U.S. Fish & Wildlife Service

Southern Sailfin Catfish (*Pterygoplichthys ambrosettii*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, April 2012
Revised, March 2019
Web Version, 1/3/2020

Photo: Sam Kieschnick. Licensed under CC BY-NC. Available: http://eol.org/data_objects/33556259. (October 2016).

1 Native Range and Status in the United States

Native Range

From Fricke et al. (2019):

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

Status in the United States

According to Nico et al. (2019), nonindigenous occurrences of *Pterygoplichthys ambrosetii* (under the name *P. anisitsi*) have been reported in the following States, with range of years and hydrologic units in parentheses:

- Florida (2001–2007; Lower St. Johns, Northern Okeechobee Inflow, Oklawaha, Upper St. Johns)
- Texas (1996–2017; Buffalo-San Jacinto, East San Antonio Bay, Lower Brazos, Lower San Antonio, South Laguna Madre, West Galveston Bay)

From Nico et al. (2019):

"Reported, possibly established, in a small drainage in Texas. Established in Florida."

From Nico and Martin (2001):

"*Pterygoplichthys anisitsi* [*P. ambrosettii*], or a closely-related species, is sold in local pet stores in the Houston area as plecostomus."

"Based on our preliminary findings, the Texas population of *P. anisitsi* [*P. ambrosettii*] is successfully reproducing."

"In the urban streams of the Houston area, *Pterygoplichthys* apparently is using outflow from sewage treatment plants as thermal refugia (M. Webb, Texas Parks and Wildlife Department, pers. obser.)."

Means of Introductions in the United States

From Nico et al. (2019):

"Probably the result of aquarium release."

Remarks

Pterygoplichthys ambrosettii is the valid name for this species; however, historically, some populations were considered *P. anisitsi* which has been determined to be a junior synonym to *P. ambrosettii* (Fricke et al. 2019 and references therein). Information for this screening was searched for using both names. Many sources still retain the validity of both names, efforts have been made within this document to clarify which name original sources used. An ERSS for the name *P. anisitsi* was published in 2018 which has been replaced by this document. Some information in this screening pertains to the *Pterygoplichthys* genus as a whole when species specific information was not available; it is clearly indicated when this occurs.

From Nico and Martin (2001):

"The existence of seemingly abnormal or intermediate abdominal color patterns in some specimens from introduced *Pterygoplichthys* populations in Texas (and elsewhere) suggests the possibility of introgressive hybridization. Indeed, J. W. Armbruster (Auburn University, pers.

comm.) has seen a number of *Pterygoplichthys* in the aquarium trade that he considers the products of artificial hybridization. Because of the variety of unusual patterns commercially available, Armbruster believes that several different combinations of crosses have occurred. In his brief review of *Pterygoplichthys*, Armbruster (1997) listed 21 nominal species, of which 13 were considered to be valid. Many different forms are in the aquarium trade."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Pterygoplichthys ambrosettii* (Holmberg 1893) is the current valid name for this species. It was originally described as *Liposarcus ambrosettii* (Holmberg 1893). *P. anisitsi* was recently determined to be a synonym to *P. ambrosettii* (Fricke et al. 2019).

From Froese and Pauly (2019b):

"Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > […] Actinopterygii (Class) > Siluriformes (Order) > Loricariidae (Family) > Hypostominae (Subfamily) > *Pterygoplichthys* (Genus) > *Pterygoplichthys ambrosettii* (Species)"

Size, Weight, and Age Range

From Garcia et al. (2011):

"[…] juveniles (120 mm total length) as well as sexually mature adult individuals (469 mm) […]"

From GISD (2019):

"Growth of *Pterygoplichthys* [spp.] is rapid during the first two years of life, with total lengths of many sailfin catfishes exceeding 300 mm by age 2. Specimens in aquaria may live more than 10 years. […] *Pterygoplicthys* spp. start reproducing at approximately 25 cm (Mendoza et al, 2009)."

From Froese and Pauly (2019a):

"Max length : 54.9 cm TL male/unsexed; [Marques et al. 2016]; 55.0 cm TL (female); max. published weight: 2.3 kg [Marques et al. 2016]; max. published weight: 2.3 kg"

Environment

From Froese and Pauly (2019a):

"Freshwater; demersal; pH range: 6.5 - 8.2; dH range: ? - 25. […] 21°C - 24°C [Baensch and Riehl 1985; assumed to represent recommended aquarium water temperatures]"

From Nico et al. (2019):

"Sailfin suckermouth catfishes (*Pterygoplichthys* spp.) are capable of surviving mesohaline conditions (up to 10 ppt) for extended periods of time, […]"

From Nico and Martin (2001):

"In general, the most important factor affecting potential survival of introduced loricariid catfishes is their general lack of tolerance to low temperature. Thus, whether *P. anisitsi* [*P. ambrosettii*] will become permanently established in areas outside its native range depends heavily on its ability to survive short periods of low temperature or adapt to a low temperature regime. […] It is the only *Pterygloplichthys* with a native range extending well outside the tropical zone. Thus, its tolerance to cold temperatures is most likely greater than that of other members of the genus."

