

Neon Tetra (*Paracheirodon innesi*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, Web Version – 03/08/2018



Photo: H. Crisp. Licensed under Creative Commons BY 3.0. Available: https://commons.wikimedia.org/wiki/File:Neonsalmler_Paracheirodon_innesi.jpg.

1 Native Range and Status in the United States

Native Range

From Nico (2016):

“Tropical America. Upper Amazon basin of Peru, Colombia and Brazil.”

From Froese and Pauly (2016):

“South America: Blackwater or clearwater stream tributaries of the Solimões River.”

Status in the United States

From Nico (2016):

“The fish was taken in Colorado from geothermal waters (hot springs), San Luis Valley, Rio Grande basin, during the period 1980 to 1984 (Zuckerman and Behnke 1986).”

“Failed in Colorado.”

Means of Introductions in the United States

From Nico (2016):

“The record is most likely the result of fish escapes from local fish farms that use the hot springs for culturing aquarium fish.”

Remarks

From Nico (2016):

“The hot springs area is at an altitude of 8,000 ft and has very cold winters, but Zuckerman (personal communication) suggested that some of the introduced species might spread downstream during warmer months and reach other thermal refugia. Specimen(s) were reportedly deposited with the U.S. Fish and Wildlife Service, Fort Collins, Colorado; however, we have been unable to locate the material.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Characiformes
Family Characidae
Genus *Paracheirodon*
Species *Paracheirodon innesi* (Myers, 1936)”

From Eschmeyer et al. (2017):

“*innesi*, *Hyphessobrycon* Myers [G. S.] 1936:97 [Proceedings of the Biological Society of Washington v. 49] Likely near Iquitos, Peruvian Amazon. Holotype (unique): USNM 102109. Type catalog: Vari & Howe 1991:27. •Valid as *Hyphessobrycon innesi* Myers 1936 -- (Schreitmüller 1936:501). •Valid as *Paracheirodon innesi* (Myers 1936) -- (Ortega & Vari 1986:9, Fuller et al. 1999:186, Malabarba in Reis et al. 2003:153, Marshall et al. 2012:378). **Current status:** Valid as *Paracheirodon innesi* (Myers 1936). Characidae: Pristellinae.”

Size, Weight, and Age Range

From Nico (2016):

“Size: 4 cm.”

From Froese and Pauly (2016):

“Max length : 2.2 cm SL male/unsexed; [Lima et al. 2003]”

Environment

From Froese and Pauly (2016):

“Freshwater; pelagic; pH range: 5.0 - 7.0; dH range: 1 - 2. [...]; 20°C - 26°C [assumed to be recommended aquarium temperature range] [Riehl and Baensch 1991]”

Climate/Range

From Froese and Pauly (2016):

“Tropical; [...]”

Distribution Outside the United States

Native

From Nico (2016):

“Tropical America. Upper Amazon basin of Peru, Colombia and Brazil.”

From Froese and Pauly (2016):

“South America: Blackwater or clearwater stream tributaries of the Solimões River.”

Introduced

From FAO (2016):

“*Paracheirodon innesi* introduced to Singapore from unknown
Date of introduction: 1960s”

“*Paracheirodon innesi* introduced to Canada from unknown”

“*Paracheirodon innesi* introduced to Philippines from unknown”

From Froese and Pauly (2016):

“From unknown to Spain”

Means of Introduction Outside the United States

From FAO (2016):

“Introducer: Private sector

Reasons of Introduction: 1) ornamental”

Short Description

From Butler (2016):

“This fish has a slender body and is slightly laterally compressed. The back is silver to olive brown while the belly is silver. A green to blue iridescent stripe extends from the eye near the tail. Below this, beginning in the middle of the body, is a bright red band that runs to the base of the tail.”

Biology

From Froese and Pauly (2016):

“Feeds on worms, small insects, crustaceans and plant matter. In tank, female lays a relatively small number of eggs, which hatch in about 24 hours [Mills and Vevers 1989].”

