Marbled Hatchetfish (*Carnegiella strigata*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2014
Revised, December 2015, October 2017, November 2017
Web Version, 9/10/2018

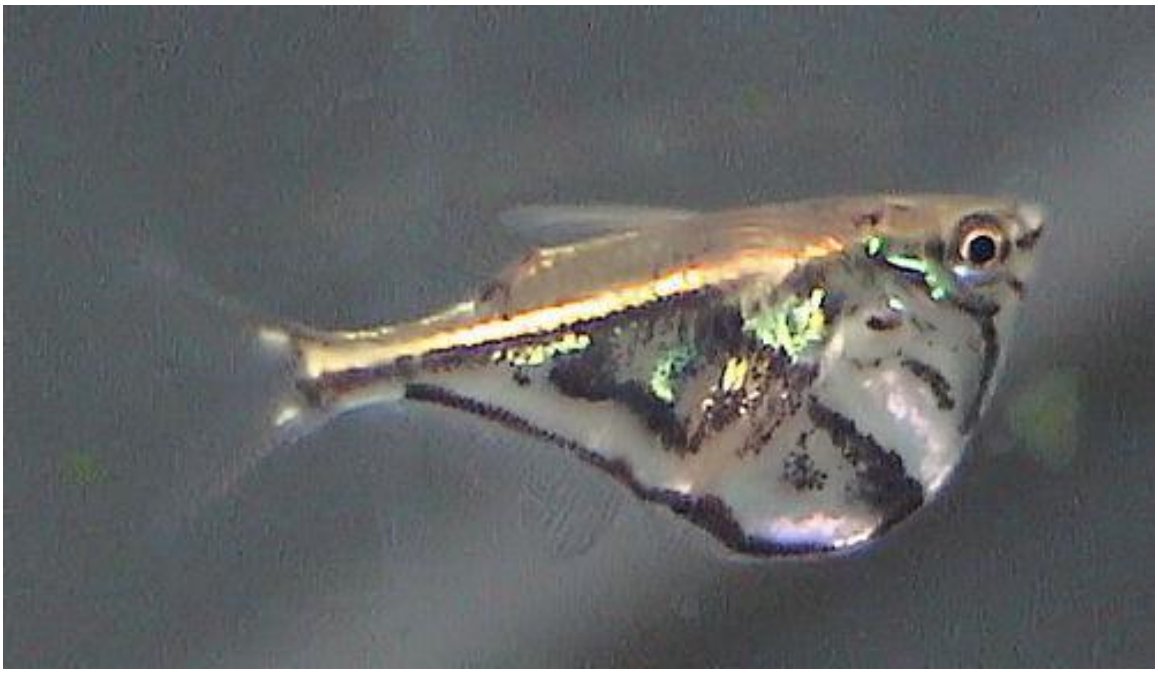

Photo: LA Dawson. Licensed under Creative Commons BY-SA 2.5. Available: http://eol.org/data_objects/27707244. (October 16, 2017).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

"South America: Lower, middle and upper Amazon River basin; south of Amazon; and Caqueta River in Colombia."

"Known from the Amazon [Weitzman and Palmer 2003], Machado [Casatti et al. 2013] and Acre River basins [Claro-García et al. 2013]. Also [Planquette et al. 1996]."

"Occurs in tributaries of the Amazon system and vicinity of Iquitos; also in the Napo and Mazán Rivers."

Status in the United States

No records of *Carnegiella strigata* introduction into the wild in the United States were found.

Carnegiella strigata made up 2% of the total fish imported to the United States in 1971 (Chapman et al. 1997, under the synonym *Gasteropelecus strigatus*).

Means of Introductions in the United States

No records of *Carnegiella strigata* introduction into the wild in the United States were found.

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Eschmeyer et al. (2017), *Carnegiella strigata* (Günther 1864) is the valid name for this species. It was originally described as *Gasteropelecus strigatus*.

From ITIS (2014):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Characiformes
Family Gasteropelecidae
Genus *Carnegiella* Eigenmann, 1909
Species *Carnegiella strigata* (Günther, 1864)"

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Max length: 3.5 cm SL male/unsexed; [Weitzman and Palmer 2003]"

Gery (1965) lists a maximum length of 37mm.

