

Upper Zambezi Labeo (*Labeo lunatus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2012

Revised, April 2018

Web Version, 9/11/2018

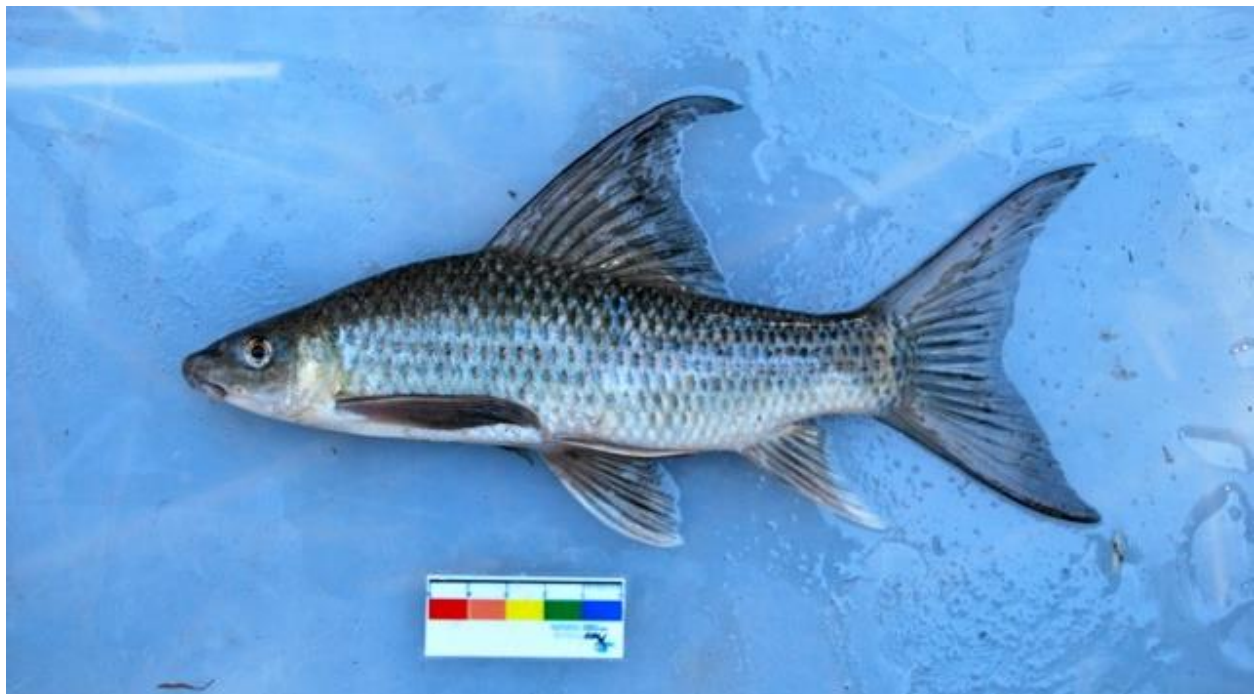


Photo: South African Institute for Aquatic Biodiversity. Licensed under CC BY 4.0. Available: <https://www.gbif.org/occurrence/1265267125>. (April 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Africa: Upper Zambezi/Okavango Rivers [Angola, Botswana, Namibia, Zambia, Zimbabwe].”

Status in the United States

This species has not been reported as introduced or established in the United States. There is no indication that this species is in trade in the United States.

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

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 *Labeo*
Species *Labeo lunatus* Jubb, 1963”

From Eschmeyer et al. (2018):

“Current status: Valid as *Labeo lunatus* Jubb 1963. Cyprinidae: Labeoninae.”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 40.0 cm SL male/unsexed; [Skelton 1993]; max. published weight: 2.5 kg [Skelton 1993]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; potamodromous [Riede 2004].”

Climate/Range

From Froese and Pauly (2018):

“Tropical; 11°S - 22°S”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Africa: Upper Zambezi/Okavango Rivers [Angola, Botswana, Namibia, Zambia, Zimbabwe].”

