Spotted Tiger Shovelnose Catfish (*Pseudoplatystoma punctifer*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, July 2017
Web Version, 09/15/2017

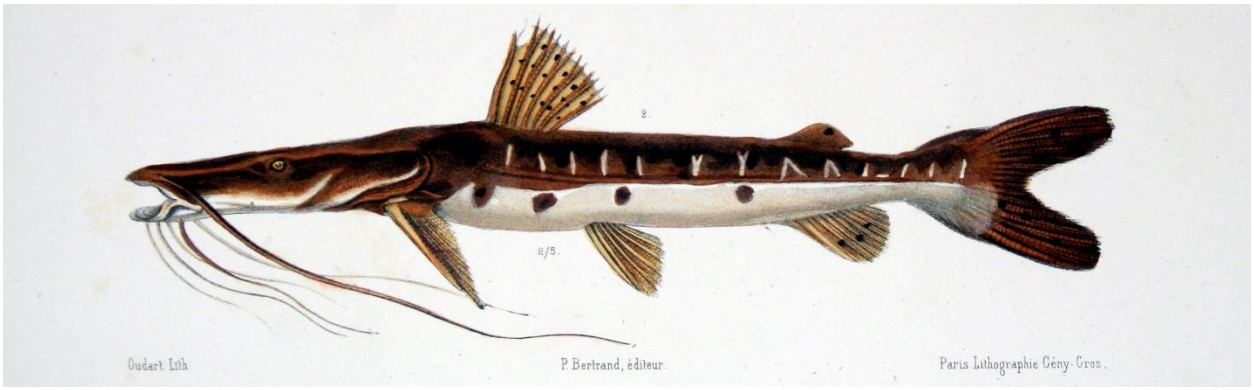

Image: Francis de Laporte de Castelnau. Public domain. Available: https://commons.wikimedia.org/wiki/File:F_de_Castelnau-poissonsPl19.jpg. (July 2017).

1 Native Range and Status in the United States

Native Range

From Buitrago-Suárez and Burr (2007):

"Amazon River in Bolivia, Brazil, Colombia, Ecuador, Perú, and Venezuela"

Status in the United States

From Daniel (2017):

"Nonindigenous Occurrences: Louisiana-Atchafalaya River a quarter mile north of Melville. […] Status: Failed"

Means of Introduction into the United States

From Daniel (2017):

"Presumed introduction through an aquarium release."

Remarks

From Hashimoto et al. (2015):

"The taxonomy of pimelodids (long-whiskered catfish) is complex and subject to constant revisions. […] Moreover, specific groups still contain species of uncertain status, such as the species of the genera *Pseudoplatystoma* and *Zungaro* (Buitrago-Suárez and Burr, 2007; Torrico et al., 2009; Carvalho-Costa et al., 2011; Boni et al., 2011)."

From Buitrago-Suárez and Burr (2007):

"Unrecognized species of *Pseudoplatystoma* have been included under the names *P. fasciatum* and *P. tigrinum* for decades."

"As recognized here, the genus contains at least 8 species: *P. fasciatum* restricted to the Guyana region; *P. punctifer* (formerly recognized as *P. fasciatum* from the Amazon River); *P. orinocoense*, n. sp., (formerly *P. fasciatum* from the Orinoco basin); *P. magdaleniatum*, n. sp., (formerly *P. fasciatum* from the Magdalena River); *P. reticulatum* (formerly *P. fasciatum* from the Amazon and Paraná rivers); *P. corruscans* (from the Paraná and São Francisco rivers), *P. tigrinum*, restricted to the Amazon basin, and *P. metaense*, n. sp. (formerly *P. tigrinum* from the Orinoco River)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From GBIF (2016):

"KINGDOM Animalia
PHYLUM Chordata
CLASS Actinopterygii
ORDER Siluriformes
FAMILY Pimelodidae
GENUS *Pseudoplatystoma*
SPECIES *Pseudoplatystoma punctifer*"

"TAXONOMIC STATUS
accepted species"

Size, Weight, and Age Range

From Buitrago-Suárez and Burr (2007):

"Maximum recorded length 1400 mm TL."

From Chepkemoi (2016):

"It has a lifespan of 20 years and more."

Environment
From Telles et al. (2014):

"[…] freshwater […]"

From Di Persia and Neiff (1986):

"[…] piscivorous pimelodids like *Zungaro*, *Paulicea* and *Pseudoplatystoma* generally occur in deep, open-water habitats."

