

***Potamotrygon leopoldi* (a stingray, no common name)**

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2012

Revised, September 2018

Web Version, 2/26/2021

Organism Type: Fish

Overall Risk Assessment Category: Uncertain



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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“[In Brazil:] Known from the Xingu and Fresco Rivers of the Xingu River basin [de Carvalho et al. 2003]. Type locality, little creek on the right shore of Alto Xingú, Mato Grosso [Eschmeyer 1998].”

From Charvet-Almeida et al. (2009):

“Possibly endemic to the Xingu River Basin (Brazil) (Rosa 1985). Incorrectly indicated as being restricted to a single river (Carvalho et al. 2003), this species has been observed and photographed in the Xingu River and at least two of its tributaries (Curuá and Iriri Rivers) (Charvet-Almeida and Almeida pers. obs.).”

Status in the United States

No records of *Potamotrygon leopoldi* in the wild in the United States were found. *P. leopoldi* is in trade in the United States.

From Froese and Pauly (2018):

“Confiscated by a wildlife enforcement officer from an aquarium dealer in California.”

According to Chapman et al. (1994), *P. leopoldi* was imported to the United States for the ornamental industry in October 1992.

The Florida Fish and Wildlife Conservation Commission has listed the freshwater stingray *Potamotrygon leopoldi* as a conditional species. Conditional nonnative species (FFWCC 2018), “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.”

From Arizona Office of the Secretary of State (2013):

“I. Fish listed below are considered restricted live wildlife:

[...]

32. All species of the family Potamotrygonidae. Common name: stingray.”

From California Department of Fish and Wildlife (2019):

“It shall be unlawful to import, transport, or possess live animals restricted in subsection (c) below except under permit issued by the department. [...]

Restricted species include:

[...]

Family Potamotrygonidae-River stingrays: All species (D).”

From Georgia DNR (2020):

“The exotic species listed below, except where otherwise noted, may not be held as pets in Georgia. This list is not all inclusive. [...]

Fresh-water stingray; all species”

From Mississippi Secretary of State (2019):

“All species of the following animals and plants have been determined to be detrimental to the State's native resources and further sales or distribution are prohibited in Mississippi. No person shall import, sell, possess, transport, release or cause to be released into the waters of the state any of the following aquatic species or hybrids thereof. However, species listed as prohibited may be allowed under a permitting process where environmental impact has been assessed. [...]

Freshwater stingrays Family Potamotrygonidae **** [indicating all species within the family are included in the regulation]”

From State of Nevada (2018):

“Except as otherwise provided in this section and NAC 504.486, the importation, transportation or possession of the following species of live wildlife or hybrids thereof, including viable embryos or gametes, is prohibited:

[...]

Freshwater stingray.....All species in the family Potamotrygonidae”

From Oklahoma Secretary of State (2019):

“Until such time as is necessary for the Department of Wildlife Conservation to obtain adequate information for the determination of other harmful or potentially harmful exotic species, the importation into the State and/or the possession of the following exotic fish or their eggs is prohibited:

[...]

Freshwater Stingray group: *Paratrygon* spp., *Potomotrygon* spp., and *Disceus* spp.”

From Texas Parks and Wildlife (2020):

“The organisms listed here are legally classified as exotic, harmful, or potentially harmful. No person may possess or place them into water of this state except as authorized by the department.

Permits are required for any individual to possess, sell, import, export, transport or propagate listed species for zoological or research purposes; for aquaculture (allowed only for Blue, Nile, or Mozambique tilapia, Triploid Grass Carp, or Pacific White Shrimp); or for aquatic weed control (for example, Triploid Grass Carp in private ponds).

[...]

Freshwater Stingrays, Family Potamotrygonidae All species”

Means of Introductions in the United States

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

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2018), *Potamotrygon leopoldi* Castex and Castello 1970 is the valid name for this species; it is also the original name.

