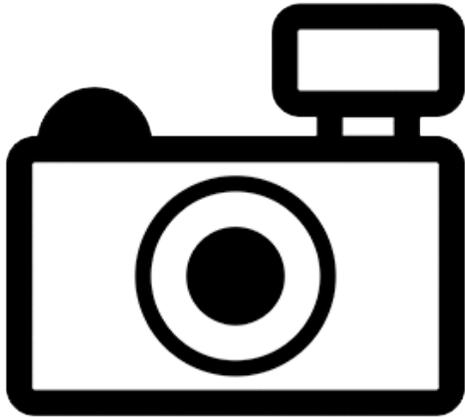


Blue Peacock Bass (*Cichla piquiti*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, August 2011
Revised, October 2012 and June 2018
Web Version, 7/27/2018



No Photo Available

1 Native Range and Status in the United States

Native Range

From Kullander and Ferreira (2006):

“*Cichla piquiti*, new species, is restricted to the Tocantins river basin [Brazil], but transplanted in the Paraná River basin in Brazil and Paraguay.”

Status in the United States

This species has not been recorded as introduced or established in the United States. This species has been observed in trade in the United States among aquarium hobbyists.

From Petzone Tropical Fish (2018):

“Azul Peacock Bass [...] Your Price: \$49.99”

From Aqua Scape Online (2018):

“Peacock Bass Azul 2.5”-3” (*Cichla Piquiti*) [...] Our Price: \$65.00”

Means of Introductions in the United States

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

Remarks

From Kullander and Ferreira (2006):

“*Cichla piquiti* bears some resemblance to *C. ocellaris* and *C. nigromaculata* in the presence of five wide vertical bars on the side, but ocellar markings are absent from the side, and the vertical bars reach more ventrally on the side. *Cichla piquiti* can be distinguished from the sympatric *C. kelberi* by the absence of light spots on the anal fin, presence of bars 1a and 2a, absence of abdominal blotches, and absence of occipital bar. It may be confused at small sizes with *C. pinima*, which also occurs in the lower Rio Tocantins, but the two species appear to be only narrowly parapatric [...].”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Froese and Pauly (2018):

“Biota > Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > Pisces (Superclass) > Actinopterygii (Class) > Perciformes (Order) > Labroidei (Suborder) > Cichlidae (Family) > Cichlinae (Subfamily) > *Cichla* (Genus) > *Cichla piquiti* (Species)”

“Status accepted”

Size, Weight, and Age Range

From Froese and Pauly (2011):

“Max length: 43.0 cm SL male/unsexed; [Kullander and Ferreira 2006]”

Environment

From Froese and Pauly (2011):

“Freshwater; benthopelagic.”

Climate/Range

From Froese and Pauly (2011):

“Tropical”

Distribution Outside the United States

Native

From Kullander and Ferreira (2006):

“*Cichla piquiti*, new species, is restricted to the Tocantins river basin [Brazil] [...]”

Introduced

From Kullander and Ferreira (2006):

“[...] transplanted in the Paraná River basin in Brazil and Paraguay.”

Means of Introduction Outside the United States

From Kullander and Ferreira (2006):

“*Cichla piquiti* is extensively stocked in reservoirs in the Paraná river drainage, and the States of Minas Gerais and São Paulo.”

From Resende et al. (2008):

“The tucunaré, *Cichla piquiti*, is a native fish species from the Amazonian watershed that was introduced into the Pantanal probably in 1982, as a consequence of escaping from culture fish ponds in the Upper Piquiri River [...]”

Short Description

From Kullander and Ferreira (2006):

“Differs from other species of *Cichla* in having 83-104 scales in E1 row and adult color pattern with five wide dark vertical bars below the dorsal fin (bars 1-3, 1a, 2a). [...] Dorsal fin rays 4-6 longest; soft dorsal fin rounded, not reaching to caudal fin base. Anal fin rounded, not reaching to caudal fin base. Caudal fin subtruncate or slightly convex, with more angled dorsal corner and rounded lower corner. Pectoral fin pointed, extending halfway to origin or middle of soft anal fin. Pelvic fin subacuminate, with tip formed by rays 1-2, ray 1 longest, extending halfway to anal fin origin or slightly beyond.”

Biology

No information available.

Human Uses

From Kullander and Ferreira (2006):

“Species of the genus *Cichla* are among the major food and game fishes in South America.”

This species has been observed in trade in the United States among aquarium hobbyists.

