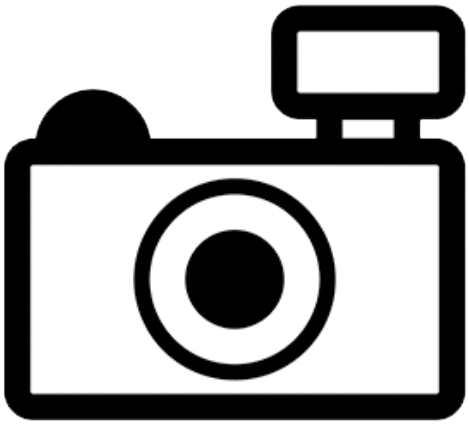
Trichomycterus tiraquae (a catfish, no common name)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2017
Revised, February 2018
Web Version, 2/28/2020



1 Native Range and Status in the United States

Native Range

From Hablützel et al. (2013):

"upper Mamoré River drainage [Bolivian Amazon]"

From Fernández and Miranda (2007):

"The first record of two trichomycterid species from the thermal waters of a small stream in Miraflores, north of Potosí, Bolivia is given. The reported species are *Trichomycterus therma* n. sp. and *Trichomycterus tiraquae*."

Status in the United States

This species has not been reported as introduced or established in the United States. There is no indication that this species is in trade in the United States.

From Arizona Secretary of State (2006):

"Fish listed below are restricted live wildlife [in Arizona] as defined in R12-4-401. […] South American parasitic catfish, all species of the family Trichomycteridae and Cetopsidae […]"

From Dill and Cordone (1997):

"[…] At the present time, 22 families of bony and cartilaginous fishes are listed [as prohibited in California], e.g. all parasitic catfishes (family Trichomycteridae) […]"

From FFWCC (2019):

"Nonnative Conditional species (formerly referred to as restricted species) and Prohibited species are considered to be dangerous to Florida's native species and habitats or could pose threats to the health and welfare of the people of Florida. These species are not allowed to be personally possessed, but can be imported and possessed by permit for research or public exhibition; Conditional species may also be possessed by permit for commercial sales. Facilities where Conditional or Prohibited species are held must meet certain biosecurity criteria to prevent escape."

Trichomycterus tiraquae is listed as a Prohibited species in Florida.

From Louisiana House of Representatives Database (2010):

"No person, firm, or corporation shall at any time possess, sell, or cause to be transported into this state [Louisiana] by any other person, firm, or corporation, without first obtaining the written permission of the secretary of the Department of Wildlife and Fisheries, any of the following species of fish: […] all members of the families […] *Trichomycteridae* (pencil catfishes) […]"

From Mississippi Secretary of State (2019):

"All species of the following animals and plants have been determined to be detrimental to the State's native resources and further sales or distribution are prohibited in Mississippi. No person shall import, sell, possess, transport, release or cause to be released into the waters of the state any of the following aquatic species or hybrids thereof.
[The list includes all species of] Family Trichomycteridae"

From Legislative Council Bureau (2018):

"Except as otherwise provided in this section and NAC [Nevada Administrative Code] 504.486, the importation, transportation or possession of the following species of live wildlife or hybrids thereof, including viable embryos or gametes, is prohibited [in Nevada]: […]
All species in the families Cetopsidae and Trichomycteridae"

From Utah DNR (2012):

"All species of fish listed in Subsections (2) through (30) are classified [in Utah] as prohibited for collection, importation and possession […]
Parasitic catfish (candiru, carnero) family Trichomycteridae (All species)"

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

Remarks

From Hablützel et al. (2013):

"*Trichomycterus tiraquae* (Fowler 1940) has not been included in the checklist by Carvajal-Vallejos and Zeballos Fernández (2011) because several authors (De Pinna and Wosiacki 2003; Ferraris 2007) considered it as a synonym of *T. rivulatus* Valenciennes 1846 (Carvajal-Vallejos pers. comm.). However, a more recent detailed morphological examination confirmed its species status (Fernández and Miranda 2007)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From GBIF Secretariat (2017):

"KINGDOM Animalia
PHYLUM Chordata
CLASS Actinopterygii
ORDER Siluriformes
FAMILY Trichomycteridae
GENUS *Trichomycterus*
SPECIES *Trichomycterus tiraquae*"

From Eschmeyer et al. (2017):

"Current status: Valid as *Trichomycterus tiraquae* (Fowler 1940). Trichomycteridae: Trichomycterinae."

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Max length : 6.0 cm SL male/unsexed; [Fernández and Miranda 2007]"

Environment
From Froese and Pauly (2017):

"Freshwater; demersal."

From Fernández and Miranda (2007):

"[…] *T. tiraquae* live within this [temperature] range (28 to 37° C)."

