

Oreochromis karongae (a tilapia, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2012

Revised, June 2018

Web Version, 12/15/2020

Organism Type: Fish

Overall Risk Assessment Category: Uncertain

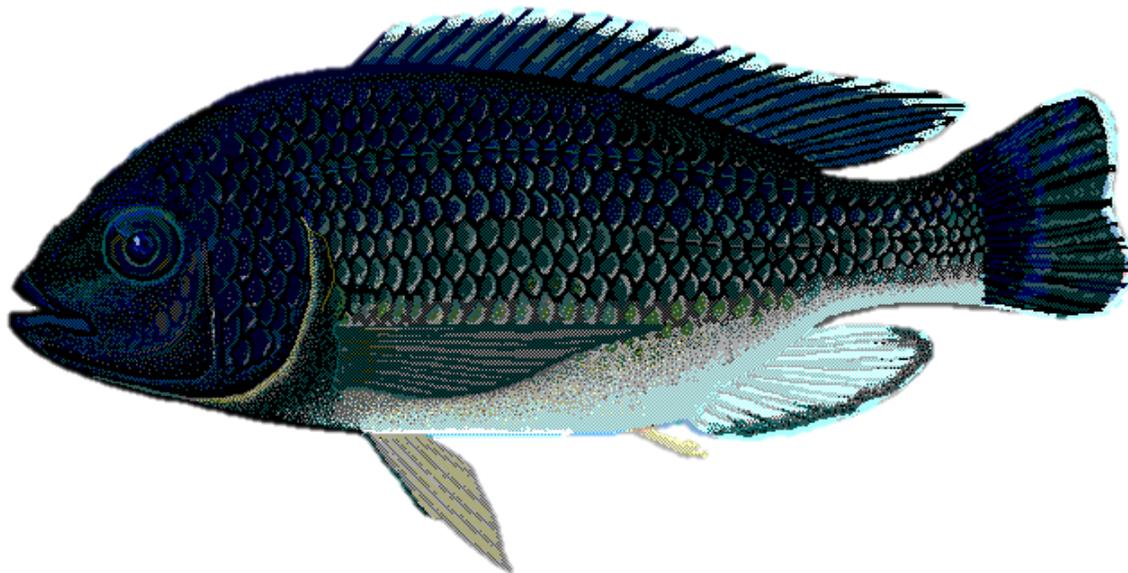


Photo: Robbie N. Cada. Licensed under Creative Commons BY 3.0 Unported. Available: <http://www.fishbase.org/photos/PicturesSummary.php?resultPage=3&ID=2042&what=species>. (June 19, 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Known from Lake Malawi [Turner et al. 1991a, b; Msiska and Costa-Pierce 1997], east of Domwe Island [Snoeks and Hanssens 2004] [Malawi] and Lake Malombe [Malawi] [Turner et al. 1991a; Seisay et al. 1992; Turner and Mwanyama 1992; Msiska and Costa-Pierce 1997].”

From Kazembe and Makocho (2004):

“Endemic to Lake Malawi, Lake Malombe and the Upper and Middle Shire river [*sic*].”

Status in the United States

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

The Florida Fish and Wildlife Conservation Commission has listed the tilapia *O. karongae* as a prohibited species. Prohibited nonnative species (FFWCC 2018), "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.

Possession of any species of tilapia is prohibited without permit in the State of Louisiana (Louisiana State Legislature 2019).

O. karongae 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.”

Tilapia species are prohibited to be sold and used as bait or stocked in heated-water reservoirs in the State of Oklahoma (Oklahoma Secretary of State 2019).

All species in the genus *Oreochromis* are listed as prohibited in Texas (Texas Parks and Wildlife 2020).

A permit is required to import, possess, or sell any species of tilapia in Virginia (Virginia Department of Game and Inland Fisheries 2020).

All species in the genus *Oreochromis* are considered regulated Type A species in Washington. Regulated Type A species (Washington State Senate 2019) are “nonnative aquatic animal species that pose a low to moderate invasive risk that can be managed based on intended use or geographic scope of introduction, have a beneficial use, and are a priority for department-led or department-approved management of the species' beneficial use and invasive risks.”

Means of Introductions in the United States

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

Remarks

From D’Amato et al. (2007):

“Hybridization of *O. mossambicus* was indicated by the presence of [...] *O. karongae* mtDNA in specimens from Malawi.”

