

Black Acara (*Cichlasoma bimaculatum*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011

Revised, August 2014 and January 2018

Web Version, 4/5/2018



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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

“South America: Orinoco River basin, in the Caroni [...] River [in] Venezuela; Guianas, from the Essequibo River to the Sinnamary River; Amazon River basin, in the upper Branco River basin [Brazil].”

Status in the United States

From Nico et al. (2018):

“The species has been established in Florida since the early 1960s; it was first discovered in Broward County (Rivas 1965). The expanded geographic range of the species includes the counties of Broward (Courtenay et al. 1974; Courtenay and Hensley 1979a; museum specimens), Collier (Courtenay and Hensley 1979a; Courtenay et al. 1986; museum specimens), Glades (museum specimens), Hendry (Courtenay and Hensley 1979a; museum specimens), Highlands (Baber et al. 2002), Lee (Ceilley and Bortone 2000; Nico, unpublished), Martin (museum specimens), Miami-Dade (Kushlan 1972; Courtenay et al. 1974; Hogg 1976; Courtenay and Hensley 1979a; Loftus and Kushlan 1987; museum specimens), Monroe (Kushlan 1972; Courtenay et al. 1974; Courtenay and Hensley 1979a; Loftus and Kushlan 1987; museum specimens), Palm Beach (Courtenay et al. 1974; Courtenay and Hensley 1979a; museum specimens), Pasco (museum specimens), and Pinellas (museum specimens). It is established in Big Cypress National Preserve, Biscayne National Park, Everglades National Park (Kushlan 1972; Loftus and Kushlan 1987; Lorenz et al. 1997; Ellis et al. 2006), and in Florida Panther National Wildlife Refuge (USFWS 2005). Collected in 2008 in a modified wetland on the Archbold Reserve (O'Connor and Rothermel 2013).”

From Courtenay and Stauffer (1990):

“The black acara [...] was an important component in the aquarium fish trade until the late 1950s. This species was one of the first aquarium fishes to be cultured in Florida, possibly in the 1930s (R. B. Socolof, personal communication). With the advent of jet cargo aircraft in the 1950s that facilitated importation of more colorful cichlids for sale or culture, it is likely that the market for black acara decreased substantially [...]”

Means of Introduction into the United States

From Nico et al. (2018):

“In southeastern Florida, introduction was the result of escapes and intentional releases from fish farms, probably during the mid- to late 1950s (Courtenay and Hensley 1979a). Some releases were deliberate attempts to dispose of unwanted and sometimes illegal fish stocks (Courtenay and Stauffer 1990).”

Remarks

From Nico et al. (2018):

“The first Florida specimens of *C. bimaculatum* were reported and identified as *Aequidens portalegreensis* (= *Cichlasoma portalegreense*) by Rivas (1965), Bailey et al. (1970), Kushlan [...] (1972). Cultured in Florida possibly since the 1930s, *Cichlasoma bimaculatum* remained an important part of the aquarium trade until the late 1950s, and probably was the first aquarium fish to become established in open waters of Florida (Courtenay and Stauffer 1990). One of the most abundant introduced species in south Florida canal systems during the early 1970s, *C. bimaculatum* has been gradually replaced by *Tilapia mariae* as the most abundant cichlid,

possibly through competition for space (Courtenay and Hensley 1979a, b; Loftus and Kushlan 1987).”

“Many photographs in the aquarium literature are incorrectly captioned as *C. bimaculatum* (Kullander, personal communication), especially those of the superficially similar port cichlid, *Cichlasoma portalegrense* (formerly *Aequidens portalegrensis*) and its relatives.”

From ITIS (2018):

“Common Name(s):
black acara [English]
twospotted cichlid [English]”

“Synonym(s): *Labrus bimaculatus* Linnaeus, 1758”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Cichlasoma*
Species *Cichlasoma bimaculatum* (Linnaeus, 1758)”

“Current Standing: valid”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 12.3 cm SL male/unsexed; [Kullander 2003]; 30.0 cm TL (female); common length : 12.0 cm TL male/unsexed; [Hugg 1996]”

Environment

From Froese and Pauly (2017):

“Freshwater; benthopelagic; pH range: 6.5 - 7.0; dH range: 3 - 10.”

“[...] 16°C - 24°C [Riehl and Baensch 1996; assumed to be recommended aquarium water temperatures]”

“Tolerates low oxygen.”

From Schofield and Huge (2011):

“*Cichlasoma bimaculatum* lost equilibrium at 12.6°C and died [at] 8.6°C, similar to other cichlid fishes from south Florida.”

