

Otjikoto Tilapia (*Tilapia guinasana*)

Ecological Risk Screening Summary

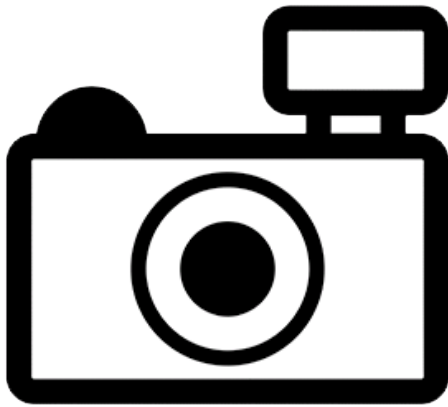
U.S. Fish & Wildlife Service, December 2019

Revised, January 2020

Web Version, 6/23/2020

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 (2019):

“Africa: endemic to Lake Guinas, Namibia.”

Status in the United States

No records of *Tilapia guinasana* in the wild or in trade were found for the United States.

The Florida Fish and Wildlife Conservation Commission has listed the tilapia *Tilapia guinasana* as a prohibited species. Prohibited nonnative species (FFWCC 2019), "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 *Tilapia guinasana* were found in the wild in the United States.

Remarks

This ERSS was previously published in June 2015 under *Tilapia guinasana*. Revisions were done to incorporate new information and to bring the document in line with current standards.

From Skelton (1987):

“Status: Endangered. Known from two sinkhole locales only, both of which are subject to human interference and exploitation.”

“*Tilapia guinasana* crosses readily with *Tilapia sparrmanii* and the crossed offspring are fertile (Penrith in littera).”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Tilapia guinasana* (Trewavas 1936) is the current valid name for this species.

From ITIS (2019):

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 *Tilapia*
Species *Tilapia guinasana* Trewavas, 1936

Size, Weight, and Age Range

From Froese and Pauly (2019):

“Max length : 14.0 cm TL male/unsexed; [de Moor and Bruton 1988]”

Environment

From Froese and Pauly (2019):

“Freshwater; benthopelagic; pH range: 7.0 - 7.8; dH range: ? - 15. [...]; 22°C - 26°C [assumed to be recommended aquarium temperature] [Baensch and Riehl 1991]; [...]

From Skelton (1987):

“Jaeger and Waibel (1921) recorded water temperatures 19 to 24°C in May 1914. [...] In the winter of 1914 Jaeger and Waibel (1921) recorded the water temperature as 25 to 27°C.”

Climate

From Froese and Pauly (2019):

“Tropical; [...]; 19°S - 21°S”

Distribution Outside the United States

Native

From Froese and Pauly (2019):

“Africa: endemic to Lake Guinas, Namibia.”

Introduced

From Froese and Pauly (2019):

“Introduced to Lake Otjikoto and several reservoirs in Namibia. Also occurs in subterranean rivers.”

FAO (2019) lists *Tilapia guinasana* as introduced to Botswana.

From Skelton (1987):

“The species has been translocated to farm dams and reservoirs in northern South West Africa/Namibia (Penrith in littera).”

Means of Introduction Outside the United States

No information on means of introductions was found for *Tilapia guinasana*.

Short Description

From Froese and Pauly (2019):

“Individuals tend to display different color patterns ranging from pure black to mottled black and blue, pink and white [Agenbag 1998].”

From Skelton (1987):

“Identification: [...] The colour and pigmentation of this species is extremely variable from a uniform dark greenish-black or olive-brown with darker vertical bars to specimens which are vividly particoloured in white, blue, yellow and black [...]. The dorsal spines number XIII-XIV usually XIII. The gill rakers are short with eight to 11 on lower anterior arch. There are one or two series of scales on the cheeks only.”

Biology

From Froese and Pauly (2019):

“Found in deep sinkhole lakes (100 m deep or more, [...]) with moderately clear water and with water temperatures ranging from 19 to 27°C [de Moor and Bruton 1988]. Omnivorous [Lamboj 2004], but feeds mainly on algae and diatoms [de Moor and Bruton 1988; Lamboj 2004]. Generally congregate, breed and feed from the near-vertical shores. Use narrow shelves for breeding, with established and defended territories, both parents guard and tend eggs. Threatened due to depletion of local groundwater resources and impact of introduced species [Skelton 1993]. Individuals tend to display different color patterns ranging from pure black to mottled black and blue, pink and white [Agenbag 1998]. Biparental open-spawning species [Lamboj 2004].”

“Nests are built on narrow rocky ledges and competition for these nest sites is very strong.”