"For the period of record (13 July 19993 through the end of 1997) the water temperature minimum for Sims Bayou at the United States Geological Survey gage station at Highway SR 35 near the site of capture [of *P. ambrosettii*] was 6.0º […]"

"However, the lower lethal temperature of *P. anisitsi* [*P. ambrosettii*] has yet to be determined."

Climate/Range

From Nico and Martin (2001):

"In South America, *P. anisitsi* [*P. ambrosettii*] naturally occurs from near 15ºS to approximately 34º15'S latitude (Weber, 1992). It is the only *Pterygloplichthys* with a native range extending well outside the tropical zone. […] The most southern natural records reported by Weber are from the lower Uruguay River basin. Annual mean air temperature in that region is ca. 16ºC (Walter et al. 1973). Weather information available for nearby Colonia del Sacramento, Uruguay […], for 1997 shows monthly air temperature minimums ranging from 1.0ºC (July) to 15.4ºC (January); […]"

Distribution Outside the United States

Native

From Fricke et al. (2019):

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

Introduced

From GISD (2019):

"Expanding populations of *P. anisitsi*, *P. disjunctivus*, and *P. multiradiatus* have also been reported in the Grijalva-Usumacinta Basin [Mexico] (Mendoza *et al*, 2009)."

From Sinha et al. (2010):

"It is not known if the population of *P. anisitsi* [*P. ambrosettii*] is well established in the River Ganga [India], but a small live specimen (11 cm) from the river indicates that probably the species is established and breeding in the Ganga River."

Froese and Pauly (2019a) list *Pterygoplichthys ambrosettii* (under the name *P. anisitsi*) as probably established in India.

From Garcia et al. (2011):

"The first *Pterygoplichthys ambrosettii* was captured in 2002 in the Lower Tibagi River [Brazil, outside the native range in Brazil], close to its confluence with the Paranapanema River, one of the large tributaries of the Upper Parana River and more than 600 km from the initial area of introduction. Additional specimens were collected with gill and seining nets from August 2009 to May 2010: seven in the Middle Paranapanema; three in the Lower Tibagi, close to the mouth with the Paranapanema River; and three in the Pirapó River […]."

"One indication that this species may be in the process of establishing itself is the capture of juveniles (120 mm total length) as well as sexually mature adult individuals (469 mm) in the basin of the Paranapanema River and its effluents."

"Non-indigenous to the upper Paraná River, it was able to disperse there as a consequence of flooding of the geographical barrier of the Sete Quedas waterfalls following construction of the Itaipu hydroelectric power plant (Graça and Pavanelli, 2007)."

Means of Introduction Outside the United States

From Garcia et al. (2011):

"One of the likely means by which this species reached the region is through the process of manual rescue (transposition from the dam). This process consists of the removal of individuals from the turbines of hydroelectric plants and releasing them upstream of the dams, making it possible for these fish to move to a new environment. Another probable means by which the species arrived at the Paranapanema River is through aquarium enthusiasts, who release ornamental fishes into the environment (Magalhães et al., 2009)."

From Garcia et al. (2014):

"Non-indigenous to the upper Paraná River, it was able to disperse there as a consequence of flooding of the geographical barrier of the Sete Quedas waterfalls following construction of the Itaipu hydroelectric power plant (Graça and Pavanelli, 2007). It was also able to reach the tributary rivers of the Tibagi and Cinzas rivers, which are tributaries of the lower Paranapanema River basin, through removal of fish specimens from the hydroelectric turbines and their release upstream the dams (Garcia et al., 2011) and/or through the release of samples cultured for ornamental aquaria (Magalhães and Jacobi, 2008)."

From GISD (2019):

"*Pterygoplichthys* spp. are very common aquarium fish throughout the world. Nearly all of their introduced populations are believed to be the result of pet release or aquaculture escape (Page & Robins, 2006).While no substantial trade in catfish is thought to occur, the live food trade cannot be discounted completely as a potential mechanism for spread to new locations (Mendoza et al., 2009)."

Short Description

From Nico and Martin (2001):

"Like all loricariid catfishes, *P. anisitsi* [*P. ambrosettii*] has a body covering of bony plates and a ventral mouth modified into a sucking disk. Members of the genus *Pterygoplichthys* are somewhat distinct in having 9 to 14 dorsal fin rays. Texas specimens we examined […] have 11 to 12 dorsal fin rays (counts do not include the dorsal spines). […] Color pattern on the fins and dorsal body of *P. anisitsi* typically is dark with white spots, although some large individuals are very dark above with few spots. Weber (1992) used abdominal color pattern as an important trait in distinguishing many of the closely-related members of the genus. In adult and large juvenile *P. anisitsi*, the abdomen is covered by large white spots, many of which are irregularly joined to form a vermiculate pattern. The abdominal pattern observed in the majority of Texas *P. anisitsi* agree with the pattern described and illustrated for this species in Weber (1992). However, the same pattern is similar to that of a subset of Florida specimens all identified by Page (1994) as *P. disjunctivus*, a species endemic to the Amazon River basin and recently described as new by Weber (1991). One Texas specimen […] has an unusual abdominal color pattern in that the white spots are small and only a few are interconnected."

