: *Gyrodactylus* sp., *Cucullanus sphaerocephalus*, *Cystidicola* sp., *Dichelyne minutus*, *Eustrongylides excisus*, *Hysterothylacium adunacum*, *Raphidascaris acus*, and *Corynosoma strusoma*.

No OIE-reportable diseases (OIE 2019) have been documented for this species.

Threat to Humans

From Froese and Pauly (2019):

“Harmless”

3 Impacts of Introductions

No information available.

4 Global Distribution



Figure 1. Known global distribution of *Neogobius pallasii* reported from Russia, Azerbaijan, and Iran. Map based on source locations reported by GBIF Secretariat (2019) and Neilson and Stepien (2011). Map made with Google Earth 7.1.1.1580 (Google LLC, Mountain View, California). Georeferenced occurrences could not be found for the established range of *Neogobius pallasii* in the Volga River basin or the Aral Sea basin.

5 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.114, which is a high climate match. (Scores of 0.103 or greater are classified as high.) Much of the Southwest and Interior Northwest had a high to medium match, while most of the eastern United States, northern Great Plains States, and coastal Pacific Northwest had a low climate match. Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington had high climate scores, and Colorado and New Mexico had medium scores. The remaining States in the contiguous United States had low individual climate scores.

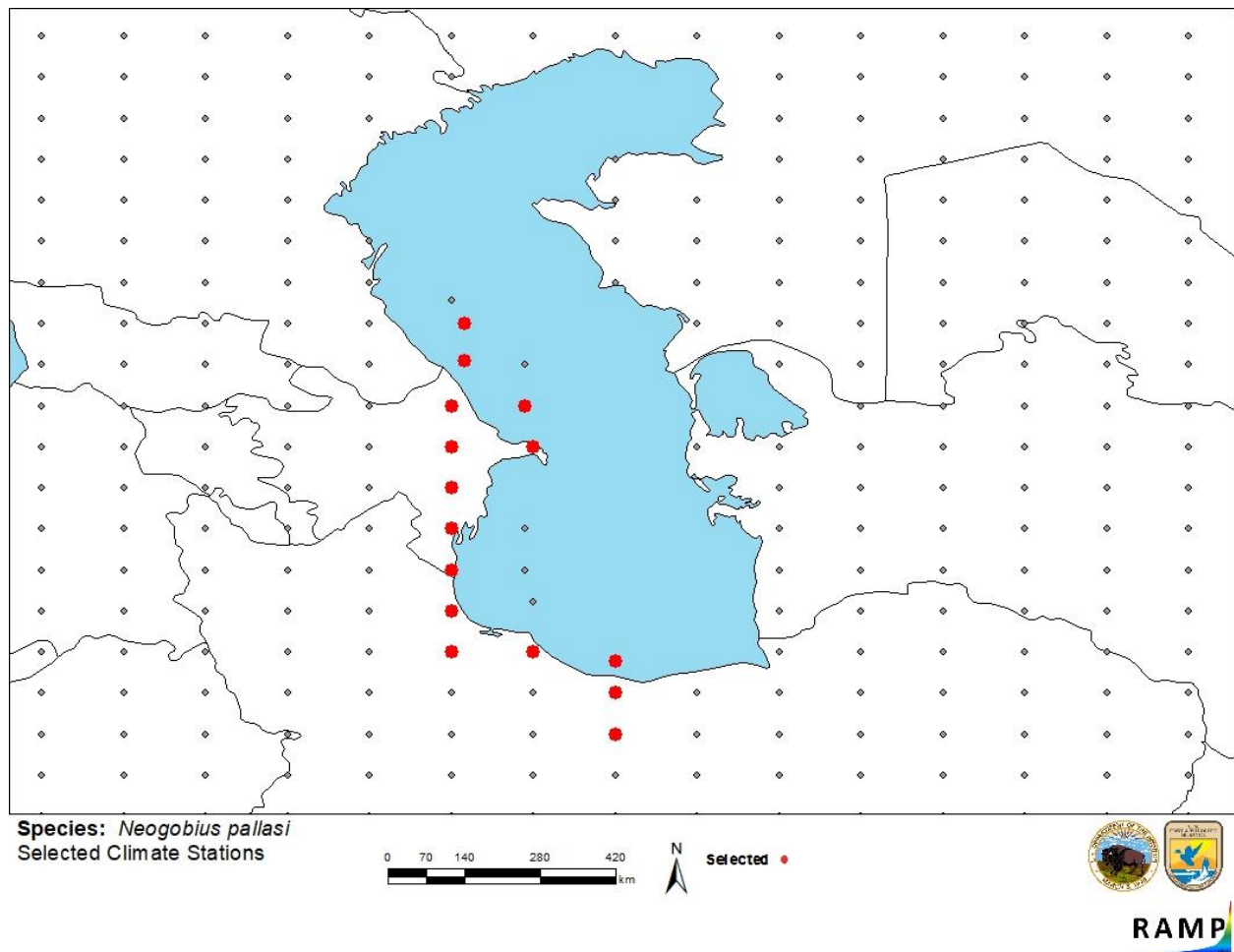


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Russia, Azerbaijan, Iran) and non-source locations (gray) for *Neogobius pallasii* climate matching. Source locations from GBIF Secretariat (2019) and Neilson and Stepien (2011).