Human Uses

From Froese and Pauly (2016):

“Most popular aquarium fish. Aquarium keeping: in groups of 5 or more individuals; minimum aquarium size 60 cm [BMELF 1999].”

From Duggan (2011):

“Despite many species potentially being imported, only a small number dominate the trade. For example, North American store surveys and importation records show fish species including goldfish, guppy (*Poecilia reticulata*), neon tetra (*Paracheirodon innesi*), swordtails (*Xiphophorus helleri*), and platy (*X. maculatus*) to be very common.”

Diseases

No records of OIE reportable diseases were found.

From Froese and Pauly (2016):

“Fin-rot Disease (late stage), Bacterial diseases
Fin Rot (early stage), Bacterial diseases
Turbidity of the Skin (Freshwater fish), Parasitic infestations (protozoa, worms, etc.)
Bacterial Gill Infection, Bacterial diseases
False Neon Disease, Bacterial diseases
Bacterial Infections (general), Bacterial diseases
Nocardiosis, Bacterial diseases
White spot Disease, Parasitic infestations (protozoa, worms, etc.)
Plistophora Disease in neon fish, Parasitic infestations (protozoa, worms, etc.)
Columnaris Disease (l.), Bacterial diseases
Columnaris Disease (e.), Bacterial diseases
Cryptobia Infestation, Parasitic infestations (protozoa, worms, etc.)
Hole-in-the-Head Disease, Parasitic infestations (protozoa, worms, etc.)”

Threat to Humans

From Froese and Pauly (2016):

“Harmless”

3 Impacts of Introductions

Specimens were collected from geothermal waters in Colorado in the early 1980s but this introduction did not result in an established population (Nico 2016). No impacts were determined from this introduction (Nico 2016).

4 Global Distribution



Figure 1. Known global distribution of *Paracheirodon innesi*. Map from GBIF Secretariat (2016).

Introductions were recorded for Singapore, Spain, the Philippines, and Canada. Only the introduction to Singapore listed the population as established but no geographic data was given for that population. None of these potential populations were used as source locations for the climate match.

The introduction in Colorado was in geothermal waters and failed to establish a population (Nico 2016); it was not used as a source point for the climate match.

5 Distribution Within the United States



Figure 2. Known distribution of *Paracheirodon innesi* in the United States. Map from Nico (2016).

The introduction in Colorado was in geothermal waters and failed to establish a population (Nico 2016); it was not used as a source point for the climate match.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Paracheirodon innesi* was low for the entire contiguous United States. Climate 6 proportion indicated that the contiguous U.S. has a low climate match. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was 0.000, low, and no states had an individually high match.

