

Porcupine River Stingray (*Potamotrygon hystrix*) Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, September 2014
Revised, January 2018
Web Version, 11/2/2020

Organism Type: Fish

Overall Risk Assessment Category: Uncertain

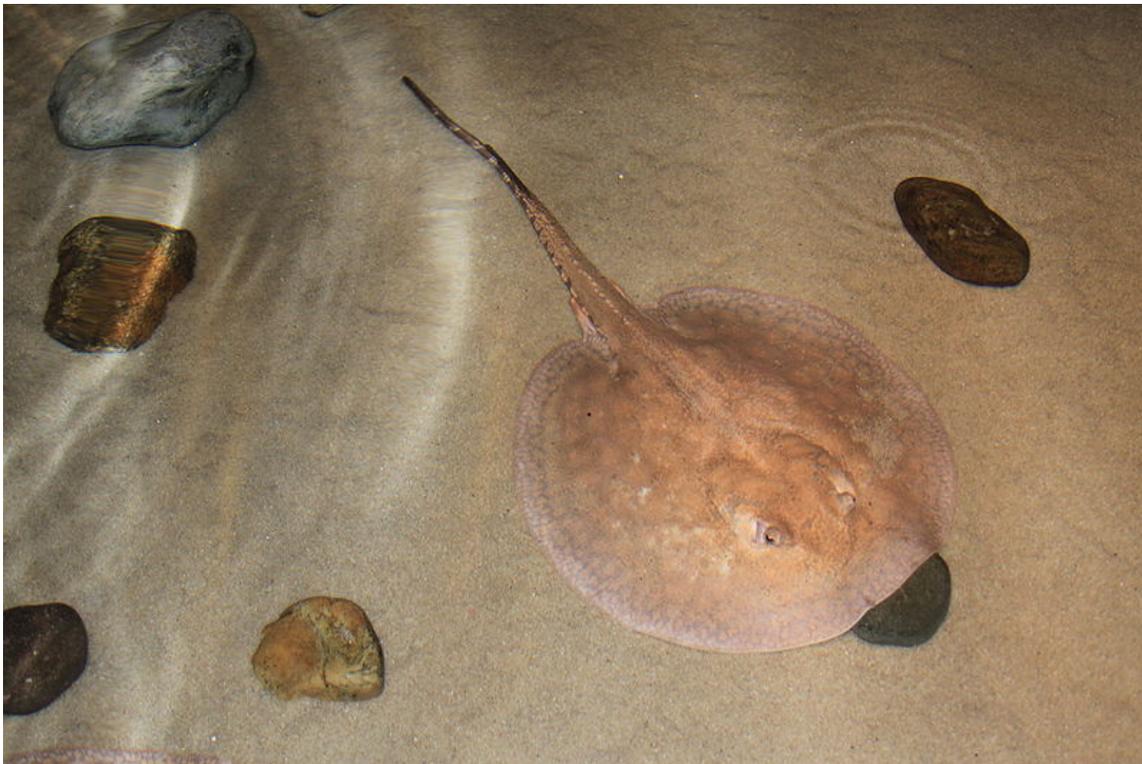


Photo: Jim Capaldi licensed under Creative Commons Attribution 2.0 Generic. Available: https://commons.wikimedia.org/wiki/File:Potamotrygon_adventure_aquarium2.jpg

1 Native Range and Status in the United States

Native Range

Potamotrygon hystrix is found in the Paraná and Paraguay River basins in Argentina, Brazil, and Uruguay (Araújo et al. 2004).

From Soto et al. (2009):

“The Porcupine River Stingray (*Potamotrygon histrix*) is a small, common but poorly known freshwater stingray from the Paraná and Paraguay River basins.”

“Achenbach and Achenbach (1976) indicate that this species is more abundant in the Paraná and Colastiné Rivers [Argentina] [...]. Seasonal migrations (upstream of the Paraná River) have also been indicated (Achenbach and Achenbach 1976).”

From Froese and Pauly (2018):

“Found in Parano Platense [Argentina] [López et al. 2003].”

Froese and Pauly (2018) list the status of *Potamotrygon histrix* as questionable in French Guiana, Guyana, Suriname, and Venezuela.

