

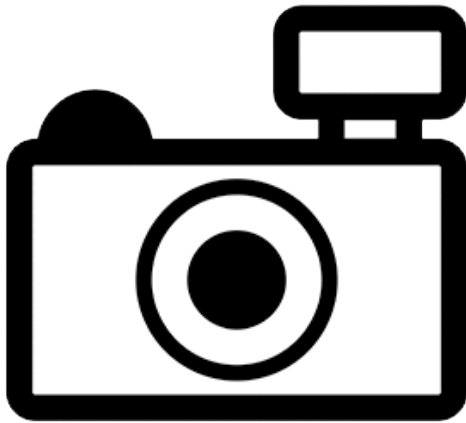
# Rio Pearlfish (*Nematolebias whitei*)

## Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011

Revised, April 2019

Web Version, 1/7/2020



No Photo Available

## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2019):

“South America: Laguna de Araruama basin, Das Ostras River basin, coastal plains adjacent to the mouth of São João River in Brazil.”

### Status in the United States

From Nico and Neilson (2019):

“This pearlfish has been listed as a nonestablished species known from open waters of California (Courtenay et al. 1986, 1991; Courtenay and Williams 1991; Williams and Jennings 1991). That listing likely based on its introduction into experimental rice plots and ponds on lands of the Butte County Mosquito Abatement District in 1973 and 1974 (e.g., Shapovalov et al. 1981; Dill and Cordone 1997), and at the Agricultural Experiment Station on the University of California Riverside (Dill and Cordone 1997).”

“Failed in California [locations listed above] (Moyle 1976). As in the case of the black pearlfish *Austrolebias nigripinnis*, Dill and Cordone (1997) concluded that there is no evidence that this pearlfish species was ever an inhabitant of open waters [...].”

No records of this species in trade in the United States were found.

## Means of Introductions in the United States

From Froese and Pauly (2019):

“Intentionally stocked to assess its ability as a mosquito control agent, [...].”

## Remarks

No additional remarks.

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

“**Current Status:** Valid as *Nematolebias whitei* (Myers 1942).”

From ITIS (2019):

“Kingdom Animalia  
Subkingdom Bilateria  
Infrakingdom Deuterostomia  
Phylum Chordata  
Subphylum Vertebrata  
Infraphylum Gnathostomata  
Superclass Actinopterygii  
Class Teleostei  
Superorder Acanthopterygii  
Order Cyprinodontiformes  
Suborder Aplocheiloidei  
Family Aplocheilidae  
Subfamily Rivulinae  
Genus *Nematolebias*  
Species *Nematolebias whitei* (Myers, 1942)”

### Size, Weight, and Age Range

From Froese and Pauly (2019):

“Max length : 8.0 cm TL male/unsexed; [Costa 2003]”

## Environment

From Froese and Pauly (2019):

“Freshwater; benthopelagic; pH range: 6.5 - 7.0; dH range: 5 - 8; non-migratory. [...] 20°C - 23°C [Riehl and Baensch 1991] [assumed to be the recommended aquarium temperature]”

## Climate/Range

From Froese and Pauly (2019):

“Tropical; [...]”

## Distribution Outside the United States

Native

From Froese and Pauly (2019):

“South America: Laguna de Araruama basin, Das Ostras River basin, coastal plains adjacent to the mouth of São João River in Brazil.”

Introduced

No records of *Nematolebias whitei* introductions outside the United States were found.

## Means of Introduction Outside the United States

No records of *Nematolebias whitei* introductions outside the United States were found.

## Short Description

From Froese and Pauly (2019):

“Dorsal spines (total): 0; Dorsal soft rays (total): 13-19; Anal spines: 0; Anal soft rays: 18 - 24; Vertebrae: 29 - 31. Having series of small bluish white spots, often coalesced to form continuous or fragmented line, on subdistal area of caudal fin and dark brown to black stripe on border of anal fin, adjacent and parallel to perpendicular extensions of subdistal golden transverse lines. Dorsal head profile slightly convex to nearly straight in male, gently concave to approximately straight in female [Costa 2002].”

## Biology

From Froese and Pauly (2019):

“Occurs in small freshwater temporary pools in floodplains of streams and lagoons. These pools are shallow with compact, soft reddish brown muddy bottom and dry twice a year, during winter, usually from July to August, and during summer, usually from February to March. During dry season, all fish die and eggs undergo in [*sic*] diapause within the substrate. Eclosion [hatching] happens at the onset of wet season, usually March-April and September-October [Costa 2002]. [...] Bottom spawner, 4 months incubation.”

