Malabar Danio (*Devario malabaricus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2016
Revised, March 2018
Web Version, 7/5/2018

Photo: P. Malkowski. Licensed by Creative Commons (CC-BY-3.0). Available: https://commons.wikimedia.org/wiki/File:Danio_sp.jpg. (March 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

"Asia: west coast of India and Sri Lanka. Has been widely transported around the world through the aquarium fish trade industry."

From Nico and Loftus (2018):

"Tropical Asia, southwestern India and Sri Lanka (Jayaram 1991)."

Status in the United States

From Nico and Loftus (2018):

"This species was collected near a fish farm in a canal in Ruskin, Hillsborough County, Florida, in or before 1979 (Courtenay and Hensley 1979a). Two specimens were taken in the same county from a ditch adjacent to the Tampa Bypass Canal in November 1993 (museum specimen). It was also discovered in a small roadside borrow pit south of Miami (Shafland 1976). A single specimen was captured in Rogers Spring, Clark County, Nevada, on 15 November 1983 (Courtenay, personal communication); that record is apparently the basis for other reports from this site and state (e.g., Courtenay et al. 1984, 1991)."

"Failed in Florida and Nevada."

"The Malabar danio has long been popular in the aquarium trade and is widely available."

From Froese and Pauly (2018):

"Fisheries: of no interest; aquarium: highly commercial"

Means of Introductions in the United States

From Nico and Loftus (2018):

"The Hillsborough County, Florida, introductions were probably due to releases or escapes from local fish farms. The Nevada introduction likely represents the result of an aquarium release."

Remarks

Eschmeyer et al. (2018) lists *Perilampus aurolineatus*, *Perilampus canarensis, Perilampus malabaricus, Perilampus mysoricus,* and *Eustira ceylonensis* as synonyms for *Devario malabaricus*. These synonyms were also researched for information on the species for this ERSS.

From Nico and Loftus (2018):

"Recent systematic review and distinguishing characteristics were provided by Jayaram (1991) and Kullander (2001). A key, distinguishing characteristics, and figure were given in Talwar and Jhingran (1991). Color photographs of live fish appeared in Axelrod et al. (1985)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

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 *Devario*
Species *Devario malabaricus* (Jerdon, 1849)"

"Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 12.0 cm TL male/unsexed; [Menon 1999]; common length : 8.0 cm TL male/unsexed; [Pethiyagoda 1991]."

Environment

From Froese and Pauly (2018):

"Freshwater; benthopelagic."

"[…] 18°C - 25°C [no indication if these temperatures refer to air or water]"

Climate/Range

From Froese and Pauly (2018):

"Tropical; […] 22°N - 6°N, 72°E - 81°E"

Distribution Outside the United States

Native

From Froese and Pauly (2018):

"Asia: west coast of India and Sri Lanka. Has been widely transported around the world through the aquarium fish trade industry."

From Nico and Loftus (2018):

"Tropical Asia, southwestern India and Sri Lanka (Jayaram 1991)."

Introduced

Froese and Pauly (2018) list Myanmar, Colombia, and Philippines as countries where *Devario malabaricus* has been introduced. The species has been reported as established in Colombia and status is unknown in Myanmar and Philippines. Within Colombia, the species is "[…] established in the Magdalena and Orinoco watersheds."

Means of Introduction Outside the United States

Froese and Pauly (2018) list ornamental as the reason for introduction in Myanmar, Colombia, and Philippines.

From Welcomme (1998):

"The largest of the *Danio* species the giant danio is part of contemporary tropical aquarium fish trade and as such has been widely transported around the world. Its appearance in Colombia was probably due to release from an aquarium and is unlikely to be unique. Further reports from other tropical countries can be anticipated."

Short Description

From Froese and Pauly (2018):

"Dorsal spines (total): 3; Dorsal soft rays (total): 9; Anal spines: 2; Anal soft rays: 5"

Biology

From Froese and Pauly (2018):

"Found in a variety of habitats from boulder-strewn mountain torrents to small pools in dry zone streams. Most common in flowing water than in reservoirs and tanks. Forms medium sized shoals and prefers flowing water. Feeds on terrestrial insects and detritus. Spawns in shallow water, among marginal weeds and roots usually after heavy rains. Eggs are light orange and sticky; more than 200 eggs are laid and hatch in 1-2 days. Fry are free-swimming on fifth day. Exhibits cannibalism on eggs [Pethiyagoda 1991]. Rarely reaches 12 cm [Menon 1999]."

