

Rainbow Sharkminnow (*Epalzeorhynchos frenatum*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, June 2012
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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Asia: Mekong, Chao Phraya and Xe Bangfai basins [Kottelat 1998] and Maeklong basin [Yang and Winterbottom 1998].”

“[In Cambodia:] Occurs in the Mekong River [Kottelat 1998]. Known from Tonlé Sap and Phnom Penh [Kottelat 1985].”

“[In Laos:] Occurs in the Mekong and the lower Xe Bangfai [Kottelat 1998]. Found in Ban Hang Khone, a village on an island in the middle of the mainstream Mekong River just below the Great Khone Waterfalls in Khong District, Champasak Province [Baird 1998].”

“[In Thailand:] Occurs in the MaeKlong [Vidthayanon et al. 1997], Mekong and Chao Phraya basins [Vidthayanon et al. 1997; Kottelat 1998]. Known from Chiang Mai and the Tachin (Samut Sakhon) River [Suvatti 1981]; also from Phra Nakhon Si Ayutthaya, Nakhon Sawan, Ubon Ratchathani, Kanchanaburi, Nakhon Ratchasima, Phrae and Phitsanulok [Monkolprasit et al. 1997].”

From Vidthayanon (2012):

“It has also been reported from Viet Nam.”

Status in the United States

Tuckett et al. (2017) caught 1 individual of *Epalzeorhynchus frenatum* in the wild in Florida but within 500m of an aquaculture facility.

According to Chapman et al. (1994), *Epalzeorhynchus frenatum* (listed as *Labeo frenatus*) was imported to the United States for the ornamental trade in 1992.

Means of Introductions in the United States

According to Tuckett et al. (2017) it is possible for *Epalzeorhynchus frenatum* to escape from aquaculture facilities.

Remarks

Information searches were conducted using the valid name *Epalzeorhynchus frenatum* and its synonyms: *Labeo frenatus* and *Epalzeorhynchus frenatus*.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2018), *Epalzeorhynchus frenatum* (Fowler 1934) is the valid name for this species. It was originally described as *Labeo frenatus* Fowler 1934 and the valid name has been previously spelled as *Epalzeorhynchus frenatus* (Fowler 1934) and *Epalzeorhynchus frenatus* (Fowler 1934).

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 frenatum* (Fowler, 1934)”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 15.0 cm TL male/unsexed; [Riehl and Baensch 1991]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; pH range: 6.0 - 8.0; dH range: 5 - 12. [...]; 24°C - 27°C [assumed to be recommended aquarium temperature] [Schliewen 1992]”

Climate/Range

From Froese and Pauly (2018):

“Tropical; [...]”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Asia: Mekong, Chao Phraya and Xe Bangfai basins [Kottelat 1998] and MaeKlong basin [Yang and Winterbottom 1998].”

“[In Cambodia:] Occurs in the Mekong River [Kottelat 1998]. Known from Tonlé Sap and Phnom Penh [Kottelat 1985].”

“[In Laos:] Occurs in the Mekong and the lower Xe Bangfai [Kottelat 1998]. Found in Ban Hang Khone, a village on an island in the middle of the mainstream Mekong River just below the Great Khone Waterfalls in Khong District, Champasak Province [Baird 1998].”

“[In Thailand:] Occurs in the MaeKlong [Vidthayanon et al. 1997], Mekong and Chao Phraya basins [Vidthayanon et al. 1997; Kottelat 1998]. Known from Chiang Mai and the Tachin (Samut Sakhon) River [Suvatti 1981]; also from Phra Nakhon Si Ayutthaya, Nakhon Sawan, Ubon Ratchathani, Kanchanaburi, Nakhon Ratchasima, Phrae and Phitsanulok [Monkolprasit et al. 1997].”

From Vidthayanon (2012):

“It has also been reported from Viet Nam.”

Introduced

FAO (2018) lists *Epalzeorhynchus frenatum* as introduced to the Philippines but not established in the wild.

