

## Redeye Labeo (*Labeo cylindricus*)

### Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2012

Revised, March 2018

Web Version, 6/6/2018



Photo: South African Institute for Aquatic Biodiversity. 2011. Licensed under CC BY-NC-SA. Available: [http://www.boldsystems.org/index.php/TaxBrowser\\_Taxonpage?taxid=141052](http://www.boldsystems.org/index.php/TaxBrowser_Taxonpage?taxid=141052). (March 2018).

## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2017):

“Africa: within the drainage basins of the Zambezi, Limpopo, Incomati and Usutu-Pongolo Rivers. In the Congo Basin, its distribution is limited to the middle and upper regions [Tshibwabwa 1997]. Also known from East African rivers and the region of the Cap; south through the Zambezi system [Skelton 1993] and in the Coroca and Cuanza rivers in Angola [Poll 1967].”

### Status in the United States

This species has not been reported as introduced or established in the U.S.

## Means of Introductions in the United States

This species has not been reported as introduced or established in the U.S.

## 2 Biology and Ecology

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### 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 Ostariophysii  
Order Cypriniformes  
Superfamily Cyprinoidea  
Family Cyprinidae  
Genus *Labeo*  
Species *Labeo cylindricus* Peters, 1852”

From Eschmeyer et al. (2018):

“Current status: Valid as *Labeo cylindricus* Peters 1852. Cyprinidae: Labeoninae.”

### Size, Weight, and Age Range

From Weyl and Booth (1999):

“It is a relatively small species attaining a maximum length and mass of 25 cm standard length and 0.9 kg, respectively (Skelton 1993).”

“Length-at-(50%) maturity was estimated at 96 mm FL [fork length] for males and 98 mm FL for females [...]”

### Environment

From Froese and Pauly (2017):

“Freshwater; benthopelagic; potamodromous [Riede 2004]; depth range 30 - 30 m. [...] 24°C - 28°C [Baensch and Riehl 1991; assumed to be recommended aquarium temperature range];”

From Weyl and Booth (1999):

“Mean secchi depths [in Lake Chicamba, Mozambique] were 150 cm, with a range from 10 cm in river inlets at the height of river discharge to 400 cm in the main lake during winter. In summer, the mean water temperature was 27.6° C (25.2–32.7° C) while in winter its mean was 22° C (18.5–25.5° C). The mean annual water temperature was 25.8° C [...].”

## **Climate/Range**

From Froese and Pauly (2017):

“Tropical; [...] 10°N - 28°S”

## **Distribution Outside the United States**

### **Native**

From Bills et al. (2010):

“*Labeo cylindricus* is widely distributed across the southern half of Africa, from the Democratic Republic of Congo and Ethiopia, to South Africa.”

“Central Africa: The distribution of this species in the Congo River Basin is limited to the Central and This [*sic*] species is known from upper regions (Tshibwabwa 1997).”

“Eastern Africa: It is widespread in east Africa, and is present in the Pangani drainage, Athi River system (including Tsavo drainage), Galana system, This species is known from upper Tana, Northern Ewaso Nyiro basin, Lake Baringo system, Lake Bogoria (affluents), Turkwell and Kerio system (Turkana drainage), Suguta drainage. It has also been found in Lake Tanganyika and Lake Malawi. It occurs as a rarity in Lake Turkana (Seegers et al. 2003). Also distributed in Lakes Malawi, Chuita and Chilwa Shire River, and the middle and lower Zambezi system. Boulenger (1903) reported this species from the Lumi River (Pangani drainage) as *Labeo montanus* (Günther, 1889), a junior synonym (Seegers et al. 2003).”

“Northeast Africa: This species is found in the Baro River and Rift lakes of Ethiopia.”

“Southern Africa: It is widespread in southern and eastern Africa from the Phongolo River in northern KwaZulu-Natal (Skelton 2001), South Africa, north into the Congo.”

