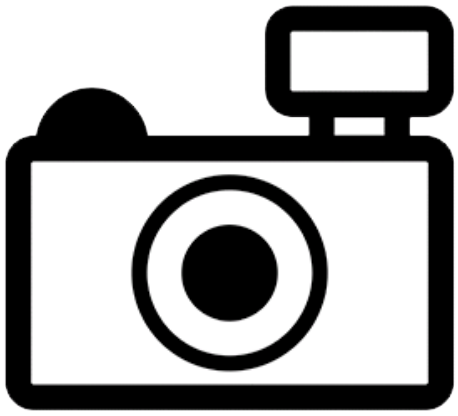
Hypostomus niceforoi (a catfish, no common name)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2013
Revised, September 2018
Web Version, 4/1/2019



1 Native Range and Status in the United States

Native Range

From Matamoros et al. (2016):

"*Hypostomus niceforoi* is a species native to the Andean region from Colombia to Peru in the Amazon and Orinoco basins […]"

Status 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."

From Cook-Hildreth et al. (2016):

"Although the San Marcos River *Hypostomu*s was identified as *Hypostomus plecostomus* (Linnaeus, 1758) in some earlier literature, the local loricariid that we studied from the San Marcos River has been declared to not be *H. plecostomus,* and has been tentatively identified (personal communication from Jonathan Armbruster at Auburn University) as *Hypostomus* cf. *niceforoi* (Fowler, 1943)."

There is no indication that this species is currently in trade in the United States, based on a search of online aquarium retailers.

Means of Introduction into the United States

No details are available on means of introduction into the San Marcos River of *Hypostomus niceforoi*.

From Hoover et al. (2014):

"Three pathways are known for the introduction of suckermouth catfishes: biocontrol, aquaculture (including suppliers for the commercial aquarium trade), and the aquarium hobby (including individual pet owners)."

From Cook-Hildreth et al. (2016):

"Because of their hardy nature and their reputation as cleaners, several genera of loricariids are routinely imported into North America for the aquarium trade (Walker 1968). Interest in loricariids by aquarists has grown substantially in the last several decades. Hoover et al. (2014) found only three loricariid genera addressed in the popular aquarium literature between 1933 and 1935, but found 35 genera addressed between 1987 and 2009. Loricariids are also sometimes intentionally released into freshwaters outside their native range by natural resource managers hoping to control algae and aquatic plants (TISI 2014)."

"Release of loricariids has led to established populations in several states in the USA (Hoover et al. 2004), including Nevada, Hawaii, Texas, Arizona, Colorado, Connecticut, Louisiana, Florida, and Pennsylvania (Courtenay and Deacon 1982)."

"The first record of loricariids in the San Marcos River, a sensitive habitat that is home to several state and federally listed endemic taxa, was in the early 1990's (Perkin 2009; Perkin and Bonner 2011)."

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)."

From Matamoros et al. (2016):

"[…] in all likelihood *H. niceforoi* is a species complex that will be divided into multiple species in the future."

From Velasquez and Chocano (2016):

"The species is listed as Data Deficient due to the lack of data on its exact range, population size and threats."

According to Fricke et al. (2018), *H. niceforoi* was originally described as *Hemiancistrus niceforoi*. 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 niceforoi* (Fowler, 1943)"

"Current Standing: valid"

From Fricke et al. (2018):

"**Current status:** Valid as *Hypostomus niceforoi* (Fowler 1943). Loricariidae: Hypostominae."

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length: 13.5 cm SL male/unsexed; [Weber 2003]"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal."

Climate/Range

From Froese and Pauly (2018):

"Tropical"

Distribution Outside the United States

Native

From Matamoros et al. (2016):

"*Hypostomus niceforoi* is a species native to the Andean region from Colombia to Peru in the Amazon and Orinoco basins […]"

Introduced

From Matamoros et al. (2016):

"We document the first record of *Hypostomus* cf. *niceforoi* in Central America. Two specimens of these suckermouth armored catfishes were collected in Lake Nicaragua (Nicaragua) and identified as *H.* cf. *niceforoi*."

