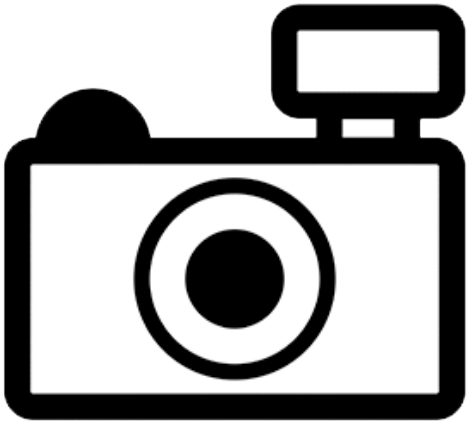
Darkedged Splitfin (*Girardinichthys multiradiatus*) (a fish)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, January 2017
Revised, January 2018
Web version, 8/16/2018



No Photo Available

1 Native Range and Status in the United States

Native Range
From Froese and Pauly (2018):

"North America: upper Rio Lerma and Zempoala lagoon in Morelos, Mexico."

Status in the United States
No records of *Girardinichthys multiradiatus* in the United States were found. No information on trade of *G. multiradiatus* in the United States was found.

Means of Introductions in the United States
No records of *Girardinichthys multiradiatus* in the United States were found.

Remarks

From Garcia et al. (2012):

"*Girardinichthys multiradiatus* is an endangered fish with their natural habitat being lost […] rapidly through increased land use, tourism and pollution (De La Vega et al., 1997)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Eschmeyer et al. (2018), *Girardinichthys multiradiatus* (Meek 1904) is the valid name for this species. It was originally described as *Characodon multiradiatus*.

From ITIS (2018):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterestomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Order Cyprinodontiformes
Suborder Cyprinodontoidei
Family Goodeidae
Subfamily Goodeinae Jordan, 1923
Genus *Girardinichthys* Bleeker, 1860
Species *Girardinichthys multiradiatus* (Meek, 1904)

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 3.5 cm TL male/unsexed; [Baensch and Riehl 1995]; 5.0 cm TL (female)"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal; pH range: 6.0 - 7.5; dH range: ? - 15. […]; 12°C - 20°C [assumed to be recommended aquarium temperature] [Baensch and Riehl 1995]"

Climate/Range
From Froese and Pauly (2018):

"Temperate; […]; 21°N - 19°N"

Distribution Outside the United States
Native
From Froese and Pauly (2018):

"North America: upper Rio Lerma and Zempoala lagoon in Morelos, Mexico."

Introduced
No records of *Girardinichthys multiradiatus* introductions into the wild were found.

Means of Introduction Outside the United States
No records of *Girardinichthys multiradiatus* introductions into the wild were found.

Short Description
A short description of *Girardinichthys multiradiatus* was not available.

Biology
From Froese and Pauly (2018):

"Gestation lasts for about 55 days. A female produces 10 to 20, rarely 30, young."

From Garcia (1994):

"*Girardinichthys multiradiatus*, a sexually dimorphic goodeid, inhabits ponds, rivers, and lakes in the upper basin of the Rio Lerma, on the Mexican Plateau."

From Gonzalez-Zuarth et al. (2011):

"*Girardinichthys multiradiatus* is a viviparous fish from Central Mexico with an elaborated courtship pattern and consensual mating, which enables female mate choice to be effectively expressed (Macias Garcia et al. 1998; González Zuarth and Macías Garcia 2006). Males respond to conspecifics of either sex by approaching them, displaying their fins and remaining static, either facing the other fish (frontal fin display) or presenting their flank (lateral fin display). When the other fish also performs a fin display and remains static the encounter escalates into a fight (Valero et al. 2005). If the approached fish folds its fins and does not remain static (it waves its body in a characteristic ''vibrating'' behaviour), the approaching male abandons its static posture and performs active courtship dances involving fin waving and body shaking (= dynamic displays; fin folding, flagging and figure-of-eight dance; Macías Garcia 1991). We have detected nine ways in which females may respond to the different male displays. They may perform (1) frontal or (2) lateral fin displays, (3) swim away, (4) flee (rapidly), (5) approach the male, (6)

swim besides it, (7) attempt to bite it, (8) vibrate tilting forward the body or (9) vibrate without tilting their body."

Human Uses

From Froese and Pauly (2018):

"Aquarium: commercial"

Diseases

No records of OIE reportable diseases were found.

Poelen et al. (2018) lists species *Cyclustera ralli* , *Valipora campylancristrota, Profilicollis brevis, Arhythmorhynchus brevis, Margotrema bravoae, Posthodiplostomum minimum, Ochetosoma brevicaecum, Valipora campylancristrota, Bothriocephalus acheilognathi,*and *Ligula intestinalis* as parasites of *Girardinichthys multiradiatus.*

From Mendoza-Palmero et al. (2009):

"*Gyrodactylus mexicanus* n. sp. and *Gyrodactylus lamothei* n. sp. are described from the fins and skin of *Girardinichthys multiradiatus*, an endemic freshwater fish from central Mexico."