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Human Uses

From Froese and Pauly (2018):

"Fisheries: of no interest; aquarium: highly commercial"

From Nico and Loftus (2018):

"The Malabar danio has long been popular in the aquarium trade and is widely available."

Diseases
No known diseases. No OIE-reportable diseases have been documented for this species.

Threat to Humans
From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions
From Nico and Loftus (2018):

"Unknown."

4 Global Distribution

Figure 1. Known global distribution of *Devario malabaricus*, reported in India, Sri Lanka, and Thailand. Map by GBIF Secretariat (2017). A location in Florida was excluded from the map extent and from the climate matching analysis because it does not represent an established population (see Status in the United States). The locations in Thailand were excluded from the climate matching analysis because no evidence was found that *D. malabaricus* is established there. No georeferenced occurrences were available for the established populations in Colombia.

5 Distribution Within the United States

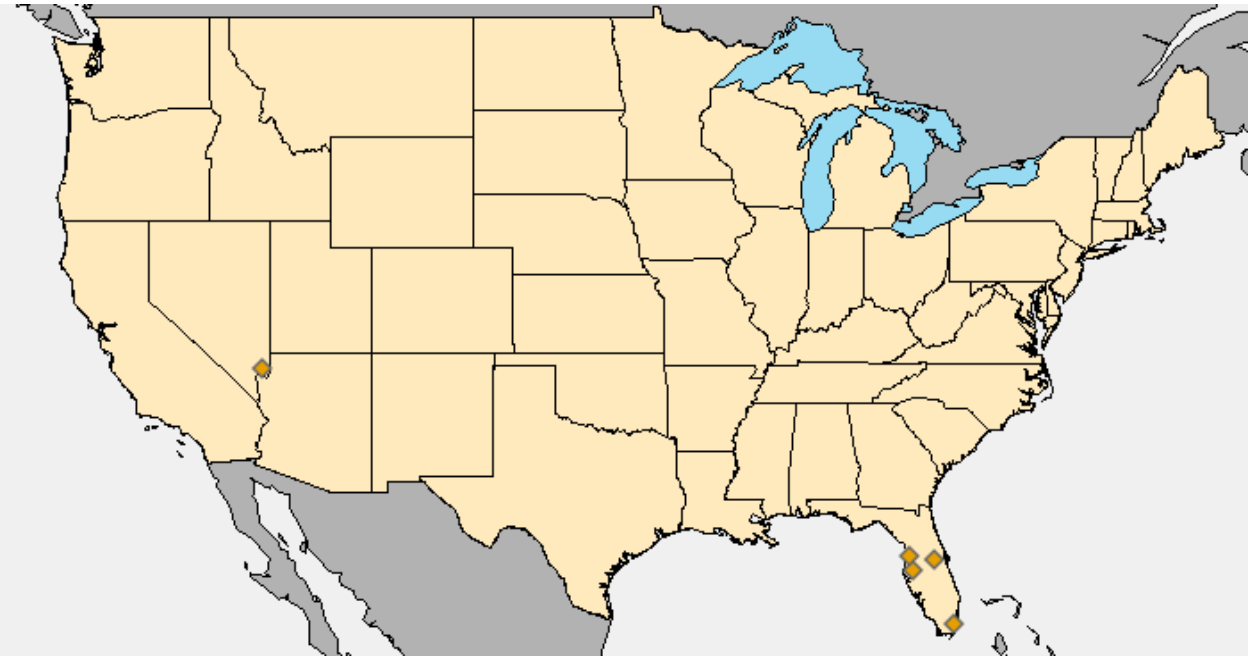

Figure 2. Distribution of *Devario malabaricus* introductions in the United States. Map from GBIF Secretariat (2017). No points were included in climate match analysis because they are not established populations.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) for *Devario malabaricus* within the contiguous United States is low overall. The Climate 6 Score for this species is 0.0. The range of proportions classified as low match is 0.000 to 0.005, inclusive. Locally, only southern Florida, southern Texas, and southern Arizona had medium matches; otherwise, all parts of the contiguous United States had low climate matches.