Means of Introduction Outside the United States

From Matamoros et al. (2016):

"As true in many places around the world, the establishment of armored catfishes in Nicaragua is likely related to the aquarium trade (Marenco 2010)."

Short Description

From Matamoros et al. (2016):

"Identification of the specimens as *Hypostomus niceforoi* […] is based on the presence of (1) long jaws with dentaries approaching a 180° angle, (2) many teeth (>60), and (3) a color pattern of dark spots on the body, fins, and abdomen."

Biology

From Velasquez and Chocano (2016):

"It lives in rivers and streams with white and clear waters, gravel, rocks, permanent pools, mountain rivulets. It feeds on periphyton and decaying organic matter."

From Cook-Hildreth et al. (2016):

"Fecundity [in the San Marcos River, Texas] was similar to *Hypostomus* spp. in the native range. There did not appear to be any synchronicity of spawning between individual fish within the invasive population, and there was a hint in the oocyte size-frequency data that some of the fish may be spawning multiple times per year. The timing of spawning activity in the novel range was seasonally inverted compared to the pattern typical of loricariids in the native range. The season of peak reproductive activity was also less distinct in the novel range than in the native range, and the period of reproductive quiescence was more seasonally compressed than in the native range. We provide data and supporting arguments suggesting that photoperiod is the primary proximate factor triggering the onset of reproductive quiescence, as well as a return to reproductive activity for these fish in both their native and novel ranges."

Human Uses

From Velasquez and Chocano (2016):

"The species is not utilized."

From Cook-Hildreth et al. (2016):

"Because of their hardy nature and their reputation as cleaners, several genera of loricariids are routinely imported into North America for the aquarium trade (Walker 1968). Interest in loricariids by aquarists has grown substantially in the last several decades. Hoover et al. (2014) found only three loricariid genera addressed in the popular aquarium literature between 1933 and 1935, but found 35 genera addressed between 1987 and 2009. Loricariids are also sometimes intentionally released into freshwaters outside their native range by natural resource managers hoping to control algae and aquatic plants (TISI 2014)."

Diseases

No information available. No OIE-reportable diseases (OIE 2019) have been documented in this species.

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

From Matamoros et al. (2016):

"While the effects of *H.* cf. *niceforoi* on their biotic and abiotic environment [in Nicaragua] has not been quantified, local fisherman claim that native fish populations have experienced declines since the introduction and discovery of armored catfish (authors, pers. obs.). One immediate and obvious negative effect to the local economy is that fisherman are severely damaging their fishing gear when *H.* cf. *niceforoi* is captured (Marenco 2010). The armored and spiny bodies of these fishes become entangled in nets, typically causing tears when they are removed."

The following quotation refers to members of the genus *Hypostomus* generally, and not specifically *H. niceforoi*.

From Nico et al. (2018):

"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*."