From Buitrago-Suárez and Burr (2007):

"They are found in diverse habitats (Reid, 1983) including large rivers, lakes, side channels, flooded forests, and floating meadows (Reid, 1983; Burgess, 1989)."

Climate/Range
From Chepkemoi (2016):

"The fish is endemic to the Amazon River basin […]"

Distribution Outside the United States
Native
From Buitrago-Suárez and Burr (2007):

"Amazon River in Bolivia, Brazil, Colombia, Ecuador, Perú, and Venezuela"

Introduced
No introductions of this species have been reported outside the U.S.

Means of Introduction Outside the United States
No introductions of this species have been reported outside the U.S.

Short Description
From Buitrago-Suárez and Burr (2007):

"Anterior region of head pointed. Widest measurement at dorsal origin. Ventral region of body forming a straight line. Profile posterior to the dorsal fin decreasing gradually in depth toward the adipose and caudal fins. Dark pigmentation in dorsolateral region and extending to lateral line. Ventral to lateral line, pale, varying from whitish to yellowish. Dark straight vertical bars with pale short lines attached. No loops in specimens smaller than 500 mm SL. Some (3) individuals with spots on dorsal region of head. Caudal, dorsal, and anal fins with few spots. Dusky pigmentation on dorsal region of pectoral fin, pale ventrally. Posterodorsal region of head rough, smooth anteriorly. Anterior nostrils tubular and whitish/yellowish, posterior one with a

flap with a whitish edge. Maxillary barbels long, extending beyond pectoral fin, posterior mental barbels (or chin barbels) reaching pelvic fin origin."

From Daniel (2017):

"*Pseudoplatystoma punctifer* can be distinguished from all North American native catfishes by its depressed (flattened) head and distinctively black striped color pattern over a body that is two-thirds tan or brown colored. *Pseudoplatystoma punctifer* can be recognized from the closely related *Pseudoplatystoma fasciatum* by having fewer spots on the adipose and caudal fins; several discrete dark spots below the lateral line; and dark vertical bars that are straight and do not connect across the back with bars on the opposite side (Buitrago-Suárez and Burr 2007)."

Biology

From Telles et al. (2014):

"It is a carnivore and migratory species, and some studies with a related species (*Pseudoplatystoma corruscans*) suggest a possible homing behavior associated with the migration patterns (see Barthem and Goulding, 1997; Pereira et al., 2009). […] Although Barthem and Goulding (1997) indicated that this species was migratory, our molecular analyses revealed that these migration and gene flow processes affect reproductive behavior and genetic variability at a relatively small geographical scale (i.e., not at Amazonian basin scale). Indeed, Isaac and Rufino (2000) suggested that migration of *Pseudoplatystomas* does not seem to occur throughout the entire basin, but mainly at a location in the main rivers toward smaller neighboring waterheads."

From Duarte et al. (2010):

"BARTHEM & GOULDING (1997) suggested that *Pseudoplatystoma* Bleeker, 1862 species prey closer to the shore than other catfishes and, as many piscivores, move towards the shores at night to feed."

From de Luca (2010):

"You can measure the spawning *P. punctifer* occurs [*sic*] between January and February, with completion in april [*sic*] 2009, coinciding with the highest values of rainfall in the region."

"The seasonality, characterized by the phases of water regime in the region, influenced the greater supply of items to the diet, especially the full. Despite the great contribution of fish in the diet of *P. punctifer*, diversity of food items indicates a carnivorous diet generalist, because it presents no selectivity of prey including several families of fish and other food groups. The presence of terrestrial vertebrates in this study may indicate an opportunistic habit of the species."

Human Uses

From Buitrago-Suárez and Burr (2007):

"We have seen tiny young of *Pseudoplatystoma* being marketed in the ornamental fish trade in both North and South America. Individuals were too small for certain identification, but slight pattern and shape differences may indicate that more than one species is being imported. All the species are sold commonly in the numerous open fish markets throughout much of South America."

