Glaphyropoma spinosum (catfish, no common name)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, December 2016
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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2016):

"South America: Brazil, State of Bahia, Chapada Diamantina, Município de Andaraí, Povoado de Igatu, Gruna dos Torras, rio Paraguaçu drainage"

Status in the United States

This species has not been reported in the United States.

From FFWCC (2016):

"Prohibited Nonnative Wildlife - Prohibited nonnative species 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 or used for commercial activities. Very limited exceptions may be made by permit from the Executive Director for research or for public exhibition by facilities that meet biosecurity criteria […] Parasitic catfishes […] 14. *Glaphyropoma spinosum.*"

Means of Introductions in the United States
This species has not been reported in the United States.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing
From GBIF (2016):

"TAXONOMIC STATUS
accepted species"

"KINGDOM Animalia
PHYLUM Chordata
CLASS Actinopterygii
ORDER Siluriformes
FAMILY Trichomycteridae
GENUS *Glaphyropoma*
SPECIES *Glaphyropoma spinosum*"

Size, Weight, and Age Range
From Froese and Pauly (2016):

"Max length : 5.8 cm SL male/unsexed; [Bichuette et al. 2008]"

Environment
From Bichuette et al. (2008):

"The water depth in the creek where the catfish live varies mostly between 10 and 50 cm, with moderate current and some spotty accummulation of plant debris where fish are found foraging. Physico-chemico water variables in January 2007 were pH 4.1; temperature 23.0ºC; conductivity 0.012 µS/cm; dissolved oxygen 6.3 mg/l."

From Froese and Pauly (2016):

"Freshwater; benthopelagic; [Bichuette et al. 2008]"

Climate/Range
From Froese and Pauly (2016):

"Tropical; 23°C - ?, preferred ?; 12°S - , 41°W -"

From Rantin and Bichuette (2013):

"The climate is tropical semi-arid, with distinct wet/dry periods, Aw according to Köppen's (1948) classification. Medium annual temperature is around 20°C (Nimer, 1989)."

Distribution Outside the United States

Native

From Froese and Pauly (2016):

"South America: Brazil, State of Bahia, Chapada Diamantina, Município de Andaraí, Povoado de Igatu, Gruna dos Torras, rio Paraguaçu drainage"

Introduced

This species has not been reported as introduced outside its native range.

Means of Introduction Outside the United States

This species has not been reported as introduced outside its native range.

Short Description

From Bichuette et al. (2008):

"It is distinguished from all other copionodontines by the presence of opercular odontodes, and further distinguished from its only congener, *G. rodriguesi*, by the reduction of dark integumentary pigmentation."

"Pinkish on dorsal portion of body and lateral portion of head, showing an iridescent aspect. Cranial fontanel white. White coloration on lateral and ventral portions of body, due to concentration of adipose tissue. Eyes black […]"

Biology

From Bichuette et al. (2008):

"[…] found in cave streams in the eastern portion of the Diamantina plateau. […]The type locality is a quartzitic cave situated within the limits of the Chapada Diamantina National Park, in the Serra do Sincorá, one of the main components of the Chapada Diamantina, inside the limits of the Chapada Diamantina National Park. The local terrain is composed of arenites, siltites, argilites and conglomerates. Caves in this area are formed by the erosion of soft rock components by rainwater penetrating through surface cracks and leaving spaces delimited by the harder components."

"Preliminary population data based on visual censuses were obtained in January and July, 2007, corresponding respectively to the rainy and dry seasons in the area. In a 150m of long stream reach and 1m of width (in average), 61 individuals were visually counted in January and 59 in July of 2007, and respectively population densities of 0.41 ind.m-2 (Jan 2007) and 0.39 ind.m-2

(Jul 2007), indicating little if any seasonal oscillations in population size. Most individuals were concentrated in quiet isolated pools."

From Rantin and Bichuette (2013):

"The troglobitic species *G. spinosum* is photophobic under the three light intensities […] It is also important to point out that we observed changes in pigmentation pattern in all cave copionodontine individuals that remained in captivity: all specimens of *G. spinosum* changed from pale yellow to purple 10-15 days after arrival from the field, indicating that this species may perceive light by the skin, a typical extraocular photoreception (EOP), very common in vertebrates (Langecker, 1992). Indeed, these pigmentation changes cannot be related to food, since the food varies during maintenance in laboratory, nor to changes related to aging, since pigmentation manifested in both juvenile and adult specimens."

