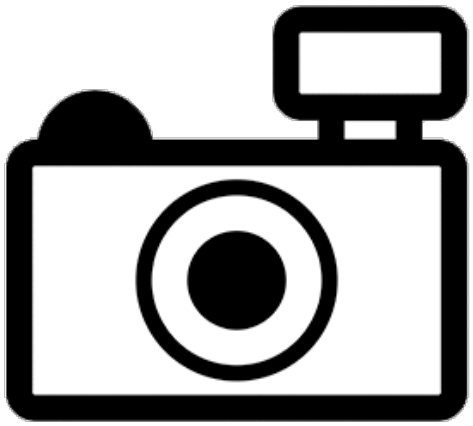
Potamotrygon tatianae (a stingray, no common name)

Ecological Risk Screening Summary

U. S. Fish & Wildlife Service, July 2014
Revised, January 2018
Web Version, 3/10/2021

Organism Type: Fish
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

"South America: Peru"

From Silva and Carvalho (2011a):

"*Potamotrygon tatianae* is known only from Río Madre de Díos, upper Río Madeira basin, Peru"

Lasso et al. (2016) lists Bolivia and Peru as locations where *Potamotrygon tatianae* is present.

Status in the United States

No records of *Potamotrygon tatianae* in the United States were found. No information on trade of this species in the United States was found.

The Florida Fish and Wildlife Conservation Commission has listed the freshwater stingray *Potamotrygon tatianae* (as a member of Family Potamotrygonidae) 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."

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 tatianae* in the United States were found.

Remarks

From Silva and Carvalho (2011a):

"*Potamotrygon tatianae* was briefly, but only tentatively presented as distinct in a recent taxonomic revision of *P. falkneri* (Silva & Carvalho, 2011[b]), but the acquisition of new morphological data, concerning dermal denticle morphology, ventral lateral-line system, and skeletal anatomy, further corroborated that it represents a separate species. Although occurring sympatrically with *P. falkneri* in Río Madre de Díos, and *P. falkneri* is a species with a demonstrably high intraspecific variation in color pattern, we were able to conclude that *P. tatianae* does not represent an example of this variation because it can be distinguished by other internal and external morphological features."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2018):

"Current status: Valid as *Potamotrygon tatianae* Silva & Carvalho 2011[a]."

From ITIS (2018):

Kingdom Animalia
Phylum Chordata
Subphylum Vertebrata
Class Chondrichthyes
Subclass Elasmobranchii
Superorder Euselachii
Order Myliobatiformes
Family Potamotrygonidae
Genus *Potamotrygon*
Species *Potamotrygon tatianae* (Silva & Carvalho, 2011[a])

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 34.8cm WD male/unsexed; [Fontenelle et al. 2014]"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal"

Climate

From Froese and Pauly (2018):

"Tropical 12°S - 13°S, 71°W - 72°W"

Distribution Outside the United States

Native

From Froese and Pauly (2018):

"South America: Peru"

From Silva and Carvalho (2011a):

"*Potamotrygon tatianae* is known only from Río Madre de Díos, upper Río Madeira basin, Peru"

Lasso et al. (2016) lists Bolivia and Peru as locations where *Potamotrygon tatianae* is present.

Introduced

No records of *Potamotrygon tatianae* introductions were found.

Means of Introduction Outside the United States

No records of *Potamotrygon tatianae* introductions were found.

Short Description

From Silva and Carvalho (2011a):

"Disc oval, longer than wide (DL varying from 102.6 to 131.2% of DW) […]. Anterior margin of disc convex, with a small fleshy protuberance on snout. Posterior margins of disc also convex. Disc dorsoventrally compressed. Anterior portion of disc with small, prominent, and oval shaped eyes […]. Spiracles oval and small (two to three times eye diameter) situated posterior to orbits and projecting obliquely from midline. Interspiracular distance approximately 1.6 times greater than interorbital distance. Nasal curtain partially covering mouth and presenting small, fringed posterior margin […]. Mouth small (mouth width ranging from 7.8 to 11% DW); mouth opening relatively straight across, and with five buccal papillae, two lateral and three central. One of three central papillae closer to lower jaw tooth plate. Mouth width and internarial space about equal. Labial ridges present. Teeth set in quincunx, with narrow and arched upper tooth plate, and wide and trapezoidal lower tooth plate. Tooth rows varying from 36-46 on upper jaw and 33-45 on lower jaw. Teeth relatively small, wider than long, and with flattened, elliptical, or lozenge-shaped crowns. Cusps rounded in males, or absent. Tooth plates presenting dignathic heterodonty. Teeth in lateral rows with elliptical crowns and generally lacking cusps. Teeth in central rows more robust, with lozenge-shaped crowns and rounded cusps; sexual dimorphism not present."

