

Lake Rukwa Tilapia (*Oreochromis rukwaensis*)

Ecological Risk Screening Summary

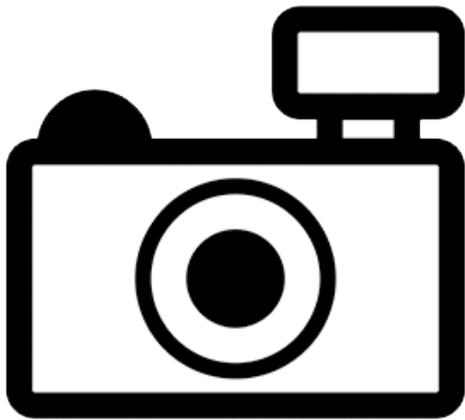
U.S. Fish & Wildlife Service, March 2012

Revised, July 2018

Web Version, 6/4/2020

Organism Type: Fish

Overall Risk Assessment Category: Uncertain



No Photo Available

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Africa: Lake Rukwa in Tanzania.”

From Shechonge et al. (2019):

“*Oreochromis rukwaensis* (Hilgendorf & Pappenheim 1903) previously known only from Lake Rukwa was present in an upstream section of the Ruaha river system, where a major exploited population was recorded at the Mtera Dam Lake [Tanzania].”

Status in the United States

No records of *Oreochromis rukwaensis* occurrences in the United States were found. No information on trade of *O. rukwaensis* in the United States was found.

The Florida Fish and Wildlife Conservation Commission has listed the tilapia, *Oreochromis rukwaensis* as a prohibited species. Prohibited nonnative species (FFWCC 2020), "are considered to be dangerous to the ecology and/or the health and welfare of the people of Florida. These species are not allowed to be personally possessed or used for commercial activities."

Means of Introductions in the United States

No records of *Oreochromis rukwaensis* occurrences in the United States were found.

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Eschmeyer et al. (2018), *Oreochromis rukwaensis* (Hilgendorf and Pappenheim 1903) is the current valid name of this species.

From ITIS (2018):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Oreochromis*
Species *Oreochromis rukwaensis* (Hilgendorf and Pappenheim, 1903)

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 33.0 cm SL male/unsexed; [Eccles 1992]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic.”

Climate

From Froese and Pauly (2018):

“Tropical; 7°S - 9°S”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Africa: Lake Rukwa in Tanzania.”

From Shechonge et al. (2019):

“*Oreochromis rukwaensis* (Hilgendorf & Pappenheim 1903) previously known only from Lake Rukwa was present in an upstream section of the Ruaha river system, where a major exploited population was recorded at the Mtera Dam Lake [Tanzania].”

Introduced

No records of *Oreochromis rukwaensis* introductions were found.

Means of Introduction Outside the United States

No records of *Oreochromis rukwaensis* introductions were found.

Short Description

From Froese and Pauly (2018):

“Dorsal spines (total): 15 - 17; Dorsal soft rays (total): 11-13; Anal spines: 3; Anal soft rays: 10 - 11; Vertebrae: 30. Caudal fin free of scales except basally. Scales on cheek in 2 rows. Vertebrae 30. Outer teeth bicuspid, occasionally with a few tricuspid. Breeding males mainly black with orange margins to dorsal and caudal fins; pelvic fins black or yellowish and the long genital tassels orange-yellow; iridescent marblings on gill-cover and snout.”

Biology

From Froese and Pauly (2018):

“Inhabits lakes and rivers [Eccles 1992]. Males construct territories in shallow water. Where there is ample space, each territory consisted of a central raised mating platform in the middle of a large circular depression [Trewavas 1983].”

“Males construct breeding territories in shallow water, each territory consisting of a central raised mating platform at the center of a large circular depression. Males occupy territory at sunrise when water temperature was 12°C. Exhibits pseudo-spawning and true spawning.”

Human Uses

From Froese and Pauly (2018):

“Fisheries: commercial”

From Bayona and Hanssens (2006):

“The species is commercially exploited [in Tanzania] and composed 34.17% of the total annual catch in 1977 (Bernascek 1980) rising to 70% in 1996 (Fish. Div. 1996).”