From Rantin and Bichuette (2015):

"The strong cryptobiosis presented by the subterranean species *Glaphyropoma spinosum* is corroborated by field and laboratory observations, where only rarely the specimens were observed exposed, stationary on the aquarium bottom, and seldom exploring walls and water column. Despite the fact that hiding is a well-known strategy against visually oriented predators, it is not an effective tactic in environments with absence of light, such as caves. Moreover, in a high intraspecific competition situation hiding behavior may be disadvantageous, since it increases the time of search of food (Trajano 1989). However, *G. spinosum* cryptobiotic behavior may be related to the strong territorialism and photophobia. In fact, dens are apparently highly valuable resources, since it consists of one of the determinant factors for establishing dominancy in *G. spinosum*, maybe allied to spawning periods (hypothesis to be tested), which always displays patrolling behavior as observed in laboratory."

Human Uses
No information available.

Diseases
No information available.

Threat to Humans
From Froese and Pauly (2016):

"Harmless"

3 Impacts of Introductions
This species has not been reported as introduced outside its native range.

From FFWCC (2016):

“Prohibited Nonnative Wildlife - Prohibited nonnative species 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 or used for commercial activities. Very limited exceptions may be made by permit from the Executive Director for research or for public exhibition by facilities that meet biosecurity criteria […] Parasitic catfishes […] 14. *Glaphyropoma spinosum.*”

4 Global Distribution

Figure 1. Known global established locations of *Glaphyropoma spinosum*. Map from GBIF (2016).

5 Distribution Within the United States

This species has not been reported in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for the contiguous U.S. was 0.001, a categorically low climate match. Climate 6 scores indicating a low climate match range from 0.000 to 0.005, inclusive. Within the contiguous U.S., medium climate matches occurred in southern peninsular Florida and in southeastern Texas; all other regions were low matches.