Introduced

This species has not been reported as introduced or established outside of its native range.

Means of Introduction Outside the United States

This species has not been reported as introduced or established outside of its native range.

Short Description

No information available.

Biology

From Marshall and Tweddle (2007):

“*Labeo lunatus* coexists with *L. cylindricus* in some quieter rocky habitats but was generally absent from rocky rapids. Its preferred habitat is the main river channel where it occurs throughout the floodplain system (Tweddle et al. 2004). Grazes algae and detritus. A shoaling species, breeding in summer, probably in flooded marginal habitats.”

Human Uses

From Froese and Pauly (2018):

“Fisheries: subsistence fisheries”

From Marshall and Tweddle (2007):

“Young fish are caught in large numbers in fish weirs set across waters draining from floodplains (Skelton 2001).”

Diseases

From Songe et al. (2012):

“A field investigation was conducted in the Sesheke District of Zambia along the Zambezi River to determine the fish species susceptible to epizootic ulcerative syndrome (EUS), a newly confirmed disease in Southern Africa. [...] The following 16 species of fish were examined and found with EUS lesions; *Clarias ngamensis*, *Clarias gariepinus*, *Barbus poechei*, *Tilapia sparrmanii*, *Serranochromis angusticeps*, *Brycinus lateralis*, *Micralestes acutidens*, *Sargo chromis carlottae*, *Hydrocynus vittatus*, *Phryngochromis acuticeps*, *Schilbe intermedius*, *Hepsetus odoe*, *Labeo lunatus*, *Oreochromis andersonii*, *Barbus unitaeniatus*, and *Barbus paludinosus*.”

“The disease [EUS] is caused by *Aphanomyces invadans* (Saprolegniaceae), a peronosporomycete fungus, and often affects stressed and injured fish in the wild (Oidtmann et al. 2008).”

World Organisation for Animal Health (OIE) includes “Infection with *Aphanomyces invadans* (epizootic ulcerative syndrome)” in its list of “OIE-Listed diseases, infections and infestations in force in 2018”.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

This species has not been reported as introduced or established outside of its native range.

4 Global Distribution



Figure 1. Known global distribution of *Labeo lunatus*. Map from GBIF Secretariat (2018). Points not located on/near the Zambezi and Okavango Rivers (in western Namibia, eastern Zambia, central-western Zimbabwe, and eastern Botswana) were excluded from climate match analysis because they fall outside the reported range of this species.

5 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.004, which is a low climate match. The range for a low climate score is from 0.0 to 0.005, inclusive. The climate score was medium for Arizona and Texas. All other states had a low climate score. There was a medium-low to medium climate match along the border with Mexico from Texas to southern California; the rest of the contiguous United States had a low climate match.

