

Ratan Goby (*Ponticola ratan*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, March 2012

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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018a):

“Eurasia: Black Sea, Sea of Azov and Caspian Sea [Miller 1986]. Restricted to brackish water habitats [Patzner et al. 2011].”

From Manilo and Didenko (2013):

“Black Sea basin (from Bulgarian coast to Crimea in the western part and from the Kerch Strait to Novorossiysk), Azov and Caspian Seas (Vasil’eva, 2007). In Ukrainian waters, it was recorded in littoral waters of Zmeiny Island (Snigirev, 2008), is known from sea coast of the Danube-Dniester interstream area to Tendrovsky bay (Manilo, 2008—2009), including Shagansky and Dniester banks, in lower part of the Dniester, Khadzhibey, Tiligul estuaries (from

1970 to 1990) (Shekk, 2004), Berezan and Dnieper-Bug estuaries (and upstream the South Bug to Belousovka village). The species was recorded near Tarkhankut peninsula (Pinchuk, 1968; Ereemeev et al., 2012). Near southern coast of Crimea, this species was recorded near Karadag and Kerch peninsula coast, abundant in the Kerch Strait (Shaganov, Milovanov, 2005; Shaganov, 2009). In the Azov Sea, this goby is known in the southern part to the Cape Kazantip (Ereemeev et al., 2012), in Utlyuk (Demchenko et al., 2005) and Molochny (during its connection with sea) lagoons (Smirnov, 2006), and in its northern part up to the Berdyansk Bar.”

Status in the United States

No reports of introduction into the United States. Searches of the scientific literature and common aquarium websites do not provide any evidence that this species is in trade in the United States.

Means of Introductions in the United States

There are no known introductions into the United States.

Remarks

Eschmeyer et al. (2018) report the synonyms *Gobius ratan* and *Neogobius ratan* for *Ponticola ratan*. All three names were used in searching for information on this species.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Froese and Pauly (2018b):

“Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > Actinopterygii (Class) > Perciformes (Order) > Gobioidae (Suborder) > Gobiidae (Family) > Gobiinae (Subfamily) > *Ponticola* (Genus) > *Ponticola ratan* (Species)”

From Eschmeyer et al. (2018):

“**Current status:** Valid as *Ponticola ratan* (Nordmann 1840). Gobiidae: Gobiinae.”

Size, Weight, and Age Range

From Froese and Pauly (2018a):

“Max length : 20.0 cm TL male/unsexed; [Berg 1965]”

From Manilo and Didenko (2013):

“Longevity is up to 4-5 years. Maximum body length of males from the Odessa coast is up to 183 mm, females are up to 153 mm long (Pinchuk et al., 2003). In Bulgarian waters it can reach 230 mm (Georgiev, 1966).”

Environment

From Froese and Pauly (2018a):

“Brackish; demersal.”

From Manilo and Didenko (2013):

“Records of the ratan goby in fresh water during two seasons [...] allows categorizing it not as a mesohaline but as a euryhaline species.”

“The ratan goby in the Black Sea prefers bottom covered with gravel and pebble, but in the Azov Sea it occurs on soft bottom.”

Climate/Range

From Froese and Pauly (2018a):

“Temperate; 47°N - 36°N, 27°E - 54°E”

Distribution Outside the United States

Native

From Froese and Pauly (2018a):

“Eurasia: Black Sea, Sea of Azov and Caspian Sea [Miller 1986]. Restricted to brackish water habitats [Patzner et al. 2011].”

From Manilo and Didenko (2013):

“Black Sea basin (from Bulgarian coast to Crimea in the western part and from the Kerch Strait to Novorossiysk), Azov and Caspian Seas (Vasil’eva, 2007). In Ukrainian waters, it was recorded in littoral waters of Zmeiny Island (Snigirev, 2008), is known from sea coast of the Danube-Dniester interstream area to Tendrovsky bay (Manilo, 2008—2009), including Shagansky and Dniester banks, in lower part of the Dniester, Khadzhibey, Tiligul estuaries (from 1970 to 1990) (Shekk, 2004), Berezan and Dnieper-Bug estuaries (and upstream the South Bug to Belousovka village). The species was recorded near Tarkhankut peninsula (Pinchuk, 1968; Ereemeev et al., 2012). Near southern coast of Crimea, this species was recorded near Karadag and Kerch peninsula coast, abundant in the Kerch Strait (Shaganov, Milovanov, 2005; Shaganov, 2009). In the Azov Sea, this goby is known in the southern part to the Cape Kazantip (Ereemeev et al., 2012), in Utlyuk (Demchenko et al., 2005) and Molochny (during its connection with sea) lagoons (Smirnov, 2006), and in its northern part up to the Berdyansk Bar.”