### **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

From Froese and Pauly (2017):

“Vertebrae: 29 - 31. Lips plicate; dorsal fin concave with 9 to 10 branched rays; eyes in superolateral position; genital orifice very far from origin of anal fin; body cylindrical, slightly elongated; snout truncate with deep transverse furrow and fleshy appendix directed upwards [Tshibwabwa 1997]. Dark lateral band present in young fish only.”

## Biology

From Bills et al. (2010):

“*Labeo cylindricus* is a benthopelagic and potamodromous species. It occurs in both sediment-free and sediment-rich rocky biotopes. *Labeo cylindricus* favours clear, running waters in rocky habitats of small and large rivers, also found in lakes and dams over rocky areas. Also found in lakes and dams over rocky areas. It feeds on diatoms and other small algae from the rocks (Konings 1990). *Labeo cylindricus* also feeds on ‘aufwuchs’ from the surface of rocks, tree trunks and other firm surfaces. *Labeo cylindricus* swims upstream in masses to breed, using the mouth and broad pectorals to climb damp surfaces of barrier rocks and weirs (Skelton 1993). It is mainly caught when migrating up streams from the lake to spawn. Populations in Lake Malawi have a well marked breeding season in December. The breeding season is very short and the eggs are laid among the rocks. In Malawi it is reported that there are both permanent riverine populations and lacustrine populations.”

From Weyl and Booth (1999):

“There is limited quantitative information available on the life history of this species. What is known, is that it is a shoaling species, inhabiting rocky habitats of small and large rivers and in lakes and dams. It feeds by grazing algae and ‘aufwuchs’ from the surface of rocks, tree trunks and other firm surfaces (Gaigher 1973).”

“Growth in the *L. cylindricus* was rapid with 43% of the maximum theoretical size attained before sexual maturity within the first year of life. In contrast sexual maturation occurred at 25% of the maximum observed age. This fast growth in the Lake Chicamba population of *L. cylindricus* could allow for the attainment of fish large enough to migrate up the rivers during the annual spawning migration, as well as to maximise individual reproductive capacity. In addition, highly seasonal growth due to the cessation of feeding and high energetic requirements for gonadal recrudescence during the summer period and the decreased metabolic rate over the winter period could ensure high fecundity without much additional somatic growth. The high natural mortality in this species, with the population being reduced at least half in size annually, could also provide a selective pressure for this growth pattern.”

“*L. cylindricus* clearly exhibits the altricial (generalist/r-selected) life history characteristics associated with environmental instability despite the relatively stable environment provided by the lake for adult fish. The altricial life history characteristics of *L. cylindricus* probably evolved in the relatively unstable riverine environment prior to the lakes construction and appear to have been retained by the species. This suggests that *L. cylindricus* in Lake Chicamba have retained

the inherent reproductive characteristics of a riverine population. Periodic flooding of the inflowing rivers during the warmer summer period, therefore, appears to be one of the most important variables in determining spawning success of *L. cylindricus* in Lake Chicamba.”

## **Human Uses**

From Bills et al. (2010):

“*Labeo cylindricus* is used as an algae grazer in public aquariums. It is also harvested as a food fish.”

From Froese and Pauly (2017):

“Fisheries: commercial; aquarium: commercial”

## **Diseases**

Poelen et al. (2014) lists the following as parasites of *Labeo cylindricus*: *Dogielius dublicornis*, *Acanthogyrus* sp., *Acanthogyrus malawiensis*, *Dactylogyrus brevicirrus*, *Dactylogyrus cyclocirrus*, and *Dogielius junorstrema* (Smithsonian Institution no date, Strona et al. 2013).

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

## **Threat to Humans**

From Froese and Pauly (2017):

“Harmless”

## **3 Impacts of Introductions**

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

## 4 Global Distribution

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**Figure 1.** Known global distribution of *Labeo cylindricus*. Map from GBIF Secretariat (2018). Point in southwestern South Africa was excluded from climate match analysis because it is located far outside the reported range of this species.