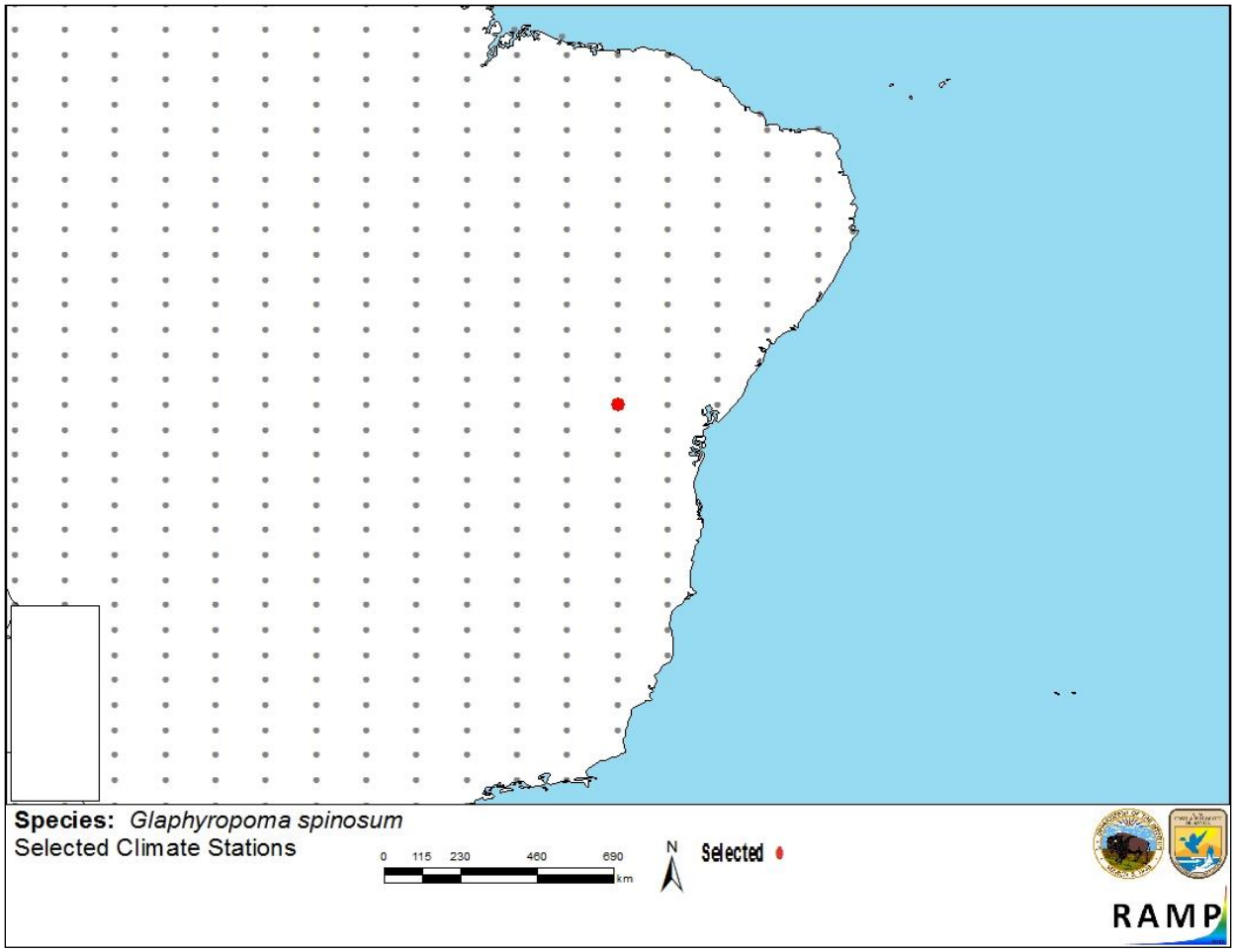

Figure 2. RAMP (Sanders et al. 2014) source map of northeastern South America showing weather stations selected as source location (red) in Brazil and non-source locations (gray) for *Glaphyropoma spinosum* climate matching. Source locations from GBIF (2016).

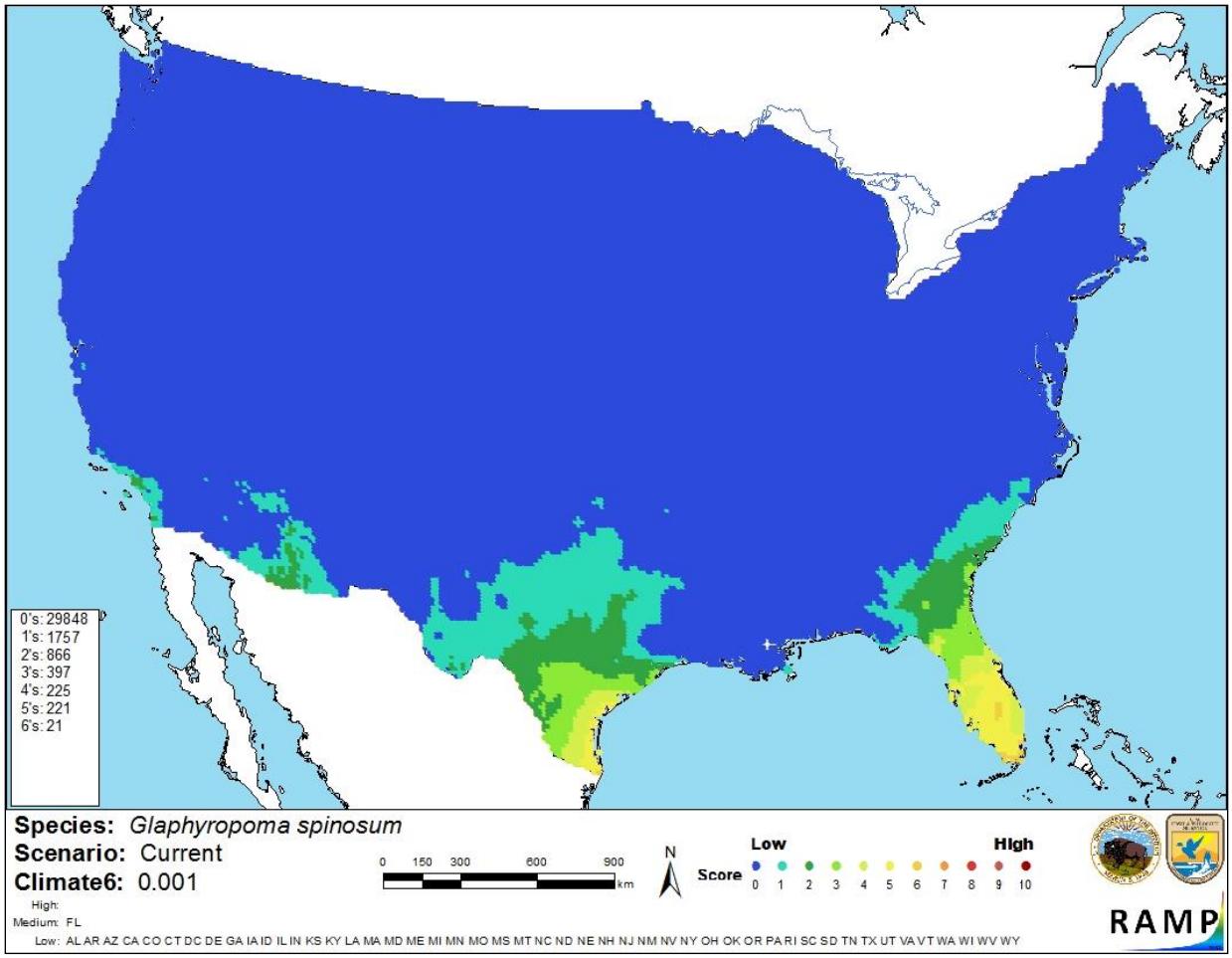

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Glaphyropoma spinosum* in the contiguous United States based on source locations reported by GBIF (2016). Counts of climate match scores are tabulated on the left. 0 = Lowest match; 10 = Highest match.