Means of Introduction Outside the United States

From FAO (2018):

“ornamental”

Short Description

From Froese and Pauly (2018):

“Has a greenish brown body with a large black blotch at the base of the caudal fin [Kottelat 1998]. Dorsal, anal and pelvic fins red with slightly dusky black color; 10-11 branched dorsal rays; 40-45 gill rakers on anterior side of first arch [Rainboth 1996].”

Froese and Pauly (2018), also report *Epalzeorhynchus frenatum* as having 33-34 scales on the lateral line, and 4-5 scale rows below lateral line.

From Bănărescu (1986):

“Upper half slightly darker than lower one; a narrow longitudinal dark stripe along sides; a dark blotch at the base of the caudal fin and a short stripe from tip of snout to the superoposterior margin of the opercul. Fins unspotted.”

Biology

From Froese and Pauly (2018):

“Observed over sandy substrate [Kottelat 1998]. Found near any type of solid surface at midwater and bottom depths in streams and rivers. Moves into seasonally flooded habitats and

returns to the rivers as floodwaters recede. Feeds on algae, periphyton, phytoplankton and some zooplankton.”

Human Uses

From Froese and Pauly (2018):

“Popular in aquarium trade [Rainboth 1996]. Aquarium keeping: minimum aquarium size 120 cm [BMELF 1999].”

“Controlled reproduction [in Thailand] for the ornamental fish trade [Ukkatawewat 2005].”

From Vidthayanon (2012):

“Popular in aquarium trade, mainly from farm bred stocks. Mixed in small cyprinid foodfish catches from small to large scale fishing gears.”

Diseases

No records of OIE-reportable diseases were found for *Epalzeorhynchus frenatum*.

From Froese and Pauly (2018):

“Bacterial Infections (general), Bacterial diseases”

Kim et al. (2002) list *E. frenatum* as a host species for *Ichthyophthirius multiliis*.

Shukla et al. (2014) detected the bacteria *Mycobacterium parascrofulaceum* in specimens of *E. frenatum*.

From Jithendran et al. (2017):

“Among aquarium fishes, *Carassius auratus* (Gold fish), *Epalzeorhynchus frenatum* (Rainbow shark), *Danio rerio* (Zebra fish) and *Amphiprion sebae* (Clown fish) were found to be susceptible to betanodavirus.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

Epalzeorhynchus frenatum was introduced in the Philippines (FAO 2018) and in Florida (Tuckett et al. 2017). Neither introduction resulted in an established wild population so there is no information on impacts of introduction.

4 Global Distribution



Figure 1. Known global distribution of *Epalzeorhynchus frenatum*. Locations are in India, Thailand, Laos, and Cambodia. Map from GBIF Secretariat (2018).

The location off the west coast of India (Figure 1) was not used as a source point for the climate match. The record information indicates that the specimens were obtained at a market (GBIF Secretariat 2018) and so are not representative of an established wild population.

5 Distribution Within the United States

According to Tuckett et al. (2017), a single specimen of *Epalzeorhynchus frenatum* was caught near an aquaculture facility in Florida. There are no records of wild populations of *E. frenatum* within the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Epalzeorhynchus frenatum* was mainly low for the contiguous United States. There were areas of medium match in southern Texas and southwestern Florida. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.002, low. All States had low individual climate scores except for Florida, which had a medium climate score.