From NatureServe (2017):

“Appears to have low salinity tolerance.”

Climate/Range

From Froese and Pauly (2017):

“Tropical; [...] 12°N - 1°N”

Distribution Outside the United States

Native

From Froese and Pauly (2017):

“South America: Orinoco River basin, in the Caroni [...] River [in] Venezuela; Guianas, from the Essequibo River to the Sinnamary River; Amazon River basin, in the upper Branco River basin [Brazil].”

Introduced

This species is not reported as introduced outside its native range, other than in the United States.

Means of Introduction Outside the United States

This species is not reported as introduced outside its native range, other than in the United States.

Short Description

From FFWCC (2018):

“Small, stout, convex-headed, bream-looking body-shape with two black blotches on side, the larger blotch at mid-body and a smaller one near base of tail; color variable with gray-blue-silver-brown base, sometimes with light blue-green sheen.”

Biology

From Froese and Pauly (2017):

“Occurs in canals and swamps [Mills and Vevers 1989]. [...] Feeds on crustaceans and insects [Mills and Vevers 1989]. Males are bigger than females which become mature at 7 to 9 cm (20-25 g). Spawning occurs at the start of the rainy season. About 700 eggs are spawned on open substrate and are cared for by the parents.”

From Nico et al. (2018):

“*Cichlasoma bimaculatum* is a generalist omnivore, consuming small crustaceans and insect larvae as juveniles (Mérigoux and Ponton 1998) and incorporating small fishes into their diet as adults.”

“Throughout its south Florida range, it is much more common in disturbed habitats, mainly canals, than in natural habitats (Loftus and Kushlan 1987). Spawning has been observed during every month of the year in southeastern Florida (Courtenay 1989).”

Human Uses

From Froese and Pauly (2017):

“Fisheries: of no interest; gamefish: yes; aquarium: commercial”

From FFWCC (2018):

“Sporting Quality:

Sometimes provides a good kid's fishery when found in small pond without many predators; no bag or size limits.

Edibility:

Too small to be of much value.”

From Courtenay and Stauffer (1990):

“The black acara [...] was an important component in the aquarium fish trade until the late 1950s. This species was one of the first aquarium fishes to be cultured in Florida, possibly in the 1930s (R. B. Socolof, personal communication). With the advent of jet cargo aircraft in the 1950s that facilitated importation of more colorful cichlids for sale or culture, it is likely that the market for black acara decreased substantially [...]”

Diseases

Citing Lansdell et al. (1993), Gauthier and Rhodes (2009) report *C. bimaculatum* as a host for *Mycobacterium simiae*.

From Francis-Floyd (2011):

“Mycobacterial diseases of fish are common, particularly in intensive aquaculture systems and display aquaria. These diseases are collectively referred to as “atypical mycobacteriosis” or simply “mycobacteriosis.” The term “fish tuberculosis” has been used in the past to refer to this group of diseases, but the term is not appropriate and should not be used. [...] Mycobacterial diseases are zoonotic, which means that they can affect humans who come in contact with infected fish or environments.”

From Řehulka et al. (2006):

“Wayne and Sramek (1992) isolated *M. simiae* from water supply of a hospital in Gaza, and Howard et al. (1987) from tap water in Arizona. *M. simiae* has been isolated from a patient with pulmonary infection in Germany (Krümmel et al. 1989).”

From Tavares-Dias et al. (2017):

“This study investigated the parasitic fauna of *Cichlasoma bimaculatum* of a tributary from the Amazon River system, northern Brazil. The prevalence of infection was 94.6 % and, in total, 428 267 parasites, such as *Ichthyophthirius multifiliis*, *Piscinoodinium pillulare* (Protozoa), *Gussevia arilla* (Monogenoidea), *Posthodiplostomum* sp. (Digenea) and *Procamallanus* (*Spirocamallanus*) *inopinatus* (Nematoda) were collected. However, the dominance was mainly of *I. multifiliis*, while *P. (S.) inopinatus* was the parasite species with the lower levels of prevalence and abundance of infection. These parasite species showed an aggregated dispersion pattern. The parasitic fauna was characterized by the presence of few species of parasites with high prevalence and abundance, specifically ectoparasites, and a low number of endoparasites.”

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

Threat to Humans

From Froese and Pauly (2017):

“Harmless”

3 Impacts of Introductions

From Nico et al. (2018):

“Considered a competitor with native sunfish for spawning areas; juvenile bands of *C. bimaculatum* have been observed to surround spawning bluegill *Lepomis macrochirus* aggressively in attempts to feed on eggs (Hogg 1976).”