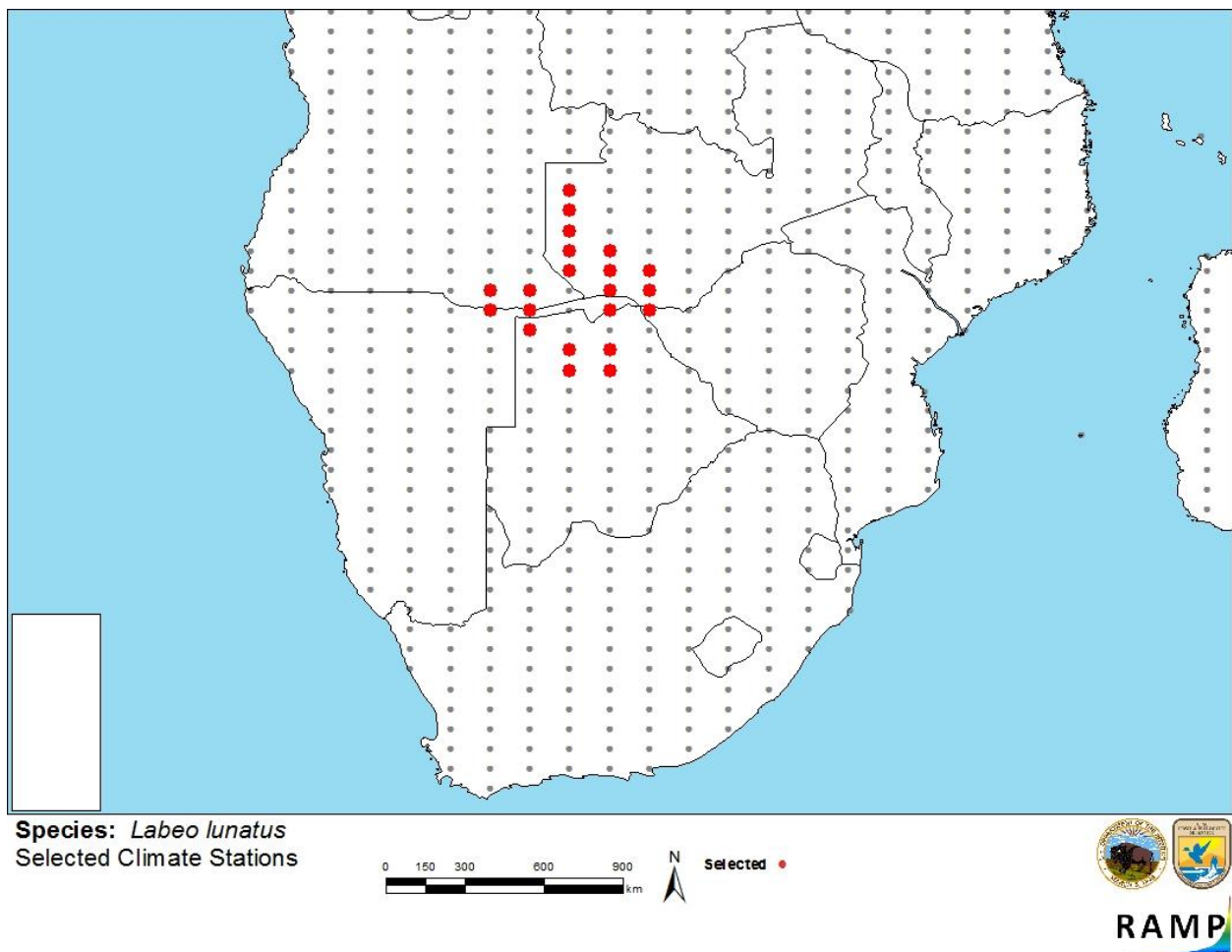


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Angola, Namibia, Zambia, Botswana, Zimbabwe) and non-source locations (gray) for *Labeo lunatus* climate matching. Source locations from GBIF Secretariat (2018).

