Raphael Catfish (*Platydoras costatus*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, July 2018
Web Version, 9/20/2019

Photo: Erling Holm, via FishWise Professional. Licensed under Creative Commons BY-NC-SA. Available: http://eol.org/data_objects/24181426. (July 2018).

1 Native Range and Status in the United States

Native Range

From Nico et al. (2018):

"South America, from Venezuela and the Guianas to Argentina (Robins et al. 1991), including the Amazon, Tocantins, Parnaíba, Orinoco, and Essequibo River basins and coastal drainages in French Guiana and Suriname."

From Piorski et al. (2008):

"[…] coastal drainages of Suriname and French Guiana […]"

From Eschmeyer et al. (2018):

"Distribution: Amazon, Tocantins, Parnaíba, Orinoco and Essequibo River basins and coastal drainages in French Guiana and Suriname: Bolivia, Brazil, Ecuador, ?Colombia, French Guiana, Guyana, Peru, Suriname and Venezuela. But perhaps only coastal drainages of Suriname and French Guiana."

Conflicting descriptions of the distribution of *P. costatus* are apparent in the quotations above. In this ERSS, the broader definition is used because most information available refers to this definition of the species range.

Status in the United States

From Nico et al. (2018):

"Reported from Florida and Texas. Likely failed introduction: there have been no additional specimens or reports since initial sightings."

Nico et al. (2018) report that the record from Florida dates to 1984 and the record from Texas dates to 1999.

VertNet (2018) reports an occurrence in May 2002 in New Mexico: "Caught 15 May 2002 by Frank Jimenez of Tesuque […] at Santa Cruz Lake, Santa Fe Co. with a net as it was swimming near shoreline."

The frequency of this species in trade is unclear (see Remarks). Several aquarium sellers listed the species on their websites as out of stock; no sellers were found that were actively trading *P. costatus*.

Means of Introduction into the United States

From Nico et al. (2018):

"Likely aquarium release, as many species of Doradidae are popular in the aquarium trade."

Remarks

From Nico et al. (2018):

"This species is one of the most common doradids in the aquarium trade. It is very similar to a congener, *P. armatulus*, which originates from the Paraguay-Paraná and portions of Amazon and Orinoco basins. Records for *P. costatus* may actually be specimens of *P. armatulus*, e.g., Howells (2001) lists *P. costatus* but the museum collection record for this specimen (ANSP 179206) is identified as *Platydoras cf. armatulus.*"

From Dignall (2018):

"This species was long misidentified as the widely distributed species commonly available in the hobby, however now appears to be restricted to two rivers in eastern South America. The common species in the hobby is *Platydoras armatulus*."

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 Ostariophysi
Order Siluriformes
Family Doradidae
Genus *Platydoras*
Species *Platydoras costatus* (Linnaeus, 1758) – Raphael catfish"

From Fricke et al. (2019):

"**Current status:** Valid as *Platydoras costatus* (Linnaeus 1758). Doradidae: Doradinae.

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 24.0 cm SL male/unsexed; [Sabaj and Ferraris 2003]"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal; pH range: 5.8 - 7.5; dH range: 2 - 20. […] 24°C - 30°C [Riehl and Baensch 1991; assumed to represent recommended aquarium water temperatures]"

Climate/Range

From Froese and Pauly (2018):

"Tropical; […] 9°N - 8°S, 72°W - 50°W"

Distribution Outside the United States

Native

From Nico et al. (2018):

"South America, from Venezuela and the Guianas to Argentina (Robins et al. 1991), including the Amazon, Tocantins, Parnaíba, Orinoco, and Essequibo River basins and coastal drainages in French Guiana and Suriname."

From Piorski et al. (2008):

"[…] coastal drainages of Suriname and French Guiana […]"

From Eschmeyer et al. (2018):

"Distribution: Amazon, Tocantins, Parnaíba, Orinoco and Essequibo River basins and coastal drainages in French Guiana and Suriname: Bolivia, Brazil, Ecuador, ?Colombia, French Guiana, Guyana, Peru, Suriname and Venezuela. But perhaps only coastal drainages of Suriname and French Guiana."