From Mshana (2015):

“Fish species of commercial importance include Rukwa tilapia (*Oreochromis rukwaensis*), introduced Singida tilapia (*Oreochromis esculentus*), Redbreast tilapia (*Coptodon rendalli*, or *Tilapia rendalli*) and African sharptooth catfish (*Clarias gariepinus*), among others [Micryakov and Lapirova 1997]. These species are important sources of animal protein, employment and income generation for the local residents [Tanzania].”

Diseases

No information on diseases of *Oreochromis rukwaensis* were found. **No records of OIE-reportable diseases (OIE 2020) were found for *O. rukwaensis*.**

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

No records of *Oreochromis rukwaensis* introductions were found.

O. rukwaensis is listed as a prohibited species in Florida (FFWCC 2020).

4 History of Invasiveness

No records of *Oreochromis rukwaensis* introductions were found, therefore the History of Invasiveness is “No known Nonnative Population”.

5 Global Distribution

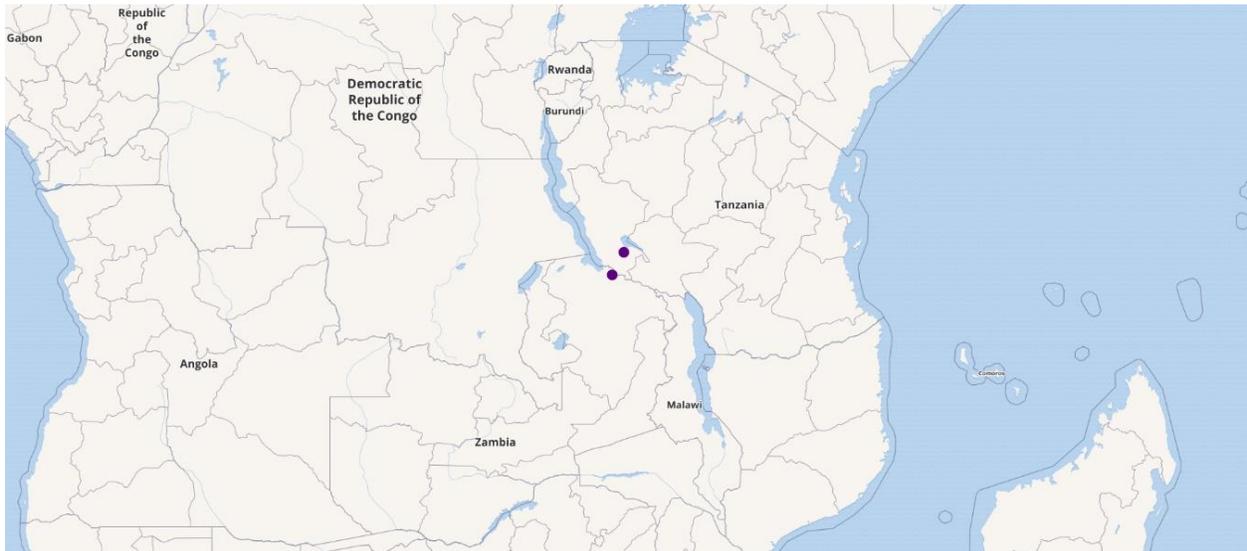


Figure 1. Known global distribution of *Oreochromis rukwaensis*. Locations are in Tanzania and Zambia. Map from GBIF Secretariat (2018).