From FFWCC (2018):

“[...] early success of this fish in Florida led to an erroneous conclusion that it would have significant negative effects on native fishes.”

From Trexler et al. (2000):

“We found little evidence of ecological effects of introduced fishes [including *C. bimaculatum*] on native freshwater fish communities in southern Florida, especially in wet prairies.”

From Schofield and Loftus (2015):

“Kobza et al. (2004) demonstrated that small native fishes gradually disappeared over the dry season in solution holes that contained non-native fishes (especially *C. bimaculatum*). However, a native predator (*Amieurus [sic] natalis*) co-occurred with *C. bimaculatum* in some holes and it was not possible to discriminate the effects of the native versus non-native predators. Water quality declined in solution holes as the dry season progressed, but it was not evaluated independently as a contributing factor to native prey fish population declines.”

4 Global Distribution



Figure 1. Known global distribution of *Cichlasoma bimaculatum*. Map from GBIF Secretariat (2017). Points in the Eastern Hemisphere (not shown) reported by GBIF Secretariat (2017) were excluded from this map and the climate matching analysis because the points do not represent known established populations. Additionally, points in Bolivia were excluded from the climate matching analysis as species misidentifications (Froese and Pauly 2017). Finally, points in Ecuador, Peru, and Brazil (along the Amazon River mainstem and outside the Amazon River basin) were excluded from the climate matching analysis because the points do not represent known established populations.

5 Distribution within the United States

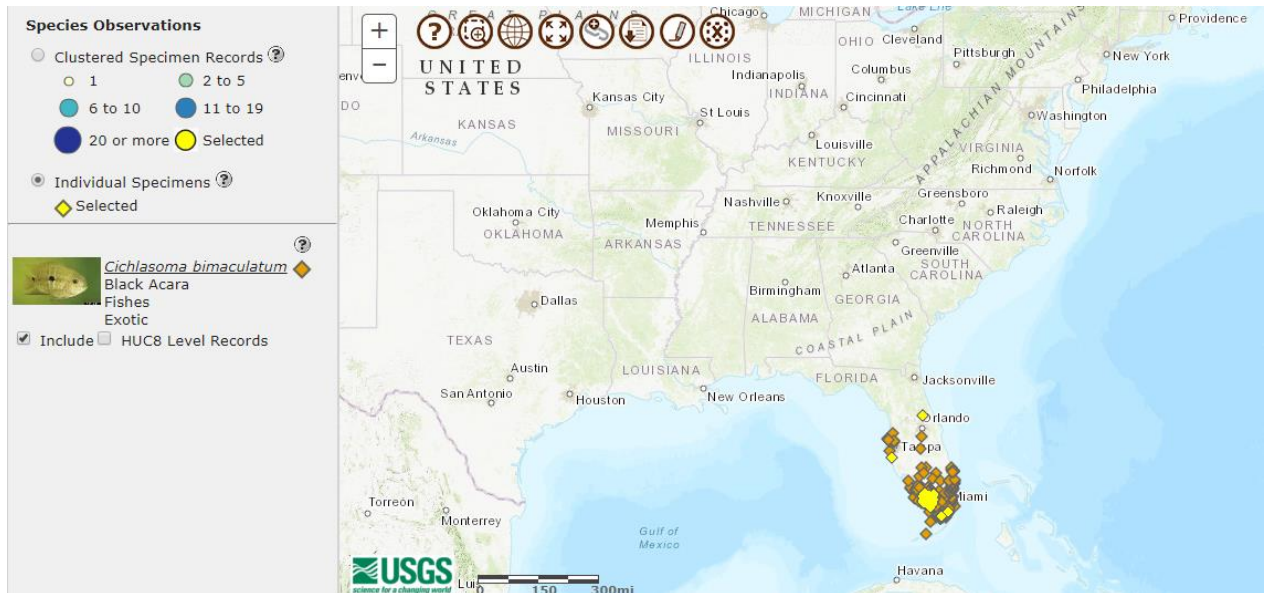


Figure 2. Known distribution of *Cichlasoma bimaculatum* in the United States. Map from Nico et al. (2018). Orange points represent established populations; yellow points represent collection locations where establishment is uncertain.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was high in Florida and coastal Georgia, medium along the Atlantic coast from Virginia to South Carolina, and medium along the Gulf Coast. The remainder of the contiguous U.S. showed low climate matches. Climate 6 score indicated that the contiguous U.S. has a medium climate match overall. Scores between 0.005 and 0.103 are classified as medium match; Climate 6 score for *Cichlasoma bimaculatum* was 0.033.