Biology

From Froese and Pauly (2019a):

"A continuous non -obligatory air-breathing species [da Cruz et al. 2013]."

From Garcia et al. (2011):

"Certain biological characteristics [of *Pterygoplichthys ambrosettii*], such as feeding on detritus, sediments and insect larvae, showing parental care, construction of nests by males, rapid growth and high fecundity (Hoover et al., 2004; Sinha et al., 2010), as well as the capacity to tolerate environments with poor oxygenation, favor a high capacity to adjust to living in diverse aquatic environments, including those impacted by dams […]"

From GISD (2019):

"*Pterygoplichthys* spp. can be found in a wide variety of habitats, ranging from relatively cool, fast-flowing and oxygen-rich highland streams to slow-flowing, warm lowland rivers and stagnant pools poor in oxygen. […] *Pterygoplichthys* spp. are also highly tolerant to poor water quality and are commonly found in polluted waters (Chavez et al., 2006). They are known to use outflow from sewage treatment plants as thermal refugia and can readily adapt to changing water quality (Nico & Martin, 2001)."

"*Pterygoplichthys* spp. reproduce sexually and have high fecundancy [*sic*] (Gibbs et al, 2008). Males construct horizontal burrows in banks that are about 120-150 cm long extend downward [*sic*]. The burrows are used as nesting tunnels and eggs are guarded by males until the free-swimming larvae leave. Females may lay between 500-3,000 eggs per female depending on size and species. Their reproductive season peaks in the summer and usually lasts several months but may be year-long in certain locations (Mendoza et al, 2009)."

Human Uses

From Garcia et al. (2011):

"Another probable means by which the species arrived at the Paranapanema River is through aquarium enthusiasts, who release ornamental fishes into the environment (Magalhães et al., 2009)."

From GISD (2019):

"*Pterygoplichthys* spp. are very common aquarium fish throughout the world.

Diseases

No OIE reportable diseases (OIE 2020) found for *Pterygoplichthys ambrosettii*.

Froese and Pauly (2019b) list *Heteropriapulus anchoradiatus*, *H. bitomus*, *H. heterotylus*, *H. microcleithrus*, *H. pterygoplichthyi*, and *H. simplex* as parasites of *P. ambrosettii*.

Threat to Humans

From Froese and Pauly (2019c):

"Harmless"

3 Impacts of Introductions

Although *Pterygoplichthys ambrosettii* has been recorded as introduced outside its native range, no information on impacts of introductions could be found. The below information concerns ***potential*** impacts of *P. ambrosettii* or potential and documented impacts of the genus.

From Nico et al. (2019):

"Largely unknown. In several natural streams in this species [*sic*] is relatively abundant. Because it grazes and removes attached algae, and also feeds on benthic organisms and detritous [*sic*], this introduced catfish may be having a significant impact on the aquatic food base and, therefore, negatively effecting [*sic*] native invertebrate and vertebrate species (Nico, personal observations)."

“Male members of the genus *Pterygoplichthys* dig out river banks to create burrows in which an attracted female will lay and guard her eggs. In large numbers, this burrowing behavior by *Pterygoplichthys* contributes to problems with siltation. In addition, the burrows potentially destabilize the banks, leading to an increased rate of erosion (Nico et al. 2009). Diurnal aggregations of *Pterygoplichthys* can potentially alter nutrient dynamics by creating biogeochemical hotspots through nitrogen and phosphorus excretion and remineralization (Capps and Flecker 2013).”

From GISD (2019):

“Potential effects of *Pterygoplichthys* spp. include alteration of bank structure and erosion, disruption of aquatic food chains, competition with native species, mortality of endangered shore birds, changes in aquatic plant communities, and damage to fishing gear and industry.”

“Environmental impacts of *Pterygoplichthys* spp. are not fully understood, but in locations where they are introduced and abundant, their feeding behaviours and burrowing activities can cause considerable disturbance. Their burrows have been reported as contributing to siltation problems and bank erosion and instability (Hoover *et al*., 2004; Nico *et al*, [2009]). *Pterygoplichthys* spp. forage along the bottoms of streams and lakes, occasionally burying their heads in the substrate and lashing their tails. These behaviours can uproot or shear aquatic plants and reduce the abundance of beds of submersed aquatic vegetation, creating floating mats that shade the benthos from sunlight. By grazing on benthic algae and detritus, they may alter or reduce food availability and the physical cover available for aquatic insects eaten by other native and non-native fishes where they are introduced (Mendoza *et al*, 2009; Hossain *et al*, 2008). *Pterygoplichthys* spp. may also compete with native fish. They are believed to displace several species of minnow in Texas including the Federally threatened and 'Vulnerable (VU)' Devils River minnow (see *Dionda diaboli*) (Cohen, 2008; Mendoza *et al*, 2009). *Pterygoplichthys* spp. have also been found to ingest eggs of *Etheostoma fonticola*, also listed as vulnerable (Cook-Hildreth, 2009).”

