Redtail Sharkminnow (*Epalzeorhynchos bicolor*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, June 2012
Revised, November 2018
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Photo: Pseudogastromyzon/Wikimedia. Released to Public Domain by author. Available: http://eol.org/data_objects/26835158. (November 7, 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

"Asia: Chao Phraya basin, Thailand. Reported from the Mekong basin [Monkolprasit et al. 1997]."

"[In Thailand:] Known from Maeklong to Bang Pakong basins [Vidthayanon 2005]. Recorded from Chao Phraya basin [Yang and Winterbottom 1998]; Phra Nakhon Si Ayutthaya, Nakhon Sawan, Chai Nat and Kanchanaburi [Monkolprasit et al. 1997]. Occurrence in the Mekong River and its tributaries [Sidthimunka 1970; Monkolprasit et al. 1997] needs confirmation [Yang and Winterbottom 1998]."

From Vidthayanon (2011):

"It is reported that the species has disappeared from many parts of its range."

Status in the United States

According to Chapman et al. (1997), 153,242 individuals of *Epalzeorhynchos bicolor* (listed under the name *Labeo bicolor*) were imported to the United States in October 1992 for the ornamental trade.

Tuckett et al. (2017) captured 11 specimens of *E. bicolor* in the wild in Florida but within 500m of an aquaculture facility. *E. bicolor* was not one of the species identified to have a persistent wild population.

No records of other introductions or established populations of *E. bicolor* in the United States were found.

Means of Introductions in the United States

From Tuckett et al. (2017):

"Some level of fish escape occurred at most facilities and effluent discharge was the primary pathway."

Remarks

Information searches were conducted using the valid name *Epalzeorhynchos bicolor* and the synonym *Labeo bicolor*.

From Froese and Pauly (2018):

"IUCN Red List Status: […] Critically Endangered"

"Controlled reproduction for the ornamental fish trade [Ukkatawewat 2005]. It is not clear whether the species still exists in the wild [Kottelat and Whitten 1996]. Threatened due to habitat loss and overfishing [Vidthayanon 2005]."

From Vidthayanon (2011):

"Previously it was thought to be Extinct in the Wild and it is believed to be extirpated across its range apart from one location (C. Vidthayanon pers. comm.) in the Chao Phraya (extent of occurrence and area of occupancy both less than 10 km²). Historically it has been threatened by

high levels of harvesting for the aquarium trade, but now this is supplied entirely by captive bred individuals. Currently the major threat to the wild population is pollution from agricultural and domestic sources. More research is needed on this species' presence across its range and a reintroduction programme is recommended."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2018), *Epalzeorhynchos bicolor* (Smith 1931) is the valid name for this species. It was originally described as *Labeo bicolor* (Smith 1931).

From ITIS (2018):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Epalzeorhynchos*
Species *Epalzeorhynchos bicolor* (Smith, 1931)"

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 12.0 cm TL male/unsexed; [Mills and Vevers 1989]"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal; pH range: 6.5 - 7.5; dH range: ? - 15. […]; 22°C - 26°C [assumed to be recommended aquarium temperature] [Riehl and Baensch 1996]"

From Vidthayanon (2011):

"This fish inhabits lowland streams with rocky or sand gravel bottoms."

Climate/Range
From Froese and Pauly (2018):

"Tropical; […]"

Distribution Outside the United States
Native
From Froese and Pauly (2018):

"Asia: Chao Phraya basin, Thailand. Reported from the Mekong basin [Monkolprasit et al. 1997]."

"[In Thailand:] Known from Maeklong to Bang Pakong basins [Vidthayanon 2005]. Recorded from Chao Phraya basin [Yang and Winterbottom 1998]; Phra Nakhon Si Ayutthaya, Nakhon Sawan, Chai Nat and Kanchanaburi [Monkolprasit et al. 1997]. Occurrence in the Mekong River and its tributaries [Sidthimunka 1970; Monkolprasit et al. 1997] needs confirmation [Yang and Winterbottom 1998]."

From Vidthayanon (2011):

"It is reported that the species has disappeared from many parts of its range."

Introduced
FAO (2018) lists *Epalzeorhynchos bicolor* as introduced to the Philippines and status in the wild as unknown.

Pagad et al. (2018) lists an introduction of *E. bicolor* to Colombia.