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

Girardinichthys multiradiatus does not have any reported introductions, therefore there is no information on impacts on introductions.

4 Global Distribution

Figure 1. Known global distribution of *Girardinichthys multiradiatus*. Locations are in Mexico. Map from GBIF Secretariat (2018).

5 Distribution Within the United States

No records of *Girardinichthys multiradiatus* in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Girardinichthys multiradiatus* was low for the majority of the contiguous United States. The southwestern United States and Florida had medium to high climate matches. The climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean Distance) for *G. multiradiatus* in the contiguous United States was 0.016, medium. Florida was the only state that had an individually high Climate 6 score.

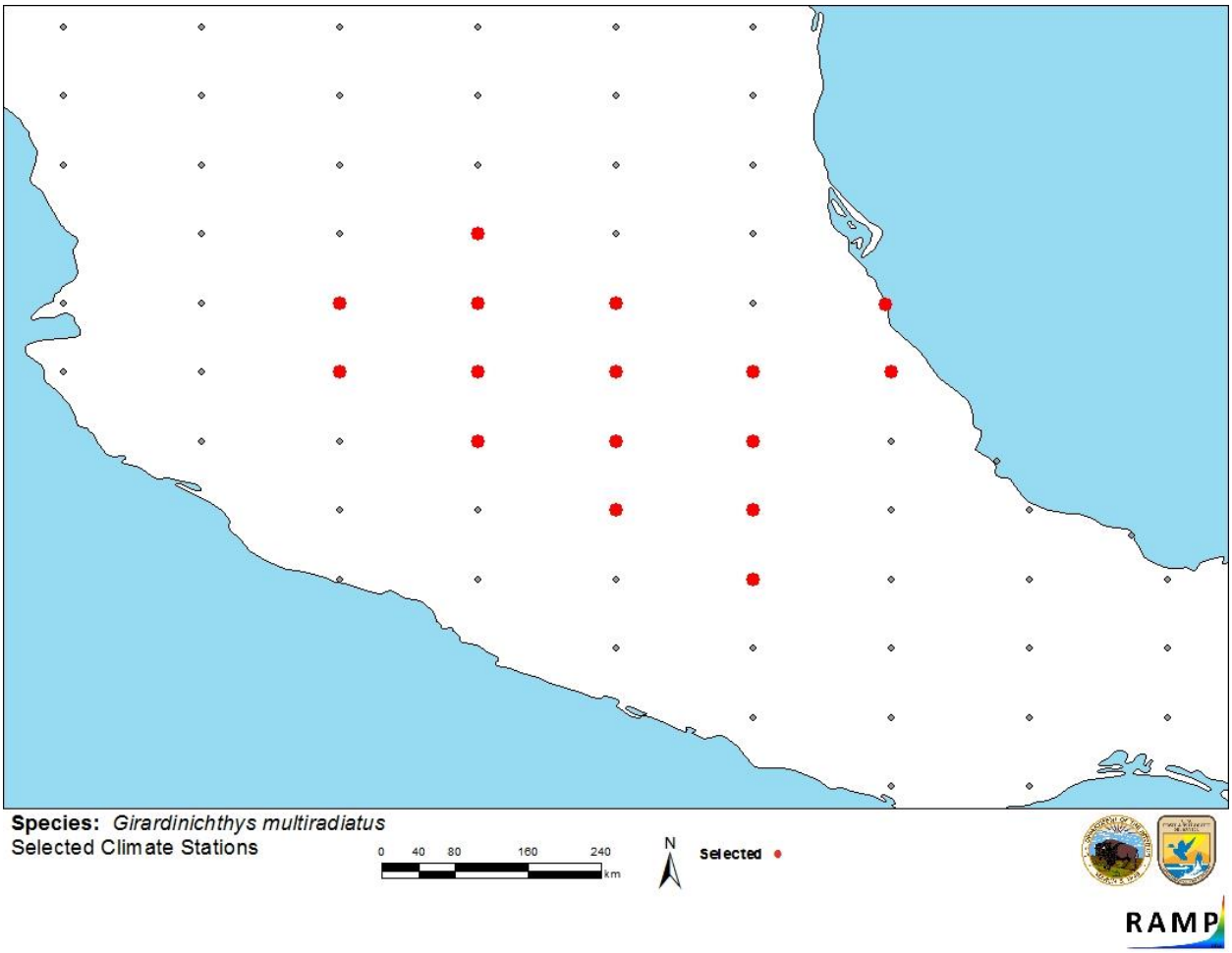


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Mexico) and non-source locations (gray) for *Girardinichthys multiradiatus* climate matching. Source locations from GBIF Secretariat (2018).