Environment

From Froese and Pauly (2017):

"Freshwater; pelagic; pH range: 5.0 - 8.0; dH range: 5 - 19. […]; 24°C - 28°C [assumed to be recommended aquarium temperature] [Riehl and Baensch 1991]"

Climate/Range

From Froese and Pauly (2017):

"Tropical; […]"

Distribution Outside the United States

Native

From Froese and Pauly (2010):

"South America: Lower, middle and upper Amazon River basin; south of Amazon; and Caqueta River in Colombia."

"Known from the Amazon [Weitzman and Palmer 2003], Machado [Casatti et al. 2013] and Acre River basins [Claro-García et al. 2013]. Also [Planquette et al. 1996]."

"Occurs in tributaries of the Amazon system and vicinity of Iquitos; also in the Napo and Mazán Rivers."

Introduced

No records of *Carnegiella strigata* introductions into the wild were found.

Vesely et al. (2011) list *Carnegiella strigata* as imported to the European Union for the aquarium trade.

Liao and Liu (1989) list *Carnegiella strigata* as imported to Taiwan.

Youguang (2014) lists *Carnegiella strigata* as present in the Singapore ornamental trade.

Means of Introduction Outside the United States

No records of *Carnegiella strigata* introductions into the wild were found.

Short Description

From Butler (2015):

"Has a convex body. The ventral fins are very small and the back is fairly straight. The wing-like pectoral fins are transparent and often measure up to one-half the fish's overall body length. The

coloration is usually silver with black patches. Depending on the angle of light, the colors can change from iridescent green to iridescent violet. A horizontal stripe, yellow in color, extends along the top of the fish."

According to Gery (1965) *Carnegiella strigata* has 29-31 lateral line scales, and 25-29 anal rays.

From Carvalho et al. (2007):

"Dwellers of forest streams, the butterfly fishes *Carnegiella strigatta* […] and *C. marthae* (Gasteropelecidae) and the arowana tetra *Gnathocharax steindachneri* (Characidae) […] have upturned mouths and powerful pectoral fins placed high on their sides."

Biology

From Froese and Pauly (2017):

"Lives in groups. Feeds on crustaceans and insects [Mills and Vevers 1989]. The females have an abdomen which is larger than those of the males. The eggs fall on the bottom or on vegetation and these hatch after 36 hours incubation at 25°C [Planquette et al. 1996]."

From Soares and Bierman (2013):

"The freshwater African butterfly fish, *Pantodon buchholzi* (family Pantodontidae), and the hatchet fish, *Carnegiella strigata* (family Gasteropelecidae), both also leave the water, moving along a ballistic aerial path, in response to startle stimuli (Eaton et al. 1977, Saidel et al. 2004)."

From Carvalho et al. (2007):

"The powerful pectoral fins of the freshwater butterfly fish *Carnegiella strigata* (Gasteropelecidae) are used to quickly reach and grab insects fallen on the water surface. When pursued by roaming predators these small fishes may jump out of the water repeatedly, momentarily disappearing from the predator's view."

Human Uses

From Froese and Pauly (2017):

"Aquarium: commercial"

"Exported [from Peru] as an aquarium fish [Tello and Sánchez 1995]."

Carnegiella strigata made up 2% of the total fish imported to the United States in 1971 (Chapman et al. 1997, under the name *Gasteropelecus strigatus*).

Brazil exported 360,184 individuals of *Carnegiella strigata* for the ornamental trade in 2007 (Ibama 2008 in Tavares-Dias et al. 2009).

Vesely et al. (2011) list *Carnegiella strigata* as imported to the European Union.

Peru exported 404,292 individuals of *Carnegiella strigata* for the ornamental trade in 2003 (Prang 2007). Venezuela and potentially Guyana also export *Carnegiella strigata* for the ornamental trade (Prang 2007).

Liao and Liu (1989) list *Carnegiella strigata* as imported to Taiwan

Youguang (2014) lists *Carnegiella strigata* as present in the Singapore ornamental trade.

Diseases

Infection with *Gyrodactylus salaris* is an OIE reportable disease. *Ranavirus* infection in amphibians is also reportable; *Carnegiella strigata* is potentially a carrier of *Ranavirus*.

From Froese and Pauly (2017):

"Fin-rot Disease (late stage), Bacterial diseases
White spot Disease, Parasitic infestations (protozoa, worms, etc.)
Fin Rot (early stage), Bacterial diseases
Bacterial Infections (general), Bacterial diseases
Bacterial Gill Infection, Bacterial diseases
Intestinal Worm Infection (general), Parasitic infestations (protozoa, worms, etc.)"