Conflicting descriptions of the distribution of *P. costatus* are apparent in the quotations above. In this ERSS, the broader definition is used because most information available refers to this definition of the species range.

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 Froese and Pauly (2018):

"Dorsal spines (total): 1; Dorsal soft rays (total): 6; Anal soft rays: 10 - 11"

From Piorski et al. (2008):

"*Platydoras costatus* lacks the pale yellow to white midlateral stripe [of other *Platydoras* species] and has a small dark spot in the axil of each midlateral thorn."

"Sides without light midlateral stripe; midlateral scutes very shallow, depth of 10th scute 7.2-9.8% of SL […]"

Biology

From Froese and Pauly (2018):

"Lives on the bottom and feeds on mollusks, crustaceans, and organic debris. Frequently occurs on sandy bottoms. Often escapes into the sediment where it hides among the anfractuosities of the submerged stocks [Le Bail et al. 2000]. A juvenile in a stream of the rio Araguaia was recorded to clean the piscivorous characin *Hoplias cf. malabaricus* [Carvalho et al. 2003]."

Human Uses

From Froese and Pauly (2018):

"Fisheries: minor commercial; aquarium: commercial"

Diseases

From Froese and Pauly (2018):

"Raphidascaroides Infection 1, Parasitic infestations (protozoa, worms, etc.)"

From Rehulka et al. (2015):

"Pathogenic *Vibrio cholerae* non-O1/non-O139 was isolated […] in adult Raphael catfish, *Platydoras costatus* kept in aquarium conditions."

"In these species [*P. costatus*, *Paracheirodon axelrodi*, and *Chondrostoma nasus*] the disease had an acute course and primarily affected young fish."

From de Chambrier and Vaucher (1994):

"The cat-fish *Platydoras costatus* (L.) is abundantly parasitised by the cestode genus *Proteocephalus* in Paraguay, previously unrecorded from this host. Morpho-metrical studies suggest the presence of two species, *Proteocephalus soniae* n. sp. and *P. renaudi* n. sp."

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

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

From Nico et al. (2018):

"**Impact of Introduction:** Unknown, but likely none because of failure to establish and no additional reports."

4 Global Distribution

Figure 1. Global distribution of *Platydoras costatus*, reported from the Americas. Map from GBIF Secretariat (2017). Occurrences in the United States were not used in the climate matching analysis because these occurrences do not represent established populations.