4 Global Distribution

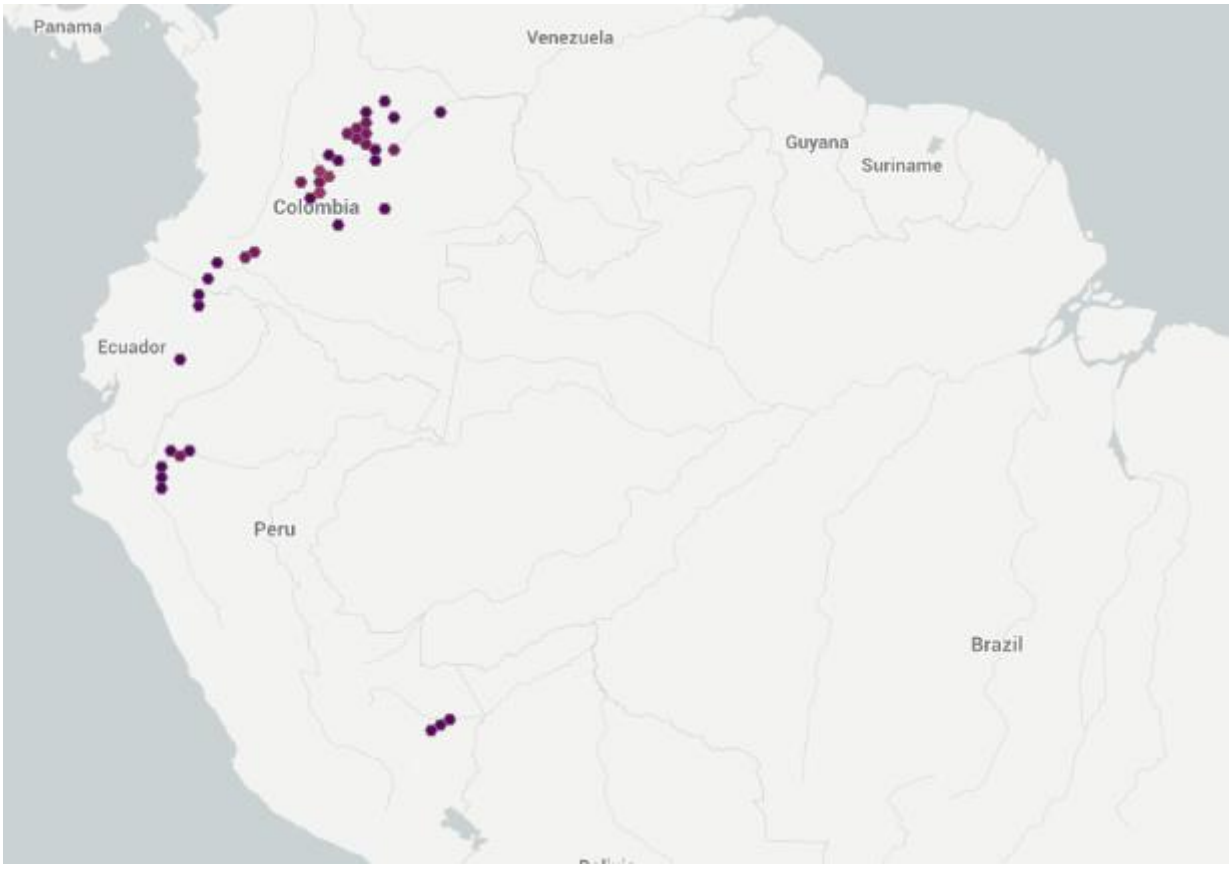


Figure 1. Known global distribution of *H. niceforoi*, reported from northwestern South America. Map from GBIF Secretariat (2017). Georeferenced occurrences are not available from GBIF Secretariat (2017) for established populations of *H.* cf. *niceforoi* in Nicaragua and the United States.