Status in the United States

No records of *Potamotrygon histrix* in the United States were found. No information on trade of *P. histrix* in the United States was found.

The Florida Fish and Wildlife Conservation Commission has listed the freshwater stingray *Potamotrygon histrix* as a conditional species. Conditional nonnative species (FFWCC 2020), “are considered to be dangerous to the ecology and/or the health and welfare of the people of Florida. These species are not allowed to be personally possessed, although exceptions are made by permit from the Executive Director for research, commercial use (with security measures to prevent escape or release) or public exhibition purposes.”

Means of Introductions in the United States

No records of *Potamotrygon histrix* in the United States were found.

Remarks

The correct spelling of the species epithet is *histrix*, many databases and papers list it with the misspelling of *hystrix*. This screening will use the correct spelling in original text but leaves quoted material as is.

From Soto et al. (2009):

“Records from French Guiana, Guyana, Suriname and Venezuela [*sic*] this species are probably *P. orbignyi* (Carvalho et al. 2003). Live and fixed specimens are easily mistaken with *P. orbignyi*, *P. humerosa* and juveniles of *P. brachyura* (Charvet-Almeida and Almeida pers. obs.). *P. histrix* is also often misidentified as *Potamotrygon* sp. or *Potamotrygon cf. histrix* (“*arraia cururu*” from the Negro River basin) (Araújo pers. com.).”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2018):

“**Current status:** Valid as *Potamotrygon hystrix* (Müller & Henle 1839).”

From ITIS (2017):

Kingdom Animalia

Subkingdom Bilateria

Infrakingdom Deuterostomia

Phylum Chordata

Subphylum Vertebrata

Infraphylum Gnathostomata

Superclass Chondrichthyes

Class Chondrichthyes

Subclass Elasmobranchii

Superorder Euselachii

Order Myliobatiformes

Family Potamotrygonidae

Genus *Potamotrygon*

Species *Potamotrygon hystrix* (Müller and Henle, 1841)

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 40.0 cm WD male/unsexed; [Boujard et al. 1997]; max. published weight: 15.0 kg [Ferreira et al. 1998].”

From Soto et al. (2009):

“[...] adults with of 30-40 cm disc width (DW) are common. The maximum weight observed is ~15 kg. Two females from the lower Paraná River (33 and 36 cm DW) [...]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; dH range: 10 - ?; potamodromous [Riede 2004]. [...]; 24°C - 26°C [assumed to be recommended aquarium temperature] [Baensch and Riehl 1995]”

Climate

From Froese and Pauly (2018):

“Subtropical; [...]”

Distribution Outside the United States

Native

Potamotrygon histrix is found in the Paraná and Paraguay River basins in Argentina, Brazil, and Uruguay (Araújo et al. 2004).

From Soto et al. (2009):

“The Porcupine River Stingray (*Potamotrygon histrix*) is a small, common but poorly known freshwater stingray from the Paraná and Paraguay River basins.”

“Achenbach and Achenbach (1976) indicate that this species is more abundant in the Paraná and Colastiné Rivers [Argentina] [...]. Seasonal migrations (upstream of the Paraná River) have also been indicated (Achenbach and Achenbach 1976).”

From Froese and Pauly (2018):

“Found in Parano Platense [Argentina][López et al. 2003].”

Froese and Pauly (2018) list the status of *Potamotrygon histrix* as questionable in French Guiana, Guyana, Suriname, and Venezuela.

Introduced

No records of *Potamotrygon histrix* introductions into the wild were found.

From Soto et al. (2009):

“This species is illegally exported from Brazil and no information is available regarding its captures for the international trade (Araújo et al. 2004).”

Means of Introduction Outside the United States

No records of *Potamotrygon histrix* introductions into the wild were found.

From Soto et al. (2009):

“This species is illegally exported from Brazil and no information is available regarding its captures for the international trade (Araújo et al. 2004).”

Short Description

From Froese and Pauly (2018):

“Like all species of this family, *P. hystrix* has a tail which is equipped with one or more spines which fall spontaneously and are replaced 2 or 3 times a year. At a length of 4 to 6 cm, the spine is a barbed, flattened skeletal formation inserted dorsally in the middle portion of the tail. Its structure is similar to that of a tooth and appears as an ivory cone covered with enamel. The spine is coated with an extremely toxic mucus produced by the cells of the skin and inflicts very painful wounds [Boujard et al. 1997].”

