

Armored Catfish (*Hypostomus watwata*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, February 2018, March 2020
Web Version, 5/1/2020

Organism Type: Fish

Overall Risk Assessment Category: Uncertain

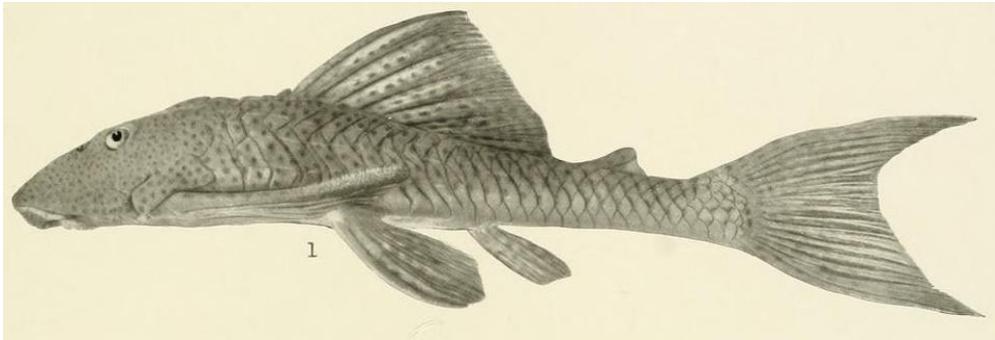


Photo: Eigenmann (1912; as *Plecostomus watwata*). Public domain.

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

“South America: Guianan coastal drainages from the Oyapock River [French Guiana] to the Demerara River [Guyana; Weber 2003].”

Status in the United States

Although the validity of the species *Hypostomus watwata* has been confirmed (Weber et al. 2012; Fricke et al. 2020), the identity of individuals present in the United States is uncertain.

From Neilson (2020):

“**Status** [for *Hypostomus* sp. (*watwata* group) in the United States]: Established in Hawaii.”

From Sabaj and Englund (1999):

“On O‘ahu, *Hypostomus* occurs in lower Nu‘uanu, Waiawa, Kalihi, Mānoa, Kamo‘oali‘i (Kāne‘ohe), and Kāwā Streams, and can dominate the low-elevation areas of streams where it has been introduced.”

According to Englund (2002), *Hypostomus* cf. *watwata* was first reported in Hawaii in 1984.

A search of online aquarium retailers found no evidence that this species is in trade in the United States, although the means of introduction (see below) indicate that it may have been in trade at one time.

Hoover et al. (2014) reports “During the 1970s, more than a dozen suckermouth catfish genera were “clean listed” by US authorities as low-risk wildlife and no state prohibited their sale (Conroy 1975). This included armadillo del rio [*Hypostomus* spp.] and sailfin catfishes, which at that time appeared to present no significant environmental impacts.” However, Conroy must have been referring to a proposed rule that was never finalized. There was no “clean list” by U.S. authorities.

Means of Introductions in the United States

From Neilson (2020):

“**Means of Introduction** [for *Hypostomus* sp. (*watwata* group)]: Aquarium release”

From Englund (2002):

“Aquarium release or with aquarium plants”

Remarks

The common name “armored catfish” can be applied to multiple species.

Fricke et al. (2020) report *Hypostomus verre* as a synonym for *Hypostomus watwata*, and Froese and Pauly (2019) also report *Plecostomus watwata* as a synonym. All names were used in searching for information for this report.

From Weber et al. (2012):

“All analysed populations of *H. watwata* (*H. watwata* group), from the Oyapock [French Guiana] to the Suriname [Suriname] basins, showed also a unique and exclusive allele at locus *Ck*, confirming the specific identity of *H. watwata*.”

From Neilson (2020):

“The genus *Hypostomus* is the largest in the family Loricariidae, containing over 130 species and many undescribed forms (Armbruster 2004). Several apparently different *Hypostomus* species have been collected in the United States but have not been definitively identified to species (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); a redescription [*sic*] of the genus and list of included species was presented in Armbruster (2004). Highlighting the serious need for additional taxonomic and systematic work, Armbruster (1997, 2004) concluded that it is difficult to identify most species in the genus, and that there is no unique characters [*sic*] to diagnose the genus. 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); several identifying traits were also given by Page and Burr (1991), although in a later edition (Page and Burr 2011) those authors indicate the difficulty of identifying specimens to species.”

