White-Eye Bream (*Ballerus sapa*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, March 2014
Revised, February 2018
Web Version, 8/30/2018

Photo: H. J. Jochims. Licensed under Creative Commons (CC-BY-NC). Available: http://www.fishbase.org/photos/ThumbnailsSummary.php?Genus=Ballerus&Species=sapa#. (February 2018).

1 Native Range and Status in the United States

Native Range

From Kakareko et al. (2008):

"White-eye bream *Ballerus sapa* (Pallas, 1814) occurs naturally in the Ponto-Caspian (Black, Caspian, Azov seas) and Aral Sea basins. It inhabits coastal marine waters, mainly brackish (estuaries), and fresh waters of large rivers systems, such as Amu-Daria, Boh, Danube, Dnieper, Dniestr, Don, Kuban, Prut, Syr-Daria, Terek, Ural, Volga. Within these systems, it avoids small tributaries (Berg 1949, Nikolski 1970, Blank et al. 1971, Lelek 1987, Zhukov 1988, Holčík 2003)."

From Froese and Pauly (2017):

“Europe and Asia: large rivers draining to Black, Azov, Caspian and Aral Seas. Introduced or native to Northern Dvina drainage (White Sea basin) where it is presently spreading from warmer upper reaches (Vychegda system) northward.”

From Freyhof and Kottelat (2008):

“Native: Austria; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Republic; Georgia; Germany; Hungary; Kazakhstan; Macedonia, the former Yugoslav Republic of; Moldova; Montenegro; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Switzerland; Turkmenistan; Ukraine; Uzbekistan.”

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.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Froese and Pauly (2018):

“Biota > Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > Pisces (Superclass) > Actinopterygii (Class) > Cypriniformes (Order) > Cyprinidae (Family) > Leuciscinae (Subfamily) > *Ballerus* (Genus) > *Ballerus sapa* (Species)”

“Status accepted”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“[…] Max length : 35.0 cm TL male/unsexed; [Gerstmeier and Romig 1998]; common length : 15.0 cm TL male/unsexed; [Muus and Dahlström 1968].”

Environment

From Froese and Pauly (2017):

“Freshwater; brackish; benthopelagic.”

“[…] 10°C - 25°C [Baensch and Riehl 1997; given the source, this is assumed to be the recommended aquarium temperature range]”

Climate/Range

From Froese and Pauly (2017):

"Temperate; […] 65°N - 45°N, 12°E - 69°E"

Distribution Outside the United States

Native

From Froese and Pauly (2017):

"Europe and Asia: large rivers draining to Black, Azov, Caspian and Aral Seas. Introduced or native to Northern Dvina drainage (White Sea basin) where it is presently spreading from warmer upper reaches (Vychegda system) northward."

Introduced

According to Froese and Pauly (2017), *Ballerus sapa* has been introduced into Poland and Netherlands. It is reported to be rarely seen and not invasive in Netherlands.

From Freyhof and Kottelat (2008):

"Introduced or native to Northern Dvina drainage (White Sea basin) where it is presently spreading from warmer upper reaches (Vychegda system) northward. Introduced in River Volkhov (a tributary of Lake Ladoga), in Rhine in 1995 and invasive in Vistula drainage, coming from Black Sea basin through Prypet-Bug canal (connecting Dniepr and Vistula drainages)."

From Kakareko et al. (2008):

"White-eye bream has established populations outside its native geographic range. Reports of white-eye bream in the Baltic Sea basin began in the 1860s when, as Zhukov (1988) stated, this species penetrated the Volkov River from the Volga River. In the 1980s, Terlecki (1990) documented the first occurrence of white-eye bream population in Poland in the Zegrze Reservoir on the Bug and Narev Rivers. Probably, it moved there via the man-made Bug-Prypyat Canal, connecting the Vistula River catchment (Baltic basin) with the Dnieper River catchment (Black Sea basin). Several years later, white-eye bream was reported in the Włocławek Reservoir on the lower Vistula where it established a rather abundant population (Brylińska 2000, Kakareko – unpubl. data). In the 1990s, white-eye bream was unintentionally introduced into the Rhine catchment of Germany, most likely from the Weser and Danube Rivers (Freyhoff 2003). In Russia, it moved outside its native geographic range of inland waters and become locally a non-indigenous species, but its range expansion is relatively slow (Bogutskaya & Naseka 2002)."