Introduced

From Didenko (2013):

“Sampling in the Dniprodzerzhynsk reservoir [Ukraine] was conducted during late August of 2011 and 2012 within the framework of routine annual juvenile fish surveys in the Dnieper

reservoirs. [...] Ratan goby was recorded for the first time from this reservoir. [...] The occurrence of ratan goby, an estuarine and marine species that adapted to freshwater conditions, is an evidence for ongoing Ponto-Caspian gobiid invasion to the Dnieper reservoirs.”

“[...] Pinčuk et al. (1985) indicated that a dwarf form of this species established an isolated viable population in the Kakhovka Reservoir; however, no information has been available since then.”

Means of Introduction Outside the United States

From Manilo and Didenko (2013):

“Dispersal pathways of *P. ratan* into fresh waters of the Dneprodzerzhinsk reservoir are not currently known. It is possible that the ratan goby population from the lower part of the Kakhovka reservoir near Berislav mentioned in the work of V. I. Pinchuk et al. (1985) expanded its range; however, it requires further studies in these reservoirs. It is also possible that this is an isolated population, the first representatives of which or their eggs were accidentally brought to this location by ships berthed here during active construction of the Dnepr-Donbass canal facilities in the 1970s. After finishing this construction, the berth was abandoned.”

Short Description

From Manilo and Didenko (2013):

“Body is short, laterally flattened, covered with ctenoid scales. Top of the head, back of the head, the back ahead of the dorsal fin, and part of the breast and the base of the pectoral fins are covered with cycloid scales. Head is laterally compressed, its height is not less than 90 % of its width, equal to it or somewhat larger. Cheeks are not swollen. Snout length is about equal to orbit diameter. Mouth is large, slightly oblique, its angles extend to the middle of the pupil. Lower jaw is slightly protruding. Upper lip is narrow, long, does not expand on sides. Eyes are large, interorbital distance is 40-60 % of the eye diameter. Anterior nostrils are not extended in form of long tubes. Pelvic disk usually reaches the anal opening or extends beyond it; its length is not less than 90 % of the abdomen length. The pelvic disk fraenum has lateral angular or rounded lobes. Pectoral fins extend beyond the vertical of the beginning of the first dorsal fin and reach the vertical of the beginning of the anal fin. All pectoral fin rays are connected with a membrane. Dorsal fins are not separated by a gap. The second dorsal fin height slightly increases in its posterior part. Caudal peduncle is very compressed laterally, short, its height is not less than 75 % of its length. Large specimens from some populations have distinctly larger scales on the caudal peduncle than on other parts of the body (Pinchuk et al., 2003); the specimens from the Dneprodzerzhinsk reservoirs have scales of the same size on all parts of the body. Swimbladder is absent. Caudal fin is rounded. General coloration in life of the body is brownish-brown, lighter on sides. Abdomen is light grey. There are lighter vertical bands ahead of the first dorsal fin, under the second dorsal fin and on the caudal peduncle. Fins are greyish with blue-gray hue. There is a yellow or orange band along the upper margin of the first dorsal fin, below which there is a small black spot in specimens of some populations, while others have several almost parallel darkish bands. The specimens from the Dneprodzerzhinsk reservoirs have the first dorsal fin coloration corresponding to the second variant. The second dorsal fin is unicolored grey with narrow light margin and three or four rows of darkish bands near its base,

more visible in young specimens. Ventral disk and anal fin are greyish-cream with wide light margin. During spawning period males become completely black with grey-blue hue, however some females from the Dneprodzerzhinsk reservoir also had dark coloration of the body [...]"

