Leopard Pleco (*Pterygoplichthys gibbiceps*)

Ecological Risk Screening Summary

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1 Native Range and Status in the United States

Native Range

From Eschmeyer et al. (2018):

"Middle and upper Amazon and Orinoco River basins: Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela."

Status in the United States

From Nico et al. (2012):

"The single *P. gibbiceps* taken in the Santa Fe system [river in Florida] was captured at Poe Spring on 26 August 2009 just after dawn […]"

"The only other records of *P. gibbiceps* (or its hybrids) confirmed for North America, that we are aware of, are two small juvenile specimens (48 and 82 mm SL) taken from Horse Creek in Florida's Peace River drainage in 2005- 2006."

"The limited sightings and their small numbers is evidence that *Pterygoplichthys* are not abundant in the Santa Fe and their establishment somewhat uncertain."

Means of Introductions in the United States

From Fuller (2016):

"Aquarium release."

Remarks

Froese and Pauly (2016) report the following synonyms for *P. gibbiceps*: *Ancistrus gibbiceps* Kner, 1854, *Glyptoperichthys gibbiceps* (Kner, 1854), and *Liposarcus altipinnis* Günther, 1864.

From Armbruster and Page (2006):

"A group of loricariid catfishes with 10 or more dorsal-fin rays is commonly referred to as sailfin catfishes. Weber (1991, 1992) reviewed variation among sailfin catfishes and assigned them to three genera. Species with an elevated supraoccipital process were placed in *Glyptoperichthys* Weber, 1991, those lacking the elevated supraoccipital process and with the supraoccipital bone bordered posteriorly by one large plate were assigned to *Pterygoplichthys* Gill, 1858, and those lacking the elevated supraoccipital process and with the supraoccipital bone bordered posteriorly by three plates were assigned to *Liposarcus* Günther, 1864."

"Armbruster (2004) noted that the synapomorphies provided by Weber (1991, 1992) were inadequate to diagnose three genera, and that neither *Pterygoplichthys* nor *Glyptoperichthys* could be recovered as monophyletic. He placed *Liposarcus* and *Glyptoperichthys* in the synonymy of *Pterygoplichthys* and recognized the tribe Pterygoplichthyini (originally misspelled as Pterygoplichthini) for *Pterygoplichthys* and an undescribed genus (the *Hemiancistrus annectens* group of Armbruster, 1998) from the trans-Andean region. […] *Pterygoplichthys* cannot be diagnosed by any unique synapomorphies; however, Armbruster (2004) listed several homoplasic synapomorphies: the presence of more than seven dorsal-fin rays, no or a diminutive interopercle that is on the hyomandibula when present, and a reduction in the number of vertebrae (eight to 11 vs. 12-20) between the dorsal fin and hypural."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

"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 *Glyptoperichthys*
Species *Glyptoperichthys gibbiceps* (Kner, 1854)"

From Eschmeyer et al. (2018):

"Current status: Valid as *Pterygoplichthys gibbiceps* (Kner 1854). Loricariidae: Hypostominae."

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 50.0 cm TL male/unsexed; [Riehl and Baensch 1991]"

Environment

From Froese and Pauly (2016):

"Freshwater; demersal; pH range: 6.0 - 8.0; dH range: 5 - 19."

From GISD (2016):

"*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. They are tropical fish and populations are typically limited only by their lower lethal temperature which has been found to be about 8.8-11°C in some species (Gestring, 2006). They can thrive in a range of acidic to alkaline waters in a range of about (pH 5.5.0 to 8.0) (Mendoza *et al.*, 2009). They are often found in soft waters, but can adapt very quickly to hard waters. *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)."

Climate/Range
From Froese and Pauly (2016):

"Tropical […]"

From GISD (2016):

"*Pterygoplichthys* spp. may be found in from lowlands to elevations of up to 3,000 m (Wakida-Kusunki, 2007)."

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

"Middle and upper Amazon and Orinoco River basins: Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela."

Introduced
From Fuller (2016):

"Collected from Dos Bocas Reservoir, Puerto Rico, in 2007 (F. Grana, pers. comm.)."

From Keszka et al. (2008):

"The presently reported finding of leopard pleco, *Pterygoplichthys gibbiceps* (Kner, 1854) (Loricariidae), in open waters of the Brda River in the centre of Bydgoszcz [Poland], constitutes the first record of a south-American loricariid fish species in Poland."