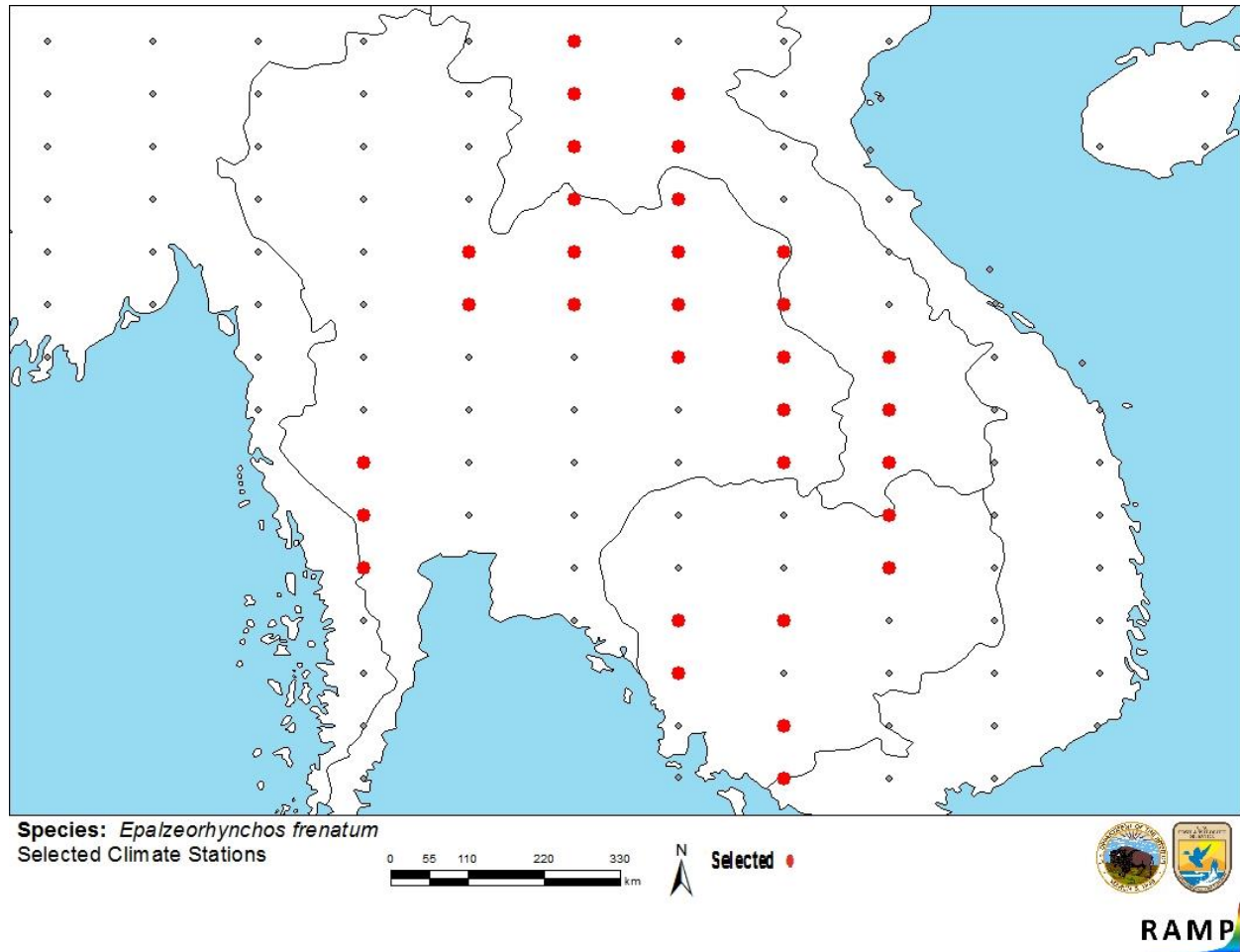


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Southeast Asia selected as source locations (red; Laos, Cambodia, Thailand) and non-source locations (gray) for *Epalzeorhynchus frenatum* climate matching. Source locations from GBIF Secretariat (2018).

