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

U.S. Fish & Wildlife Service, April 2017
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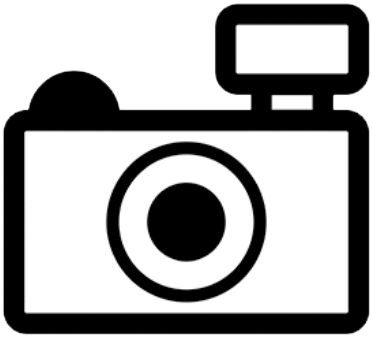

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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2016):

"South America: Middle and upper Uruguay River basin."

From Eschmeyer et al. (2017):

"Brazil and Uruguay."

Status in the United States

This species has not been reported as introduced or established in the U.S.

From Nico et al. (2017):

"Several morphologically distinct but unidentified *Hypostomu*s 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."

Means of Introductions in the United States

This species has not been reported as introduced or established in the U.S.

From Nico et al. (2017):

"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. (2017):

"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)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Loricariidae
Subfamily Hypostominae
Genus *Hypostomus*
Species *Hypostomus isbrueckeri* Reis, Weber and Malabarba, 1990"

From Eschmeyer et al. (2017):

"Current status: Valid as *Hypostomus isbrueckeri* Reis, Weber & Malabarba 1990. Loricariidae: Hypostominae."

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 24.6 cm SL male/unsexed; [Weber 2003]; max. published weight: 285.10 g [Zaniboni Filho et al. 2004]"

Environment

From Froese and Pauly (2016):

"Freshwater; demersal."

Climate/Range

From Froese and Pauly (2016):

"Temperate, preferred ?"

Distribution Outside the United States

Native

From Froese and Pauly (2016):

"South America: Middle and upper Uruguay River basin."

From Eschmeyer et al. (2017):

"Brazil and Uruguay."

Introduced

This species has not been reported as introduced or established outside of its native range.

Means of Introduction Outside the United States

This species has not been reported as introduced or established outside of its native range.

Short Description

From Reis et al. (1990):

"Upper caudal ray shorter than head length, 3.4-4.1 in SL; margin of caudal fin truncated to slightly concave, homogeneously dark, often with an yellow (whitish in alcohol preserved specimens) distal band on mature males"

"*Hypostomus isbrueckeri* sp. n. is distinguished from all other *Hypostomus* species by the presence in mature males of a yellow vertical band (whitish in alcohol-preserved specimens) in the distal margin of caudal fin."

Biology

No information available.

Human Uses

No information available.

Diseases

From Reis et al. (1990):

"Small hirudines are common external parasites of all *Hypostomus* species included in this study [of which *H. isbrueckeri* is one]."

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

Threat to Humans

From Froese and Pauly (2016):

"Harmless"

3 Impacts of Introductions

The following information discusses the impacts of loricariid, or suckermouth, catfishes in general. *Hypostomus isbrueckeri* is assumed to have similar traits and behave similarly to other members of its family, but there is no information available to confirm this assumption.

From Nico et al. (2017):

"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)."

From Hoover et al. (2014):

"Suckermouth catfishes burrow into banks and bottom sediments to create chambers in which females lay eggs and males guard the developing mass of eggs (Burgess 1989; Ferraris 1991). Burrows may be especially evident in highly disturbed urban ponds (ERDC) and streams (Tompkins 2004). When burrows are dense, erosion, sedimentation, and elevated turbidity may

result (Devick 1988, 1989, 1991[b]). Bank failure, shoreline collapse, and a characteristic terracing have been observed in Mexico, Texas, and Florida where burrow densities were high […] Not all infested waters, however, exhibit significant erosion."

"[…] sheer numbers of these large, grazing animals can create problems for other animals (e.g., competition for food or space with like-sized aquatic organisms, or interference with other animals. Competition has apparently taken place in Hawaiian streams where native species no longer exist in the presence of high densities of suckermouth catfishes (Englund et al. 2000) or are threatened by low water quality after fishkills (Honolulu Advertiser 2006)."

"Suckermouth catfishes produce copious and conspicuous feces (Sandford and Crow 1991, Ferraris 1991 […]) which, in aquatic systems, transforms and translocates nutrients, alters sediment characteristics, and impacts microbial and benthic communities (Wotton and Malmqvist 2001), notably so in subtropical environments (e.g., Iovino and Bradley 1969, Frouz et al. 2004)."

"Economic impacts of suckermouth catfishes have been quantified for commercial tilapia fishing in Florida and for Mexico (Mendoza-Alfaro et al. 2009). In Florida, during the period 1993-2006, tilapia catch in six lakes decreased from 45- 80% to 17-30% after suckermouth catfishes became established, after which they represented 11-65% of the commercial catch."