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

Due to the remote karst environment this troglobitic species inhabits and inherently limited opportunities to observe and/or collect specimens here for continued study since it was first described by Bichuette et al. (2008), little is known regarding *Glaphyropoma spinosum* beyond its morphology, its phototactic behavior, and the unique physiochemical properties of its subterranean freshwater environment. Likewise, the potential for this species to prove invasive or transmit disease pathogens beyond the boundaries of its presumed native range (i.e., Chapada

Diamantina National Park, Bahia State, Brazil), is unknown. Therefore, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Glaphyropoma spinosum is a troglobitic species of fish that inhabits acidic freshwater in remote karst environments of the tropical semi-arid Diamantina Plateau in Bahia State, Brazil. Little is currently known about this species beyond its morphology, its phototactic behavior, and the unique physiochemical properties of its native subterranean environment. To date, only a few specimens have been collected and removed from caves here for limited studies conducted elsewhere in Brazil. The most likely risk this species may pose to the contiguous United States is if it would ever prove to be invasive (and/or a vector for a serious pathogenic disease) and escape (or be released) in Florida where karst terrain is common (FSS 2011) and a tropical climate may permit *G. spinosum* (or its associated disease pathogens) to persist or thrive. Due to uncertainties like these and the tropical climate inhabited by this species in its native range, state authorities currently consider *G. spinosum* dangerous to the ecology and/or the health and welfare of the people of Florida where personal possession or commercial use of this species is prohibited by law (FFWCC 2016). Climate match to the contiguous U.S. as a whole is low. Overall risk posed by this species 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.

Bichuette, M. E., M. C. C. de Pinna, and E. Trajano. 2008. A new species of *Glaphyropoma*: the first subterranean copionodontine catfish and the first occurrence of opercular odontodes in the subfamily (Siluriformes: Trichomycteridae). Neotropical Ichthyology 6(3):301-306.

FFWCC (Florida Fish and Wildlife Conservation Commission). 2016. Prohibited species list. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. Available: http://myfwc.com/wildlifehabitats/nonnatives/regulations/prohibited/. (December 2016).

Froese, R., and D. Pauly, editors. 2016. *Glaphyropoma spinosum* Bichuette, de Pinna & Trajano, 2008. FishBase. Available: http://fishbase.org/summary/Glaphyropoma-spinosum.html/. (November 2016).

FSS (Florida Speleological Society). 2011. Karst map of Florida. Florida Speleological Society, Gainesville, Florida. Available: http://www.floridacaving.com/karst-map-of-florida/. (December 2016).

GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Glaphyropoma spinosum* Bichuette, de Pinna & Trajano, 2008. Global Biodiversity Information Facility, Copenhagen. Available: http://www.gbif.org/species/2343339/. (November 2016).

Rantin, B., and M. E. Bichuette. 2013. Phototactic behavior of subterranean Copionodontinae Pinna, 1992 catfishes (Siluriformes, Trichomycteridae) from Chapada Diamanina, central Bahia, northeastern Brazil. International Journal of Speleology 42(1):57-63.

Rantin, B., and M. Bichuette. 2015. Spontaneous behavior of basal Copionodontinae cave catfishes from Brazil (Teleostei, Siluriformes, Trichomycteridae). Subterranean Biology 16:61-77.

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

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.

Köppen, W. 1948. Climatología. Fondo de Cultura Economica, Mexico City, Mexico.

Langecker, T. G. 1992. Light sensitivity of cave vertebrates—behavioral and morphological aspects. *In* A. I. Camacho, editor. The natural history of biospeleology. Museo de Ciencias Naturales, Madrid.

Nimer, E. 1989. Climatologia do Brasil. SUPREN, Rio de Janeiro, Brazil.

Trajano, E. 1989. Estudo do comportamento espontâneo e alimentar e da dieta do bagre cavernícola, *Pimelodella kronei*, e seu provável ancestral epígeo, *Pimelodella transitoria* (Siluriformes, Pimelodidae). Revista Brasileira de Biologia 49(3):757-769.