

Banded Tilapia (*Tilapia sparrmanii*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, June 2015



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1 Native Range, and Status in the United States

Native Range

From Nico et al. (2015):

“Tropical and subtropical Africa: Kasai drainage including the Lulua and Kwango (middle Congo River basin), upper Congo River basin including the upper Lualaba, Luvua, Lake Mweru, Luapula, Lufira, and Upemba region (Thys van den Audenaerde 1964), upper Cuanza, Cunene, Okavango, Lake Ngami, Limpopo, Sabi, Lundi, northern tributaries of the Orange River, and Bangweulu (Teugels and Thys van den Audenaerde 1991), Lake Malawi, and Zambezi system (Skelton 1993)”

Status in the United States

From Nico et al. (2015):

“This species was found in Six Mile Creek above U.S. Highway 92 in Florida, and in ditches near Eureka Springs (which connects to Six Mile Creek), Hillsborough County, in 1958 (Burgess 1958; museum specimens).”

“Status: Failed in Florida (Courtenay and Stauffer 1990; Courtenay and Williams 1992).”

Means of Introductions in the United States

From Nico et al. (2015):

“Probable fish farm release or escape (Smith-Vaniz, personal communication).”

Remarks

From Nico et al. (2015):

“In response to suggestions that *T. sparrmani* be introduced into California, Pelzman (1972) evaluated its life history and recommended it be placed on the prohibited list because of its potential for competition with native sport fishes. In Africa, this species has been introduced outside its native range as a forage fish for bass (de Moor and Bruton 1988). It can tolerate low temperatures of about 7°C (de Moor and Bruton 1988) and, based on its distribution in Africa, *T. sparrmani* may be "more restricted by high (above 32°C) than low temperatures" (Skelton 1993).”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2015):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Tilapia*
Species *Tilapia sparrmanii* Smith, 1840”

“Taxonomic Status: valid”

Size, Weight, and Age Range

From Froese and Pauly (2015):

“Max length : 23.5 cm TL male/unsexed; [Seegers 1996]; max. published weight: 445 g [Skelton 1993]”

Environment

From Froese and Pauly (2015):

“Benthopelagic; potamodromous; freshwater; pH range: 7.0 - ? ; dH range: 10 - ?; depth range 5 - ? m [Philippart and Ruwet 1982]”

Climate/Range

From Froese and Pauly (2015):

“Tropical; 22°C - 25°C [Baensch and Riehl 1991]; 10°S - 30°S”

Distribution Outside the United States

Native

From Kazembe et al. (2010):

“Angola (Angola); Botswana; Congo, The Democratic Republic of the; Malawi; Mozambique; Namibia; South Africa (KwaZulu-Natal); Swaziland; Tanzania, United Republic of; Zambia; Zimbabwe”

Introduced

From Froese and Pauly (2015):

“Madagascar: established”

“South Africa: established”

“Tanzania: probably not established”

“Japan: established”

From Kazembe et al. (2010):

“It has probably also been introduced to Libya, Egypt, Chad and Sudan.”

Means of Introduction Outside the United States

From De Silva et al. (2004):

“aquaculture”

From Ellender and Weyl (2014):

“angling-motivated introductions”

Short description

From Froese and Pauly (2015):

“Dorsal spines (total): 13 – 15”

Biology

From Froese and Pauly (2015):

“Occurs in widely diverse habitat. Favors areas where plant cover exists along the edges of rivers, lakes or swamps. Prefers shallow sheltered waters and does not colonize the open water of large lakes. Adults feed preferentially on filamentous algae, aquatic macrophytes and vegetable matter of terrestrial origin (leaves, plants, etc.) [Philippart and Ruwet 1982]. Juveniles feed small crustaceans and midge larvae [de Moor and Bruton 1988]. Forage fish for bass [Skelton 1993]. Undertake seasonal upstream migration and breeds before and during these migrations [Bell-Cross and Minshull 1988].”

