

Tana Labeo (*Labeo mesops*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2012

Revised, May 2018

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<https://www.gbif.org/occurrence/1230326579>. (May 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Africa: present in Lake Malawi basin [Ricardo Bertram et al. 1942; Snoeks 2004; Van Steenberge et al. 2014], Juba system [Reid 1985] and Ruvuma River [Reid 1985; Seegers 2003]. Status Tana River population is uncertain [Seegers et al. 2003]. Reports from the Lufira River,

Upper Congo River basin [Reid 1985; Tshibwabwa 1997], are misidentifications of *Labeo rosae* [Van Steenberge et al. 2014].”

Froese and Pauly (2018) list Malawi, Mozambique, Somalia, and Tanzania as the countries where *L. mesops* is native.

From Kazembe et al. (2006):

“Endemic to Lake Malawi and the Shire River [Malawi].”

From Van Steenberge et al. (2017):

“The status of *L. mesops* as a Lake Malawi basin endemic (Snoeks 2004) was validated although, at least for meristic characters, this species had affinities with the unidentified specimen from the Ruaha River.”

Status in the United States

This species has not been reported as introduced or established in the United States. There is no evidence 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.

Remarks

There is a history of disagreement surrounding the native distribution of *L. mesops*.

From Van Steenberge et al. (2014):

“Prior to Reid’s (1985) revision, *L. mesops* was considered endemic to the Lake Malawi basin. Reid (1985), however, extended this species’ range considerably. Foremost, he placed two species from the Horn of Africa: *Labeo grammipleura* Vinciguerra 1927 and *Labeo gracilis* Boulenger 1916 into synonymy with *L. mesops*. Secondly, he listed *L. mesops* as occurring in the Tana River in Kenya. Finally, he mentioned a ‘doubtful’ presence of *L. mesops* in the Lufira (upper Congo). Reid (1985) referred to Goorts et al. (1961) as a reference hereof. Yet, no mention of *L. mesops* nor of any species of *Labeo* other than *L. cylindricus* Peters, 1852 is made in that document. Tshibwabwa (1997) contested the first range extension and revalidated *L. grammipleura* and *L. gracilis*. The second range extension was refuted by Seegers et al. (2003), who listed the Tana population as of uncertain taxonomical status. Tshibwabwa (1997) did, however, confirm the presence of *L. mesops* in the upper Congo.”

The International Union for the Conservation of Nature has classified this species as endangered (Kazembe et al. 2006).

From Kazembe et al. (2006):

“A significant population reduction suspected from observation although quantitative data are lacking. Causes of decline include overfishing and habitat degradation and these have not ceased. Population reduction estimated at not less than 50% over 10 years.”

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 mesops* Günther, 1868”

“Current Standing: valid”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Maturity: L_m 33.9 [cm TL] [...]
Max length : 39.0 cm TL male/unsexed; [Lévêque and Daget 1984]”

Environment

From Froese and Pauly (2018):

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

Climate/Range

From Froese and Pauly (2018):

“Tropical”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Africa: present in Lake Malawi basin [Ricardo Bertram et al. 1942; Snoeks 2004; Van Steenberge et al. 2014], Juba system [Reid 1985] and Ruvuma River [Reid 1985; Seegers 2003]. Status Tana River population is uncertain [Seegers et al. 2003]. Reports from the Lufira River, Upper Congo River basin [Reid 1985; Tshibwabwa 1997], are misidentifications of *Labeo rosae* [Van Steenberge et al. 2014].”

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Introduced

No introductions of this species have been reported.

Means of Introduction Outside the United States

No introductions of this species have been reported.

Short Description

From Froese and Pauly (2018):

“Dorsal soft rays (total): 11; Vertebrae: 34. Snout rounded and not fleshy or warty.”

Biology

From Froese and Pauly (2018):

“Found in shallow water over sandy bottoms [Ricardo Bertram 1942; Konings 1990]. Is a mud-feeder [Ricardo Bertram 1942], feeds from the biocover and sediment on the sand [Konings 1990]. Also caught using weirs and baskets; formerly very abundant in Malawi, but now rare except where rivers drain undisturbed soil; possible that silt prevents development of eggs [Eccles 1992]. Indications that it may leave the lake and run up rivers to spawn [Ricardo Bertram 1942].”