“*Pterygoplichthys* spp. are thought to create large, novel nutrient sinks in invaded streams of southern Mexico. They sequester the majority of nitrogen and phosphorus of systems in their body armor. These impacts on nutrient systems may also exacerbate the nutrient limitation of primary productivity in invaded streams (Capps *et al*, 2009).”

4 Global Distribution

Figure 1. Known global distribution of *Pterygoplichthys ambrosettii*. Observations reported from Florida, Brazil, Paraguay, and Argentina. Map from GBIF Secretariat (2019a).

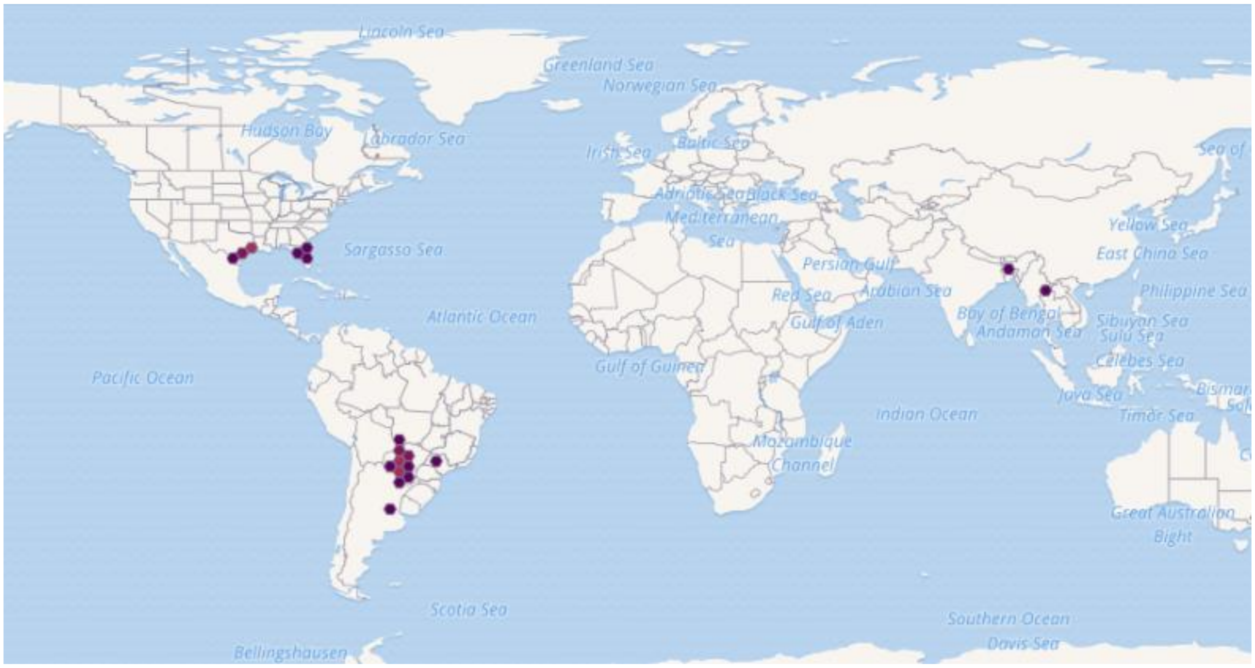

Figure 2. Additional known global distribution of *Pterygoplichthys ambrosettii* (listed under *P. anisitsi*). Observations reported from Florida, Texas, Brazil, Bolivia, Paraguay, Argentina, Bangladesh, and Thailand. Map from GBIF Secretariat (2019b). The observations in Bangladesh and Thailand were not used to select source points; they are the result of geographically tagged genetic sequences and not wild observations (GBIF Secretariat 2019b). The observations around Houston, Texas were not used to select source points as the species may be sustained there in thermal refugia over winter (Nico and Martin 2001) and the climate matching program cannot account for thermal refugia (Sanders et al. 2018).

