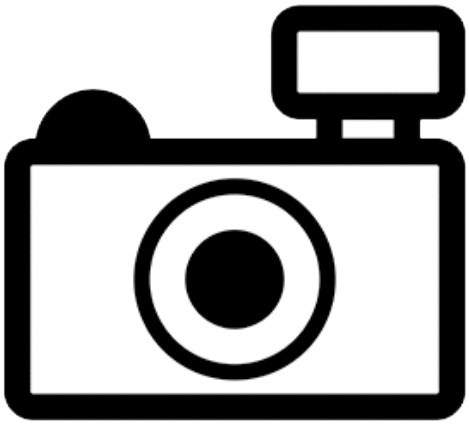
Aphanotorulus emarginatus (a catfish, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, January 2012
Revised, April 2019
Web Version, 10/17/2019



No Photo Available

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"South America: Lower, middle and upper Amazon River basin [Bolivia, Brazil, and Peru]."

From Ray and Armbruster (2016):

"**Distribution.** […] A wide-ranging species, *A. emarginatus's* range includes the upper Orinoco River (except the Rio Apure); the Essequibo River and its tributaries; the lower Amazon River including the Rio Negro, the Rio Tapajos, and the Rio Xingu."

Status in the United States

No records of *Aphanotorulus emarginatus* in trade or in the wild in the United States were found.

Means of Introductions in the United States

No records of *Aphanotorulus emarginatus* in the wild in the United States were found.

Remarks
Information searches were conducted using the accepted species name, *Aphanotorulus emarginatus*, and the commonly used synonym *Squaliforma emarginata*. Some data sources still used *S. emarginata* as the valid name for this species.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing
From Fricke et al. (2019):

"**Current status:** Valid as *Aphanotorulus emarginatus* (Valenciennes 1840)."

From Bailly (2017):

"Biota > Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > […] Actinopterygii (Class) > Siluriformes (Order) > Loricariidae (Family) > Hypostominae (Subfamily) > *Squaliforma* (Genus) > *Squaliforma emarginata* (Species)"

Size, Weight, and Age Range
From Froese and Pauly (2019):

"Max length : 15.0 cm TL male/unsexed; [Baensch and Riehl 1995]"

Environment
From Froese and Pauly (2019):

"Freshwater; demersal. […]; 24°C - 27°C [Baensch and Riehl 1995] [assumed to be recommended aquarium temperature]"

Climate/Range
From Froese and Pauly (2019):

"Tropical; […]"

Distribution Outside the United States
Native
From Froese and Pauly (2019):

"South America: Lower, middle and upper Amazon River basin [Bolivia, Brazil, and Peru]."

From Ray and Armbruster (2016):

"**Distribution.** […] A wide-ranging species, *A. emarginatus*'s range includes the upper Orinoco River (except the Rio Apure); the Essequibo River and its tributaries; the lower Amazon River including the Rio Negro, the Rio Tapajos, and the Rio Xingu."

Introduced

No records of introductions were found for *Aphanotorulus emarginatus.*

Means of Introduction Outside the United States

No records of introductions were found for *Aphanotorulus emarginatus.*

Short Description

From Ray and Armbruster (2016):

"**Description.** […]. Head moderately compressed. Supraoccipital crest not elevated, with posterior edge sloping gently into nape. Interorbital surface flat. Nape increasing in depth posteriorly to dorsal fin. Pectoral fin reaches past point of insertion of pelvic fin. Depressed pelvic spine reaches point of insertion of the anal fin. Adipose fin triangular.

Lateral line plates 26–31 […]; dorsal-fin base plates six to nine […]; folded dorsal plates nine to 14 […]; plates between dorsal and adipose fin seven to 12 […]; adipose fin plates two to three […]; anal-fin base plates two to three […]; plates from anal fin insertion to last plate on caudal peduncle 14–19 […]; plates in folded pectoral fin five to eight […]; number of teeth on dentary 10–45 […]; number of teeth on premaxilla 14–45 […]."