"Pelvic fins wider than long, partially covered by disc, and with posterior margins exposed posterior to disc margins. Clasper dorsoventrally depressed […], wider at bases and narrowing toward tips. Clasper groove beginning proximally at level of posterior margin of pelvics. Anterior half of clasper groove running obliquely from inner margin to outer margin of clasper. Posterior half of clasper groove curving inward at level of dorsal pseudosiphon, reaching midline and extending to clasper tip. Dorsal pseudosiphon well developed near inner edge, elliptical, and obliquely oriented in relation to midline. Ventral pseudosiphon also well developed, located at lateral distal edge of clasper.

Tail elongated (mean tail length 109% of DW) and wide (mean width 15.5% of DW), with proximal portion slightly depressed dorsoventrally, and tapering from base to just posterior to caudal sting insertion. Distal portion of tail, posterior to sting base, laterally compressed and presenting membranous dorsal and ventral caudal folds (these about 3 mm in height). Dorsal caudal fold originating underneath sting tip and extending to tail extremity. Ventral caudal fold originating at level ventral to sting base, extending to tail extremity. One irregular row of spines on middorsal tail extending from base of tail to level of sting origin. Enlarged spines on tail with rounded bases."

"Disc with scattered dermal denticles mainly on midregion, from interorbital area to tail base […]. Denticles on middisc with predominantly four crown ridges. Crown ridges rarely showing crown dichotomies. In dorsal view, denticles asymmetrical and star-shaped due to different lengths of crown ridges. Denticles in central region with wide and flattened crown plates, bearing pointed projections. Anterior crowns ridges or closer to crown plate projection shorter than

posterior ones. Minute dermal denticles interspersed with larger denticles, exhibiting two crown ridges. Denticles become dispersed and smaller farther away from central disc region, with crown ridges becoming less evident. Denticles on disc margins practically absent. Dermal denticles also occur around and on margins of spiracle openings, as well as on orbits. Denticles devoid of crown ridges, but with pointed crowns, occur exclusively on spiracle superior margins, whereas denticles with two crown ridges occur on remaining regions. Pelvic fins and claspers devoid of dermal denticles. Denticles on dorsal tail small, devoid of crown ridges and with crowns sharply pointed. Dorsal caudal fold presenting numerous very small dermal denticles; ventral caudal fold devoid of dermal denticles. Dermal denticles also occur on lateral tail region, from slightly anterior to sting base to distal tail extremity. Denticles more developed near base of caudal stings."

"Disc background color generally blackish-brown. Spots on background close together, narrow, with variable extensions and presenting exclusively vermicular shapes […]. Spots beige, light beige or dark brown. Some specimens presenting irregular vermicular spots forming strong vermicular patterns […]. Spots on central region narrower than the ones positioned marginally. In addition, small circular spots on disc edges present in most specimens. Pelvic fins dorsally similar to disc. Dorsal tail also with same basic color pattern. Ventral medial region of disc white in majority of specimens. In some cases, within white background, small, rounded grey spots occur laterally and posterolaterally to gill slits. These spots scattered anteriorly, and coalesce posterioly. In some specimens, rounded and scattered gray spots also occur within the space between branchial slits. Border of disc margins gray, from level of nasal slits to posterior region of disc. Some specimens predominantly gray ventrally, with white embracing only a small portion of anterior region. In these specimens, branchial slits surrounded by gray coloration. Light gray and white circular spots may occur over gray background. Closely packed spots form continuous stripes on lateral borders of disc. In region posterior to branchial slits, a black oval spot of varying shape and intensity occurs. Pelvic fins with predominantly white ventral coloration. Dark gray coloration restricted to fine bands on posterior region of fins, presenting small circular light gray spots. Ventral tail region with white circular and sometimes vermicular spots restricted to tail borders, over a light gray background. At ventral midtail, gray background coloration homogeneous and without spots."