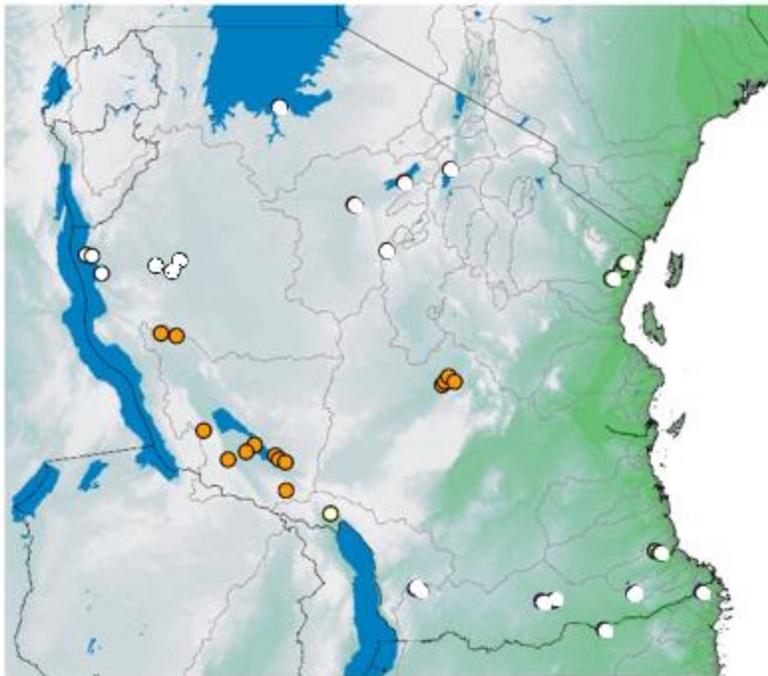


Figure 2. Distribution of *Oreochromis rukwaensis* (in orange) in eastern Africa according to Shechonge et al. (2019). Locations are all in Tanzania. Map edited from Shechonge et al. (2019), licensed under Creative Commons Attribution 4.0 International License.

6 Distribution Within the United States

No records of *Oreochromis rukwaensis* occurrences in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Oreochromis rukwaensis* was low for most of the contiguous United States with small patches of medium match in southern Florida, southern Texas, and the southern California coastline. 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 low). All States had low individual climate scores.

