Spanish Toothcarp (*Aphanius iberus*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2017
Revised, July 2017
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Image: Osado. Licensed under CC BY-SA. Available: http://eol.org/data_objects/31331085. (March 2017). Top: male, bottom: female.

1 Native Range and Status in the United States

Native Range
From Froese and Pauly (2016):

"Europe: Spain along Mediterranean coast from 30 known localities (now extirpated in 14 of them). Historical records from near Perpignan, France now extirpated."

Status in the United States
This species has not been reported as introduced or established in the U.S.

Means of Introductions in the United States
This species has not been reported as introduced or established in the U.S.

Remarks

From Froese and Pauly (2016):

"Populations from Algeria and the Atlas along Morocco-Algeria border have long been identified as *Aphanius iberus* but they belong to *Aphanius saourensis* and other, unnamed and possibly extinct, species [Kottelat and Freyhof 1972]."

From Crivelli (2006):

"Red List Category & Criteria: Endangered A2ce ver 3.1"

"It is estimated that *A. iberus* has undergone a population decline of at least 50% in the past 10 years due to pollution and introduced fish (Carmona, J. pers comm). The area of occupancy (AOO) is less than 500 km², is fragmented and is in decline due to pollution and habitat destruction. This species is also in continuous decline with subpopulations regularly disappearing. Although a reintroduction programme using captive stock might help this species to recover, the threats will still be present."

"It is listed in the Annex II of the European Union Habitat Directive and in the Appendix II and III of the Bern Convention."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Acanthopterygii
Order Cyprinodontiformes
Suborder Cyprinodontoidei
Family Cyprinodontidae
Subfamily Cyrpinodontinae
Tribe Orestiini
Genus *Aphanius*

Species *Aphanius iberus* (Valenciennes in Cuvier and Valenciennes, 1846) – Spanish toothcarp"

From Eschmeyer et al. (2017):

"Current status: Valid as *Aphanius iberus* (Valenciennes 1846). Cyprinodontidae: Cyprinodontinae."

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 5.5 cm TL male/unsexed; [Wildekamp et al. 1986]; 5.4 cm TL (female)"

From Alcaraz and García-Berthou (2007):

"[…] short longevity (aged up to 2 +) […]"

Environment

From Froese and Pauly (2016):

"Freshwater; brackish; benthopelagic; pH range: 6.5 - 7.5; dH range: 8 - 10; non-migratory."

Climate/Range

From Froese and Pauly (2016):

"Temperate; 10°C - 32°C [Riehl and Baensch 1991], preferred ?; 42°N - 34°N, 3°W - 1°E"

Distribution Outside the United States

Native

From Froese and Pauly (2016):

"Europe: Spain along Mediterranean coast from 30 known localities (now extirpated in 14 of them). Historical records from near Perpignan, France now extirpated."

Introduced

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

Means of Introduction Outside the United States

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

Short Description

From Froese and Pauly (2016):

"Dorsal spines (total): 0; Dorsal soft rays (total): 9-11; Anal spines: 0; Anal soft rays: 7 - 10. Can

be diagnosed from other species of *Aphanius*, Valenciidae and Fundulidae in Europe by having the following characters: males possess a hyaline to bluish-grey caudal fin, with 2-5 dark grey bars, 10-20 dark grey to dark blue bars on a silvery background, bars usually irregularly shaped and set, often connected, breaking up into a mosaic of dark blue and silvery spots along back and in posterior part of body; females have numerous dark brown spots on sides and back; 23-27 scales in lateral line series on body; pectoral fin with 9-10 rays; and anal fin with 7-8 rays [Kottelat and Freyhof 1972]."

Biology

From Froese and Pauly (2016):

"Inhabits lagoons, salt marshes, swamps, estuaries and freshwaters. Euryhaline, occurring in water bodies with salinities ranging from freshwater to 57 ppt [Kottelat and Freyhof 1972]. Occurs in lowland water with little current. Spawns from April to September. Is an egg-laying carnivorous fish which is used for mosquito control [Crivelli 1996]. This short-lived species is now threatened throughout its entire range because of habitat destruction and because of the introduction of *Gambusia affinis* [Wildekamp et al. 1986]."

