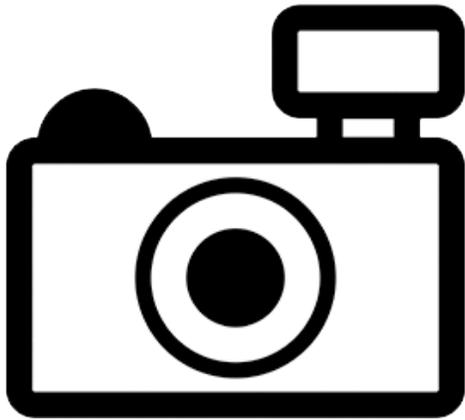


Blue-eye Cichlid (*Cryptoheros spilurus*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, April 2011
Revised, February 2019
Web Version, 10/10/2019



No Photo Available

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019a):

“Central America: Atlantic slope from Belize to Nicaragua.”

From Fricke et al. (2019):

“Rivers flowing into Lake Isabel, Atlantic slope from Belize to Nicaragua: Belize, Guatemala, Honduras and Nicaragua;”

From Nico (2019):

“Tropical America. Atlantic Slope drainages of Middle America [Conkel 1993]; from the Yucatan Peninsula, Mexico, throughout Belize, south to Panama [Greenfield and Thomerson 1997].”

Status in the United States

From Mundy (2005):

“This species was reported to have been introduced to O‘ahu in 1984 (Devick, 1991; Fuller et al., [1999]). Yamamoto & Tagawa (2000) stated that it was well established in Nu‘uanu Reservoir and Hausten Ditch but disappeared from the reservoir after the 1984 drought, which suggests that the species was introduced prior to that year. Given the species’ occurrence in two disjunct habitats of O‘ahu, more investigation of its persistence on O‘ahu might be warranted to demonstrate its absence from open waters of the state.”

From Nico (2019):

“Reported as established in Nu‘uanu Reservoir by Yamamoto and Tagawa (2000), but disappeared after the 1984 drought. Unclear at this time whether it is extirpated.”

While the means of introduction in Hawaii (aquarium release) implies trade in this species within the United States the author could not find evidence of current trade in the species.

Means of Introductions in the United States

From Froese and Pauly (2019a):

“Aquarium escape; considered an accidental introduction.”

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Cryptoheros spilurus* (Günther 1862) is the current valid name for this species. It was originally described as *Heros spilurus* (Günther 1862) and has been known previously as *Cichlasoma spilurum* (Günther 1862) and *Archocentrus spilurus* (Günther 1862).

From Froese and Pauly (2019b)

“Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > [...] Actinopterygii (Class) > Perciformes (Order) > Labroidei (Suborder) > Cichlidae (Family) > Cichlinae (Subfamily) > *Cryptoheros* (Genus) > *Cryptoheros spilurus* (Species)”

Size, Weight, and Age Range

From Froese and Pauly (2019a):

“Max length : 12.0 cm TL male/unsexed; [Kullander 2003]; 8.0 cm TL (female)”

Environment

From Froese and Pauly (2019a):

“Freshwater; benthopelagic. [...]; 22°C - 32°C [Conkel 1993]”

Climate/Range

From Froese and Pauly (2019a):

“Tropical;”

Distribution Outside the United States

Native

From Froese and Pauly (2019a):

“Central America: Atlantic slope from Belize to Nicaragua.”

From Fricke et al. (2019):

“Rivers flowing into Lake Isabel, Atlantic slope from Belize to Nicaragua: Belize, Guatemala, Honduras and Nicaragua;”

From Nico (2019):

“Tropical America. Atlantic Slope drainages of Middle America (Conkel 1993); from the Yucatan Peninsula, Mexico, throughout Belize, south to Panama (Greenfield and Thomerson 1997).”

Introduced

No introductions were reported outside of the United States.

Means of Introduction Outside the United States

There are no reports of introductions outside of the native range other than the introductions in Hawaii.

Short Description

A short description of *Cryptoheros spilurus* was not available.

Biology

From Froese and Pauly (2019a):

“Inhabits lakes and rivers, preferring the shallows and bank areas. Found over sand, mud and rock bottoms and prefers the slower moving waters of the lower river valleys [Conkel 1993].”

“Usually lays eggs in sand depressions. Produces 300-400 offspring per spawning.”

