Wami Tilapia (*Oreochromis urolepis*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, January 2018
Web Version, 6/28/2019

Photo: G. F. Turner. Licensed under CC BY-NC 3.0. Available: http://www.fishbase.org/photos/PicturesSummary.php?StartRow=1&ID=1420&what=species&TotRec=4. (January 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

"Africa: Rufigi River and its tributaries; the Kilombero and Great Ruaha Rivers, but not in the delta; the Kingani, Mbenkuru and Wami Rivers, all in Tanzania."

Status in the United States

From Nico (2018):

"This species was stocked with other tilapia in the Coyote Creek drainage, a tributary of the San Gabriel River in Los Angeles basin, California, in 1972; only this species, or a hybrid, persisted and reached high numbers (Legner and Pelsue 1977; Legner et al. 1980). It is established in the

Bolsa Chica Flood Control Channel in Huntington Beach, Orange County (Courtenay et al. 1984, 1991). It is also established in the Cerritos Flood Control Channel, Cerritos Lagoon, and in the Coyote Creek-San Gabriel River drainage, Long Beach, Los Angeles County (Knaggs 1977; Courtenay et al. 1984). It is possibly established in Imperia, Los Angeles,l [*sic*] and Riverside counties (Legner and Pelsue 1977; Legner et al. 1980; Courtenay et al. 1984, 1986) in the Salton Sea drainage and in the whole length of the Colorado River of California and Arizona, and possibly into Nevada (Moyle and Randall 1999). Specimens have been reported in non-specific locations in Puerto Rico (Lee et al 1983). Also in Puerto Rico, the wami tilapia has been collected in the Dos Bocas Reservoir (Grana 2007)."

Means of Introductions in the United States

From Nico (2018):

"This species was first brought to California prior to the 1970s and survived in isolated colonies in relatively warm waters of the southern part of the state in the area of the Colorado Desert, Imperial and Riverside counties (Legner and Pelsue 1977; Courtenay et al. 1984), but it is unclear whether these fish were restricted to experimental ponds or whether populations were actually released into open waters. In 1972, *O. urolepis* was stocked into open waters by the University of California, Riverside, and by the Southeast and Orange County Mosquito Abatement districts, to control aquatic plants, mosquitoes, and chironomid midges (Legner and Pelsue 1977; Legner et al. 1980; Courtenay et al. 1984, 1986). These fish were derived from stock obtained from the University of Arizona (Legner et al. 1980)."

Remarks

From Nico (2018):

"Other commonly used names or synonyms include *Tilapia hornorum*, *Oreochromis hornorum*, and *Tilapia urolepis*. The Wami tilapia closely resembles *O. mossambicus* and was previously considered a strain (Zanzibar strain) of that species; it was later elevated to species status (i.e., *Tilapia hornorum*). Trewavas (1983) more recently determined *T. hornorum* to be a subspecies of *Oreochromis urolepis* (i.e., *Oreochromis urolepis hornorum*)."

"*Oreochromis urolepis* in the United States represent the subspecies *O. urolepis hornorum* (Courtenay et al. 1991). Because many hybrid *O. urolepis* were introduced into southern California, some doubt remains as to whether the established populations in California open waters represent pure *O. urolepis* strains or hybrids with *O. mossambicus* (Legner et al. 1980; Courtenay et al. 1984, 1991)."

The scientific name synonyms *Tilapia hornorum*, *Oreochromis hornorum*, and *Tilapia urolepis* were used (in addition to *Oreochromis urolepis*) to search for information for this report.

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 Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Oreochromis*
Species *Oreochromis urolepis* (Norman, 1922)"

"Direct Children:
Subspecies *Oreochromis urolepis hornorum* (Trewavas, 1966)
Subspecies *Oreochromis urolepis urolepis* (Norman, 1922)"

From Eschmeyer et al. (2018):

"Current status: Valid as *Oreochromis urolepis* (Norman 1922). Cichlidae: Pseudocrenilabrinae."