From Alcaraz and García-Berthou (2007):

"It reproduces from April to October, laying up to 900 eggs in successive spawns, and reaches sexual maturity in a few months (at a total length of less than 20 mm). The only published studies on *A. iberus* feeding ecology are Vargas & de Sostoa (1999) and experimental work by Rincón et al. (2002) and Caiola and Sostoa (2005). Vargas & de Sostoa (1999) showed that the Spanish toothcarp in the Ebro river delta is omnivorous, with a diet composed of both animal prey (mainly benthic crustaceans such as harpacticoid copepods and amphipods) and plant debris and detritus. This population also showed a seasonal change in diet related to the hydrological cycle of the lagoon (Vargas & de Sostoa 1999)."

Human Uses

From Froese and Pauly (2016):

"[…] used for mosquito control [Crivelli 1996]."

"Fisheries: of no interest; aquarium: commercial"

From Seriously Fish (2017):

"You're unlikely to find it on sale in aquatic stores as its collection and trade are currently prohibited although it may be available via specialist breeders or associations from time-to-time."

Diseases
From Alcaide et al. (1999):

"We have isolated *Vibrio parahaemolyticus* as the causative agent of infection in Iberian toothcarp *Aphanius iberus* […] This is the first description of a bacterial pathogen affecting Iberian toothcarp."

No OIE-reportable diseases have been documented for this species.

Threat to Humans
From Froese and Pauly (2016):

"Harmless."

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

4 Global Distribution

Figure 1. Known global distribution of *Aphanius iberus*. Map from GBIF (2016). A point in Algeria was excluded from this map and from the climate matching analysis because the fish in this location are now considered a separate species (see "Remarks", above). The point on the Atlantic coast of Spain was also excluded from climate matching because it is outside the described range of *A. iberus* and GBIF (2016) acknowledges interpretation issues with the data.

5 Distribution Within the United States

This species has not been reported as introduced or established in the U.S.

6 Climate Matching

Summary of Climate Matching Analysis

Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was 0.037, which is classified as a medium climate match. The range of Climate 6 scores that are classified as medium match is 0.005-0.103. Locally, medium to high climate matches occurred in Idaho, Montana, and far northern California. Much of the West showed medium climate matches, as did the Great Lakes and Mid-Atlantic regions. Low climate matches occurred in the Pacific Northwest, North-Central, Southeast, and Northeast regions.