Biology

From Araújo et al. (2004):

“[...] low fecundity, late maturation and slow growth [...] diverse habitats in freshwater environments, including beach sands, flooded forest, small creeks with mud or stone bottoms and lakes. In all habitats in which they are found freshwater stingrays are predators on top of the food web. The adult forms of different species eat mainly fishes, worms and small crustaceans (Charvet-Almeida 2001, Lasso et al. 1996), and the juveniles eat small crustacean and aquatic insects.”

From Froese and Pauly (2018):

“Occurs in marshy zones where it is frequently found partially hidden in the sandy bottom. This behavior, associated with its perfect immobility and its capacity to undergo homochromy, makes it practically undetectable to the eye. Like all species of this family, *P. hystrix* has a tail which is equipped with one or more spines which fall spontaneously and are replaced 2 or 3 times a year. At a length of 4 to 6 cm, the spine is a barbed, flattened skeletal formation inserted dorsally in the middle portion of the tail. Its structure is similar to that of a tooth and appears as an ivory cone covered with enamel. The spine is coated with an extremely toxic mucus produced by the cells of the skin and inflicts very painful wounds [Boujard et al. 1997].”

From Soto et al (2009):

“Its conservation status is uncertain due to the sparse life history and population data available. It probably undertakes seasonal migrations and very few pregnant females have been observed so far.”

“There is no life history or population data for this poorly known freshwater ray. The main area of occurrence for this species is apparently the Paraná-Paraguay River confluence, where it is considered relatively abundant (Soto pers. obs.).

Achenbach and Achenbach (1976) indicate that this species is more abundant in the Paraná and Colastiné Rivers and seems to prefer "open waters" (probably preferring to wider areas instead of small streams). Seasonal migrations (upstream of the Paraná River) have also been indicated (Achenbach and Achenbach 1976).”

“Achenbach and Achenbach (1976) suggested that reproduction takes place in the upper portion of the Paraná River. Newborns have been observed in early summer and adults with of 30-40 cm disc width (DW) are common. [...] Two females from the lower Paraná River (33 and 36 cm DW) contained nine and six embryos, respectively (Soto unpublished data).”

“Achenbach and Achenbach (1976), in general observations considering this and other species of potamotrygonids in the mid Paraná River system, indicated that neonates feed on plankton and then gradually change their diet to small molluscs, crustaceans (crabs), insect larvae, small fish and other food items.”

Human Uses

From Araújo et al. (2004):

“Data on fishing practices and conservation efforts of *Potamotrygonidae* for ornamental trade have only recently begun to be collected.”

From Soto et al. (2009):

“This and other southern freshwater stingray species are taken as a food source and are considered to have delicious meat. They are harpooned by fishermen when sighted resting in shallow water.”

“There is a small amount of fishing for the more attractively patterned juveniles to supply the ornamental fish trade. This species is illegally exported from Brazil and no information is available regarding its captures for the international trade (Araújo et al. 2004).”

According to Torres et al. (2009) and Ziemendorff (2008) in Alves and Alves (2011), *Potamotrygon hystrix*, or parts of, is used in traditional medicine to treat asthma, hernias, flu, pneumonia, cough, earache, and burns.

P. hystrix is listed as a Conditional species requiring a permit for possession in Florida (FFWCC 2020).

Diseases

No records of OIE reportable diseases (OIE 2020) were found.

Poelen et al (2017) lists species *Acanthobothrium regoi*, *Rhinebothroides glandularis*, *Rhinebothroides freitasi*, *Rhinebothroides venezuelensis*, *Eutetrarhynchus araya*, *Megapriapus ungriai*, *Parancomegas araya*, *Potamotrygonocetus orinocoensis*, *Potamotrygonocetus travassosi*, *Echinocephalus dauleyi*, *Rhinebothroides scorzai*, *Potamotrygonocotyle eurypotamoxenus*, *Terranova caballeroi*, *Pulchrascaris chiloscyllii*, *Rhinebothroides scorzai*, and *Rhinebothrium paratrygoni* as parasites of *Potamotrygon hystrix*.