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Max length : 44.0 cm SL male/unsexed; [Eccles 1982]"

From Nico (2018):

"30 cm SL (Trewavas 1983)."

Environment

From Froese and Pauly (2017):

"Freshwater; brackish; benthopelagic;"

Climate/Range
From Froese and Pauly (2017):

"Tropical; 22°C - 28°C [Baensch and Riehl; assumed to be recommended aquarium temperatures]; 5°S - 10°S"

Distribution Outside the United States
Native
From Froese and Pauly (2017):

"Africa: Rufigi River and its tributaries; the Kilombero and Great Ruaha Rivers, but not in the delta; the Kingani, Mbenkuru and Wami Rivers, all in Tanzania."

Introduced
Froese and Pauly (2019) report that *O. urolepis* has been introduced to Fiji (unknown status), Russia (probably not established), and Saudi Arabia (established).

Ruelas-Inzunza et al. (2011) report *Oreochromis urolepis* from the Baluarte River basin in northwest Mexico.

Kiruba-Sankar et al. (2018) report that *O. urolepis* (as *T. hornorum*) is established in the Dominican Republic.

Means of Introduction Outside the United States
From Froese and Pauly (2019):

"aquaculture"

Short Description
From Froese and Pauly (2017):

"Dorsal spines (total): 16 - 18; Dorsal soft rays (total): 11-14; Anal spines: 3; Anal soft rays: 9 - 12; Vertebrae: 29 - 30. Jaws of mature males become enlarged resulting in a concave upper profile. Females and non-breeding males silvery or steel-grey with 2-4 mid-lateral blotches and a more dorsal series usually evident. Mature males almost entirely black; lips pale or black; margin of dorsal fin and margin or upper half of caudal bright red, pink or orange. Deep preorbital bone."

Biology
From NatureServe (2016):

"Habitat Comments: Southern California: irrigation canals, flood control channels, and associated drainages; warm weedy ditches and canals (Page and Burr 1991)."

Human Uses
From Froese and Pauly (2017):

"Fisheries: commercial; aquaculture: commercial; aquarium: commercial"

Diseases
No OIE-listed diseases have been reported for this species.

Poelen et al. (2014) lists *Cichlidogyrus sclerosus*, *Diplostomum compactum*, *Cichlidogyrus tilapiae*, and *Centrocestus formosanus* as parasites of *Oreochromis urolepis* (Strona et al. 2013).

Threat to Humans
From Froese and Pauly (2017):

"Harmless"

3 Impacts of Introductions
From Nico (2018):

"Unknown."

4 Global Distribution

Figure 1. Known global distribution of *Oreochromis urolepis*, reported from Tanzania and Uganda. Map from GBIF Secretariat (2018). Point in Uganda was excluded from climate match analysis as an outlier because this species has not been reported as established in Uganda. Points in Alabama and Thailand represent captive occurrences of *O. urolepis* and were excluded from the extent of this map and from climate match analysis.

