U.S. Fish & Wildlife Service

Kuhli Loach (*Pangio kuhlii*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, July 2019
Web Version, 2/10/2021

Organism Type: Fish
Overall Risk Assessment Category: Uncertain

Photo: Louie/Wikimedia. Licensed under Creative Commons Attribution-Share Alike 3.0 Unported. Available: https://commons.wikimedia.org/wiki/File:Pangio_kuhlii.jpg. (July 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"Asia [Indonesia, Malaysia, and Thailand]."

From Nico and Loftus (2019):

"Native Range: Sumatra, Borneo, Java, Malaysia (Kottelat et al. 1993)."

Status in the United States

Froese and Pauly (2019) lists *Pangio kuhlii* as introduced but probably not established in Florida.

Nico and Loftus (2019) lists *Pangio kuhlii* as introduced to Tampa Bay, Florida in 1993.

From Nico and Loftus (2019):

"Status: Failed in Florida."

Pangio kuhli falls within Group I of New Mexico's Department of Game and Fish Director's Species Importation List (New Mexico Department of Game and Fish 2010). Group I species "are designated semi-domesticated animals and do not require an importation permit."

P. kuhlii is in trade in the United States (e.g. Aqua Imports 2021).

Means of Introductions in the United States

From Froese and Pauly (2019):

"A single specimen was taken in Florida from a ditch adjacent to the Tampa Bypass Canal, Hillsborough County, in the vicinity of an ornamental fish farm in November 1993 (museum specimen). Probable escapee from an ornamental fish farm."

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

"**Current status:** Valid as *Pangio kuhlii* (Valenciennes 1846)."

From ITIS (2019):

Kingdom Animalia
  Subkingdom Bilateria
    Infrakingdom Deuterostomia
      Phylum Chordata
        Subphylum Vertebrata
          Infraphylum Gnathostomata
            Superclass Actinopterygii

Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cobitoidea
Family Cobitidae
Subfamily Cobitinae
Genus *Pangio*
Species *Pangio kuhlii* (Valenciennes in Cuvier and Valenciennes, 1846)

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length : 12.0 cm TL male/unsexed; [Riehl and Baensch 1991]"

From Nico and Loftus (2019):

"Size: 8 cm (Sterba 1973) to 12 cm TL (Riehl and Baensch 1991)"

Environment

From Froese and Pauly (2019):

"Freshwater; demersal; pH range: 5.5 - 6.5; dH range: ? - 5. […]; 24°C - 30°C [Riehl and Baensch 1991] [assumed to be recommended aquarium temperature]"

Climate

From Froese and Pauly (2019):

"Tropical; […]"

Distribution Outside the United States

Native

From Froese and Pauly (2019):

"Asia [Indonesia, Malaysia, and Thailand]."

From Nico and Loftus (2019):

"Native Range: Sumatra, Borneo, Java, Malaysia (Kottelat et al. 1993)."

Introduced

From Froese and Pauly (2019):

"Introduced [to the Philippines] in the 1970's."

From Vasil'eva et al (2013):

"[…]; recorded for the first time from Vietnam (Vasil'eva and Vasil'ev, 2012) based on materials collected on Phu Quoc Island, where it has been revealed in a number of waterbodies in the basins of the Cua Can and Duong Dong rivers […]."

Means of Introduction Outside the United States

No information was found on the means of introductions of *Pangio kuhlii* outside the United States.

Short Description

From Froese and Pauly (2019):

"Vertebrae: 47 - 51. Color pattern consisting of 6-10 bars, usually irregular, with a dark large quadrangular blotch occupying the proximal half of caudal fin; median lobe of lower lip not produced into a barbel."

Biology

From Froese and Pauly (2019):

"Lives in hill streams to lowland forest canals and peats [Vidthayanon 2002]. Oviparous [Breder and Rosen 1966]. Well known in aquarium trades as "Kuhli's loach" [Vidthayanon 2002]."

"Oviparous [Breder and Rosen 1966]. Distinct pairing during breeding [Breder and Rosen 1966]."

Human Uses

From Froese and Pauly (2019):

"Aquarium: commercial"

From Nico and Loftus (2019):

"Remarks: This species, or species complex, is common in the aquarium trade."

P. kuhlii is in trade in the United States (e.g. Aqua Imports 2021).

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Pangio kuhlii.* No information on diseases was found for *P. kuhlii.*

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

No record of impacts of introductions were found for *Pangio kuhlii.*

4 History of Invasiveness

A single specimen of *Pangio kuhlii* was found in Florida, assumed to be an escapee from a fish farm, but no other information exists. Therefore, the history of invasiveness is no known nonnative population.

5 Global Distribution

Figure 1. Known global distribution of *Pangio kuhlii*. Map from GBIF Secretariat (2019). The *Pangio kuhlii* population in Florida was not considered an established population and was not used to select source points for climate matching. The population of *Pangio kuhlii* in Singapore was not used to select source points as there was no additional information available to determine if it an established population.