From Fernández-Méndez et al. (2015):

"Commercial fishing for big catfish species is one of the main economic activities in the Peruvian Amazon (Barthem and Goulding, 1997). Among these large catfish, *Pseudoplatystoma punctifer* is one of the most prized, with great acceptance among the Amazonian population due to the quality of its meat. High demand has caused heavy fishing pressure on the natural populations, resulting in an increase in the capture of individuals below minimum fishing size (Tello and García, 2009). This situation has led to a growing interest in the cultivation of this species as it presents a great potential for commercial aquaculture in the Peruvian Amazon (Kossowski, 1996; Nuñez, 2009). The reproduction of *P. punctifer* by hormonal induction in captivity has been mastered (Kossowski and Madrid, 1985; Padilla et al., 2001; Leonardo et al., 2004; Nuñez et al., 2008); however, the larval stage is shown to be a critical step in the culture of this species. The first larval rearing trials showed strong cannibalism among individuals (Kossowski and Madrid, 1991), with a high level of aggressiveness due to piscivorous feeding habits favoured by size heterogeneity of individuals and high rearing densities (Atencio-García and Zaniboni-Filho, 2006)."

Diseases

From Lopes et al. (2009):

"During May-September 2005 were [*sic*] autopsied 21 specimens of *Pseudoplatystoma punctifer* and 9 specimens of *Pseudoplatystoma tigrinum* looking for parasites. The fish, acquired from fishermen of the market fair (Ceasa) in Manaus, were captured in the Negro and Solimões Rivers, near the town of Careiro da Várzea, region of Manaus."

"Parasite species	TN	P%	MI	MA
Monogenoidea				
Vancleavius fungulus	8,352	100	397.7	397.7
Pavanelliella pavanellii	294	76.0	18.3	14
Digenea				
Strigeoidea (metacercariae)	301	61.9	23.1	14.3
Nematoda				
Goezia spinulosa	33	0.38	4.25	1.6
Spirocamallanus inopinatus	6	0.04	6	0.28
Larvae	525	76.1	32.8	25
Cestoda				
Spatulifer rugosa	899	71.4	59.9	42.8

"Parasite species	TN	P%	MI	MA
Nomimoscolex sp.	1,341	85.7	96.7	82.9
Copepoda				
Ergasilus sp.	83	57.1	6.8	3.95
Vaigamus sp.	22	28.7	18	5.14
Branchiura				
Argulus multicolor	4	19.0	1	0.19
Argulus pestifer	1	4.7	1	0.04
Dolops geayi	1	4.7	1	0.04
Isopoda				
Cymonthoidae	1	4.7	1	0.04

TN - Total number of specimens; P% - Prevalence; MI - Mean intensity; MA - Mean abundance."

From de Chambrier et al. (2014):

"Cestode Species […] *Megathylacus* sp.
Fish host […] *Pseudoplatystoma punctifer*
Basin/country […] Amazon, Peru"

No OIE-reportable diseases have been documented for *Pseudoplatystoma punctifer*.

Threat to Humans

From Souza-Araujo et al. (2016):

"This study assessed total mercury (THg) and methyl mercury (MeHg) concentrations, bioaccumulation and biomagnification of THg through the food web in fishes consumed by indigenous communities of Bacajá River, the largest tributary of the right bank of Xingu River. […] Nine species had THg concentrations above the limit recommended by the World Health Organisation (0·5 μg g−1 wet mass) […] The average concentration of THg increased significantly with trophic guild (herbivorous to piscivorous) and trophic level, with higher accumulation in fishes with greater total length. Ninety-six per cent of all mercury was methylated."

Pseudoplatystoma punctifer was reported to have a mean THg concentration of 0.76 μg g^{-1}, and a range of 0.13 – 2.03 μg g^{-1} across 23 individuals sampled (Souza-Araujo et al. 2016).

3 Impacts of Introductions

From Daniel (2017):

"**Impact of Introduction:** Unknown, but *Pseudoplatystoma punctifer* are predatory and will eat fish, mussels, and invertebrates (Burgess 1989; Buitrago-Suárez and Burr 2007)."

4 Global Distribution

Figure 1. Known global distribution of *Pseudoplatystoma punctifer*. Map from GBIF (2016). The easternmost point was not included in climate matching because it is outside the Amazon River basin, where *P. punctifer* is reported to be endemic.

5 Distribution Within the United States

Figure 2. Known distribution of *P. punctifer* in the United States. No populations are established. Map from Daniel (2017).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was classified as “Low”, based on a Climate 6 proportion of 0.001. Proportions of 0.005 or less indicate a low match. Locally, climate match was medium in southern Florida and low throughout the remainder of the contiguous U.S.

