

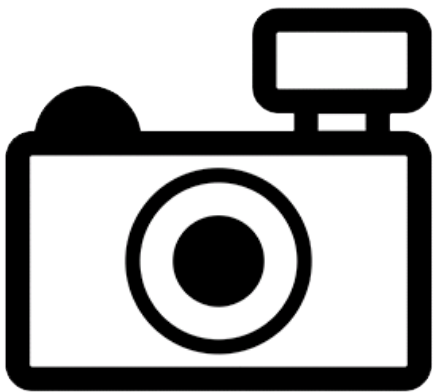
Least Crayfish (*Cambarellus diminutus*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2014

Revised, October 2016

Web Version, 10/30/2017



No Photo Available

1 Native Range, and Status in the United States

Native Range

From Fetzner (2016):

“Mobile County, Alabama, and George and Jackson counties, Mississippi.”

Status in the United States

From Adams and Jones (2010):

“This species is known to occur in Mobile County, Alabama, and George and Jackson counties, Mississippi, USA (Hobbs 1945), from fewer than 15 different localities and with an estimated extent of occurrence of less than 8,000 km² (R. L. Jones pers. comm. 2010). Within this area, this species is regarded as neither widely nor uniformly distributed (R.L. Jones pers. comm. 2010).”

Means of Introductions in the United States

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

Remarks

From Adams and Jones (2010):

“Although not regarded as common, this species is known to be abundant at sites where it occurs (R.L. Jones pers. comm. 2010).”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Protostomia
Superphylum Ecdysozoa
Phylum Arthropoda
Subphylum Crustacea
Class Malacostraca
Subclass Eumalacostraca
Superorder Eucarida
Order Decapoda
Suborder Pleocyemata
Infraorder Astacidea
Superfamily Astacoidea
Family Cambaridae
Subfamily Cambarellinae
Genus *Cambarellus*
Subgenus *Cambarellus* (*Pandicambarus*)
Species *Cambarellus diminutus*”

“Current Standing: valid”

Size, Weight, and Age Range

From Patoka et al. (2015):

“Size class (cm): 1-1.5, 1.5-2”

From Hobbs (1945):

“Measurements.-Male (form I) Holotype: carapace, height 3.0, width 3.1, length 7.4 mm.; areola, width 1.0, length 2.0 mm.; rostrum, width 1.0, length 2.4 mm.; abdomen, length 10.0 mm.; right chela, length of inner margin of palm 2.3, width of palm 1.4, length of outer margin of hand 6.3, length of movable finger 2.3 mm. Allotypic female: carapace, height 3.5, width 3.1, length 7.4 mm.; areola, width 1.0, length 2.1 mm.; rostrum, width 1.2, length 2.6 mm.; abdomen, length

11.0 mm.; right chela, length of inner margin of palm 2.1, width of palm 1.3, length of outer margin of hand 5.0, length of movable finger 2.3 mm.”

Environment

From Adams and Jones (2010):

“Freshwater”

“This species is tolerant of differing water and habitat qualities (Hobbs 1945)”

Climate/Range

From Peterson et al. (1996):

“We surveyed oxbow side-pond and channel habitats in seven drainages in coastal Mississippi in July 1993 and 1994 and August 1995.

Temperature (°C)	[Ponds with <i>C. diminutus</i>] 26.4 ± 0.3”
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From NatureServe (2015):

“tolerant of warm water, but prefers shaded areas (Hobbs, 1989)”

From Adams and Jones (2010):

“This species is only known from three counties in Alabama and Mississippi, from fewer than 15 localities, and has an estimated extent of occurrence of less than 8,000 km².”

Distribution Outside the United States

Native

This species is not native outside the United States.

Introduced

No established populations have been reported outside the native range.

Means of Introduction Outside the United States

No established populations have been reported outside the native range. However, the species is present in the pet trade (see Human Uses, below), and the following information describes how other crayfish species have been introduced to new locations via the pet trade.

From Patoka et al. (2015):

“In addition to its economic importance, pet trade is also recognized as one of the main pathways for the introduction of new species: including “hitch-hiking” species via the transportation water and pathogens (Rixon et al., 2005; Peay, 2009; Mrugała et al., 2014). Although the pet trade in

freshwater crayfish is relatively new in the EU, some of the ornamental crayfish species have already been recorded from the wild. Most probably, these originated from aquarium releases and include, for example, *Procambarus fallax* f. *virginialis* in Germany (Chucholl and Pfeiffer, 2010), Italy (Nonnis Marzano et al., 2009), the Netherlands (Soes and Koese, 2010), Slovakia (Janský and Mutkovič, 2010) and, surprisingly, Sweden (Bohman et al., 2013); *Cherax destructor* in Italy (Scalici et al., 2009); and *Cherax quadricarinatus* established in one location in Slovenia (Jaklic and Vrezec, 2011)."

From Patoka et al. (2014b):

"Although vast majority of crayfish keepers [in the Czech Republic] rear ornamental crayfish strictly in home aquarium, part of them commonly release crayfish into garden ponds at least for the summer period. These irresponsible activities are considerably dangerous for ICS [Indigenous Crayfish Species] and other native biota, because there is non-negligible probability that NICS [Nonindigenous Crayfish Species] escape from ponds spontaneously or during a flood (Peay, 2009). Moreover part of keepers introduces offspring of ornamental crayfish directly into the wild or flush them down the toilet. These illegal activities can participate on spreading of NICS."