5 Distribution Within the United States

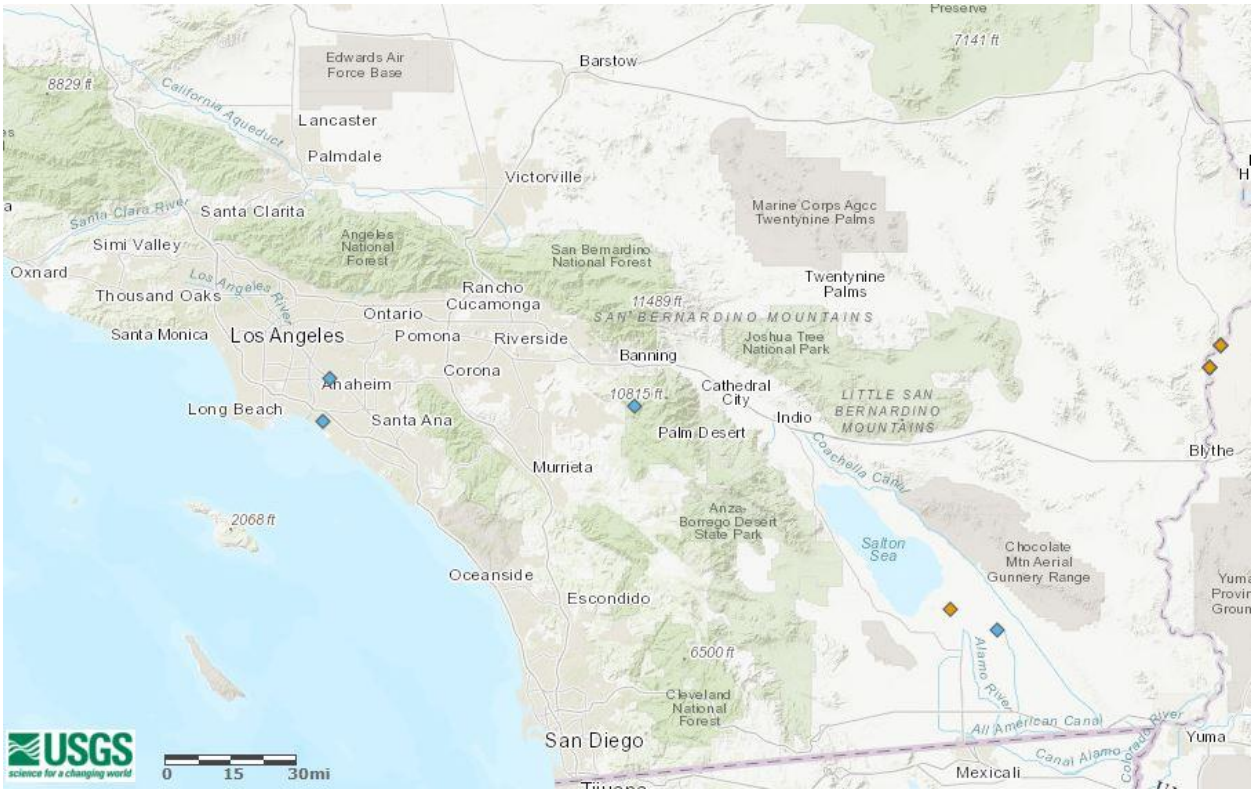

Figure 2. Known distribution of *Oreochromis urolepis* (represented by blue diamonds) and subspecies *Oreochromis urolepis hornorum* (represented by orange diamonds) in the United States, reported from southern California. Map from Nico (2018). All points represent established populations.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the Continental U.S. was 0.055, which is a medium climate match. The climate match was high in Arizona, California, and Nevada, with the area of highest match located in California and Arizona, in the general area where *O. urolepis* is established. The climate match was medium in Florida, Oregon, Texas, Utah, and Washington, and low elsewhere in the contiguous U.S.