From Petzone Tropical Fish (2018):

“Azul Peacock Bass [...] Your Price: \$49.99”

From Aqua Scape Online (2018):

“Peacock Bass Azul 2.5”-3” (*Cichla Piquiti*) [...] Our Price: \$65.00”

Diseases

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

From Franceschini et al. (2013):

“Fifty specimens of *Cichla piquiti* were collected from the Paraná River downstream of the Ilha Solteira Hydroelectric Power Station in Brazil and surveyed for endohelminth parasites. All fish were parasitised by at least one helminth species (overall prevalence [P] = 100%). Eight parasite taxa were present: the nematode *Procamallanus (Procamallanus) peraccuratus* in the intestines; third-stage larvae of the anisakids *Contracaecum* sp. and *Hysterothylacium* sp. in the visceral cavity, mesentery and serosa of the stomach and intestines and on the liver and spleen; the trematodes *Austrodiplostomum compactum* in the eye (metacercariae) and *Genarchella genarchella* in the stomach; and the cestodes *Proteocephalus macrophallus*, *Proteocephalus microscopicus*, and *Sciadocephalus megalodiscus* in the intestines.”

“In this study, *C. piquiti* were found to be infected with third-stage anisakid larvae (L3), and at least one of the genera, *Contracaecum* or *Hysterothylacium*, parasitised 92% of the fish analysed.”

“In fish, the third-stage larvae (L3) of anisakid nematodes were located on the visceral serosa, from where they can migrate to the musculature, where they can be encysted. If encysted parasites are ingested, they can cause an important human pathology known as anisakiasis [BARROS; CAVALCANTI, 1998; TAKEMOTO et al., 2004; TAVARES; LUQUE, 2006]. Larvae were not found encysted in the fish muscles. This finding is extremely important, as this fish species has commercial importance in the region, representing an important source of food for local people as well as a popular target for sport fishing.”

Threat to Humans

From Froese and Pauly (2011):

“Harmless”

3 Impacts of Introductions

Moore et al. (2010) assessed *C. piquiti* as a species “known to modify or disturb habitat”; “known to impact other species through competition, aggression, predation”; and “likely to pose a significant genetic risk through hybridisation/introgression with exotic species” if introduced to Australia. No details are given on the sources used to make these assessments.

From Almeida-Ferreira et al. (2011):

“Since exclusive SPAR molecular markers were obtained for *Cichla kelberi* and *C. piquiti* populations, the introduction of the two species in the region has been confirmed. Identification of the markers in specimens of the Paraná river basin confirmed hybridization between these exotic species.”

From Gomiero et al. (2010):

“The genus *Cichla* adapts well in locations in which it is introduced, however this adaptation shows itself to be strongly adjusted to each particular location, determining great plasticity and establishment capacity.”

From Yamada et al. (2011):

“The gills of 41 *Cichla piquiti* and 39 *C. kelberi* from Itaipu and Lajes reservoirs, respectively, Brazil, were examined to describe the ectoparasite assemblages of these two non-native peacock-bass populations. [...] Overall, our results suggest that the trend of parasite species loss through the invasion process may have contributed to the establishment of non-native *C. piquiti* and *C. kelberi* populations in Brazilian reservoirs.”

From Resende et al. (2008):

“The tucunaré, *Cichla piquiti*, is a native fish species from the Amazonian watershed that was introduced into the Pantanal probably in 1982, as a consequence of escaping from culture fish ponds in the Upper Piquiri River [...] The results of this work reveal that *C. piquiti* is well established in the Pantanal. No visible deleterious effect on native fish species has been observed.”

“The evidence up to now suggests that, in the long term, co-existence among *Cichla piquiti* and native fishes will be reached in the Pantanal as observed in Florida for *Cichla ocellaris*. Local fishermen continue to fish the same species as in the past and now they say it is better, as tucunaré is good for fishing and for consumption. The tucunaré have now crossed the Paraguay River and can also be found on the right bank, meaning that in the future, it will be dispersed through the entire Pantanal region.”

From Vieira et al. (2009):

“*Cichla piquiti* is an exotic piscivore fish that is well adapted to this Neotropical reservoir, which exhibits environmental conditions considerably different from its original habitat. This study indicates that the species presents plasticity in reproduction and in allocation of resources, probably due the seasonality of the reservoir and the exploitation of native species.”

