

Largespot River Stingray (*Potamotrygon falkneri*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, June 2015
Revised, January 2018
Web Version, 10/28/2020

Organism Type: Fish
Overall Risk Assessment Category: High



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<http://www.fishbase.se/photos/ThumbnailsSummary.php?Genus=Potamotrygon&Species=falkneri>. (January 2018).

1 Native Range and Status in the United States

Native Range

From da Silva and Carvalho (2011):

“*Potamotrygon falkneri* occurs in the Paraná-Paraguay (Manso, Aricá-Mirim, Casca, Piquiri, Cuiabá, and upper Paraná Rivers) and La Plata (lower Paraná and Colastiné Rivers, Santa Fé

stream, and lago Setúbal) basins, and in the upper Amazon drainage in Bolivia (Madre de Dios, Guaporé, and Beni Rivers), Peru (Madre de Dios and Marañon Rivers), and Brazil (rio Solimões) [...]”

From: Góes de Araújo (2009):

“Northeastern Argentina, central Paraguay, Western of Brazil in Mato Grosso found in Rio Cuiabá, Rio Paraguay, and in Rio Paraná (Middle and High) from Guaíra to Entre Rios (Rosa 1985). In Alto Paraná the species is found at Puerto San Jorge and in the Mouth of Uruguay River (Misiones) (Castex 1964, Castex and Maciel 1965).”

Status in the United States

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

P. falkneri is in trade in the United States (AquaScapeOnline 2020).

The Florida Fish and Wildlife Conservation Commission has listed the freshwater stingray, *Potamotrygon falkneri* 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 falkneri* in the United States were found.

Remarks

The valid name of this species is *Potamotrygon falkneri* (Eschmeyer et al. 2018). *Potamotrygon castexi* is a synonym of *P. falkneri*. This taxonomic change occurred in 2011 (Eschmeyer et al. 2018). Information searches were conducted using both *P. falkneri* and *P. castexi* to ensure completeness of the information used in this assessment.

From Góes de Araújo (2009):

“The Reticulated Freshwater Stingray (*Potamotrygon falkneri*) is a little known freshwater stingray from the Paraná River basin. [...] As other potamotrygonids, it faces numerous identified threats including habitat degradation and fishing activities. Further evaluation when more information [*sic*] available will be required to assess this species beyond Data Deficient.”

From Cruz et al. (2015):

“Four individuals morphologically characterized as *P. motoro* but showing *P. falkneri* mtDNA haplotypes were suspected to be the result of hybridization and were further analyzed with microsatellites. These individuals showed the combination of diagnostic alleles for both species, thus demonstrating for the first time the occurrence of hybrids between species of stingrays.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2018):

“**Current status:** Valid as *Potamotrygon falkneri* Castex & Maciel 1963.”

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 falkneri* (Castex and Maciel, 1963)

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length: 60.0 cm WD male/unsexed; [de Carvalho et al. 2003]”

From Góes de Araújo (2009):

“Maximum size 485 mm disc width (DW) and 892 mm of total length (TL) (Castex and Maciel 1963).”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic.”

Climate

From Froese and Pauly (2018):

“Temperate”

Distribution Outside the United States

Native

From da Silva and Carvalho (2011):

“*Potamotrygon falkneri* occurs in the Paraná-Paraguay (Manso, Aricá-Mirim, Casca, Piquiri, Cuiabá, and upper Paraná Rivers) and La Plata (lower Paraná and Colastiné Rivers, Santa Fé stream, and lago Setúbal) basins, and in the upper Amazon drainage in Bolívia (Madre de Díos, Guaporé, and Beni Rivers), Peru (Madre de Díos and Marañon Rivers), and Brazil (rio Solimões) [...]”

From: Góes de Araújo (2009):

“Northeastern Argentina, central Paraguay, Western of Brazil in Mato Grosso found in Rio Cuiabá, Rio Paraguay, and in Rio Paraná (Middle and High) from Guaíra to Entre Rios (Rosa 1985). In Alto Paraná the species is found at Puerto San Jorge and in the Mouth of Uruguay River (Misiones) (Castex 1964, Castex and Maciel 1965).”

