

Pirambeba (*Serrasalmus humeralis*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2012
Revised, July 2018
Web Version, 9/11/2020

Organism Type: Fish
Overall Risk Assessment Category: Uncertain



Image: Francis de Laporte de Castelnau. Public domain. Available:
<http://eol.org/pages/211487/overview>. (July 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“South America: Amazon River basin.”

Froese and Pauly (2018) report that *Serrasalmus humeralis* is native to Bolivia, Brazil, and Peru, and that records from French Guiana are a misidentification. Maldonado-Ocampo et al. (2008) report *S. humeralis* from the Amazon basin in Colombia.

Status in the United States

Specimens from the breeding population described in the quotations below were later re-examined and identified as *Serrasalmus rhombeus* (see Remarks).

From Shafland and Foote (1979):

“An isolated reproducing population of the pirambeba, *Serrasalmus humeralis*, was recently discovered at a Dade County, Florida tourist attraction. Twenty to 25 unidentified *Serrasalmus* sp. had been stocked into the ‘piranha pool’ in 1963 or 1964. The only fish kill noted during the 13 to 14 yr [sic] history of this population occurred during a severe drought in 1971 when the pool dried into a small mud-puddle. A few *S. humeralis* survived this drought and continued reproducing.”

From Froese and Pauly (2018):

“[...] breeding population was eradicated deliberately in 1981 in Florida.”

This species is in trade in the United States. For example:

From AquaScapeOnline (2018):

“Humeralis Piranha 5" (*Serrasalmus Humeralis* [sic]) [...] New Piranha. Seldom seen available for sale. [...] Our Price: \$225.00”

Possession or importation of fish of the genus *Serrasalmus*, or fish known as “piranha” in general, is banned or regulated in many States. Every effort has been made to list all applicable State laws and regulations pertaining to this species, but this list may not be comprehensive.

From Alabama Department of Conservation and Natural Resources (2019):

“No person, firm, corporation, partnership, or association shall possess, sell, offer for sale, import, bring, release or cause to be brought or imported into the State of Alabama any of the following live fish or animals: [...] Any Piranha or any fish of the genera *Serrasalmus*, *Pristobrycon*, *Pygocentrus*, *Catorprion*, or *Pygopristus*; [...]”

From Alaska State Legislature (2019):

“Except as provided in (b) - (d) of this section, no person may import any live fish into the state for purposes of stocking or rearing in the waters of the state.

(b) Live oysters native to and originating from the Pacific Coast of North America may be imported [...]

(c) Ornamental fish not raised for human consumption or sport fishing purposes may be imported into the state, but may not be reared in or released into the waters of the state. Fish wastes and waste water from ornamental fish may not be released directly into the waters of the state.

(d) Weathervane scallops originating from wild stocks or cultured stocks in the Southeastern Alaska and Yakutat Areas may be imported for aquaculture purposes and may be released only into the waters of the Southeastern Alaska and Yakutat Areas under a stock transport permit required by this chapter [...]"

From Arizona Office of the Secretary of State (2013):

““Restricted live wildlife” means wildlife that cannot be imported, exported, or possessed without a special license or lawful exemption.”

“Fish listed below are considered restricted live wildlife [...]

Piranha, all species of the genera *Serrasalmus*, *Serrasalmo*, *Phygocestrus*, *Teddyella*, *Rooseveltiella*, and *Pygopristis* [...]"

From Arkansas Game and Fish Commission (2019):

“It is unlawful to import, transport, or possess any species commonly known as [...] piranha [...]"

“EXCEPTION: These species may be possessed for display and educational purposes by written permit approved by the Commission.”

From California Department of Fish and Wildlife (2019):

“All species of piranha are on California’s list of restricted animals and cannot be imported, transported, or possessed without a permit.”

