

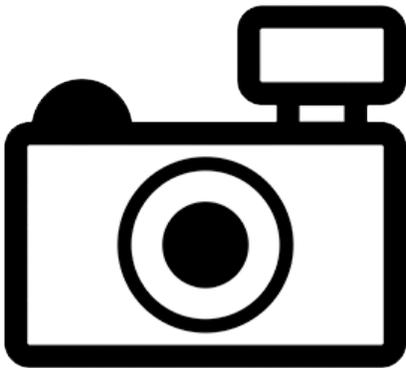
Giant Rivulus (*Anablepsoides hartii*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011

Revised, January 2018

Web Version, 6/28/2018



No Photo Available

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

“South America: Caribbean coastal river basins [Netherlands Antilles, Trinidad and Tobago, Venezuela; questionable in Colombia].”

From Nico et al. (2018):

“Tropical America. Caribbean Slope drainages of Venezuela, South America, from Rio Aroa east to Rio San Juan; islands of Trinidad, Tobago, Grenada, and Margarita (J. E. Thomerson, personal communication).”

Status in the United States

From Nico et al. (2018):

“A population was discovered in a small ditch (flowing into the Salton Sea) draining a tropical fish farm in Imperial County, California (St. Amant 1970; Dill and Cordone 1997; Moyle 2002).”

Status: Locally established in California. The species was thought to have disappeared after 1969 (Shapavalov et al. 1981), but additional specimens were taken in 1990 (Courtenay et al. 1991; Swift et al. 1993). Moyle (2002) appears to indicate that it is still present, although he says it is probably not permanently established.”

The current extent of U.S. trade in this species is unclear.

Means of Introductions in the United States

From Nico et al. (2018):

“The California fish were first found in January 1967 (St. Amant 1970). This introduction was probably due to escape or release from a nearby fish farm.”

Remarks

From Bailly (2017):

“Synonymised names *Haplochilus hartii* Boulenger, 1890
Rivulus bondi Schultz, 1949
Rivulus harti (Boulenger, 1890) (misspelling)
Rivulus hartii (Boulenger, 1890)”

The synonymized names were used as search terms, in addition to the valid scientific name, to find literature on introductions and impacts of this species.

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 Cyprinodontiformes
Suborder Aplocheiloidei
Family Aplocheilidae
Subfamily Rivulinae
Genus *Rivulus*
Species *Rivulus hartii* (Boulenger, 1890)”

From Eschmeyer et al. (2018):

“Current status: Valid as *Anablepsoides hartii* (Boulenger 1890). Cynolebiidae.”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 10.0 cm TL male/unsexed; [Huber 1996]”

Environment

From Froese and Pauly (2017):

“Freshwater; brackish; benthopelagic;”

Climate/Range

From Froese and Pauly (2017):

“Tropical; 22°C - 26°C [Baensch and Riehl 1991; assumed to be recommended aquarium temperatures]”

Distribution Outside the United States

Native

From Froese and Pauly (2017):

“South America: Caribbean coastal river basins [Netherlands Antilles, Trinidad and Tobago, Venezuela; questionable in Colombia].”

From Nico et al. (2018):

“Tropical America. Caribbean Slope drainages of Venezuela, South America, from Rio Aroa east to Rio San Juan; islands of Trinidad, Tobago, Grenada, and Margarita (J. E. Thomerson, personal communication).”

Introduced

No information available.

Means of Introduction Outside the United States

No information available.

Short Description

From Boulenger (1890):

“Height of body 5 to $5\frac{1}{2}$ times in males, $4\frac{1}{2}$ times in females, in the total length (without caudal); length of head $3\frac{2}{3}$ to 4 times in males, $3\frac{1}{2}$ to $3\frac{2}{3}$ in females. Diameter of eye equal to length of snout and one fourth the length of the head; interorbital space half length of head; snout very short, lower jaw projecting beyond the upper; a short tentacle on each side of the snout. Origin of the dorsal above the middle of the anal, twice as far from the occiput as from the root of the caudal, corresponding to the twenty-fifth to twenty-seventh scale of the lateral line. Pectorals not reaching ventrals, latter not reaching anal. Brown or bronzy above, yellowish inferiorly; each scale with a darker spot, best defined in the males; dorsal and anal fins whitish, with grey dots, anal with a fine blackish edge; caudal grey or blackish.”