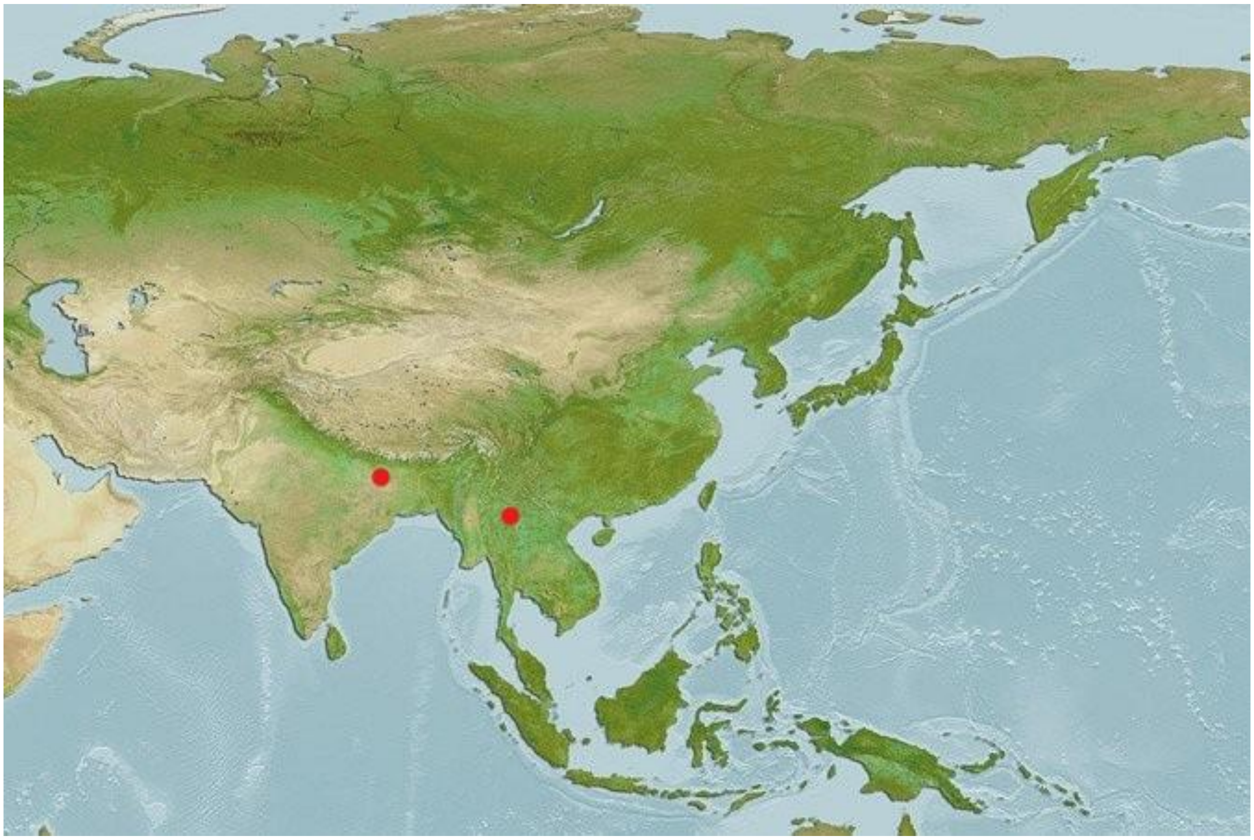

Figure 3. Known distribution of *Pterygoplichthys ambrosettii* (under the name *P. anisitsi*) in Asia. Observations are in India and Myanmar. Map from Froese and Pauly (2019a). The observation in Myanmar was not used to select source points for the climate match; there is no evidence of an established population in that country.

No georeferenced observations for the populations in Mexico or Uruguay were available to use in selecting source points for the climate match.

5 Distribution Within the United States

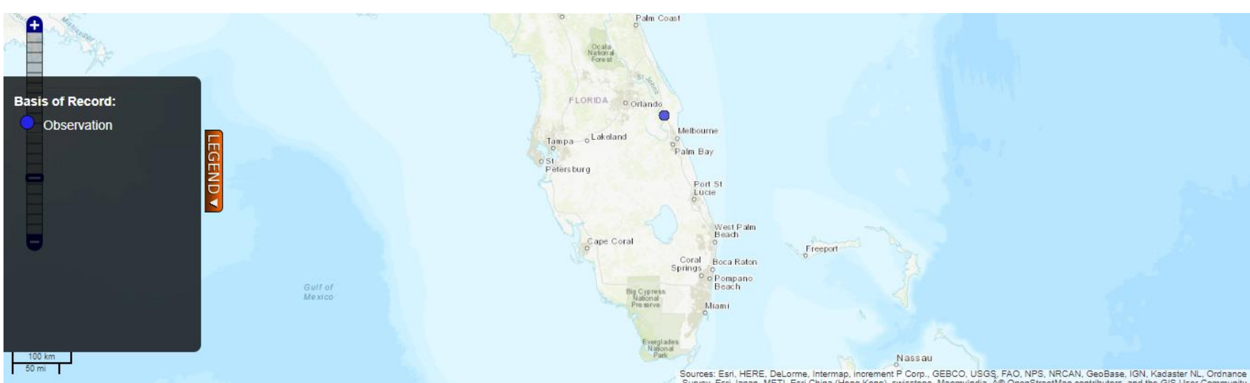

Figure 4. Known distribution of *Pterygoplichthys ambrosettii* in the United States. Observation reported from Florida. Map from BISON (2019).