From Colorado Secretary of State (2019):

“For the following aquatic species or viable gametes thereof, because of the potential for a detrimental affect [sic] on existing fish and their habitat in Colorado, and except as enumerated in these regulations, or as authorized in writing by the Division of Wildlife for management purposes only; the release or the importation, transportation, stocking, sale, acquisition or possession for release is prohibited. Persons who have proof of possession issued prior to January 1,1978 or who obtain prior approval from the Division of Wildlife may possess the following species:

a. Piranha: including members of the genera *Serrasalmus*, *Roosevelthiella*, and *Pygocentrus*.”

From Connecticut Secretary of State (2016):

“The importation or possession of piranha of the subfamily: Serrasalminae, genera *Serrasalmus*, *Serrasalmo*, *Pygocentrus*, *Teddyella*, *Rooseveltiella* and *Pygopristus*, [...] is prohibited except

that the Commissioner may at his discretion issue permits for the importation and possession, when it is in the public interest, for public display purposes, of specimens of piranha [...]"

FFWCC (2019) lists *S. humeralis* as a prohibited nonnative species in Florida.

From Georgia Department of Natural Resources (2019):

"The animals listed below are examples of the exotic species regulated under Georgia Law. [...] The exotic species listed below, except where otherwise noted, may not be held as pets in Georgia. [...] Piranha; all species"

From Hawaii Department of Agriculture (2019):

"For example, the following are prohibited from entry or possession by private individuals in the State. [...] *Piranhas*"

From Idaho Office of the Administrative Rules Coordinator (2019):

"No person may possess, cultivate, import, ship, or transport any invasive species [...] into or through the state of Idaho following the effective date of this rule, unless the person possessing, importing, shipping or transporting has obtained a permit under Section 103, or unless otherwise exempt by this rule, as set forth in Section 104."

"INVASIVE SPECIES – FISH. [...]"

05. Piranhas, *Serrasalmus* spp., *Rosseveltiella* spp., *Pygocentrus* spp. [...]"

From Illinois Department of Natural Resources (2015):

"For the purposes of Section 20-90 of the Fish and Aquatic Life Code [515 ILCS 5/20-90], the Aquatic Life Approved Species List is established. The following aquatic life categories will be considered approved for aquaculture, transportation, stocking, importation and/or possession in the State of Illinois."

Serrasalmus humeralis does not appear on the Aquatic Life Approved Species List for Illinois.

From Kentucky General Assembly (2019):

"The live aquatic organisms established in subsections (1) through (7) of this section shall not be imported, bought, sold, or possessed in aquaria:

(1) Subfamily Serrasalminae - piranha, piraya, pirae, or tiger characins; [...]"

From Louisiana State Legislature (2019):

"No person shall have in possession or sell in this state [Louisiana] a piranha or Rio Grande Cichlid; except that, piranha may be possessed and displayed at the Aquarium of the Americas, Audubon Institute, New Orleans, as authorized by a special permit issued by the department,

under conditions the department deems necessary to prevent their introduction into waters of the state.”

From Maine Department of Inland Fisheries and Wildlife (2019):

“Unrestricted List [...] (no permit needed): Maine law allows the Department to maintain a list of species of fish and wildlife, including tropical fish and invertebrates, which do not require an importation, exhibition, or possession permit, and may be traded by commercial pet shops.”

Serrasalmus humeralis does not appear on the Maine Department of Inland Fisheries and Wildlife’s Unrestricted List.

From Massachusetts Division of Fisheries and Wildlife (2014):

“All aquarium trade fish may be kept without a permit except species categorically non-exempt pursuant to 321 CMR 9.01(3), and except that the following species are prohibited without a permit: [...]

(b) Piranha (*Pygocentrus* spp. and *Serrasalmus* spp.)”

From Mississippi Secretary of State (2019):

“All species of the following animals and plants have been determined to be detrimental to the State’s native resources and further sales or distribution are prohibited in Mississippi. No person shall import, sell, possess, transport, release or cause to be released into the waters of the state any of the following aquatic species or hybrids thereof. However, species listed as prohibited may be allowed under a permitting process where environmental impact has been assessed.”