Means of Introduction Outside the United States
From FAO (2018):

"ornamental"

Short Description
Froese and Pauly (2018) list an elongated body, 33–35 lateral line scales, and 5–6 scale rows below the lateral line as characteristics of *Epalzeorhynchos bicolor*.

From Yang and Winterbottom (1998):

"In *E. munensis* and *E. bicolor*, the caudal fin is uniformly reddish or yellowish-red […]"

"In *E. bicolor*, *E. munensis*, *E. frenatus*, and *C. reticulatus*, no stripe is present on the side of the body […]"

According to Yang and Winterbottom (1998), *E. bicolor* has 13–14 branched dorsal rays.

From da Silva Henriques (2016):

“It is a fish characterised by its black body, red fins and small inferior mouth with barbells (Yue and Shan, 2000). The males are thinner and smaller than females that have rounded and bigger bodies (Lesmana *et al.*, 2001).

Biology

From Froese and Pauly (2018):

“Inhabits mainstream rivers and floodplains [Vidthayanon 2005]. Omnivorous, feeding on plant matter and small benthic animal [Vidthayanon 2005].”

Human Uses

From Froese and Pauly (2018):

“Tens of thousands of specimens are exported annually from Thailand for the ornamental trade, all now captive bred [Kottelat and Whitten 1996]. Aquarium keeping: solitary, adults are territorial and may 'bully' other fish; minimum aquarium size 12.0 cm [reference unknown].”

“Fisheries: of no interest; aquaculture: commercial; aquarium: highly commercial”

From Vidthayanon (2011):

“The aquarium fish trade has been accused of driving the species to local extirpation because of very selective overfishing (over the past 40 years), but there is no documented evidence for this (Kottelat and Whitten 1996).”

Diseases

Infection with *Aphanomyces invadans* is an OIE-reportable disease.

According to Russo et al. (2006), *E. bicolor* is susceptible to infection with *Streptococcus iniae*.

From Czeczuga et al. (2014):

“According to Lilley et al. (2009), this invasive *Aphanomyces* infection of fish, reported by Shaheen et al. (1999), was caused by the *Aphanomyces invadans* species. It has also been observed in Poland, during autumn, on the skin and muscles of *Labeo bicolor* Smith specimens in water from Fosa Pond (Czeczuga et al., 2011c).”

From Froese and Pauly (2018):

“Pop-eye disease, Bacterial diseases
Pseudomonas infection, Bacterial diseases

Bacterial Infections (general), Bacterial diseases
Aeromonosis, Bacterial diseases
Infectious ascites (Ornament.), Bacterial diseases
DMS, Others"

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

A few records of introduction were found for the Philippines and Colombia for *Epalzeorhynchus bicolor* but none of the records indicated that the introduction resulted in an established wild population. There is no information on impacts of introduction.

4 Global Distribution

Figure 1. Known global distribution of *Epalzeorhynchos bicolor*. Locations are in Thailand and off the west coast of India. Map from GBIF Secretariat (2018).

The location of the west coast of India (Figure 1) was not used as a source point in the climate match. The specimens were collected from a market in Mumbai (GBIF Secretariat 2018) and do not represent established, wild populations.

5 Distribution Within the United States

No records of established, wild populations of *Epalzeorhynchos bicolor* in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Epalzeorhynchos bicolor* was low across virtually all of the contiguous United States. Only small areas of very southern Texas and Florida had medium matches. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low. All States had low individual climate scores.