“Spawns in small, muddy wet season rivers leading to swampy dambos [Lowe 1952]. Holds its spawn until the rivers flood.”

From Msiska (1990):

“Males and females mature in the second year at 28.9cm and 33.5cm, respectively. They run up ephemeral rivers and streams to breed.”

“*Labeo mesops* breeds only once when rivers are in full spate and very turbid. While the eggs of mpasa [*Opsaridium microlepis*] are initially clumped into small groups, those of ntchila [*Labeo mesops*] are separated. They undergo considerable hydration and expand to 3-7mm, making them semi-buoyant. From observations made in suspended *hapas* in ponds, females weighing 106-280g were able to produce 1400-4700 fingerlings.”

“*Labeo mesops* was observed to have a higher number of ova per body weight, the range being 10479 to 47957 for fish of 106-280g.”

From Kazembe et al. (2006):

“Both the adults and juveniles spend an extremely short time in the rivers where spawning occurs. The young fish can survive being carried downstream at an early age.”

Human Uses

From Froese and Pauly (2018):

“Fisheries: commercial; aquaculture: experimental; aquarium: commercial”

Diseases

No information available. No OIE-reportable diseases have been documented in this species.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

No information available. No introductions of this species have been reported.

4 Global Distribution

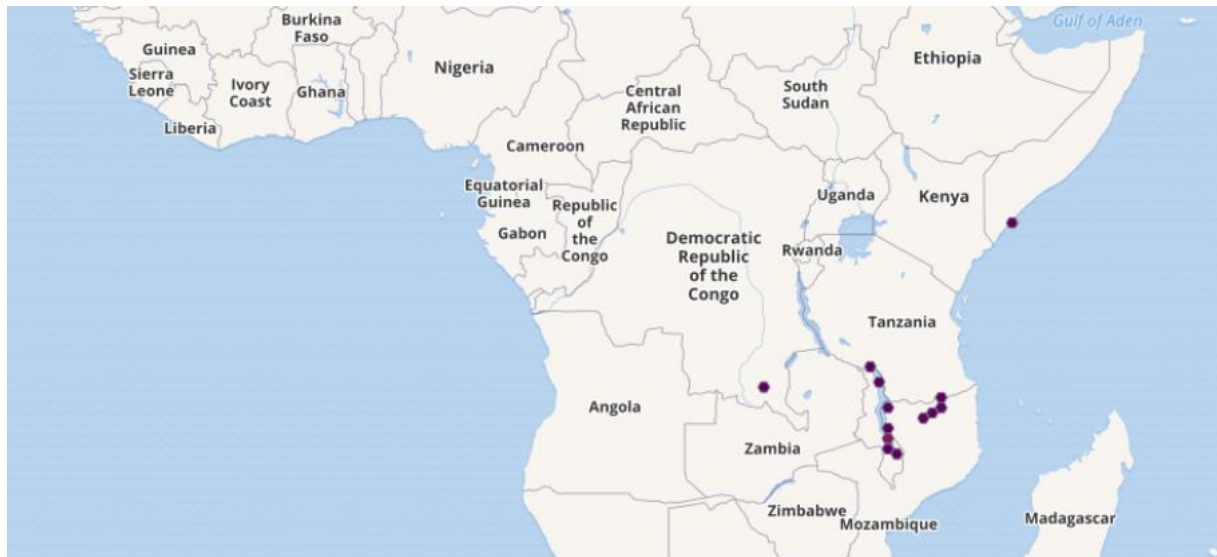


Figure 1. Reported global distribution of *Labeo mesops*. Map from GBIF Secretariat (2017). The most recent study on the distribution of *L. mesops* (Van Steenberge et al. 2017) confirmed it as endemic to the Lake Malawi basin, so only locations within that basin were used for the climate matching analysis.

5 Distribution within the United States

This species has not been reported in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

Only locations within the Lake Malawi basin were used in the climate match based on the most recent information on the species distribution. The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was low throughout most of the contiguous United States with medium matches in southwestern Florida and far southern Texas. Climate 6 score indicated that the contiguous United States has a low climate match overall. Scores of 0.005 and below are classified as low match; Climate 6 score for *Labeo mesops* was 0.000.