Biology

From Nico et al. (2018):

“Inhabits small pools, ponds, streams, and tributaries. Can access isolated waterbodies via terrestrial mobility over moist ground (Seghers 1978). Omnivorous: primarily feeds on insects and juvenile *Poecilia reticulata*. Can also jump up to 14 cm above water surface to reach prey on overhanging vegetation (Seghers 1978).”

From Furness et al. (2012):

“This species is an egg layer and exhibits external fertilization. There is little sexual dimorphism and both sexes reach an asymptotic size around 100 mm. Their diet consists mainly of aquatic and terrestrial invertebrates (Fraser et al. 1999). In the wild *Rivulus* have been found to produce eggs throughout the year (Fraser and Gilliam 1992).”

From Froese and Pauly (2017):

“Has been observed to hunt insects from overhanging vegetation by jumping out of the water; has also been observed to travel on land and feed on insects in wet weather [Seghers 1978].”

From Turko and Wright (2015):

“Impressive jumping ability is [...] exhibited by *A. hartii*, which can jump 14 cm vertically to capture ants or other insects (Seghers, 1978).”

“[...] *A. hartii* can cover 53 cm in a single jump and move 363 cm in 5 min, allowing these fish to disperse widely (Seghers, 1978). *Anablepsoides hartii* frequently move between pools of water after rainfall, thus rapidly occupying open habitats. In Trinidad, *A. hartii* colonized a newly dug pit within 2 months, even though the pit was at least 20 m from the nearest temporary water body and 500 m from the nearest permanent stream (Jordan, 1923).”

Human Uses

From Froese and Pauly (2017):

“Eaten in its native range and exported for the ornamental trade [Robins et al. 1991].”

Diseases

Poelen et al. (2014) lists *Ieredactylus rivuli*, *Pseudorhabdosynochus americanus*, *Centrocestus formosanus*, and *Contracaecum* sp. as parasites of *Rivulus hartii* [synonym of *Anablepsoides hartii*] (Strona et al. 2013; Smithsonian Institution, no date).

No OIE-listed diseases have been reported for this species.

Threat to Humans

From Froese and Pauly (2017):

“Harmless”

3 Impacts of Introductions

From Nico et al. (2018):

“Unknown.”

4 Global Distribution



Figure 1. Known global distribution of *Anablepsoides hartii*. Map from GBIF Secretariat (2017). Locations in Colombia and Guyana, as well as unpictured points in Brazil and Indonesia, were excluded from the climate matching analysis because these points are all outside the known established range of *A. hartii* (see Distribution Outside the United States).

5 Distribution Within the United States



Figure 2. Known distribution of *Anablepsoides hartii* 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 0.057, which is a medium climate match. The range for a medium climate match is between 0.005 and 0.103. The climate match was generally high in Arizona, southern Nevada, and California, where it has been introduced. States with a high climate match were Arizona, California, Nevada, and Washington. Florida, Oregon, Texas, and Utah had a medium climate match. The climate match was generally low in the Midwest and Eastern contiguous United States.