5 Distribution within the United States

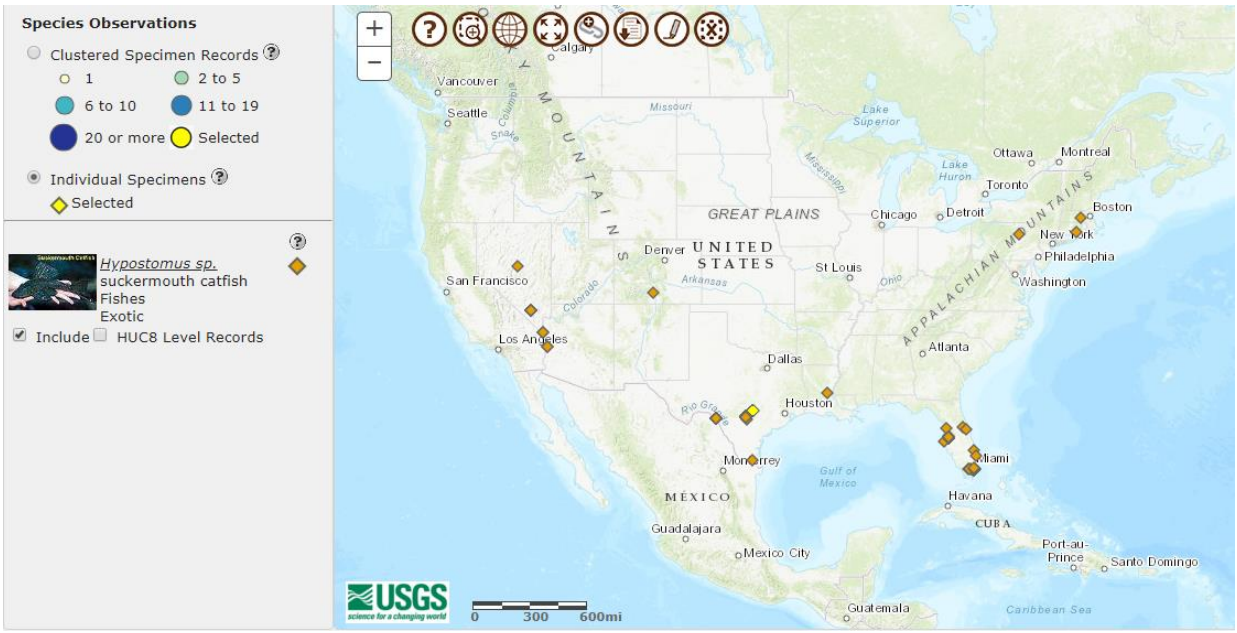


Figure 2. Known distribution of the genus *Hypostomus* in the contiguous United States. Occurrences identified as *H.* cf. *niceforoi* by Cook-Hildreth et al. (2016) are highlighted in yellow. Unknown species in the genus *Hypostomus* have also been reported on the island of Oahu, Hawaii. Map from Nico et al. (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was high in central and northern Texas, extending into Oklahoma and Kansas. There was also a small area of high match in central Georgia. Medium matches surrounded the high match areas in the south-central United States, and also extended along the Atlantic Coast from southern New Jersey to southeastern Florida, and along the Pacific Coast from the U.S.-Mexico border to northern California and around Seattle, Washington. Climate match was low in the northeastern United States, along the Appalachian Mountain range, and in much of the north-central and western contiguous United States. 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. niceforoi* was 0.082.

