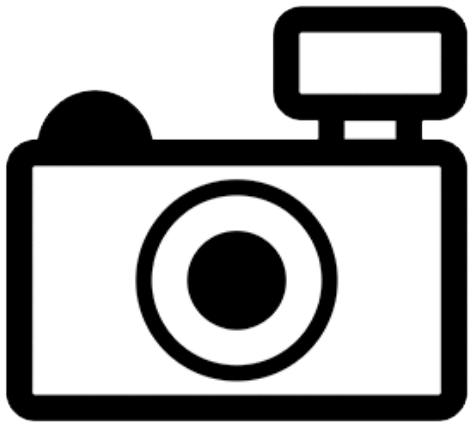
Kariba Tilapia (*Oreochromis mortimeri*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2012
Revised, July 2018
Web Version, 5/21/2020

Organism Type: Fish
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2020):

"Africa: Middle Zambezi and its tributaries, including Luangwa River (except probably the upper reaches of its tributaries Lunsemfwa and Mulungwishi above the escarpment), Hunyani River and Lake Kariba [Trewavas and Teugels 1991]."

"[In Zambia,] Known from Lake Kariba [Jackson 1961; Bell-Cross and Minshull 1988; Kenmuir 1989; Losse 1998], where it is a species of primary economic importance [Losse 1998]. Also known from the Luangwa River [Jackson 1961; Trewavas 1966; Thys van den Audenaerde 1968; Bell-Cross 1976; Bell-Cross and Minshull 1988; Kenmuir 1989], the Lusito River [Balon 1974] and the Middle Zambezi [Jackson 1961; Kenmuir 1989]."

"Its frequent transfer throughout the country [Zimbabwe] makes it extremely difficult to define accurately the natural limits of distribution [Bell-Cross 1976; Bell-Cross and Minshull 1988].

Probably confined to Lake Kariba [Bell-Cross 1976; Bell-Cross and Minshull 1988; Marshall 1988; Kenmuir 1989; Sanyanga et al. 1995; Feresu-Shonhiwa and Howard 1998; Mhlanga 1998], the Middle Zambezi [Bell-Cross 1976; Bell-Cross and Minshull 1988; Marshall 1988; Feresu-Shonhiwa and Howard 1998; Gregg et al. 1998] and its tributaries [Bell-Cross 1976; Bell-Cross and Minshull 1988]. Known from the rivers Hunyani [Thys van den Audenaerde 1968; Lamboj 2004] and Sanyati [Mhlanga 2000]. Also collected from the Upper Zambezi [Sodsuk et al. 1995]."

Status in the United States

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

The Florida Fish and Wildlife Conservation Commission has listed the tilapia *Oreochromis mortimeri* 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 mortimeri* occurrences in the wild in the United States were found.

Remarks

From Froese and Pauly (2020):

"Interbreeds with *O. mossambicus* in the lower Athi River, where both species meet [Thys van den Audenaerde1988]."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Eschmeyer et al. (2018), *Oreochromis mortimeri* (Trewavas 1966) 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 mortimeri* (Trewavas, 1966)

Size, Weight, and Age Range

From Froese and Pauly (2020):

"Maturity: L_m 22.0 range ? - ? cm
Max length : 48.0 cm TL male/unsexed; [Kolding et al. 1992]; max. published weight: 4.1 kg [Bell-Cross and Minshull 1988]; max. reported age: 8 years [Trewavas 1983]"

Environment

From Froese and Pauly (2020):

"Freshwater; benthopelagic."

Climate

From Froese and Pauly (2020):

"Tropical; 10°S - 19°S"

Distribution Outside the United States

Native

From Froese and Pauly (2018):

"Africa: Middle Zambezi and its tributaries, including Luangwa River (except probably the upper reaches of its tributaries Lunsemfwa and Mulungwishi above the escarpment), Hunyani River and Lake Kariba [Trewavas and Teugels 1991]."

"[In Zambia,] Known from Lake Kariba [Jackson 1961; Bell-Cross and Minshull 1988; Kenmuir 1989; Losse 1998], where it is a species of primary economic importance [Losse 1998]. Also known from the Luangwa River [Jackson 1961; Trewavas 1966; Thys van den Audenaerde 1968; Bell-Cross 1976; Bell-Cross and Minshull 1988; Kenmuir 1989], the Lusito River [Balon 1974] and the Middle Zambezi [Jackson 1961; Kenmuir 1989]."