Climate/Range
From Froese and Pauly (2017):

"Tropical […]"

Distribution Outside the United States
Native
From Hablützel et al. (2013):

"upper Mamoré River drainage [Bolivian Amazon]"

From Fernández and Miranda (2007):

"The first record of two trichomycterid species from the thermal waters of a small stream in Miraflores, north of Potosí, Bolivia is given. The reported species are *Trichomycterus therma* n. sp. and *Trichomycterus tiraquae*."

Introduced
This species has not been reported as introduced or established outside of its native range.

Means of Introduction Outside the United States
This species has not been reported as introduced or established outside of its native range.

Short Description
From Fowler (1940):

"Depth $5\frac{1}{4}$ to $6\frac{1}{2}$; head $4\frac{1}{2}$ to 5, width 1 to $1\frac{1}{8}$. Snout $2\frac{1}{4}$ to $2\frac{2}{5}$ in head; eye $5\frac{4}{5}$ to $7\frac{1}{2}$, $2\frac{1}{2}$ to $2\frac{7}{8}$ in snout, $1\frac{3}{4}$ to 2 in interorbital, margins not free; mouth cleft short, reaches $\frac{1}{3}$ to eye, low, mandible much shorter than upper jaw; nasal barbel extends back eye diameter behind eye, maxillary barbel reaches $\frac{2}{3}$ to $\frac{4}{5}$ to pectoral origin; lips thick, fleshy, smooth; mouth width 3 in head; narrow band of very small uniform villiform teeth in each jaw; interorbital $2\frac{7}{8}$ to 3 in head, flat. Cluster of 5 to 8 rather large close-set backward directed simple spines on opercle, and 10 to 12 arranged along interopercle."

"Skin smooth. Lateral line little distinct, axial along side of body."

"D. ii, 7, second branched ray 2 to $2\frac{1}{5}$ in head; A. ii, 5 or ii, 6, second branched ray $1\frac{3}{4}$ to $2\frac{1}{2}$; least depth of caudal peduncle $1\frac{7}{8}$; caudal 1 to $1\frac{1}{4}$, convexly rounded behind; pectoral $1\frac{1}{5}$ to $1\frac{1}{2}$, rays I, 8, spine largely flexible and ends in short free point; ventral $2\frac{2}{5}$ to 3, rays I, 4, spine flexible."

"General color light buff-brown, inclining paler to whitish below. The back is variably specked, spotted or marbled with darker or brown flakes or dots, which may be concentrated to form a streak along each side of the back above; in resulting paler predorsal band a dark median line or streak forward to occiput. Dark streak along each side of back may be entire or with 10 to 12 pronounced dark blotches, variable and usually less evident on caudal peduncle behind. From above gill opening to caudal base a dark axial streak, which may be continuous, or variously broken with dark to blackish blotches, like those along upper edge of back; blotch often more defined along tail posteriorly and on side of caudal peduncle. A dark spot at middle of caudal base, usually as a short dark gray vertical bar. Iris dark gray. Upper surface of head dark on cranium and a dark brown horizontal bar along each cheek above, below eye. Barbels with brown margins, otherwise pale to whitish like under surface of head. Fins all pale brown to whitish. Dorsal pale ochraceous or brown forward and basally. Caudal more or less gray terminally. Pectoral pale brown medially. Ventral and anal whitish."

"A species known by its coloration, which is somewhat variable, though its general pattern persisting throughout the materials. The upper pectoral ray is with only slightly extended point, and may be developed sometimes only on one side of the fish. The rudimentary caudal rays are usually well developed, often very numerous and may form a long adipose like keel along the edge of the caudal peduncle."

Biology
No information reported for this species.

Human Uses
No information reported for this species.

Diseases
No OIE reportable diseases (OIE 2020) have been documented for this species.

Threat to Humans
From Froese and Pauly (2017):

"Harmless"

3 Impacts of Introductions
This species has not been documented as introduced or established outside of its native range.

The importation, possession, or trade of the catfish *T. tiraquae* is prohibited or restricted in the following states: Arizona (Arizona Secretary of State 2006), California (Dill and Cordone 1997), Florida (FFWCC 2019), Louisiana (Louisiana House of Representatives Database 2010), Mississippi (Mississippi Secretary of State 2019), Nevada (Legislative Council Bureau 2018), and Utah (Utah DNR 2012).

4 Global Distribution

Figure 1. Known global distribution of *Trichomycterus tiraquae*, reported from Bolivia. Map from VertNet (2017).

5 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

Note: Part of the native range of *Trichomycterus tiraquae* is a thermal stream where water temperatures are elevated above temperatures of nearby, non-thermal streams. Locations of geothermal activity or elevated water temperatures in the contiguous United States may be an important predictor of establishment probability for *T. tiraquae* in addition to the broad climatic patterns used in the climate matching analysis.