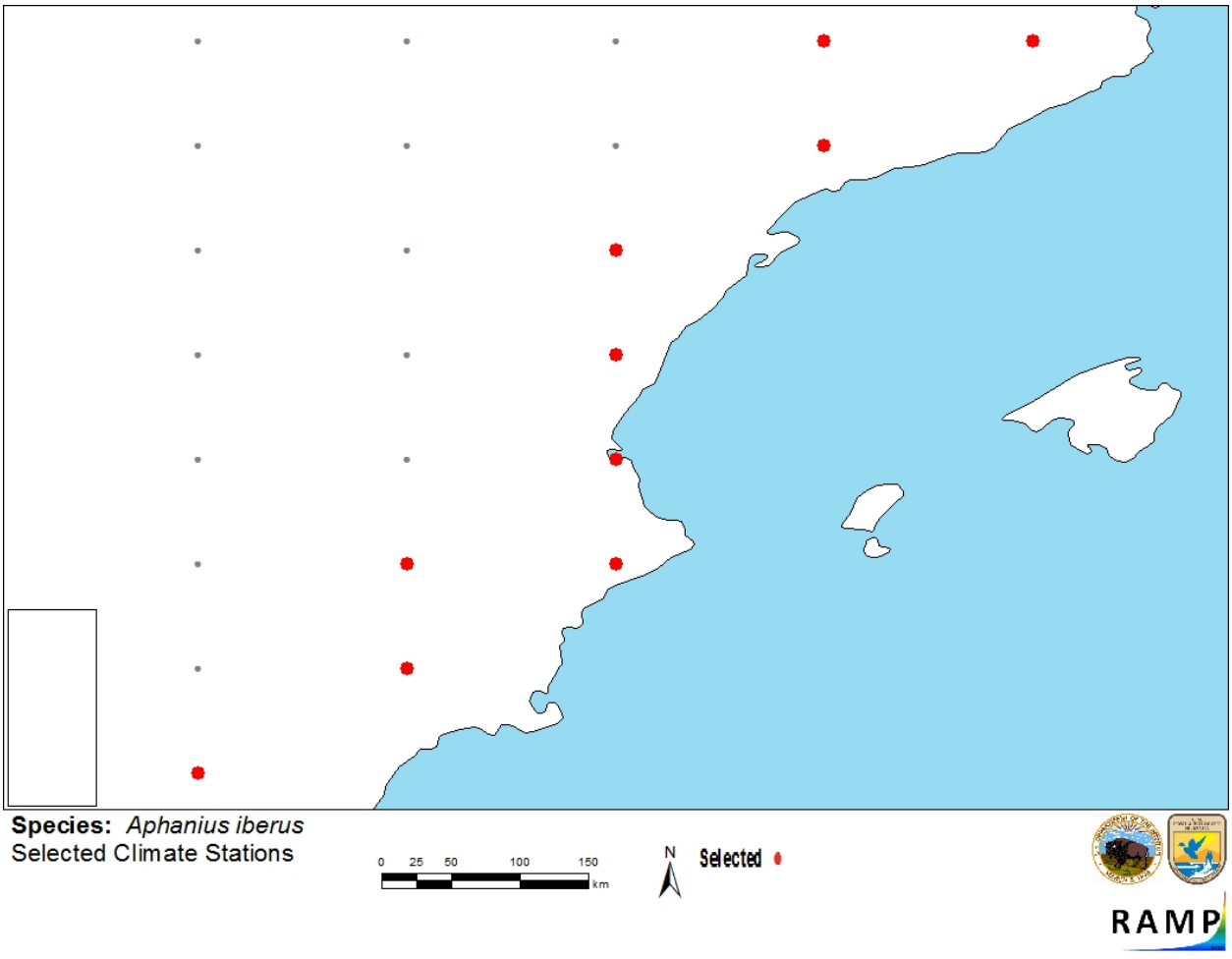

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Aphanius iberus* climate matching. Source locations from GBIF (2016).

