Rose Bitterling (*Rhodeus ocellatus*)
Ecological Risk Screening Summary

Web Version - 10/1/2012

Photo: © KENPEI From EOL (2014).

1 Native Range, and Status in the United States

Native Range
Asia: Eastern Asia and Taiwan (Froese and Pauly 2010).

Status in the United States
This species has not been reported in the United States.

Means of Introductions to the United States
This species has not been introduced to the United States.

2 Biology and Ecology

Taxonomic Hierarchy and Status
From ITIS (2012):

"Kingdom Animalia
Phylum Chordata
Subphylum Vertebrata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus Rhodeus
Species Rhodeus ocellatus

Taxonomic Status: Valid

Size, Weight, Age
From Froese and Pauly (2010):

"Max length : 6.5 cm TL male/unsexed; (Shao and Lim 1991); common length : 5.2 cm SL male/unsexed; (Nichols 1943)."

Environment
From Froese and Pauly (2010):

"Benthopelagic; freshwater; pH range: ? - 7.0; dH range: 10 – 15."

Climate/Range
From Froese and Pauly (2010):

"Subtropical; 18°C - 24°C (Baensch and Riehl 1985)."

Distribution Outside the United States

From Froese and Pauly (2010):

"Asia: Eastern Asia and Taiwan. Introduced into eastern China, the Korean Peninsula and Japan which for a time were considered as the native range of the species due to an effective colonization of the natural waters. At least one country reports adverse ecological impact after introduction (Welcomme 1988)."

Means of Introduction Outside the United States

In some cases this species was accidentally introduced in shipments of grass carp, in other cases introductions were likely for ornamental purposes (Froese and Pauly 2010).

Human uses

From Froese and Pauly (2010):

"Aquarium: commercial."

Diseases

None reported.

Threat to humans

From Froese and Pauly (2010):

"Potential pest (Chiba et al. 1989)"

3 Impacts of Introductions

Japan's National Institute of Environmental Studies lists the impacts of *R. ocellatus* as competition, hybridization against native species (NIES 2012).

From Chiba et al. (1989):

"Introduced into Japan mixed with grass carp from China. It has since established itself in natural waters endangering the Japanese subspecies *R. ocellatus smithi* by ecological pressures and hybridization. *R. ocellatus smithi* is now on the brink of extinction as a distinct subspecies."

From Washitani (2004):

"*Rhodeus ocellatus ocellatus*, which was unintentionally introduced through intermingling with the fry of *Hypophthalmichthys molitrix* imported from China as a fishery resource, has become established in fresh aquatic ecosystems through range expansion facilitated by human activities of stocking lakes and rivers (Nagata 1980). *R. ocellatus ocellatus* has hybridized with *Rhodeus ocellatus kurumeus*, which was once widely distributed in western Japan but has now become

endangered (Environment Agency of Japan 1999). Hybridization with *R. ocellatus ocellatu*s is assumed as the main cause of the threat."

4 Global Distribution

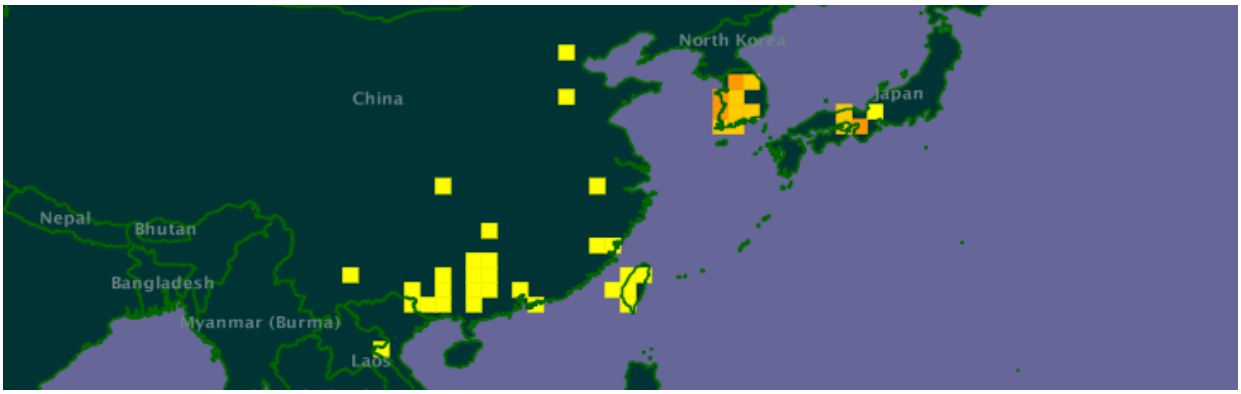

Figure 1 (above). Global distribution of *R. ocellatus*. Map from GBIF (2010).