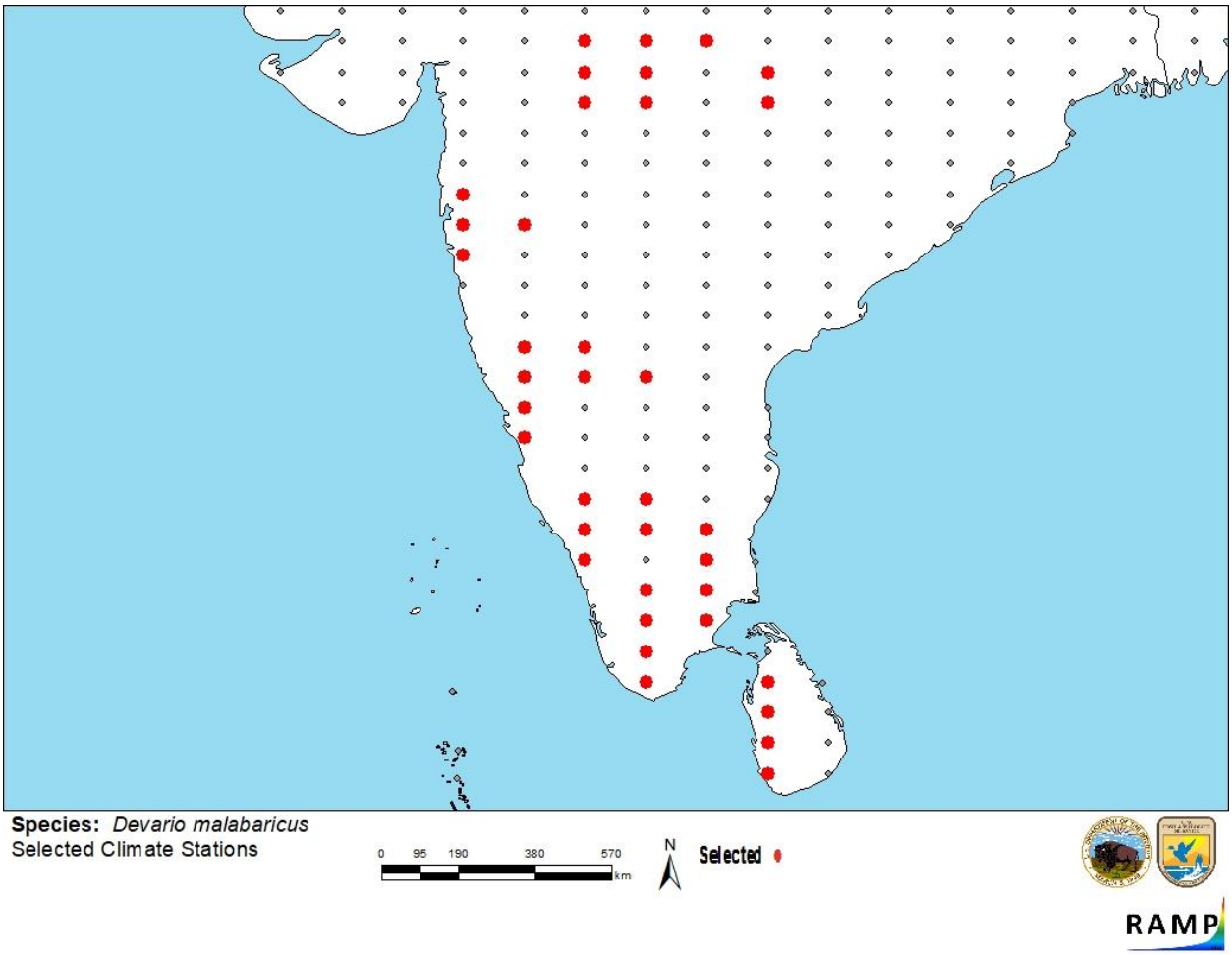

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in South Asia selected as source locations (red; India, Sri Lanka) and non-source locations (gray) for *Devario malabaricus* climate matching. Source locations from GBIF Secretariat (2017).