Means of Introduction Outside the United States

From Freyhof and Kottelat (2008):

"The species is widespread and expanding its range (through canals and introductions)."

Short Description

From Froese and Pauly (2017):

"Differs from *Ballerus ballerus* by having small and inferior mouth, 47-54 scales on lateral line, and large eye, about equal to snout length."

Biology

From Froese and Pauly (2017):

"Occurs in fast flowing rivers. Eastern, brackish populations enter the lower reach of rivers for spawning (Berg 1964). Inhabit large lowland rivers and estuaries. Active at night. Prey on benthic invertebrates. Semi-anadromous populations forage in large brackish-water habitats in estuaries around Black Sea. Spawn in large aggregations in fast-flowing water on gravel bottom or submerged vegetation. Usually rare and threatened due to water pollution."

Human Uses

From Froese and Pauly (2017):

"Fisheries: subsistence fisheries"

Diseases

No OIE reportable diseases have been documented for this species.

From Kirin et al. (2013):

"*Gyrodactylus elegans* was reported as parasite species on the gills of […] *B. sapa* […]"

"The specimens *Pomphorhynchus*, established of […] *B. sapa* […] of the freshwater ecosystem of the Danube (Biotope Vetren) are defined as *P. tereticollis*."

Košková et al. (2011) report *B. sapa* as a host of diplozoid parasite *Paradiplozoon sapae*.

Hanzelová et al. (2015) report *B. sapa* as a host of cestode *Caryophyllaeus laticeps*.

Kudlai et al. (2017) report *B. sapa* as a host of metacercariae of *Diplostomum pseudospathaceum* and *'D. mergi* Lineage 2'.

Threat to Humans

From Froese and Pauly (2017):

"Harmless"

3 Impacts of Introductions

From Kakareko et al. (2008):

"Although white-eye bream has extended its distribution beyond its native range, and this process seems to be accelerated in the last decades, little is known about biological characteristics of this species in newly established areas."

4 Global Distribution

Figure 1. Known global distribution of *Ballerus sapa*, reported from southern and eastern Europe. Map from GBIF Secretariat (2017).

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 match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was medium across most of the United States. High matches occurred in the Great Lakes basin and portions of the western U.S. Low matches were recorded for the Gulf Coast and Pacific Coast. Climate 6 match indicated that the contiguous U.S. has a high climate match. The range for a high climate match is 0.103 and greater; climate match of *Ballerus sapa* is 0.202.