“Male spreads his milt over the cluster of eggs which are deposited on the bottom or even attached to the branches of aquatic weeds. Parents guard the eggs. Eggs and fry may be moved into the mouth to alternative sites during hatching operations but there is no evidence of actual mouth brooding.”

Human uses

From Froese and Pauly (2015):

“Fisheries: subsistence fisheries; aquaculture: commercial; gamefish: yes”

Diseases

From Froese and Pauly (2015):

“Fish tuberculosis (FishMB), Bacterial diseases”

From Kanchanakhan (2013):

“Fish species susceptible to infection with *Aphanomyces invadans*: ... *Tilapia sparrmanii*”

“*Aphanomyces invadans* causes disease and mortality in farmed and wild fish, worldwide. ... Infection with *A. invadans* has been reported from more than 20 countries in four continents: North America, Southern Africa, Asia and Australia. ... When infection with *A. invadans* spreads into a fish culture pond, such as a snakehead fish pond, high morbidity (>50%) and high mortality (>50%) might be observed in those years that have a long cold season, with water temperatures between 18 and 22°C.”

Infection with *A. invadans* (epizootic ulcerative syndrome) is OIE-reportable.

Threat to humans

From Froese and Pauly (2015):

“Harmless”

3 Impacts of Introductions

From Darwall et al. (2009):

“*Tilapia sparrmanii* has also been introduced and is reported to compete with native species for food.”

“*Tilapia sparrmanii* is beginning to out-compete the indigenous Cape kurper (*Sandelia capensis*) populations that occupy a similar niche.”

From Ellender and Weyl (2014):

“While a suite of non-native fishes have been introduced into the Berg River system (*O. mykiss*, *M. dolomieu*, *M. punctulatus*, *M. salmoides*, *O. mossambicus*, *T. sparrmanii*, *C. gariepinus*, *L. macrochirus*, *C. carpio* and *G. affinis*), disentangling impacts of non-native species from other anthropogenic stressors such as pollution and water abstraction was considered unrealistic (Clark et al. 2009). However, given the invasive nature of the non-native fishes present in the Berg River system, and the limitation of native fish distributions to non-invaded stream reaches, impacts on native fishes are inferred.”

From Ellender et al. (2011):

“*Tilapia sparrmanii* has been widely translocated in South Africa as fodder fish for both *M. salmoides* and *M. dolomieu*, including Eastern Cape rivers (de Moor & Bruton 1988). Studies on their invasive potential are limited, although it has been suggested that they compete with native fishes for food resources and possibly prey on juvenile native fish (de Moor & Bruton 1988). The successful establishment of *T. sparrmanii* in the Blindekloof stream may be due to its wide habitat tolerance and generalist nature. The species prefers quiet or standing waters, typical of the pools on the Blindekloof stream. *Tilapia sparrmanii* is predominantly macrophagous, but may feed on small invertebrates and in some cases even small fish (Skelton 2001; Zengeya & Marshall 2007). There may be food resource competition between *T. sparrmanii* and the two native species *P. afer* (diet of filamentous algae and invertebrates) and *S. capensis* (diet of terrestrial and aquatic invertebrates as well as small fish) (Skelton 2001). The invasive potential of *T. sparrmanii* is, however, still inconclusive and needs to be investigated further.”

4 Global Distribution



Figure 1. Global distribution of *T. sparrmanii*. Map from GBIF (2015). The locations in Brazil, the U.S., and Thailand were excluded from climate matching (Sec. 6) because of locational uncertainty (Brazil) or specimen records that do not represent extant populations (U.S., Thailand).