"**Color:** Light tan to white background. Spotting pattern highly variable across range. Spots small (less than or equal to pupil width) to medium in size; can be very dense (less background color showing) to very sparse (more background color showing) across entire body. Ventral surface with some spots across pectoral girdle or no spots. Spots on fin rays similar to those on body. Spots irregularly placed on paired-fin rays. Dorsal-fin membrane with two distinct rows of spots between each fin ray. Lower caudal fin lobe dark in color, almost black in some specimens."

Biology

From Ray and Armbruster (2016):

"**Sexual Dimorphism.** Breeding males with hypertrophied odontodes on pectoral-fin spine, which increase in density and length distally along spine. Paired-fin spines swell and become larger distally. Odontodes present on caudal fin, with largest odontodes on spines and rays and also covering posteromedial edge of most plates on lateral surface of body; most relatively short (less than 2–3mm). Longest plate odontodes occur on mid-dorsal, median, and mid-ventral plate rows. Slightly lengthened odontodes present on cheek."

Human Uses

From Froese and Pauly (2019):

"Fisheries: minor commercial"

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Aphanotorulus emarginatus*.

Poelen et al. (2014) lists *Trinigyrus mourei* as a parasite of *Aphanotorulus emarginatus*.

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

No records of introductions were found for *Aphanotorulus emarginatus*; therefore there is no information on impacts of introduction.

4 Global Distribution

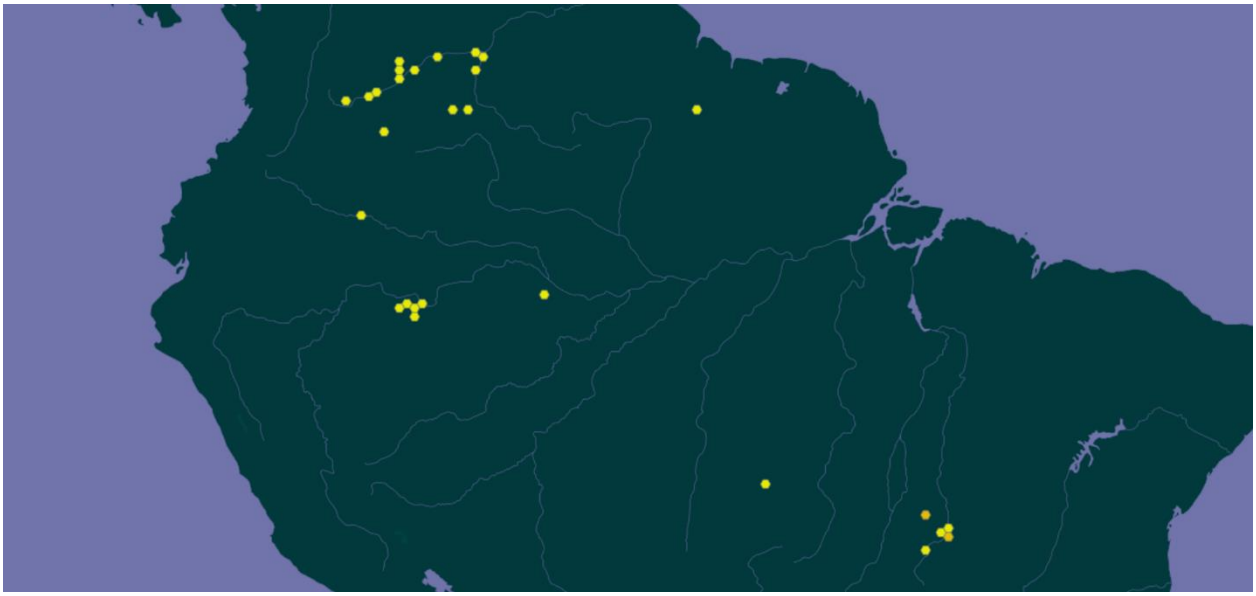


Figure 1. Known global distribution of *Aphanotorulus emarginatus*. Locations are in Bolivia, Brazil and Columbia. Map from GBIF Secretariat (2019a).