5 Distribution within the United States

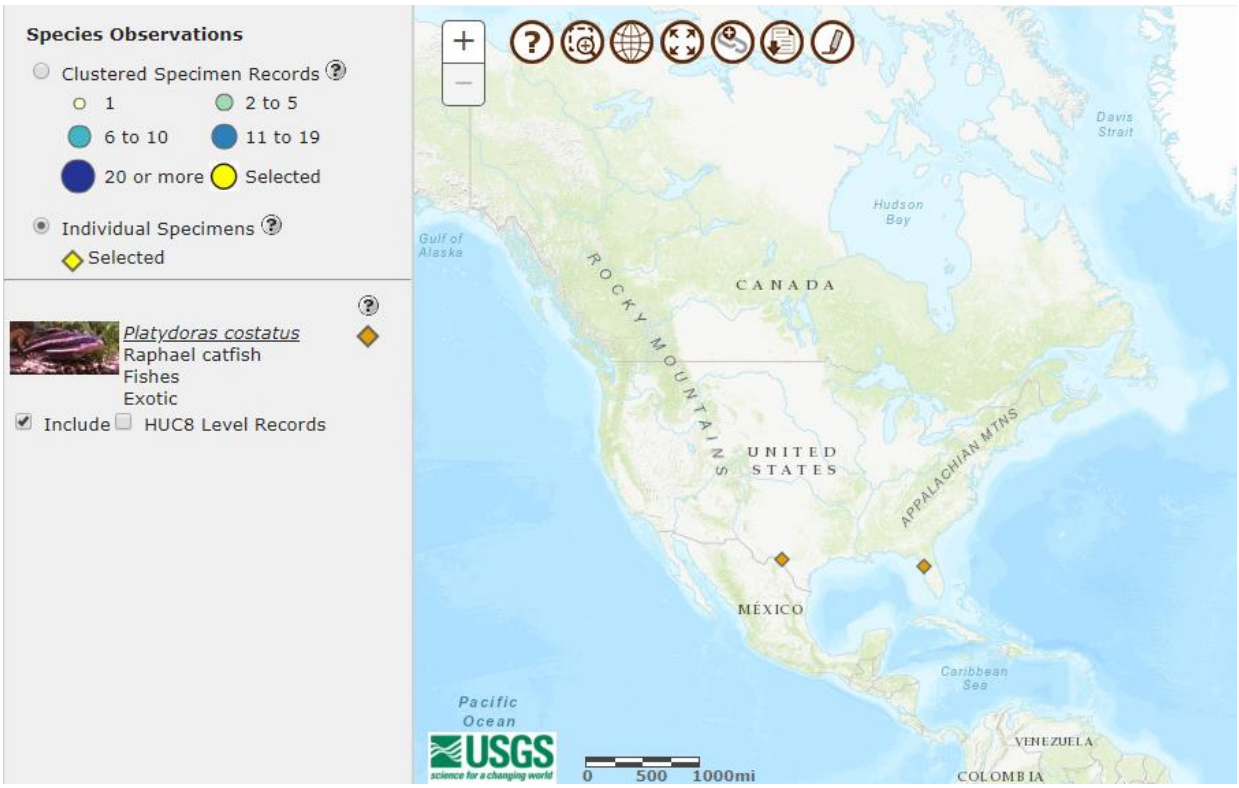

Figure 2. Reported distribution of *P. costatus* in the United States. Map from Nico et al. (2018). Neither of the occurrences shown were included in the climate matching analysis because they do not represent established populations.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was high in coastal Texas from approximately Houston to Corpus Christi, and in scattered locations around Florida and southern Georgia. Medium match extended north from Florida to Maryland. The climate match was also medium in the southern Great Plains, northwestern Washington, and much of coastal California. The remainder of the contiguous United States had low climate match. Climate 6 score indicated that the contiguous United States has a medium climate match overall. Scores between 0.005 and 0.103 are classified as medium match; Climate 6 score for *P. costatus* was 0.042. The States of Florida, Georgia, South Carolina, and Texas had high individual climate scores, and the States of North Carolina and Oklahoma had medium climate scores. All other States had low climate scores.