5 Distribution within the United States

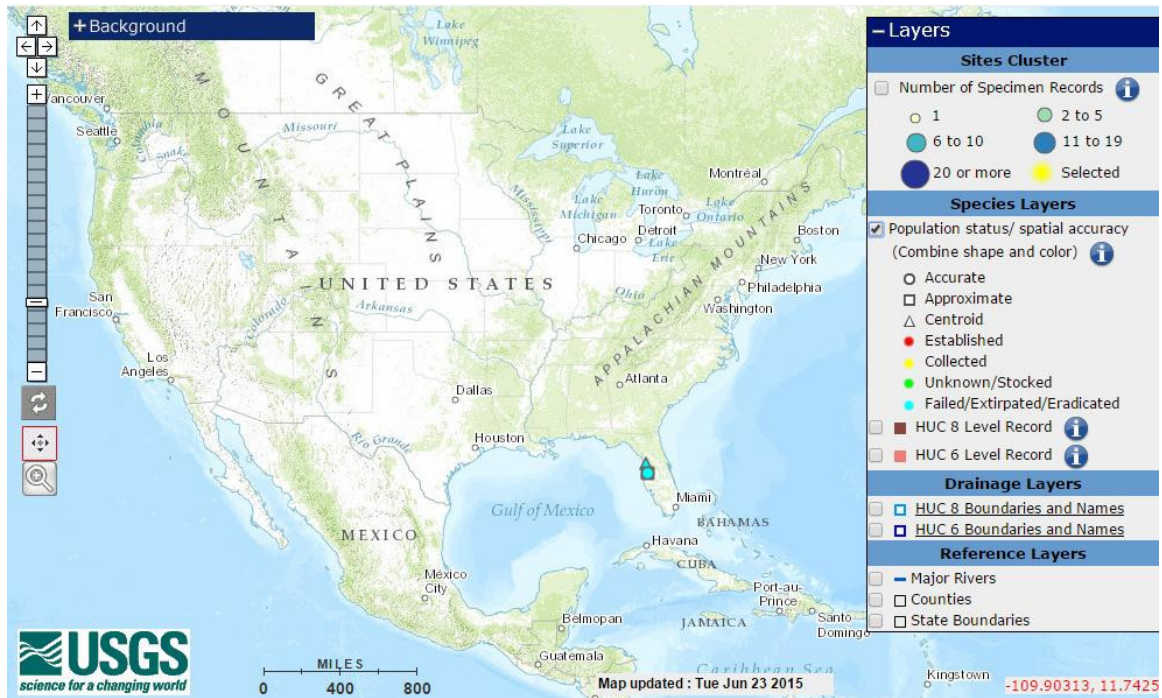


Figure 2. Distribution of *T. sparrmanii* in the US. Map from Nico et al. (2015).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) is medium to high in eastern Florida and the Southwest, from southern California to Texas and into the southern Plains states. The remainder of the country has a low climate match. Climate 6 score indicated that the contiguous U.S. has a high climate match overall. The range for a high climate match is 0.103 and greater; the Climate 6 score of *T. sparrmanii* is 0.143.