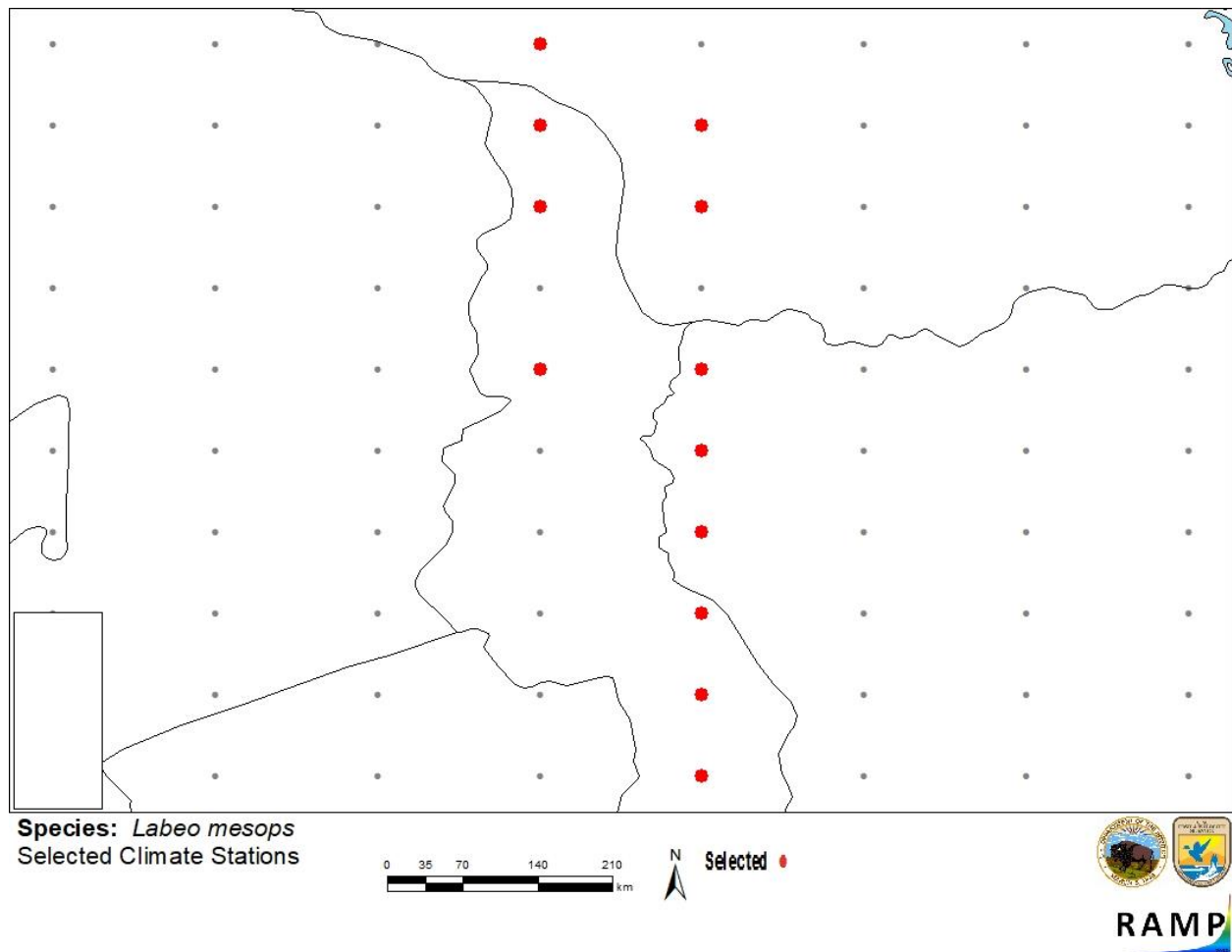


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in southeastern Africa selected as source locations (red; Malawi, southwestern Tanzania, and northwestern Mozambique) and non-source locations (gray) for *Labeo mesops* climate matching. Source locations from GBIF Secretariat (2017).

