U.S. Fish & Wildlife Service

Hypostomus regani (a catfish, no common name)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, November 2011
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1 Native Range and Status in the United States

Native Range

From Fricke et al. (2018):

"Paraná, Paraguay and Uruguay River basins: Argentina, Brazil, Paraguay and Uruguay."

Status in the United States

This species has not been reported as introduced or established in the United States. However, unidentified members of the genus are established in the United States.

From Nico et al. (2018):

"Several morphologically distinct but unidentified *Hypostomus* species have been recorded as established in the United States: these included populations in Indian Springs in Nevada; Hillsborough County in Florida; and the San Antonio River and San Felipe Creek in Texas (Courtenay and Deacon 1982; Courtenay et al. 1984, 1986; Courtenay and Stauffer 1990; Page and Burr 1991; López-Fernández and Winemiller 2005). A population of an unidentified *Hypostomus* species is firmly established in Hawaii (Devick 1991a, b). Reported from Arizona, Colorado, Connecticut, Louisiana, and Pennsylvania. Failed in Connecticut, Massachusetts, and Pennsylvania."

This species was not found for sale from U.S.-based online aquarium retailers and it does not appear to be in trade in the United States.

Means of Introduction into the United States

This species has not been reported as introduced or established in the United States. However, unidentified members of the genus are established in the United States.

From Nico et al. (2018):

"Members of this genus have been introduced through a combination of fish farm escapes or releases, and aquarium releases (Courtenay and Stauffer 1990; Courtenay and Williams 1992). In Texas, the initial introduction occurred when *Hypostomus* entered local streams after escaping from pool and canal systems of the San Antonio Zoological Gardens in or before 1962 (Barron 1964); the Comal County introduction was probably due to an aquarium release (Whiteside and Berkhouse 1992)."

Remarks

From Nico et al. (2018):

"The genus *Hypostomus* contains about 116 species (Burgess 1989). Highlighting the serious need for additional taxonomic and systematic work, Armbruster (1997) concluded that it is currently impossible to identify most species in the genus. Several apparently different *Hypostomus* species have been collected in the United States but not definitively identified to

species level (Page and Burr 1991; Courtenay and Stauffer 1990). Distinguishing characteristics of the genus and a key to loricariid genera were provided by Burgess (1989) and Armbruster (1997). Photographs appeared in Burgess (1989) and Ferraris (1991). *Hypostomus* has officially replaced the generic name *Plecostomus*. The genus was included in the key to Texas fishes of Hubbs et al. (1991) and several identifying traits were also given by Page and Burr (1991)."

According to Fricke et al. (2018), *H. regani* was originally described as *Plecostomus regani*. Both names were used in searching for information for this report.

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 Loricariidae
Subfamily Hypostominae
Genus *Hypostomus*
Species *Hypostomus regani* (Ihering, 1905)"

"Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 41.0 cm SL male/unsexed; [Freitas-Souza et al. 2016]; max. published weight: 955.00 g [Freitas-Souza et al. 2016]"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal; pH range: 6.0 - 7.0; dH range: ? - 15."

"[…] 22°C - 25°C [Baensch and Riehl 1991; assumed to represent recommended aquarium water temperature]"

Climate/Range
From Froese and Pauly (2018):

"Tropical; […]"

Distribution Outside the United States
Native
From Fricke et al. (2018):

"Paraná, Paraguay and Uruguay River basins: Argentina, Brazil, Paraguay and Uruguay."

Introduced
From Mendes-Neto et al. (2011):

"The occurrence of *Hypostomus regani* in the São Francisco River Basin is reported for the first time here."

Means of Introduction Outside the United States
From Mendes-Neto et al. (2011):

"*H. regani* likely invaded the São Francisco River Basin after the transposition of the Piumhi River (Moreira-Filho and Buckup 2005)."

"We must stress here that *Hypostomus regani* is not a great migrator, as with the majority of Loricariidae, the anatomy of which imposes difficulties on the movement of these fish in overcoming physical barriers, such as waterfalls (Paiva et al. 2005)."

Short Description
From Dias and Zawadzki (2018):

"Body with spots, dorsal and caudal fins with conspicuous spots or vermiculated"

"Body with roundish spots"

"Body with light spots"

"Pectoral-fin spine longer than pelvic-fin spine length"

"Caudal fin notched"

"Premaxilla with 92–99 teeth; 93–106 teeth in dentary; dentary width 19.1–21.3% of head length"

Biology

From Alexandre et al. (2010):

"*Parodon nasus* and *H. regani* are known to be periphyton scrapers, which show preference for stony substrates where algae and bryophytes are abundant (Shibatta et al., 2007). The latter species has been found in the disturbed Pardo River, where it is one of the few fish that survived after the establishment of the great sugar mills (Favaretto et al., 1981). At the sites where *P. nasus* and *H. regani* occurred, the substrate was composed of coarse gravel and large boulders, indicating that it was an important component determining the presence of these species, where algal productivity was probably favored by the increased nutrient levels."