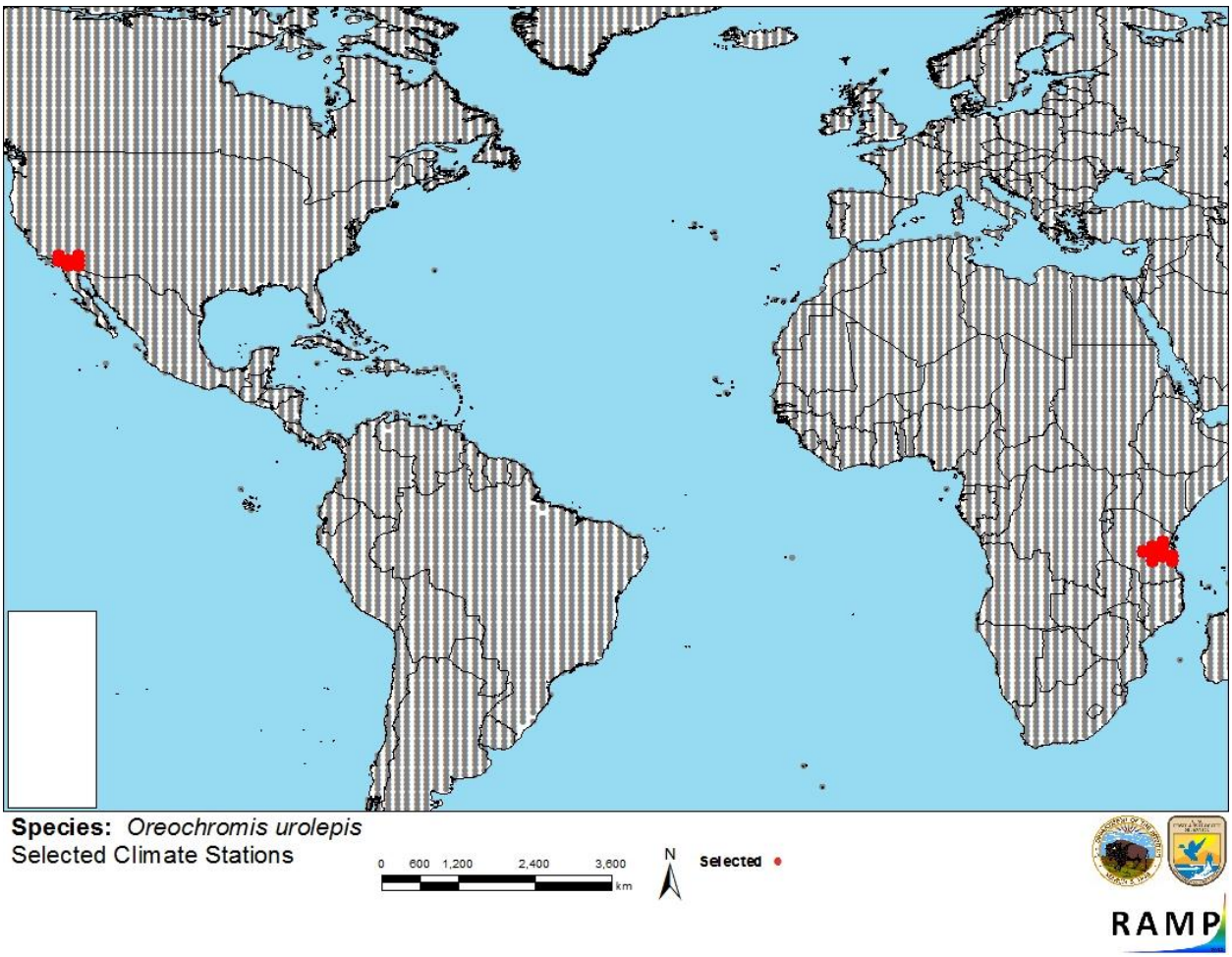

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; United States (California), Tanzania) and non-source locations (gray) for *Oreochromis urolepis* climate matching. Source locations from GBIF Secretariat (2018) and Nico (2018).