From Sabaj and Englund (1999):

“Taxonomic studies of *Hypostomus* that may be useful for identifying the Hawaiian population are those of Boeseman (1968, 1969) who recognized 15 species and three subspecies in Suriname. Boeseman (1968) separated the Suriname species into two distinct groups, the *H. plecostomus* (Linnaeus) and *H. watwata* Hancock groups, by comparing ratios between the minimum depth of the caudal peduncle and interdorsal length (i.e., distance measured between base of last dorsal-fin ray and origin of adipose-fin spine). Based on Boeseman’s ratios, the Hawaiian specimens are referable to the *Hypostomus watwata* group (depth of caudal peduncle 1.8–2.7 in interdorsal length vs. 1.35–1.70 for species of the *H. plecostomus* group).”

“Unfortunately, the Hawaiian specimens are not clearly identifiable as any of the eight Surinamese species assigned to the *Hypostomus watwata* group. Based on descriptions in Boeseman (1968), the Hawaiian specimens [...] most closely resemble *H. corantijni* with respect to the following: post-occipital plate single, depressed dorsal fin falling considerably short of origin of adipose fin spine, depth of caudal peduncle 2.05–2.41 in interdorsal length (2.1–2.3 in *H. corantijni*), mandibular ramus 1.97–2.32 in interorbital width (compared to 2.2–2.5), and mandibular teeth about 46–59 per ramus (compared to 40–60). However, the cleithral width of the Hawaiian specimens (3.19–3.32 into SL) falls outside the range reported for *H. corantijni* (3.50–3.85). The Hawaiian specimens are not readily assignable to any of the species native to southern Brazil and Paraguay that were recently described and revised by Weber (1986a, 1986b, 1987), Reis et al. (1990) and Mazzoni et al. (1994). There is not enough taxonomic information available to compare the Hawaiian specimens to the numerous species of *Hypostomus* that occur throughout the Amazon and Orinoco basins.”

“Coloration of species in the *Hypostomus watwata* group is similar and shared by many other species of *Hypostomus* outside Suriname. [...] According to Boeseman (1968), dusky spots are present on the ventral surfaces in *H. watwata* (but become vague or disappear in old or badly preserved specimens), and are lacking in *H. corantijni*. The ventral surface of the Hawaiian specimens is covered with dusky round spots. However, the length of the mandibular ramus relative to the interorbital width in the Hawaiian specimens precludes their identification as *H. watwata* assuming this character is useful for discriminating species of *Hypostomus*.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2020):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysii
Order Siluriformes
Family Loricariidae
Subfamily Hypostominae
Genus *Hypostomus*
Species *Hypostomus watwata*

From Fricke et al. (2020):

“**Current status:** Valid as *Hypostomus watwata* Hancock 1828. Loricariidae: Hypostominae.”

“*verres*, *Hypostomus* [...] **Current status:** Synonym of *Hypostomus watwata* Hancock 1828. Loricariidae: Hypostominae.”

Size, Weight, and Age Range

From Froese and Pauly (2019):

“Max length : 45.0 cm SL male/unsexed; [Galvis et al. 1997]”

Environment

From Froese and Pauly (2019):

“Freshwater; demersal. [...] 26°C - 29°C [Baensch and Riehl 1997; assumed to represent recommended aquarium water temperatures]”

“Coastal species which also occur [*sic*] in brackish waters of the lower reaches of rivers. [...] Benthic [Mundy 2005].”

Climate

From Froese and Pauly (2019):

“Tropical [...]”

Distribution Outside the United States

Native

From Froese and Pauly (2019):

“South America: Guianan coastal drainages from the Oyapock River [French Guiana] to the Demerara River [Guyana; Weber 2003].”

Introduced

No introductions known outside the United States.

Means of Introduction Outside the United States

No introductions known outside the United States.

Short Description

From Weber et al. (2012):

“*Hypostomus watwata* is mostly characterized by its slender appearance with long caudal peduncle. In addition this species possesses numerous platelets just bordering the posterior portion of the supraoccipital and the pterotic-supracleithrum.”

From Sabaj and Englund (1999):

“According to Boeseman (1968), dusky spots are present on the ventral surfaces in *H. watwata* (but become vague or disappear in old or badly preserved specimens) [...]”