Information searches for this screening were conducted using the valid name *Oreochromis karongae* and the synonym *Tilapia karongae*.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Eschmeyer et al. (2018), *Oreochromis karongae* (Trewavas 1941) is the valid name for this species. *O. karongae* was originally described as *Tilapia karongae* Trewavas 1941.

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 karongae* (Trewavas, 1941)

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Maturity: L_m 28.9, range 20 - 38 cm

Max length : 42.0 cm TL male/unsexed; [Turner and Mwanyama 1992]; 38.0 cm SL (female)”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic, usually ? - 10 m [Konings 1990]. [...]; 22°C - 28°C [assumed to be recommended aquarium temperature]; [...]”

Climate

From Froese and Pauly (2018):

“Tropical; [...]; 8°S - 15°S”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Known from Lake Malawi [Turner et al. 1991a, b; Msiska and Costa-Pierce 1997], east of Domwe Island [Snoeks and Hanssens 2004] [Malawi] and Lake Malombe [Malawi] [Turner et al. 1991a; Seisay et al. 1992; Turner and Mwanyama 1992; Msiska and Costa-Pierce 1997].”

From Kazembe and Makocho (2004):

“Endemic to Lake Malawi, Lake Malombe and the Upper and Middle Shire river [*sic*].”

Introduced

FAO (2018) lists *Oreochromis karongae* as introduced to and probably established in Malawi from Nkhata Bay (Malawi). The specific location of introduction in Malawi was not given therefore it is unknown if this is a record of an introduction outside the species' native range.

Means of Introduction Outside the United States

FAO (2018) lists aquaculture and research as the reasons of introduction by an international organization.

From D'Amato et al. (2007):

“This phylogenetic reconstruction allows for the inference of anthropogenic translocations, examples being the presence of *O. andersonii–mortimeri* in the Limpopo basin and *O. karongae* in Sucoma.”

“The presence of *O. karongae* mtDNA in Sucoma may likely result from hybridization with escapees from fish farms.”

Short Description

From Froese and Pauly (2018):

“Dorsal spines (total): 15 - 17; Dorsal soft rays (total): 10-12; Anal spines: 3; Anal soft rays: 8 - 10; Vertebrae: 30 - 32. Diagnosis: head length 30.8-36.0% SL; length of lower jaw 28.4-34.5% head length; teeth of jaws in 4-5(6) rows [Trewavas 1983]. Massive (lower) pharyngeal bone with large toothed area [Lowe 1952; Trewavas 1983], with straight [Ricardo Bertram et al. 1942; Jackson 1961; Trewavas 1983] or slightly convex sides [Trewavas 1983]. Median length of bone 1.14-1.32 times its width and 38.2-42.2 % length of head; blade 1.0-1.7 times median length of toothed area; breeding male black [Trewavas 1983].”

“Caudal fin scaly [Trewavas 1941, 1983] and emarginate [Trewavas 1983]. In adults both upper and lower lobes of caudal fin rounded; caudal peduncle as long as or longer than deep; genital papilla prominent and bifid in breeding fishes [Trewavas 1983]. Males develop a breeding dress

[Konings 1990] and a genital tassel [Konings 1990; Sodsuk et al. 1995], each branch bearing tubercles and filaments [Trewavas 1983].”

“Coloration: Non-breeding fish: silver-grey, darker on the dorsum, with black vertical bars of uneven length from the dorsum to mid-flanks [Trewavas 1983]. Ripe females: very dark, almost black [Turner and Robinson 1991]. At some times of the year [Turner and Robinson 1991] females, juveniles and non-breeding fish develop a yellowish-brown body with yellow margin to the dorsal fin [Turner and Robinson 1991; Turner and Mwanayama 1992]. Courting male: black [Lowe 1952; Turner and Robinson 1991; Eccles 1992; Turner and Mwanayama 1992], often with iridescent patches on the head or body [Turner and Robinson 1991]. Flank scales often with coppery metallic spot [Turner and Robinson 1991]. Broad white margins to dorsal [Trewavas 1941, 1983] and caudal fin and sometimes also to the anal fin [Trewavas 1983]. Black color lost in a few seconds when alarmed, turning a pale grey, often with iridescent greenish or coppery areas on the flanks or head [Turner et al. 1991b].”

Froese and Pauly (2018) also list 33–36 scales on lateral line.