Biology

Information on the biology of *Potamotrygon tatianae* was not found.

Human Uses

From Ng et al. (2010):

"Freshwater stingrays of the family Potamotrygonidae are native to the Atlantic drainages of South America (Berra 2001), and are frequently encountered in the aquarium trade, where they are popular as pets (Ross 1999; de Araújo et al. 2004). More than 60,000 specimens are sold worldwide, with Brazil alone accounting for up to 47,000 specimens exported annually (including both legally and illegally traded specimens) (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) 2006) and Peru accounting for another 15,000 (Moreau and Coomes 2007). In addition, large-scale captive breeding in Asia has added more specimens to the trade, and contributed to their popularity through lowered shipping costs

and enhanced ‘‘attractiveness’’ of the stingrays with the production of hybrids with various color patterns (CITES 2009).”

Diseases

No records of OIE-reportable diseases (OIE 2021) were found for *Potamotrygon tatianae.* Information on diseases of *Potamotrygon tatianae* was not found.

Threat to Humans

From Reynolds et al. (2017):

“Envenomation [process by which venom is injected by the stinger] by a potamotrygonid [includes *P. tatianae*] may result in severe injury, typically exceeding the degree of trauma resulting from the barb of a marine stingray. […] Potamotrygonid envenomation may result not only in severe pain, but also edema, erythema, tissue necrosis, and ulcers, which can take up to three months to heal [Haddad et al., 2004].”

3 Impacts of Introductions

No records of *Potamotrygon tatianae* introductions were found.

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

4 History of Invasiveness

No record of introductions of *Potamotrygon tatianae* were found. Therefore, the history of invasiveness of *Potamotrygon tatianae* is classified as No Known Nonnative Population.

5 Global Distribution

Figure 1. Known global distribution of *Potamotrygon tatianae*. Photo: Kmusser. Licensed under CC BY-SA 3.0. Available: https://en.wikipedia.org/wiki/Madre_de_Dios_River#/media/File:Madredediosrivermap.png. (January 2018). The Madre de Dios River begins in Peru and flows through northern Bolivia.

The source points for the climate match were chosen based on the description of the native range from Silva and Carvalho (2011a) and Lasso et al. (2016) (see section 1). No records of specific georeferenced observations of *Potamotrygon tatianae* were found, therefore the area of Madre de Dios River (Figure 1) was used as the source location for the climate match.

6 Distribution Within the United States

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

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Potamotrygon tatianae* was low across most of the contiguous United States. There was a small area of high match in the southern tip of Florida and much of the rest of southern Florida had a medium match. Everywhere else had a low match. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.004, low (scores between 0.000 and 0.005, inclusive, are classified as low). Florida had a high individual Climate 6 score, while all other States had low individual climate scores. The climate match was based on a general description of the range because there were no georeferenced observations available.