5 Distribution within the United States

This species has not been reported in the United States

6 CLIMATCH

Summary of Climate Matching Analysis

The climate match (Australian Bureau of Rural Sciences 2010; 16 climate variables; Euclidean Distance) was high in Florida and the Southeast Coast and into the Central Plains; these high matches were surrounded by medium matches. Low matches in the far Northeast, North, and West. Climate 6 match indicated that the United States has a high climate match. The range for a high climate match is 0.103 and greater: the climate match of *R. ocellatus* is 0.192.

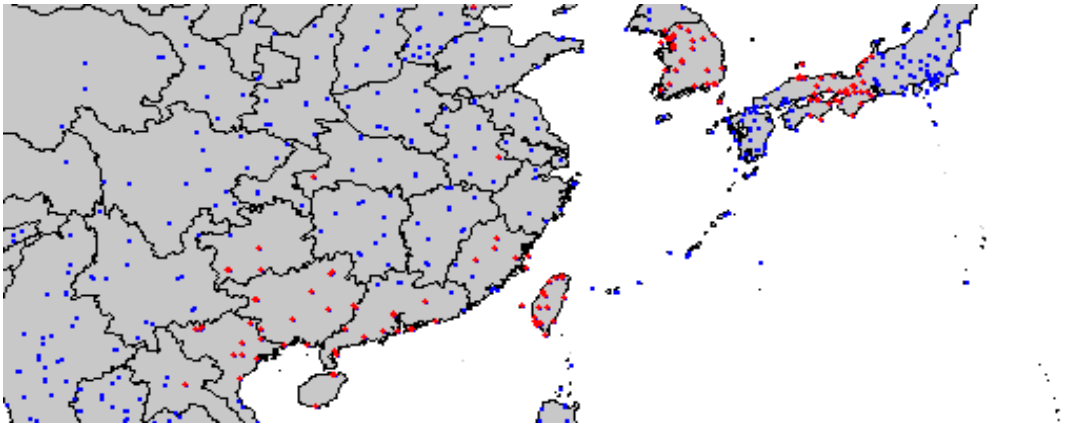

Figure 2 (above). CLIMATCH (Australian Bureau of Rural Sciences 2010) source map showing weather stations selected as source locations (red) and non-source locations (blue) for *R. ocellatus* climate matching. Source locations from GBIF (2010).