From ITIS (2018):

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 leopoldi* Castex & Castello, 1970

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 111 cm WD male/unsexed; [Giarrizzo et al. 2015]; max. published weight: 17.0 kg [Giarrizzo et al. 2015]”

From Charvet et al. (2018):

“Overall, females attain larger disc width (W_D) than males; the former are mature at 43–46 cm W_D and the latter at 34–37 cm W_D (Charvet-Almeida, 2006).”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; pH range: 6.0 - 6.8. [...]; 20°C - 25°C [assumed to be recommended aquarium temperature] [Baensch and Riehl 1997]”

Climate

From Froese and Pauly (2018):

“Tropical; [...]”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“[In Brazil:] Known from the Xingu and Fresco Rivers of the Xingu River basin [de Carvalho et al. 2003]. Type locality, little creek on the right shore of Alto Xingú, Mato Grosso [Eschmeyer 1998].”

From Charvet-Almeida et al. (2009):

“Possibly endemic to the Xingu River Basin (Brazil) (Rosa 1985). Incorrectly indicated as being restricted to a single river (Carvalho et al. 2003), this species has been observed and photographed in the Xingu River and at least two of its tributaries (Curuá and Iriiri Rivers) (Charvet-Almeida and Almeida pers. obs.).”

Introduced

No records of *Potamotrygon leopoldi* introductions were found.

Means of Introduction Outside the United States

No records of *Potamotrygon leopoldi* introductions were found.

Short Description

From Charvet-Almeida et al. (2009):

“This freshwater stingray presents a moderate chromatic variation. It could be mistaken for *Potamotrygon henlei*, which has very similar colour patterns (authors’ pers. obs.).”

From Ramos (2017):

“*Potamotrygon leopoldi* has an intense black dorsal color, as in *P. albimaculata*, but with large, relatively few and incomplete yellow to whitish ocelli or incomplete rings or sickle-shaped figures with black centers on mid-disc (CARVALHO, 2016a). Other species that could look similar, as *P. motoro* or *P. henlei* shows more brow or grayish colors, and darker rings around ocelli, which is not seen in *P. leopoldi*, considering their intense dorsal color”

Biology

From Froese and Pauly (2018):

“Buried in sand during day, hunting for benthic invertebrates during night [Baensch and Riehl 1997].”

From Charvet-Almeida et al. (2009):

“This species seems to prefer rocky river bottoms where it probably more easily finds freshwater snails and crabs that are among its main food items (Charvet-Almeida and Almeida pers. obs.).

The available unpublished data indicates that this species has a relatively high fecundity compared with other potamotrygonids, ranging from 4 to 12 pups per litter (average of 7-8) (Charvet-Almeida and Almeida unpublished data).”

“Historically, severe droughts (associated with the El-Niño phenomenon) in some small tributaries of the Xingu river have caused high mortality (Charvet-Almeida, pers. obs.).”

From Charvet et al. (2018):

“*Potamotrygon leopoldi* exhibits trophodermic-matrotrophic viviparity; the gestation period lasts c. 5–6 months and births occur over 4–5 months (Charvet-Almeida, 2006). The reproductive cycle is strongly influenced by the alternating of wet and dry seasons, which triggers changes in the river flow from <1000 to $>20\,000\text{ m}^3\text{s}^{-1}$ (dos Santos *et al.*, 2016).”

Human Uses

From Charvet-Almeida et al. (2009):

“Juveniles are captured for the international ornamental fish trade and at present this activity is regulated by an export quota system that must be correctly enforced by the environmental and export related national agencies. It is important to note that captures for ornamental purposes represents an important socio-economic activity for riparian residents in this region.”

“This species is seldom used as a food source but is captured as bycatch (mainly by hooking, netting, entanglement and occasionally by poisoning) in other target species fisheries.”

From Charvet et al. (2018):

“Regarding fisheries, as per Charvet-Almeida *et al.* (2002), stingrays comprise 1% of the total ornamental fish exports and *P. leopoldi*, together with another five Potamotrygonidae species, make up 67% of all freshwater stingrays exported from Manaus, Amazonas state [Brazil] (Charvet-Almeida, 2006).”

From Oldfield (2005):

“In 1999, Ross summarized some cases of captive breeding that had occurred up to that time, including three species bred in public aquariums: *P. magdalenae* (Belle Isle Aquarium), *P. leopoldi* (Aquarium of the Americas), and *P. motoro* (Exotarium Frankfurt), and three by an independent aquarist: *P. motoro*, *P. leopoldi*, and *P. hystrix*.”