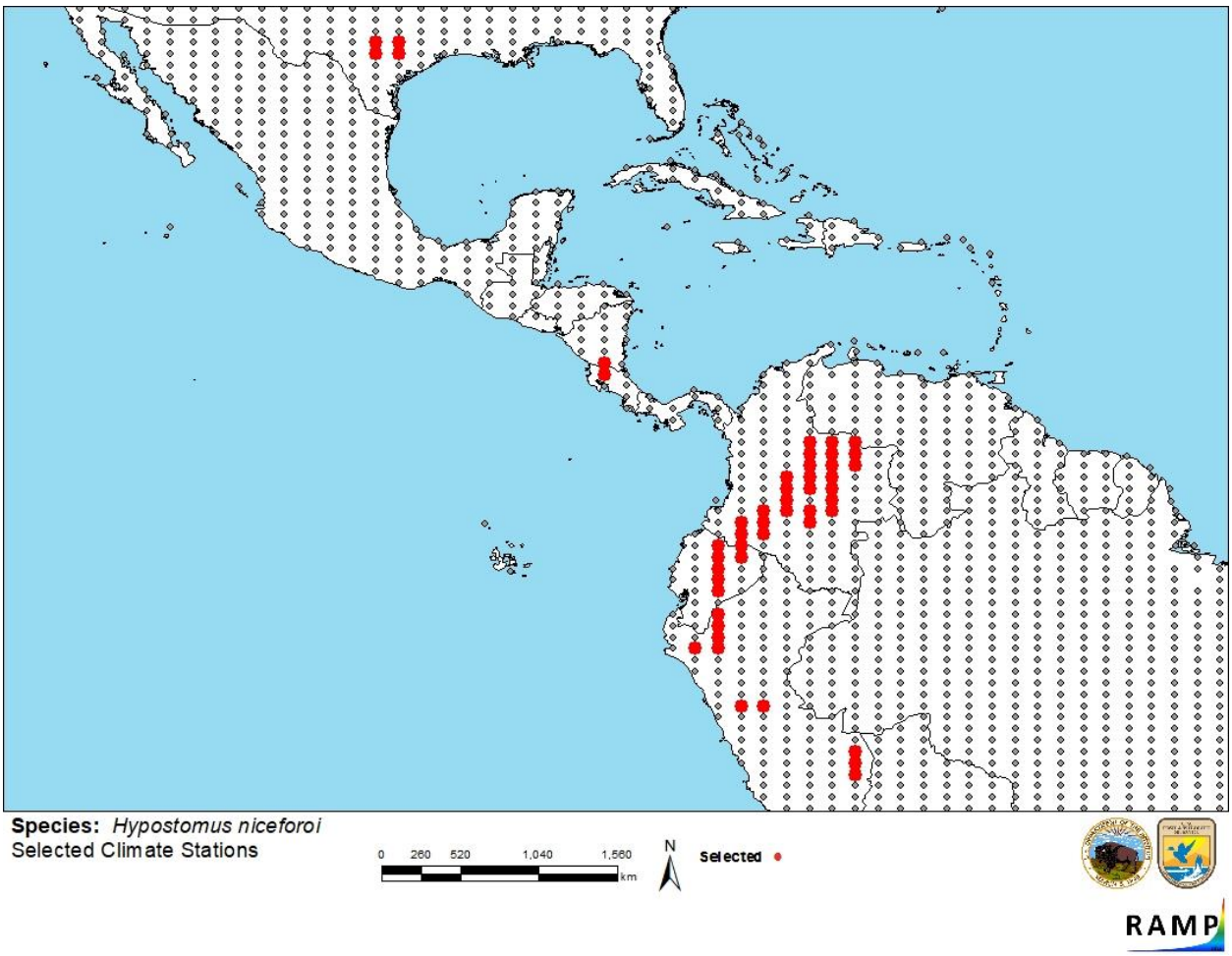


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; United States, Nicaragua, Costa Rica, Colombia, Ecuador, Peru) and non-source locations (gray) for *H. niceforoi* climate matching. Source locations from GBIF Secretariat (2017). Additional source locations from Cook-Hildreth et al. (2016; United States), Matamoros et al. (2016; Nicaragua, Costa Rica), and VertNet (2018; central Peru).