6 Distribution Within the United States

Figure 2. Known distribution of *Pangio kuhlii* in the United States. Map from Nico and Loftus (2019). *Pangio kuhlii* is not established in Florida. The population in Tampa Bay, Florida, is not considered an established wild population and was not used to select source points for climate matching.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Pangio kuhlii* was low for the majority of the contiguous United States with small patches of medium match in southern Texas, Louisiana, and Florida. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low (scores between 0.000 and 0.005, inclusive, are classified as low). All States had low individual Climate 6 scores.

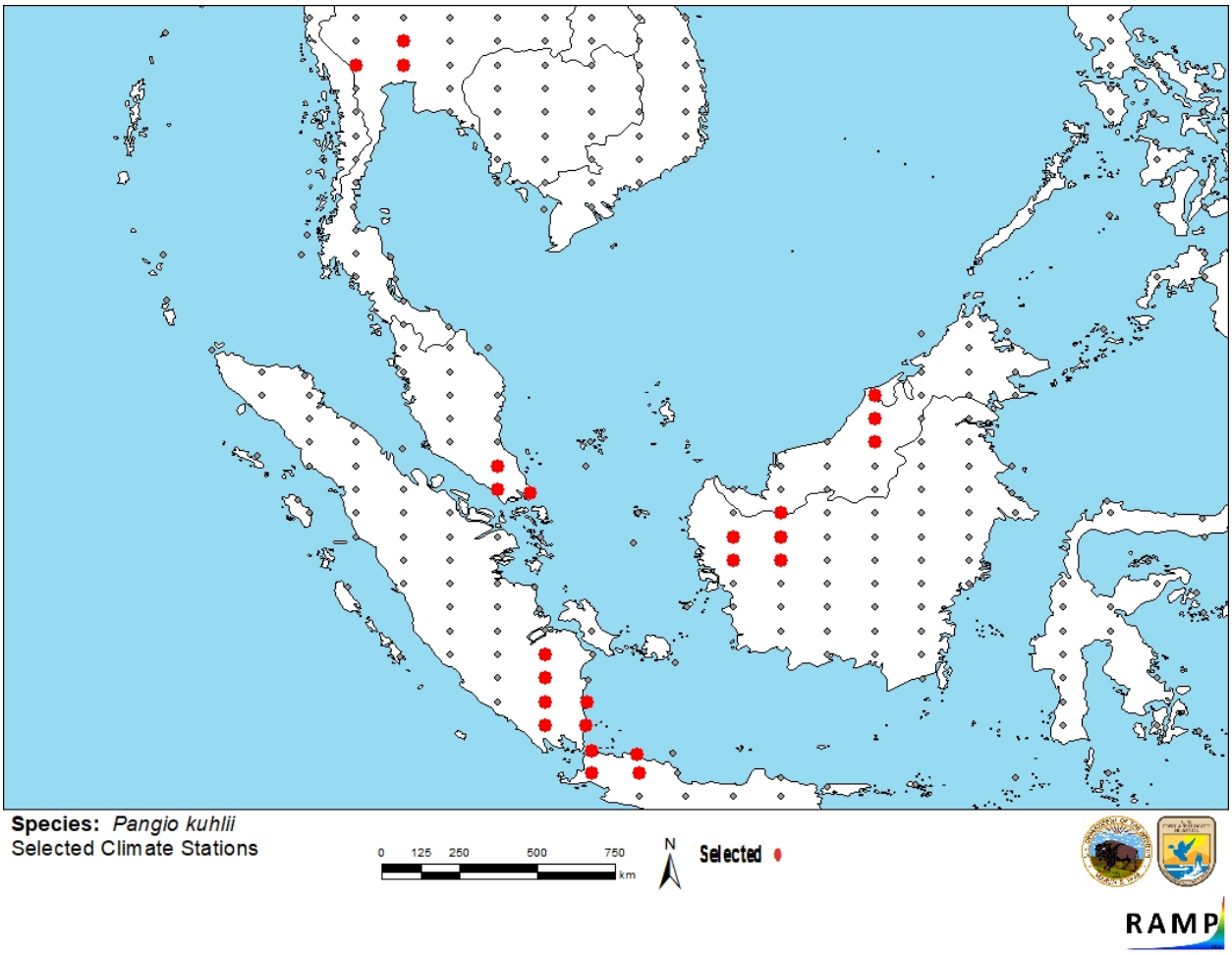

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in Asia selected as source locations (red; Indonesia, Malaysia, and Thailand) and non-source locations (gray) for *Pangio kuhlii* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences and do not necessarily represent the locations of occurrences themselves."