Human Uses

From Froese and Pauly (2019):

“Fisheries: ; aquarium: commercial”

From Adeyemi et al. (2012):

“Investigation revealed that about 100 people are engaged in fishing activities while the major types of fishes at the dam are *Tarwada* (Cat Fish or *Ictalurus Furcatus*), *Karfasa* (Tilapia or *Tilapia Guinasana*), *Kawara* (*Alestes Nurse* (ln)), *Lulu* (*Schilbe Mystus* (ln)), *Akunu* (*Barbus Occidentalis*), Gold Fish (*Electris Nan Chevalier*) and *Lakki* (*Barillu Senegalenses*). The major ones harvested however are *Tarwada*, *Karfasa*, *Kawara*, *Lulu* and *Akunu*, while the peak of fishing activities is from April/May up till September/October, at the end of the rainy season.”

From Skelton (1987):

“Aquarium and captive breeding potential is excellent as several garden ponds have been stocked and the species breeds readily in these (P H Skelton personal observation).”

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Tilapia guinasana*.

No records of diseases were found for *Tilapia guinasana*.

Threat to Humans

From Froese and Pauly (2019):

“Harmless”

3 Impacts of Introductions

From Barnard (1998):

“This species [*Pseudocrenilabrus philander*] was ironically also lost from Lake Otjikoto when the endemic *Tilapia guinasana* was introduced from nearby Lake Guinas, presumably to safeguard the latter’s tiny population.”

Tilapia guinasana is listed as a prohibited species in Florida (FFWCC 2019).

4 History of Invasiveness

The history of invasiveness for *Tilapia guinasana* is Data Deficient. There is a record of an introduced population of *Tilapia guinasana* causing the extirpation of *Pseudocrenilabrus philander* in Lake Otjikoto in Namibia. The source of the information is a published book, however the methods used to determine the impact are not outlined within the book and no further references are provided. While the type of impact is significant, without access to the information that supports that claim the history of invasiveness cannot be rated as High.

5 Global Distribution

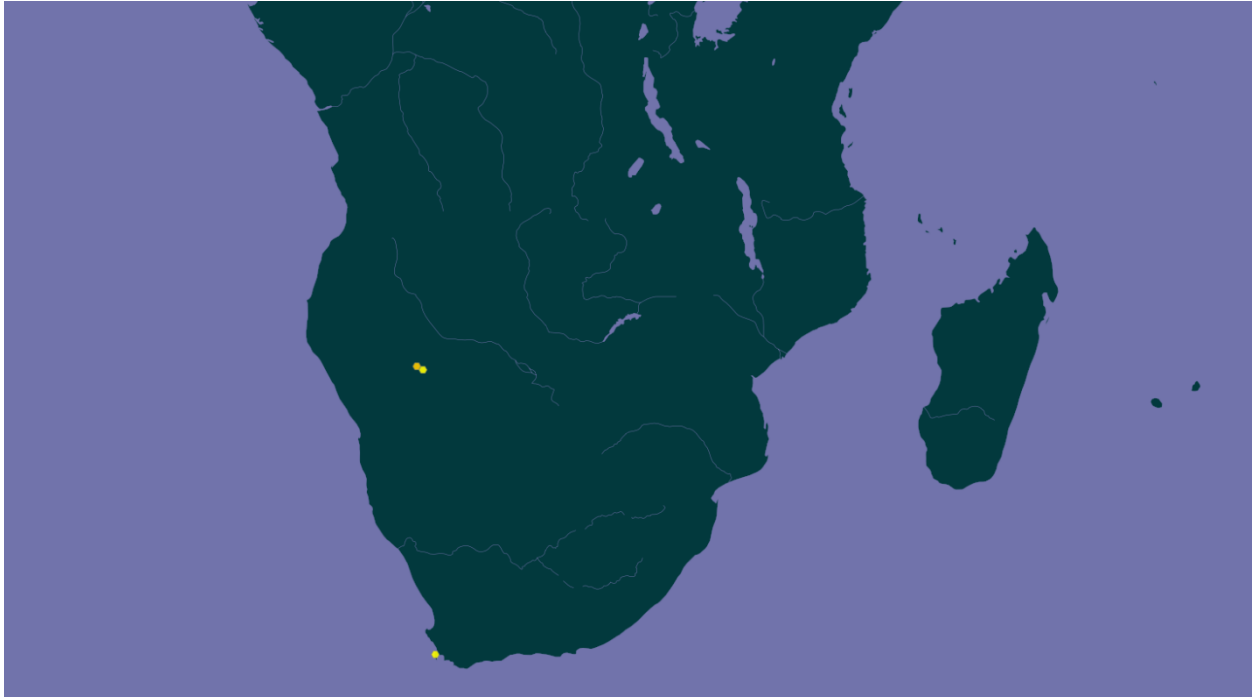


Figure 1. Known global distribution of *Tilapia guinasana*. Observations are in Namibia and South Africa. Map from GBIF Secretariat (2019). The location in South Africa was not used to select source points for the climate match because this location is located at the Kirstenbosch National Botanical Garden and it is not clear if the specimens were collected from a self-sustaining wild population.