4 Global Distribution

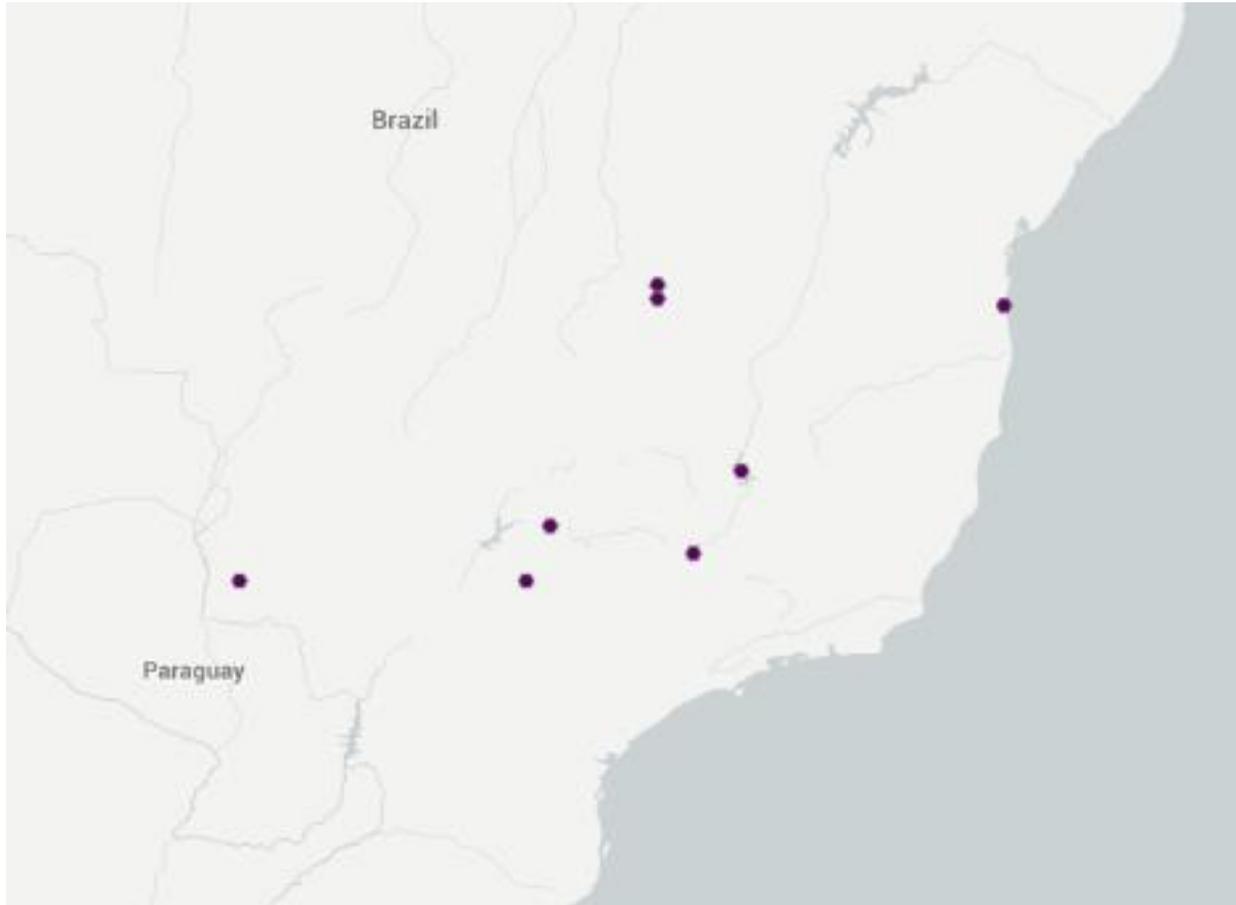


Figure 1. Known global distribution of *Cichla piquiti*, reported from Brazil. Map from GBIF Secretariat (2017). No georeferenced occurrences were available from GBIF Secretariat (2017) for the range of this species in Paraguay, but the occurrences shown cover both river basins in Brazil where the species is established. The location on the Brazilian coastline was excluded from the climate matching analysis because it is outside the known established range of *C. piquiti*.

5 Distribution Within the United States

No known locations.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was medium overall for the contiguous United States, reflected in a Climate 6 proportion of 0.012. The range for Climate 6 proportions indicating a medium climate match between 0.005 and 0.103. The highest match was 8 out of 10 which was found in southern Florida. Florida was the only state to

record a high match. Areas of medium match were found along the Texas coast, in northern Florida, and in much of Georgia. The majority of the contiguous United States recorded 0 out of 10.