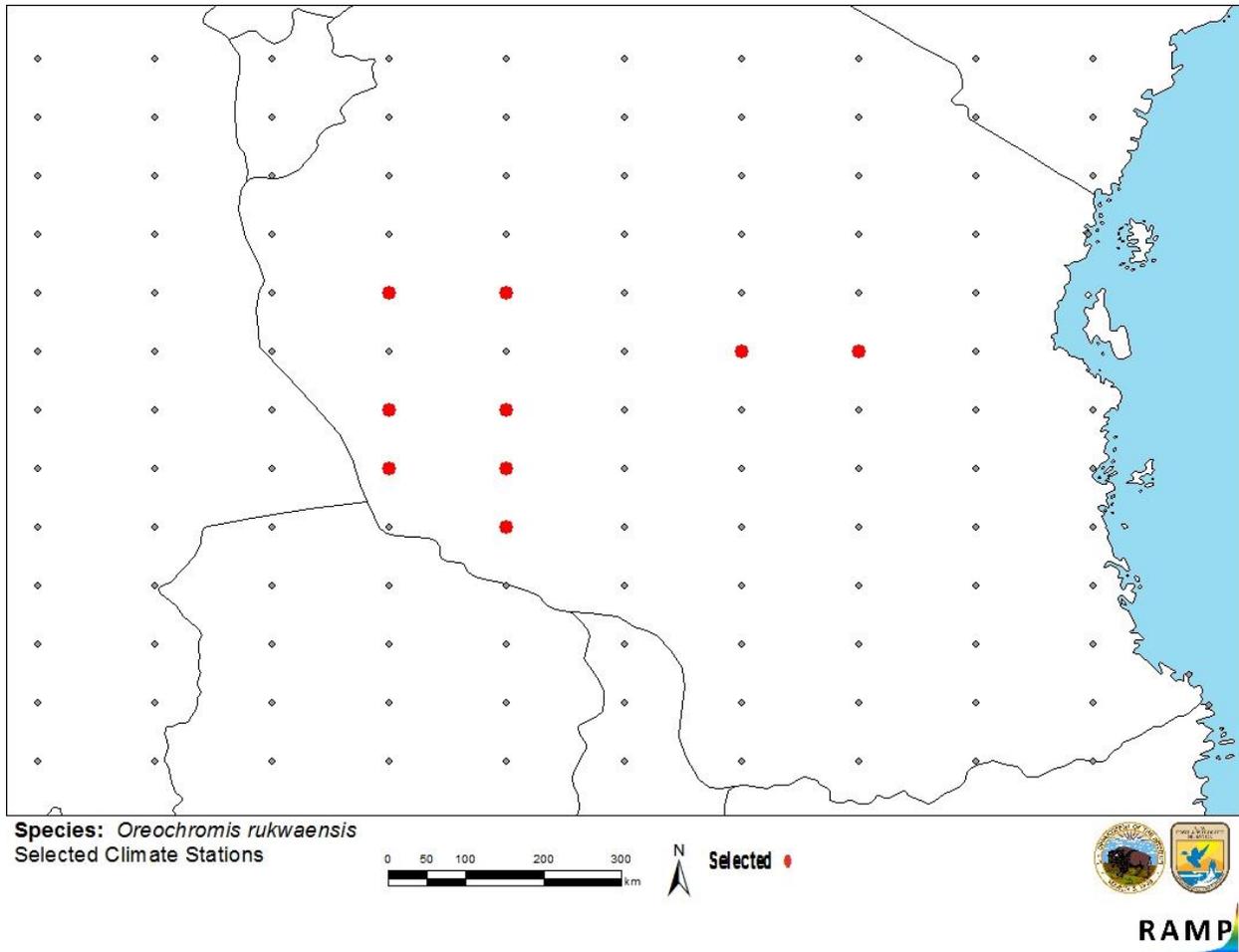


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in Tanzania selected as source locations (red; Tanzania) and non-source locations (gray) for *Oreochromis rukwaensis* climate matching. Source locations from GBIF Secretariat (2018) and Shechonge et al. (2019). Selected source locations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