Biology

From Froese and Pauly (2018):

“Occurs in shallow vegetated bays, over sand, in purely rocky biotopes and other kinds of habitats; mostly found at shallow depths; feeds on phytoplankton and on diatom sediment on the sand [Konings 1990]. Maternal mouthbrooder [Turner and Mwanayama 1992].”

“Breeding period extends over several months as noted in Lake Malombe, at present one of the main breeding areas for this species [Turner and Mwanayama 1992]. Males build nests on a variety of substrata and at depths of 0.5m to at least 28m; nests generally 0.3-1.9m diameter, with dimensions correlated to male size [Turner and Robinson 1991]. Nest with a characteristic spawning cone in its center [Konings 1990]. Courtship appears to occur mainly in the early morning [Turner and Robinson 1991; Turner et al. 1991b], and consist of leading, followed by tilting and head-down quivering if the female follows the male to the nest [Turner et al. 1991b]. A female with 324 young of 15mm long in the mouth has been caught [Lowe 1952]. Females keep guarding their fry until they are about 24 mm [Lowe 1952; Turner and Mwanayama 1992].”

Human Uses

From Kazembe and Makocho (2004):

“The total chambo [*Oreochromis karongae* and two other *Oreochromis* spp.] catch (for Lake Malawi, Upper Shire and Lake Malombe combined) in 1980 was 10,711 tons, increasing to 17,439 tons in 1982. However, by 1990 it had declined to 6,483 dropping further to 2,774 tons in 1996. This infers a reduction of more than 70% in the catches over a ten-year period. Further monitoring in southern Lake Malawi has found that chambo stocks have continued to decline at the same rate during 1994–1999.”

“Chambo are the most valuable food fishes in Malawi.”

Diseases

No records of OIE-reportable diseases (OIE 2020) were found for *Oreochromis karongae*.

From García-Vásquez et al. (2011):

“*G[yrodactylus]. cichlidarum* was also found to infect *Oreochromis karongae* (Trewavas) [...]”

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

A single record of introduction was found but no information was available on any potential or realized impacts.

Oreochromis karongae is a regulated species in multiple States. See Section 1 for more information.

4 History of Invasiveness

A single record of introduction was found that did indicate it possibly resulted in an established population. However, the only location information given was that it was introduced to Malawi, which contains part of the native range of this species. The history of invasiveness is classified as “No Known Nonnative Population.”

5 Global Distribution

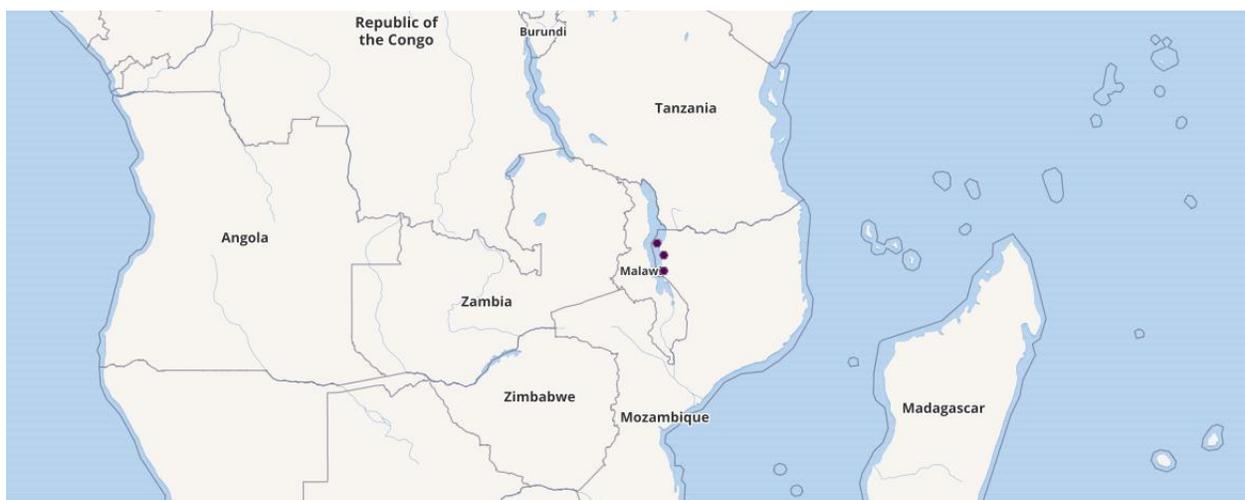


Figure 1. Known global distribution of *Oreochromis karongae*. Locations are in Malawi (eastern Africa). Map from GBIF Secretariat (2018).