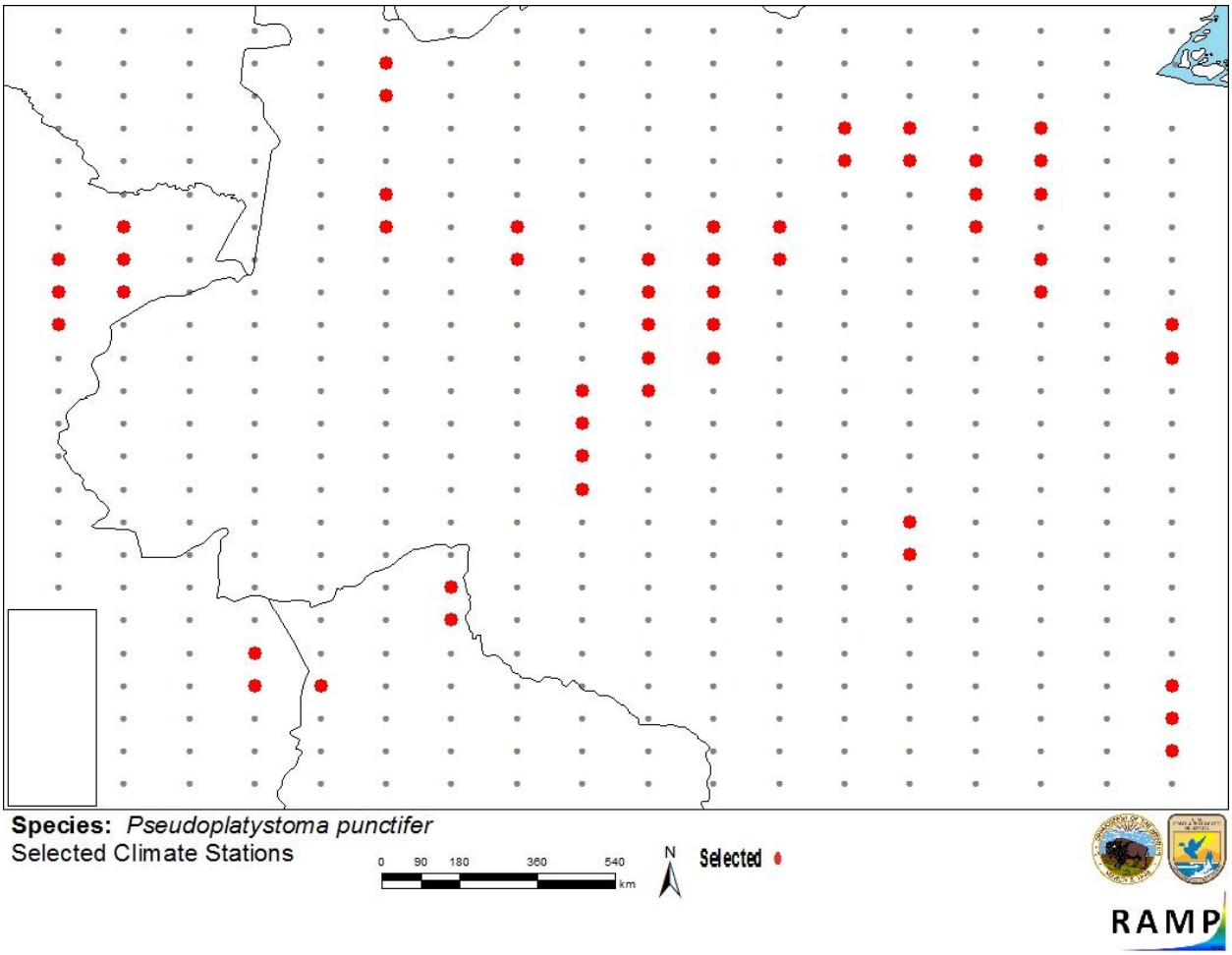

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Pseudoplatystoma punctifer* climate matching. Source locations from GBIF (2016).