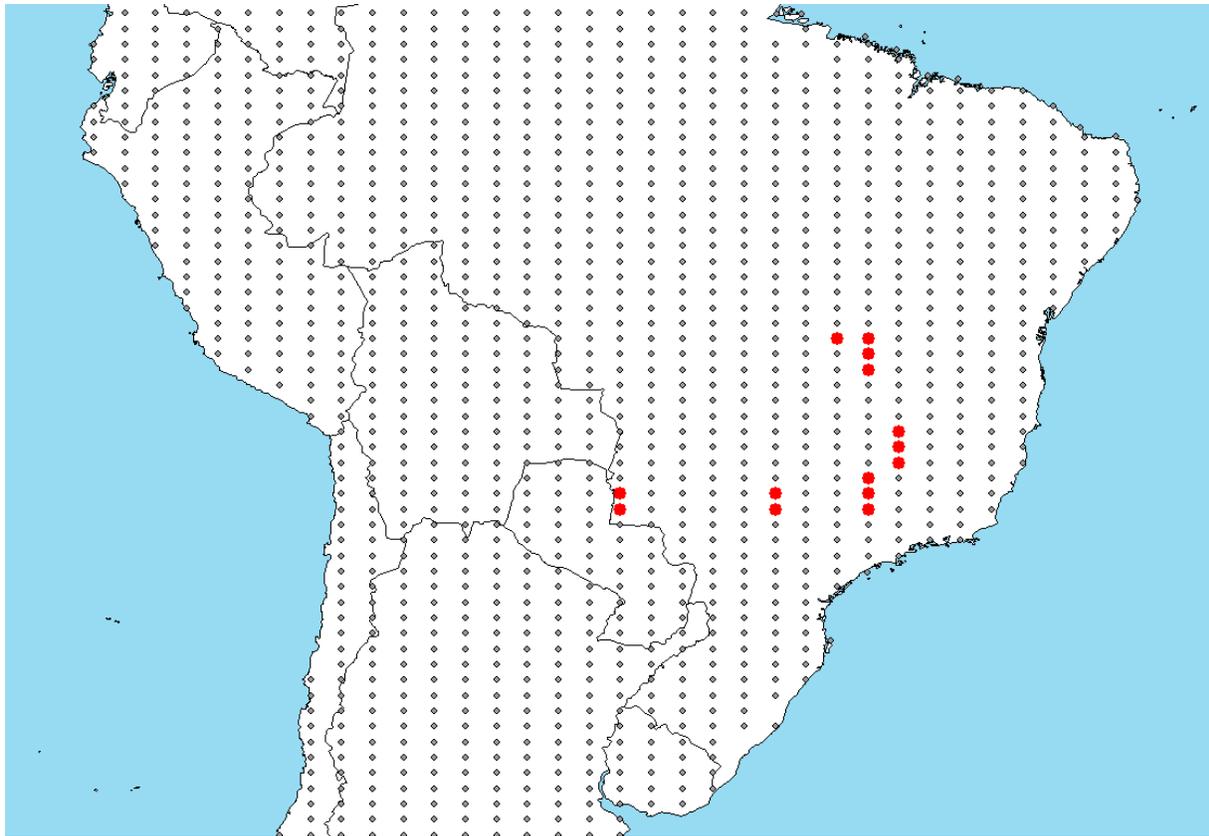


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Brazil, Tocantins and Paraná River basins) and non-source locations (gray) for *Cichla piquiti* climate matching. Source locations from GBIF Secretariat (2017).