6 Distribution Within the United States

No records of *Tilapia guinasana* were found in the wild in the United States.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Tilapia guinasana* was low for the most of the contiguous United States. There were areas of medium match along most of the Southwest border of the United States from the southeastern tip of Texas to southern California. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.002, low (scores between 0.000 and 0.005, inclusive, are classified as low). All of the contiguous States had low individual Climate 6 scores, except for Texas and Arizona which had medium individual Climate 6 scores.



Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Namibia selected as source locations (red) and non-source locations (gray) for *Tilapia guinasana* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

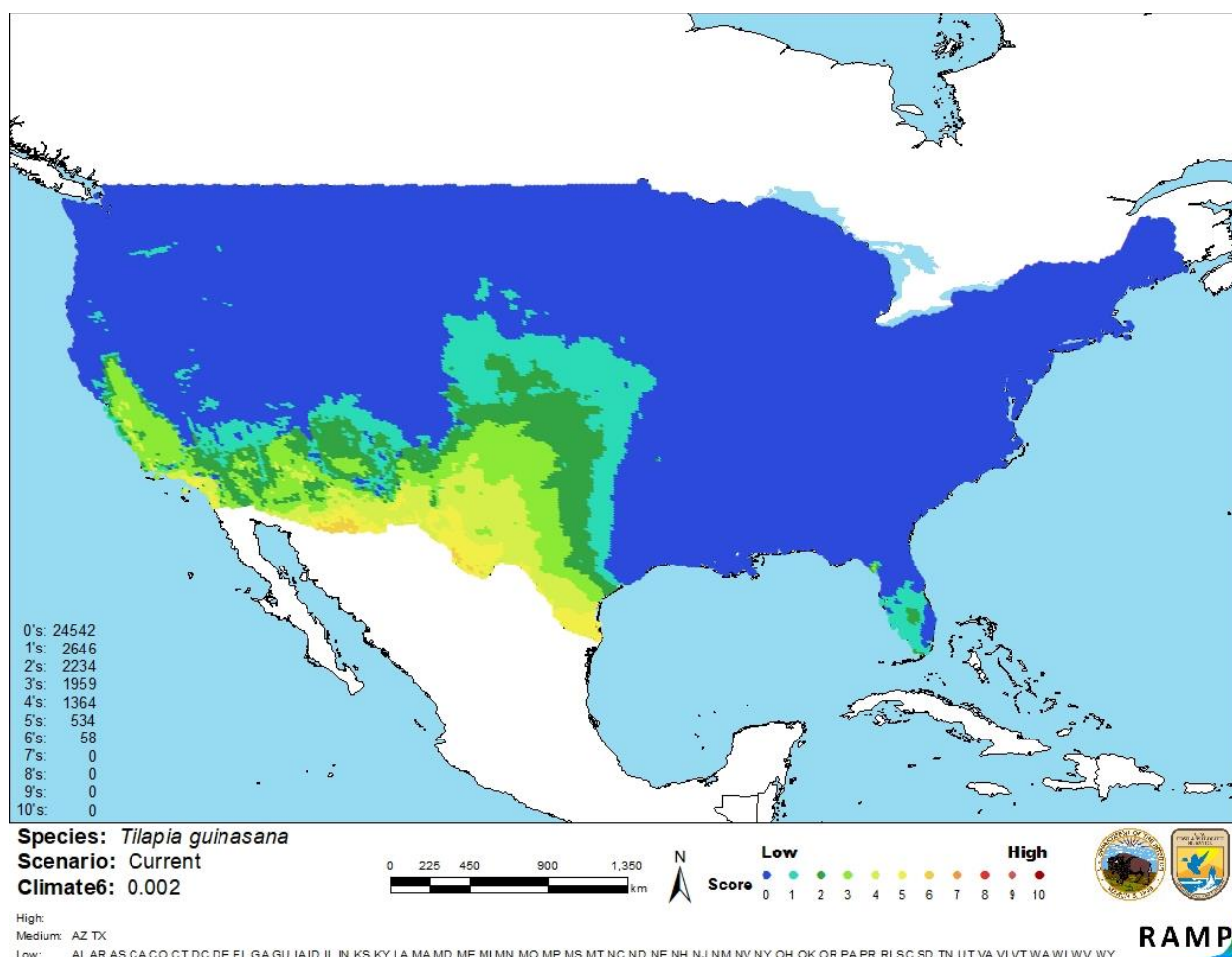


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Tilapia guinasana* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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

