

Rainbow Characodon (*Characodon lateralis*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, June 2017
Revised, September 2017
Web Version, 11/30/2017



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1 Native Range and Status in the United States

Native Range

From Eschmeyer et al. (2017):

“Headwaters of Río Mezquital, Pacific Slope of Mexico.”

From Goodeid Working Group (2017):

“*Characodon lateralis* is distributed in habitats along the lower part of the Río Tunal below the waterfalls of El Salto in Durango. One center is between the Río Tunal and the Río de Nombre de Dios, the second one was more eastern at Amado Nervo.”

Status in the United States

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

From Select Aquatics (no date) [located in Erie, Colorado]:

“*Characodon lateralis*, Red Morph [...] Price- \$12.50 each, \$25 pair.”

Means of Introductions in the United States

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

Remarks

From Froese and Pauly (2017):

“IUCN Red List Status [IUCN 2017]
Endangered”

From Goodeid Working Group (2017):

“This fish disappeared from a large part of its original range by pollution of the Río Mezquital through the big company Celulosas de México. As far as we know, there are only two location centers left [...]”

“The aquarium strain of *Characodon lateralis* cannot be assigned to one locality and might be mixed up from different localities. Some strains show very red males whereas wild-caught males often display red only on the venter (at least the population of Ojo de Agua Los Berros).”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Cyprinodontiformes
Suborder Cyprinodontoidae
Family Goodeidae

Subfamily Goodeinae
Genus *Characodon*
Species *Characodon lateralis* Günther, 1866”

“Current Standing: valid”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 4.0 cm TL male/unsexed; [Wischnath 1993]; 5.5 cm TL (female)”

Environment

From Froese and Pauly (2017):

“Freshwater; demersal; pH range: 6.0 - 8.0; dH range: 9 – 19.”

Climate/Range

From Froese and Pauly (2017):

“Subtropical; 18°C - 27°C [Baensch and Riehl 1985]; 24°N - 23°N”

Distribution Outside the United States

Native

From Eschmeyer et al. (2017):

“Headwaters of Río Mezquital, Pacific Slope of Mexico.”

From Goodeid Working Group (2017):

“*Characodon lateralis* is distributed in habitats along the lower part of the Río Tunal below the waterfalls of El Salto in Durango. One center is between the Río Tunal and the Río de Nombre de Díos, the second one was more eastern at Amado Nervo.”

Introduced

No introductions of this species have been reported.

Means of Introduction Outside the United States

No introductions of this species have been reported.

Short Description

From Smith and Miller (1986):

“A *Characodon* (to 63 mm SL) with dorsal-fin rays typically 12 in males, 11 in females; outer-series teeth conic, bicuspid or tricuspid; pelvic fins usually reaching or surpassing anus in males; dorsal profile convex. Coloration of adult males distinguishes the species from all other goodeids: median fins bear a proximal band of red or orange followed by a broad black band; lower parts of body are bright red, orange, or yellow, extending dorsally to midline on sides and caudal peduncle; outer two-thirds of paired fins are clear.”

Biology

From Froese and Pauly (2017):

“Inhabits clear springs with plant growth. Feeds on algae.”

“Gestation lasts for about 55 days. Female gives birth to 5-20 young. Reaches sexual maturity in about 5 months.”

From Goodeid Working Group (2017):

“The habitats are similar to the ones, *Characodon audax* inhabits: Marshy pools, spring-fed ponds, springs and their outflows with abundant submergent vegetation (*Myriophyllum*, *Ceratophyllum*, *Potamogeton* and *Scirpus*). Concerning the substrates predominate silt, clay, mud, sand, soft marl, gravel and rocks. The currents are usually slight to none, occasionally [*sic*] moderate, the water is clear to turbid. The Rainbow Characodon prefers depths of less than 0.5m.”

“Young were captured from 0.8 to 11mm SL between 13 March and 2 September. This indicates a protracted reproductive season extending from at least early March through August. At least in one habitat (Ojo de agua de San Juan), the fish moved about in large aggregations in shallow water, retreating to deeper places when disturbed (Fitzsimmons 1972).”

Human Uses

From Froese and Pauly (2017):

“Aquarium: commercial”

Diseases

From Pérez-Ponce de León et al. (2009):

“Parasites previously recorded in the same host species in the region are marked with an asterisk, followed with the bibliographical reference in parenthesis. [...]