Biology

From Froese and Pauly (2018a):

"Restricted to brackish water habitats [Patzner et al. 2011]. Reported to enter fresh waters [Fricke et al. 2007]. Occur inshore, over stones and gravel. Feeds mainly on crustaceans and fish [Miller 1986]."

From Manilo and Didenko (2013):

"The ratan goby is characterized by marked seasonal migrations related to spawning. In spring, it goes to shallow coastal warm waters, where it spawns at water temperature from 8 to 10°C, which occurs on the Odessa coast in May (Khutornoy, 2010), while in Bulgarian waters from the end of March to the beginning of May (Georghiev, 1966). Eggs are laid under stones in the littoral zone, fecundity of 97-103 mm females varied from 222 to 360 eggs (Pinchuk et al., 2003). Sexual maturation occurs at the age of 2 years after reaching the body length of about 70 mm (Vasil'eva, 2007; Pinchuk et al., 2003)."

"Diet of adult fish in the Northwestern part of the Black Sea was dominated by crustaceans (73.2 %), among which the most abundant were shrimps *Palaemon* (45.5 %) and gammarids (9.4 %), polychaetes *Nereis* (15.8 %), fish juveniles (6.6 %) and mollusks. It is known about changes in ratan goby diet from spring to autumn as well as with its age (Strautman, 1973)."

Human Uses

No human uses reported.

Diseases

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

Kvach (2002) report the following species of helminth parasites from *P. ratan* (as *N. ratan*): *Cryptocotyle lingua*, *Cryptocotyle concavum*, *Dichelyne minutus*, *Acanthocephaloides propinquus*, and *Telosentis exiguous*.

From Kvach (2002):

"*Cryptocotyle* spp. met. [metacercariae]

These helminthes are common in the north-western Black Sea. The adult stage infects the fish-eating birds, rats, dogs and some other mammals (Gayevskaya et al., 1975). In addition it is capable [*sic*] of infecting humans (Zimmerman, Smith, 1975). Metacercariae cause the blackspot disease of fish."

"The maximal infection with *C. lingua* met. was noted for the ratan goby (93.75%) [...]"

“Metacercariae of *C. concavum* were occurred [*sic*] in monkey, round, grass, and tubenose gobies. The ratan goby was infected mostly (93.75%) [...]”

Threat to Humans

From Froese and Pauly (2018a):

“Harmless”

From Kvach (2002):

“*Cryptocotyle* spp. met. [metacercariae]

These helminthes are common in the north-western Black Sea. The adult stage infects the fish-eating birds, rats, dogs and some other mammals (Gayevskaya et al., 1975). In addition it is capable [*sic*] of infecting humans (Zimmerman, Smith, 1975).”

3 Impacts of Introductions

There is no information available.

4 Global Distribution



Figure 1. Known global distribution of *Ponticola ratan*, reported from the Black and Caspian Seas. Map from GBIF Secretariat (2019).

5 Distribution Within the United States

There are no known occurrences.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.206, indicating an overall high climate match. (Scores of 0.103 or greater are classified as high.) The climate match was high across most of the Great Lakes region and in the western Rocky Mountains. Medium match extended across the central United States between these two areas of high match. The Cascade Range in the Pacific Northwest and most of central and southern California had a medium match, as well. Areas of low match were located along the Atlantic Coast, all of the Southeast and South-Central regions of the country, scattered areas of the Interior West, the Pacific Coast north of San Francisco, and the western edge of the Columbia River basin in the Pacific Northwest.