“[The list includes all piranhas and all species of] Subfamily Serrasalminae”

From State of Nevada (2018):

“Except as otherwise provided in this section and NAC [Nevada Administrative Code] 504.486, the importation, transportation or possession of the following species of live wildlife or hybrids thereof, including viable embryos or gametes, is prohibited: [...]

Piranhas..... All species in the genera *Serrasalmus*, *Serrasalmo*, *Pygocentrus*, *Teddyella*, *Rooseveltiella* and *Pygopristis*”

From New Mexico Department of Game and Fish (2010):

“Species importation list group IV may be for live non-domesticated animals that are considered dangerous, invasive, undesirable, state or federal listed threatened, endangered, a furbearer or any other species of concern as identified by the director. The importation of these species are prohibited for the general public but may be allowed for, scientific study, department approved restoration and recovery plans, zoological display, temporary events/entertainment, use as service animal or by a qualified expert.”

All piranha and pacu (Family Characidae) are listed in Group IV of the Director's Species Importation List for New Mexico.

From New York State Senate (2019):

“No person shall import, export, own, possess, acquire or dispose of live piranha fish (*Serrasalmus*, *Rooseveltiella* or *Pyrocentrus* [sic]), grass carp (*Ctenopharyngodon idella*) or hybrid grass carp within the state without a license or permit issued at the discretion of the department for scientific, biological or exhibition purposes.”

From North Carolina Office of Administrative Hearings (2019):

“It shall be unlawful to transport, purchase, possess, sell, or stock in the public or private waters of North Carolina any live individuals of [...] piranha; [...]”

From Oklahoma Secretary of State (2019):

“Until such time as is necessary for the Department of Wildlife Conservation to obtain adequate information for the determination of other harmful or potentially harmful exotic species, the importation into the State and/or the possession of the following exotic fish or their eggs is prohibited: [...]

“Piranha group: *Serrasalmus* spp., *Pygocentrus* spp., *Rooseveltiella* spp., *Catoprion* spp., *Hydrocynus* spp., and *Salminus* spp.”

From South Carolina Legislature (2019):

“A person may not possess, sell, offer for sale, import, bring, cause to be brought or imported into this State [South Carolina], or release in this State the following species at any stage of its life cycle: [...] piranha (all members of *Serrasalmus*, *Rooseveltiella*, and *Pygocentrus* genera) [...]”

From Texas Parks and Wildlife (2019):

“The organisms listed here are legally classified as exotic, harmful, or potentially harmful. No person may possess or place them into water of this state except as authorized by the department.”

“Piranhas, Family Characidae

All species of genera *Catoprion*, *Pristobrycon*, *Pygocentrus*, *Pygopristis*, and *Serrasalmus*”

From Utah Office of Administrative Rules (2019):

“All species of fish listed in Subsections (2) through (30) are classified as prohibited for collection, importation and possession [...]

(22) Piranha, (*Serrasalmus*, All species) family Characidae.”

From Virginia Department of Game and Inland Fisheries (2019):

“A special permit is required, and may be is- sued [sic] by the Department, if consistent with the Department’s fish and wildlife management program, to import, possess, or sell the following non-native (exotic) amphibians, fish, mollusks, aquatic invertebrates, and reptiles: [...] piranhas [...]”

Means of Introduction into the United States

From Courtenay and Stauffer (1990):

“This [Dade County, Florida introduction] was a purposeful aquarium fish release [...]”

Remarks

From Shafland et al. (2008):

“Pirambeba (*Serrasalmus humeralis*)—Some confusion exists over the species identity of this fish which is categorized as a formerly reproducing species [in Florida] (Shafland and Foote, 1979). This fish was originally identified as *S. humeralis* because the “third infraorbital does not entirely cover the cheek” (Fink, 1979 [personal communication]). Since then, Fuller and co-workers (1999) reported this species had subsequently been identified as *S. rhombeus* based on specimens in the Florida Museum of Natural History in Gainesville (UF 87975 and UF 97059). As noted in Shafland and Foote (1979) these two species are very similar, and possibly synonymous, but until taxonomic clarity is attained, we retain the name *S. humeralis* for these Florida specimens.”