Figure 2. Known global distribution of *Squaliforma emarginata*. Locations are in Brazil, Columbia, and Peru. Map from GBIF Secretariat (2019b). *S. emarginata* is a synonym of *Aphanotorulus emarginatus*, the valid name for this species. At the time of writing the GBIF database still listed both synonyms as valid species so both data sets are used in this screening to accurately capture the full distribution of this species.

Source points for the climate match were selected using locations from both GBIF Secretariat (2019a) and GBIF Secretariat (2019b). These points include all source point locations from both the current valid name *Aphanotorulus emarginatus* and the synonym *Squaliforma emarginata*. The GBIF database currently treats *Aphanotorulus emarginatus* and *Squaliforma emarginata* as separate species while the current accepted taxonomy, followed in this ERSS, treats *Squaliforma emarginata* as junior synonym of *Aphanotorulus emarginatus* (Fricke et al. 2019).

5 Distribution Within the United States

No records of *Aphanotorulus emarginatus* in the wild in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Aphanotorulus emarginatus* was mostly low for the contiguous United States. Areas of high match were found in southern Florida and areas of medium match were along the southeastern coast. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.005, low. The range for low climate scores is 0.000 to 0.005, inclusive. All States had low individual climate scores except for Florida which had a high individual climate score.

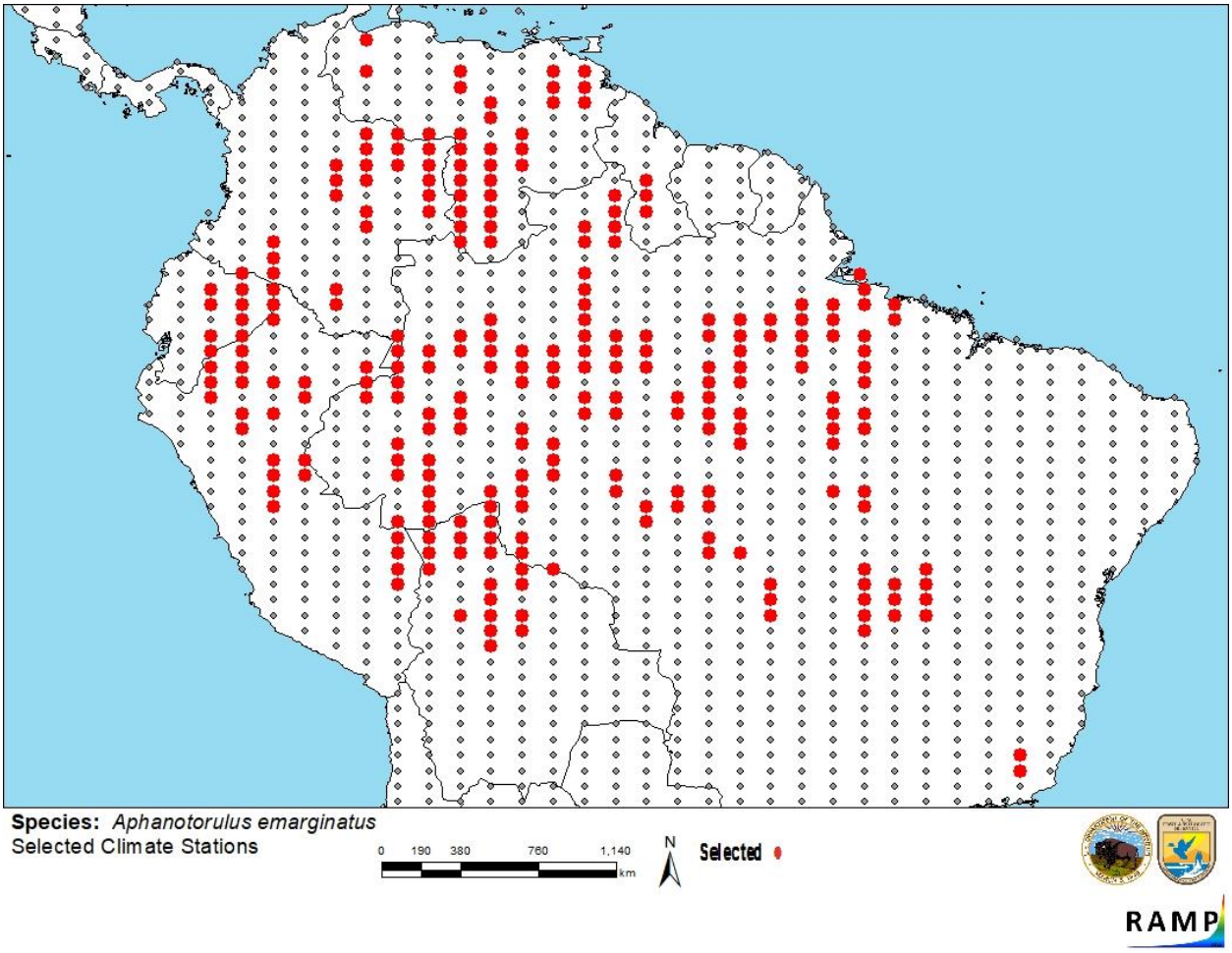


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Colombia, Venezuela, Suriname, Ecuador, Peru, Bolivia, and Brazil) and non-source locations (gray) for *Aphanotorulus emarginatus* climate matching. Source locations from GBIF Secretariat (2019a, b). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

