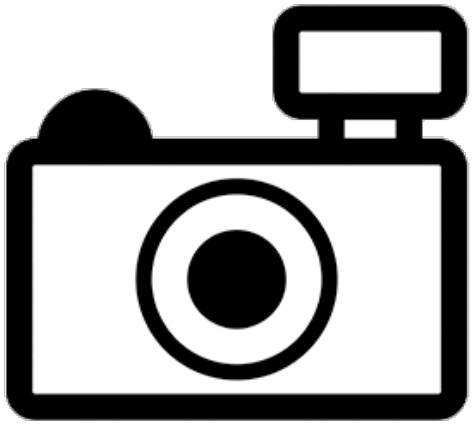
Oneline Pencilfish (*Nannostomus unifasciatus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2022
Revised, April 2022
Web Version, 5/22/2023

Organism Type: Fish
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2022):

"South America: Parts of the Amazon basin of Bolivia, Brazil, and probably Colombia; the upper Orinoco basin of Venezuela, and Guyana."

Status in the United States

No records of *Nannostomus unifasciatus* in the wild in the United States were found. This species has been found in the aquarium trade.

From The Wet Spot Tropical Fish (2022):

"*Nannostomus unifasciatus*
'One Line Pencilfish' 'Colombia'

$3.00”

Means of Introductions in the United States

No records of *Nannostomus unifasciatus* in the wild in the United States were found.

Remarks

According to Fricke et al. (2022), *Poecilobrycon ocellatus* is a synonym of *Nannostomus unifasciatus*. Both names were used during the information search for this screening.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2022), *Nannostomus unifasciatus* Steindachner 1876 is the current valid and original name for this species.

From ITIS (2022):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Characiformes
Family Lebiasinidae
Subfamily Pyrrhulininae
Tribe Nannostomini
Genus *Nannostomus*
Species *Nannostomus unifasciatus* Steindachner, 1876

Size, Weight, and Age Range

From Froese and Pauly (2022):

“Max length : 3.8 cm SL [standard length] male/unsexed; [Weitzman and Weitzman 2003]”

From Ramoutar (2016):

“*Nannostomus unifasciatus*, also known as the one-lined pencil fish, is a species of freshwater fish with adults growing to an average length of 4 cm and maximum of 7 cm.”

“They live up to 5 years.”

Environment

From Froese and Pauly (2022):

"Freshwater; benthopelagic; pH range: 5.5 - 7.0; dH range: ? - 4. […] 25°C - 28°C [Riehl and Baensch 1991; assumed to be the recommended aquarium temperature]"

From Ramoutar (2016):

"The one-lined pencil fish can be found in forest streams, swamp areas, rivers and tributaries. They inhabit areas which have slow moving or stagnant shallow water with dense aquatic vegetation and can be found dispersed throughout floodplains during the wet season. They are also found beneath "floating islands" which are masses of floating aquatic plants and mud. They thrive in water that is slightly acidic with pH ranges from 4.0-6.5 and temperature ranges from 23-28°C."

Climate

From Froese and Pauly (2022):

"Tropical; […]"

Distribution Outside the United States

Native

From Froese and Pauly (2022):

"South America: Parts of the Amazon basin of Bolivia, Brazil, and probably Colombia; the upper Orinoco basin of Venezuela, and Guyana."

Introduced

From Fricke et al. (2022):

"[…] introduced in Trinidad and Tobago."

Froese and Pauly (2022) suggest that *Nannostomus unifasciatus* is probably not established in Trinidad.

Means of Introduction Outside the United States

From Froese and Pauly (2022):

"Aircraft carriers of this exported fish (from Guyana then British Guiana) refueled at Piarco [Trinidad] and inevitably some broke down. During the incidence, some fish died of anoxia. However, there were dying fish that were dumped at the nearest river, the Oropune River on the airport road. From 1958 to 1963, it became established in the lower Oropune River and its tributaries, but disappeared abruptly. It is assumed to be extirpated probably due to habitat degradation."

Short Description

From Ramoutar (2016):

"The one-lined pencil fish is the largest species of *Nannostomus*, with a long slender body containing 17-33 scales in the lateral series, adipose fin (small posterior dorsal fin, without rays) and small terminal mouth (Nelson, 1994). There is a long black stripe which runs laterally down the central length of its body and onto its indented caudal fin (primary stripe) (Fig. 1[in source material]). Two silver metallic bands border the single black stripe (secondary and tertiary stripes). The colour of the caudal (tail) fin is variable and is dependent on the geographic population of the fish. The colour is usually isolated to the lower section of the caudal fin, beneath the black stripe but with more colourful species, the pigment extends above the stripe. The pelvic fins, dorsal fin and anal fin are slanted back, with the pelvic and anal fins sometimes tipped with the colour of the fish (Weitzman and Weitzman, 2003). They usually possess an ocellus (eyespot) in the upper caudal fin lobe. Sexes have different shape and colours with respect to their body and fins. The males are narrower-bodied and have elongated anal fins and the tips of the ventral and anal fins are brighter and more outstanding compared females (Weitzman and Weitzman, 2002)."