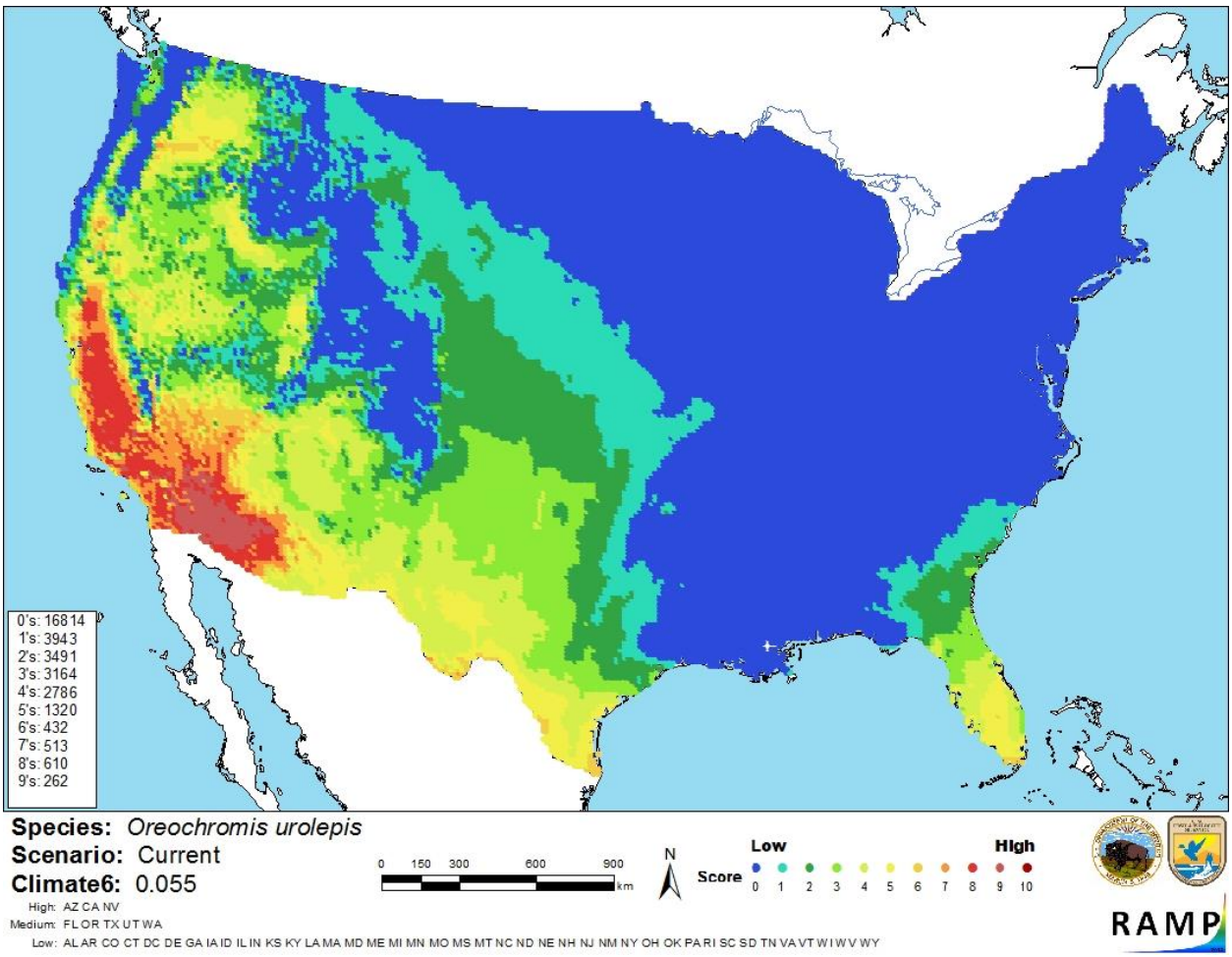

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Oreochromis urolepis* in the contiguous United States based on source locations reported by GBIF Secretariat (2018) and Nico (2018). Counts of climate match scores are tabulated on the left. 0= Lowest match, 10= Highest match.

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

7 Certainty of Assessment

There is little information available on the biology of *Oreochromis urolepis*. The introduced distribution of this species in southern California has been well-documented; despite this, there is no information available on impacts of introductions of this species. Further information if needed to adequately assess the risk this species poses. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Oreochromis urolepis is a tilapia species native to Tanzania. It was introduced to water bodies in California in the 1970s to control mosquito larvae and aquatic plants. It has become established in southern California. Impacts of its introduction are not known. *O. urolepis* has a medium climate match with the contiguous United States overall, with the areas of highest match located in California and Arizona and areas of lowest match in northern and eastern states. Further information is necessary to determine what impacts, if any, this species is having where introduced, and what risk it poses to the United States as a whole. Overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): 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.

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10 References Quoted But Not Accessed

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