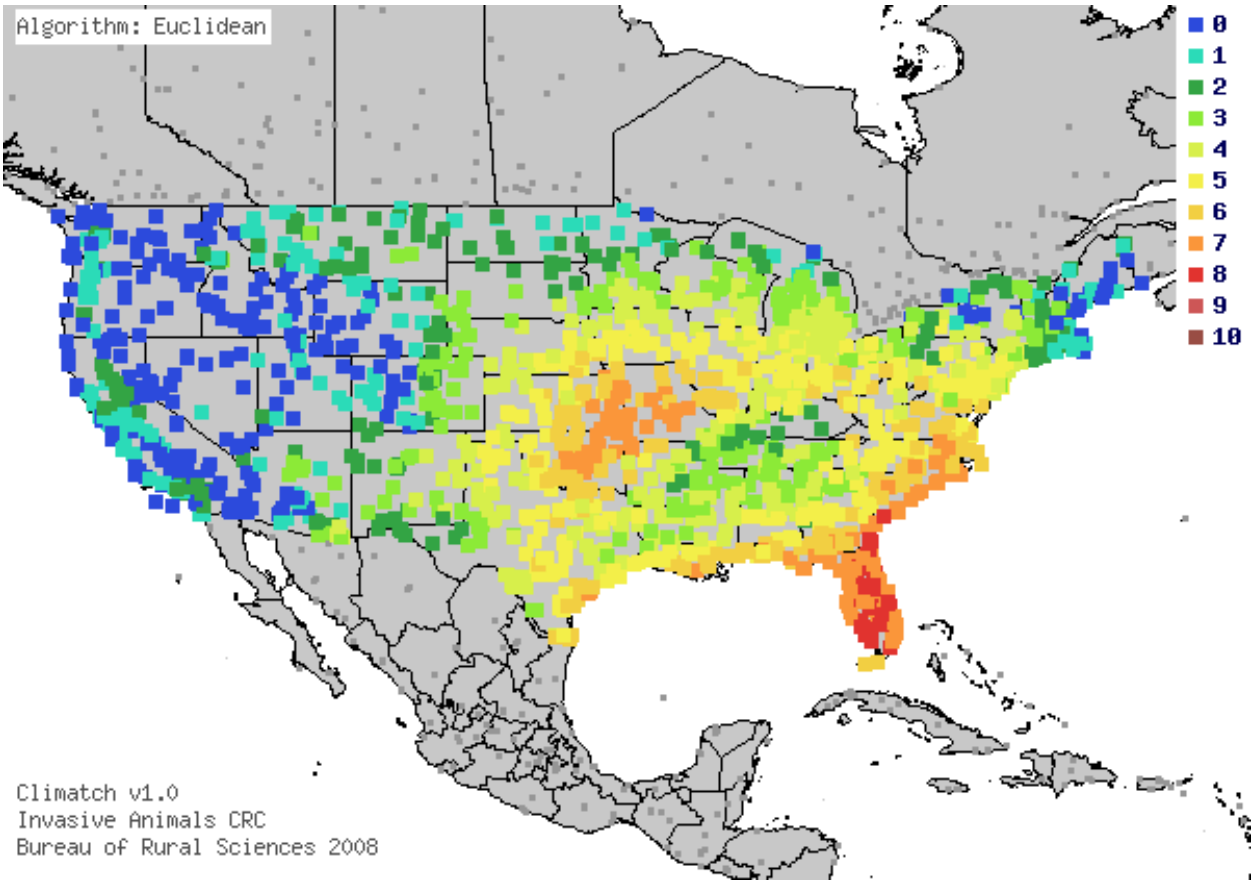

Figure 3 (above). Map of CLIMATCH (Australian Bureau of Rural Sciences 2010) climate matches for *R. ocellatus* in the continental United States based on source locations reported by GBIF (2010). 0= Lowest match, 10=Highest match.

Table 1 (below). CLIMATCH (Australian Bureau of Rural Sciences 2010) climate match scores.

CLIMATCH Score	0	1	2	3	4	5	6	7	8	9	10
Count	282	196	212	249	335	321	206	135	38	0	0
Climate 6 Proportion =			0.192	(High)							

7 Certainty of Assessment

Information on the biology of this species is abundant. However, while some information on the impacts caused by introduction of this species is available, more research is needed in order for higher certainty. Certainty of this assessment is medium.

8 Risk Assessment

Summary of Risk to the Continental United States

R. ocellatus is native to parts of Southeast Asia, but has been introduced to other parts of Asia through accidental means. The introduction of this species into Japanese waters has led to the near extinction of a Japanese sub-species of *R. ocellatus* due to hybridization and competition. This species has not been introduced in the United States Climate match with the United States is high, especially in the Southeast.

Assessment Elements

- **History of Invasiveness (See Section 3):** High
- **Climate Match (See Section 6):** High
- **Certainty of Assessment (See Section 7):** Medium
- **Overall Risk Assessment Category: High**

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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Chiba, K., Y. Taki, K. Sakai, and Y. Oozeki. 1989. Present status of aquatic organisms introduced into Japan. p. 63-70. In S.S. De Silva (ed.) Exotic aquatic organisms in Asia. Proceedings of the Workshop on Introduction of Exotic Aquatic Organisms in Asia. Spec. Publ. Asian Fish. Soc. 3, 154 p.

Encyclopedia of Life (EOL). 2014. *Rhodeus ocellatus*. Available: http://eol.org/data_objects/27043249. Photo license available: http://creativecommons.org/licenses/by-nc/3.0/legalcode. (September 2014).

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GBIF. 2010. Global Biodiversity Information Facility: *Rhodeus ocellatus*. http://data.gbif.org/species/13536482. Accessed July 2010.

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Washitani, I. 2004. Invasive alien species problems in Japan: an introductory ecological essay. Global Environmental Research, 8: 1-11.

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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Nichols, J.T. 1943. The freshwater fishes of China. Natural history of Central Asia: Volume IX. The American Museum of Natural History, New York, USA, 322 p.

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Shao, K.T. and P.L. Lim. 1991. Fishes of freshwater and estuary. Encyclopedia of field guide in Taiwan. Recreation Press, Co., Ltd., Taipei. vol. 31. 240 p. (in Chinese).

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