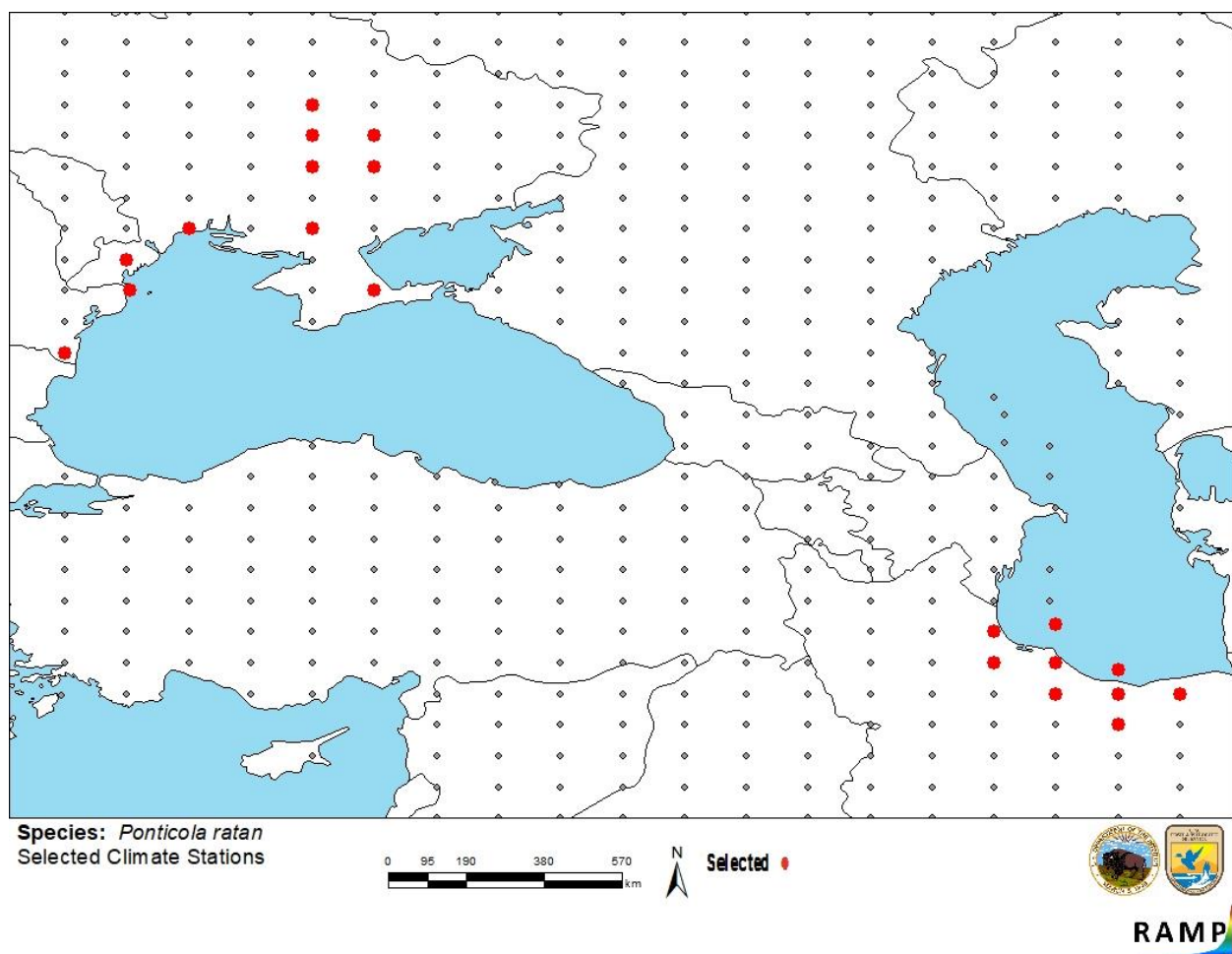


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in eastern Europe and western Asia selected as source locations (red; Ukraine, Romania, Iran) and non-source locations (gray) for *Ponticola ratan* climate matching. Source locations from GBIF Secretariat (2019). Additional source locations in Ukraine from Eremeev et al. (2012) and Manilo and Didenko (2013).