"Its frequent transfer throughout the country [Zimbabwe] makes it extremely difficult to define accurately the natural limits of distribution [Bell-Cross 1976; Bell-Cross and Minshull 1988]. Probably confined to Lake Kariba [Bell-Cross 1976; Bell-Cross and Minshull 1988; Marshall 1988; Kenmuir 1989; Sanyanga et al. 1995; Feresu-Shonhiwa and Howard 1998; Mhlanga 1998], the Middle Zambezi [Bell-Cross 1976; Bell-Cross and Minshull 1988; Marshall 1988; Feresu-Shonhiwa and Howard 1998; Gregg et al. 1998] and its tributaries [Bell-Cross 1976; Bell-Cross and Minshull 1988]. Known from the rivers Hunyani [Thys van den Audenaerde 1968; Lamboj 2004] and Sanyati [Mhlanga 2000]. Also collected from the Upper Zambezi [Sodsuk et al. 1995]."

Introduced
From Froese and Pauly (2020):

"Introduced to Kipopo and the Lufira River (upper Congo River basin) in Democratic Republic of the Congo [Moreau et al. 1988]."

"Introduced from Lake Kariba (Zimbabwe?) to Chilanga [Zambia] [Thys van den Audenaerde 1994]. Information is incomplete."

Froese and Pauly (2020) lists *Oreochromis mortimeri* as introduced and established through natural reproduction in the Democratic Republic of the Congo (under the name Zaire).

Means of Introduction Outside the United States

From Froese and Pauly (2020):

"Used for stocking reservoirs and dams [Welcomme 1988]."

Short Description

From Froese and Pauly (2020):

"Dorsal spines (total): 16 - 17; Dorsal soft rays (total): 10-13; Anal spines: 3; Anal soft rays: 10 - 12; Vertebrae: 29 - 30. Diagnosis: jaws greatly enlarged in mature males; scales in 2-3 rows on cheek; caudal peduncle relatively shorter than in *O. mossambicus* [Trewavas 1983]. In life greenish grey [Trewavas 1983], green-blue [Lamboj 2004] or grey-blue with a darker spot on each scale [Trewavas 1983; Lamboj 2004]. Females and immature males often with 1-3 dark mid-lateral blotches [Trewavas 1983; Lamboj 2004], which may appear only as the fish dies [Trewavas 1983]. Breeding males: predominantly iridescent blue-green to bronze [Trewavas 1983; Lamboj 2004], with iridescent spots on dorsal and caudal fins [Trewavas 1983], a dorsal fin with a red edge that is not as pronounced as in *O. mossambicus*, and a narrow (as opposed to wide) red band at posterior end of caudal fin [Bell-Cross 1976; Bell-Cross and Minshull 1988]."

Biology

From Froese and Pauly (2020):

"Forms schools [Trewavas 1983; Kenmuir 1989]. Is mainly diurnal; salt-tolerant [Trewavas 1983]. Feeds mainly on (filamentous) algae [Bell-Cross 1976; Trewavas 1983; Bell-Cross and Minshull 1988; Kenmuir 1989; Lamboj 2004] and diatoms, as well as higher plants [Trewavas 1983; Lamboj 2004], dipterous larvae, cladocerans, copepods [Trewavas 1983], aquatic and terrestrial insects, shrimps, worms [Bell-Cross 1976; Bell-Cross and Minshull 1988; Kenmuir 1989] and mollusks [Kenmuir 1989]. Mouthbrooder; spawns several times per year [Bell-Cross 1976; Bell-Cross and Minshull 1988; Kenmuir 1989]."

"Nest a saucer-shaped depression with a raised mound in the middle [Bell-Cross 1976; Bell-Cross and Minshull 1988], made by the male in a breeding arena in shallow water down to about 4m [Kenmuir 1989]. Females are lured to these through male courtship displays; female collects

eggs in mouth after spawning and fertilisation, and moves off; mouthbrooding females may shoal together and do not feed at this time; eggs hatch after about ten days but remain in the mouth for a further few days; juveniles make short feeding sorties once the storage yolk is used up, but seldom stray far and dart into her mouth when danger threatens; after about another 10 days young are released in warm shallow water in the margins (nursery areas), where they feed independently in small shoals [Kenmuir 1989]. Young released from mouthbrooding female are about 1cm long [Trewavas 1983]. Female returns to the breeding arena where she spawns again [Kenmuir 1989]."