From Delariva and Agostinho (2001):

"Although *H. regani* consumed great quantities of organic detritus as well, it ingested plant detritus, sediment, and periphytic organisms such as bryozoans, sponges and aquatic insect larvae."

From Mattias et al. (1998):

"Fish of the genus *Hypostomu*s are facultative air-breathers when the water O_2 is reduced [Carter and Beadle 1931; Carter 1935]. These fish utilize the stomach, which contains numerous blood capillaries in the fundic region [Silva 1965], as the accessory respiratory organ."

"In well-oxygenated water, *H. regani* did not breathe air. The onset of aerial respiration occurred at inspired oxygen tensions (Pi_{O2}) between 50 and 60 mmHg; there was no correlation between body mass and the O_2 threshold for air-breathing."

Human Uses

This species is on the current stock list for British aquarium retailer Wharf Aquatics (Wharf Aquatics 2018).

Diseases

From Molina et al. (2016):

"In this study, an analysis of *Trypanosoma* sp. infections by individual species of fishes demonstrated the following prevalence and density results: […] for *Hypostomus regani*, 44.0% and 0.78 parasites/µl of blood (standard deviation = 0.63) […]"

From Zica et al. (2012):

"During a parasitological survey in *H. iheringii* (Regan, 1908), *H. regani* (Ihering, 1905), and *H. strigaticeps* (Regan, 1907), specimens of *U*[*nilatus*] *unilatus* were collected from the gill filaments."

From Kohn et al. (2000):

"*Paranaella*, a new microcotyline monotypic genus, is erected to accommodate *Paranaella luquei* sp. n., parasite of gill filaments from *Hypostomus* sp., *Hypostomus regani* (Ihering) and *Rhinelepis aspera* Spix et Agassiz (Loricariidae) from the Paraná River, Brazil."

From Silva-Souza and Eiras (2002):

"It is described the histopathology of the infection of *Tilapia rendalli* (Osteichthyes, Perciformes, Cichlidae) and *Hypostomus regani* (Osteichthyes, Siluriformes, Loricariidae) by lasidium larvae of *Anodontites trapesialis* (Mollusca, Bivalvia, Mycetopodidae). The larvae were encysted within the epidermis of the host, being surrounded by a thin hyaline membrane, 3-6 µm thick, of parasite origin. A proliferative host cell reaction did not occur. The histopathology of the infection shows that the lesions induced by the parasites are minimal. However, the numerous small lesions produced by the release of the larvae may provide optimal conditions for the infection by opportunistic pathogens, namely fungus, which may eventually cause the death of the host."

From Zica et al. (2011):

"The aim of this study was to report the occurrence of *Austrodiplostomum compactum* metacercariae in the eyes of 98 specimens of loricariid fish (*Hypostomus ancistroides*, *H. hermanni*, *H. iheringii*, *H. margaritifer*, *H. regani*, *H. strigaticeps*, *Hypostomus* sp. and *Megalancistrus parananus*) from the Chavantes reservoir (23°07'36"S and 49°37'35"W) located in the rio Paranapanema, upper Paraná river basin, municipality of Ipaussu, São Paulo State, Brazil."

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

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

No information is available on impacts of *H. regani* where it has been introduced in the São Francisco River Basin in Brazil. Nico et al. (2018) discuss impacts of unidentified members of the genus that are established in the United States:

"The effects of these loricariid catfish is largely unknown. In Texas, Hubbs et al. (1978) reported possible local displacement of algae-feeding native fishes such as *Campostoma anomalum* by *Hypostomus*, and López-Fernández and Winemiller (2005) suggest that reductions in *Dionda diaboli* abundance in portions of San Felipe Creek are due to population increases of *Hypostomus*. Because of their abundance in Hawaii, introduced *Hypostomus*, *Pterygoplichthys*,

and *Ancistrus* may compete for food and space with native stream species (Devick 1989; Sabaj and Englund 1999).”

4 Global Distribution

Figure 1. Known global distribution of *Hypostomus regani*, reported from South America. Map from GBIF Secretariat (2017). No georeferenced occurrences were available from portions of the species range in Uruguay and Argentina.