Allocreadium sp. (Adult, D[igenea])

**Allocreadium mexicanum* (Adult, D[igenea]) [unknown reference]

Bothriocephalus acheilognathi (Adult, C[estoda])

Clinostomum complanatum (Metacercariae, D[igenea])
Spiroxys sp. (Larvae, N[ematoda])
 **Spiroxys* sp. (Larvae, N[ematoda]) [unknown reference]
Streptocara sp. (Larvae, N[ematoda])”

From Martínez-Aquino et al. (2014):

“Digenea	<i>Allocreadium mexicanum</i> (A[dult])
	<i>Allocreadium</i> sp. (A[dult])
Monogenea	<i>Gyrodactylus</i> sp. 1 (A[dult])
Cestoda	<i>Bothriocephalus acheilognathi</i> (A[dult])
Nematoda	<i>Spiroxys</i> sp. (L[arvae, third stage])
	<i>Streptocara</i> sp. (L[arvae, third stage])
Acanthocephala	<i>Polymorphus brevis</i> (C[ystacanth])”

No OIE-reportable diseases have been documented for this species.

Threat to Humans

From Froese and Pauly (2017):

“Harmless”

3 Impacts of Introductions

No introductions of this species have been reported.

4 Global Distribution

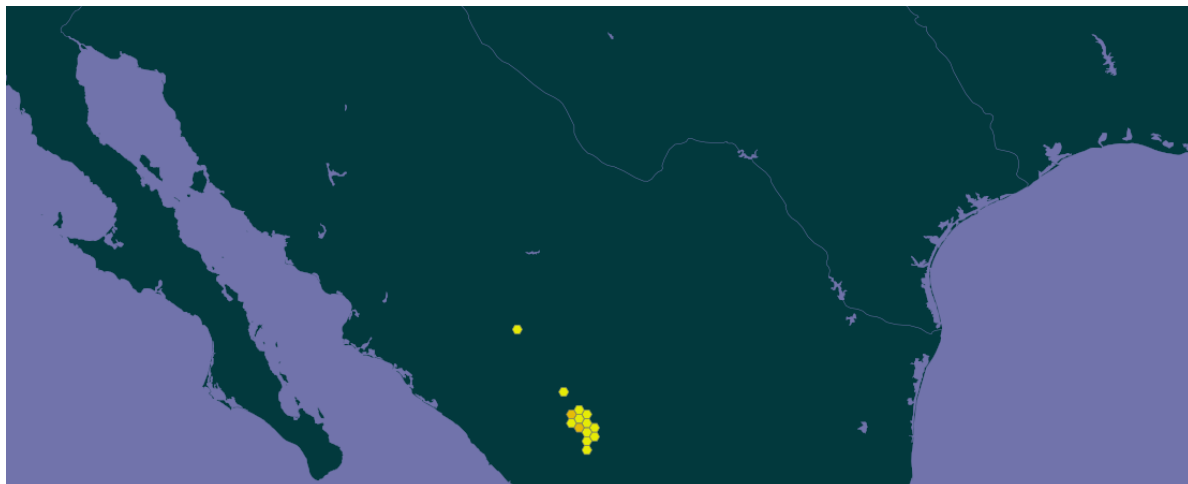


Figure 1. Known global distribution of *C. lateralis*. Map from GBIF (2017). Locations reported in the Río Grande de Santiago basin, Mexico, were excluded from the map and climate matching analysis because these points are outside the described range of established populations of *C. lateralis* (see Distribution Outside the United States, above).

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

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was high along the U.S.-Mexico border in the Southwest; medium in California, western Texas, and the remainder of the Southwest; and low elsewhere. Climate 6 score indicated a medium climate match overall for the contiguous U.S. Scores between 0.005 and 0.103 are classified as medium match; Climate 6 score for *C. lateralis* was 0.016.