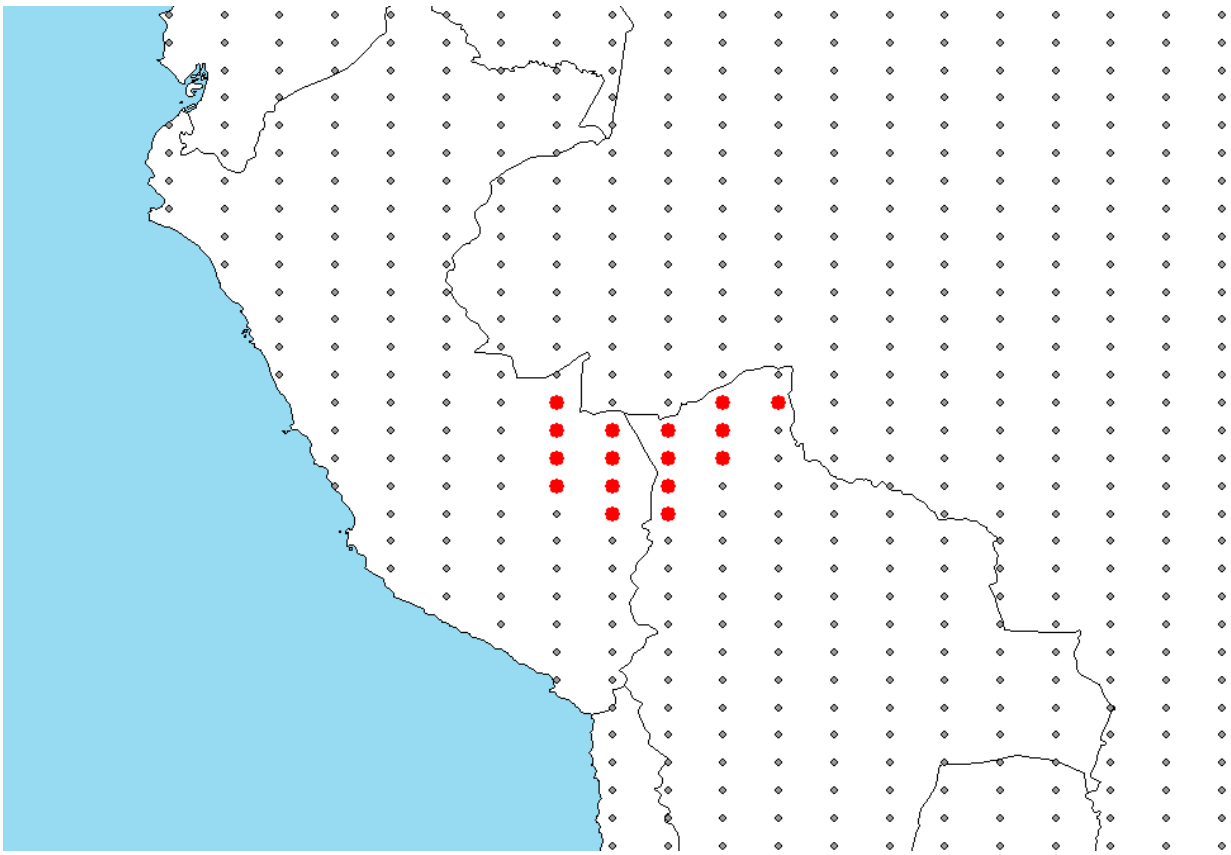


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in southern Peru and northern Bolivia selected as source locations (red) and non-source locations (gray) for *Potamotrygon tatianae* climate matching. Source locations based on range description from Silva and Carvalho (2011a) and Lasso et al. (2016).