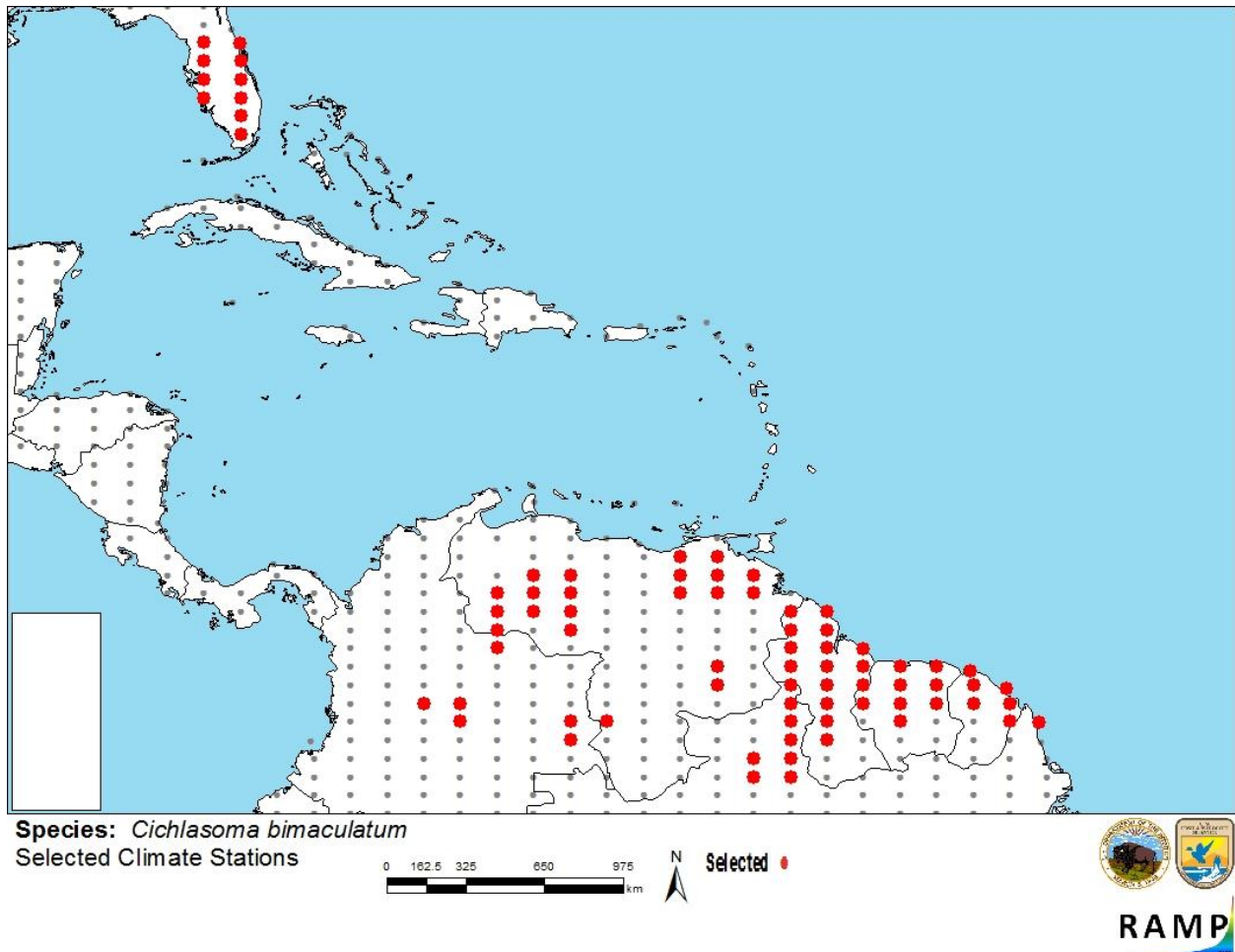


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil) and non-source locations (gray) for *Cichlasoma bimaculatum* climate matching. Source locations from GBIF Secretariat (2017).