Biology

From Froese and Pauly (2022):

"Feeds on worms, crustaceans and insects [Mills and Vevers 1989]"

From Ramoutar (2016):

"*N. unifasciatus* can be diurnal, nocturnal or crepuscular, active at all times of day. Males establish and defend small territories but rarely cause harm to each other. They are sociable in groups as males are friendly towards females."

"*N. unifasciatus* is an omnivore, micro-predator which feeds on periphyton (micro-algae films growing on rocks), insects, worms and small crustaceans. After hatching, the larva first feeds by absorbing its yolk sac, followed by periphyton. They are also prey to higher trophic levels and play an important role in the overall health of an aquatic system."

"However, it is known that *N. unifasciatus* are dioecious (with separate sexes) and are egg-layers; soft, acidic waters which are fairly warm induce spawning. The males flash their brightly coloured displays as part of courtship then adult females scatter their eggs among plants and the males discharge their sperm into open water as fertilization is external. After spawning, the parent fish are not involved with the eggs anymore. The eggs can number up to a hundred, and hatch within 36 hours (Weitzman and Weitzman, 2002). The larvae remain at the river bed and first feed on the yolk sac and later as they grow, start feeding on periphyton. The larvae first cling to surfaces early on while absorbing the yolk sac, but within five days the fry are able to swim."

"*N. unifasciatus* are timid fish which hide in aquatic vegetation and leaf litter. However, males often chase and nip at females and each other. Sometimes, females would also nip at each other. They assume an oblique swimming position where their snout is held upwards. Natural behaviour also includes browsing for algae and hovering at a fixed position in water (Oliveira et al., 2011). Hovering is a form of anti-predator behaviour as it helps with camouflage. Males have brighter colours compared to females and use it as communication by flashing their displays as part of a courtship ritual. Males also establish territories which they defend during courtship. However, they are usually present in relatively peaceful schools of 10 members or more."

Human Uses

From Ramoutar (2016):

"They are popular in aquarium trade due to their size, colour display and swimming posture, […]"

From Beheregaray et al. (2004):

"The one-lined pencilfish *Nannostomus unifasciatus* is a small fish from the flooded forests of the Amazon basin. Pencilfish are popular in aquaria and are used as ornamental fishery resource by riverine communities from central Amazonia."

Diseases

No records of OIE-reportable diseases (OIE 2022) were found for *Nannostomus unifasciatus.*

According to Tavares-Dias et al. (2010) *Ichthyophthirius multifiliis* and a monogenea species of the genus *Dactylogyrus* were found in *Nannostomus unifasciatus*.

Threat to Humans

From Froese and Pauly (2022):

"Harmless"

3 Impacts of Introductions

There was a record of introduction for *Nannostomus unifasciatus* in Trinidad and Tobago but the population did not persist and no information was found regarding impacts.

4 History of Invasiveness

The history of invasiveness for *Nannostomus unifasciatus* is classified as No Known Nonnative Population. This species has been recorded as introduced in Trinidad and Tobago, but establishment did not occur and there were no impacts found associated with that introduction. *Nannostomus unifasciatus* is found in the aquarium trade but the exact volume and trade history could not be found.

5 Global Distribution

Figure 1. Known global distribution of *Nannostomus unifasciatus*. Observations are reported from Venezuela, Colombia, Guyana, Bolivia, Peru, and Brazil. Map from GBIF Secretariat (2022).

6 Distribution Within the United States

No records of *Nannostomus unifasciatus* in the wild in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

The majority of the contiguous United States had a low climate match. There were areas of medium climate match located along the coast of the Gulf of Mexico, with a small area of high match located in the southern tip of Peninsular Florida. The overall Climate 6 score (Sanders et al. 2021; 16 climate variables; Euclidean distance) for the contiguous United States was 0.005, Low (scores between 0.000 and 0.005, inclusive, are classified as Low). All States had a Low individual Climate 6 score except for Florida which had a High individual Climate 6 score.