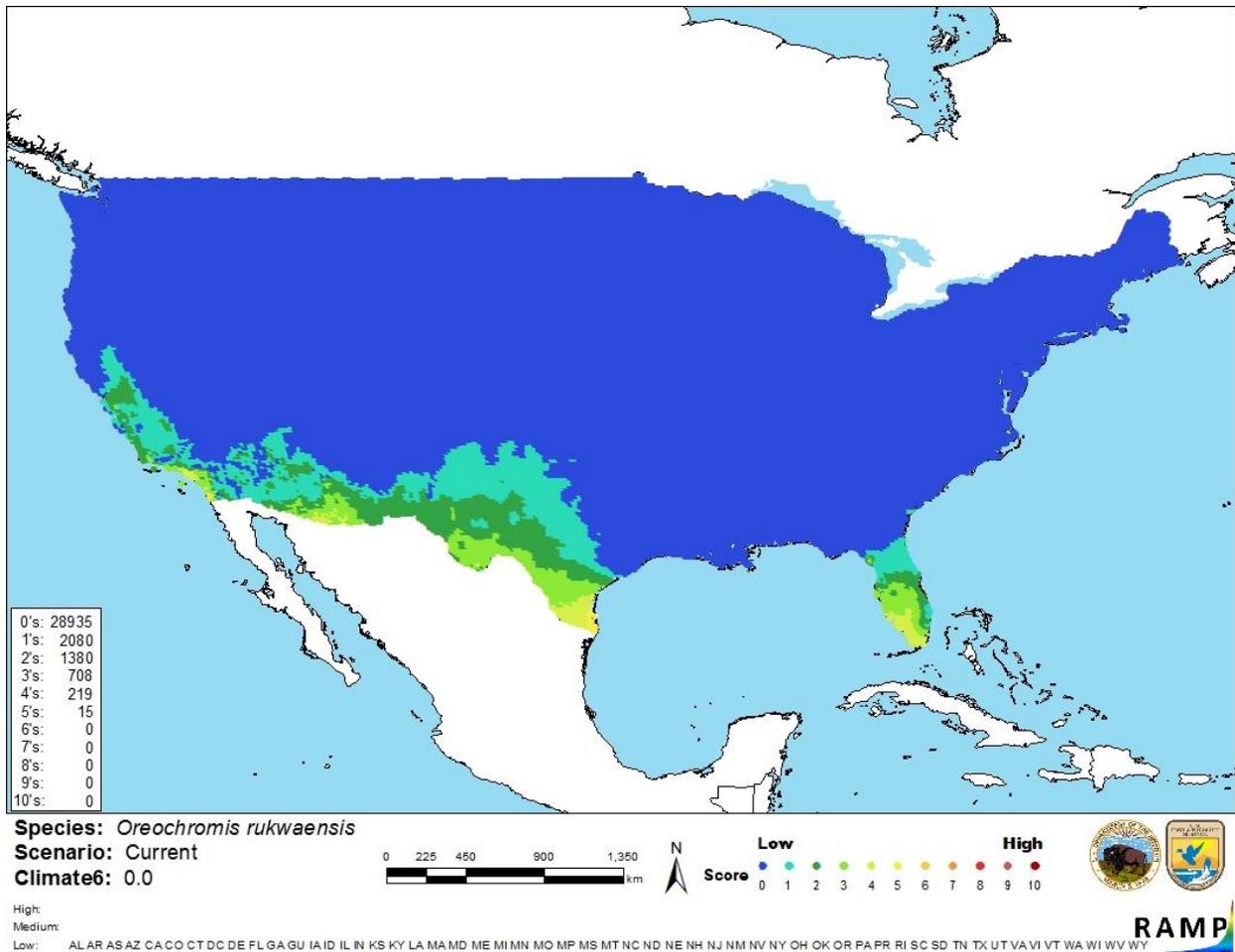


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Oreochromis rukwaensis* in the contiguous United States based on source locations reported by GBIF Secretariat (2018) and Shechonge et al. (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = 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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

Information is available about the biology, ecology, and distribution of *Oreochromis rukwaensis*. No records of introduction were found and therefore, there is no information on impacts of introduction. Due to this lack of information regarding the history of invasiveness the certainty of assessment is low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Lake Rukwa Tilapia, *Oreochromis rukwaensis*, is a fish native to Lake Rukwa and the Ruaha river system in Tanzania. This species forms an important commercial fishery in Tanzania. The history of invasiveness is No Known Nonnative Population. It has not been reported as introduced or established outside of its native range. *O. rukwaensis* is listed as a prohibited species in Florida. The climate match analysis resulted in a low match for the contiguous United States. There were very small areas of medium match in southern California, Texas, and Florida. The certainty of this assessment is low due to a lack of information on history of invasiveness. The overall risk assessment category 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.

Bayona JDR, Hanssens M. 2006. *Oreochromis rukwaensis*. The IUCN Red List of Threatened Species 2006: e.T60631A12389114. Available: <http://www.iucnredlist.org/details/60631/0> (July 2018).

Eschmeyer WN, Fricke R, van der Laan R, editors. 2018. Catalog of fishes: genera, species, references. California Academy of Science. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (July 2018).

[FFWCC] Florida Fish and Wildlife Conservation Commission. 2020. Prohibited species list. Tallahassee, Florida: Florida Fish and Wildlife Conservation Commission. Available: <https://myfwc.com/wildlifehabitats/nonnatives/prohibited-species-list/> (June 2020).

Froese R, Pauly D, editors. 2018. *Oreochromis rukwaensis* Hilgendorf and Pappenheim, 1903. FishBase. Available: <http://www.fishbase.se/summary/Oreochromis-rukwaensis.html> (July 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Oreochromis rukwaensis* (Hilgendorf and Pappenheim, 1903). Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/2372419> (July 2018).

[ITIS] Integrated Taxonomic Information System. 2018. *Oreochromis rukwaensis* (Hilgendorf and Pappenheim, 1903). Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=648853 (July 2018).

Mshana JG. 2015. Mercury and lead contamination in three fish species and sediments from Lake Rukwa and catchment areas in Tanzania. *Journal of Health and Pollution* 5:7–18.

[OIE] World Organisation for Animal Health. 2020. OIE-listed diseases, infections and infestations in force in 2020. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2020/> (June 2020).

Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.

Shechonge A, Ngatunga BP, Bradbeer SJ, Day JJ, Freer JJ, Ford AGP, Kihedu J, Richmond T, Mzighani S, Smith AM, Sweke EA, Tamatamah R, Tyers AM, Turner GF, Genner MJ. 2019. Widespread colonisation of Tanzanian catchments by introduced *Oreochromis* tilapia fishes: the legacy from decades of deliberate introduction. *Hydrobiologia* 832:235–253.

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.

Bernascek. 1980. [Source material did not give full citation for this reference.]

Eccles DH. 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. Rome, FAO: Project URT/87/016.

Fish. Div. 1996. [Source material did not give full citation for this reference.]

Hilgendorf FM, Pappenheim P. 1903. Über die Fischfauna des Rukwa-Sees. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin* 1903:259–271.

Micryakov VR, Lapirova TB. 1997. Influence of salts of some heavy metals on the differential blood count in juvenile *Acipenser baeri*. *Journal of Ichthyology* 37(6):458–62.

Trewavas E. 1983. Tilapiine fishes of the genera *Sarotherodon*, *Oreochromis* and *Danakilia*. London: British Museum of Natural History.