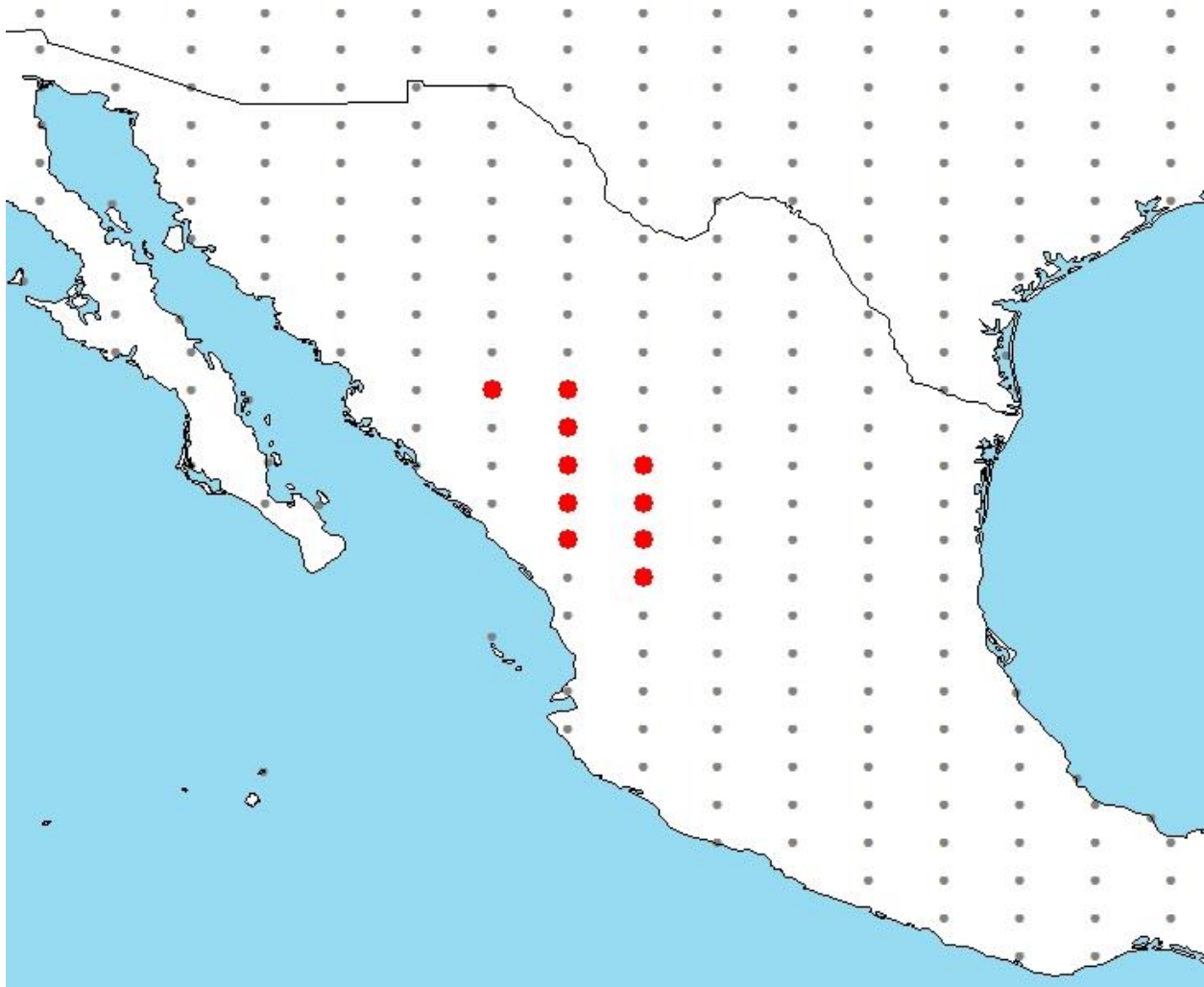


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in western Mexico selected as source locations (red) and non-source locations (gray) for *Characodon lateralis* climate matching. Source locations from GBIF (2017).