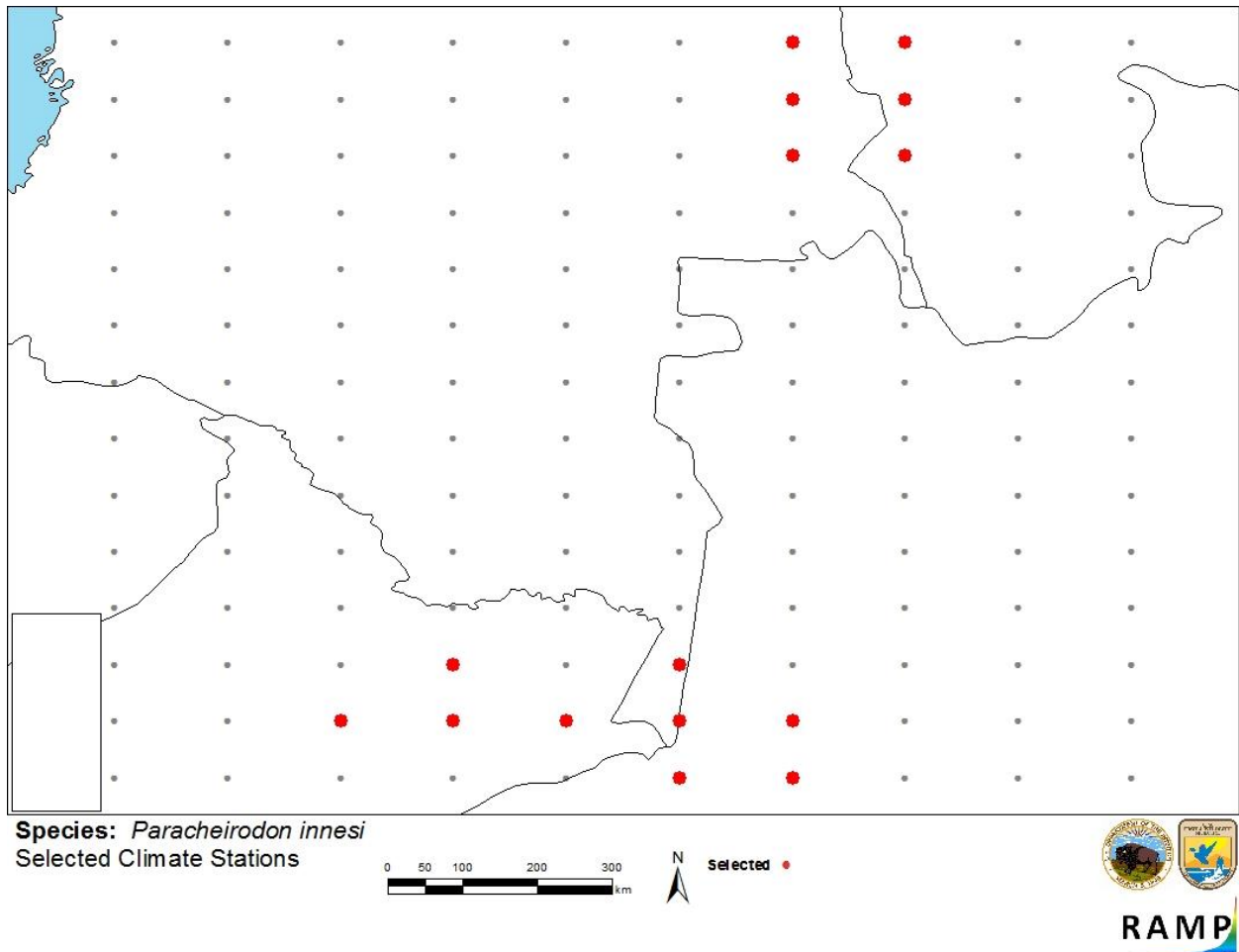


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Colombia, Venezuela, Brazil, and Peru) and non-source locations (grey) for *Paracheirodon innesi* climate matching. Source locations from GBIF Secretariat (2016).