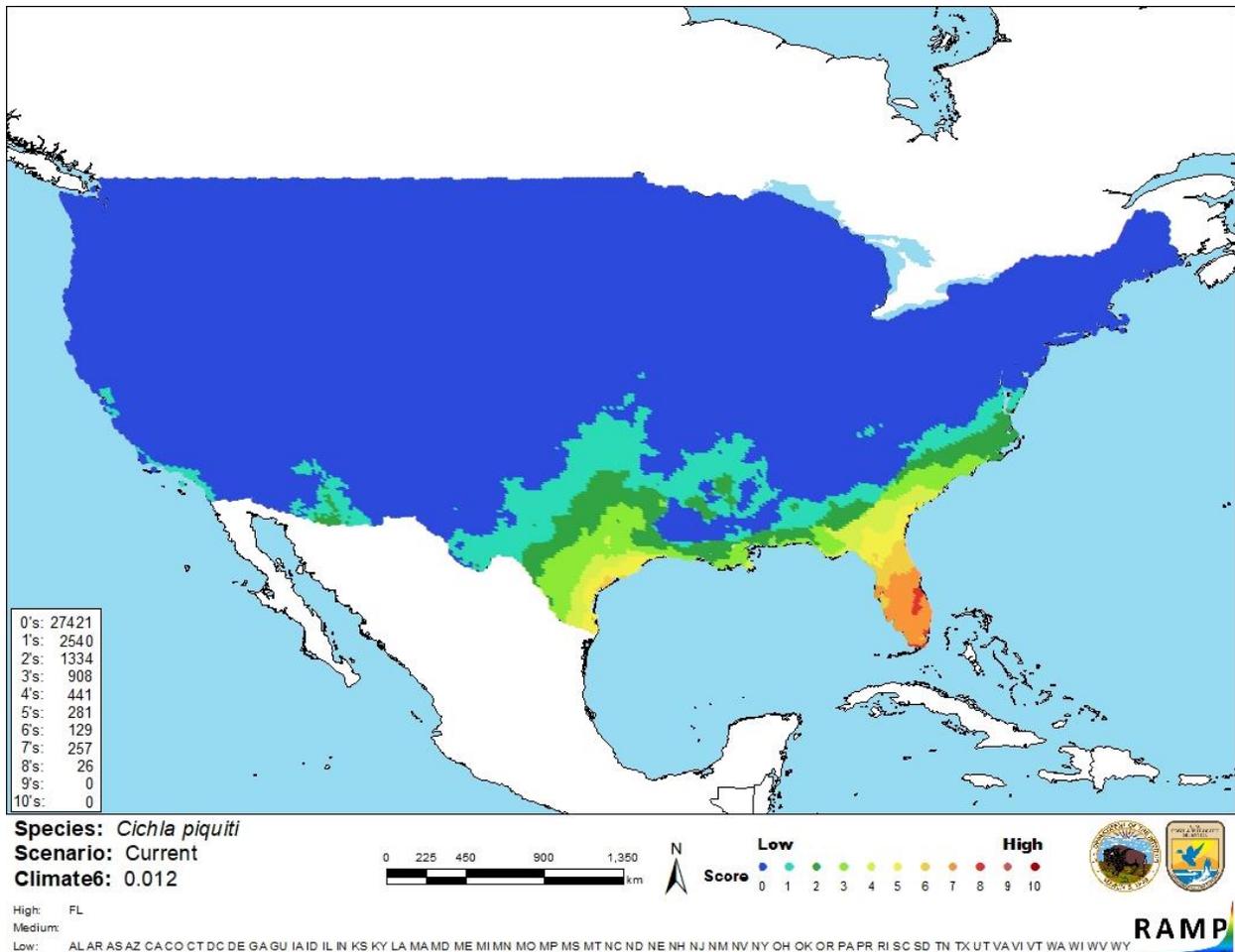


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Cichla piquiti* in the contiguous United based on source locations reported by GBIF Secretariat (2017). 0= Lowest match, 10=Highest match.”

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

7 Certainty of Assessment

There is little knowledge of the biology and ecology of *Cichla piquiti*. This species has established a population outside of its native range. One study (Resende et al. 2008) reports no ecological impacts to native species from the introduction. However, *C. piquiti* has been reported as very adaptable to its environment, is anticipated to have negative impacts on habitat and native species if introduced to new locations, and has reportedly hybridized with another nonnative congener in the Paraná River basin (Almeida-Ferreira et al. 2011). The certainty of

assessment is low because of the conflicting findings of studies on the impacts of introduction of *C. piquiti*, and more information is needed to go beyond the suspicion of negative impacts to confirmation of their existence or non-existence.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Blue Peacock Bass (*Cichla piquiti*) is a fish native to the Tocantins River Basin in Brazil that has been translocated into the Paraná River basin in Brazil and Paraguay, where it has established populations and spread. Resende et al. (2008) observed no negative effects on native fish in the Paraguay River (part of the Paraná River basin). *C. piquiti* reportedly hybridized with another nonnative species in the Paraná River basin (Almeida-Ferreira et al. 2011), although hybridization with native species has not been reported. Despite the lack of impacts reported above, other authors suggest *C. piquiti* is highly adaptable and capable of negative impacts to habitat and native species where introduced. Until more rigorous scientific studies are completed to confirm whether or not *C. piquiti* has negative impacts in at least some locations of introduction, the history of invasiveness is classified as “none documented” and the certainty of the assessment is low. *C. piquiti* is a major game fish used for human consumption and is found in the aquarium trade in the United States. A survey in the Paraná River found eight parasitic taxa on *C. piquiti*. *C. piquiti* has a medium climate match with the contiguous United States. Florida had the highest match, with a high match in southern Florida and a medium match in northern Florida. The Texas coast and Georgia had areas of medium match. The remainder of the contiguous United States had a low match. The overall risk is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **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.

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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.

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