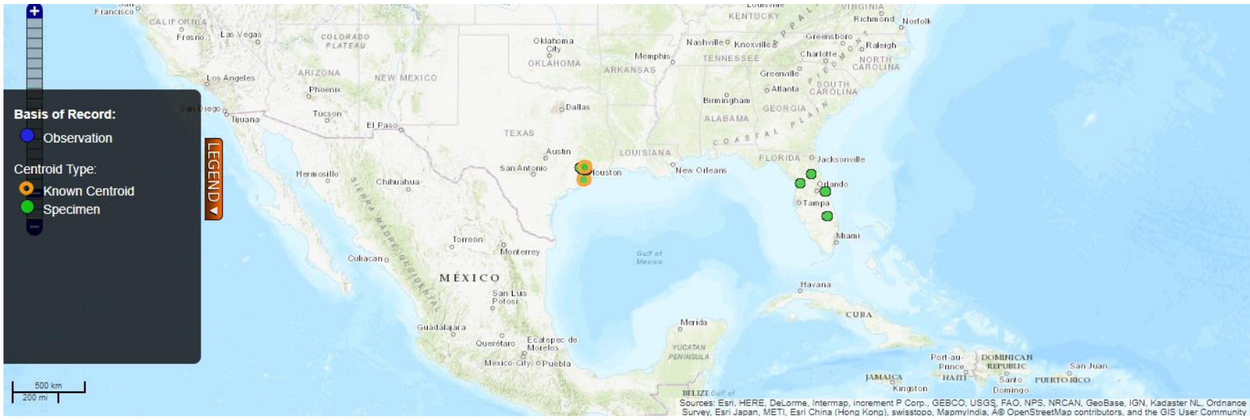

Figure 5. Additional known distribution of *Pterygoplichthys ambrosettii (under the name P. anisitsi)* in the United States. Observations reported from Texas and Florida. Map from BISON (2019). The observations around Houston, Texas were not used to select source points as the species may be sustained there in thermal refugia over winter (Nico and Martin 2001) and the climate matching program cannot account for thermal refugia (Sanders et al. 2018).

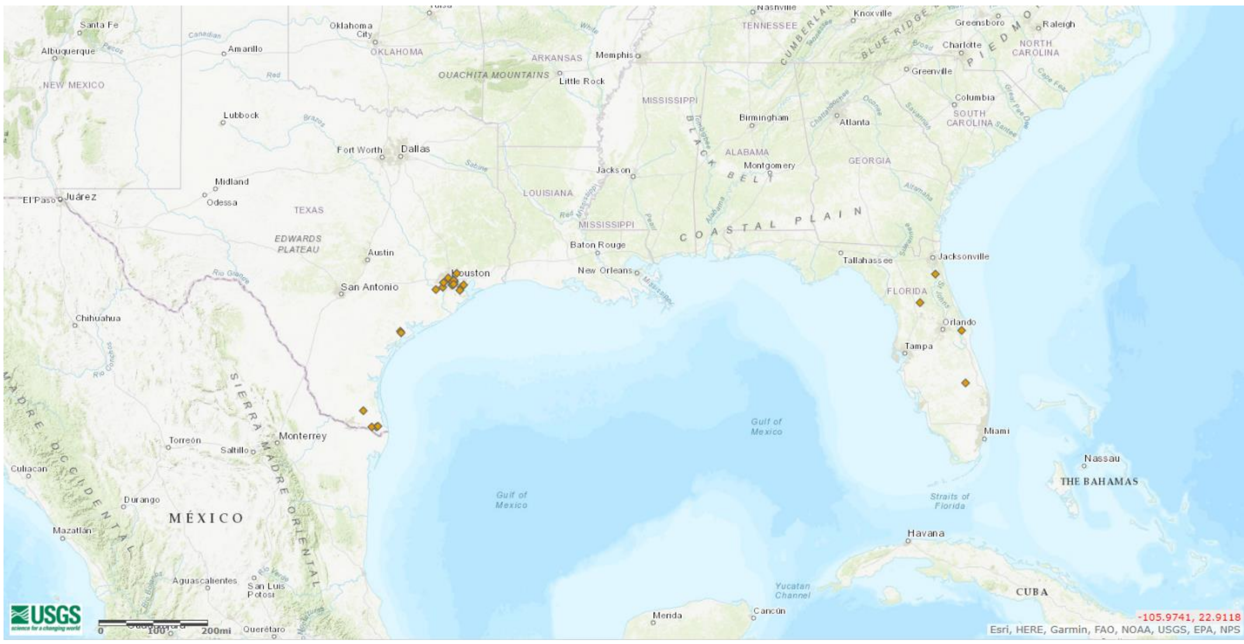

Figure 6. Additional known distribution of *Pterygoplichthys ambrosettii* (under the name *P. anisitsi*) in the United States. Map from Nico et al. (2019). The observations around Houston, Texas were not used to select source points as the species may be sustained there in thermal refugia over winter (Nico and Martin 2001) and the climate matching program cannot account for thermal refugia (Sanders et al. 2018).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Pterygoplichthys ambrosettii* for the contiguous United States is mostly low. Areas of high match were found in Florida and along the southern Atlantic Coast, in southern Texas, and southern Arizona. Areas of medium match were found all along the border with Mexico, the Gulf Coast, the remainder of Texas and Oklahoma, and the central Atlantic coastal areas. Everywhere else had low matches. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.098, medium. (Scores between 0.005 and 0.103 are classified as medium.) All States had low individual Climate 6 scores except for Alabama, Arkansas, California, Louisiana, New Mexico and Oklahoma, which had medium scores, and Arizona, Florida, Georgia, North Carolina, South Carolina, and Texas, which had high scores.