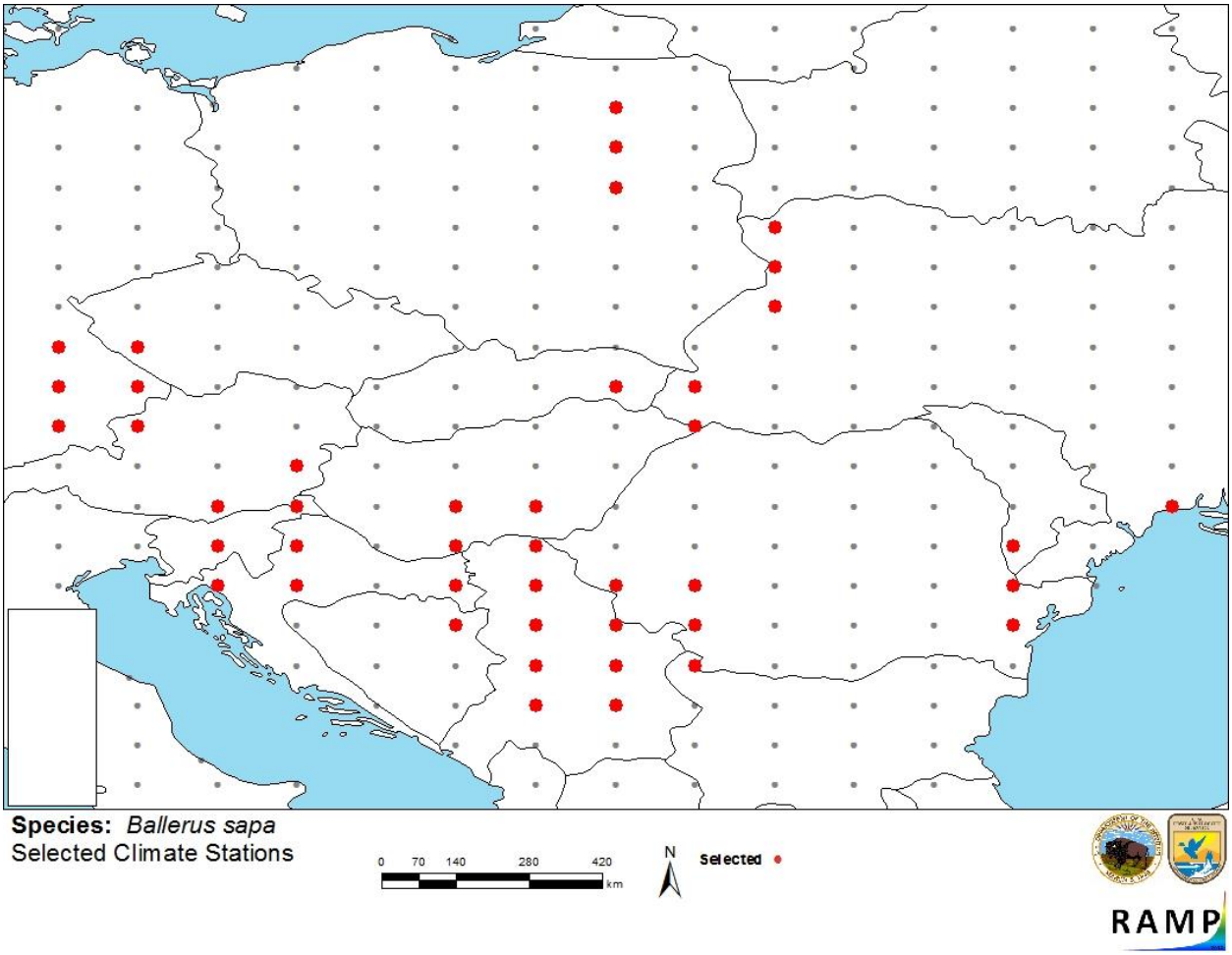

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Germany, Czech Republic, Slovakia, Hungary, Austria, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Bulgaria, Romania, Moldova, Ukraine, Poland) and non-source locations (gray) for *Ballerus sapa* climate matching. Source locations from GBIF Secretariat (2017).