The certainty of assessment is low. Biological information was available for this species and there was one record of an introduction that caused a negative impact on a native species. The source of the information is a published book, however the methods used to determine the impact

are not outlined within the book and no further references are provided. The scientific defensibility of the information supporting the determination of the impact cannot be evaluated.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Tilapia guinasana, Otjikoto Tilapia, is a cichlid endemic to Lake Guinas, Namibia, Africa. The species is caught by fishermen for consumption and may be used in aquariums and garden ponds. *T. guinasana* is listed as a prohibited species in Florida. The history of invasiveness is Data Deficient. There is evidence of an introduced population of *Tilapia guinasana* causing the extirpation of a native population of fish species. However, the information supporting that claim was not available to be evaluated. The overall climate match for the contiguous United States was low. Areas of medium match were found along the southern border and in southern California. The certainty of assessment is low due to a lack of supporting information on the reported impact. The overall risk assessment category is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **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.

Adeyemi A, Dukku SJ, Gambo MJ, Kalu JU. 2012. The market price method and economic valuation of biodiversity in Bauchi State, Nigeria. *International Journal of Economic Development Research and Investment* 3(3):11–24.

Barnard P. 1998. *Biological diversity in Namibia: a country study*. Cape Town, South Africa: ABS Press; Windhoek, Namibia: Namibian National Biodiversity Task Force.

[FAO] Fisheries and Agriculture Organization of the United Nations. 2019. Database on introductions of aquatic species. Rome: FAO. Available: <http://www.fao.org/fishery/introsp/8939/en> (December 2019).

[FFWCC] Florida Fish and Wildlife Conservation Commission. 2019. Prohibited species list. Tallahassee, Florida: Florida Fish and Wildlife Conservation Commission. Available: <https://myfwc.com/wildlifehabitats/nonnatives/prohibited-species-list/> (December 2019).

- Fricke R, Eschmeyer WN, van der Laan R, editors. 2019. Eschmeyer's catalog of fishes: genera, species, references. California Academy of Science. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (December 2019).
- Froese R, Pauly D, editors. 2019. *Tilapia guinasana* Trewavas, 1936. FishBase. Available: <https://www.fishbase.de/summary/Tilapia-guinasana.html> (December 2019).
- GBIF Secretariat. 2019. GBIF backbone taxonomy: *Tilapia guinasana* (Trewavas, 1936). Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/2370580> (December 2019).
- [ITIS] Integrated Taxonomic Information System. 2019. *Tilapia guinasana* (Trewavas, 1936). Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=648969#null (December 2019).
- [OIE] World Organisation for Animal Health. 2019. OIE-listed diseases, infections and infestations in force in 2019. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/> (June 2019).
- Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.
- Skelton PH. 1987. South African red data book: fishes. Grahamstown, South Africa: Committee for Nature Conservation Research National Programme for Ecosystem Research. South African National Scientific Programmes Report 137.

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.

- Agenbag S. 1998. Lake Otjikoto: history and mystery. Windhoek, Namibia.
- Baensch HA, Riehl R. 1991. Aquarien atlas. Band 3. Melle, Germany: Mergus, Verlag für Natur- und Heimtierkunde.
- Barnard P. 1998. Biological diversity in Namibia. Windhoek, Namibia: Namibian National Biodiversity Taskforce.
- de Moor IJ, Bruton MN. 1988. Atlas of alien and translocated indigenous aquatic animals in southern Africa. Port Elizabeth, South Africa: A report of the Committee for Nature Conservation Research National Programme for Ecosystem Research. South African National Scientific Programmes Report 144.

- Dunz AR, Schliewen UK. 2010. Description of a new species of *Tilapia* Smith, 1840 (Teleostei: Cichlidae) from Ghana. *Zootaxa* 2548:1–21.
- Jaeger F, Waibel L. 1921. Landschaften des nördlichen Südwestafrika. Beiträge zur Landeskunde von Südwestafrika. Berlin: Band II. E S Mittler and Sohn.
- Lamboj A. 2004. The Cichlid fishes of Western Africa. Bornheim, Germany: Birgit Schmettkamp Verlag.
- Penrith MJ. 1978. Otjikoto Lake. *South West Africa Annual* 1978:138–139.
- Skelton PH. 1993. A complete guide to the freshwater fishes of southern Africa. Southern Book Publishers.
- Trewavas E. 1936. Dr. Karl Jordan's expedition to South-West Africa and Angola: the freshwater fishes. *Novitates Zoologicae. A Journal of Zoology in Connection with the Tring Museum* 40:63–74.