“Males are territorial and very aggressive. Males display an elaborate courtship behavior beginning with waving lateral movement in front of female, with the unpaired fins completely opened. In an oblique position, the male touches the bottom surface with the anterior portion of its head, with vibrating body. The female placed her body side to side with the male. Then both couple dives into the substrates where spawning takes place [Costa 2002].”

## Human Uses

From Froese and Pauly (2019):

“Aquarium: commercial”

## Diseases

There are no records of diseases for *Nematolebias whitei*. **There are no records of any OIE reportable diseases (OIE 2020) for *Nematolebias whitei*.**

## Threat to Humans

From Froese and Pauly (2019):

“Harmless”

## 3 Impacts of Introductions

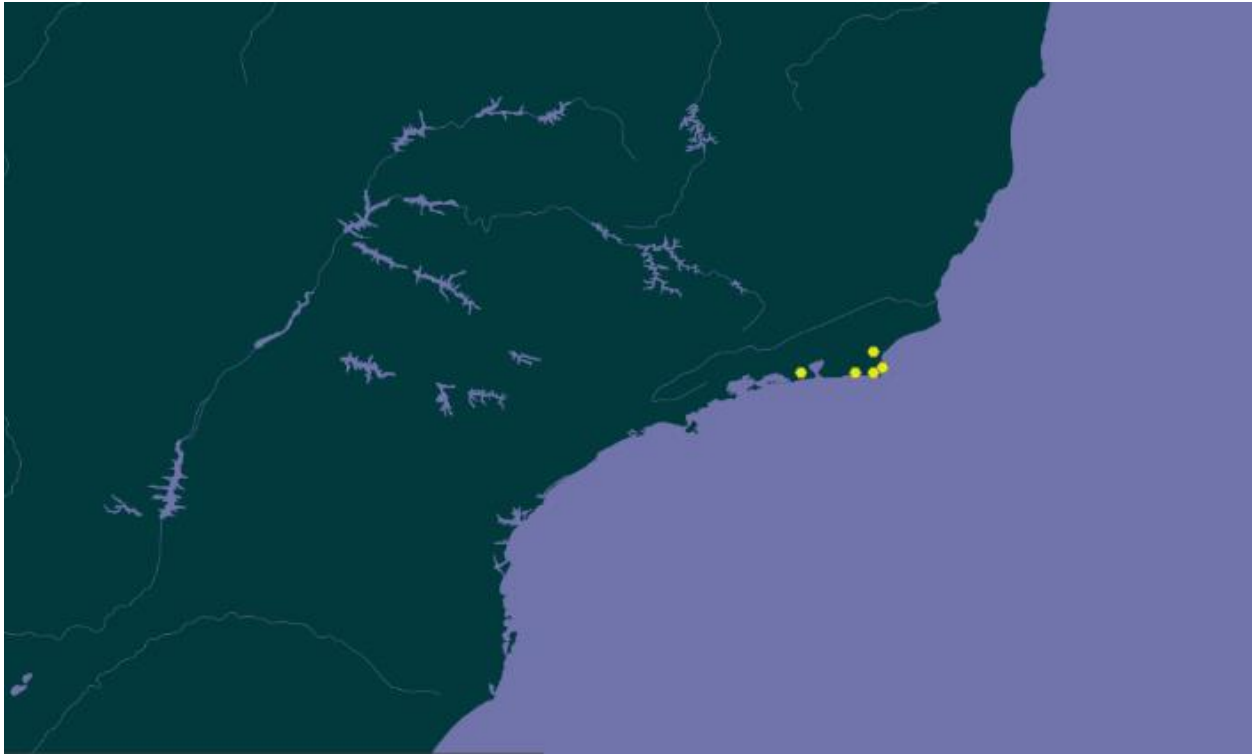
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From Nico and Nielson (2019):

“The impacts of this species are currently unknown, as no studies have been done to determine how it has affected ecosystems in the invaded range. The absence of data does not equate to lack of effects. It does, however, mean that research is required to evaluate effects before conclusions can be made.”

## 4 Global Distribution

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**Figure 1.** Known global distribution of *Nematolebias whitei*, locations are in southeastern Brazil. Map from GBIF Secretariat (2019).