"Social impacts resulting from economic impacts have been most pronounced in Mexico, where thousands of livelihoods in the Balsas Basin have been affected by the collapse of commercial fisheries. The collapse has impacted health status (e.g., wounds, infections, vaccinations), unemployment, emigration, and has created changes in household structure (Mendoza-Alfaro et al. 2009)."

4 Global Distribution

Figure 1. Known global distribution of *Hypostomus isbrueckeri* in Uruguay in South America. Map from GBIF (2016).

5 Distribution Within the United States

This species has not been reported as introduced or established in the U.S.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean distance) was medium in the Southeast U.S. from coastal New Jersey to eastern Texas, and low elsewhere. Climate 6 score for the contiguous U.S. indicated a medium climate match overall. Climate 6 scores between 0.005 and 0.103 are classified as medium matches; Climate 6 score for *H. isbrueckeri* was 0.014. The

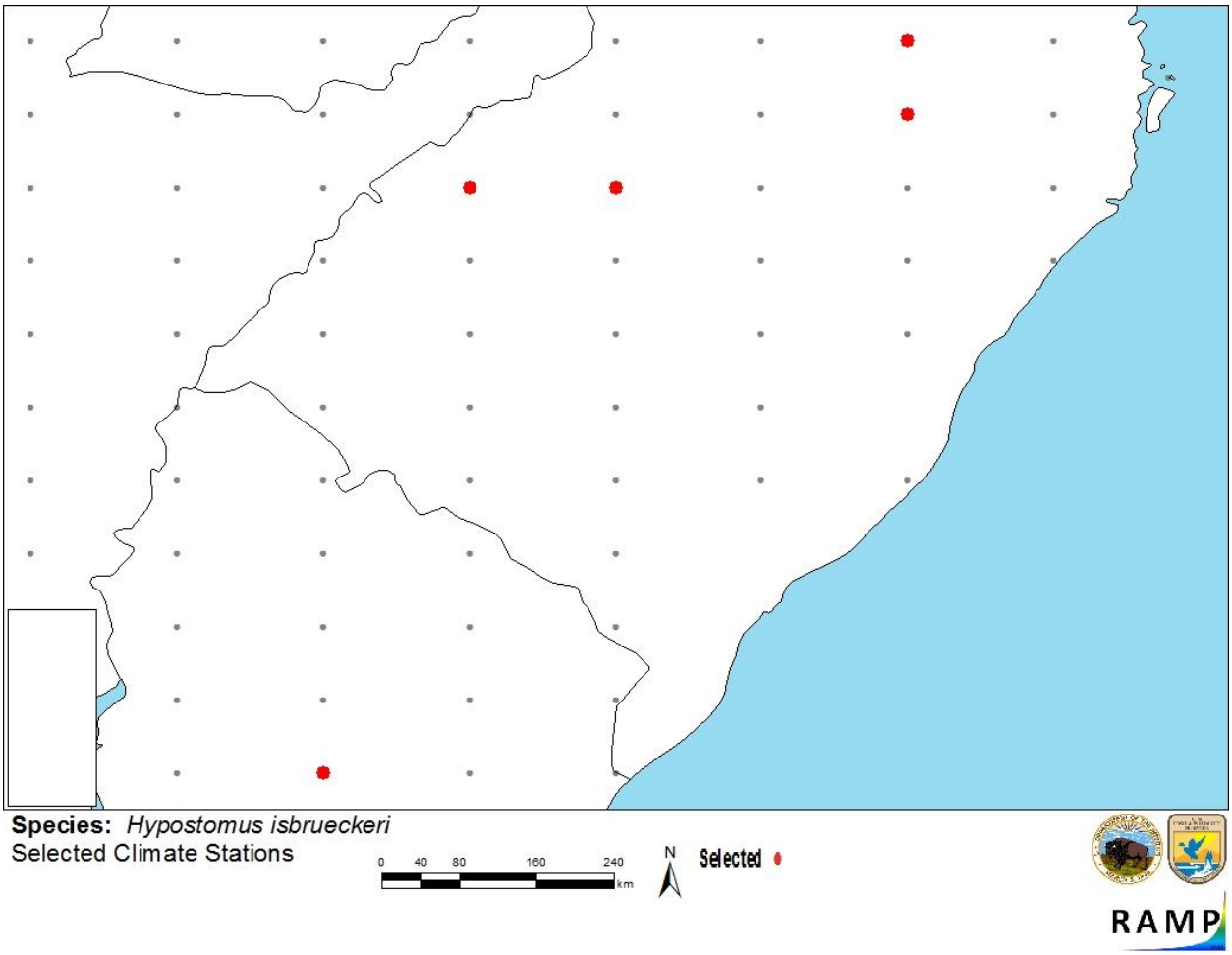

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in southern Brazil and Uruguay selected as source locations (red) and non-source locations (gray) for *Hypostomus isbrueckeri* climate matching. Source locations from Reis et al. (1990) and GBIF (2016).

