# Red Devil (*Amphilophus labiatus*)

## Ecological Risk Screening Summary

**U.S. Fish and Wildlife Service, March 2011**
**Revised, August 2018**
**Web Version, 8/27/2018**

Photo: AtelierMonpli. Licensed under CC BY-SA 3.0. Available: http://eol.org/pages/616335/overview. (August 2018).

# 1 Native Range and Status in the United States

## Native Range

From Froese and Pauly (2018):

"Central America: Atlantic slope of Nicaragua, in Lakes Nicaragua and Managua."

## Status in the United States

From Nico et al. (2018):

"Established in Hawaii and Puerto Rico."

From Froese and Pauly (2018):

“Known from the Loíza and Dos Bocas Reservoirs [in Puerto Rico] from 1995-2007.”

“A popular fish in the aquarium trade, frequently confused with *A. citrinellus*.”

This fish is readily available in the aquarium trade in the United States. For example:

From Arizona Aquatic Gardens (2018):

“Red Devil Cichlid Freshwater Fish […] $12.66 […]
Origin: Farm-Raised in US”

## Means of Introductions in the United States

From Nico et al. (2018):

“Aquarium release.”

## Remarks

From Nico et al. (2018):

“A fish taken from Hillsborough County, Florida, in 1976, originally was reported to be this species [Courtenay and Hensley 1979; Courtenay and Stauffer 1990], but that specimen later was re-identified tentatively as *Amphilophus citrinellus* [Smith-Vaniz, personal communication].”

Froese and Pauly (2018) report the following synonyms for *A. labiatus*: *Heros labiatus*, *Cichlasoma labiatum*, *Herichthys labiatus*, *Amphilophus froebelii*, *Heros erythraeus*, *Heros lobochilus*, and *Cichlasoma dorsatum*. All synonyms were used in searching for information for this report.

# 2 Biology and Ecology

## Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Taxanomic Status:
Current Standing: valid”

“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 *Amphilophus*
Species *Amphilophus labiatus* (Günther, 1864)"

## Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 24.0 cm SL male/unsexed; [Kullander 2003]"

## Environment

From Froese and Pauly (2018):

"Freshwater; benthopelagic."

## Climate/Range

From Froese and Pauly (2018):

"Tropical; 28°C - 33°C [Conkel 1993; it is unknown whether this temperature range refers to air or water, in an aquarium or in the wild]"

## Distribution Outside the United States

### Native

From Froese and Pauly (2018):

"Central America: Atlantic slope of Nicaragua, in Lakes Nicaragua and Managua."

### Introduced

Froese and Pauly (2018) state that this fish has been introduced in Singapore from unknown location and has become established.

From Nico et al. (2018):

"Red devil cichilds [*sic*], as well as Midas cichlids (*A. citrinellus*) were introduced to, and are established in, Queensland, Australia in 1992 [Lintermans 2004]."

## Means of Introduction Outside the United States

From Froese and Pauly (2018):

"ornamental" (in reference to introduction into Singapore)

Lintermans (2004) states that this species was introduced into Queensland, Australia for ornamental reasons.

## Short Description

From Barlow and Munsey (1976):

"Diagnosis - It can be distinguished from those *C. citrinellum* with which it is sympatric, and from other members of the section *Amphilophus* (Miller, 1966) by the combination of large lips, generally more slender body and pointed head, and shorter fins. Laboratory reared specimens of *C. labiatum* tend to have a slightly deeper body and lips only barely enlarged at the midpoint […]. Approximately ten percent of the *C. labiatum* lack the species-typical markings and range in color from pink to red, often with irregular black patches. Some of the normal colored morphs also have black patches or, on the other hand, pale splotches […]."

## Biology

From Froese and Pauly (2018):

"Inhabits lakes and rarely enters rivers [Conkel 1993]. Feeds on small fish, snails, insect larvae, worms and other bottom-dwelling organisms [Yamamoto and Tagawa 2000]. Females tend clutch of eggs [Baensch and Riehl 1985].