From Froese and Pauly (2018):

“Terranova Infection 1, Parasitic infestations (protozoa, worms, etc.)

Echinocephalus Infestation, Parasitic infestations (protozoa, worms, etc.)”

Bailly (2018) lists *Terranova edcaballeroi* in addition to other species already mentioned as parasites of *Potamotrygon hystrix*.

Threat to Humans

From de Haro and Pommier (2003):

“[...] The other case involved a sting by a fresh-water Amazon sting-ray [kept as a pet and identified earlier in the text as *Potamotrygon hystrix* but this is most likely a misidentification as *P. hystrix* is not present in the Amazon] that led to extensive swelling and systemic symptoms (trembling and nausea). Both of these patients required 24-h hospitalization for symptomatic treatment (wound debridement, disinfecting, analgesics and antibiotics).”

3 Impacts of Introductions

This species does not have any reported introductions. Therefore, there was no information on impacts of introductions.

4 History of Invasiveness

There were no records of introductions found for this species. Therefore the history of invasiveness is classified as No Known Nonnative Population.

5 Global Distribution



Figure 1. Global Distribution of *Potamotrygon hystrix*. Observations are located in Ecuador, Colombia, Venezuela, French Guiana, Suriname, Guyana, Brazil, Paraguay, and Argentina. Map from GBIF Secretariat (2017) [misspelled as *P. hystrix*].

P. hystrix is only found in the wild in the Paraná and Paraguay River basins, in the countries of Argentina, Brazil, Paraguay and Uruguay (Soto et al. 2009; Froese and Pauly 2018). Records outside these basins, specifically those located in French Guiana, Guyana, Suriname, Ecuador, Colombia, and Venezuela are likely due to misidentifications of other species, which has been reported by Soto et al. (2009) and Froese and Pauly (2018). Those locations were not used as source points for the climate match. A point in northern Brazil was also excluded as a source point since it was outside the known range (the Paraná and Paraguay River basins), and in an area (Amazon Basin) where misidentifications have been reported (Soto et al. 2009; Froese and Pauly 2018). No georeferenced locations were available for the portion of the range in Uruguay.

6 Distribution Within the United States

No records of *Potamotrygon hystrix* in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Potamotrygon hystrix* was low for the majority of the contiguous United States. The Southeastern Atlantic Coast, Florida, and an area from southeastern Texas to central Oklahoma all had medium to high climate matches. The climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.043, medium (scores between 0.005 and 0.103, exclusive, are classified as medium). The following states had individually high Climate 6 scores: Florida, Georgia, South Carolina, and Texas. North Carolina and Oklahoma had medium individual Climate 6 scores. All other States had low individual scores.