Human Uses

From Froese and Pauly (2020):

"Fisheries: commercial; aquaculture: experimental; gamefish: yes"

"[…] where [Zambia] it is a species of primary economic importance [Losse 1998]."

Diseases

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

Froese and Pauly (2020) lists *Acanthogyrus* infestation and *Diplostomum* sp. as diseases of *Oreochromis mortimeri.*

Poelen et al. (2014) lists *Cichlidogyrus longicornis, Scutogyrus longicornis, Cichlidogyrus dossoui, Scutogyrus gravivaginus, Cichlidogyrus karibae, Cichlidogyrus halli, Cichlidogyrus sclerosus, Cichlidogyrus tilapiae, Cichlidogyrus zambezensis, Gyrodactylus niloticus,* and *Gyrodactylus shariffi* as parasites of *Oreochromis mortimeri.*

Threat to Humans

From Froese and Pauly (2020):

"Harmless"

3 Impacts of Introductions

Impacts of introductions of *Oreochromis mortimeri* have not been reported.

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

4 History of Invasiveness

Oreochromis mortimeri has been introduced to the Democratic Republic of the Congo and established a population. It has also been introduced and become established outside of its native range in Zambia and Zimbabwe. No records of impacts from those introductions were found so the history of invasiveness for *O. mortimeri* is Data Deficient.

5 Global Distribution

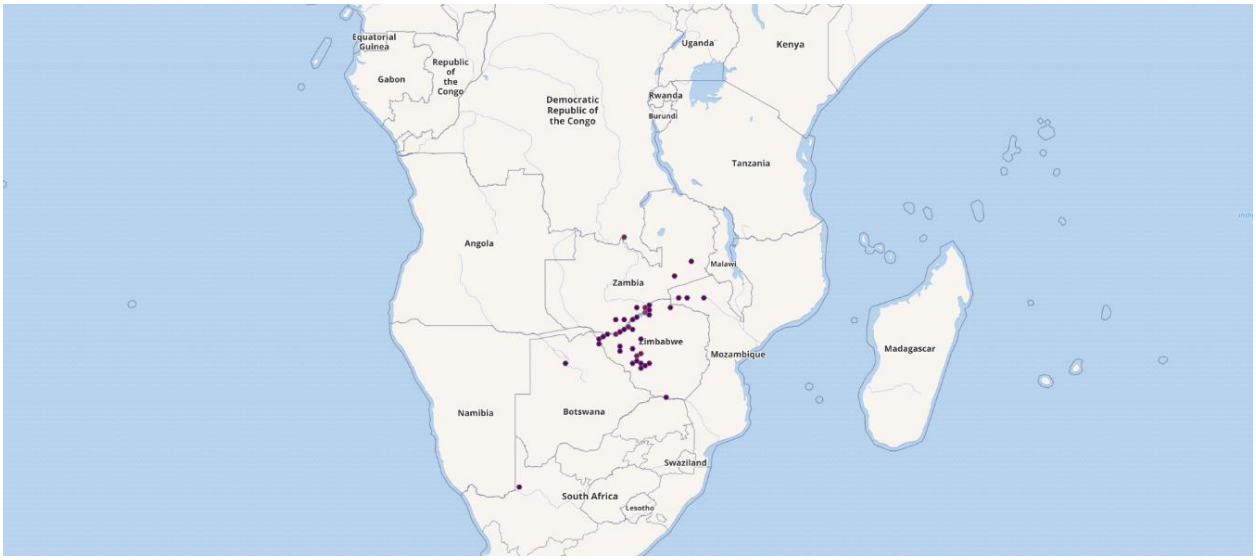


Figure 1. Known global distribution of *Oreochromis mortimeri*. Locations are in Democratic Republic of the Congo, Zambia, Mozambique, Zimbabwe, Botswana, and South Africa. Map from GBIF Secretariat (2018). The points in western Mozambique were used to select source points for the climate match as those locations are in the same system as known populations. The points located in South Africa and northern central Botswana were not used a location source point due to lack of literature supporting this location.

6 Distribution Within the United States

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

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Oreochromis mortimeri* was low for most of the contiguous United States with patches of medium match in southern Florida, southwestern Texas, southern New Mexico, southern Arizona, and along the southern coast of California. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.009, medium (scores between 0.005 and 0.103, are categorized as medium). Almost all States had a low individual climate score except for Texas and Arizona which had a medium individual scores.