Introduced

From Garrone-Neto et al. (2014):

“In the Paraná River, Southeastern Brazil, the Sete-Quedas Falls played an important role in the division of the ichthyofauna, [...]. However, in 1982 this natural barrier was submerged after the filling of the reservoir formed by the Itaipu Dam, enabling the connection of fish faunas that were previously isolated (Bonetto 1986; Agostinho et al. 1992, 1997; Luiz et al. 2004). Therefore, several species of fishes restricted to the downstream of the Sete-Quedas Falls successfully colonized and spread over the upper course of the Paraná River (see Júlio-Júnior et al. 2009 and references therein for reviews). Among these, at least two species of potamotrygonid stingrays belonging to the genus *Potamotrygon* Garman, 1877 were recognized in the Upper Paraná River basin: *P. falkneri* Castex and Maciel (1963) and *P. motoro* (Müller and Henle [sic], 1841) (Agostinho et al. 1997; Garrone Neto et al. 2007; Júlio-Júnior et al. 2009). Today, both species are found more than 400 km upstream from the Sete-Quedas Falls, where their populations are apparently established and exhibit signs of expansion (Garrone Neto et al. 2007; Garrone Neto and Haddad Jr. 2010; Haddad Jr. et al. 2013).”

Means of Introduction Outside the United States

From Garrone-Neto et al. (2014):

“However, in 1982 this natural barrier was submerged after the filling of the reservoir formed by the Itaipu Dam, enabling the connection of fish faunas that were previously isolated (Bonetto 1986; Agostinho et al. 1992, 1997; Luiz et al. 2004). Therefore, several species of fishes restricted to the downstream of the Sete-Quedas Falls successfully colonized and spread over the upper course of the Paraná River (see Júlio-Júnior et al. 2009 and references therein for reviews).”

Short Description

From Góes de Araújo (2009):

“This species is distinguished by the following characters: dorsal surface of the disc dark brown, with irregular yellow spots, oval to reniform, usually larger than eye diameter, teeth relatively, small, wider than long, with flat crowns. Lack prominent cusps except in mature males. Middorsal tail spines low relatively to basal diameter, in irregular parallel rows (Rosa 1985).”

From Pedroso et al. (2007):

“Tail of *Potamotrygon falkneri* with two stingers [...].”

Biology

From Froese and Pauly (2018):

“After a gestation period of about 20 weeks two pups were born in a public aquarium [Velte 2005].”

From Góes de Araújo (2009):

“It inhabits deeper waters in channels with strong current (Castex 1965a in Rosa 1985).”

From Garrone-Neto et al. (2014):

“In the upper course of the Paraná River, *P. falkneri* and *P. motoro* are known to use different environments throughout their development, with juveniles and sub-adults occupying predominantly shallow areas with depths less than four meters (Garrone Neto and Uieda 2012).”

“This condition [ship passage channel of a dam] created a lentic environment in which the stingrays are abundant and frequently sighted foraging next to the lock gates (Garrone Neto et al. 2007; Garrone Neto and Sazima 2009).”

Human Uses

From Froese and Pauly (2018):

“Fisheries: of no interest; aquarium: show aquarium”

From Oldfield (2005):

“Zoos have since been breeding more species in captivity. The Audubon Aquarium of the Americas began a breeding program in 1993 and has produced 275 pups from four of the five different species it maintains, including *P. leopoldi*, *P. castexi* (otorongo ray) [= *P. falkneri*], and the reportedly first captive breeding of *P. henleii*. [...] The Smithsonian National Zoological Park is also breeding *P. castexi* [= *P. falkneri*]. In the spring of 2001 they acquired four wild-

caught individuals. In three years, one pair produced 28 offspring. One of the offspring then hybridized with an unidentified *Potamotrygon* sp. also in the exhibit.”

Diseases

There were no records of OIE-reportable diseases (OIE 2020) found for this *Potamotrygon falkneri*.

Poelen et al. (2014) list *Potamotrygonocotyle eurypotamoxenus*, *Eutetrarhynchus araya*, *P. tsalickisi*, *Acanthobothrium amazonensis*, *A. quinonesi*, *Potamotrygonocestus amazonensis*, *P. magdalensis*, *Rhinebothrium molarai*, *R. paratrygoni*, *R. circularis*, *R. freitasi*, *Genarachella overstreeti*, *Acanthobothrium peruvienne*, *A. ramiroi*, *Rhinebothroides campbelli*, *R. mclennanae*, *Paraheteronchocotyle amazonensis*, *P. chisholmae*, *P. dromedaries*, *Echinocephalus daileyi*, *Paroncomegas araya*, and *R. molarai* as parasites of *Potamotrygon falkneri*.