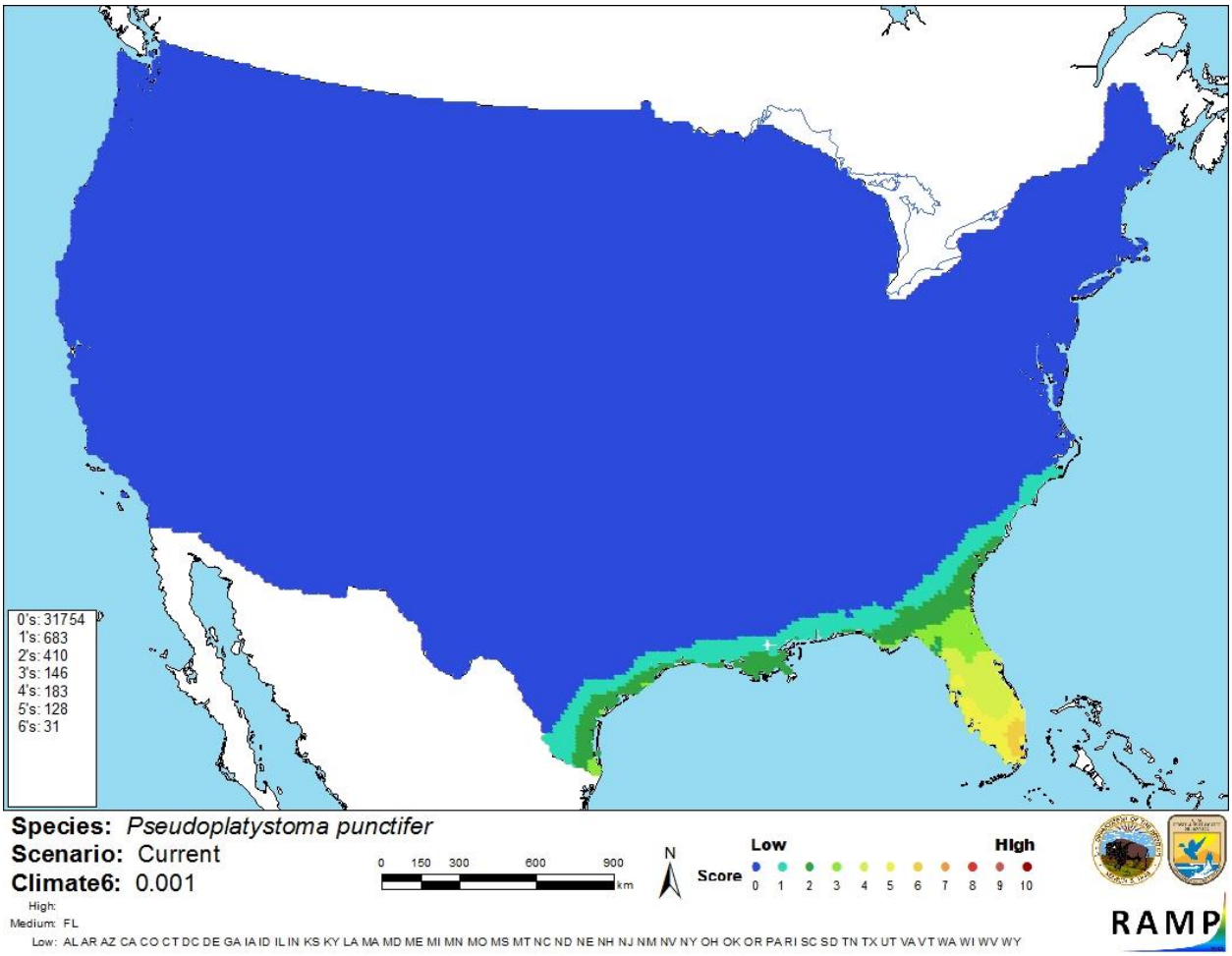

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Pseudoplatystoma punctifer* in the contiguous United States based on source locations reported by GBIF (2016). 0= Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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

7 Certainty of Assessment

Information is available on the biology and ecology of *Pseudoplatystoma punctifer*, particularly in reference to aquaculture of this species for human consumption or ornamental purposes. However, the taxonomy of the *Pseudoplatystoma* genus is not fully resolved; not all authors recognize *P. punctifer* as a species unique from *P. fasciatus*. Because of this taxonomic uncertainty and the lack of information on impacts of introduction of *P. punctifer*, certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Pseudoplatystoma punctifer is a large piscivorous catfish native to the Amazon River basin. The species is popular for human consumption in South America and research into best aquaculture practices for this species is ongoing. Juvenile *Platystoma spp.* are also marketed in the ornamental fish trade, at a size at which the fish cannot be reliably identified to species. There are no reports of introduction and establishment of *P. punctifer* outside its native range, although taxonomic uncertainty within the genus limits confidence that no introductions have occurred. Climate match to the contiguous U.S. is low. Overall risk assessment category for *P. punctifer* 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.