Means of Introduction Outside the United States
From Keszka et al. (2008):

"Loricariids are commonly used for removing algae from the glass walls of fish tanks worldwide. Some of them escape on their own, but in some cases they are also deliberately released by people to local bodies of water."

"The presently reported leopard pleco was probably released into the Brda River [Poland] by aquarists as well."

Short Description
From Keszka et al. (2008):

"According to Weber (1991, 1992) species of *Pterygoplichthys* are large loricariids that have large dorsal fins with nine or more (usually 10+) dorsal-fin rays."

"The colour pattern was generally dark brown with either darker spots or lighter spots or vermiculations. Abdomen almost completely covered in small plates […]. Tail forked with the lower lobe longer than the upper. Five rows of plates on the abdomen side. The *Pterygoplichthys gibbiceps* group (*Glyptopterichthys* sensu Weber 1991, 1992 excluding *P. punctatus*) is easily recognized by having a large supraoccipital crest (Armbruster 2004) […]"

Biology

From Fuller (2016):

"The Leopard Pleco is nocturnal. It feeds on algae (Ferraris 2007), although it will also feed on dead animals. Egg rearing is also presumed to take place in burrows dug into mud banks, similar to many related species."

From GISD (2016):

"*Pterygoplichthys* spp. reproduce sexually and have high fecundancy (Gibbs *et al*, 2008). Males construct horizontal burrows in banks that are about 120-150 cm long extend downward. 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 Fuller (2016):

"As of 1989, this species was the second most imported Loricariid, after *Pterygoplichthys anisitsi* (Burgess, 1989). That probably is no longer the case."

From Keszka et al. (2008):

"This species has high market value as an aquarium fish and can be found in aquaria worldwide."

"Loricariids are commonly used for removing algae from the glass walls of fish tanks worldwide."

From GISD (2016):

"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)."

Diseases

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

Threat to Humans

From Froese and Pauly (2016):

"Harmless"

3 Impacts of Introductions

From Fuller (2016):

"Unknown, but probably similar to *Pterygoplichthys* spp. (a synonym of the genus)"

From Neilson and Cannister (2016):

"Male members of the genus *Pterygoplichthys* use crevices in canals or dig into river banks to create burrows in which an attracted female will lay and guard her eggs. When populations are large, 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 and potential bank failures (Nico et al. 2009[a]). Several authors have shown interactions between the endangered Florida manatee (*Trichechus manatus latirostris*) and *Pterygoplichthys* catfishes in Florida freshwater springs that are used by both species as winter thermal refuges. Nico et al (2009[b]), Gibbs et al. (2010), and Nico (2010) described this behavior and determined that manatees onto which *Pterygoplichthys* catfish (possibly *P. disjunctivus*) had attached demonstrated higher activity levels and numbers of active behaviors."

From GISD (2016):

"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[a]). *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. Distribution of *Pterygoplichthys gibbiceps* in northern South America. Map from GBIF (2016). Locations in the continental United States and Puerto Rico were not included in climate matching because these locations have not been confirmed as established populations. Location in far eastern Brazil was excluded from climate matching because this location is outside the known range of the species (see Distribution Outside the United States, above).

5 Distribution Within the United States

Figure 2. Known distribution of *Pterygoplichthys gibbiceps* in the United States. Map from Fuller (2016). Locations in Florida and Puerto Rico were not included in climate matching because the population status has not been confirmed as "established" (Nico et al. 2012).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was low throughout the contiguous United States, with a slightly higher (but still low) match occurring in southern Florida. Climate 6 proportion indicated that the contiguous U.S. was a low climate match. Climate 6 proportion indicates a low climate match if the value is less than or equal to 0.005; the Climate 6 proportion of *Pterygoplichthys gibbiceps* was 0.00.