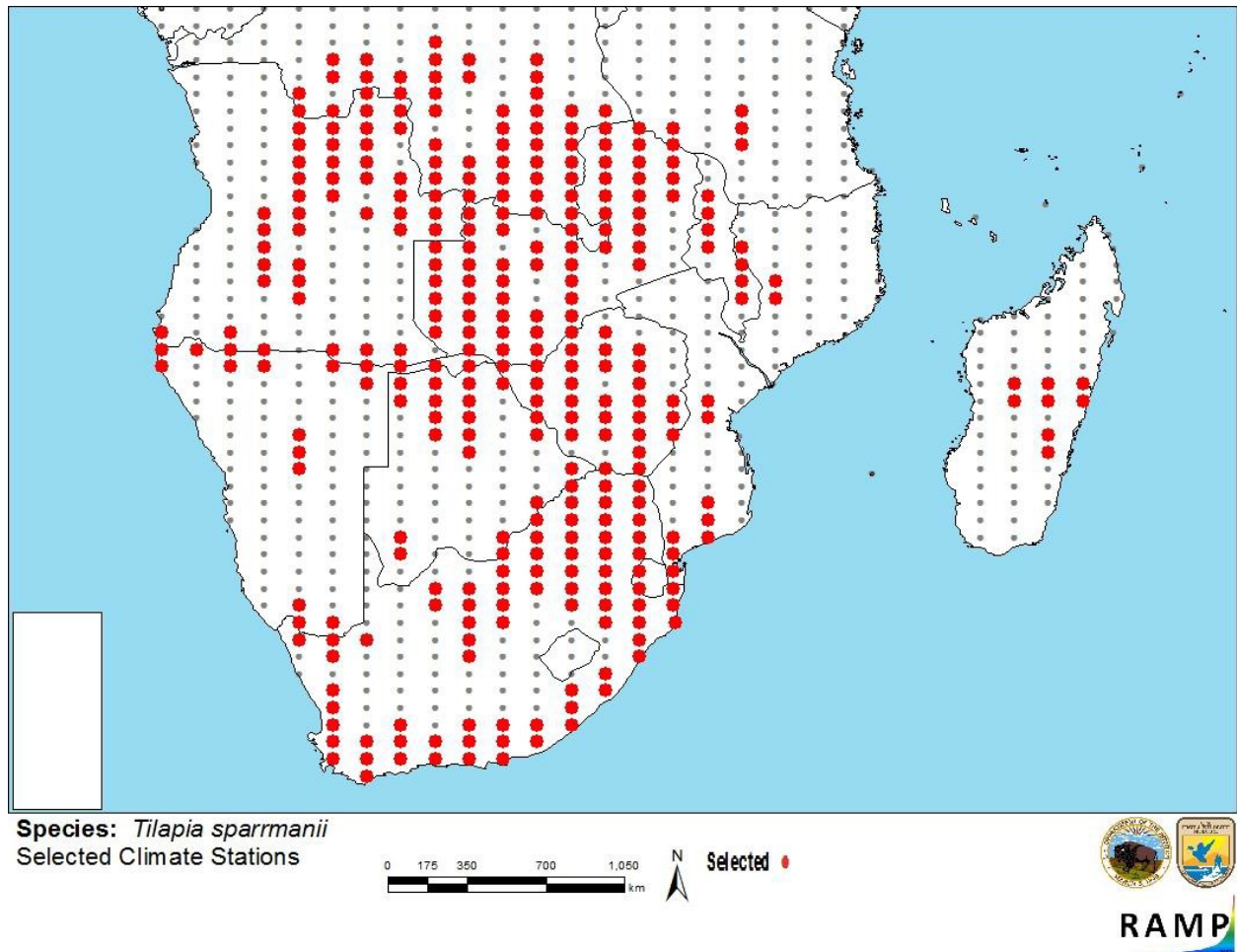


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *T. sparrmanii* climate matching. Source locations from GBIF (2015). Only established locations were used.