Buitrago-Suárez, U. A., and B. M. Burr. 2007. Taxonomy of the catfish genus *Pseudoplatystoma* Bleeker (Siluriformes: Pimelodidae) with recognition of eight species. Zootaxa 1512:1-38.

Chepkemoi, J. 2016. Native fish species of Bolivia. WorldAtlas. Available: http://www.worldatlas.com/articles/native-fish-species-of-bolivia.html. (July 2017).

Daniel, W. M. 2017. *Pseudoplatystoma punctifer*. USGS Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=3171. (July 2017).

de Chambrier, A., T. Scholz, and R. Kuchta. 2014. Taxonomic status of Woodland's enigmatic tapeworms (Cestoda: Proteocephalidea) from Amazonian catfishes: back to museum collections. Systematic Parasitology 87:1-19.

de Luca, A. S. 2010. Aspectos da reprodução e da alimentação de *Pseudoplatystoma punctifer* (Castelnau,1855) (Siluriformes, Pimelodidae) na bacia do Rio Teles Pires, Alta Floresta-MT. Doctoral dissertation. Universidade Federal de São Carlos, São Carlos, Brazil. (In Portuguese with English abstract.)

Di Persia, D. H., and J. J. Neiff. 198 The Uruguay River system. Pages 599-629 *in* B. R. Davies, and K. F. Walker. The ecology of river systems. Springer-Science+Business Media, Dordrecht, The Netherlands.

Duarte, C., L. H. Rapp Py-Daniel, and C. P. de Deus. 2010. Fish assemblages in two sandy beaches in lower Purus river, Amazonas, Brazil. Iheringia, Série Zoologia 100(4):319-328.

Fernández-Méndez, C., F. David, M. J. Darias, D. Castro-Ruiz, and J. Núñez-Rodríguez. 2015. Rearing of the Amazon catfish *Pseudoplatystoma punctifer* (Castelnau, 1855): weaning with dry and moist diets. Journal of Applied Ichthyology 31(S4):83-87.

GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Pseudoplatystoma punctifer*. Global Biodiversity Information Facility, Copenhagen. Available: http://www.gbif.org/species/7879329. (July 2017).

Hashimoto, D. T., F. D. do Prado, J. A. Senhorini, F. Foresti, and F. Porto-Foresti. 2010. Aquaculture of Neotropical catfish hybrids: genetic strategies for conservation and management. Pages 1-31 *in* B. Regan, editor. Carp and catfish: biology, behavior and conservation strategies. Nova Publishers, New York.

Lopes, L. P. da C., A. M. B. Varella, and J. C. de O. Malta. 2009. Metazoan parasites of *Pseudoplatystoma punctifer* (Linnaeus, 1766) and *Pseudoplatystoma tigrinum* (Spix & Agassiz, 1829) (Siluriformes: Pimelodidae) of the central Amazon basin, Brazil. Biologia Geral e Experimental 9(2):3-15.

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

Souza-Araujo, J., T. Giarrizzo, M. O. Lima, and M. B. G. Souza. 2016. Mercury and methyl mercury in fishes from Bacajá River (Brazilian Amazon): evidence for bioaccumulation and biomagnification. Journal of Fish Biology 89(1):249-263.

Telles, M. P. C., R. G. Collevatti, R. S. Braga, L. B. S. Guedes, T. G. Castro, M. C. Costa, N. J. Silva-Júnior, R. B. Barthem, and J. A. F. Diniz-Filho. 2014. Geographical genetics of *Pseudoplatystoma punctifer* (Castelnau, 1855) (Siluriformes, Pimelodidae) in the Amazon Basin. Genetics and Molecular Research 13(2):3656-3666.

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.

Atencio-García, V. J., and E. Zaniboni-Filho. 2006. El canibalismo en la larvicultura de peces. [Cannibalism in fish larviculture.] Revista MVZ Córdoba 11:9-19.

Barthem, R. B., and M. Goulding. 1997. Os bagres balizadores: ecologia, migração e conservação de peixes Amazônicos. Sociedade Civil Mamirauá and CNPq, Brasília, Brazil.

Boni, T. A., A. A. Padial, S. M. A. P. Prioli, L. C. Lucio, T. C. Maniglia, T. S. Bignotto, R. S. Panarari-Antunes, R. A. Prioli, and A. J. Prioli. 2011. Molecular differentiation of species of the genus *Zungaro* (Siluriformes; Pimelodidae) from the Amazon and Paraná-Paraguay River basins in Brazil. Genetics and Molecular Research 10:2795-2805.