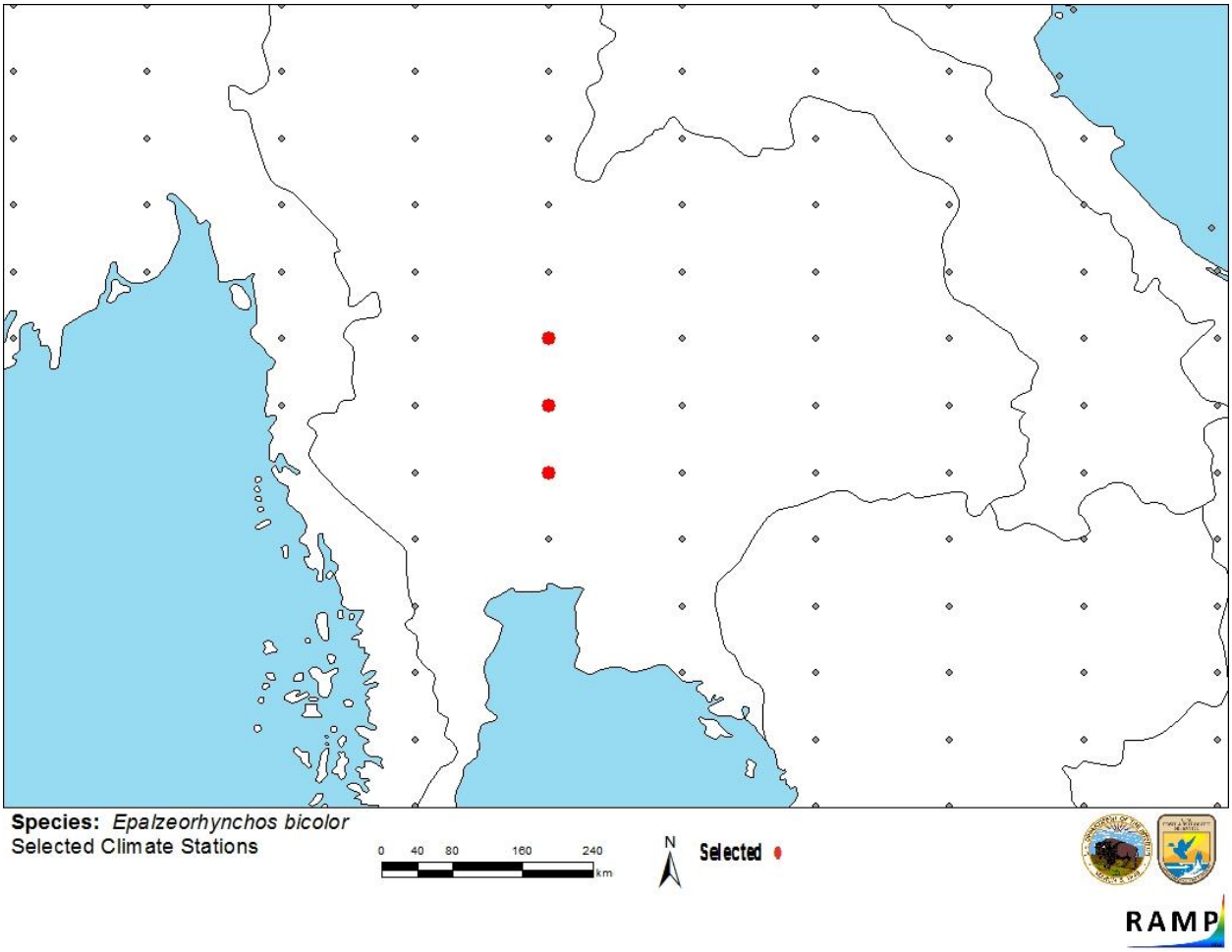

Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Thailand selected as source locations (red) and non-source locations (gray) for *Epalzeorhynchos bicolor* climate matching. Source locations from GBIF Secretariat (2018).