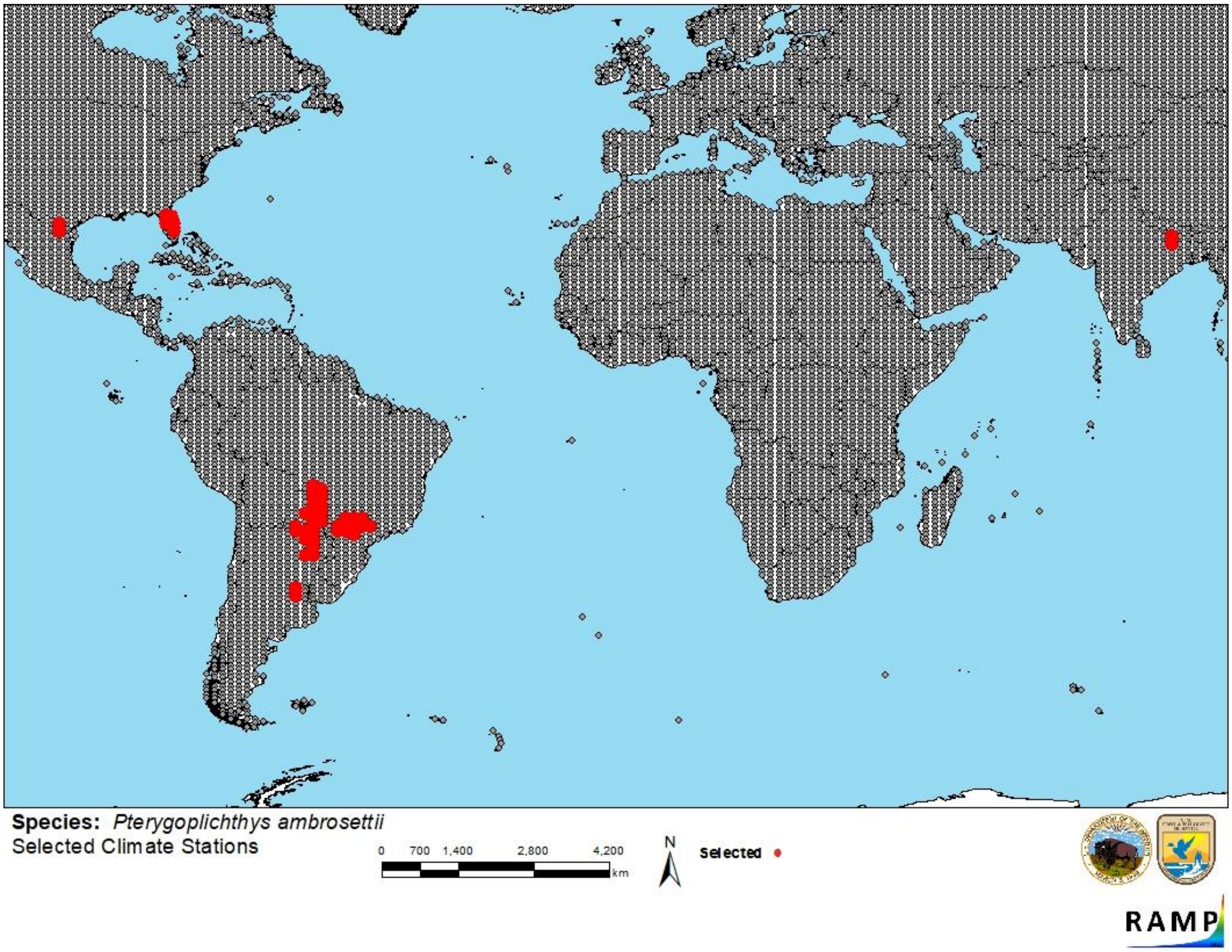

Figure 7. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Florida, Texas, Mexico, Brazil, Bolivia, Paraguay, Argentina, India) and non-source locations (gray) for *Pterygoplichthys ambrosettii* climate matching. Source locations from Nico and Martin (2001), BISON (2019), Froese and Pauly (2019a), GBIF Secretariat (2019a,b), and Nico et al. (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