Fujimoto et al. (2013) list unidentified monogeneans and nematodes as parasites of *Carnegiella strigata*.

Tavares-Dias et al. (2010) identify *Gyrodactylus* spp., *Ichtyophthirius multifiliis*, *Trethymnena* sp., and *Trichodina* spp. as parasites of *Carnegiella strigata*.

Vesely et al. (2011) list *Carnegiella strigata* as testing positive for *Ranavirus* DNA.

Threat to Humans

From Froese and Pauly (2017):

"Harmless"

3 Impacts of Introductions

No records of *Carnegiella strigata* introductions into the wild were found.

4 Global Distribution

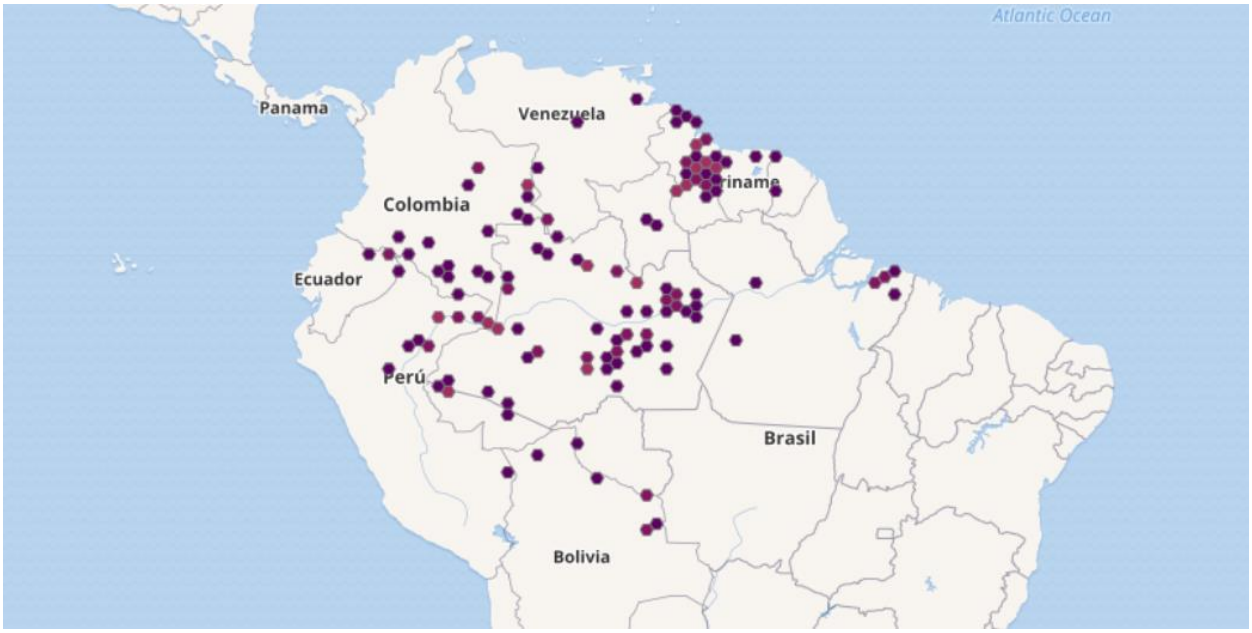

Figure 1. Known global distribution of *Carnegiella strigata*. Locations are in Venezuela, Colombia, Ecuador, Peru, Brazil, Bolivia, Guyana, Suriname, and French Guiana. Map from GBIF Secretariat (2017).

5 Distribution Within the United States

No records of *Carnegiella strigata* introduction into the wild in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Carnegiella strigata* was high in southern Florida, medium for the rest of Florida and along the Gulf Coast, and low everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.007, medium, and Florida had an individually high climate score.