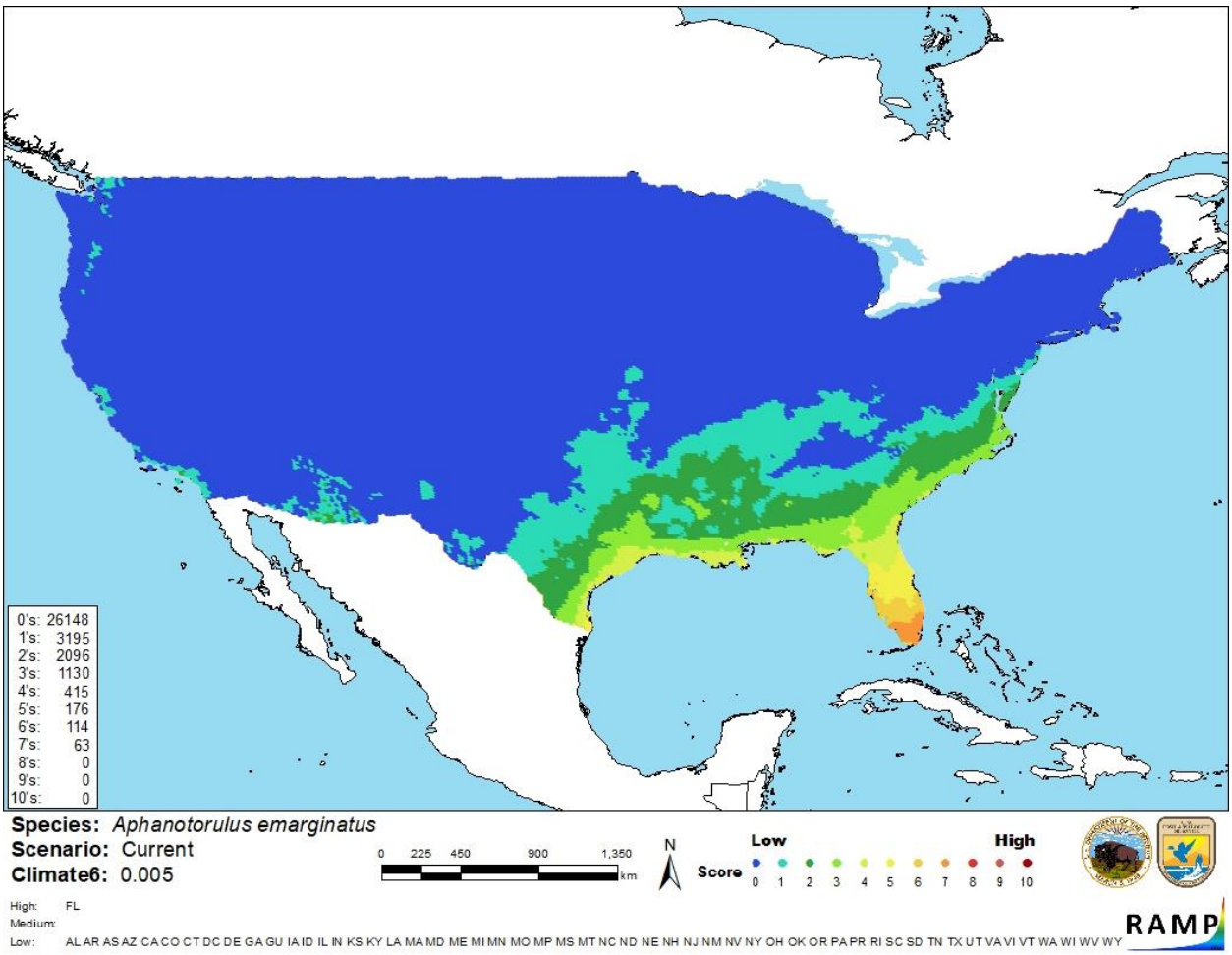


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Aphanotorulus emarginatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2019a, b). Counts of climate match scores are tabulated on the left. 0 = Lowest match, 10 = Highest match.

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

The certainty of assessment is low. There was minimal biological information available for this species. There were no records of introductions found, so impacts of introduction are unknown.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Aphanotorulus emarginatus is an armored catfish native to South America. Little information is available about the biology and ecology of this species. The history of invasiveness is uncertain because no records of introductions were found. *Aphanotorulus emarginatus* is not found in trade. The climate match is low for the contiguous United States, with areas of high match in Florida and medium match along the southeastern coast. Florida was the only state with an individually high climate score. The certainty of assessment is low; the overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** No additional information.
- **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.

Bailly, N. 2017. *Squaliforma emarginata*. *In* World Register of Marine Species. Available: http://www.marinespecies.org/aphia.php?p=taxdetails&id=1022383. (April 2019).

Fricke, R., W. N. Eschmeyer, and R. van der Laan, editors. 2019. Eschmeyer's catalog of fishes: genera, species, references. Available: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. (April 2019).