From Nico and Loftus (2020):

“*Serrasalmus rhombeus* represents a geographically widespread complex of closely related species [including *S. humeralis*] in need of systematic review.”

For the purposes of evaluating the history of invasiveness and climate match to the contiguous United States, this report follows Nico and Loftus (2020) in considering the eradicated population in Florida most likely to have been *S. rhombeus* and not *S. humeralis*. Nico and Loftus (2020) report the Florida population of *Serrasalmus* on the *S. rhombeus* page of U.S. Geological Survey’s National Aquatic Species Database.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2020):

“**Current status:** Valid as *Serrasalmus humeralis* Valenciennes 1850. Serrasalmidae.”

From ITIS (2018):

Kingdom Animalia

Subkingdom Bilateria

Infrakingdom Deuterostomia

Phylum Chordata

Subphylum Vertebrata

Infraphylum Gnathostomata

Superclass Actinopterygii

Class Teleostei

Superorder Ostariophysi

Order Characiformes

Family Characidae

Genus *Serrasalmus*

Species *Serrasalmus humeralis* Valenciennes in Cuvier and
Valenciennes, 1850

“Current Standing: valid”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 20.0 cm SL male/unsexed; [Planquette et al. 1996]”

Environment

From Froese and Pauly (2018):

“Freshwater; brackish; benthopelagic.”

From Shafland and Foote (1979):

“A lower lethal temperature of 11°C was identified when these fish were subjected to decreasing water temperatures at a rate of 1°C/day.”

Climate

From Froese and Pauly (2018):

“Tropical”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“South America: Amazon River basin.”

Froese and Pauly (2018) report that *S. humeralis* is native to Bolivia, Brazil, and Peru, and that records from French Guiana are a misidentification. Maldonado-Ocampo et al. (2008) report *S. humeralis* from the Amazon basin in Colombia.

Introduced

No introductions of this species have been reported outside the United States.

Means of Introduction Outside the United States

No introductions of this species have been reported outside the United States.

Short Description

From Shafland and Foote (1979):

“The diagnostic characters used to identify these fish as *S. humeralis* included: 1. Presence of strong ectoptergoid teeth, 2. Third infraorbital does not entirely cover the cheek, 3. Body depth is less than two times the standard length in specimens greater than 100 mm, 4. Dorsal fin with 15-17 principal rays and 14-16 branched rays, 5. Anal fin with 29-34 principal rays and 28-33 branched rays, 6. Caudal fin with dark margin in specimens greater than 100 mm SL (J. S. Ramsey, Auburn Univ. and W. L. Fink, Harvard Univ., pers. comm.).”

Biology

From Froese and Pauly (2018):

“Occurs in rivers and estuaries. Feeds on the fins of other fish. Oviparous [Breder and Rosen 1966]. [...] Its reproduction in captivity has been carried out [Planquette et al. 1996]. [...] When captured with fishing nets, it must be released because it attacks the other fish caught in the net [Boujard et al. 1997].”

Human Uses

From Froese and Pauly (2018):

“Aquarium: commercial”

This species is in trade in the United States. For example:

From AquaScapeOnline (2018):

“Humeralis Piranha 5" (Serrasalmus Humeralis [sic]) [...] New Piranha. Seldom seen available for sale. [...] Our Price: \$225.00”

Diseases

No information available. No OIE-reportable diseases (OIE 2019) have been documented for this species.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

“Although armed with strong, sharp teeth, it is however not dangerous to man.”

3 Impacts of Introductions

No information available on impacts of introduction.