Lacerda et al. (2008) list *Clinostomum complanatum*, *Tylodelphis* sp., *Genarchella* sp., *Acanthobothrium regoi*, *Rhinebothrium paratrygoni*, *Paroncomegas araya*, *Potamotrygonocestus travassosi*, *Brevimulticaecum* sp., *Cucullanus* sp., *Echinocephalus* sp., *Spinitectus* sp., and *Quadrigyus machadoi* as parasites of *Potamotrygon falkneri*.

Threat to Humans

From Garrone-Neto et al. (2014):

“Unlike the situation in Singapore, where the Upper Seletar Reservoir is not inserted into a large waterway system as the Tietê-Paraná Hydroway, and impacts such as interactions between potamotrygonid stingrays and humans have not been detected in the newly colonized areas (Ng et al. 2009), *P. falkneri* and *P. motoro* have been present for at least ten years in the Upper Paraná River basin and are frequently involved in accidents with humans. Fatal incidents are not known in Brazil, but injuries provoked by stingrays usually have high morbidity rates and great potential to generate severe cases of infection and temporary or permanent incapacity (Haddad Jr. et al. 2004, 2012, 2013; Garrone Neto and Haddad Jr. 2010).”

3 Impacts of Introductions

From Garrone-Neto et al. (2014):

“In contrast [to a lack of information regarding ecological impacts], negative interactions between humans and stingrays [*Potamotrygon falkneri* and *P. motoro*] have been identified as the main impact of this colonization, with injuries to bathers and fishermen reported and with the practice of ‘negative fishing’ (i.e. the capture and mutilation and/or death of stingrays for amateur and professional anglers) over several riverside communities of the Upper Paraná River basin (Haddad Jr. et al. 2004, 2013; Garrone Neto and Haddad Jr. 2010).”

“[...] *P. falkneri* and *P. motoro* have been present for at least ten years in the Upper Paraná River basin and are frequently involved in accidents with humans. Fatal incidents are not known in Brazil, but injuries provoked by stingrays usually have high morbidity rates and great potential to

generate severe cases of infection and temporary or permanent incapacity (Haddad Jr. et al. 2004, 2012, 2013; Garrone Neto and Haddad Jr. 2010).”

P. falkneri is listed as a Conditional species in Florida (FFWCC 2020).

4 History of Invasiveness

Potamotrygon falkneri was introduced to the Upper Paraná River basin in southeastern Brazil after a dam and lock system created a bypass around a naturally occurring waterfall which had served as a barrier. *P. falkneri* is now established in that region. There are now reports of injuries to humans from stingrays in the invaded region. Due to this impact on human health the history of invasiveness is High.

5 Global Distribution



Figure 1. Known global distribution of *Potamotrygon falkneri*. Map from GBIF Secretariat (2020). The observation on the southeastern coast of Brazil is from Rio de Janeiro, which is outside the described range of the species. This location was not used to select source points for the climate match.

Additional observation locations in Peru, Bolivia, and southern Brazil were given in da Silva and Carvalho (2011).

6 Distribution Within the United States

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

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Potamotrygon falkneri* was low across the most of the western, upper Midwest, and northeastern portion of the contiguous United States. Coastal states in the Southeast from Virginia to Texas had a medium to high climate match. The areas of high match were found in southern Florida and along the Gulf coastal area from eastern Texas to the western end of the Florida panhandle. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.039, medium (scores between 0.005 and 0.103 are classified as medium). Alabama, Florida, Georgia, Louisiana, and South Carolina each had a high individual Climate 6 score. Mississippi, North Carolina, and Texas had medium individual scores while the remaining States all had low individual scores.