## Human Uses

From Froese and Pauly (2018):

"Aquarium: commercial"

This fish is readily available in the aquarium trade in the United States. For example:

From Arizona Aquatic Gardens (2018):

"Red Devil Cichlid Freshwater Fish […] $12.66 […]
Origin: Farm-Raised in US"

## Diseases

No OIE reportable diseases. No information found.

## Threat to Humans

From Froese and Pauly (2018):

"Harmless"

# 3 Impacts of Introductions

From Froese and Pauly (2018):

"Hybridized with *A. citrinellus* [in Puerto Rico, where *A. citrinellus* is also introduced], and maybe with other cichlids, as well."

Froese and Pauly (2018) state that this species introduction into Puerto Rico has had some adverse ecological effects and some undecided socio-economic effects. The introductions into Hawaii and Singapore have had unknown ecological effects. Froese and Pauly (2018) state that Singapore has not experienced significant socio-economic effects of the introduction of *A. labiatus*. The above information is based on populations that have become established since introduction.

# 4 Global Distribution

**Figure 1.** Known global distribution of *Amphilophus labiatus*. Map from GBIF Secretariat (2017). The points in India, Hong Kong, and Costa Rica were removed for the climate matching analysis as they do not represent established populations.

# 5 Distribution Within the United States

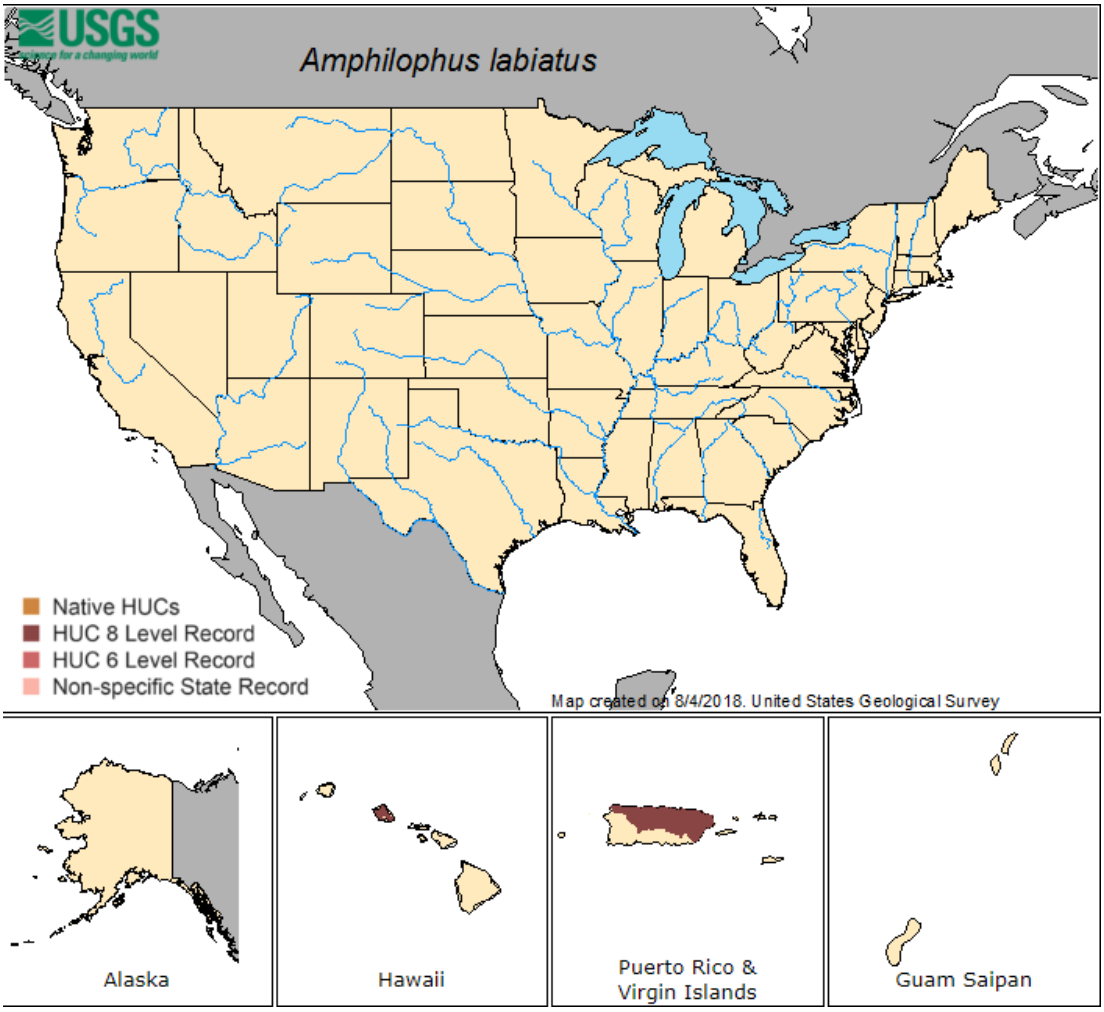


**Figure 2**. Known distribution of *Amphilophus labiatus* in the United States. Map from Nico et al. (2018).

# 6 Climate Matching

## Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.007, indicating a medium climate match overall. Scores between 0.005 and 0.103 are classified as medium match. Southeastern Florida had a high climate match, while medium matches occurred in the rest of peninsular Florida, coastal Texas, southeastern Louisiana, and coastal southern California. The remainder of the contiguous United States had a low match.