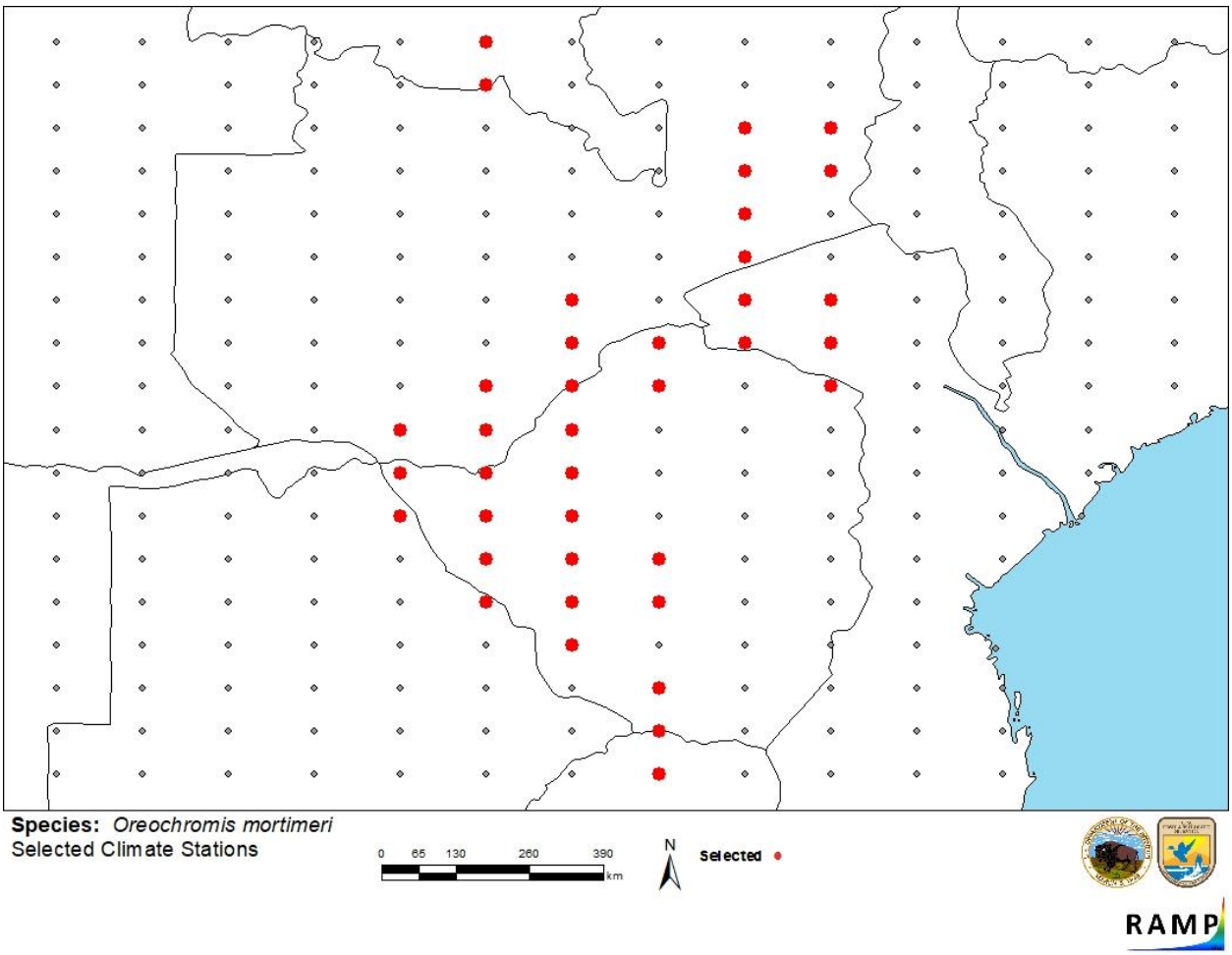


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in south Africa selected as source locations (red; Democratic Republic of the Congo, Zambia, Mozambique, Zimbabwe, Botswana, South Africa) and non-source locations (gray) for *Oreochromis mortimeri* climate matching. Source locations 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.