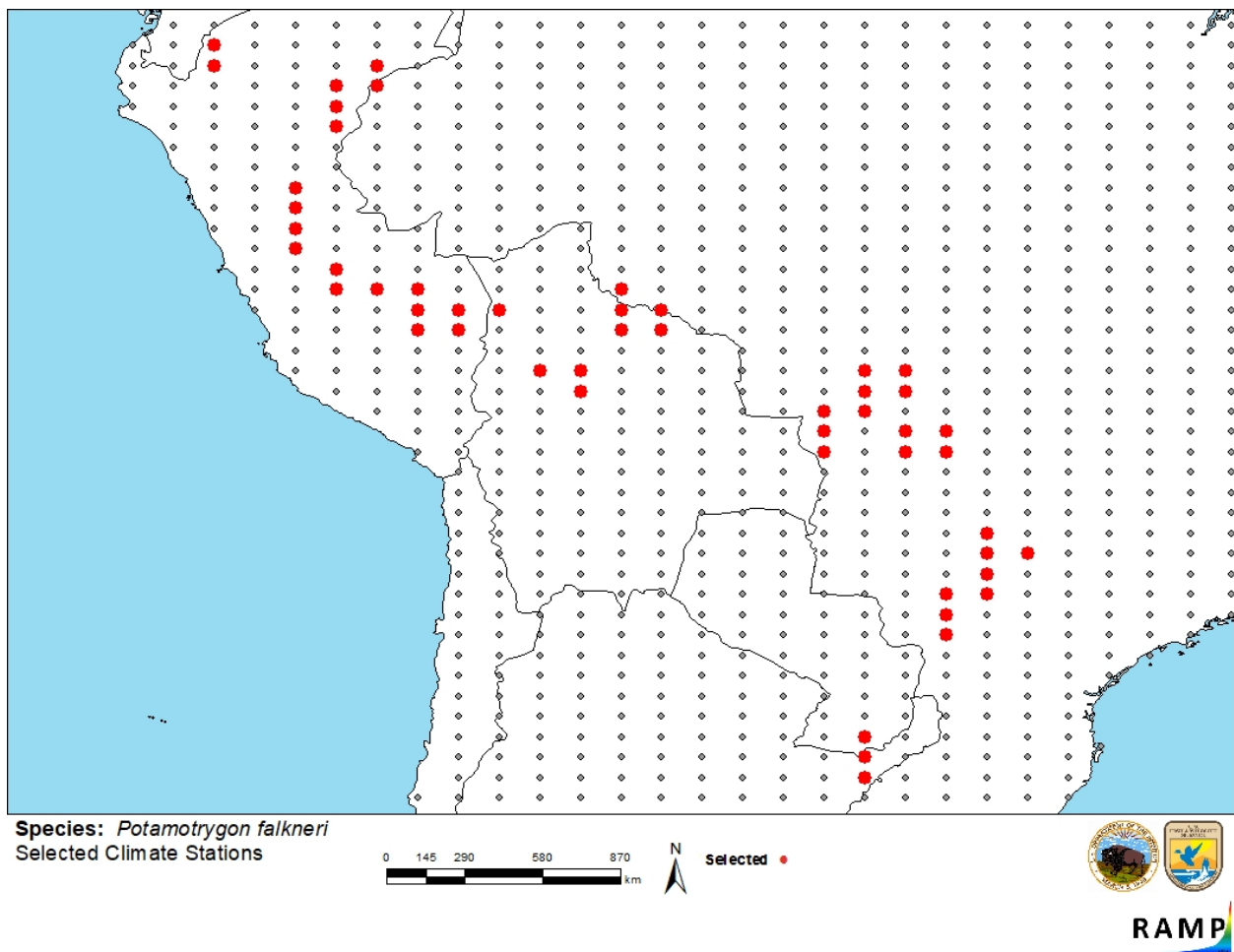


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Argentina, Bolivia, Brazil, Paraguay, Peru) and non-source locations (gray) for *Potamotrygon falkneri* climate matching. Source locations from da Silva and Carvalho (2011) and GBIF Secretariat (2020). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