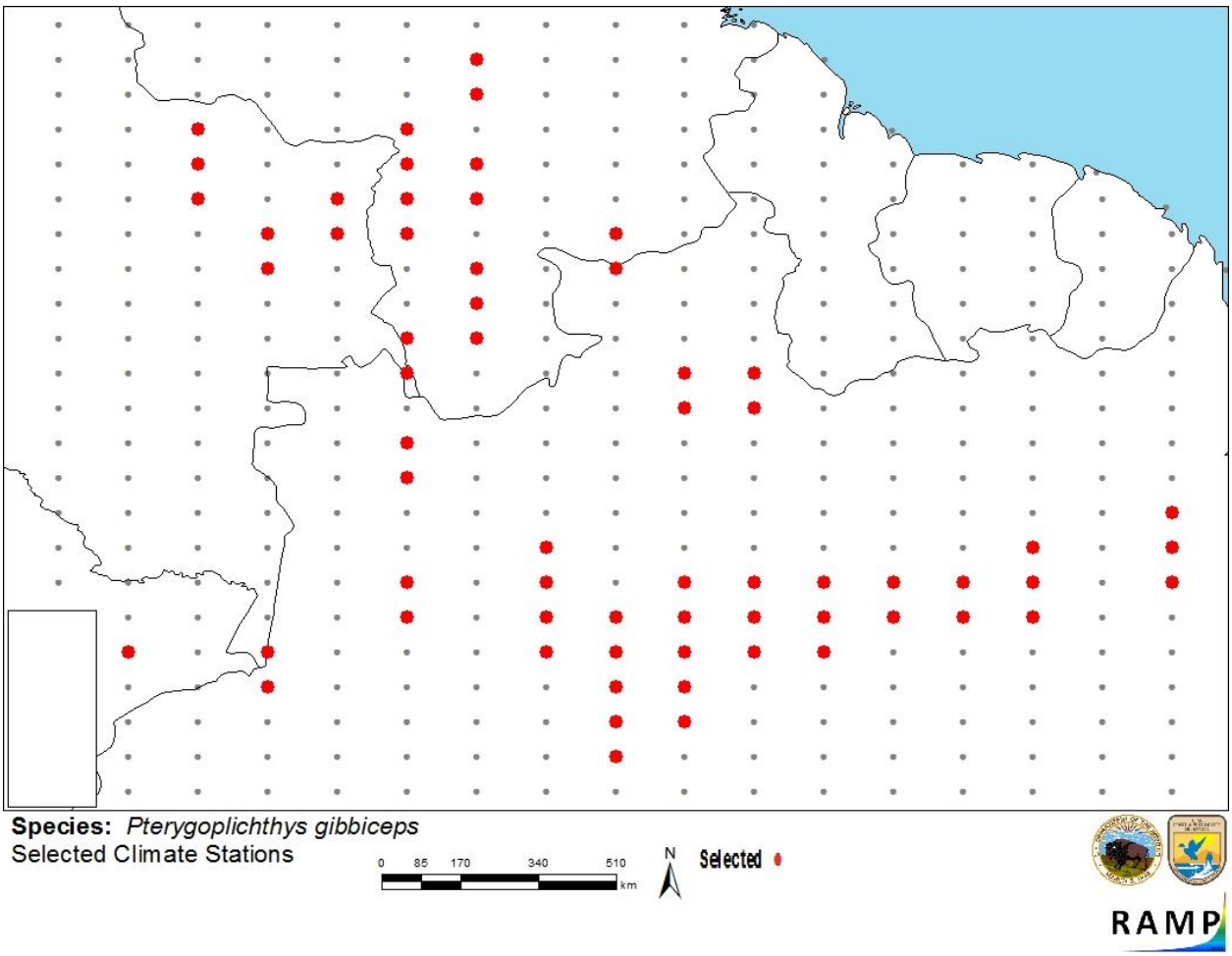

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Colombia, Venezuela, Ecuador, and Brazil) and non-source locations (gray) for *Pterygoplichthys gibbiceps* climate matching. Source locations from GBIF (2016) and Fuller (2016).