Human Uses

From Froese and Pauly (2019a):

“Fisheries: of no interest; aquarium: commercial”

Diseases

No OIE-reportable diseases (OIE 2019) were found to be associated with *Cryptoheros spilurus*.

According to Poelen et al. (2019), *Cryptoheros spilurus* is the host to the parasite *Crassicutis cichlasomae*.

Threat to Humans

From Froese and Pauly (2019a):

“Harmless”

3 Impacts of Introductions

From Nico (2019):

“The impacts of this species are currently unknown, as no studies have been done to determine how it has affected ecosystems in the invaded range. The absence of data does not equate to lack of effects. It does, however, mean that research is required to evaluate effects before conclusions can be made.”

4 Global Distribution



Figure 1. Known global distribution of *Cryptoheros spilurus*. Locations in Belize, Guatemala, Honduras, Mexico, Nicaragua, Costa Rica and Hawaii. Map from GBIF Secretariat (2019). The farthest west location in Mexico was not included in the climate match; it is likely this occurrence was misidentified. The locations in Hawaii were not used to select source points for the climate match. The current status of that population is unknown (Mundy 2005; Nico 2019).

5 Distribution Within the United States



Figure 2. Known distribution of *Cryptoheros spilurus* in the United States. Locations are on O'ahu and Hawai'i. The location on Hawai'i represents a state level record without information on where in the state the species was observed. Map from Nico (2019). These locations were not used to select source points for the climate match. There have been no records of this species being collected since the first observation (Mundy 2005; Nico 2019).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Cryptoheros spilurus* was low for most of the contiguous United States. Areas of medium to high match are found in Florida and southern Texas. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.008, medium. (Scores between 0.005 and 0.103 are classified as medium.) All States had individually low climate scores with the exception of Texas, which had a medium score, and Florida, which had a high score.