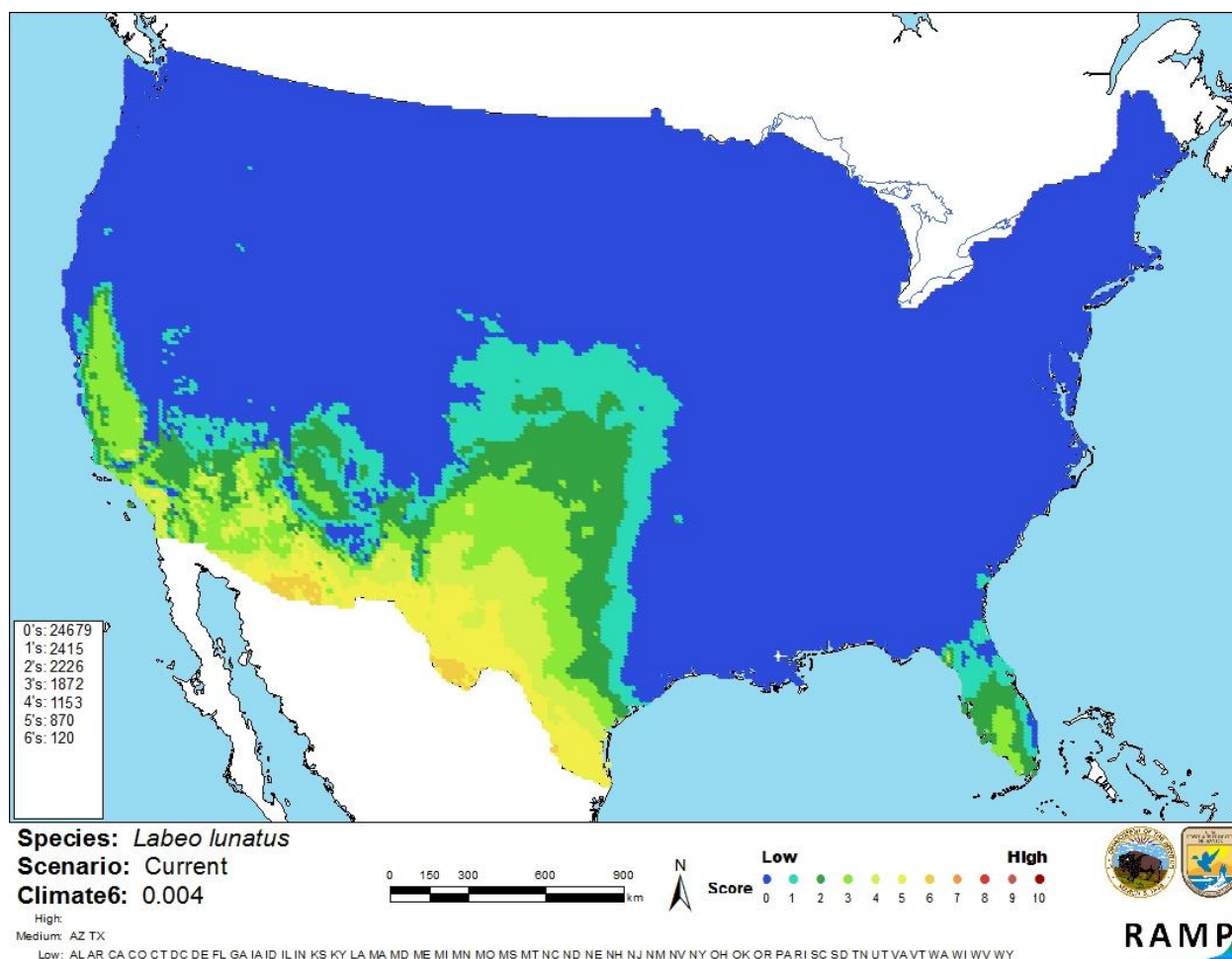


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Labeo lunatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0=Lowest match, 10=Highest match.

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

There is limited information available about *Labeo lunatus*. This species has never been reported as introduced outside of its native range, so there is no information available on impacts of introductions of this species from which to base an assessment of risk. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Upper Zambezi Labeo (*Labeo lunatus*) is a freshwater carp native to southern Africa. It is harvested for human consumption. *L. lunatus* collected during one study in Zambia had epizootic ulcerative syndrome lesions caused by *Aphanomyces invadans*, an OIE-reportable disease. History of invasiveness is uncertain because this species has never been reported as introduced or established outside of its native range. *L. lunatus* has a low climate match with the contiguous United States, with a medium match in the Southwest along the border with Mexico. There is limited information available on the biology of this species. With limited biological information and no history of *L. lunatus* introduction outside the native range, the certainty of this 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**
- **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.

Oidtmann, B., Steinbauer, P., Geiger, S. and Hoffmann, W. R., 2008. Experimental infection and detection of *Aphanomyces invadans* in European catfish, rainbow trout and European eel. *Diseases of Aquatic Organisms* 82:195–207.

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