## 5 Distribution Within the United States

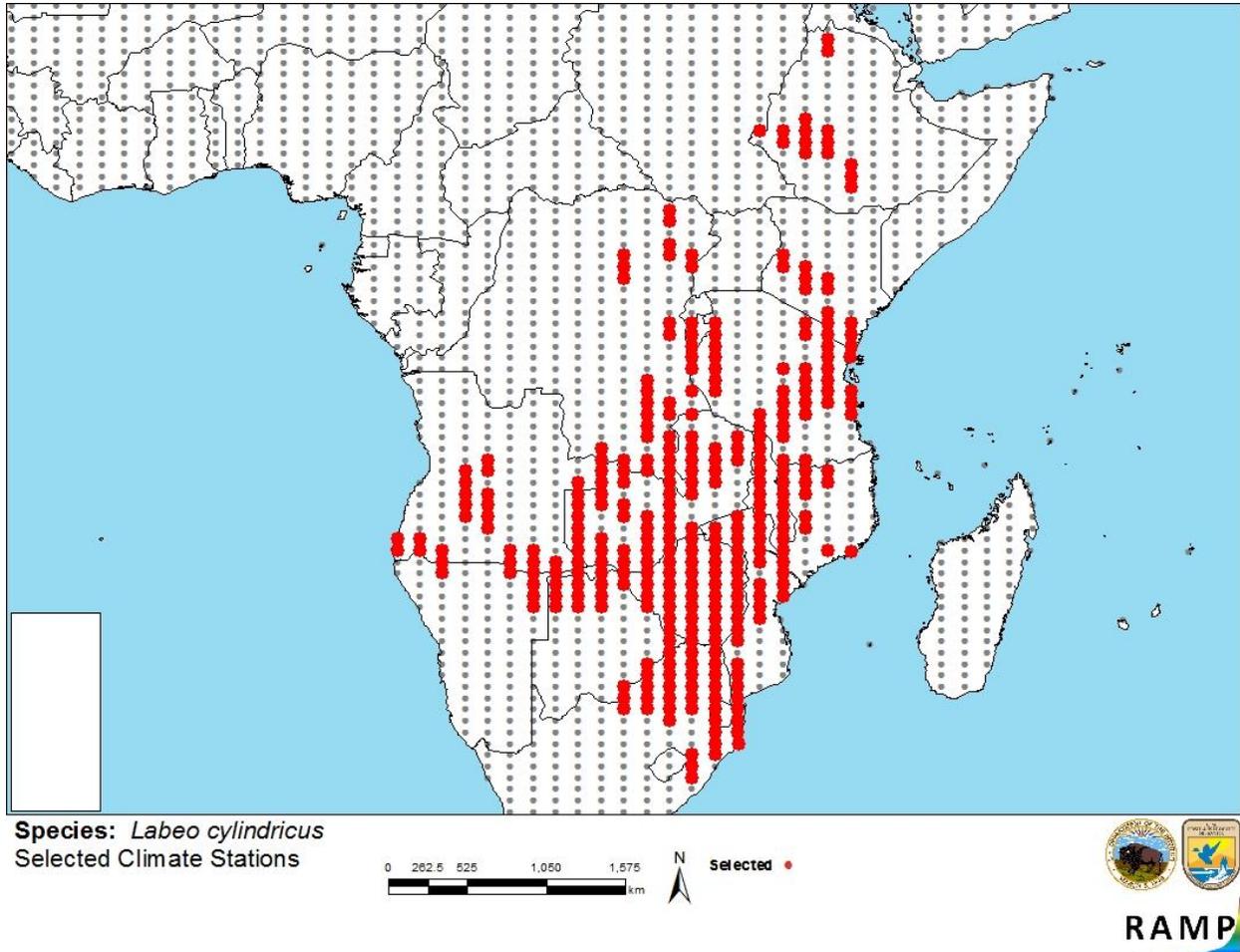
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This species has not been reported as introduced or established in the U.S.