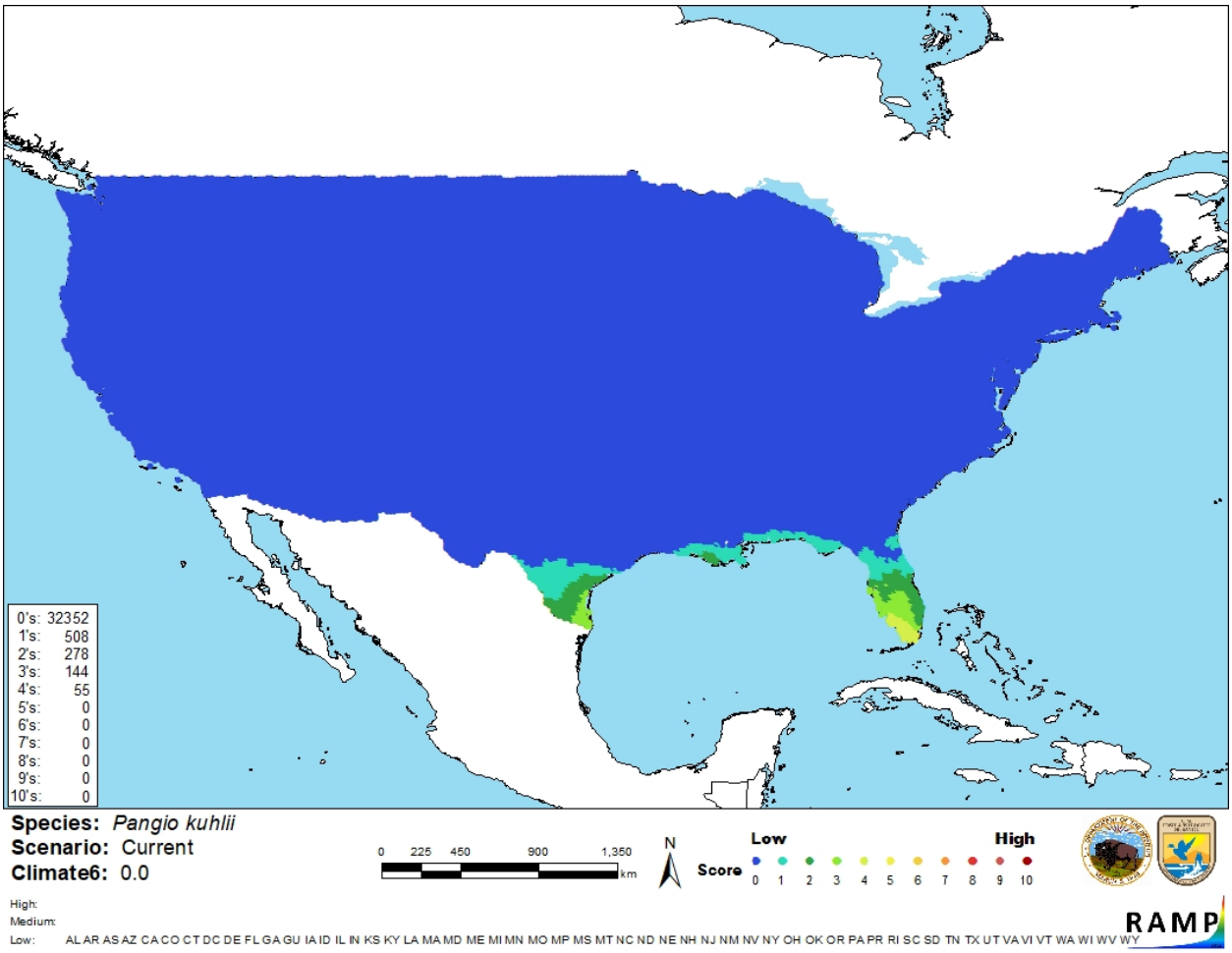

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Pangio kuhlii* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of assessment for *Pangio kuhlii* is low. There is minimal information available for this species. Information on introductions was found for *Pangio kuhlii*; however, no information was found on the impacts of introductions.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Kuhli loach, *Pangio kuhlii,* is a small eel-like freshwater fish native to Indonesia, Malaysia, and Thailand. *P. kuhlii* is in the aquarium trade, including within the United States. The history of invasiveness for *Pangio kuhlii* is no known nonnative population. *P. kuhlii* has been introduced outside of its native range; however, no information has been found on impacts from the introductions. This fish is found in the aquarium trade. The climate match for the contiguous United States was low, with each of the United States having individually low climate matches. The certainty of assessment is low. The overall risk assessment category for *Pangio kuhlii* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information: No additional remarks**
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

Aqua Imports. 2021. Kuhlii loach (*Pangio kuhlii*) – group of 5 fish. Boulder Colorado, Aqua Imports. Available: https://www.aqua-imports.com/product/kuhli-loach-pangio-kuhlii-group-of-5-fish/ (February 2021).

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Vasil'eva ED, Medvedev DA, Chi TTL, Prazdnikov DV, Pavlov DS, Nga NT, Vasil'ev VP. 2013. Species structure of the icthyofauna of the inland waters of Phu Quoc Island, Gulf of Thailand, Vietnam. Journal of Ichthyology 53:405–422.

11 Literature Cited in Quoted Material

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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Riehl R, Baensch HA. 1991. Aquarien atlas. Band. 1. Melle, Germany: Mergus, Verlag für Natur-und Heimtierkunde.

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