Burgess, W. E. 1989. An atlas of freshwater and marine catfishes: a preliminary survey of the Siluriformes. T. F. H. Publications, Neptune City, New Jersey.

Carvalho-Costa, L. F., N. M. Piorski, S. C. Willis, P. M. Galetti, Jr., and G. Ortí. 2011. Molecular systematics of the neotropical shovelnose catfish genus *Pseudoplatystoma* Bleeker 1862 based on nuclear and mtDNA markers. Molecular Phylogenetics and Evolution 59:177-194.

Guerin, M. 2009. Tiger shovelnose catfish *Pseudoplatystoma fasciatum*. Available: http://www.thejump.net/id/tiger-shovelnose-catfish.htm.

Isaac, V. J., and M. L. Ruffino. 2000. A estatística pesqueira no Baixo Amazonas: experiência do Projeto Iara. IBAMA, Coleção Meio Ambiente Série Estudos de Pesca 22:201-223.

Kossowski, C. 1996. Perspectives de l'élevage des poissons-chats (Siluroidei) en Amérique du Sud. [Perspectives of the breeding of catfishes (Siluroidei) in South America.] Aquatic Living Resources 9:189-195.

Kossowski, C., and F. Madrid. 1985. Ensayo de la reproducción inducida en bagre rayado cabezon *Pseudoplatystoma fasciatum* (Linnaeus) 1766 (Pisces, Siluriformes). [Induced breeding trial of catfish *Pseudoplatystoma fasciatum* (Linnaeus) 1766 (Pisces, Siluriformes).] Acta Cientifica Venezolana 36:284-285.

Kossowski, C., and F. Madrid. 1991. Observaciones de los estadios embrionario y larval del bagre rayado cabezon *Pseudoplatystoma fasciatum* (Linnaeus) 1766 (Pisces, Siluriformes). [Observations of the embryonic and larval stages of catfish *Pseudoplatystoma fasciatum* (Linnaeus) 1766 (Pisces, Siluriformes).] Biollania 8:9-15.

Leonardo, A. F. G., E. Romagosa, M. I. Borella, and S. R. Batlouni. 2004. Induced spawning of hatchery-raised Brazilian catfish, cachara *Pseudoplatystoma fasciatum* (Linnaeus, 1766). Aquaculture 240:451-461.

Nuñez, J. 2009. Domestication de nouvelles espèces d'intérêt piscicole en Amazonie. Cahiers Agricultures 18:136-143.

Nuñez, J., R. Dugué, N. Corcuy Arana, F. Duponchelle, J. F. Renno, T. Raynaud, N. Hubert, and M. Legendre. 2008. Induced breeding and larval rearing of Surubí, *Pseudoplatystoma*

fasciatum (Linnaeus, 1766), from the Bolivian Amazon. Aquaculture Research 39:764-776.

Padilla, P., F. Alcantara, and R. Ismiño. 2001. Reproducción inducida de la doncella *Pseudoplatystoma fasciatum* y desarrollo embrionario-larval. [Induced breeding of Doncella *Pseudoplatystoma fasciatum* and embryonic-larval development.] Folia Amazónica 12:141-154.

Pereira, L. H. G., F. Foresti, and C. Oliveira. 2009. Genetic structure of the migratory catfish *Pseudoplatystoma corruscans* (Siluriformes: Pimelodidae) suggests homing behavior. Ecology of Freshwater Fish 18:215-225.

Reid, S. 1983. La biología de los bagres rayados *Pseudoplatystoma fasciatum* y *P. tigrinum* en la cuenca del Río Apure, Venezuela. Revista Unellez Ciencia y Tecnología 1:13-41.

Tello, S., and A. García. 2009. La pesquería de grandes bagres en la región Loreto. [The fishery of big catfishes in the Loreto region.] Instituto de Investigaciones de la Amazonía Peruana, Peru.

Torrico, J. P., N. Hubert, E. Desmarais, F. Duponchelle, J. Nuñez Rodriguez, J. Montoya-Burgos, C. Garcia Davila, F. M. Carvajal-Vallejos, A. A. Grajales, F. Bonhomme, and J. F. Renno. 2009. Molecular phylogeny of the genus *Pseudoplatystoma* (Bleeker; 1862): biogeographic and evolutionary implications. Molecular Phylogenetics and Evolution 51:588-594.