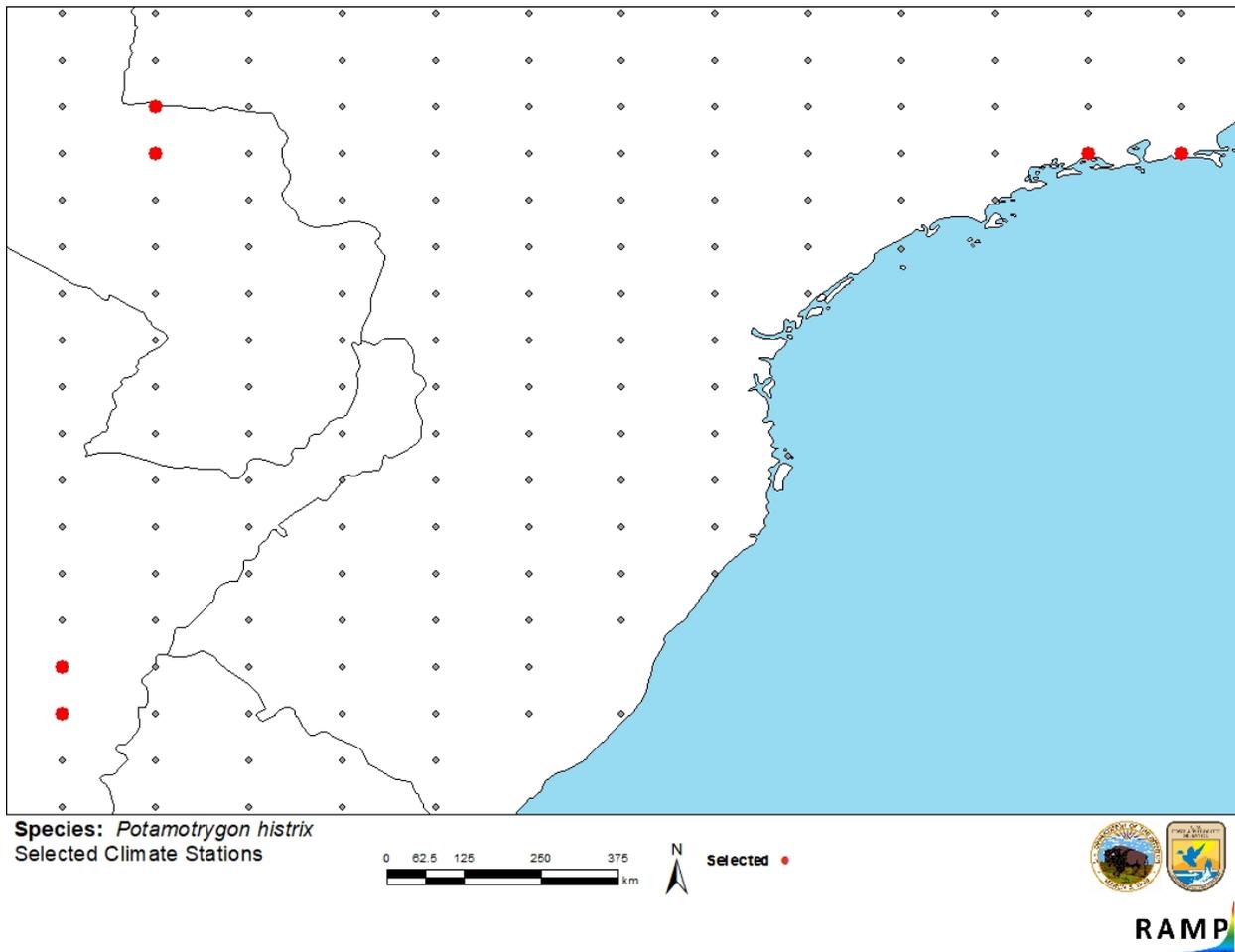


Figure 2. RAMP (Sanders et al. 2018) source map for showing weather stations in South America selected as source locations (red; Argentina, Brazil, Paraguay) and non-source locations (gray) for *Potamotrygon hystrix* climate matching. Source locations from GBIF Secretariat (2017), with some points eliminated based on information provided in Soto et al. (2009) and Froese and Pauly (2018). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