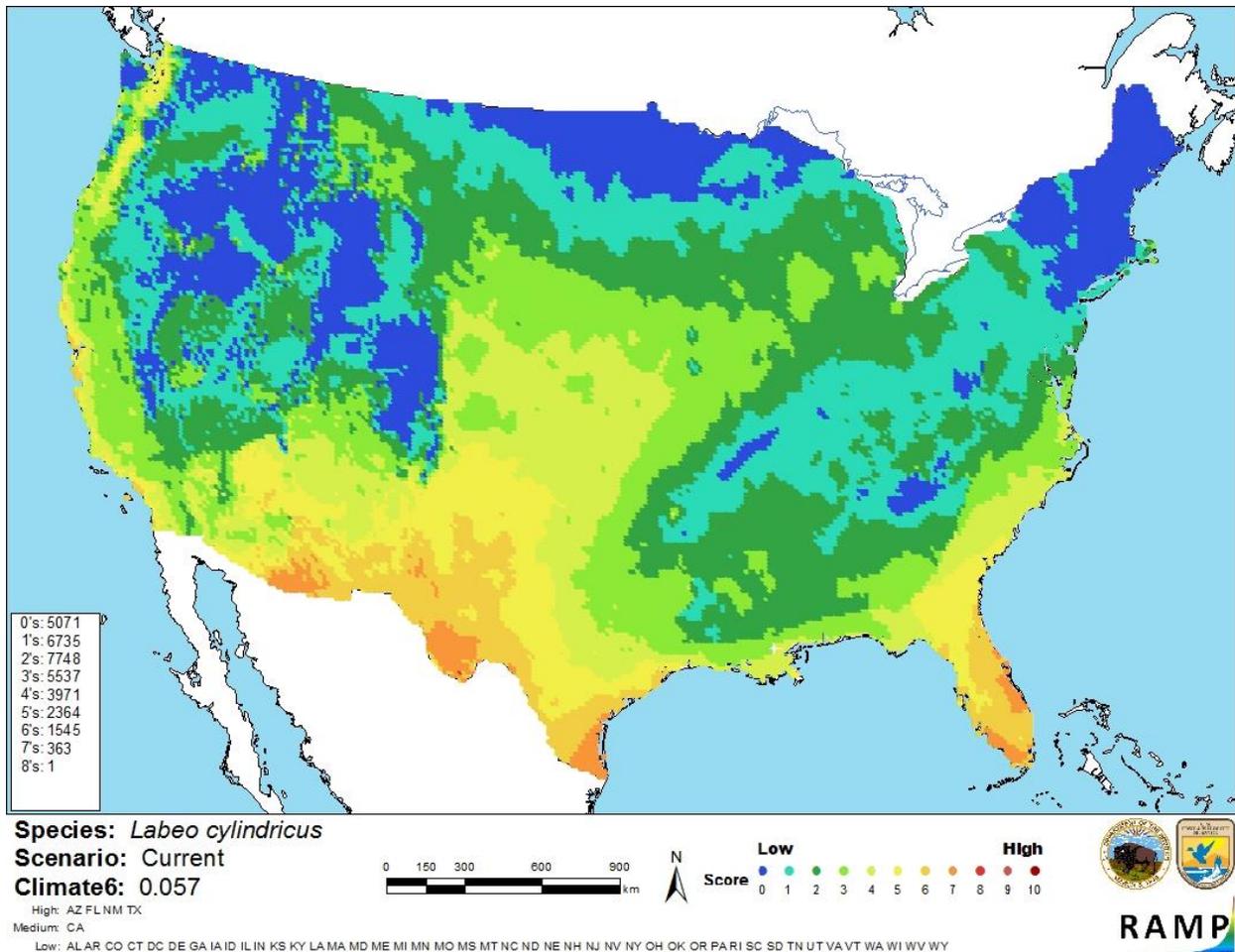
# 6 Climate Matching

## Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was 0.057, which is a medium climate match. The climate match was medium in much of the Southwest, southern Great Plains including Texas, coastal California, the Cascade Range in Oregon and Washington, Florida, and the southeast Atlantic coast as far north as North Carolina. All other regions had a low climate match.