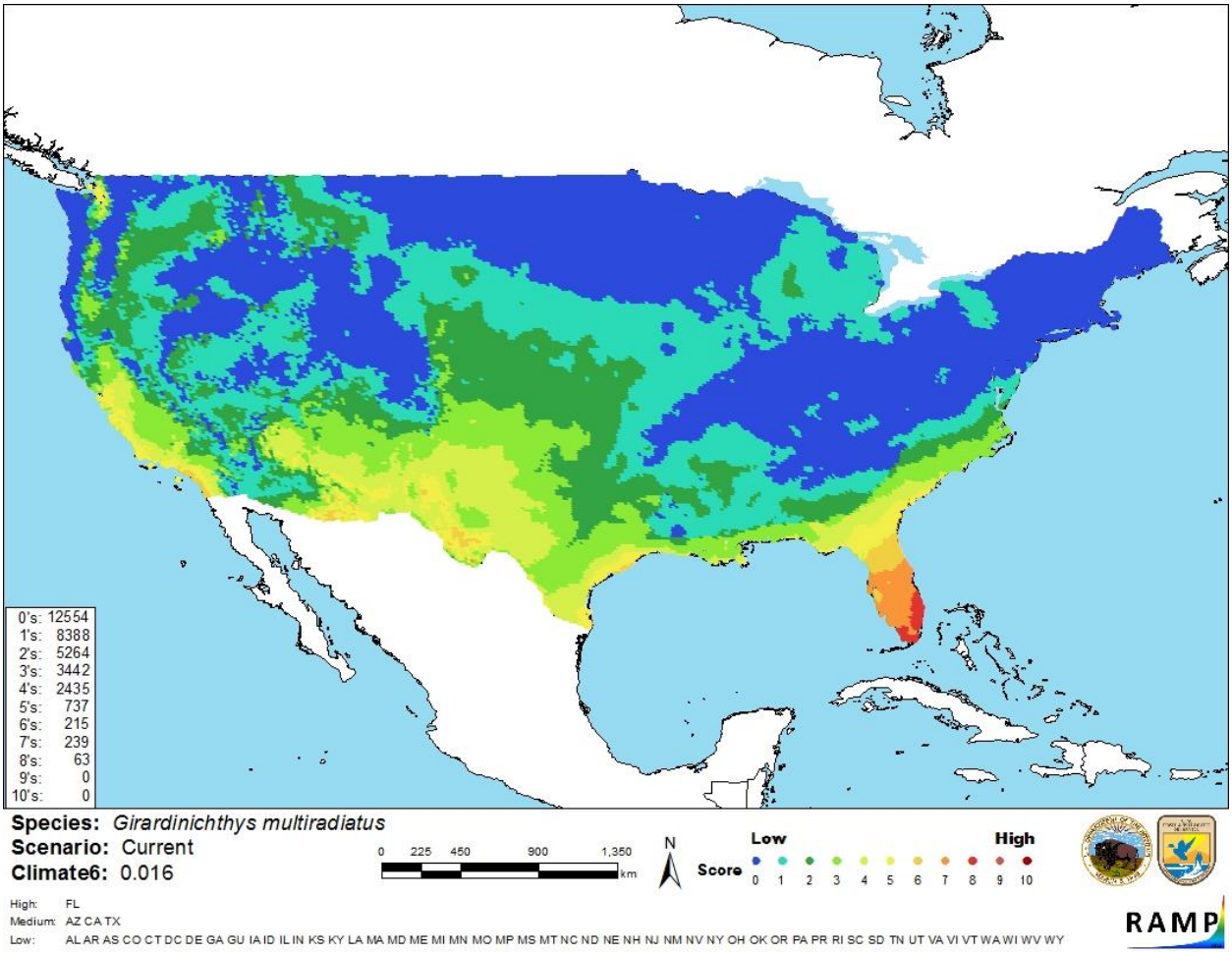


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Girardinichthys multiradiatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0 = Lowest match, 10 = Highest match. Counts of climate match scores are tabulated on the left.

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

The certainty of the assessment for *Girardinichthys multiradiatus* is low. There was limited ecological and biological information available. This species has not been reported outside of its native range.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The Darkedged Splitfin (*Girardinchthys multiradiatus*) is a fish native to Mexico. The species is considered endangered and is losing habitat due to human activities. *G. multiradiatus* is also used in the aquarium trade. The history of invasiveness for *G. multiradiatus* is uncertain. No records of introductions into the wild were found. The climate match is medium, with areas of high match in Florida. The certainty of this assessment is low. The overall risk category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information** No additional remarks.
- **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.

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Sanders, S., C. Castiglione, and M. Hoff. 2018. Risk assessment mapping program: RAMP, version 3.1. 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.

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Macías Garcia, C. 1991. Sexual behaviour and trade-offs in the viviparous fish *Girardinichthys multiradiatus*. Doctoral dissertation. University of East Anglia, Norwich, UK.

Valero, A., R. Hudson, E. Avila Luna, and C. Macías Garcia. 2005. A cost worth paying: energetically expensive interactions with males protect females from intrasexual aggression. Behavioral Ecology Sociobiology 59:262–269.