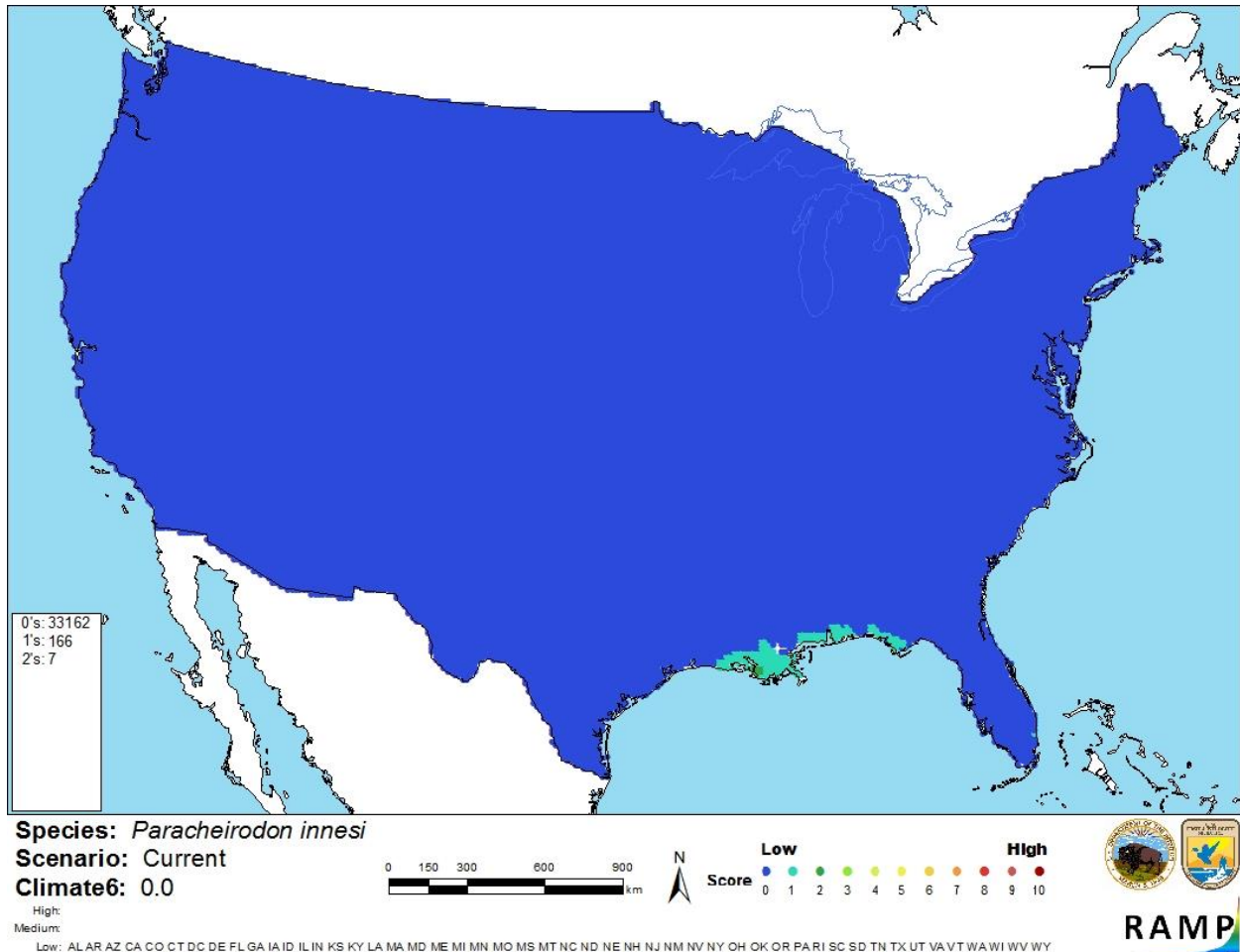


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Paracheirodon innesi* in the contiguous United States based on source locations reported by GBIF Secretariat (2016). 0 = Lowest match, 10 = Highest match.

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
$0.000 \leq X < 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

The certainty of assessment is medium. There was adequate biological information available for *Paracheirodon innesi*. Records of introductions were found, but there was no corresponding distribution data for most records. No information on impacts of introductions was available.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Paracheiroduon innesi is a small freshwater fish that is native to northern South America. This species is reported to be very popular in the aquarium trade. The history of invasiveness for *P. innesi* is not documented. There were a few records of introductions found, but detailed information on the establishment of populations or impacts was lacking in most cases. The climate match for the contiguous U.S. is low. The climate match indicates that this species requires a tropical climate and that there would be virtually no areas in the contiguous U.S. with a climate that could support the establishment of a population of *P. innesi*. The certainty of assessment is medium. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information** No additional remarks.
- **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.

Butler, R. 2016. Neon tetra *Paracheiroduon innesi*. Mongabay, San Francisco. Available: fish.mongabay.com/species/Parachierodon_innesi.html. (March 2016).

Duggan, I. C. 2011. Aquaria. Pages 32–35 in D. Simberloff, and M. Rejmánek, editors. Encyclopedia of biological invasions. University of California Press, Berkeley and Los Angeles.

Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2017. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (April 2017).

FAO (Fisheries and Agriculture Organization of the United Nations). 2016. Database on introductions of aquatic species. FAO, Rome. Available: <http://www.fao.org/fishery/introsp/search/en>. (March 2016).