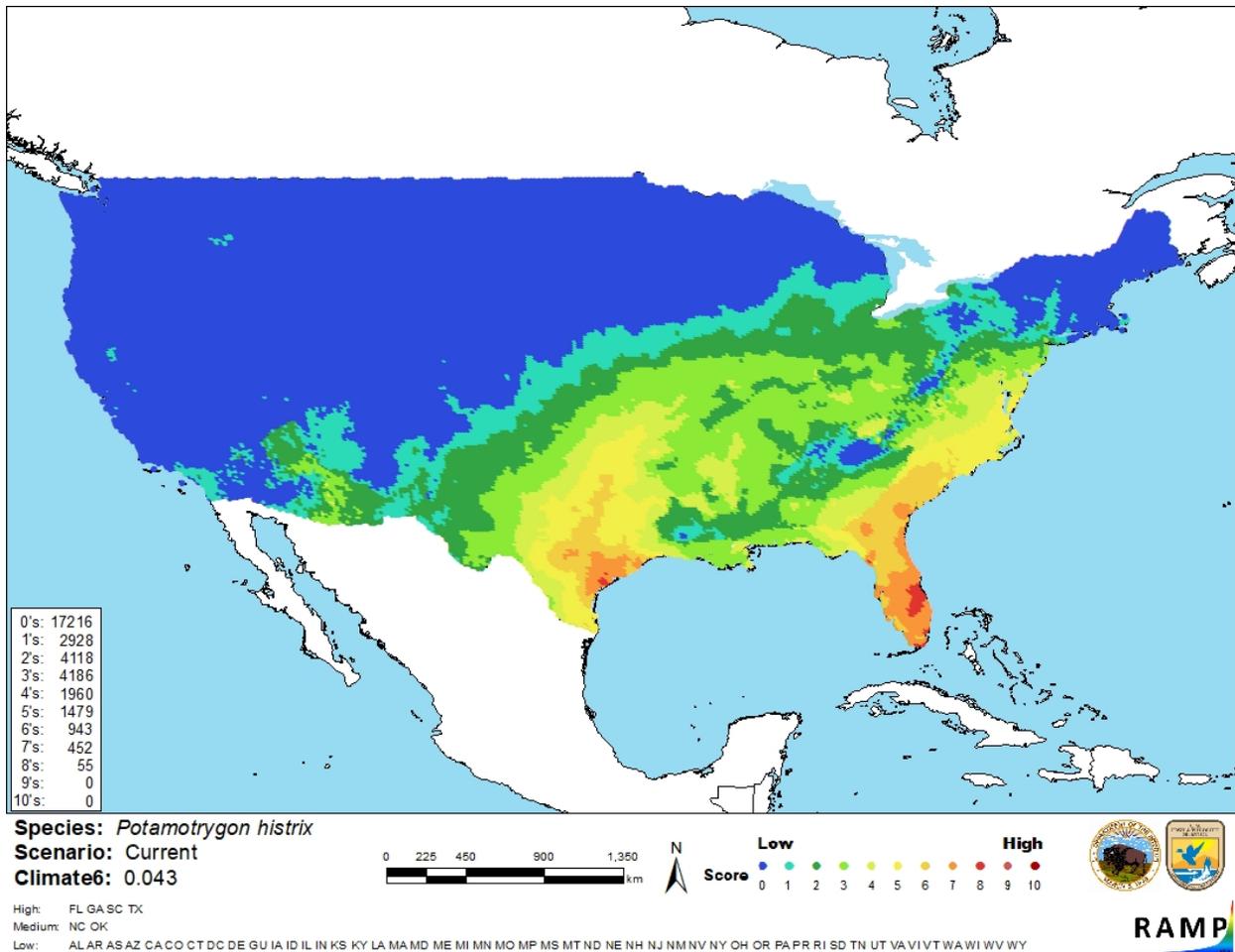


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Potamotrygon histrix* in the contiguous United States based on source locations reported by Soto et al. (2009), GBIF Secretariat (2017), and Froese and Pauly (2018). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest 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

The certainty of assessment for *Potamotrygon histrix* is low. The probable misidentifications and the lack of life history information create some confusion even with the existing information. Georeferenced observations to use in selecting source points for the climate match were not

available in parts of the known range. No records of introductions were found for *Potamotrygon hystrix*.

9 Risk Assessment

Summary of Risk to the Contiguous United States

The Porcupine River Stingray (*Potamotrygon hystrix*) is a freshwater stingray native to the Paraná and Paraguay River basins in South America. *P. hystrix* is used as a food source and is potentially present illegally in the ornamental trade. *P. hystrix* is listed as a conditional species in Florida, which prohibits possession without a special permit. As with most stingrays, there is risk of injury to humans from the barbed spine present on the tail of this species. The history of invasiveness for *Potamotrygon hystrix* is classified as No Known Nonnative Population. This species may be present in the aquarium trade. No records of introduction into the wild were found. The climate match with the contiguous United States is medium. Much of the contiguous United States had a low match with areas of high match in the southeast, southeastern Texas, and central Oklahoma. The certainty of assessment is low due to lack of information. The overall risk category is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Medium**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information:** Potential risk of injury to humans from barbed spine present on the tail.
- **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.

Alves RRN, Alves HN. 2011. The faunal drugstore: animal-based remedies used in traditional medicines in Latin America. *Journal of Ethnobiology and Ethnomedicine* 7:9.