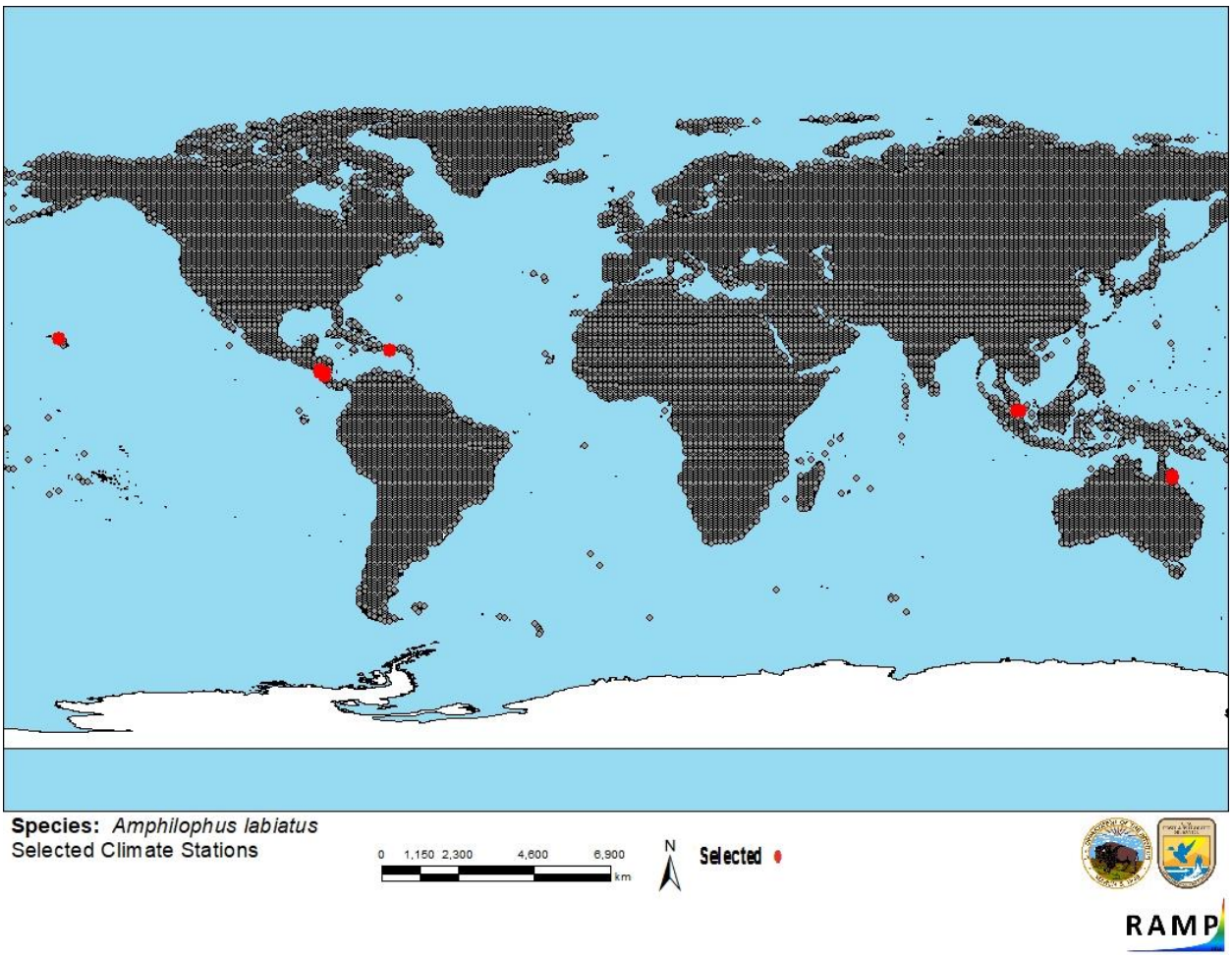


**Figure 3**. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Nicaragua, Hawaii, Puerto Rico, Singapore, Australia) and non-source locations (gray) for *Amphilophus labiatus* climate matching. Source locations from GBIF Secretariat (2017). Singapore added to source locations according to Froese and Pauly (2018).