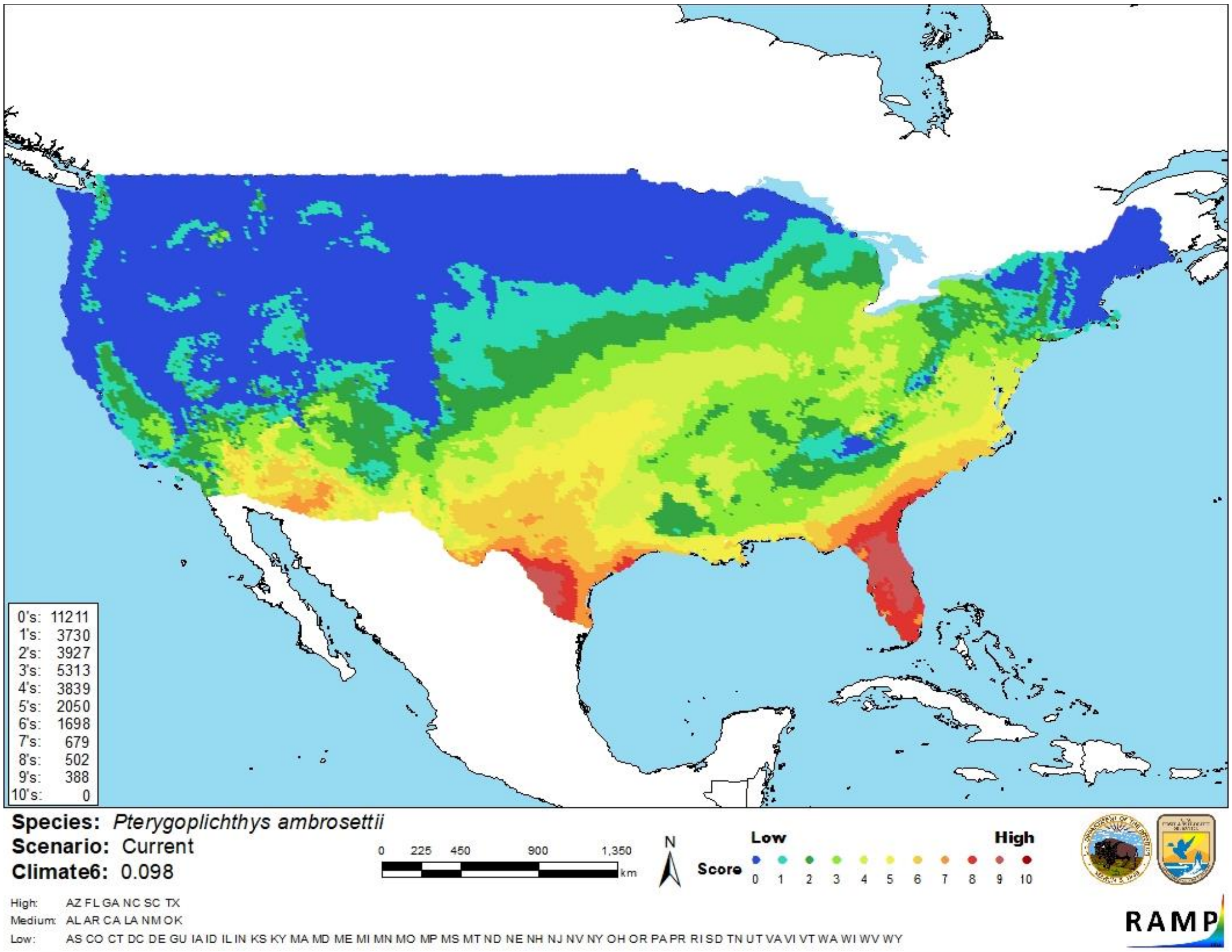

Figure 8. Map of RAMP (Sanders et al. 2018) climate matches for *Pterygoplichthys ambrosettii* in the contiguous United States based on source locations reported by Nico and Martin (2001), BISON (2019), Froese and Pauly (2019a), GBIF Secretariat (2019a,b), and Nico et al. (2019). 0 = Lowest match, 10 = 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

Certainty of assessment for *Pterygoplichthys ambrosettii* is low. Information on the biology, ecology, and distribution of the species is available. Some records of introductions that resulted in establishment were found; however there is no documentation of actual impacts from this specific species.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The southern sailfin catfish (*Pterygoplichthys ambrosettii*) is a freshwater armored catfish native to South America, including the Paraguay, middle Paraná, Bermejo and Uruguay River basins. This species can tolerate environments with poor oxygen levels, allowing them to adjust to living in diverse aquatic environments, including those impacted by dams. *P. ambrosettii* is present in the aquarium trade around the world and appears to be in trade within the United States. The history of invasiveness is None Documented. *P. ambrosetti* has been introduced outside its native range in South America through release of fish caught in turbines upstream of dams, flooding, and release by aquarium enthusiasts. It has also been introduced in Florida, Texas, and India, presumably through aquarium releases, and has established populations in those locations. No information on actual impacts from this species was found. There is some information on potential impacts from this specific species and potential and documented impacts from the genus. The overall climate match for the contiguous United States is medium. Areas of high match were found along part of the Atlantic and Gulf Coasts and portions of the border with Mexico. The certainty of assessment is low due to the lack of information on impacts of introductions. Overall risk for this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** *Pterygoplichthys anisitsi* was previously considered a separate species but is now a junior synonym to *P. ambrosetti*.
- **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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