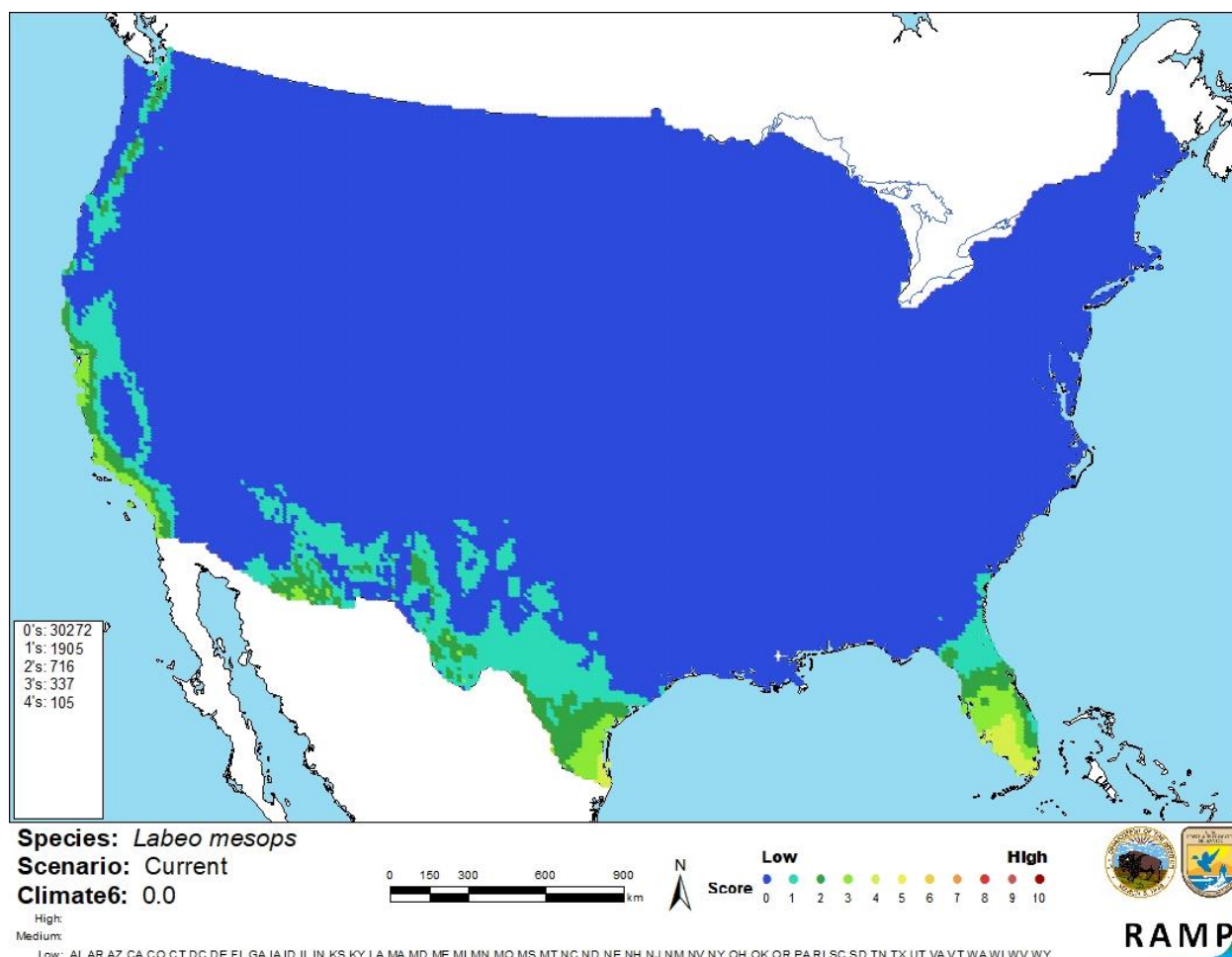


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Labeo mesops* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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

Some information is available on the biology and ecology of *Labeo mesops*. No introductions have been reported. There is a history of disagreement among authors about the native distribution of *L. mesops*. Because the native range of the species cannot be delineated with confidence, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Tana Labeo (*Labeo mesops*) is a cyprinid fish native to the Lake Malawi basin and possibly other regions in eastern Africa. *L. mesops* is used as a food and aquarium fish, and has been the subject of some experimental aquaculture. There has been considerable disagreement within the literature over whether populations of the species exist outside the Lake Malawi basin, but none of these populations have been described as introduced. Some consider the populations outside the Lake Malawi basin as separate species. The certainty of the assessment is low partially due to the uncertainty over the species range. Climate match to the contiguous United States is low. Without a history of introduction outside its native range, the overall risk assessment category for *Labeo mesops* is Uncertain.