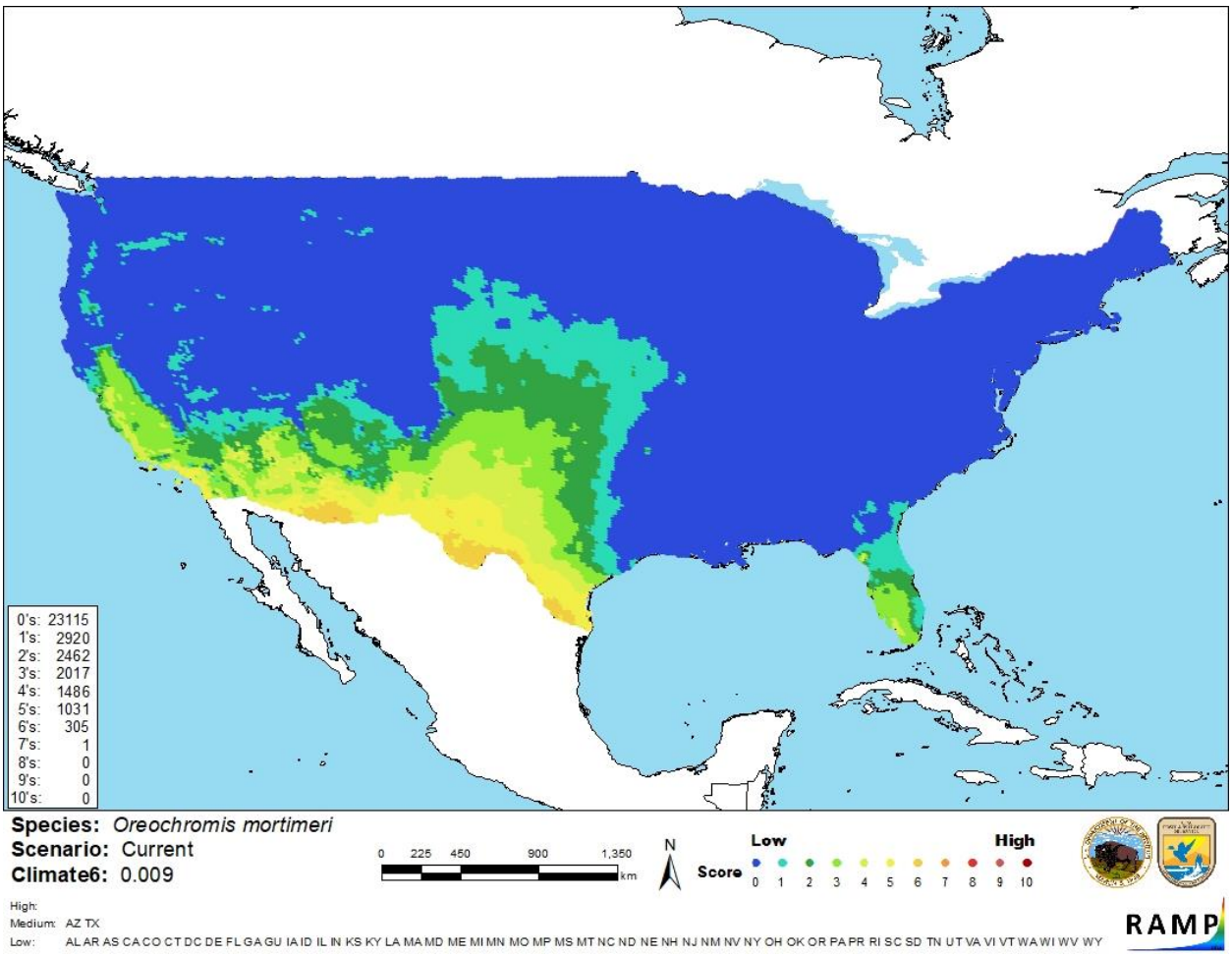


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Oreochromis mortimeri* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

There is biological and ecological information for *Oreochromis mortimeri*. A couple records of introduction were found, at least one resulted in an established population. No records of impacts from the introductions were found. Therefore, due to the lack of information the certainty is low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Kariba Tilapia (*Oreochromis mortimeri*) is a fish native to river systems in Zambia and Zimbabwe. This species is utilized in a commercial fishery in its native range. *O. mortimeri* is listed as a prohibited species in Florida. The history of invasiveness is Data Deficient. *O. mortimeri* has been introduced to Democratic Republic of the Congo and outside the native range in Zambia and Zimbabwe. Some of those introductions resulted in established populations but no information on impacts of those introductions was found. The climate match analysis resulted in a medium match for the contiguous United States. Most of the contiguous United States had a low match but there were areas of medium match in southern Florida, Texas, Arizona, New Mexico, and California. The certainty of this assessment is low due to lack of information. The overall risk assessment category in uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Data Deficient**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): 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.

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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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