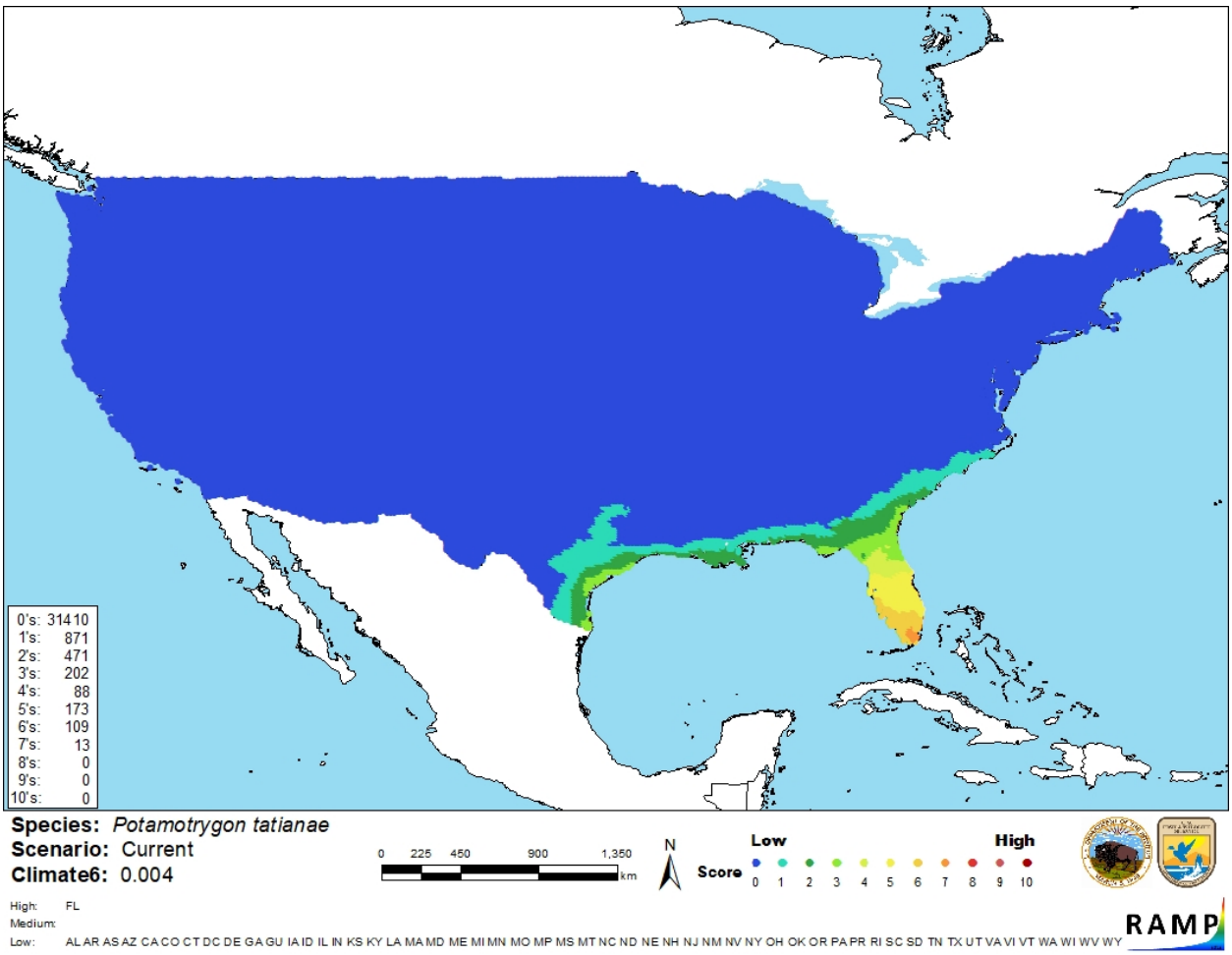


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Potamotrygon tatianae* in the contiguous United States based on source locations reported by Silva and Carvalho (2011a) and Lasso et al. (2016). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest 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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of this assessment is low. Little biological and ecological information was available for *Potamotrygon tatianae*. No records of introductions in the wild were found. The climate match was based on a general description of the species' range and not georeferenced observations. This reduces the certainty in the interpretation of the climate match results.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Potamotrygon tatianae is a stingray native to the Madre de Dios River in southern Peru and northern Bolivia. *P. tatianae* was only recently recognized as a separate species from *P. falkneri,* so there is very little information regarding *P. tatianae*. This species is regulated in multiple States. The history of invasiveness for *Potamotrygon tatianae* is No Known Nonnative Population. There were no records of introduction. The overall climate match with the contiguous United States is low. Peninsular Florida had a medium to high climate match. Everywhere else had a low match. The climate match is based on a verbal description of the range because there were no georeferenced observations available. The certainty of this assessment is low due to lack of information. 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:** No additional remarks.
- **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.

Arizona Office of the Secretary of State. 2013. Live wildlife. Arizona Administrative Code, Game and Fish Commission, Title 12, Chapter 4, Article 4.

California Department of Fish and Wildlife. 2019. Restricted species laws and regulations manual. Available: https://wildlife.ca.gov/Conservation/Invasives/Regulations (November 2020).

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 nonnative species list. Tallahassee: Florida Fish and Wildlife Conservation Commission. Available: https://myfwc.com/wildlifehabitats/nonnatives/conditional-species-list/ (October 2020)

Froese R, Pauly D, editors. 2018. *Potamotrygon tatianae* Silva & Carvalho, 2011. FishBase. Available: http://www.fishbase.org/summary/Potamotrygon-tatianae.html (January 2018).

Georgia [DNR] Department of Natural Resources. 2020. Wild animals/exotics. Social Circle: Georgia Department of Natural Resources Law Enforcement Division. Available: http://gadnrle.org/exotics (November 2020).