Froese, R., and D. Pauly, editors. 2016. *Paracheiroduon innesi* (Myers, 1936). FishBase. Available: <http://www.fishbase.org/Summary/speciesSummary.php?ID=10691>. (March 2016).

GBIF Secretariat. 2016. GBIF backbone taxonomy: *Parachierodon innesi* (Myers, 1936). Global Biodiversity Information Facility, Copenhagen. Available: <http://www.gbif.org/species/2353909>. (March 2016).

ITIS (Integrated Taxonomic Information System). 2016. *Parachierodon innesi* (Myers, 1936). Integrated Taxonomic Information System, Reston, Virginia. Available: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=163041. (March 2016).

Nico, L. 2016. *Parachierodon innesi* (Myers, 1936). U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=426>. (March 2016).

Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk assessment mapping program: RAMP. 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.

BMELF (Bundesministerium für Ernährung, Landwirtschaft und Forsten). 1999. Gutachten über Mindestanforderungen an die Haltung von Zierfischen (Süßwasser). Bundesministerium für Ernährung, Landwirtschaft und Forsten (BMELF), Bonn. (In German.)

Fuller, P. L., L. G. Nico, and J. D. Williams. 1999. Nonindigenous fishes introduced into inland waters of the United States. American Fisheries Society, Special Publication 27, Bethesda, Maryland.

Lima, F. C. T., L. R. Malabarba, P. A. Buckup, J. F. Pezzi da Silva, R. P. Vari, A. Harold, R. Benine, O. T. Oyakawa, C. S. Pavanelli, N. A. Menezes, C. A. S. Lucena, M. C. S. L. Malabarba, Z. M. S. Lucena, R. E. Reis, F. Langeani, C. Moreira et al. 2003. Genera Incertae Sedis in Characidae. Pages 106–168 in R. E. Reis, S. O. Kullander, and C. J. Ferraris, Jr., editors. Checklist of the freshwater fishes of outh and Central America. EDIPUCRS, Porto Alegre, Brazil.

Marshall, B. G., B. R. Forsberg, L. L. Hess, and C. E. de Carvalho Freitas. 2012. Water temperature differences in interfluvial palm swamp habitats of *Paracheiroduon axelrodi* and *P. simulans* (Osteichthyes: Characidae) in the middle Rio Negro, Brazil. Ichthyological Exploration of Freshwaters 22(4):377–383.

Mills, D., and G. Vevers. 1989. The tetra encyclopedia of freshwater tropical aquarium fishes. Tetra Press, New Jersey.

Myers, G. S. 1936. A new characid fish of the genus *Hyphessobrycon* from the Peruvian Amazon. Proceedings of the Biological Society of Washington 49:97–98.

- Ortega, H., and R. P. Vari. 1986. Annotated checklist of the freshwater fishes of Peru. Smithsonian Contributions to Zoology 437.
- Reis, R. E., S. O. Kullander, and C. J. Ferraris, Jr., editors. 2003. Check list of the freshwater fishes of South and Central America. CLOFFSCA. EDIPUCRS, Porto Alegre, Brazil.
- Riehl, R., and H. A. Baensch. 1991. Aquarien atlas. Band. 1. Melle: Mergus, Verlag für Natur- und Heimtierkunde, Germany.
- Schreitmüller, W. 1936. Neu- und Wiedereinführungen. Nachrichtenblatt für Aquarien- und Terrarienvereine 1936(35):501.
- Vari, R. P., and J. C. Howe. 1991. Catalog of type specimens of recent fishes in the National Museum of Natural History, Smithsonian Institution. 1. Characiformes (Teleostei, Ostariophysi). Smithsonian Contributions to Zoology 517:1–52.
- Zuckerman, L. D., and R. J. Behnke. 1986. Introduced fishes in the San Luis Valley, Colorado. Pages 435–452 *in* R. H. Stroud, editor. Fish culture in fisheries management. Proceedings of a symposium on the role of fish culture in fisheries management at Lake Ozark, Missouri, 1985. American Fisheries Society, Bethesda, Maryland.