**Figure 2.** RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Labeo cylindricus* climate matching. Source locations from GBIF Secretariat (2018).



**Figure 3.** Map of RAMP (Sanders et al. 2014) climate matches for *Labeo cylindricus* 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
$\geq 0.103$	High

## 7 Certainty of Assessment

There is adequate information available on the biology and distribution of *Labeo cylindricus*. No introductions of this species outside of its native range have been documented. Because of this, no impacts of introductions have been documented, so certainty of this assessment is low.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Labeo cylindricus* is a carp native to southern and eastern Africa. This species is used as a food fish and in public aquariums, but it has never been reported as introduced outside of its native range. *L. cylindricus* has a medium climate match with the contiguous United States. Because of a lack of information from which to base an assessment of invasive potential, 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): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

## 9 References

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**Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.**

Bills, R., J. Cambray, A. Getahun, M. Hanssens, B. Marshall, T. Moelants, and G. Ntakimazi. 2010. *Labeo cylindricus*. The IUCN Red List of Threatened Species 2010: e.T182433A7883850. Available: <http://www.iucnredlist.org/details/182433/0>. (March 2018).

Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2018. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (March 2018).

Froese, R., and D. Pauly, editors. 2017. *Labeo cylindricus* (Peters, 1852). FishBase. Available: <http://www.fishbase.org/summary/5409>. (March 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Labeo cylindricus*, Peters, 1852. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/5206108>. (March 2018).

ITIS (Integrated Taxonomic Information System). 2018. *Labeo cylindricus* (Peters, 1852). Integrated Taxonomic Information System, Reston, Virginia. Available: [https://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=689282#null](https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=689282#null). (March 2018).

Poelen, J. H., J. D. Simons, and C. J. Mungall. 2014. Global Biotic Interactions: an open infrastructure to share and analyze species-interaction datasets. *Ecological Informatics* 24:148-159.

Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. US Fish and Wildlife Service.

Weyl, O. L., and A. J. Booth. 1999. On the life history of a cyprinid fish, *Labeo cylindricus*. Environmental Biology of Fishes 55(3):215-225.

## 10 References Quoted But Not Accessed

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**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.**

Baensch, H. A., and R. Riehl. 1991. Aquarien atlas volume 3. Mergus, Verlag für Natur-und Heimtierkunde, Melle, Germany.

Boulenger. 1903. [Source material did not give the full citation for this reference.]

Gaigher, I. G. 1973. The habitat preferences of fishes from the Limpopo River system, Transvaal and Mozambique. Koedoe 16:103-116.

Konings. 1990. [Source material did not give the full citation for this reference.]

Poll, M. 1967. Contribution à la faune ichthyologique de l'Angola. Diamang Publicações Culturais 75.

Riede, K. 2004. Global register of migratory species - from global to regional scales. Final Report of the R&D-Projekt 808 05 081. Federal Agency for Nature Conservation, Bonn, Germany.

Seegers et al. 2003. [Source material did not give the full citation for this reference.]

Skelton. 2001. [Source material did not give the full citation for this reference.]

Skelton, P. H. 1993. A complete guide to the freshwater fishes of southern Africa. Southern Book Publishers, Johannesburg, South Africa.

Smithsonian Institution. No date. US National Parasite Collection Database. Available: <http://invertebrates.si.edu/parasites.htm>.

Strona, G., M. Lourdes, D. Palomares, N. Bailly, P. Galli, and K. D. Lafferty. 2013. Host range, host ecology, and distribution of more than 11800 fish parasite species. Ecology 94:544.

Tshibwabwa, S. M. 1997. Systématique des espèces africaines du genre *Labeo* (Teleostei, Cyprinidae) dans les régions ichtyogéographiques de Basse-Guinée et du Congo. II. Presses Universitaires de Namur, Namur, Belgium.