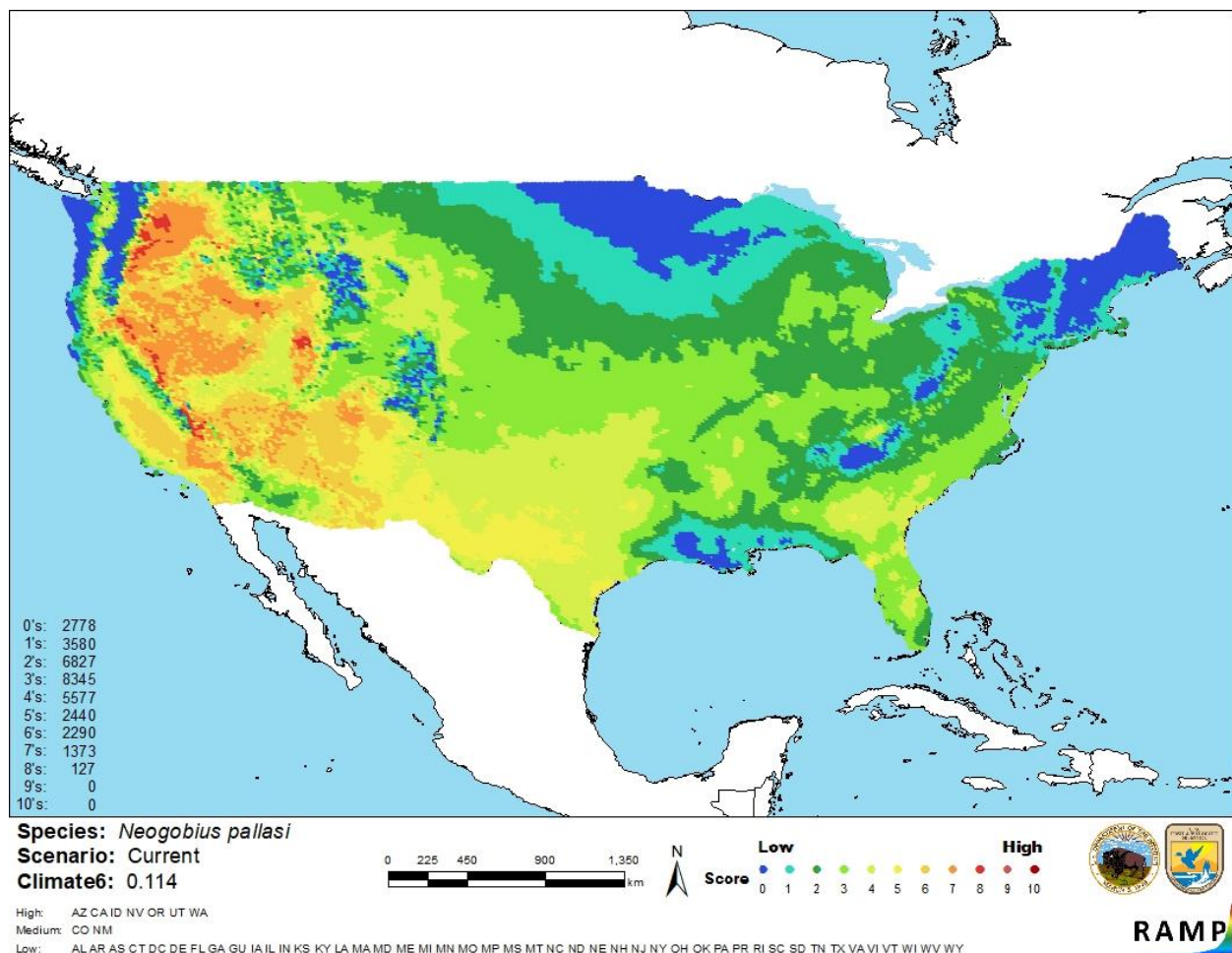


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Neogobius pallasii* in the contiguous United States based on source locations reported by GBIF Secretariat (2019) and Neilson and Stepien (2011). 0= Lowest match, 10=Highest match.

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

7 Certainty of Assessment

Some information is available on the biology, ecology, and distribution of *Neogobius pallasii*. Little is known about the introductions and impacts of *Neogobius pallasii*, due in part to its limited distribution and recent designation as a species. More information is needed to evaluate the potential and actual impacts the species may be having in introduced areas. No distribution

information was available for *N. pallasii* in the Volga River drainage or Aral Sea, decreasing the certainty of the climate match. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Neogobius pallasii, the Caspian Monkey Goby, is a freshwater fish native to the Caspian Sea and Volga River drainage. It is reportedly the most commercially important goby in the Caspian Sea. This species was, until recently, designated a subspecies of *Neogobius fluviatilis*, which is considered invasive in many locations in Europe. *N. pallasii* has been introduced and become established in the Aral Sea. Further information on this introduction and impacts, if any, are not available. History of invasiveness is “None Documented.” *N. pallasii* has a high climate match with the contiguous United States. Areas of high and medium match are found in the West and Southern Great Plains. Certainty of assessment is low due to a lack of information on both impacts of introduction and distribution. Overall risk assessment category for this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **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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Esmaeili, H. R., B. W. Coad, H. R. Mehraban, M. Masoudi, R. Khaefi, K. Abbasi, H. Mostafavi, and S. Vatandoust. 2014. An updated checklist of fishes of the Caspian Sea basin of Iran with a note on their zoogeography. *Iran Journal of Ichthyology* 1(3):152-184.

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- Sanders, S., C. Castiglione, and M. H. Hoff. 2018. Risk Assessment Mapping Program: RAMP, version 3.1. U.S. Fish and Wildlife Service.

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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