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was medium in parts of Florida, Texas, New Mexico, Arizona, and coastal California. The remainder of the contiguous United States had a low match. The Climate 6 score indicated that the contiguous United States has a low overall climate match. (Scores between 0.000 and 0.005, inclusive, are

classified as low.) The Climate 6 score for *Trichomycterus tiraquae* is 0.002. Texas and Arizona had medium individual Climate 6 scores, while the rest of the States had low Climate 6 scores.

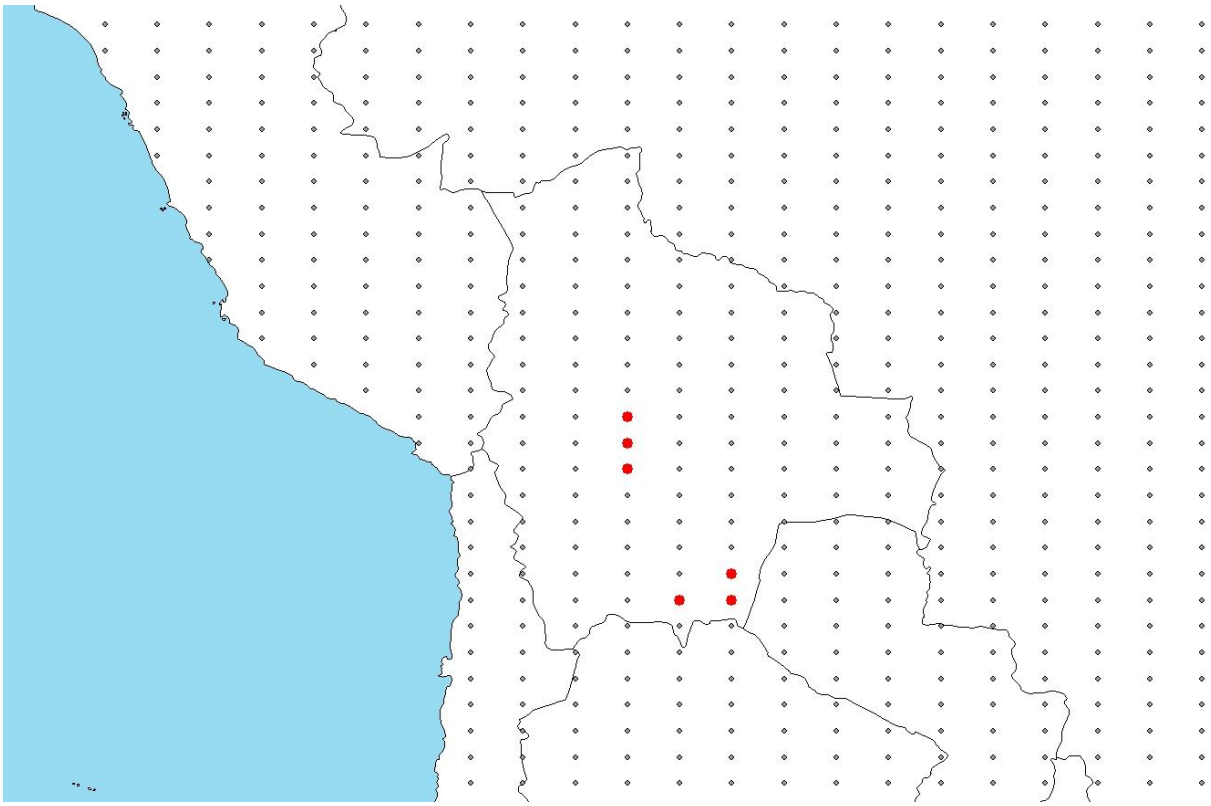


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Bolivia) and non-source locations (gray) for *Trichomycterus tiraquae* climate matching. Source locations from VertNet (2017).