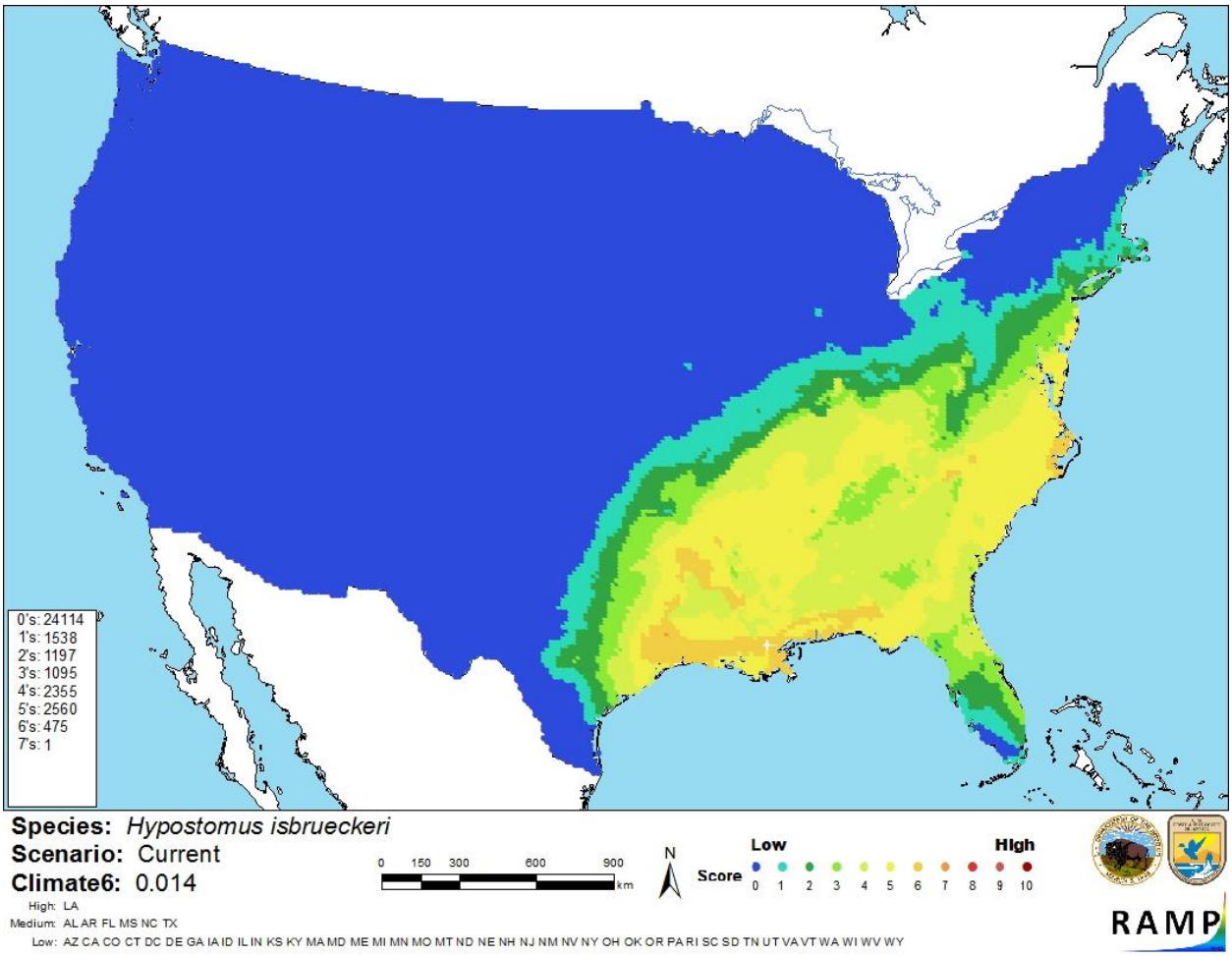

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Hypostomus isbrueckeri* in the contiguous United States based on source locations reported by Reis et al. (1990) and GBIF (2016). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

There is little information available on *Hypostomus isbrueckeri*. There is no information available on the biology of this species. No introductions of this species outside of its native range have been documented. Members of the genus can also be difficult to identify to the species level. Certainty of this assessment is low due to a lack of information and taxonomic uncertainty.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Hypostomus isbrueckeri is a suckermouth catfish native to the middle and upper Uruguay River basin. It has not been reported as introduced or established outside its native range, although unidentified members of the genus are currently established in the U.S. *H. isbrueckeri* has a medium climate match with the contiguous United States. Overall, there is little information available on this species. More information is needed to adequately assess the risk this species poses. Overall risk category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **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.

Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2017. Catalog of fishes: genera, species, references. Available: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. (March 2017).

Froese, R., and D. Pauly, editors. 2016. *Hypostomus isbrueckeri* Reis, Weber & Malabarba, 1990. FishBase. Available: http://www.fishbase.org/summary/Hypostomus-isbrueckeri.html. (March 2017).

GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Hypostomus isbrueckeri* Reis, Weber & Malabarba, 1990. Global Biodiversity Information Facility, Copenhagen. Available: http://www.gbif.org/species/5202137. (March 2017).

Hoover, J. J., C. E. Murphy, and J. Killgore. 2014. Ecological impacts of suckermouth catfishes (Loricariidae) in North America: a conceptual model. Aquatic Nuisance Species Research Program Bulletin 14-1. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

ITIS (Integrated Taxonomic Information System). 2017. *Hypostomus isbrueckeri* Reis, Weber and Malabarba, 1990. Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=680183#null. (March 2017).

Nico, L, P. Fuller, and M. Neilson. 2017. *Hypostomus* sp. Lacepède, 1803. U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=762. (August 2017).

Reis, R. E., C. Weber, and L. R. Malabarba. 1990. Review of the genus *Hypostomus* Lacépède, 1803 from southern Brazil, with descriptions of three new species (Pisces, Siluriformes, Loricariidae). Revue Suisse de Zoologie 97(3):729-766.

Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.

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.

Armbruster, J. W. 1997. Phylogenetic relationships of the sucker-mouth armored catfishes (Loricariidae) with particular emphasis on the Ancistrinae, Hypostominae, and Neoplecostominae. Doctoral dissertation. University of Illinois, Champaign-Urbana.

Barron, J. L. 1964. Reproduction and apparent over-winter survival of the sucker-mouth armoured catfish, ***Plecostomus*** sp., in the headwaters of the San Antonio River. The Texas Journal of Science 16:449.

Burgess, W. E. 1989. An atlas of freshwater and marine catfishes – a preliminary survey of the Siluriformes. TFH Publications, Neptune City, New Jersey.

Courtenay, W. R., Jr., and J. E. Deacon. 1982. Status of introduced fishes in certain spring systems in southern Nevada. Great Basin Naturalist 42(3):361-366.

Courtenay, W. R., Jr., D. A. Hensley, J. N. Taylor, and J. A. McCann. 1984. Distribution of exotic fishes in the continental United States. Pages 41-77 *in* W. R. Courtenay, Jr., and J. R. Stauffer, Jr, editors. Distribution, biology, and management of exotic fishes. John Hopkins University Press. Baltimore, Maryland.

Courtenay, W. R., Jr., D. A. Hensley, J. N. Taylor, and J. A. McCann. 1986. Distribution of exotic fishes in North America. Pages 675-698 *in* C. H. Hocutt, and E. O. Wiley, editors. The zoogeography of North American freshwater fishes. John Wiley and Sons, New York.

Courtenay, W. R., Jr., and J. R. Stauffer. 1990. The introduced fish problem and the aquarium fish industry. Journal of the World Aquaculture Society 21(3):145-159.

Courtenay, W. R., Jr., and J. D. Williams. 1992. Dispersal of exotic species from aquaculture sources, with emphasis on freshwater fishes. Pages 49-81 ***in*** A. Rosenfield, and R.

Mann, editors. Dispersal of living organisms into aquatic ecosystems. Maryland Sea Grant, College Park, Maryland.

Devick, W. S. 1988. Disturbances and fluctuations in the Wahiawa Reservoir ecosystem. Project F-14-R-12, Job 4, Study I. Division of Aquatic Resources, Hawaii Department of Land and Natural Resources, Honolulu.

Devick, W. S. 1989. Disturbances and fluctuations in the Wahiawa Reservoir ecosystem. Project F-14-R-13, Job 4, Study I. Division of Aquatic Resources, Hawaii Department of Land and Natural Resources, Honolulu.