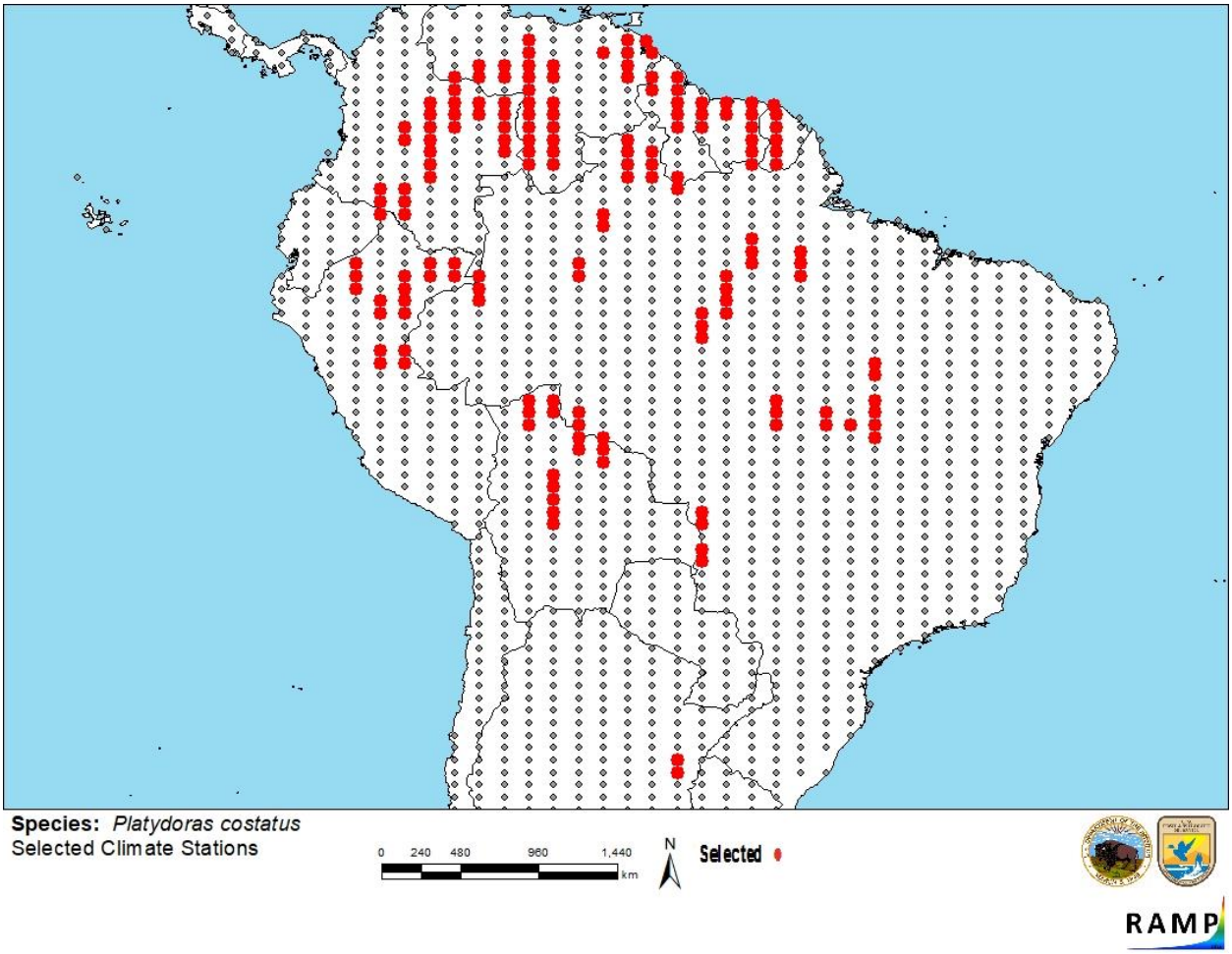

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; French Guiana, Suriname, Guyana, Venezuela, Colombia, Ecuador, Peru, Brazil, Bolivia, Argentina) and non-source locations (gray) for *P. costatus* climate matching. Source locations from GBIF Secretariat (2017).