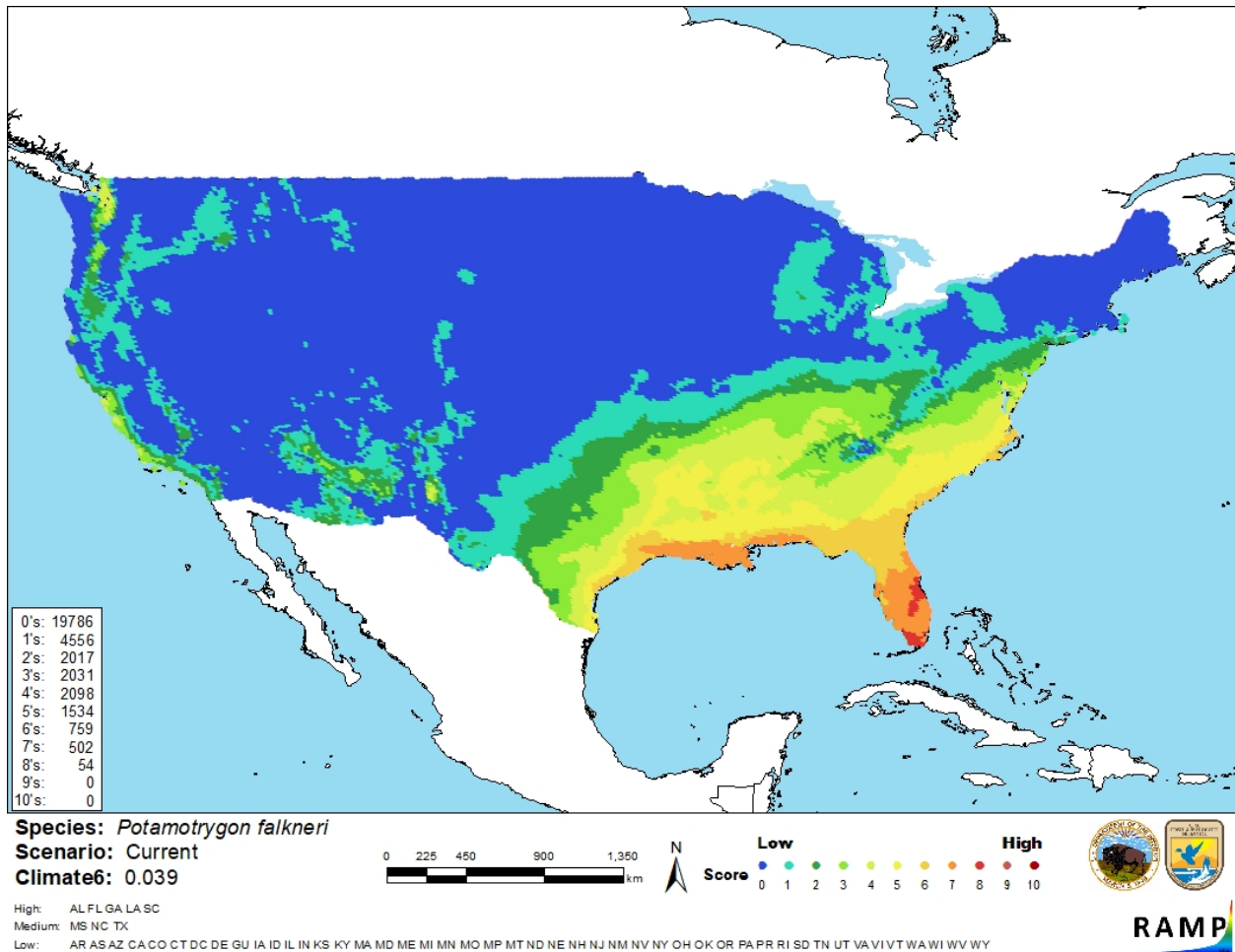


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Potamotrygon falkneri* in the contiguous United States based on source locations reported by da Silva and Carvalho (2011) and GBIF Secretariat (2020). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = 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 this assessment is medium. Some biological and ecological information was available for *Potamotrygon falkneri*. Georeferenced locations were available for the climate match. A single record of introduction was found along with a documented impact. The impact

information was not very detailed and attributed the impact to two *Potamotrygon* species, and not just *P. falkneri*.

9 Risk Assessment

Summary of Risk to the Contiguous United States

The Largespot River Stingray (*Potamotrygon falkneri*) is a large bodied stingray that is native to the Paraná-Paraguay River basin. This species is in the ornamental trade, including within the United States. *P. falkneri* is listed as a Conditional species in Florida, which prohibits possession without a special permit. The history of invasiveness for *Potamotrygon falkneri* is High. It has invaded now accessible upstream regions and causes injuries to humans using the same waterbodies for recreational and commercial activity. The climate match with the contiguous United States is medium. Most of the contiguous United States had a low match with the areas of medium and high match concentrated in the southeast from Texas to Virginia. The certainty of this assessment is medium. There was only one peer-reviewed report of impacts available which did not include much detailed information. The overall risk assessment category is High.

Assessment Elements

- **History of Invasiveness (Sec. 4): High**
- **Overall Climate Match Category (Sec. 7): Medium**
- **Certainty of Assessment (Sec. 8): Medium**
- **Remarks/Important additional information: No additional remarks**
- **Overall Risk Assessment Category: High**

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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