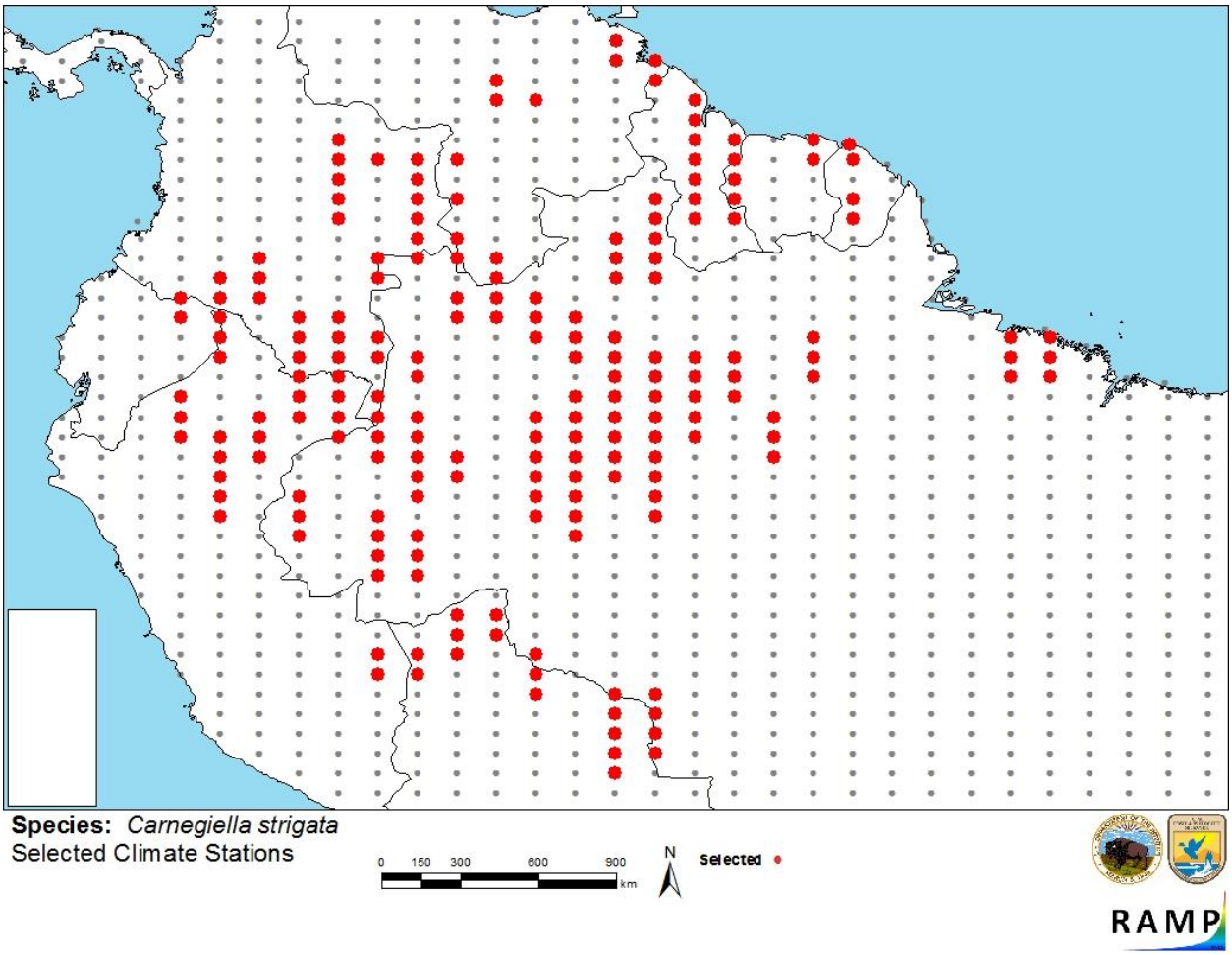

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in northern South America selected as source locations (red; Venezuela, Colombia, Ecuador, Peru, Brazil, Bolivia, Guyana, Suriname, French Guiana) and non-source locations (grey) for *Carnegiella strigata* climate matching. Source locations from GBIF Secretariat (2017).