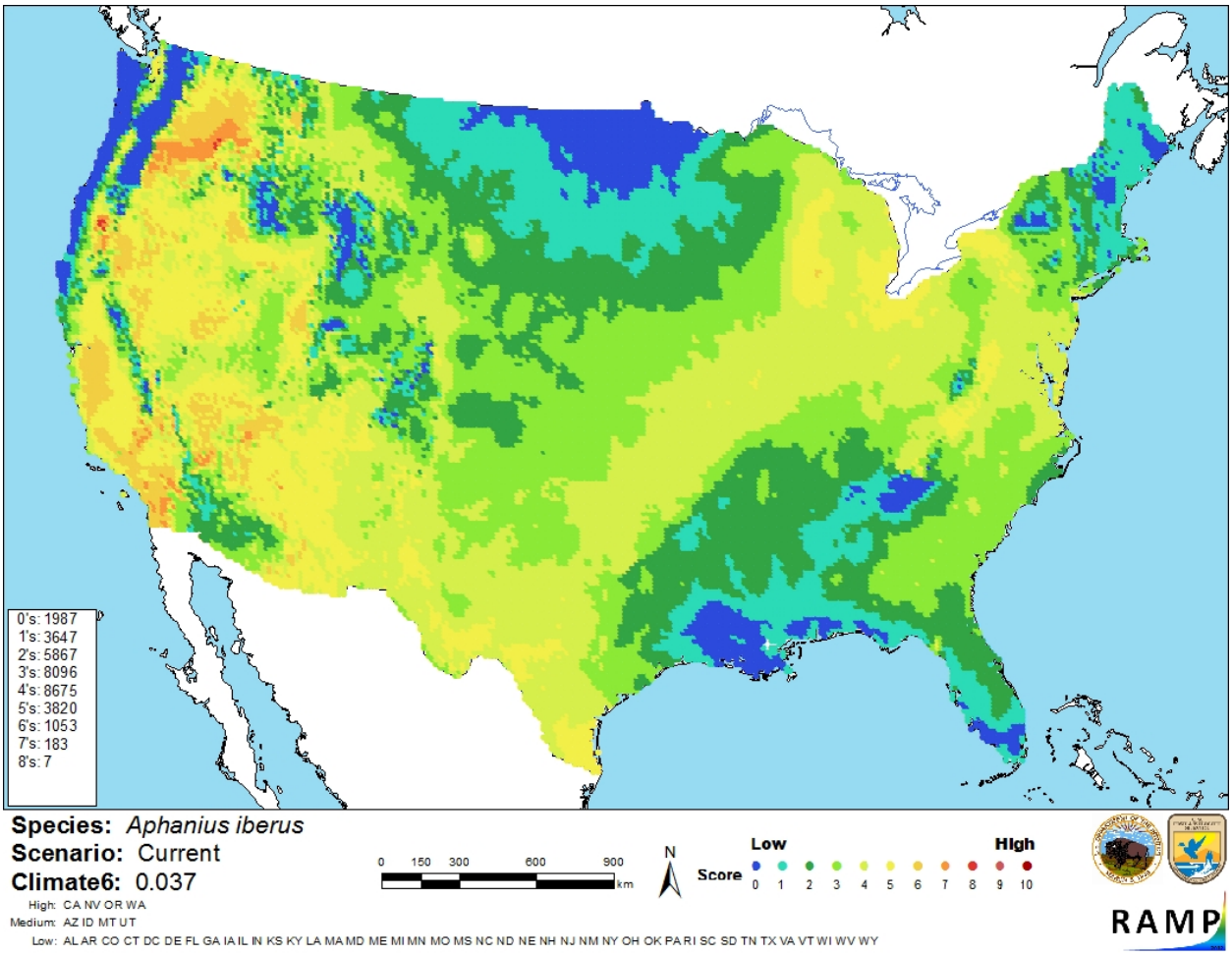

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Aphanius iberus* in the contiguous United States based on source locations reported by GBIF (2016). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

The biology of *Aphanius iberus* is well documented. No introductions of this species outside of its native range have been documented. Certainty of this assessment is low due to a lack of information on potential impacts of this species when introduced outside its native range.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Aphanius iberus is a small fish endemic to Spain's Mediterranean coast. Several populations have been extirpated; the species is categorized as "Endangered" on the IUCN Red List and is protected within the European Union Habitat Directive and the Bern Convention. *A. iberus* is of interest in the aquarium trade, but its protected status means that the species is rare in trade. *A. iberus* has a medium climate match with the contiguous United States. The biology of this species has been well documented, but more information on the history of invasiveness is needed because no introductions of the species have been reported. Overall risk category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3):** Uncertain
- **Climate Match (Sec. 6):** Medium
- **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.

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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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Kottelat, M., and J. Freyhof. 1972. Handbook of European freshwater fishes. Publications Kottelat, Cornol and Freyhof, Berlin.

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Wildekamp, R. H., R. Romand, and J. J. Scheel. 1986. Cyprinodontidae. Pages 165-276 *in* J. Daget, J.-P. Gosse, and D. F. E. Thys van den Audenaerde, editors. Check-list of the freshwater fishes of Africa (CLOFFA), volume 2. ISNB, Brussels; MRAC, Tervuren, Belgium; and ORSTOM, Paris.