6 Distribution Within the United States

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

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Oreochromis karongae* was low across all of the contiguous United States. 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 scores.

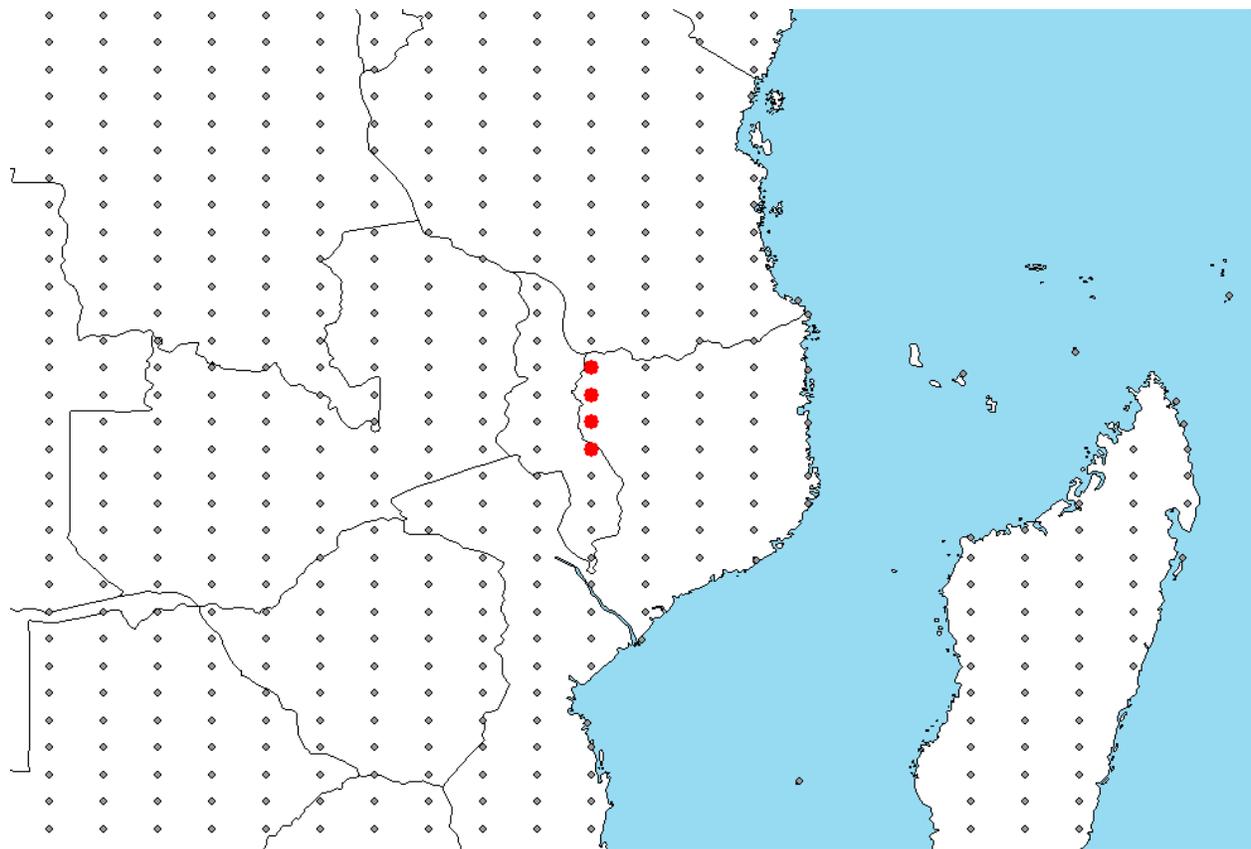


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in eastern Africa selected as source locations (red; Malawi and Tanzania) and non-source locations (gray) for *Oreochromis karongae* climate matching. Source locations from GBIF Secretariat (2018). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