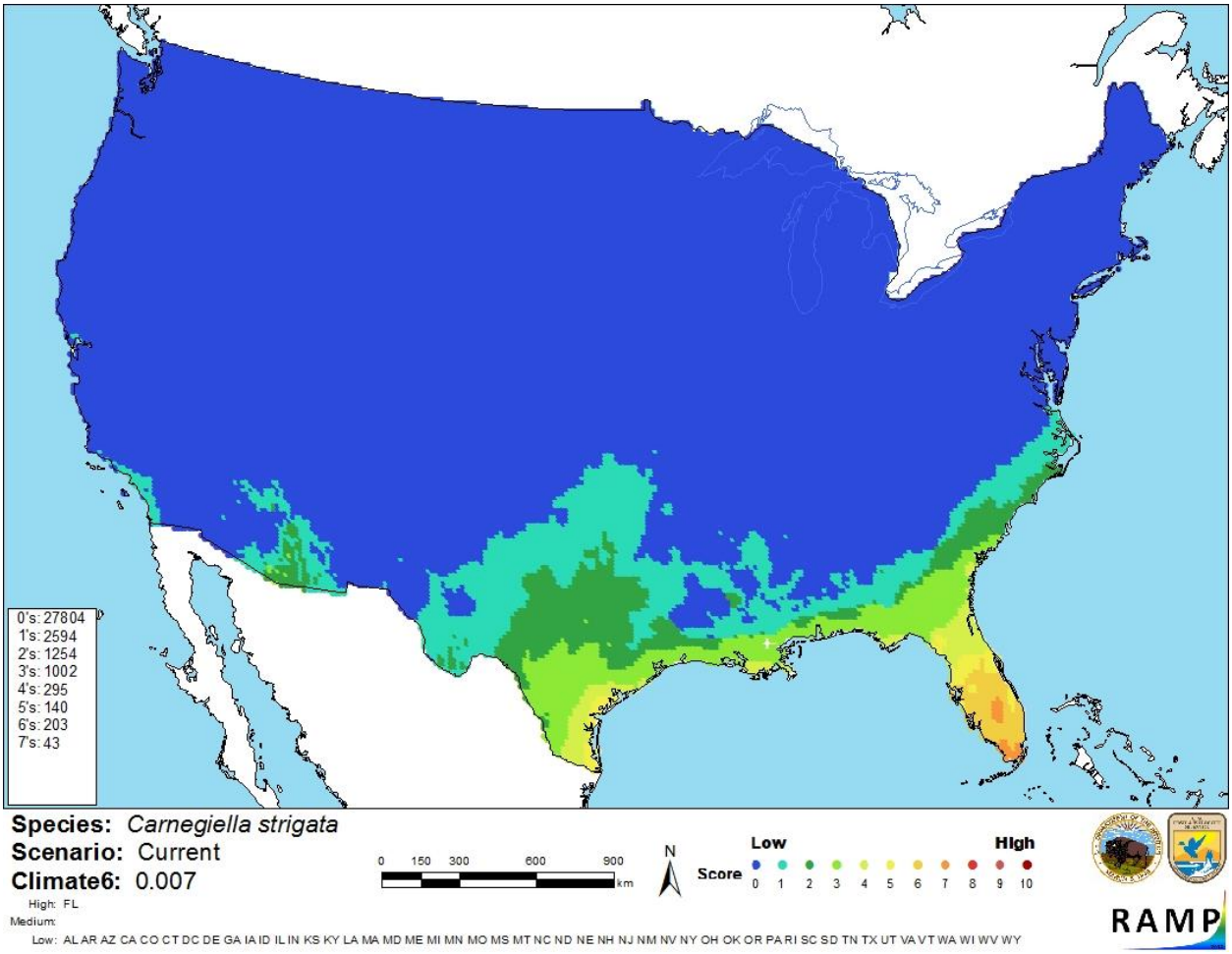

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Carnegiella strigata* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0 = Lowest match, 10 = Highest match. Counts of climate match scores are tabulated on the left.

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

The certainty of this assessment is high. There was adequate quality information available for *Carnegiella strigata*. No records of introductions into the wild were found; however many peer reviewed records of a high volume of trade over a period of time was available. The distribution of this species is well documented with georeferenced points available to use as source locations for the climate match.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The Marbled Hatchetfish (*Carnegiella strigata*) is a species of fish native to the rivers of northern South America. This species consumes crustaceans and insects and can propel itself out of the water to avoid predation. The history of invasiveness for *Carnegiella strigata* is low. *Carnegiella strigata* is present in the pet trade and has been since at least 1971 (Chapman et al. 1997). In 1971, this species was 2% of the total ornamental fish imported into the United States (Chapman et al. 1997). In a single year Brazil exported 360,184 (Ibama 2008 in Tavares-Dias et al. 2009) individuals and Peru exported 404,292 individuals (Prang 2007). Other countries where this species is present also export for the aquarium trade. The climate match is medium with Florida having an individually high match. The certainty of assessment is high. There was adequate quality information available to be able to make a determination about the history of invasiveness and a detailed distribution. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Low**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): High**
- **Remarks/Important additional information** *Carnegiella strigata* has been present in high volume in the aquarium trade since 1971. This species has records of infection with *Gyrodactylus* spp. and potentially *Ranavirus*. Infection with *Gyrodactylus salaris* and amphibian infection with *Ranavirus* are OIE reportable diseases.
- **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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