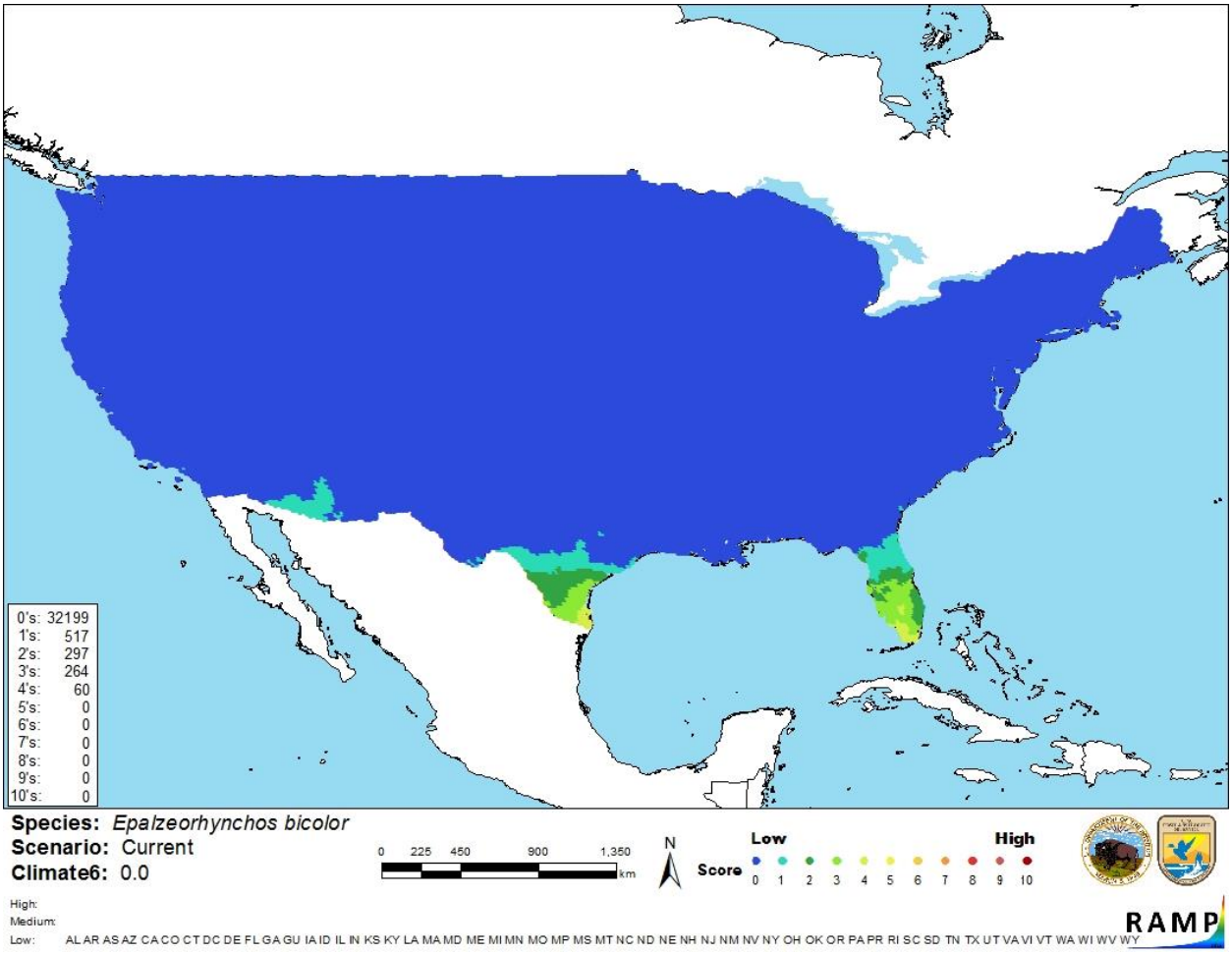

Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Epalzeorhynchos bicolor* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0 = Lowest match, 10 = Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

The certainty of assessment is medium. There is quality general information available about *Epalzeorhynchos bicolor*. A few records of introduction were found but no records of establishment; therefore there is no information on impacts of introduction, such as whether it is likely to spread the pathogens the species can carry and what effect that would have on U.S. native species. Some information on volume and duration of trade was found.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Redtail Sharkminnow (*Epalzeorhynchos bicolor*) is a species of cyprinid native to the Chao Phraya basin in Thailand. This fish has been extirpated from much of its original native range due to a combination of human inducted factors, including overharvesting for the ornamental industry. *E. bicolor* is still extremely popular in the ornamental trade and is supplied through extensive captive breeding. *E. bicolor* is susceptible to some diseases, including infection with *Aphanomyces invadans*, which is an OIE-reportable disease. The history of invasiveness is low. A few records of introduction were found, but no records of establishment were found. *E. bicolor* has been in trade for at least 4 decades. In a single month in 1992, 153,242 individuals of *E. bicolor* were imported to the United States alone. If this number is extrapolated for even a single decade that would result in an estimated trade volume of over 18 million individuals. The climate match was low. There were only two small areas of medium match in the contiguous United States, southern Texas and southern Florida. The certainty of assessment is medium. The overall risk assessment category is low.

Assessment Elements

- **History of Invasiveness (Sec. 3): Low**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information:** Infection with *Aphanomyces invadans*, an OIE-reportable disease.
- **Overall Risk Assessment Category: Low**

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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