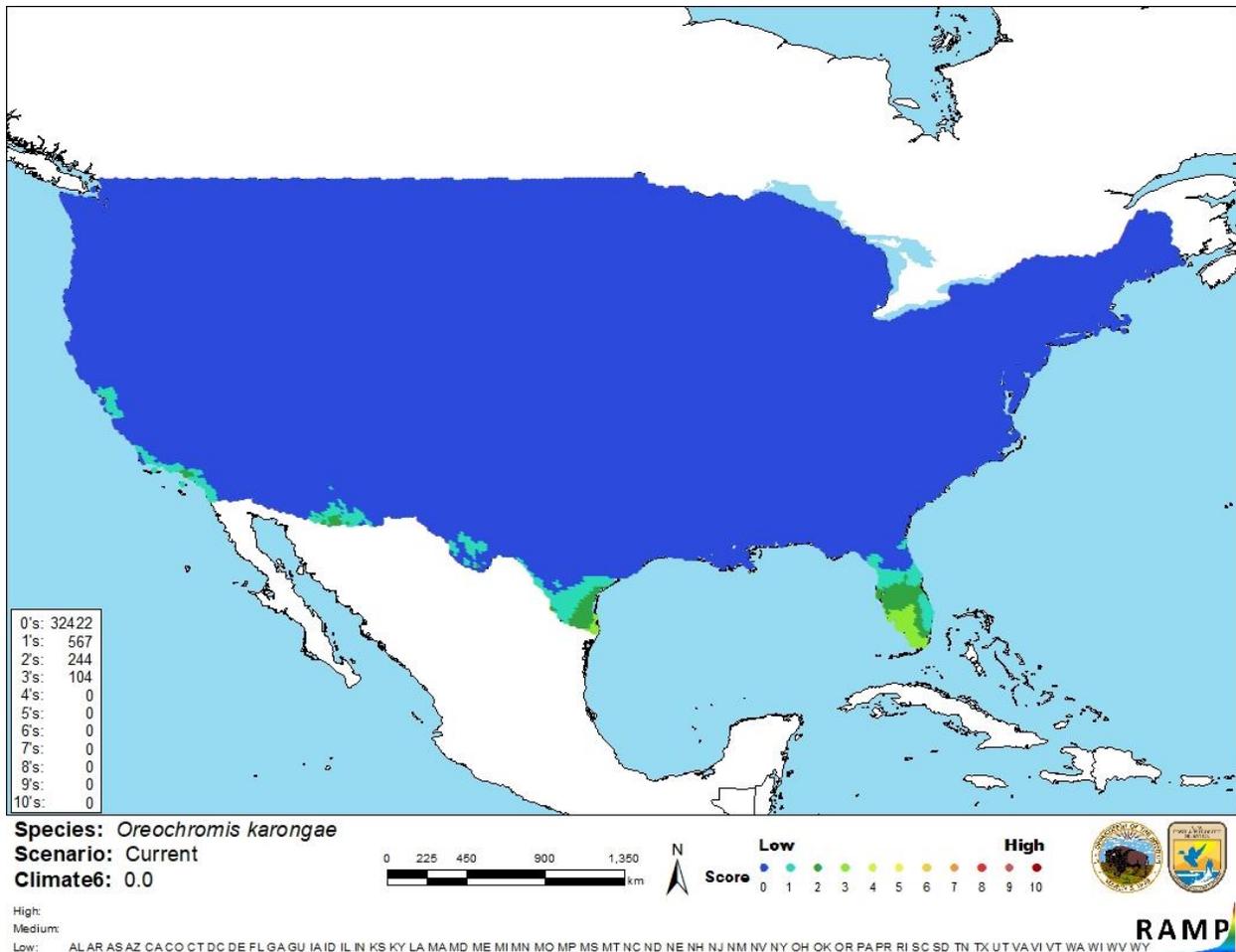


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Oreochromis karongae* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). Counts of climate match are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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

The certainty of assessment for *Oreochromis karongae* is low. General biological information is available from reliable sources. A single record of introduction was found but it did not contain much information and there was no information on any impacts from that introduction.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Oreochromis karongae is a species of tilapia native to Lake Malawi in Africa. It is locally important in the commercial fish harvest. The history of invasiveness for *O. karongae* is classified as “No Known Nonnative Population.” A single record of introduction was found that did indicate it possibly resulted in an established population. However, it is unknown if this introduction was outside of the native range. *O. karongae* is a regulated species in multiple States. The climate match is low with no areas of medium or high match. The certainty of assessment is low and 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 information
- **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.

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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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