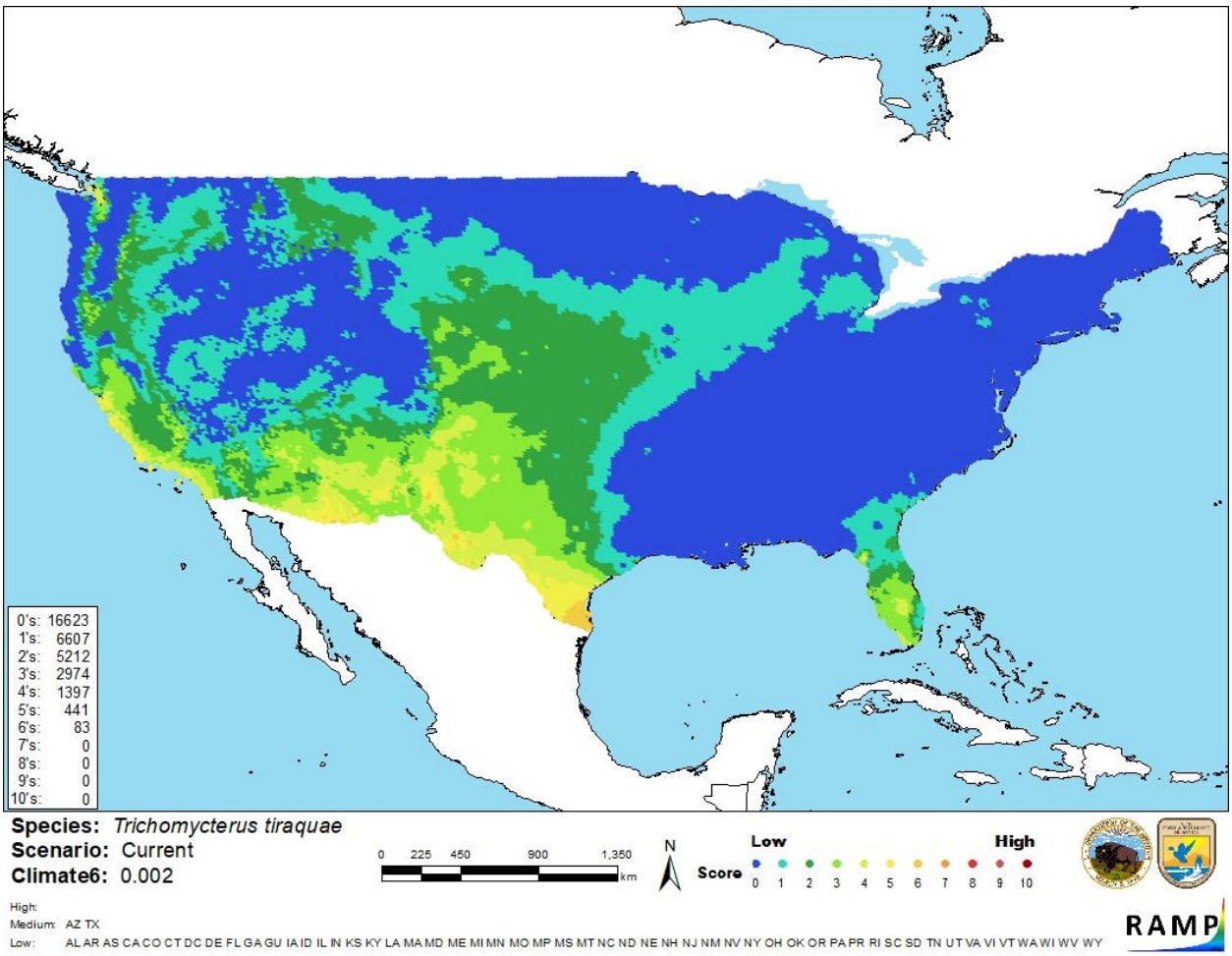


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Trichomycterus tiraquae* in the contiguous United States based on source locations reported by VertNet (2017). 0= Lowest match, 10= Highest match. Counts of climate match scores are tabulated on the left.

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

Limited information is available on the distribution and biology of *T. tiraquae*. No introductions of this species outside of its native range have been documented. Therefore, data on the impacts of introductions are lacking. The climate matching analysis does not take into account the elevated water temperatures of a thermal stream to which *T. therma* is native, lending uncertainty to the results of the climate matching analysis. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Trichomycterus tiraquae is a small catfish native to Bolivia. *T. tiraquae* has not been documented outside of its native range, so history of invasiveness is uncertain. Several U.S. States prohibit or restrict the possession, transport, or trade of this species along with other members of the family Trichomycteridae. *T. tiraquae* has a low climate match with the contiguous United States, with only small areas of medium match in the Southwest, coastal California, and Florida. Certainty of assessment is low due to lack of information on impacts of introduction, and the inadequacy of the climate matching analysis to account for *T. tiraquae*'s adaptation to high water temperatures. The overall risk posed by this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **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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VertNet. 2017. VertNet Search Portal: *Trichomycterus tiraquae.* National Science Foundation, Arlington, Virginia. Available: http://portal.vertnet.org/search?q=trichomycterus+tiraquae. (January 2017).

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.

Carvajal-Vallejos, F. M., and A. J. Zeballos Fernández. 2011. Diversidad y distribución de los peces de la Amazonía boliviana. Pages 101-147 *in* P. A. Van Damme, F. M. Carvajal,

and J. Molina, editors. Peces y Delfines de la Amazonía boliviana: Hábitats, potencialidades y amenazas. Editorial INIA, Cochabamba, Bolivia.

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