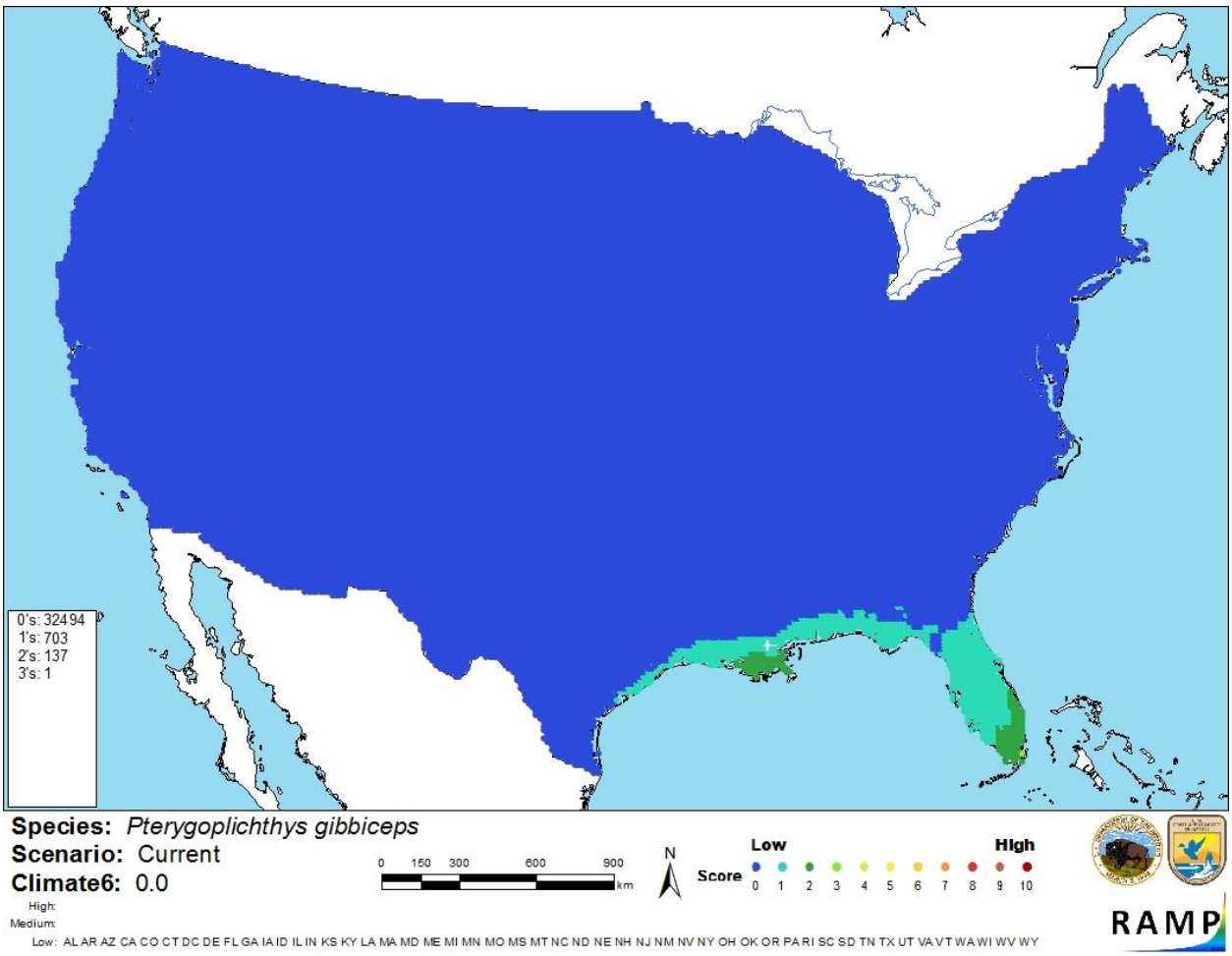

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Pterygoplichthys gibbiceps* in the contiguous United States based on source locations reported by GBIF (2016) and Fuller (2016). 0= Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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

There is some information available on the biology, habitat, and native distribution of *P. gibbiceps*. There are documented captures of this species outside of its native range, but no documented established populations or impacts associated with this species. Further information is needed to evaluate the status of populations of *P. gibbiceps* in the U.S. and any negative impacts it may have. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Pterygoplichthys gibbiceps is a species of armored sailfin catfish native to South America. Like other armored catfish species, it is popular in the aquarium trade as an algae-eater in freshwater aquariums. *P. gibbiceps* has a low climate match with the United States. There have been documented captures of this species in Florida and Poland, but no documented established populations of *P. gibbiceps* outside of its native range. Other species of the *Pterygoplichthys* genus have had negative impacts in the United States through their burrowing behavior and direct interactions with native species, but there has been no study of impacts of introduction from *P. gibbiceps* specifically. Overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **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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