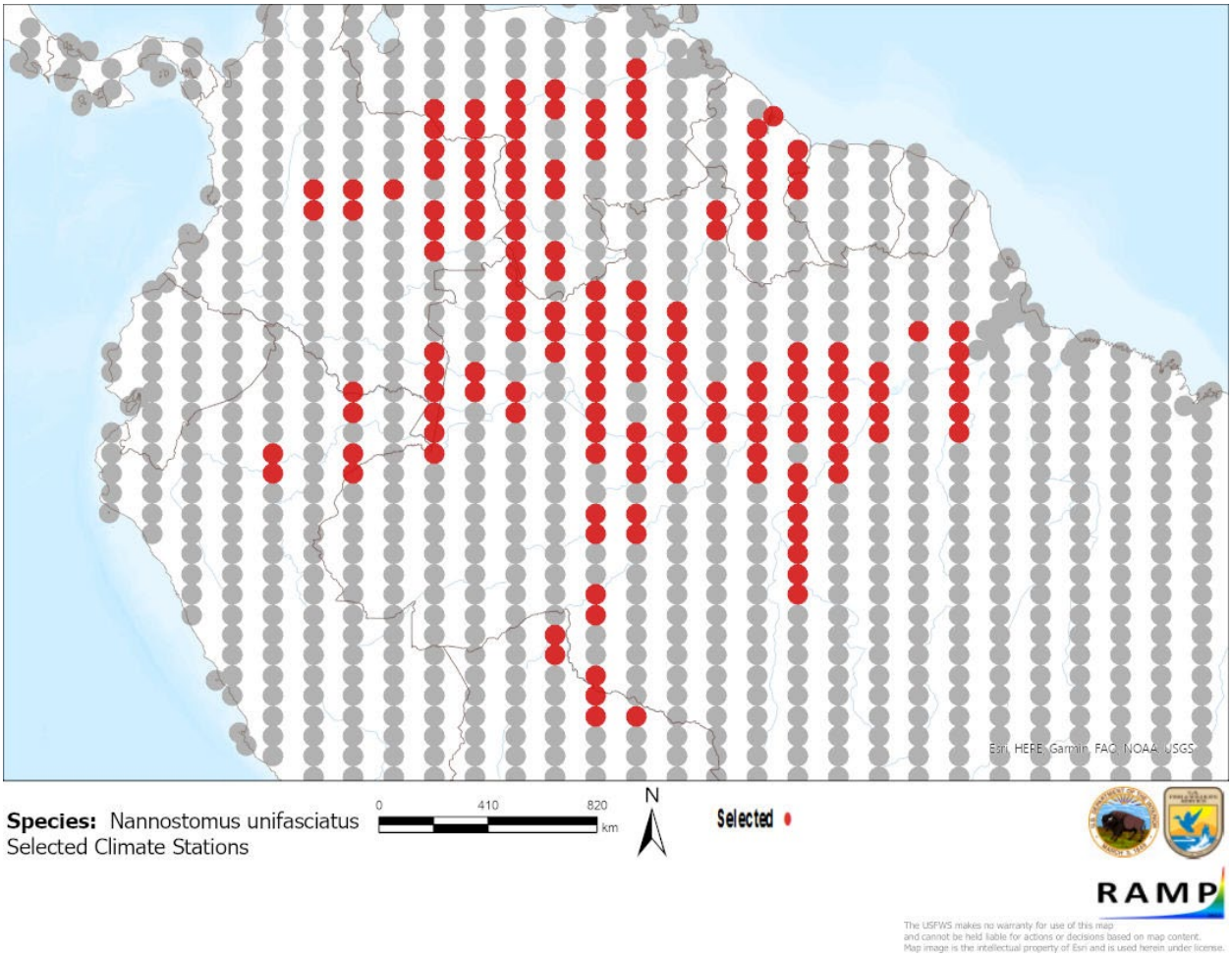


Figure 2. RAMP (Sanders et al. 2021) source map showing weather stations in northern South America selected as source locations (red; Brazil, Colombia, Peru, Guyana, Bolivia, Venezuela) and non-source locations (gray) for *Nannostromus unifasciatus* climate matching. Source locations from GBIF Secretariat (2022). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