5 Distribution within the United States

There is currently no known distribution of *Hypostomus regani* within the United States; however, unidentified species of *Hypostomus* are established in Nevada, Florida, Texas, and Hawaii.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was high in peninsular Florida and along the Gulf Coast to eastern Texas. The match was medium throughout the Southeast and coastal Mid-Atlantic from New Jersey to Texas. The remainder of the contiguous United States had a 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 *H. regani* was 0.043.

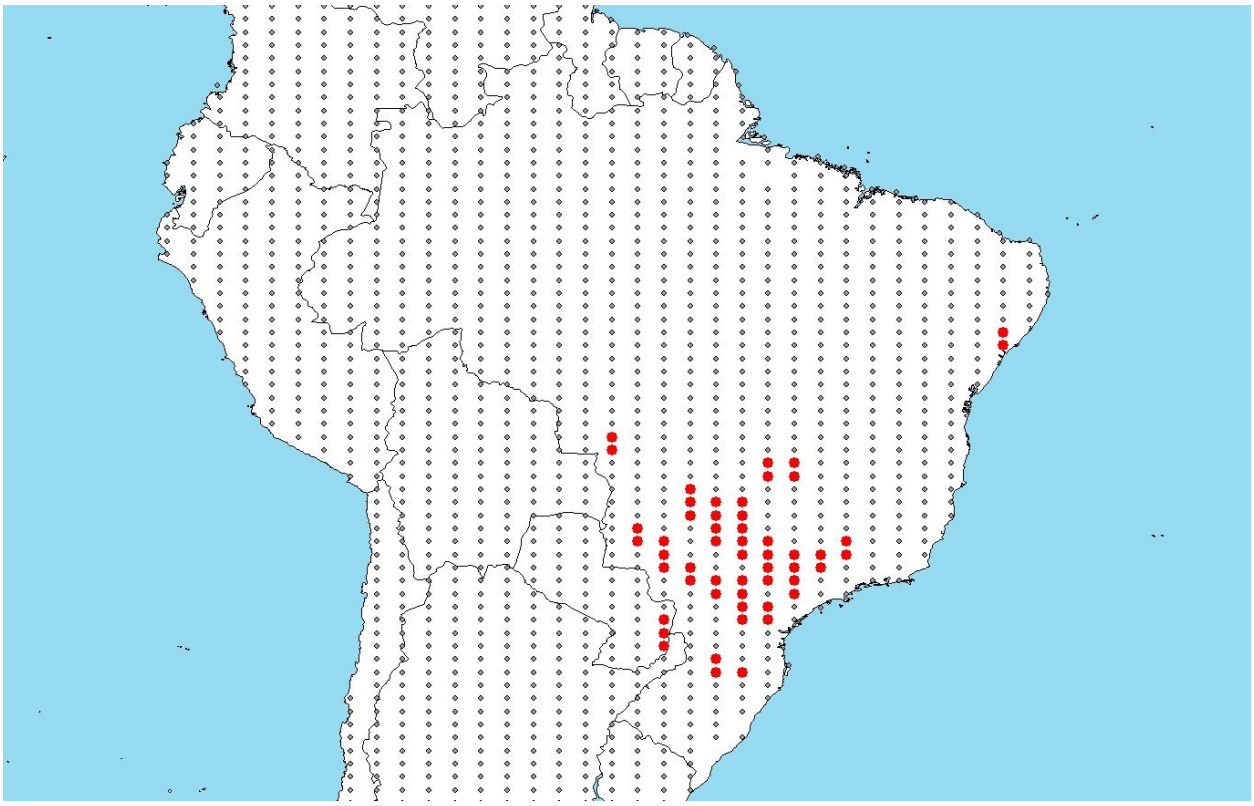

Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Brazil, Paraguay) and non-source locations (gray) for *Hypostomus regani* climate matching. Source locations from GBIF Secretariat (2017).