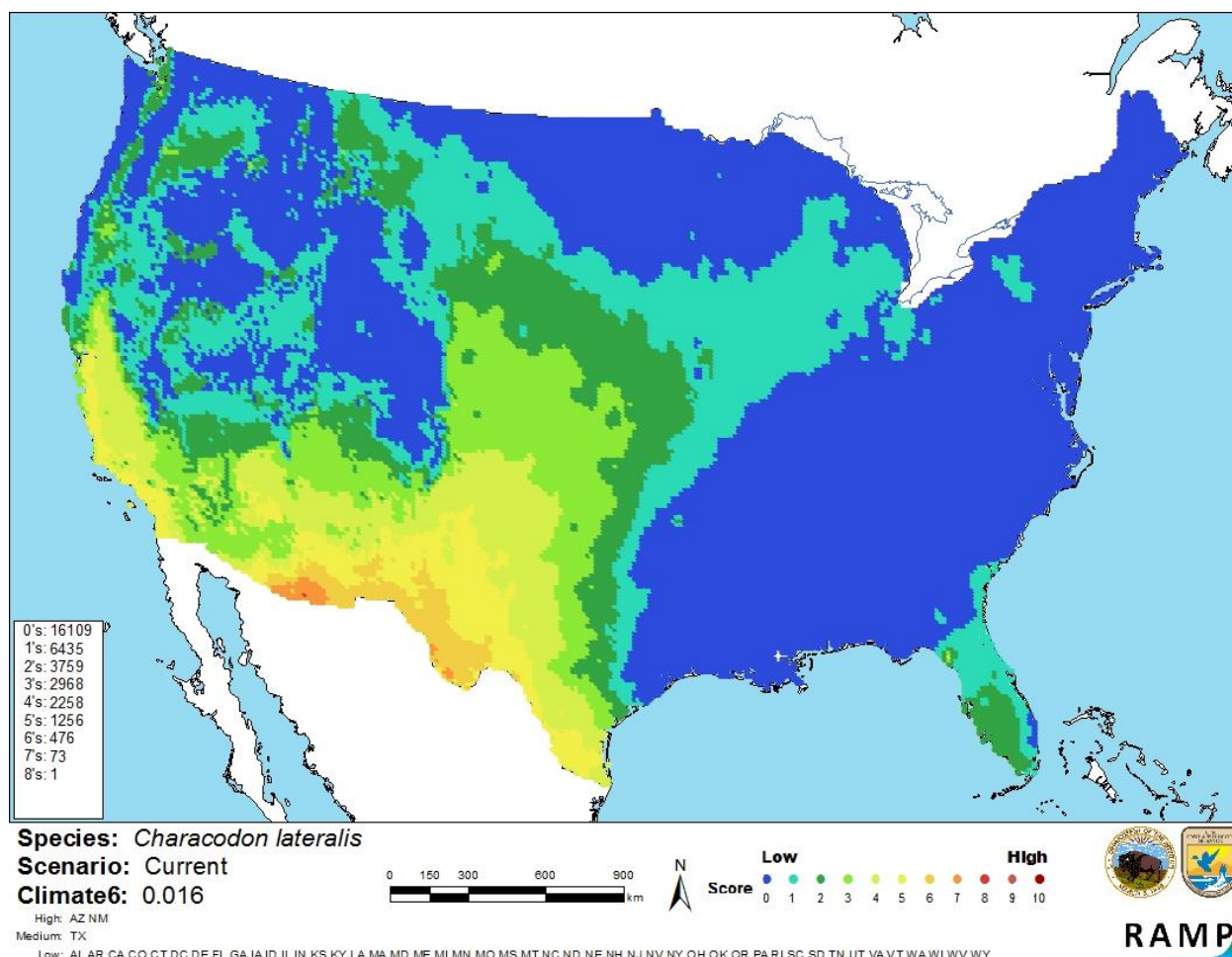


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *C. lateralis* in the contiguous United States based on source locations reported by GBIF (2017). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

Some information on the biology and distribution of this species is available. No *C. lateralis* have been documented as introduced in the wild, so impacts of introduction remain unknown. Therefore, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Characodon lateralis is an endangered goodeid fish native to the state of Durango, Mexico. *C. lateralis* has a medium climate match to the contiguous United States. While the species is known to be present in the aquarium trade in the U.S., it has not been documented in the wild outside of its native range. Without any past introductions of *C. lateralis* to observe, it is impossible to know the potential impacts of introduction of *C. lateralis* to the U.S. Therefore, the overall risk of this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **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.

- 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>. (June 2017).
- Froese, R., and D. Pauly, editors. 2017. *Characodon lateralis* Günther, 1866. FishBase. Available: <http://www.fishbase.org/summary/Characodon-lateralis.html>. (September 2017).
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- Martínez-Aquino, A., C. A. Mendoza-Palmero, R. Aguilar-Aguilar, and G. Pérez-Ponce de León. 2014. Checklist of helminth parasites of Goodeinae (Osteichthyes: Cyprinodontiformes:

Goodeidae), an endemic subfamily of freshwater fishes from Mexico. *Zootaxa* 3856(2):151-191.

Pérez-Ponce de León, G., R. Rosas-Valdez, B. Mendoza-Garfias, R. Aguilar-Aguilar, J. Falcón-Ordaz, L. Garrido-Olvera, and R. Pérez-Rodríguez. 2009. Survey of the endohelminth parasites of freshwater fishes in the upper Mezquital River Basin, Durango State, Mexico. *Zootaxa* 2164:1-20.

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Smith, M. L., and R. R. Miller. 1986. Mexican goodeid fishes of the genus *Characodon*, with description of a new species. *American Museum Novitates* 2851:1-14.

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. 1985. *Aquarien atlas*, volume 2. Mergus, Verlag für Natur-und Heimtierkunde GmbH, Melle, Germany.

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IUCN (International Union for Conservation of Nature). 2017. The IUCN Red List of Threatened Species, version 2017-1. (May 2017).

Wischnath, L. 1993. *Atlas of livebearers of the world*. T. F. H. Publications, Inc., New Jersey.