## 5 Distribution Within the United States

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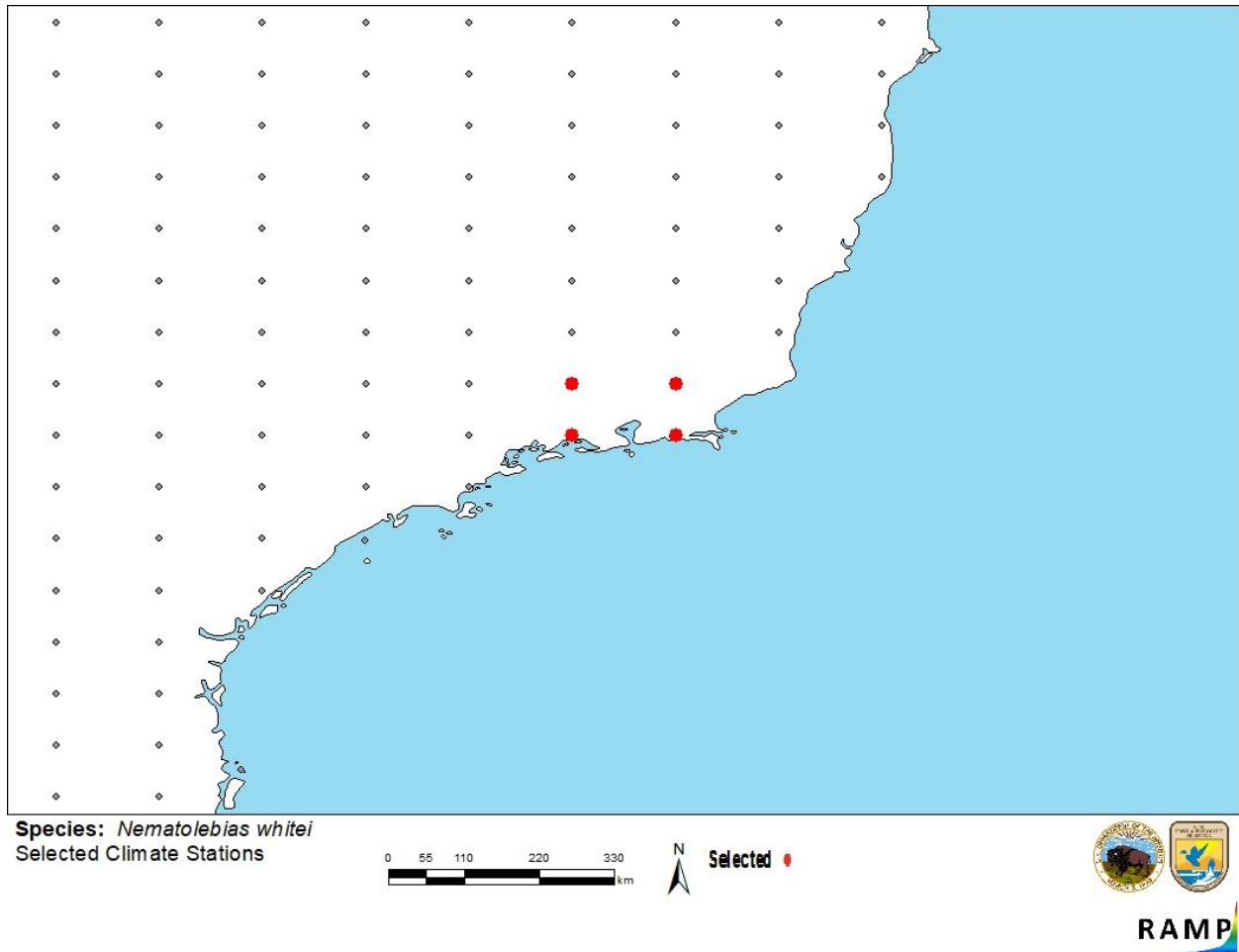


**Figure 2.** Known distribution of *Nematolebias whitei* in the United States. Map from BISON (2019). According to Nico and Neilson (2019), both the points located in California actually represent populations that were introduced to act as a control for mosquito populations. There is no evidence to suggest that these populations became established. These points were not used to select source points for the climate match.