[ITIS] Integrated Taxonomic Information System. 2018. *Potamotrygon tatianae* Silva & Carvalho, 2011. Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=943756#null (January 2018).

Lasso CA, Rosa R, Morales-Betancourt MA, Garrone-Neto D, de Carvalho MR, editors. 2016. XV. Rayas de Agua Dulce (Potamotrygonidae) de Suramerica: Parte II Colonia, Brasil, Peru, Bolivia, Paraguay, Uruguay y Argentina. Bogota, D. C., Colombia: Instituto de Investigavion de Recursos Biologicos Alexander von Humboldt.

Mississippi Secretary of State. 2019. Guidelines for aquaculture activities. Mississippi Administrative Code, Title 2, Part 1, Subpart 4, Chapter 11. Jackson: Regulatory and Enforcement Division, Office of the Mississippi Secretary of State.

Ng HH, Tan HH, Yeo DCJ, Ng PKL. 2010. Stingers in a strange land: South American freshwater stingrays (Potamotrygonidae) in Singapore. Biological Invasions 12:2385–2388.

[OIE] World Organisation for Animal Health. 2021. OIE-listed diseases, infections and infestations in force in 2021. Available: http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2021/ (March 2021).

Oklahoma Secretary of State. 2019. List of restricted exotic species. Oklahoma Administrative Code, Title 800, Chapter 20-1-2.

Reynolds J, Hornbrook E, Stettner G, Terrell R. 2017. Husbandry of freshwater stingrays. Pages 99–112 in Smith M, Warmolts D, Thoney D, Hueter R, Murray M, Ezcurra J, editors. Elasmobranch husbandry manual II: recent advances in the care of sharks, rays and their relative. Columbus: Ohio Biological Survey. Special Publication.

Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.

Silva JPCB da, de Carvalho MR. 2011a. A new species of Neotropical freshwater stingray of the genus *Potamotrygon* Garman, 1877 from the Río Madre de de Díos, Peru (Chondrichthyes: Potamotrygonidae). Papéis Avulsos de Zoologia, Museu de Zoologia da Universidade de São Paulo 51:139–154.

State of Nevada. 2018. Restrictions on importation, transportation and possession of certain species. Nevada Administrative Code, Chapter 503, Section 110.

Texas Parks and Wildlife. 2020. Invasive, prohibited and exotic species. Austin: Texas Parks and Wildlife. Available: https://tpwd.texas.gov/huntwild/wild/species/exotic/prohibited_aquatic.phtml (November 2020).

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.

Berra TM. 2001. Freshwater fish distribution. San Diego, California: Academic Press.

[CITES] Convention on International Trade in Endangered Species of Wild Fauna and Flora. 2006. Conservation and management of sharks: species affected by trade. Lima, Peru: Twenty-second meeting of the Animals Committee.

[CITES] Convention on International Trade in Endangered Species of Wild Fauna and Flora. 2009. Conservation and management of sharks and stingrays: regional workshop on South American freshwater stingrays. Geneva, Switzerland: Twenty-fourth meeting of the Animals Committee.

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

Fontenelle JP, Da Silva JPC, De Carvalho MR. 2014. *Potamotrygon limai*, sp. nov., a new species of freshwater stingray from the upper Madeira River system, Amazon basin (Chondrichthyes: Potamotrygonidae). Zootaxa 3765:249–268.

Haddad V Jr, Garrone Neto D, de Paula Neto JB, Marques FPL, Barbaro KC. 2004. Freshwater stingrays: study of epidemiologic, clinic and therapeutic aspects based on 84 envenomings in humans and some enzymatic activities of the venom. Toxicon 43:287–294.

Moreau M-A, Coomes OT. 2007. Aquarium fish exploitation in western Amazonia: conservation issues in Peru. Environmental Conservation 34:12–22

Ross RA. 1999. Freshwater stingrays from South America. Rodgau, Germany: Aqualog Verlag.

Silva JPCB da, de Carvalho MR. 2011b. A taxonomic and morphological description of *Potamotrygon falkneri* Castex and Maciel, 1963 (Chondrichthyes: Myliobatiformes: Potamotrygonidae). Neotropical Ichthyology 9:209–232.