The importation, possession, or trade of the piranha *Serrasalmus humeralis* is prohibited or restricted in the following states: Alabama (Alabama Department of Conservation and Natural Resources 2019), Alaska (Alaska State Legislature 2019), Arizona (Arizona Office of the Secretary of State 2013), Arkansas (Arkansas Game and Fish Commission 2019), California (California Department of Fish and Wildlife 2019), Colorado (Colorado Secretary of State 2019), Connecticut (Connecticut Secretary of State 2016), Florida (FFWCC 2019), Georgia (Georgia Department of Natural Resources 2019), Hawaii (Hawaii Department of Agriculture 2019), Idaho (Idaho Office of the Administrative Rules Coordinator 2019), Illinois (Illinois Department of Natural Resources 2015), Kentucky (Kentucky General Assembly 2019), Louisiana (Louisiana State Legislature 2019), Maine (Maine Department of Inland Fisheries and Wildlife 2019), Massachusetts (Massachusetts Division of Fisheries and Wildlife 2014), Mississippi (Mississippi Secretary of State 2019), Nevada (State of Nevada 2018), New Mexico (New Mexico Department of Game and Fish 2010), New York (New York State Senate 2019), North Carolina (North Carolina Office of Administrative Hearings 2019), Oklahoma (Oklahoma Secretary of State 2019), South Carolina (South Carolina Legislature 2019), Texas (Texas Parks and Wildlife 2019), Utah (Utah Office of Administrative Rules 2019), and Virginia (Virginia Department of Game and Inland Fisheries 2019).

4 History of Invasiveness

The only reported introduction of *Serrasalmus humeralis* is a likely misidentification of an introduction of congener *S. rhombeus*. This species appears in the aquarium trade in the United States and globally, but appears to be traded at low volume. Without confirmed establishment outside the native range, history of invasiveness is classified as No Known Nonnative Population.

5 Global Distribution



Figure 1. Reported global distribution of *S. humeralis*. Map from GBIF Secretariat (2019). Locations in the United States, Ecuador, Venezuela, Suriname, French Guiana, Paraguay, and southern Brazil were excluded from the climate matching analysis because these locations are outside the countries where *S. humeralis* is known to be established; there are no confirmed reports of introduction to these areas.

6 Distribution Within the United States



Figure 2. Reported distribution of *Serrasalmus humeralis* in the United States (southern Florida). Map from GBIF Secretariat (2019). The single population is a likely misidentification of a population of *Serrasalmus rhombeus* that was purposefully extirpated in 1981 (Froese and Pauly 2018). This occurrence was not included in the climate matching analysis.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was high in far southeastern Florida. Medium matches occurred through the remainder of peninsular Florida; along nearly all of the Gulf Coast and along the Atlantic coast into Georgia; and in scattered small patches in eastern New Mexico, coastal California, and coastal Washington near Seattle. The climate match was low across the remainder of the contiguous United States. Climate 6 score indicated that the contiguous United States has a low climate match overall (scores between 0.000 and 0.005, inclusive, are classified as low). The Climate 6 score for *S. humeralis* was 0.004. All States had a low individual climate score, except Florida, which had a high climate score.