From Neilson (2020):

“*Hypostomus* can be distinguished from *Pterygoplichthys* (another loricariid common in the aquarium trade that has often been misidentified as *Hypostomus*) by the number of dorsal fin rays (7 vs 9-14 in *Pterygoplichthys*). In Hawaii, introduced *Hypostomus* can be distinguished from the sympatric introduced *Ancistrus* cf. *temminckii* by rough bony plates present along the snout margin (vs. plates absent in *Ancistrus*; Sabaj and Englund 1999).”

Biology

From Froese and Pauly (2019):

“Can be caught along the banks with muddy bottom occupied by plants like *Laguncularia racemosa*, *Avicennia germinans* and *Rhizophora mangle* [Le Bail et al. 2000]. [...] As part of its reproductive behavior, excavates and creates burrows for egg laying [Nico et al. 2009].”

From Hoover et al. (2014):

“[...] various *Hypostomus* species in their native range [...] have total fecundities of several thousand eggs, and batch fecundities of approximately 1000 eggs (Mazzoni and Caramaschi 1997).”

“In their native range, *Hypostomus* spp. also exhibit protracted spawning periods (e.g., > 5 months), usually coinciding with the warm rainy season, and asynchronous oocyte development, indicating serial spawning (Mazzoni and Caramaschi 1997).”

Human Uses

From Monks (2019):

“Another species, *Hypostomus watwata*, is also common in slightly brackish environments [...] While these fish sound like ideal additions to a low-salinity brackish aquarium alongside things like mollies, gobies, and dwarf cichlids, the problem is that they are not traded much, if at all [...]”

From Froese and Pauly (2019):

“Aquarium: commercial”

A search of online aquarium retailers found no evidence that this species is currently in trade in the United States, although the means of introduction suggest that it may have been in trade in the United States at one time.

Diseases

No information available. No OIE-reportable diseases (OIE 2020) have been documented for this species.

Threat to Humans

From Froese and Pauly (2019):

“Harmless”

3 Impacts of Introductions

Introductions of *H. watwata* have not been reported outside the United States and the *Hypostomus* species introduced to Hawaii has not been confirmed as *H. watwata*. The following quotations report impacts of *Hypostomus* introductions in general, rather than impacts specific to *H. watwata*.

From Neilson (2020):

“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).”

From Englund (2000):

“Native stream gobies are undoubtedly adversely affected by loricariid catfish through competition for food and space, and introduced parasites. Loricariid catfish found in Pearl Harbor streams are primarily algivores, but will also readily consume fish eggs (Sabaj and Englund 1999). Although habitat disturbance and other introduced fish are factors, native gobies such as *Awaous guamensis* were rare in the lower sections of Pearl Harbor streams (Waiawa and Waikele) containing very high densities of introduced armored catfish such as Waikele Stream.”

4 History of Invasiveness

The history of invasiveness for *Hypostomus watwata* is No Known Nonnative Population. *H. watwata* or a closely related species is established in Hawaii; the species identification remains uncertain due to the difficulty of distinguishing among members of the genus based on morphological characters. Thus, *H. watwata* cannot be confirmed as established outside its native range. This species appears to be rare in the aquarium trade, at least in recent years, so it does not meet the criteria for Low history of invasiveness. Low history of invasiveness would require evidence of trade of millions of individuals over a decade or more with no nonnative population establishment.

5 Global Distribution



Figure 1. Reported global distribution of *Hypostomus watwata*. Observations are reported from South America and the central Pacific Ocean (Hawaii). Map from GBIF Secretariat (2019). Reports from South America outside of Guianan river drainages are outside the described range of the species (Fricke et al. 2020) and were excluded from the climate matching analysis. Observations from Hawaii were also excluded from the climate matching analysis because the established population of *Hypostomus spp.* in that State has not been identified to the species level. No observations were reported for parts of the species range in Guyana.

6 Distribution Within the United States



Figure 2. Reported distribution of *Hypostomus spp.* (*watwata* group) in the United States. Map from Neilson (2020). Because the established populations (yellow points) of *Hypostomus spp.* in Hawaii have not been identified to the species level, they were excluded from the climate matching analysis.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean distance) was low throughout the contiguous United States. The highest (still low) matches occurred along the coast of peninsular Florida and the central Gulf Coast. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, indicating an overall low climate match (scores between 0.000 and 0.005, inclusive, are classified as low). All States had low individual Climate 6 scores.