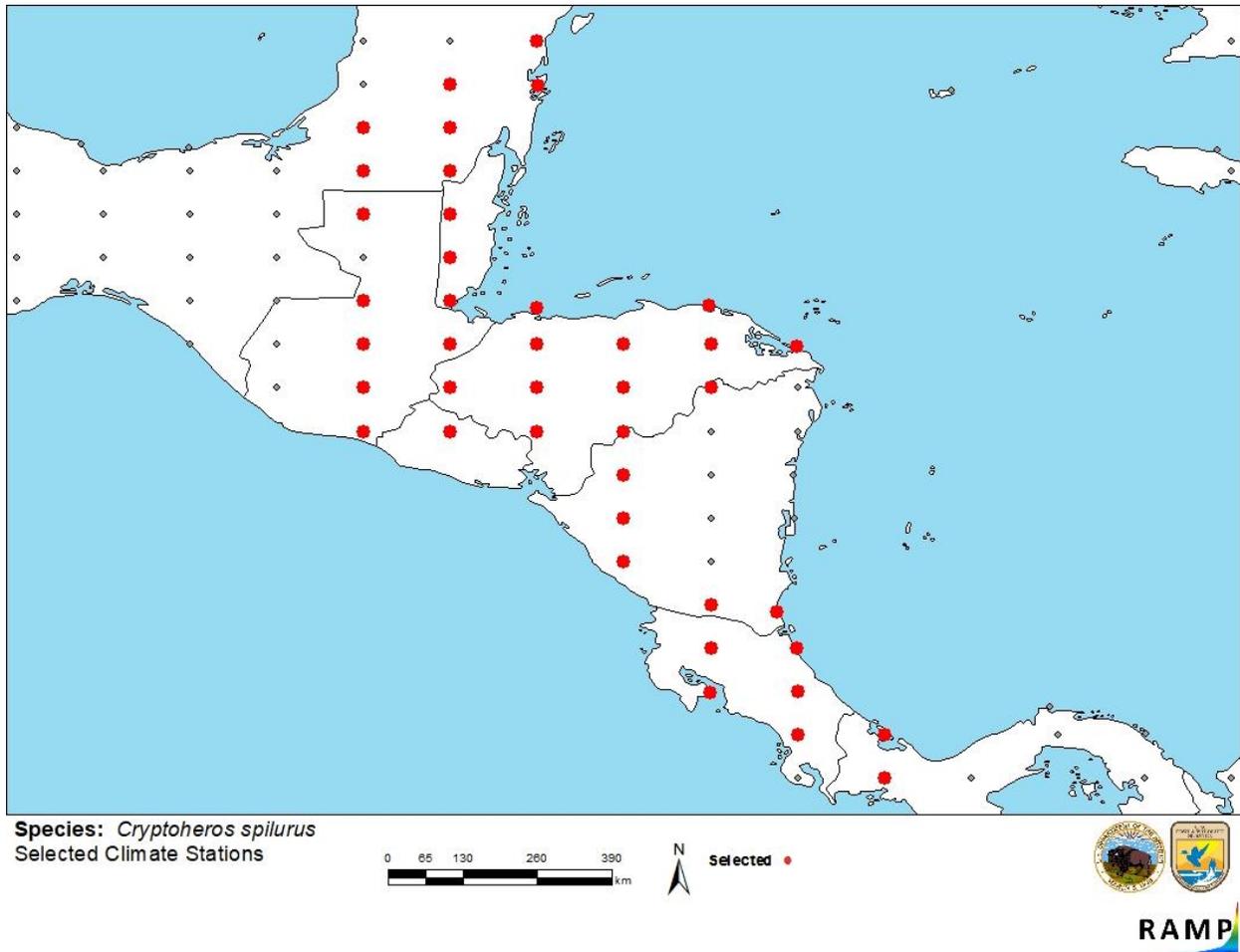


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in Central America selected as source locations (red; Belize, Guatemala, El Salvador, Honduras, Mexico, Nicaragua, Costa Rica, Panama) and non-source locations (gray) for *Cryptoheros spilurus* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