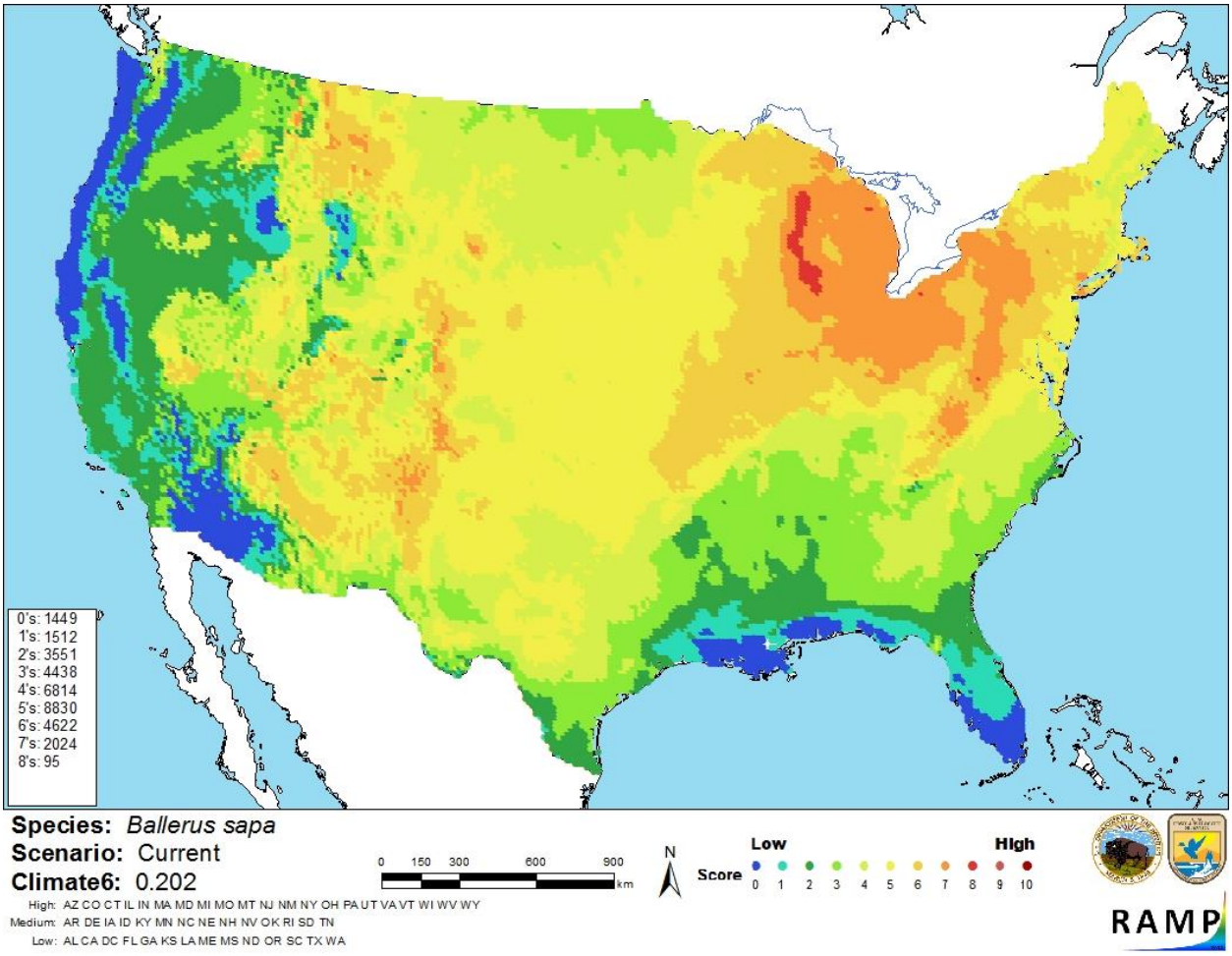

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Ballerus sapa* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0= Lowest match, 10= Highest match. Counts of climate match scores are tabulated on the left.

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

Information on the biology and distribution of *B. sapa* is available, however scientific information on the impact of introductions of the species is lacking. More study is needed to fully understand the potential and actual impacts the species could have in introduced areas; absence of this research makes the certainty of assessment low.

8 Risk Assessment

Summary of Risk to the Continental United States

Ballerus sapa is a cyprinid fish that is widespread in many large rivers in Europe and Asia in drainages of the Black Sea, Caspian Sea, and Aral Sea. It has established in several locations in Europe outside its native range; spread has occurred primarily through man-made canals. Climate match with the United States is high, with the Great Lakes basin being the most likely habitat for this species. More research on the impacts from introductions of this species is needed; the absence of this research makes the certainty of this assessment low. Overall risk posed by 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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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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