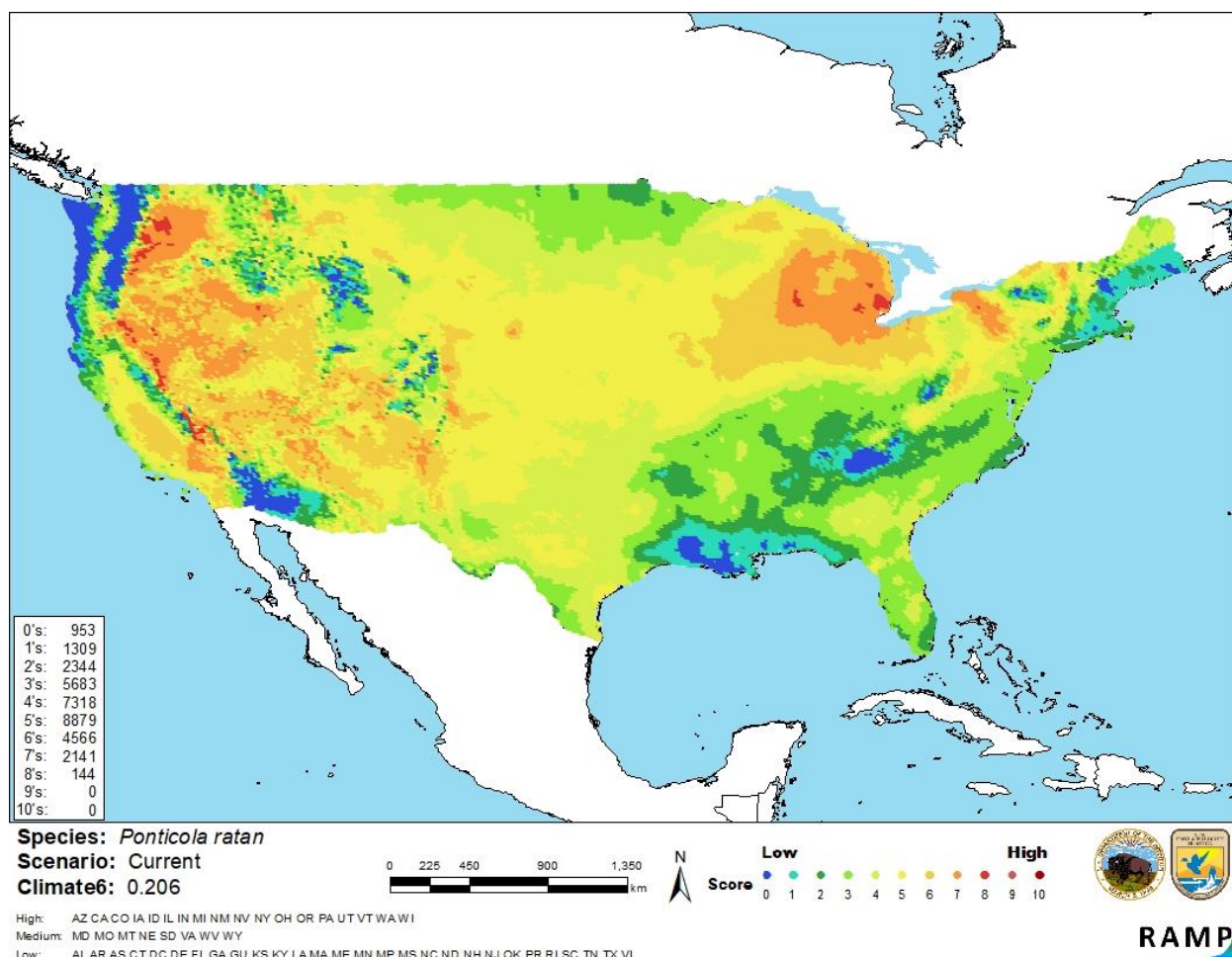


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Ponticola ratan* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Additional source locations in Ukraine from Ereemeev et al. (2012) and Manilo and Didenko (2013). 0 = Lowest match, 10 = Highest 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 *Ponticola ratan*. This species has become established outside its native range, but no information is available on impacts of introduction. Due to lack of information, the certainty of assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Ponticola ratan is a species of goby native to the Black Sea, Sea of Azov, and the Caspian Sea. This species has established a nonindigenous population in two inland reservoirs in Ukraine, possibly through shipping. No information is available on impacts of these introductions, so the history of invasiveness is classified as “none documented.” It does not appear that this species is in trade in the United States or elsewhere. The climate match with the contiguous United States is high overall, with the highest matches occurring in the Great Lakes region and the Interior West. Due to lack of information on impacts of introduction, the certainty of assessment is low. The overall risk posed by *P. ratan* 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**

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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 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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