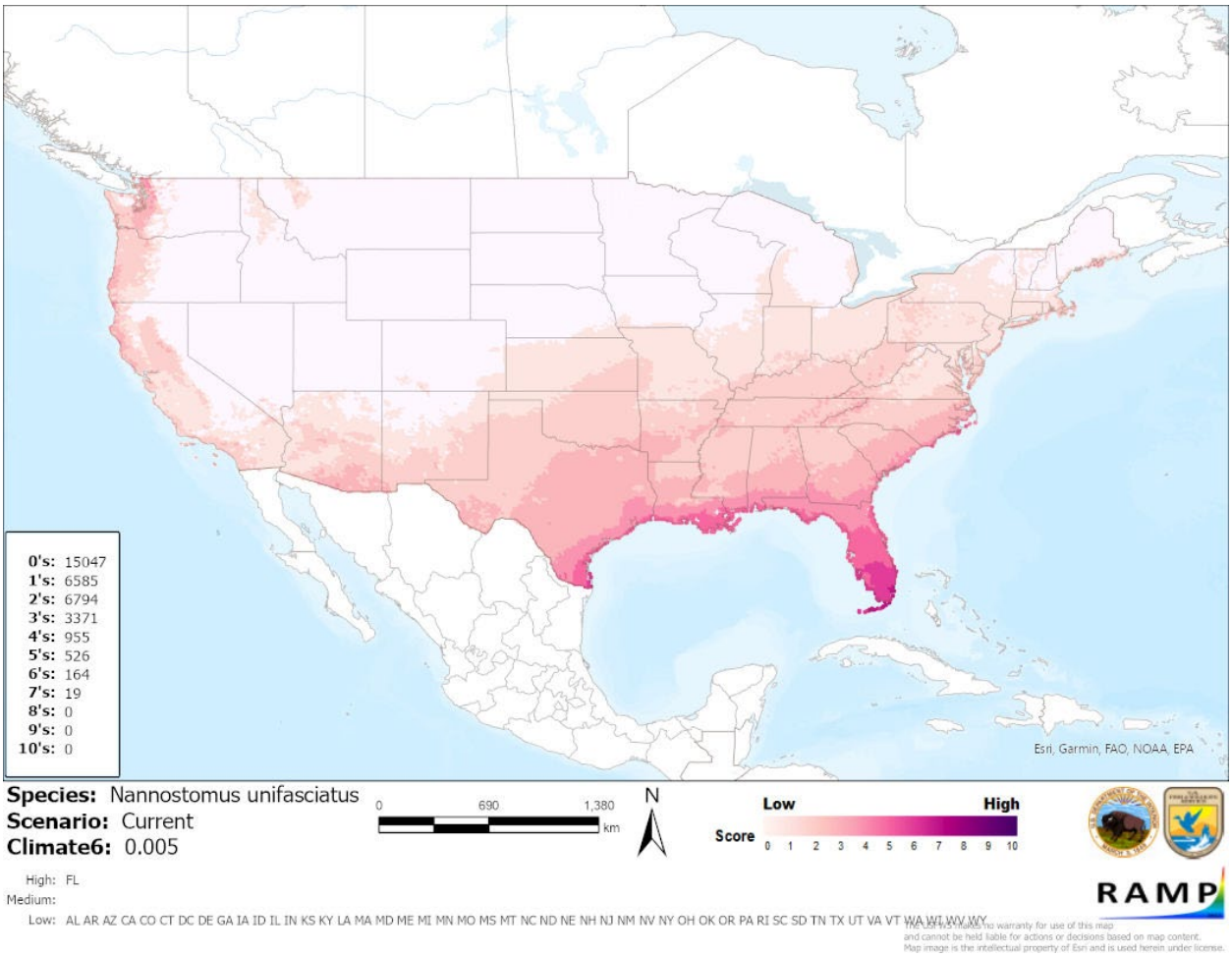


Figure 3. Map of RAMP (Sanders et al. 2021) climate matches for *Nannostromus unifasciatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2022). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

There is reasonably complete information regarding species distribution and biology, however information is lacking about introduction impacts. The species is found in trade but there was no explicit information found on duration or volume of that trade. The certainty of assessment is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Nannostomus unifasciatus is a small freshwater fish that is native to the Amazon and Orinoco basins in South America. This species is popular in the aquarium trade and can be found for sale in the United States, but the exact trade volume and duration is unknown. *Nannostromus unifasciatus* has been introduced into Trinidad and Tobago but it did not become established. No information regarding impacts from that introduction was found. For these reasons, the history of invasiveness for *Nannostomus unifasciatus* is classified as No Known Nonnative Population. The overall Climate 6 score for the contiguous United States was Low. Most of the contiguous United States had a low local climate match. Areas of the Gulf Coast had a medium match with the southern tip of Florida having a high local climate match. The certainty of assessment is Low due to the lack of information pertaining to history of invasiveness. The overall risk assessment category is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information: No additional remarks.**
- **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.

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The Wet Spot Tropical Fish. 2022. *Nannostomus unifasciatus*. Available: https://www.wetspot-tropicalfish.com/product/nannostomus-unifasciatus/ (February 2022).

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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Nelson JS. 1994. Fishes of the world. Third edition. New York: John Wiley & Sons.

Oliveira CA, Avellino GS, Abe KT, Mariguela TC, Benine RC, Orti G, Vari RP, Corrêa e Castro RM. 2011. Phylogenetic relationships within the speciose family Characidae. BMC Evolutionary Biology 11:275–300.

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Weitzman M, Weitzman, SH. 2003. Lebiasinidae (pencil fishes). Pages 241–251 in Reis RE, Kullander SO, Ferraris CJ Jr, editors. Checklist of the freshwater fishes of South and Central America. Porto Alegre, Brasil: EDIPUCRS.