Froese, R., and D. Pauly, editors. 2019. *Squaliforma emarginata* Valenciennes, 1840. FishBase. Available: http://www.fishbase.org/summary/Squaliforma-emarginata.html. (April 2019).

GBIF Secretariat. 2019a. GBIF backbone taxonomy: *Aphanotorulus emarginatus* (Valenciennes, 1840). Global Biodiversity Information Facility, Copenhagen. Available: https://www.gbif.org/species/7873074. (April 2019).

GBIF Secretariat. 2019b. GBIF backbone taxonomy: *Squaliforma emarginata* (Valenciennes, 1840). Global Biodiversity Information Facility, Copenhagen. Available: https://www.gbif.org/species/2339599. (April 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/. (October 2019).

Poelen, J. H., J. D. Simons, and C. J. Mungall. 2014. Global Biotic Interactions: an open infrastructure to share and analyze species-interaction datasets. Ecological Informatics 24:148–159.

Ray, C. K., and J. W. Armbruster. 2016. The genera *Isorineloricaria* and *Aphanotorulus* (Siluriformes: Loricariidae) with description of a new species. Zootaxa 4072(5):501–539.

Sanders, S., C. Castiglione, and M. Hoff. 2018. Risk assessment mapping program: RAMP, version 3.1. U.S. Fish and Wildlife Service.

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.

Baensch, H. A., and R. Riehl. 1995. Aquarien atlas, band 4. Mergus Verlag GmbH, Verlag für Natur-und Heimtierkunde, Melle, Germany.

Cuvier, G., and A. Valenciennes. 1840. Histoire naturelle des poissons. Tome quinzième. Suite du livre dix-septième. Siluroïdes 15:421–455.