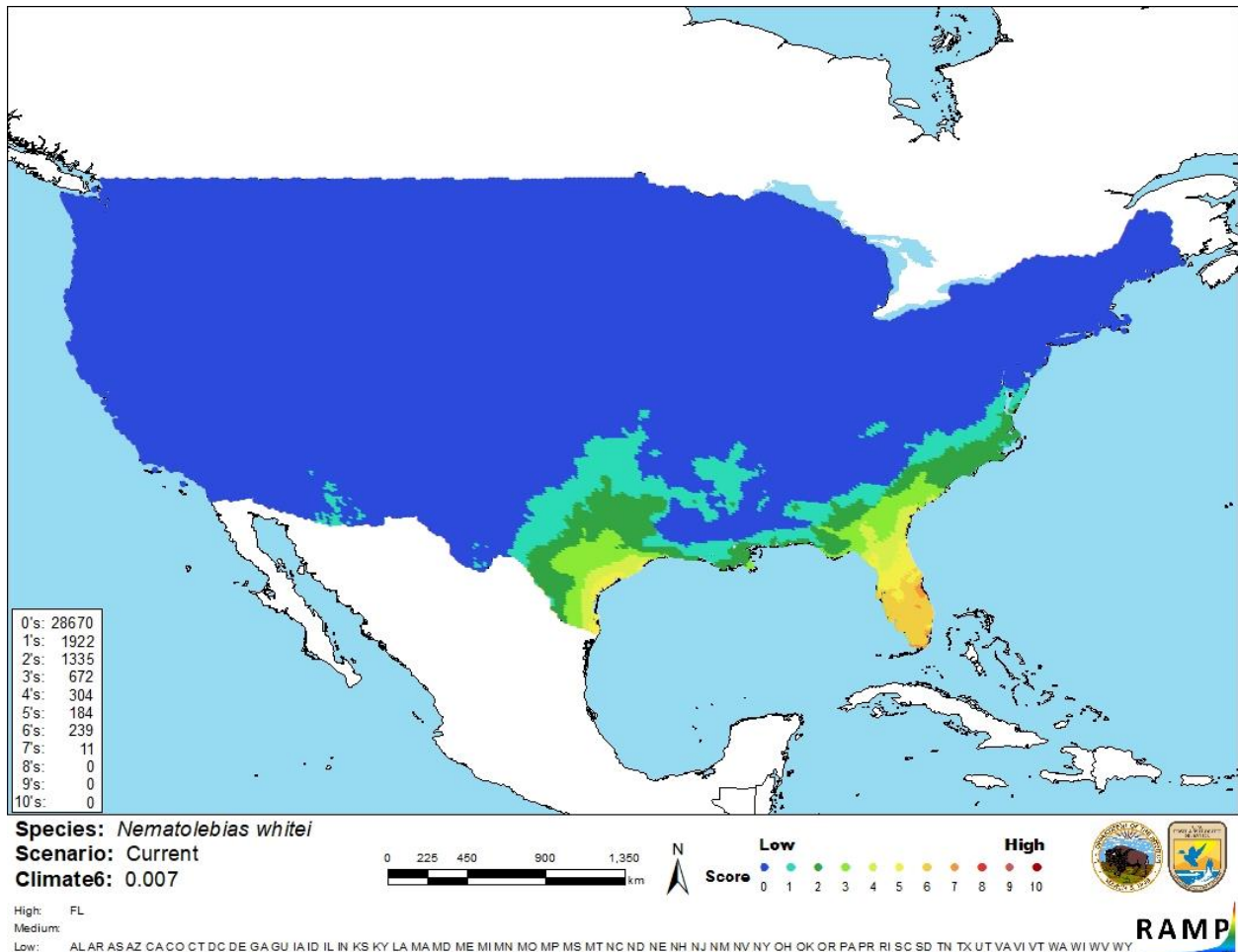
## 6 Climate Matching

### Summary of Climate Matching Analysis

The climate match for *Nematolebias whitei* was low for the majority of the contiguous United States. There were some patches of medium match in southern Florida and southeastern Texas, and small areas of high match in some coastal areas of southern Florida. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.007, medium. (Scores between 0.005 and 0.103 are classified as medium.) All States had low individual Climate 6 scores except for Florida, which had a high individual score.



**Figure 3.** RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Brazil) and non-source locations (gray) for *Nematolebias whitei* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.



**Figure 4.** Map of RAMP (Sanders et al. 2018) climate matches for *Nematolebias whitei* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). 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
$\geq 0.103$	High

## 7 Certainty of Assessment

The certainty of assessment for *Nematolebias whitei* is low. There is minimal information available for this species. *Nematolebias whitei* has been recorded as intentionally stocked in the United States to assess its ability to control mosquitos, but it is unknown if it became established or if it had any impacts as a result.



## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

Rio Pearlfish (*Nematolebias whitei*) is a fish endemic to Brazil. This fish has an annual lifecycle where all adults die during the dry season and the eggs undergo diapause; the eggs will hatch when the wet season starts. The species is present in the aquarium trade internationally. *Nematolebias whitei* was intentionally stocked in an approved study in the United States to test its ability in controlling mosquitos. It was stocked into test water bodies and there was no evidence of escape into the wild or establishment of a population. There were no other records of introduction. Therefore, history of invasiveness is uncertain. The climate match for the contiguous United States is medium. All States had a low individual climate score except Florida, which had a high climate score. The certainty of assessment is low due to lack of information. The overall risk assessment category for *Nematolebias whitei* 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

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**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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## 10 References Quoted But Not Accessed

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**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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