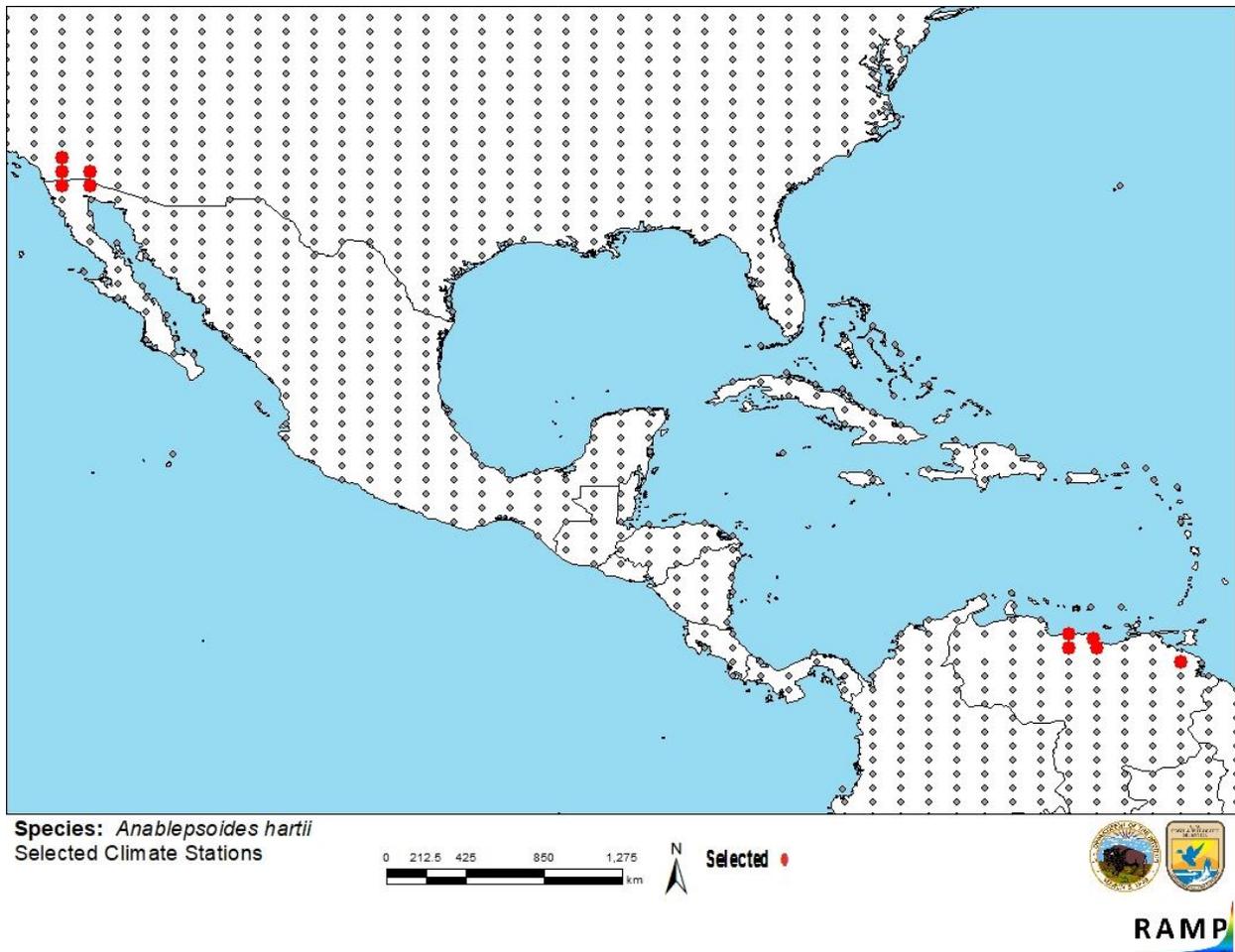


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Venezuela, United States – California, Mexico) and non-source locations (gray) for *Anablepsoides hartii* climate matching. Source locations from GBIF Secretariat (2017). Selected source locations are within 100 km of a reported occurrence and do not represent the exact location of an established population.