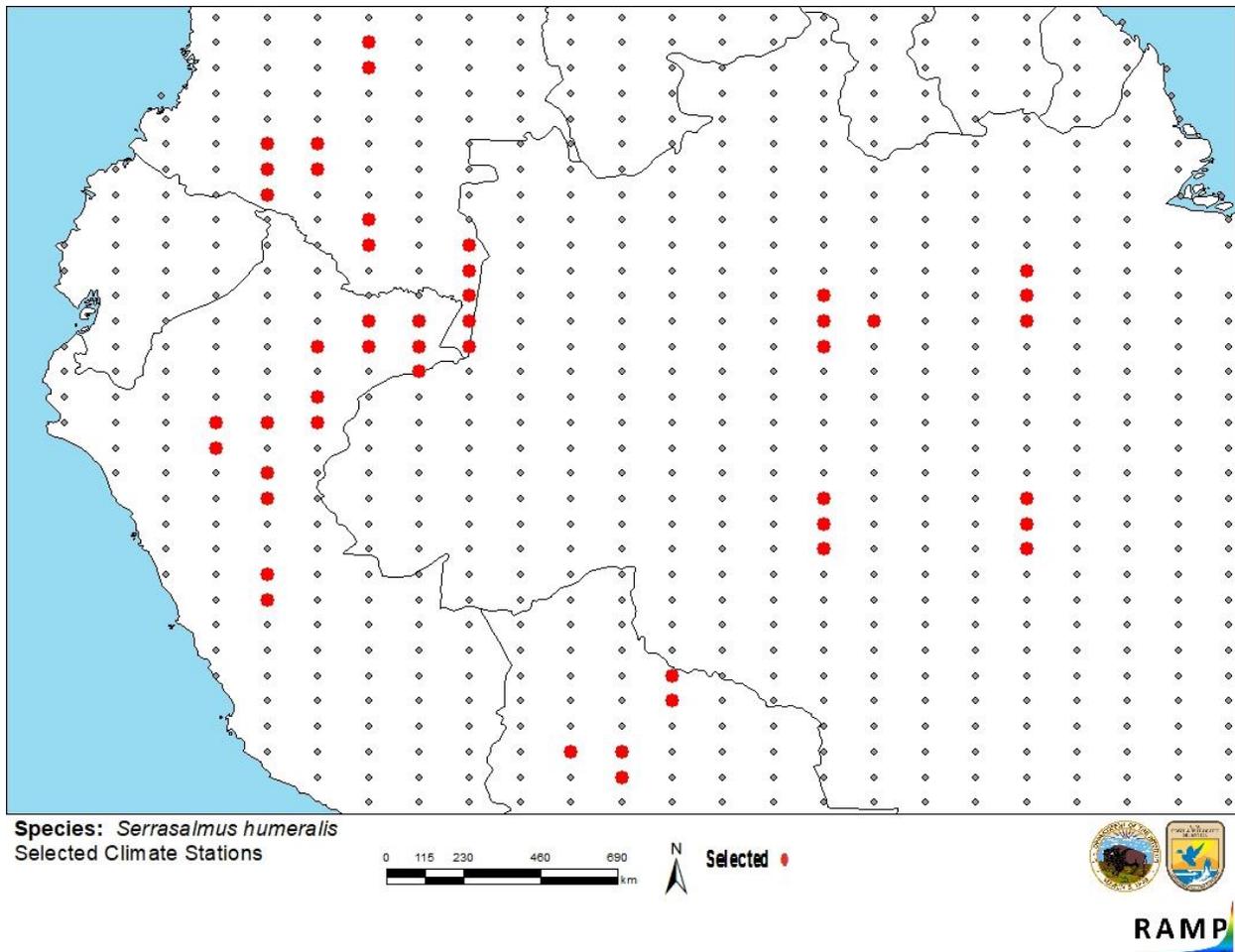


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Brazil, Bolivia, Peru, Colombia) and non-source locations (gray) for *S. humeralis* climate matching. Source locations from GBIF Secretariat (2017). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