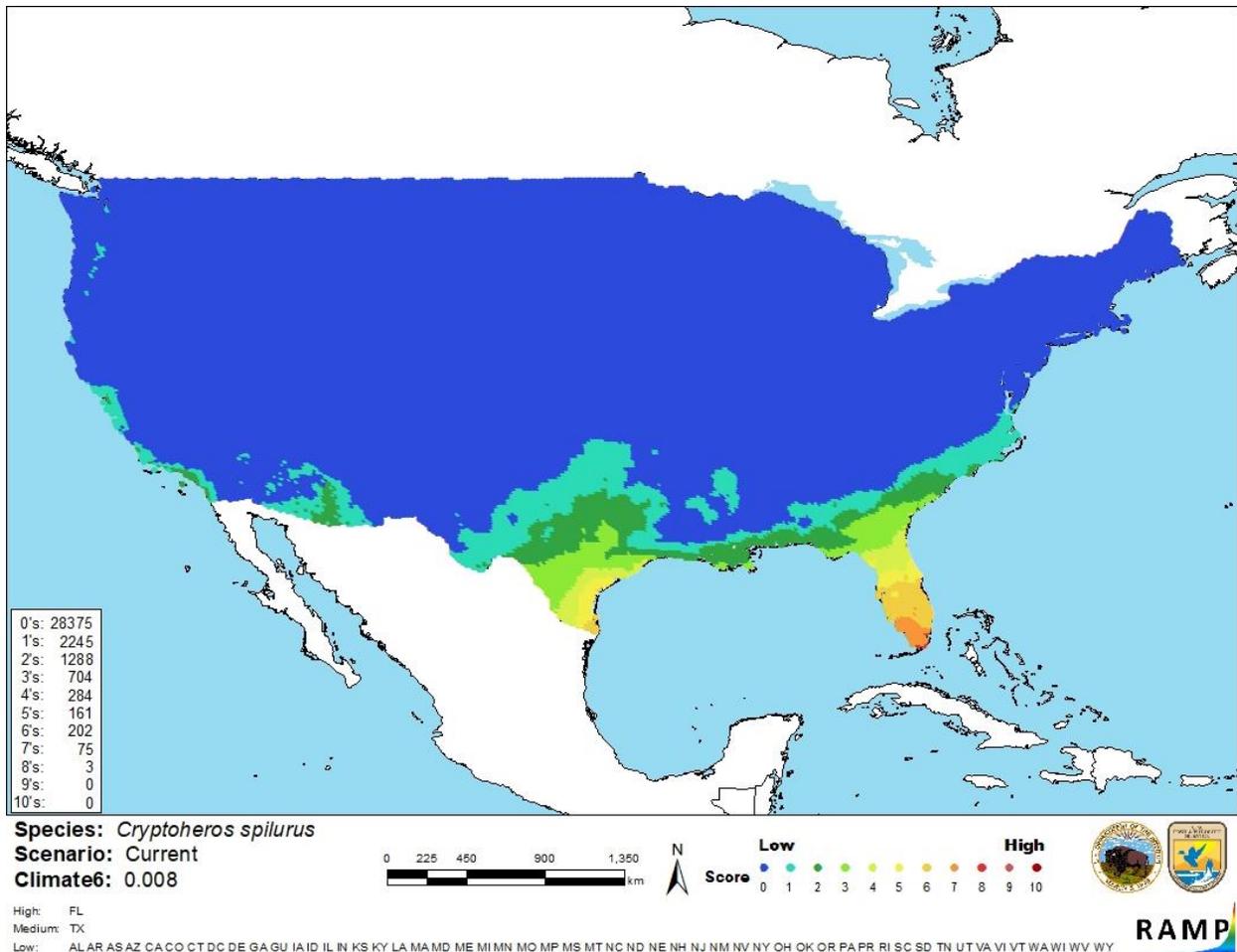


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Cryptoheros spilurus* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). 0 = Lowest match, 10 = Highest match.

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

The certainty of assessment for *Cryptoheros spilurus* is low. Information on the biology and distribution of the species is available. There was one record of introduction found that resulted in an established population at one point but no information on its impacts of introduction was found. The current status of the species is unknown with some authors considering the species extirpated

8 Risk Assessment

Summary of Risk to the Contiguous United States

The blue-eyed cichlid (*Cryptoheros spilurus*) is a South American fish, native to Belize, Guatemala, Honduras Mexico, Nicaragua, Costa Rica and Panama. It is used in the aquarium trade. The history of invasiveness is none documented. *C. spilurus* has been introduced to Hawaii accidentally from an aquarium, which resulted in an established population in the early 1980s, but the current status of the species is unknown with some authors considering the species extirpated. There have been no studies of potential impacts. The climate match for the contiguous United States was medium. However, only southern Florida and the Gulf coast of Texas had a medium-high match; all other areas had a low climate match. The certainty of assessment is low due to lack of information on impacts of introduction. The overall risk assessment category for *Cryptoheros spilurus* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None documented**
- **Climate Match (Sec. 6): Medium**
- **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.

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>. (February 2019).

Froese, R., and D. Pauly, editors. 2019a. *Cryptoheros spilurus* (Günther, 1862). FishBase. Available: <http://www.fishbase.org/summary/Cryptoheros-spilurus.html>. (February 2019).

Froese, R., and D. Pauly, editors. 2019b. *Cryptoheros spilurus* (Günther, 1862). In World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=1021148>. (February 2019).

GBIF Secretariat. 2019. GBIF backbone taxonomy: *Cryptoheros spilurus* (Günther, 1862). Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/2370311>. (February 2019).

Mundy, B. C. 2005. Checklist of the fishes of the Hawaiian Archipelago. Bishop Museum, Bulletins in Zoology 6, Bishop Museum Press, Honolulu, Hawaii.

Nico, L. 2019. *Cryptoheros spilurus* (Günther, 1862). U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: <https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=450>. (February 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.

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.

Conkel, D. 1993. *Cichlids of North and Central America*. T. F. H. Publications.

Devick, W. S. 1991. Patterns of introductions of aquatic organisms to Hawaiian freshwater habitats. Pages 189–213 in W. S. Devick, editor. *New directions in research, management and conservation of Hawaiian freshwater stream ecosystems*. Proceedings of the 1990 symposium on freshwater stream biology and fisheries management. Hawaii State Department of Land and Natural Resources, Honolulu.

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.

Greenfield and Thomerson. 1997. [Source material did not give full citation for this reference.]

Kullander, S. O. 2003. Cichlidae (cichlids). Pages 605–654 in R. E. Reis, S. O. Kullander, and C. J. Ferraris, Jr., editors. *Checklist of the freshwater fishes of South and Central America*. EDIPUCRS, Porto Alegre, Brazil.

Yamamoto, M. N., and A. W. Tagawa. 2000. *Hawaii's native and exotic freshwater animals*. Mutual Publishing, Honolulu, Hawaii.