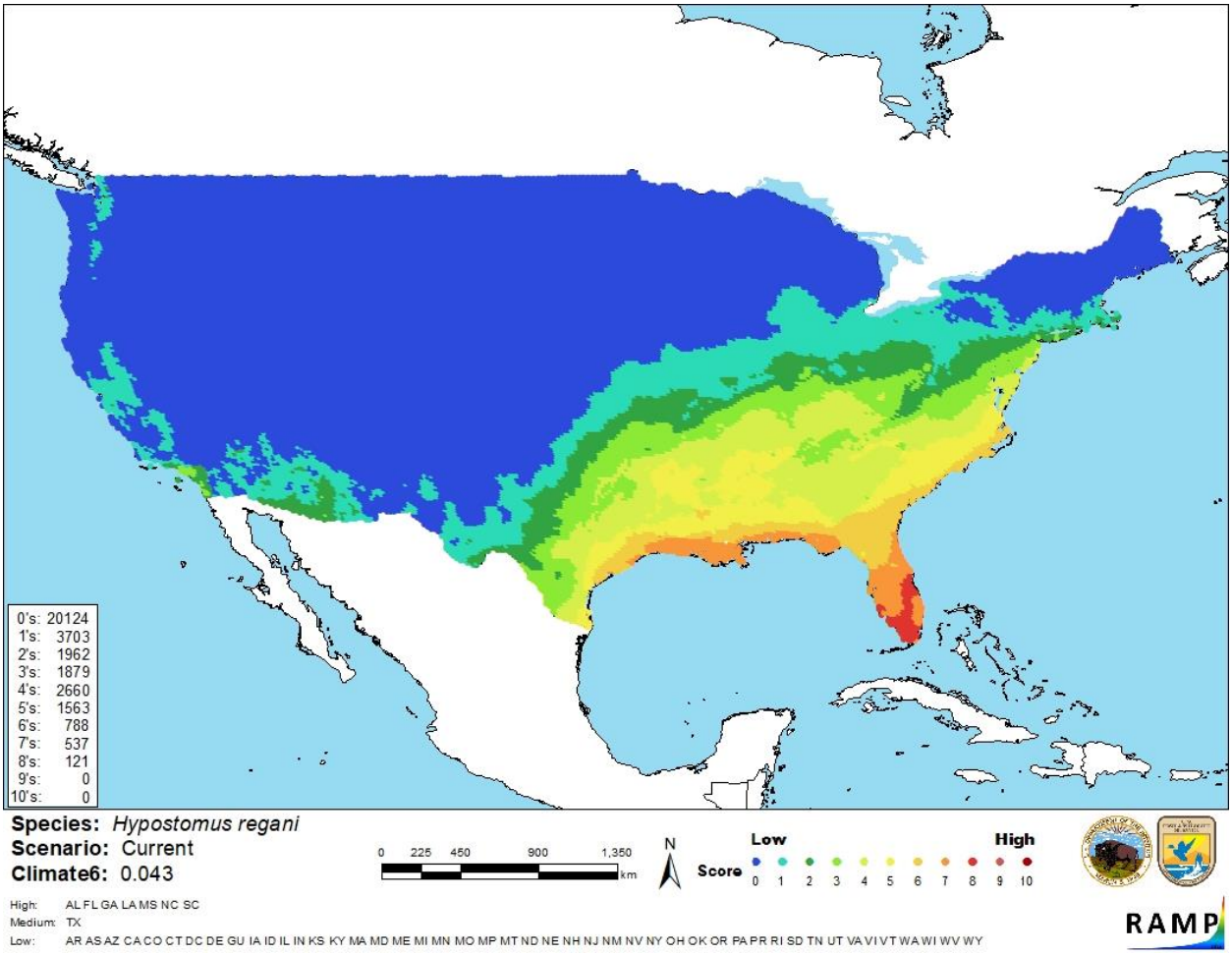

Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Hypostomus regani* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0= Lowest match, 10= Highest match.

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 was available on the biology and ecology of *Hypostomus regani*. However, no information was available on impacts of introduction. Unidentified species of *Hypostomus* have become established in the United States, and it is possible that one or more of those populations could be identified later as *H. regani*. There is considerable uncertainty about the taxonomy of this genus and about species-level identification. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Hypostomus regani is a catfish native to the Paraná, Paraguay and Uruguay River basins of South America. The species is present in the aquarium trade internationally, but it was not found in trade in the United States. *H. regani* has been introduced in the São Francisco River basin in eastern Brazil, but no information is available on impacts of the introduction. Additionally, unidentified species of *Hypostomus* are established in the United States. Climate match to the contiguous United States was medium overall, with high match in peninsular Florida and along the Gulf Coast. It is possible that the climate match could increase if more georeferenced occurrences from the southern portion of the species range became available. Because of the lack of documented introduction history and substantial taxonomic uncertainty, certainty of this assessment is low and overall risk is uncertain.

Assessment Elements

- **History of Invasiveness: None Documented**
- **Climate Match: Medium**
- **Certainty of Assessment: Low**
- **Overall Risk Assessment Category: Uncertain**

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