According to Ramos (2017), over 27,000 individuals of *Potamotrygon leopoldi* were exported from Brazil between 2003 and 2016.

From Ramos (2017):

“It’s the most expensive of the Brazilian stingrays. Its ornamental commerce is limited to 5000 specimens/year, and only specimens smaller than 30cm can be exported for the ornamental commerce. The distribution is completely restricted to Brazil, and it’s the main target of illegal trade, since it could regularly reach values as high as US\$2.500 each specimen.”

Diseases

No records of OIE-reportable diseases (OIE 2021) were found for *Potamotrygon leopoldi*.

Marques (2000) lists *P. leopoldi* as a host for *Plesiorhinebothroides jaime*, *Rhinebothrium paratrygoni*, *Rhinebothroides freitasi*, *Potamotrygonocetus fitzgeraldae*, Cavisomidae sp., and *Dolops* sp.

Alves et al. (2017) list *P. leopoldi* as a host for *Rhinebothrium copianullum*.

Magalhães et al. (2018) list *P. leopoldi* as a host for *Dolops striata*.

Poelen et al. (2014) list *Potamotrygonocotyle dromedarius* as an additional parasite of *P. leopoldi*.

Threat to Humans

From Charvet-Almeida et al. (2009):

“[...] the species faces persecution in some areas due to fear of sting injuries.”

From Kovtalo et al. (2017):

“The local injury caused by these stingrays [*Potamotrygon leopoldi*] is due to mechanical penetration of the sting into the tissue and subsequent release of venom leading to the development of local edema, necrosis, intense local pain and cases of secondary infection [IUCN undated].”

“Two different cultures of motile rod like Gram negative bacteria were isolated from skin ulcer on *Potamotrygon*’s [*P. leopoldi*] tail. Isolated strains were identified as *Shewanella* algae and *Citrobacter freundii* on the basis of their morphological, cultural, physiological and biochemical properties. Both species are rarely associated with human diseases. However, some strains of *C. freundii*, which is a part of normal gut microbiome, have been associated with opportunistic [sic] nosocomial infections of blood, respiratory and urinary tract in immunocompromised patients [Whalen et al. 2007]. Also, reports of *Shewanella* infections have been increasing [Bulut et al. 2004; Sharma and Kalawat 2010].”

3 Impacts of Introductions

No records of *Potamotrygon leopoldi* introductions were found, therefore there is no information on impacts of introductions.

Potamotrygon leopoldi is regulated in multiple States, see section 1.

4 History of Invasiveness

No record of introduction were found for *Potamotrygon leopoldi*. *P. leopoldi* is in trade. However, the information available regarding volume and duration (Ramos 2017) does not meet the thresholds for ‘significant trade history’ which would have allowed the history of invasiveness to be classified as low. The history of invasiveness of *Potamotrygon leopoldi* is classified as No Known Nonnative Population.

5 Global Distribution



Figure 1. Known global distribution of *Potamotrygon leopoldi*. Locations are in Brazil. Map from GBIF Secretariat (2021). The observation to the southwest was not used to select source points for the climate match, it is outside the described native range and could not be confirmed by another source.

6 Distribution Within the United States

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

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Potamotrygon leopoldi* was low across the entire contiguous United States. There was one area of medium match at the southern tip of Florida. There were no areas of high match. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low (scores between 0.000 and 0.005, inclusive, are classified as low). All states had low individual climate scores.