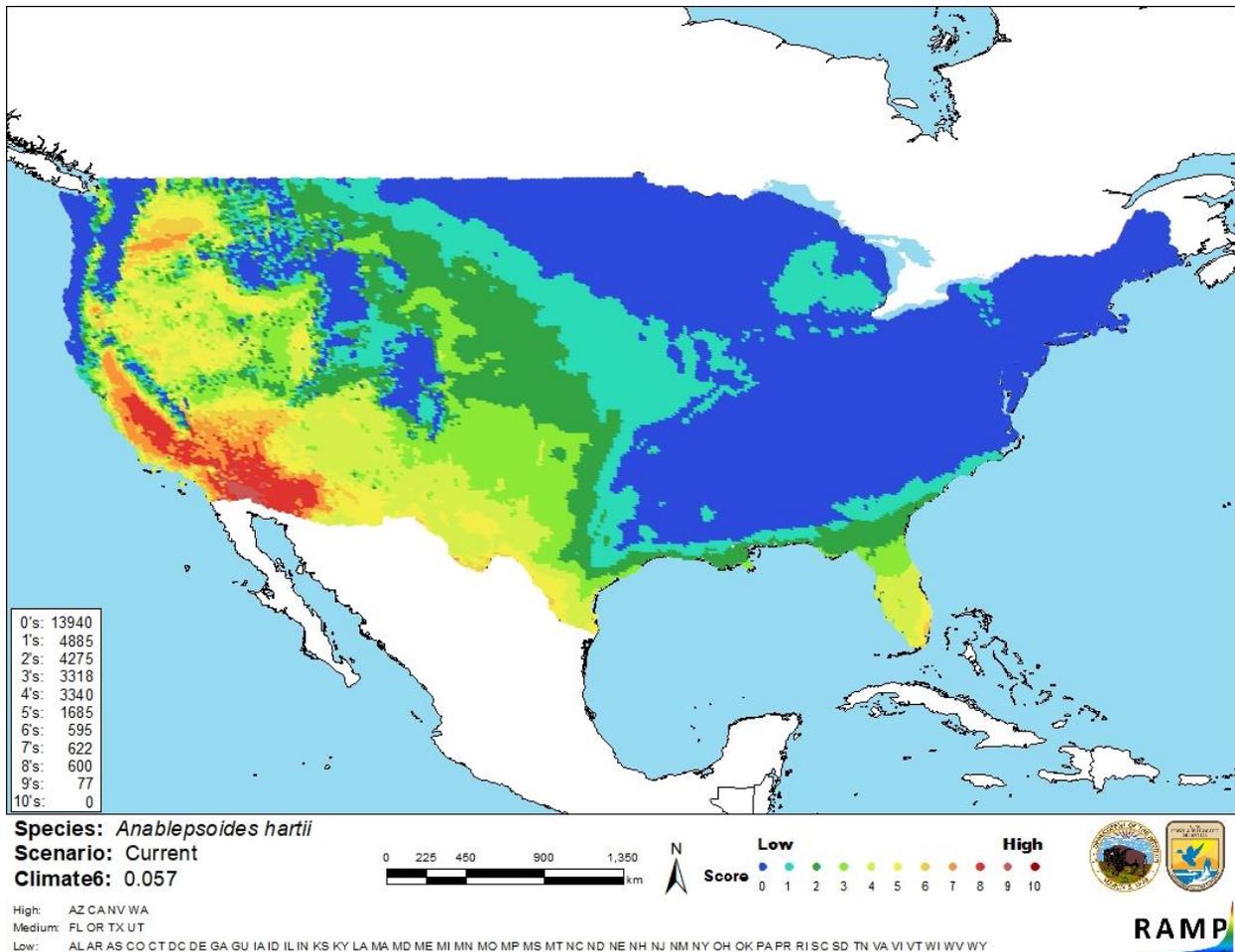


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Anablepsoides hartii* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

There is adequate information available on the biology of *Anablepsoides hartii*. Only one introduction of this species outside of its native range has been documented, and no information is available on the impact of this introduction. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Giant Rivulus (*Anablepsoides hartii*) is a killifish native to Caribbean drainages of South America. This species has a medium climate match with the contiguous United States, with the area of highest match located in California. The only known introduction of this species to the United States is in southern California, where it escaped a tropical fish farm and was found in a nearby drainage ditch. Certainty of this assessment is low because no research is available which documents what impacts, if any, *A. hartii* has had where introduced. Overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **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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