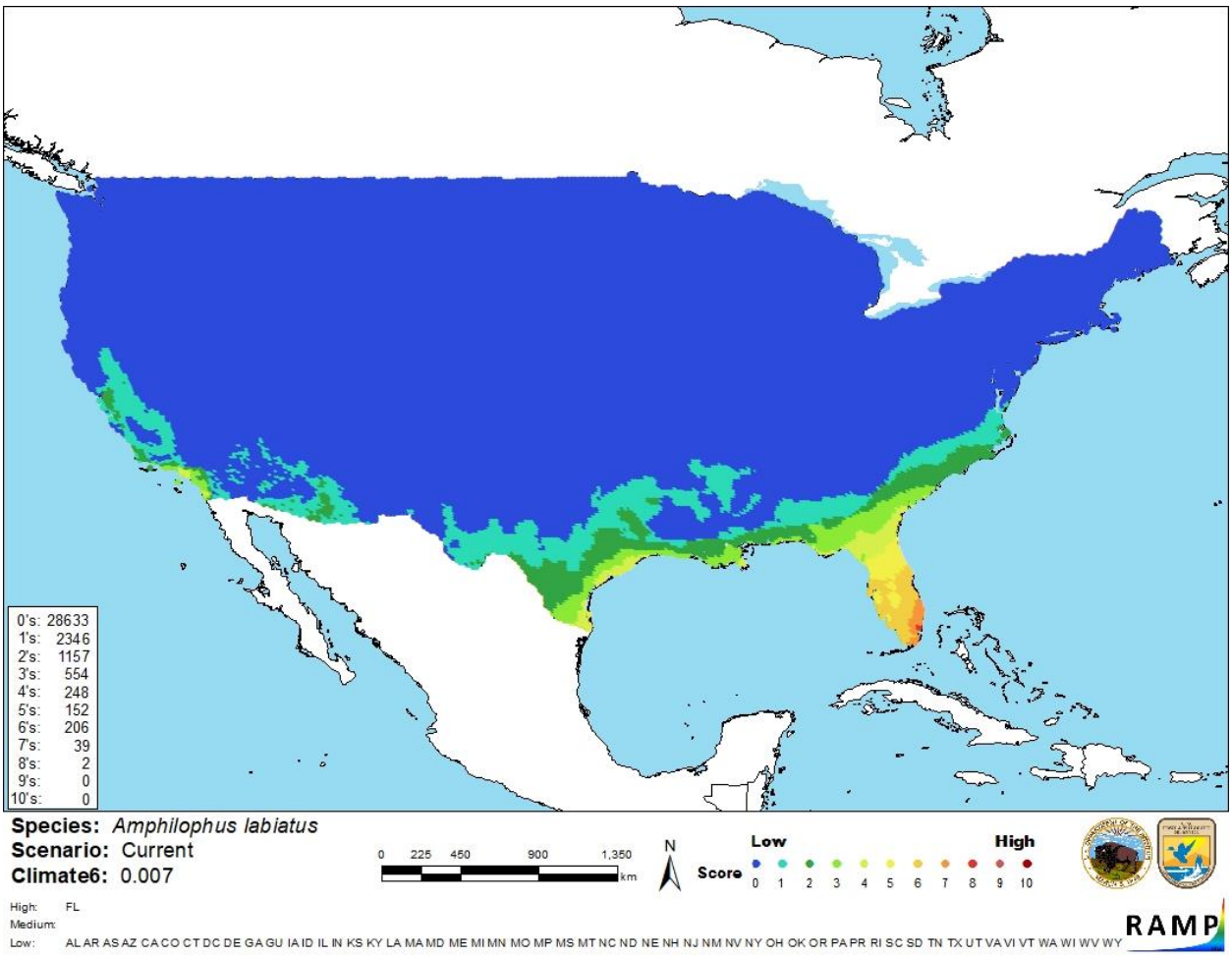


**Figure 4**. Map of RAMP (Sanders et al. 2018) climate matches for *Amphilophus labiatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017) and Froese and Pauly (2018). 0= Lowest match, 10= Highest match.

The "High", "Medium", and "Low" climate match categories are based on the following table:

| Climate 6: Proportion of<br>(Sum of Climate Scores 6-10) / (Sum of total Climate Scores) | Climate Match Category |
|---|---|
| 0.000≤X≤0.005 | Low |
| 0.005<X<0.103 | Medium |
| ≥0.103 | High |

# 7 Certainty of Assessment

Some information is known on the biology and ecology of *Amphilophus labiatus*. This fish has been reported as introduced in Singapore, Australia, Puerto Rico, and Hawaii. Some negative ecological impacts have been reported from the introduction to Puerto Rico, but the only impact described thus far is hybridization with another introduced species. There is no information available about potential impacts for the other introduced populations in Australia, Singapore, and Hawaii. Due to lack of information, the certainty of assessment is low.

# 8 Risk Assessment

## Summary of Risk to the Contiguous United States

Red devil (*Amphilophus labiatus*) is a cichlid fish that is reported to be native in Lakes Nicaragua and Managua in Nicaragua. It has been reported as introduced in Singapore, Australia, Puerto Rico, and Hawaii. This fish is popular in the U.S. trade market. In Puerto Rico, *A. labiatus* has been known to hybridize with another introduced cichlid species, but no information is available on other reportedly negative ecological effects of *A. labiatus* introduction in Puerto Rico. The other introduced populations have no information available on potential impacts. Because *A. labiatus* is established outside its native range with little record of impacts of its introduction, the history of invasiveness is classified as "none documented". Climate match with the United States is medium overall, with high match in southeastern Florida. Overall risk posed by *A. labiatus* 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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Sanders, S., C. Castiglione, and M. H. 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.**

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