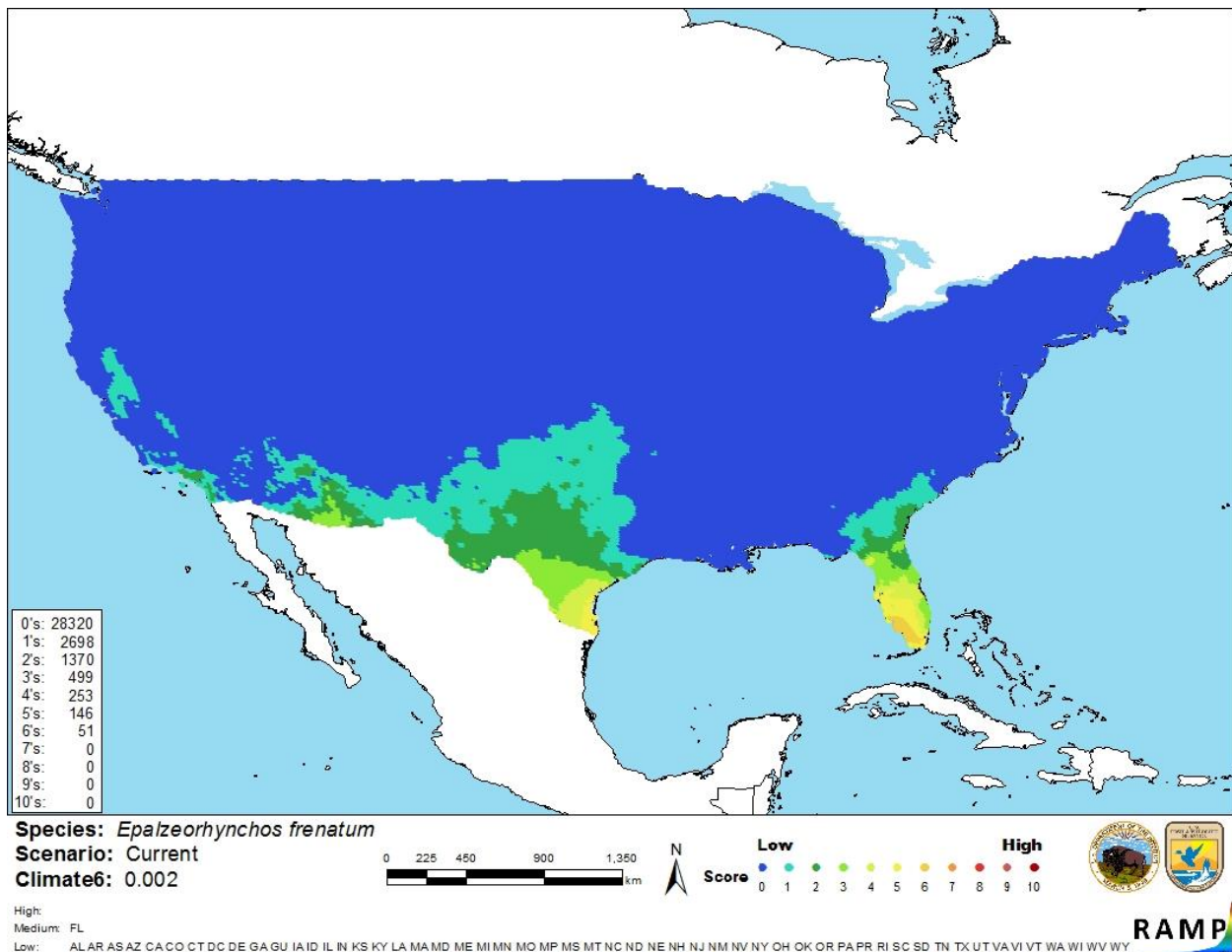


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Epalzeorhynchios frenatum* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

The certainty of assessment for *Epalzeorhynchios frenatum* is low. There is some information available for this species. A few records of introduction were found but there were no records of established populations or impacts from introduction. The species is popular in the aquarium trade and some indication of the duration the species had been in trade was found but there was no information about the volume of trade.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Rainbow Sharkminnow (*Epalzeorhynchus frenatum*) is a species of cyprinid native to river basins in Southeast Asia. This fish is popular in the aquarium trade and is also caught in mixed schools for human consumption. Most supply for trade comes from captive breeding. The history of invasiveness is uncertain. Two records of introduction were found (in the Philippines and Florida) but neither introduction resulted in an established wild population. The species is in trade but not enough information was available to reliably determine the duration or volume of trade. The climate match was low for the contiguous United States. Areas of medium match occurred in southern Texas and Florida. All States had low individual climate scores except for Florida, which had a medium climate score. The certainty of assessment is low. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** No additional information.
- **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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