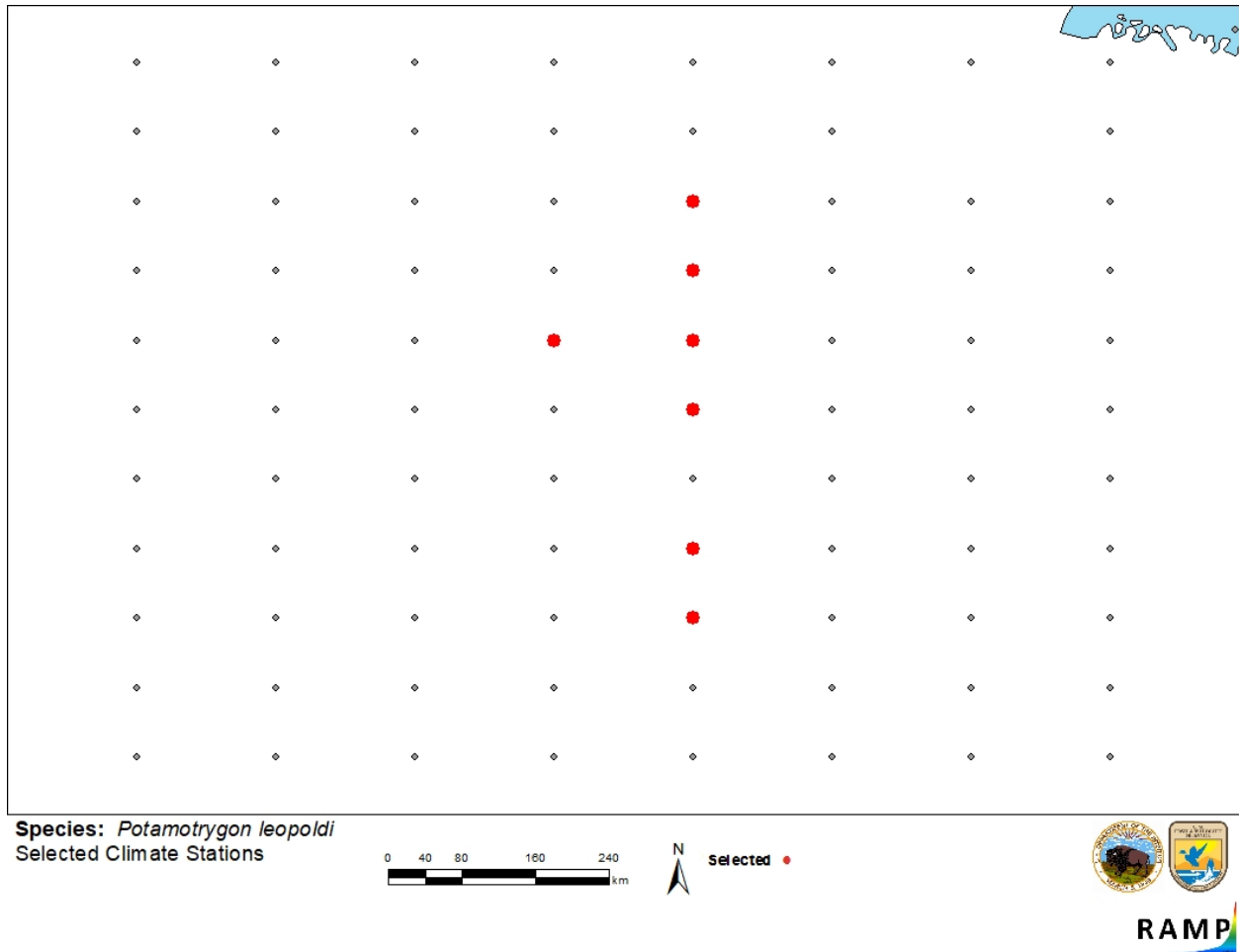


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in northern Brazil selected as source locations (red) and non-source locations (gray) for *Potamotrygon leopoldi* climate matching. Source locations from GBIF Secretariat (2021). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