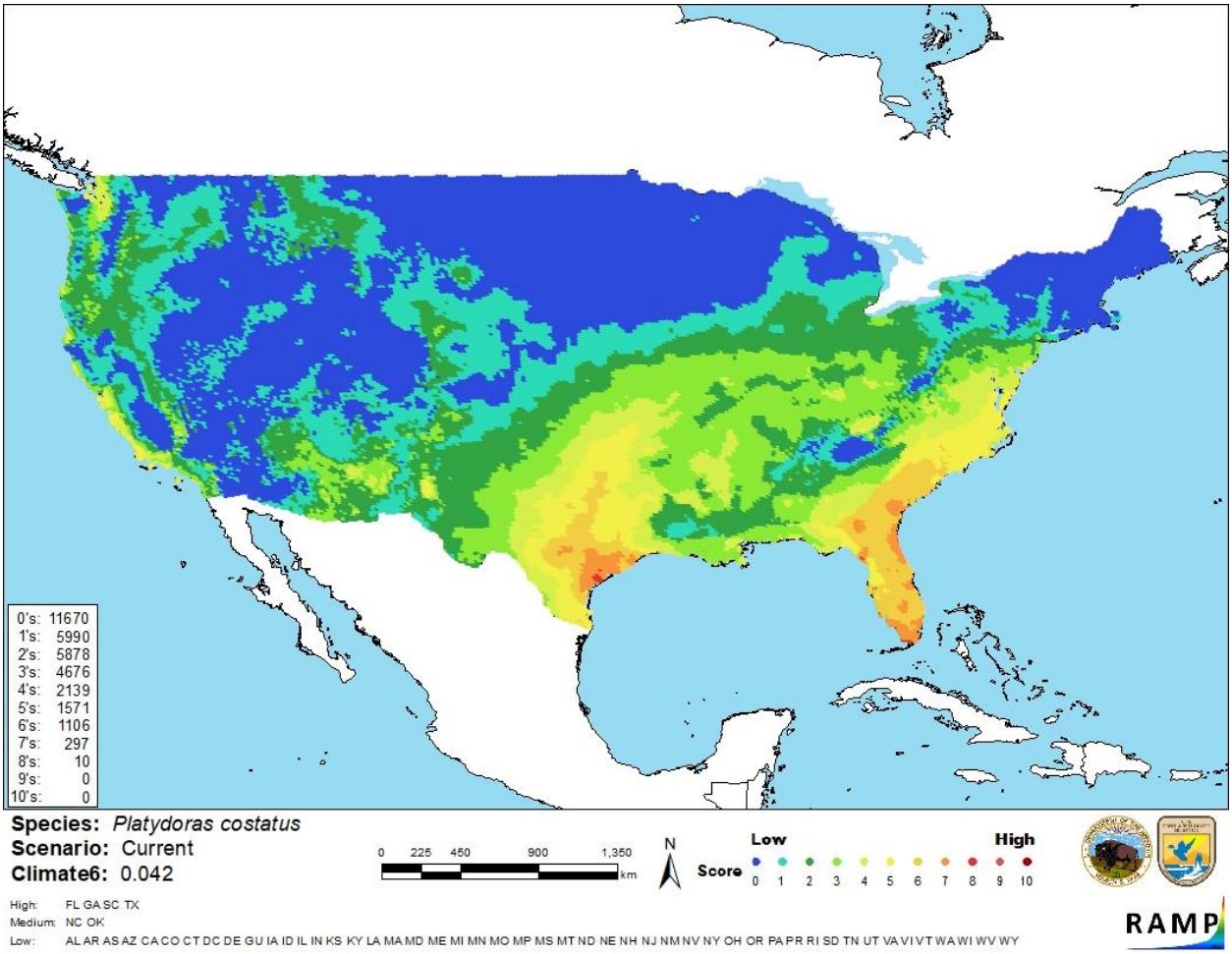

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *P. costatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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

Information is available on the biology, ecology, and distribution of *P. costatus*. However, there are conflicting descriptions of the species range in the literature and it has a history of misidentification. Three introductions have been reported in the United States, but no information is available on impacts of these introductions because only a single individual was observed in each location. Because of these uncertainties, certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Raphael Catfish (*Platydoras costatus*) is native to South America, although there are conflicting descriptions of the breadth of the native range. For the purposes of this report, the broader range description was used; this range encompasses numerous river basins from the Guianas and Venezuela to Argentina. It is unclear whether this species is currently in trade in the United States and if so, how abundant it is in trade. Past introductions into the United States have been attributed to aquarium releases; these introductions did not result in established populations. No information is available on impacts of introduction because the introduction history of *P. costatus* is very limited and has not resulted in any established populations. History of invasiveness is uncertain. Climate match to the contiguous United States was medium overall, with high matches in Texas, Florida, and Georgia. Certainty of assessment is low due to confusion in the literature with another species and lack of information on impacts and trade volumes. Overall risk posed by *P. costatus* is uncertain.

Assessment Elements

- **History of Invasiveness: Uncertain**
- **Climate Match: Medium**
- **Certainty of Assessment: 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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