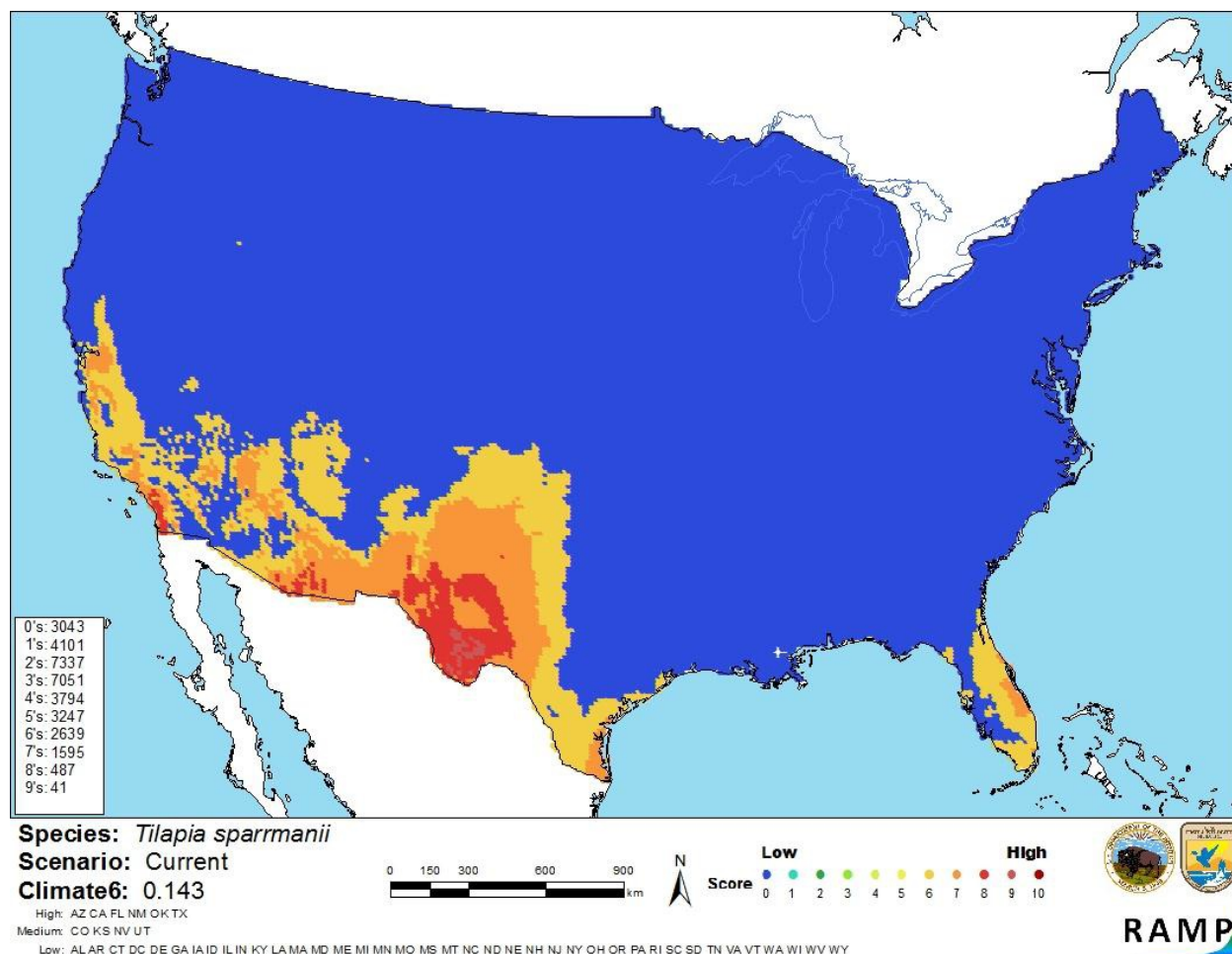


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *T. sparrmanii* in the continental United States based on source locations reported by GBIF (2015). 0= Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

7 Certainty of Assessment

Some information is available on the biology and ecology of *T. sparrmanii*. Information about impacts of introductions is mostly anecdotal or hypothetical, rather than the product of rigorous scientific study. The certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Continental United States

Tilapia sparrmanii is a benthopelagic cichlid native to sub-Saharan Africa. It was discovered to have been introduced into Florida in the mid-20th century, but there is no extant population today. The species has become established outside its native range in South Africa, Madagascar, and Japan. There has been suggestion in the scientific literature that *T. sparrmanii* competes with native fish for food, but there have been no definitive demonstrations of such competition. *T. sparrmanii* is susceptible to epizootic ulcerative syndrome, which can cause high levels of mortality in both wild and farmed fish. Climate match of *T. sparrmanii* to the continental U.S. is

high. Because of the high climate match, potential for impacts on native fish, and potential to spread a serious fish disease, the overall risk of *T. sparrmanii* is high.

Assessment Elements

- History of Invasiveness:** Uncertain
- Climate Match:** High
- Certainty of Assessment:** Low
- Overall Risk Assessment Category:** High

9 References

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10 References Quoted But Not Accessed

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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