Assessment Elements

- **History of Invasiveness: Uncertain**
- **Climate Match: Low**
- **Certainty of Assessment: 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.

- Froese, R., and D. Pauly, editors. 2018. *Labeo mesops* Günther, 1868. FishBase. Available: <https://www.fishbase.de/summary/Labeo-mesops.html>. (May 2018).
- GBIF Secretariat. 2017. GBIF backbone taxonomy: *Labeo mesops* Günther, 1868. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/5206085>. (May 2018).
- ITIS (Integrated Taxonomic Information Facility). 2018. *Labeo mesops* Günther, 1868. Integrated Taxonomic Information Facility, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=689314#null. (May 2018).
- Kazembe, J., Z. Magombo, D. Khawa, and E. Kaunda. 2006. *Labeo mesops*. The IUCN Red List of Threatened Species 2006: e.T60846A12418028. Available: <http://www.iucnredlist.org/details/full/60846/0>. (May 2018).
- Msiska, O. V. 1990. Reproductive strategies of two cyprinid fishes in Lake Malawi and their relevance for aquaculture development. *Aquaculture and Fisheries Management* 21:67-75.

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

Van Steenberge, M., L. Gajdzik, A. Chilala, J. Snoeks, and E. Vreven. 2014. *Labeo rosae* (Cypriniformes: Cyprinidae) in the Congo basin: a relict distribution or a historical introduction? *Journal of Fish Biology* 85(5):1733-1738.

Van Steenberge, M., L. Gajdzik, A. Chilala, J. Snoeks, and E. Vreven. 2017. Don't judge a fish by its fins: species delineation of Congolese *Labeo* (Cyprinidae). *Zoologica Scripta* 46(3):264-274.

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.

Eccles, D. H. 1992. FAO species identification sheets for fishery purposes. Field guide to the freshwater fishes of Tanzania. Prepared and published with the support of the United Nations Development Programme (project URT/87/016). FAO, Rome.

Goorts, P., N. Magis, and J. Wilmet. 1961. Les aspects biologiques, humains et économiques de la pêche dans les lacs de barrage de la Lufira (Katanga). Publications FULREAC, Liège, Belgium.

Konings, A. 1990. Ad Konings's book of cichlids and all the other fishes of Lake Malawi. T. F. H. Publications, Inc., Neptune City, New Jersey.

Lévêque, C., and J. Daget. 1984. Cyprinidae. Pages 217-342 in J. Daget, J.-P. Gosse, and D. F. E. Thys van den Audenaerde, editors. Check-list of the freshwater fishes of Africa (CLOFFA), volume 1. ORSTOM, Paris and MRAC, Tervuren, Belgium.

Lowe, R. H. 1952. Report on the Tilapia and other fish and fisheries of Lake Nyasa 1945-47. Colonial Office Fishery Publications 1(2):1-126.

Reid, G. M. 1985. A revision of African species of *Labeo* (Pisces: Cyprinidae) and a re-definition of the genus. Verlag von J. Cramer, Braunschweig, Germany.

Ricardo Bertram, C. K., H. J. H. Borley, and E. Trewavas. 1942. Report on the fish and fisheries of Lake Nyasa. The Crown Agents for the Colonies, London.

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, L., L. De Vos, and D. O. Okeyo. 2003. Annotated checklist of the freshwater fishes of Kenya (excluding the lacustrine haplochromines from Lake Victoria). *Journal of East African Natural History* 92:11-47.
- Snoeks, J. 2004. The non-cichlid fishes of the Lake Malawi system: a compilation. Pages 20-26 *in* J. Snoeks, editor. The cichlid diversity of Lake Malawi/Nyasa/Niassa: identification, distribution and taxonomy. Cichlid Press, El Paso, Texas.
- Tshibwabwa, S. M. 1997 Systématique des espèces africaines du genre *Labeo* (Teleostei, Cyprinidae) dans les régions ichthyogéographiques de Basse-Guinée et du Congo I. Doctoral thesis. Presses Universitaires de Namur, Namur, Belgium.