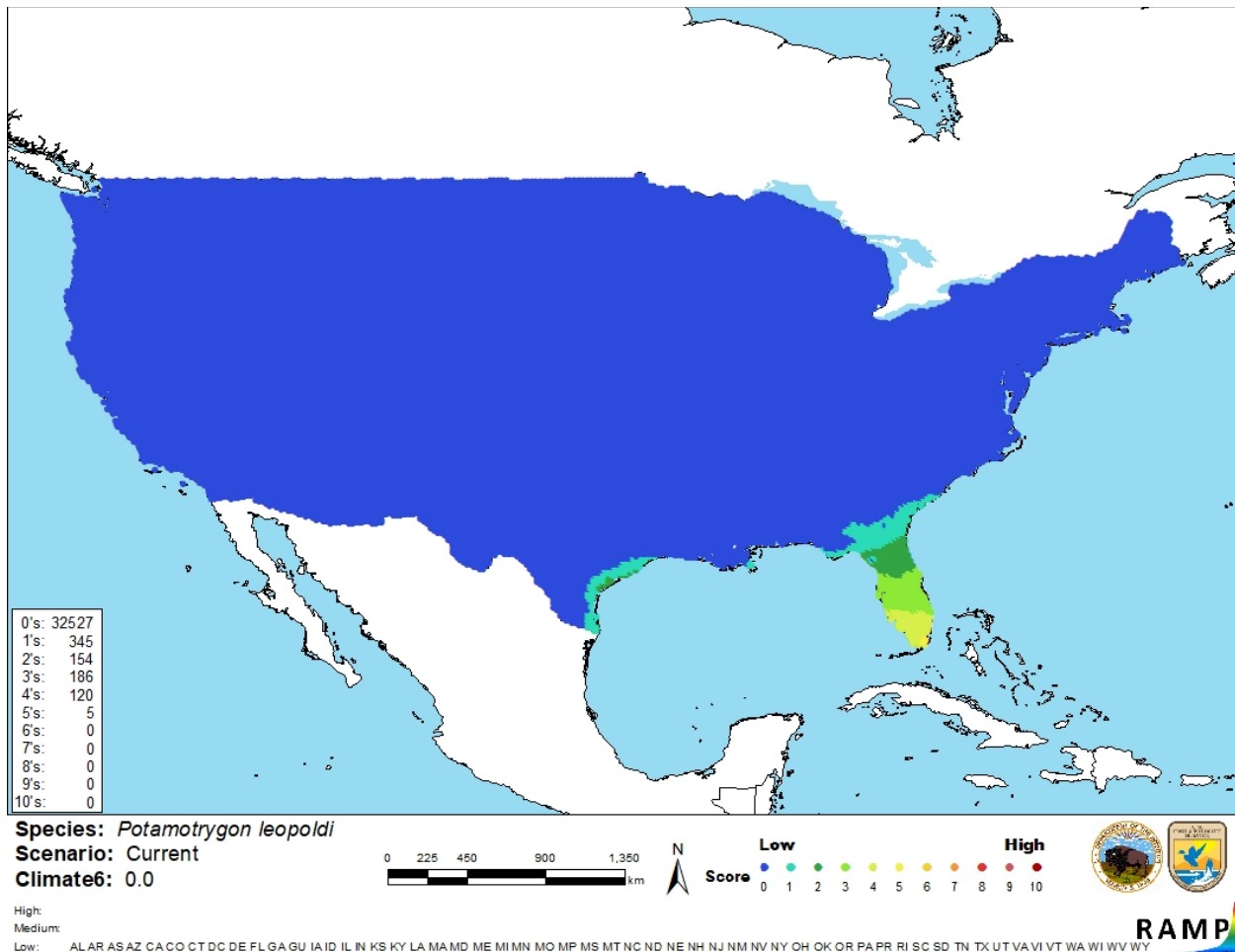


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Potamotrygon leopoldi* in the contiguous United States based on source locations reported by GBIF Secretariat (2021). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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 leopoldi* is low. Some quality information is available for this species. No records of introduction were found, therefore there is no information on impacts of introductions.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Potamotrygon leopoldi is a species of freshwater stingray native to the Xingu River basin in northern Brazil. This species is utilized in the aquarium trade at low volumes due to export restrictions. The species is also bred in aquariums, caught as by-catch, and is persecuted to some extent due to fear of injury by the tail spine. Injuries can occur and can develop infections in addition to the puncture wound. *P. leopoldi* is regulated in multiple States. The history of invasiveness is classified as No Known Nonnative Population. There were no records of introduction. The overall climate match with the contiguous United States is low. A single area of medium match occurred in southern Florida. The certainty of assessment is low due to lack of information on impact. The overall risk assessment category is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information: The tail spine of *Potamotrygon leopoldi* is venomous.**
- **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.

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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.

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