Devick, W. S. 1991a. Disturbances and fluctuations in the Wahiawa Reservoir ecosystem. Project F-14-R-15, Job 4, Study I. Division of Aquatic Resources, Hawaii Department of Land and Natural Resources, Honolulu.

Devick, W. S. 1991b. Patterns of introductions of aquatic organisms to Hawaiian freshwater habitats. Pages 189-213 *in* New directions in research, management and conservation of Hawaiian freshwater stream ecosystems. Proceedings of the 1990 symposium on freshwater stream biology and fisheries management, Division of Aquatic Resources, Hawaii Department of Land and Natural Resources, Honolulu.

Englund, R. A., K. Arakaki, D. J. Preston, S. L. Coles, and L. G. Eldredge. 2000. Nonindigenous freshwater and estuarine species introductions and their potential to affect sportfishing in the lower stream and estuarine regions of the south and west shores of Oahu, Hawaii. Bishop Museum Technical Report 17. Honolulu, Hawaii.

Ferraris, C., Jr. 1991. Catfish in the aquarium. Tetra Press, Morris Plains, New Jersey.

Frouz, J., R. J. Lobinske, and A. Ali. 2004. Influence of Chironomidae (Diptera) faecal pellet accumulation in lake sediment quality and larval abundance of pestiferous midge *Glyptotendipes paripes*. Hydrobiologia 518:169-177.

Honolulu Advertiser. 2006. EarthDay events – armored catfish roundup. Honolulu Advertiser (April 21).

Hubbs, C., R. J. Edwards, and G. P. Garrett. 1991. An annotated checklist of freshwater fishes of Texas, with key to identification of species. Texas Journal of Science, Supplement 43(4):1-56.

Hubbs, C., T. Luciere, G. P. Garrett, R. J. Edwards, S. M. Dean, and E. Marsh. 1978. Survival and abundance of introduced fishes near San Antonio, Texas. The Texas Journal of Science 30(4):369-376.

Iovino, A. J., and W. H. Bradley. 1969. The role of larval Chironomidae in the production of lacustrine copropel in Mud Lake, Marion County, Florida. Limnology and Oceanography 14:898-905.

López-Fernández, H., and K. O. Winemiller. 2005. Status of ***Dionda diaboli*** and report of established populations of exotic fish species in lower San Felipe Creek, Val Verde County, Texas. Southwestern Naturalist 50(2):246-251.

Mendoza-Alfaro, R. E., B. Cudmore, R. Orr, J. P. Fisher, S. C. Balderas, W. R. Courtenay, P. Koleff Osorio, N. Mandrak, P. Álvarez Torres, M. Arroyo Damián, C. Escalera Gallardo, A. Güevara Sanguinés, G. Greene, D. Lee, A. Orbe-Mendoza, C. Ramírez Martínez, and O. Stabridis Arana. 2009. Trinational risk assessment guidelines for aquatic alien invasive species – test cases for the snakeheads (Channidae) and armored catfishes (Loricariidae) in North American inland waters. CEC Project Report. Commission on Environmental Cooperation, Montreal (Quebec), Canada.

Page, L. M., and B. M. Burr. 1991. A field guide to freshwater fishes of North America north of Mexico. The Peterson Field Guide Series, volume 42. Houghton Mifflin Company, Boston.

Sabaj, M. H., and R. A. Englund. 1999. Preliminary identification and current distribution of two suckermouth armored catfishes (Loricariidae) intrdouced to Oahu streams. Bishop Museum Occasional Papers 59:50-55.

Sandford, G., and R. Crow. 1991. The manual of tank busters. Tetra Press, Morris Plains, New Jersey.

Tompkins, S. 2004. We're being invaded by lots of aliens. Houston Chronicle (November 25).

Weber, C. 2003. Loricariidae - Hypostominae (armored catfishes). Pages 351-372 *in* R. E. Reis, S. O. Kullander, and C. J. Ferraris, Jr., editors. Checklist of the freshwater fishes of South and Central America. EDIPUCRS, Porto Alegre, Brazil.

Whiteside, B. G., and C. Berkhouse. 1992. Some new collections locations for six fish species. The Texas Journal of Science 44(4):494.

Wotton, R. S., and B. Malmqvist. 2001. Feces in aquatic ecosystems. BioScience 51:537-544.

Zaniboni Filho, E., S. Meurer, O. A. Shibatta, and A. P. de Oliverira Nuñer. 2004. Catálogo ilustrado de peizes do alto Rio Uruguai. Editora da UFSC, Tractebel Energia, Florianópolis, Brazil.