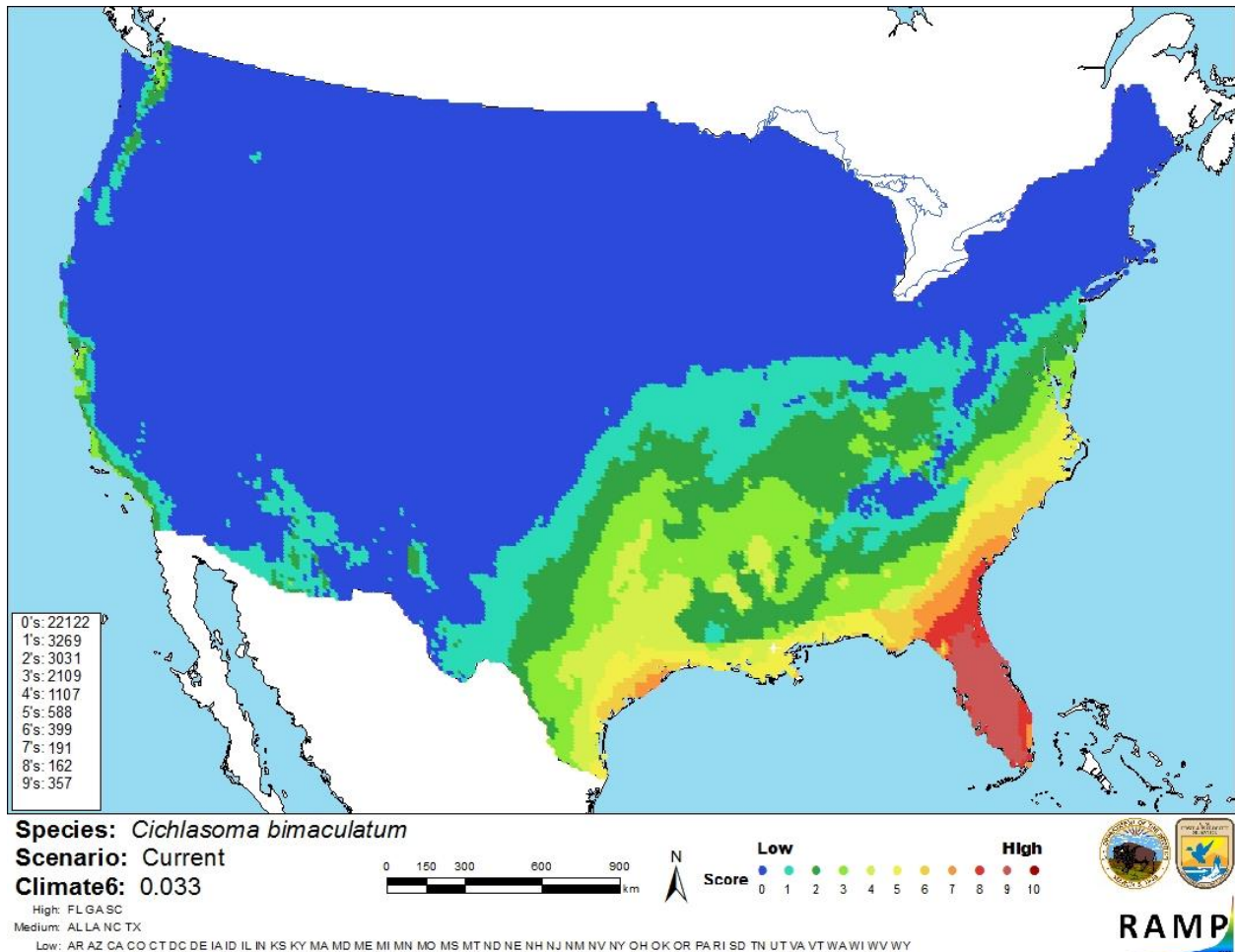


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Cichlasoma bimaculatum* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

Information on the biology and distribution of *Cichlasoma bimaculatum* is readily available. Several sources also report at least briefly on the impacts of *C. bimaculatum* introduction, but these reports provide conflicting information or are inconclusive. Because of the confusion surrounding species impacts, certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Cichlasoma bimaculatum is a South American cichlid fish that has been established in Florida since the mid-twentieth century. Despite early concern over effects of its introduction in Florida, more recent studies and reviews have concluded that the species has not had substantial impacts on native species or ecosystems. The only source cited that reported a tangible impact was an unpublished PhD thesis from 1976 that was not accessible during the writing of this report. *C. bimaculatum*, along with many other fish species, is a host of mycobacterial pathogens with zoonotic potential. Climate match of *C. bimaculatum* to the contiguous U.S. was medium. Without more conclusive evidence of impacts of *C. bimaculatum* introduction in Florida, overall risk assessment 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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