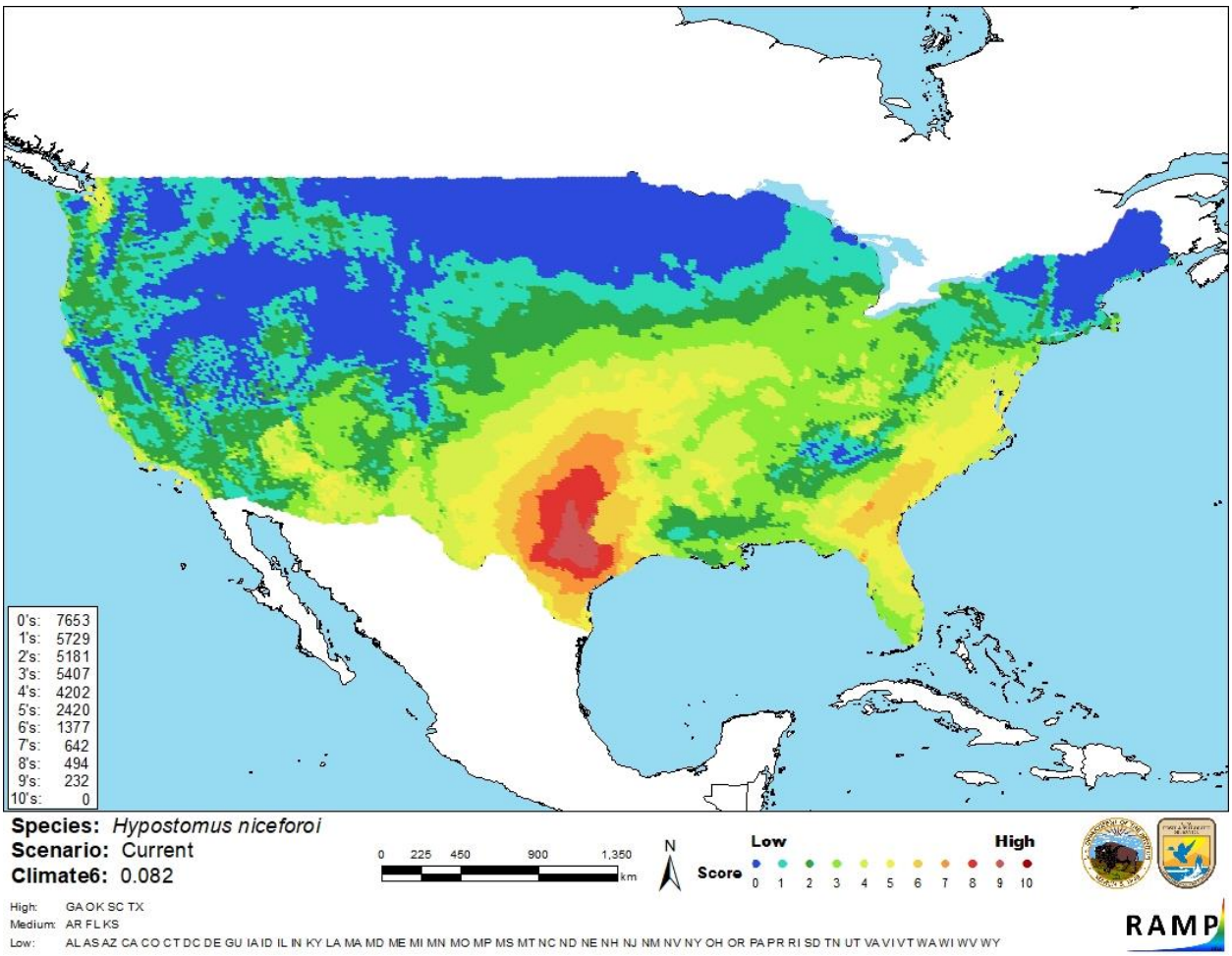


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *H. niceforoi* in the contiguous United States based on source locations reported by GBIF Secretariat (2017), Cook-Hildreth et al. (2016), Matamoros et al. (2016), and VertNet (2018). 0= Lowest match, 10= Highest match.

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

Some information is available on the biology, ecology, and distribution of *H. niceforoi*. Some uncertainty has been expressed over the exact native distribution, and there is doubt over the identity of introduced populations. Little information is available about the impacts of established populations on the local biota. Taxonomy of the genus *Hypostomus* needs further study and revision. Because of all these sources of uncertainty, the certainty of assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Hypostomus niceforoi is a catfish native to Colombia, Ecuador, and Peru. Although species identification is not certain, it is currently believed to be established in the San Marcos River in Texas, and in southwestern Nicaragua. Although no evidence was found to suggest the species is currently in trade in the United States, the aquarium trade is an important pathway for introductions of species in the genus *Hypostomus*. Anecdotal impacts of *H.* cf. *niceforoi* in Nicaragua include declines in native fish populations and damage to fishing gear. However, no impacts have yet been quantified from introduced populations of *H.* cf. *niceforoi*. Therefore, history of invasiveness is classified as "none documented." Climate match to the contiguous United States was medium overall, with high matches across large areas of Texas and Oklahoma, and small areas of Kansas and Georgia. Due to taxonomic uncertainty and lack of research on impacts of introduction, the certainty of assessment is low. Overall risk posed by *H. niceforoi* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **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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