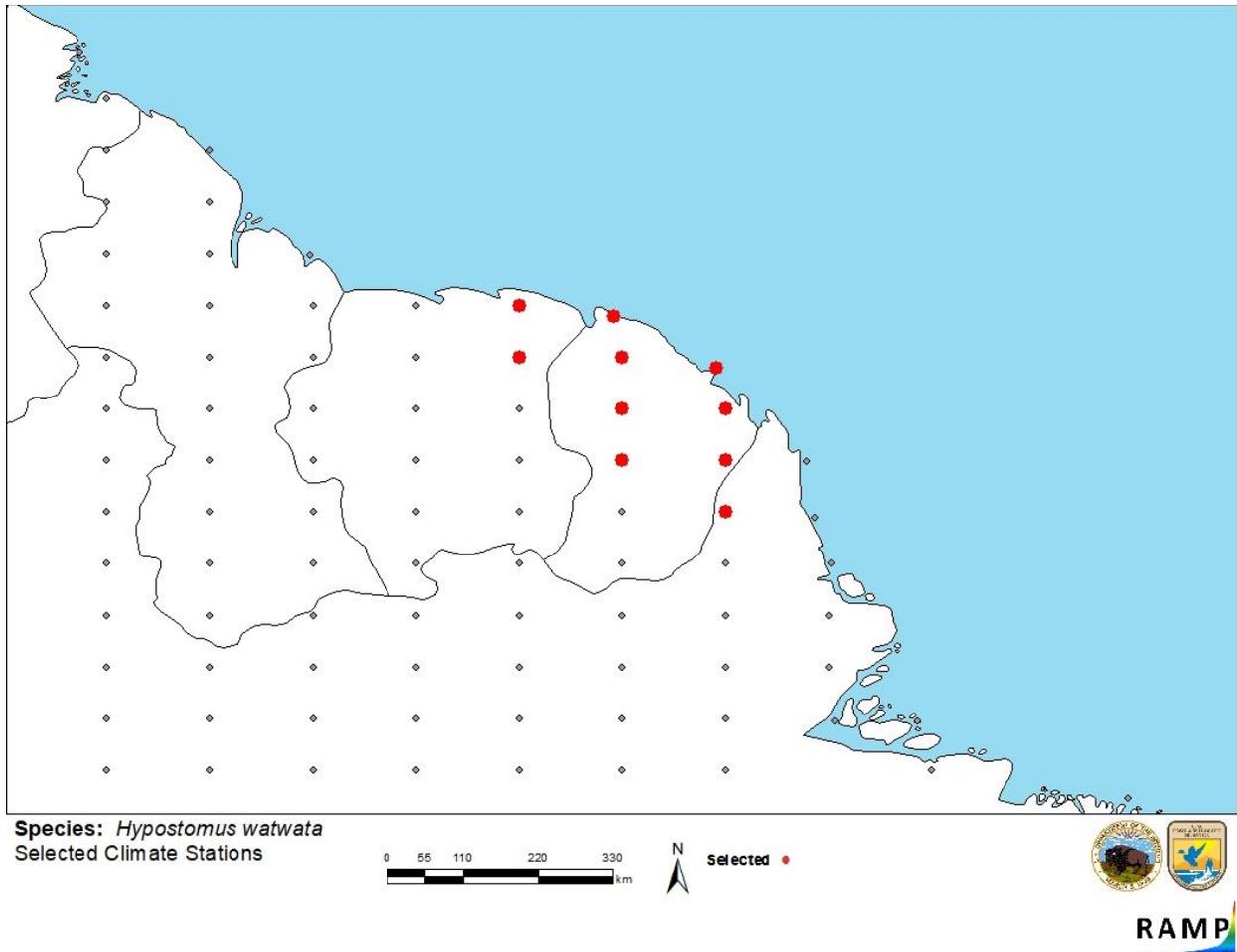


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in northeastern South America selected as source locations (red; French Guiana, Suriname, Brazil) and non-source locations (gray) for *Hypostomus watwata* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