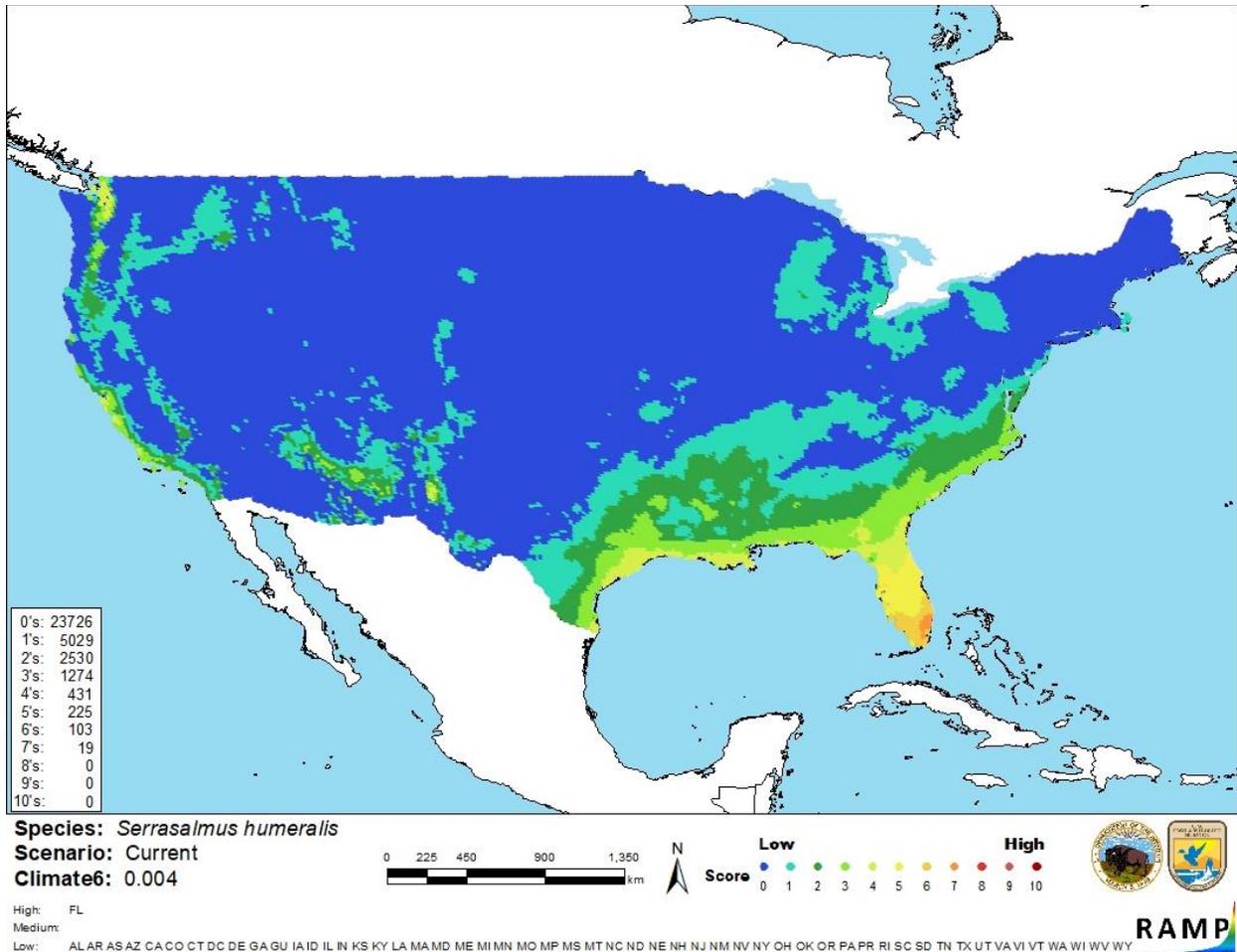


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *S. humeralis* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

Limited information was available on the biology and ecology of *S. humeralis*. No information is available on impacts of introduction of this species. Additionally, there is uncertainty over whether the population of *Serrasalmus* that persisted in southern Florida for part of the twentieth

century are accurately identified as *S. rhombeus*, instead of *S. humeralis*. The taxonomy of these species needs further investigation. Therefore, certainty of this assessment is low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Pirambeba (*Serrasalmus humeralis*) is a species of piranha native to the Amazon River basin in northern South America. No introductions of *S. humeralis* have been reported other than a probable misidentification of a population of *Serrasalmus* spp. introduced at a tourist attraction in Dade County, Florida, in the 1960s through stocking of aquarium fish. No information is available on impacts of introduction. *S. humeralis* is present in the aquarium trade in the United States, although possession or trade of piranhas is prohibited by numerous individual States. History of invasiveness is classified as No Known Nonnative Population. Climate match to the contiguous United States was low overall. The highest climate match occurred in extreme southeastern Florida. Medium matches occurred in other southeastern coastal areas as well as in scattered locations in New Mexico, California, and Washington. Because of the lack of information on impacts of introduction and taxonomic uncertainty, overall risk posed by *S. humeralis* is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Climate Match (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information: None**
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

Alabama Department of Conservation and Natural Resources. 2019. Restrictions on possession, sale, importation and/or release of certain animals and fish. Alabama Department of Conservation and Natural Resources Administrative Code, Chapter 220-2-.26.

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11 Literature Cited in Quoted Material

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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