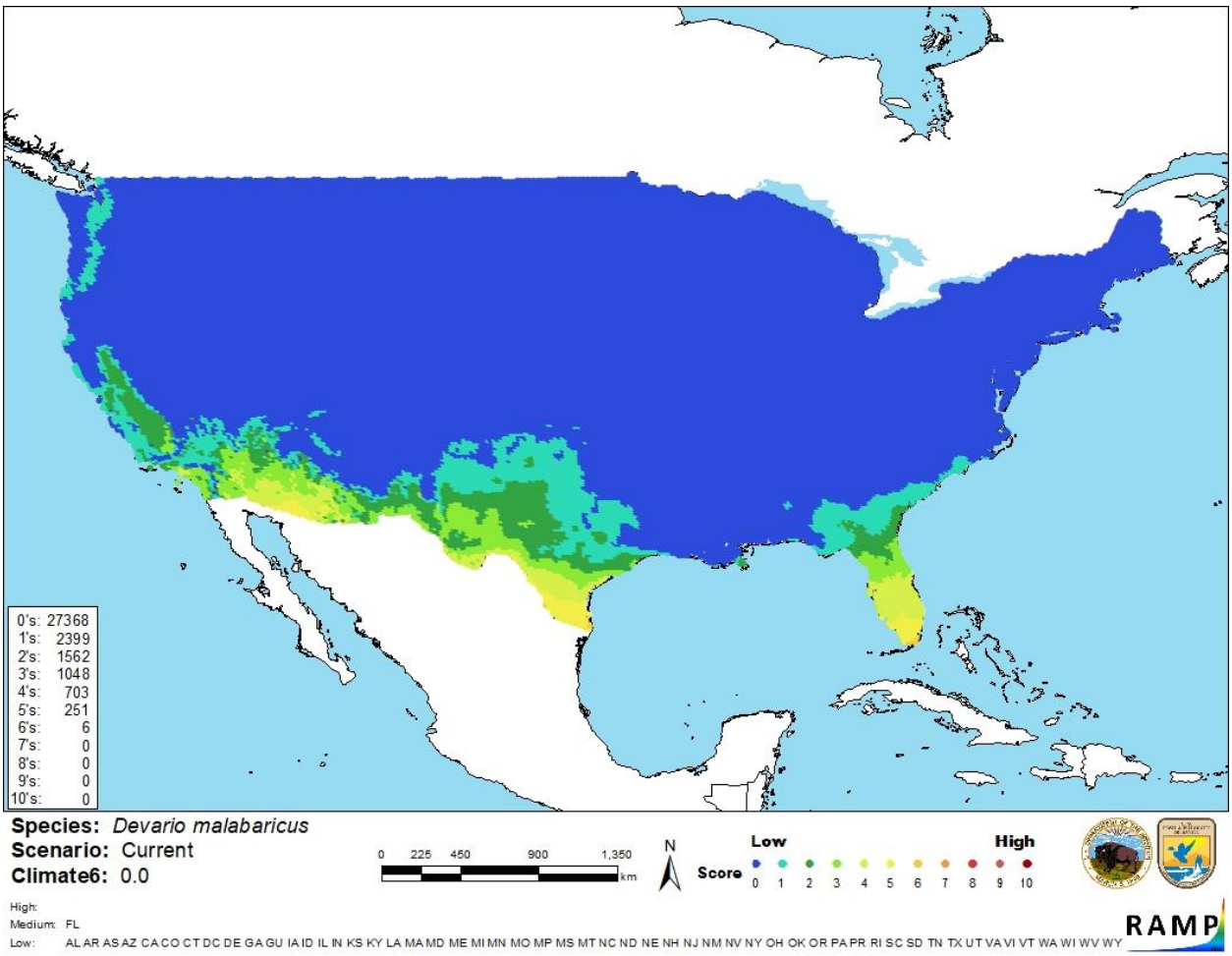

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Devario malabaricus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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 ecology of *Devario malabaricus* is well-known. However, distribution of the species is unclear. Although reported established beyond its native range in Colombia, only general distribution information is currently available. Further research addressing distribution and impacts from introductions is needed. Given these factors, certainty of assessment is medium.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Devario malabaricus, commonly known as Malabar danio, is a fish native to the west coast of India and Sri Lanka. The largest of the *Danio* species, *D. malabaricus* is widely transported around the world as an ornamental fish, which likely led to reported introductions in Myanmar, Colombia, Philippines, and the United States through aquaculture escape or aquarium releases. Current status is unknown in Myanmar and Philippines, while the species has established populations within two watersheds in Colombia. Little information about these established populations is known and no impacts of introduction have been reported. Within the United States, there have been reported occurrences that failed in Florida and Nevada. Climate match within the contiguous United States is low overall, with only the southernmost reaches of Texas and Florida showing a medium level match locally. More research is needed to address global distribution and potential impacts of introduction to better understand the level of risk *D. malabaricus* could pose if established in the United States. Given all factors, the overall risk assessment for this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Medium**
- **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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Talwar, P. K., and A. G. Jhingran, editors. 1991. Inland fishes of India and adjacent countries. Two volumes. A. A. Balkema, Rotterdam, The Netherlands.