Araújo MLG, Charvet-Almeida P, Almeida MP, Pereira H. 2004. Freshwater stingrays (*Potamotrygonidae*): status, conservation and management challenges. Information document AC 20:1–6.

Bailly N. 2018. *Potamotrygon hystrix* (Müller & Henle, 1841). In World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=882209> (January 2018).

de Haro L, Pommier P. 2003. Envenomation: a real risk of keeping exotic house pets. *Veterinary and Human Toxicology* 45:214–216.

- Eschmeyer WN, Fricke R, van der Laan R, editors. 2018. Catalog of fishes: genera, species, references. California Academy of Science. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (January 2018).
- [FFWCC] Florida Fish and Wildlife Conservation Commission. 2020. Conditional species list. Tallahassee, Florida: Florida Fish and Wildlife Conservation Commission. Available: <http://myfwc.com/wildlifehabitats/nonnatives/regulations/conditional/> (October 2020).
- Froese R, Pauly D, editors. 2018. *Potamotrygon hystrix* (Müller & Henle, 1841). FishBase. Available: <http://www.fishbase.org/summary/Potamotrygon-hystrix.html> (January 2018).
- GBIF Secretariat. 2017. GBIF backbone taxonomy: *Potamotrygon hystrix* (Müller & Henle, 1841). Copenhagen: Global Biodiversity Information Facility. Available <https://www.gbif.org/species/2419364> (December 2017).
- [ITIS] Integrated Taxonomic Information System. 2017. *Potamotrygon hystrix* (Müller and Henle, 1841). Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=564437#null (December 2017).
- [OIE] World Organisation for Animal Health. 2020. OIE-listed diseases, infections and infestations in force in 2020. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2020/> (October 2020).
- Poelen JH, Simons JD, Mungall CJ. 2014. Global Biotic Interactions: an open infrastructure to share and analyze species-interaction datasets. *Ecological Informatics* 24:148–159.
- Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.
- Soto JMR, Charvet-Almeida P, Pinto de Almeida M. 2009. *Potamotrygon hystrix*. The IUCN Red List of Threatened Species 2009: e.T161657A5474126. Available <http://www.iucnredlist.org/details/161657/0> (January 2018).

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.

- Achenbach GM, de M. Achenbach V. 1976. Notas acerca de algunas especies de raya fluvial (Batoidei, Potamotrygonidae), que frecuentan el sistema hidrográfico del río Paraná medio en el Departamento La Capital (Santa Fe-Argentina). *Comunicaciones del Museo Provincial de Ciencias Naturales Florentino Ameghino* 8:1–34.

- Araújo MLG, Charvet-Almeida P, Almeida MP, Pereira H. 2004. Freshwater stingrays (Potamotrygonidae): status, conservation and management challenges. Information document presented to CITES Animals Committee AC20:8.
- Baensch HA, Riehl R. 1995. Aquarien atlas, band 4. Melle, Germany: Mergus Verlag GmbH, Verlag für Natur-und Heimtierkunde.
- Boujard T, Pascal M, Meunier FJ, Le Bail P-Y. 1997. Poissons de Guyane. Guide écologique de l'Approuague et de la réserve des Nouragues. Paris: Institut National de la Recherche Agronomique.
- Ferreira EJG, Zuanon JAS, dos Santos GM. 1998. Peixes comerciais do médio Amazonas. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis.
- López HL, Miquelarena AM, Menni RC. 2003. Lista comentada de los peces continentales de la Argentina. ProBiota, Serie Técnica y Didáctica 5:1–85.
- Müller J, Henle FGJ. 1838-41. Systematische Beschreibung der Plagiostomen. Berlin: Veit und Comp.
- Riede K. 2004. Global register of migratory species - from global to regional scales. Bonn: Federal Agency for Nature Conservation. Final Report. R&D-Projekt 808 05 081.
- Torres DF, Oliveira ES, Alves RRN, Vasconcellos A. 2009. Etnobotânica e Etnozoologia em Unidades de Conservação: Uso da biodiversidade na Apa de Genipabu, Rio Grande do Norte, Brasil. Interciencia 34:623–629.
- Ziemendorff S. 2008. Sustancias estimulantes y brebajes afrodisíacos en la tradición de la Amazonía peruana. Culturas populares 7:1–7.