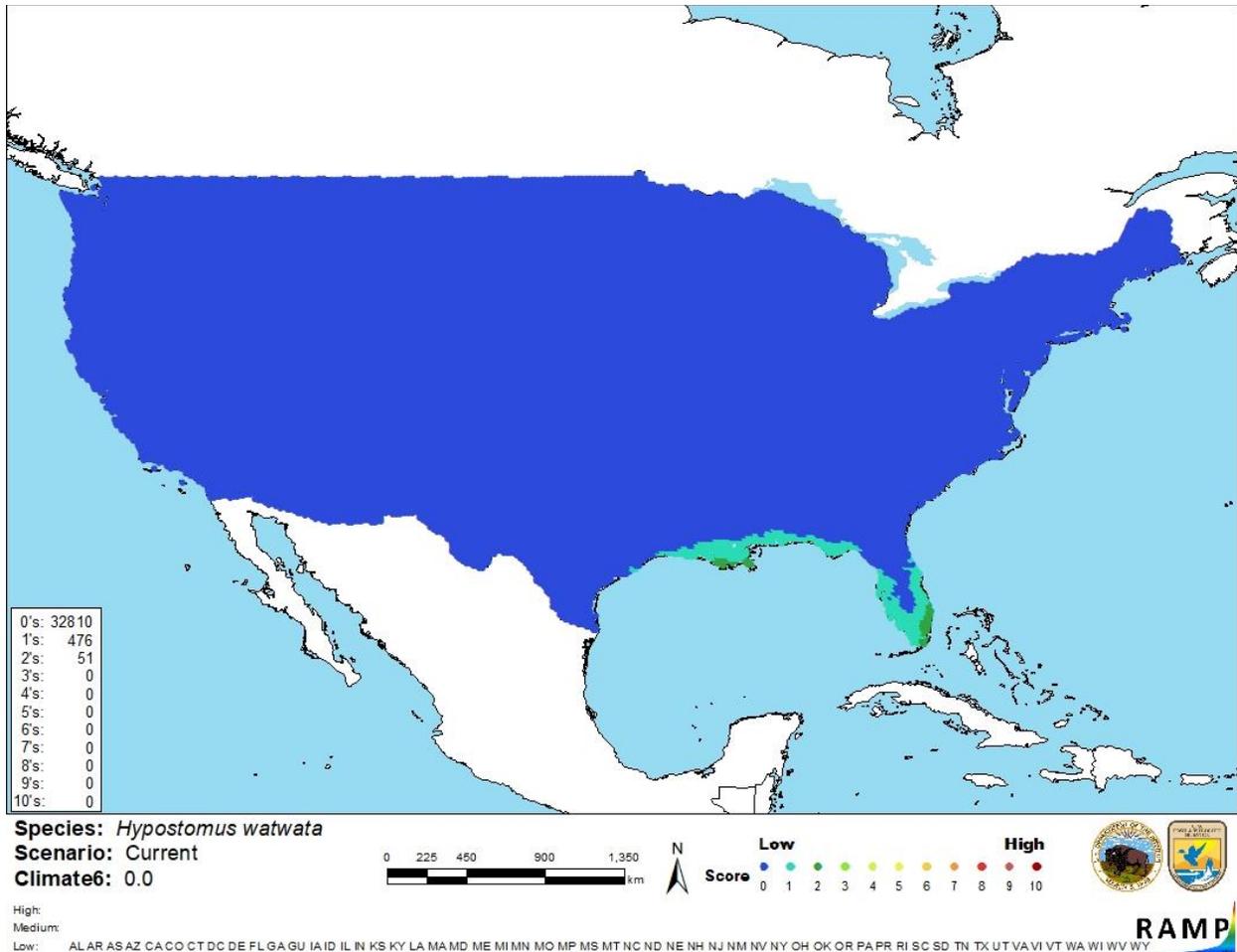


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Hypostomus watwata* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

Limited information is available on the biology and ecology of *Hypostomus watwata* as opposed to *Hypostomus* species in general. Georeferenced occurrences were not available for the full native range of *H. watwata*, and the introduced range is uncertain because the identity of the population of *Hypostomus* established in Hawaii has not been confirmed to the species level.

Although the Hawaiian population is referred to in the literature as *H. cf. watwata*, information on impacts of introduction in Hawaii cannot be confidently attributed to *H. watwata* without a more certain species identification. Certainty of this assessment is low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Hypostomus watwata, Armored Catfish, is native to coastal rivers in French Guiana, Suriname, and Guyana, occurring in fresh or brackish water at river mouths. The species is rare in the aquarium trade internationally. An established population of *Hypostomus* in Hawaii has been tentatively identified as *H. watwata*, but the identification has not been confirmed because of the difficulty of distinguishing between different *Hypostomus* species. Therefore, the history of invasiveness is No Known Nonnative Population. The climate match is low throughout the contiguous United States. The lack of species-specific biology, ecology, and introduction information leads to a low certainty of assessment. The overall risk assessment category for *Hypostomus watwata* 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: Difficult to distinguish between members of genus *Hypostomus*.**
- **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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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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