Short Description

From NatureServe (2015):

"Hooks on ischia of male third and fourth pereopods; male pleopod with three terminal elements, all curved at about 45 degrees to main axis of pleopod, caudal process broadly triangular; cervical spines strong (Fitzpatrick, 1983)."

Biology

From Adams and Jones (2010):

"This species is found in pools, sluggish portions of permanent streams and ditches. Along the Gulf coast in Mississippi, this species occurs in some oxbow lakes, which are slow moving, warm and heavily vegetated with litter-covered substrate (Peterson *et al.* 1996). These conditions provide enhanced protection for this species (Peterson *et al.* 1996). Hobbs (1945) recorded this species from pools with filamentous algae, decaying leaves, and sticks."

From NatureServe (2015):

"No empirical data, but broad seasonal occurrence of ovigerous females implies year round breeding."

"Home range probably does not exceed 20 m dia."

"Found among vegetation in small to moderate blackwater streams, usually in pine woods. Also invades ditches that communicate with sluggish streams; tolerant of warm water, but prefers shaded areas (Hobbs, 1989). Seems to prefer very sluggish flow with submerged, at least in part, vegetation. Will burrow during dry conditions."

“Adult Food Habits: Detritivore
Immature Food Habits: Detritivore”

Human Uses

Faulkes (2015a) report that *C. diminutus* has been found in the pet trade of the United States (Faulkes, 2015b), Germany (Chucholl 2013), Czech Republic (Patoka et al. 2014a, 2015), and Slovakia (Lipták and Vitázková 2015).

From Patoka et al. (2014a):

“Wholesale availability: Very rare”

Diseases

No information available.

Threat to Humans

No information available.

3 Impacts of Introductions

From Patoka et al. (2014a):

“... potential invasiveness (FI-ISK [Freshwater Invertebrate Invasiveness Scoring Kit] score) and risk category (FI-ISK category) [...]

FI-ISK score: 3

FI-ISK category: Medium”

4 Global Distribution

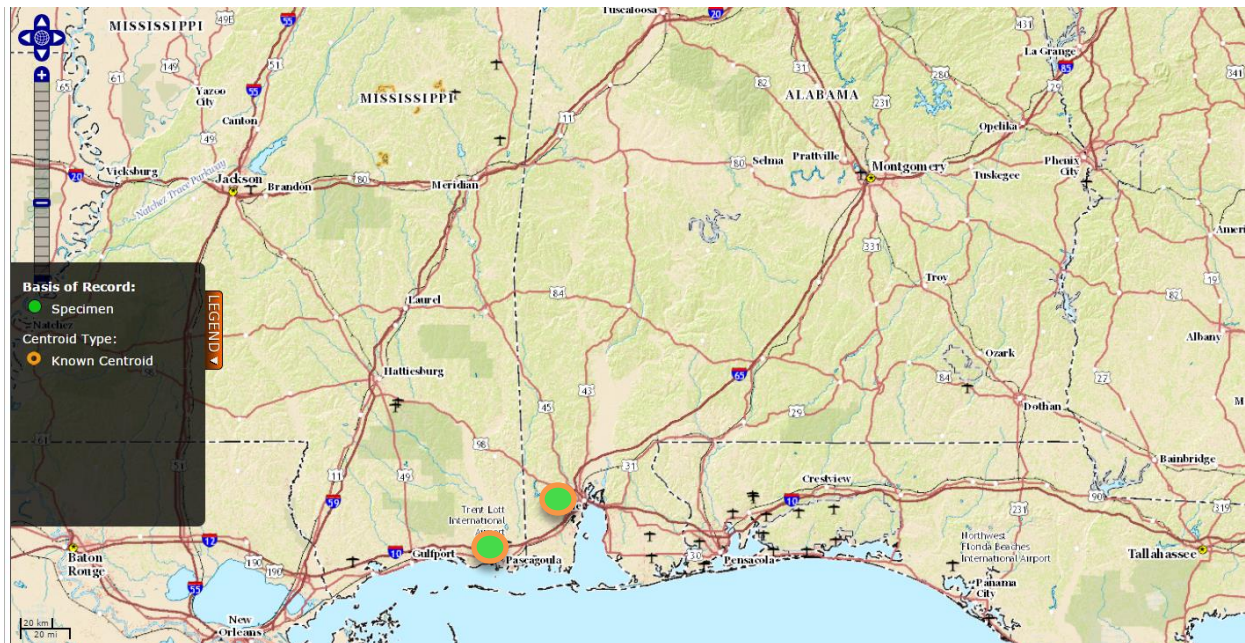


Figure 1. Map of known global distribution of *Cambarellus diminutus* (National Museum of Natural History 2016).

5 Distribution within the United States

Same as global distribution (see Section 4).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was high in the south-central U.S., especially Alabama, Mississippi, and Louisiana. Medium match was found in the Southeast, portions of the Ohio River Valley, and Texas. Low matches dominated the rest of the United States. Climate6 score indicated that the Continental U.S. has a medium climate match. The range for a medium climate match is $0.005 < X < 0.103$; Climate6 score of *Cambarellus diminutus* is 0.096.

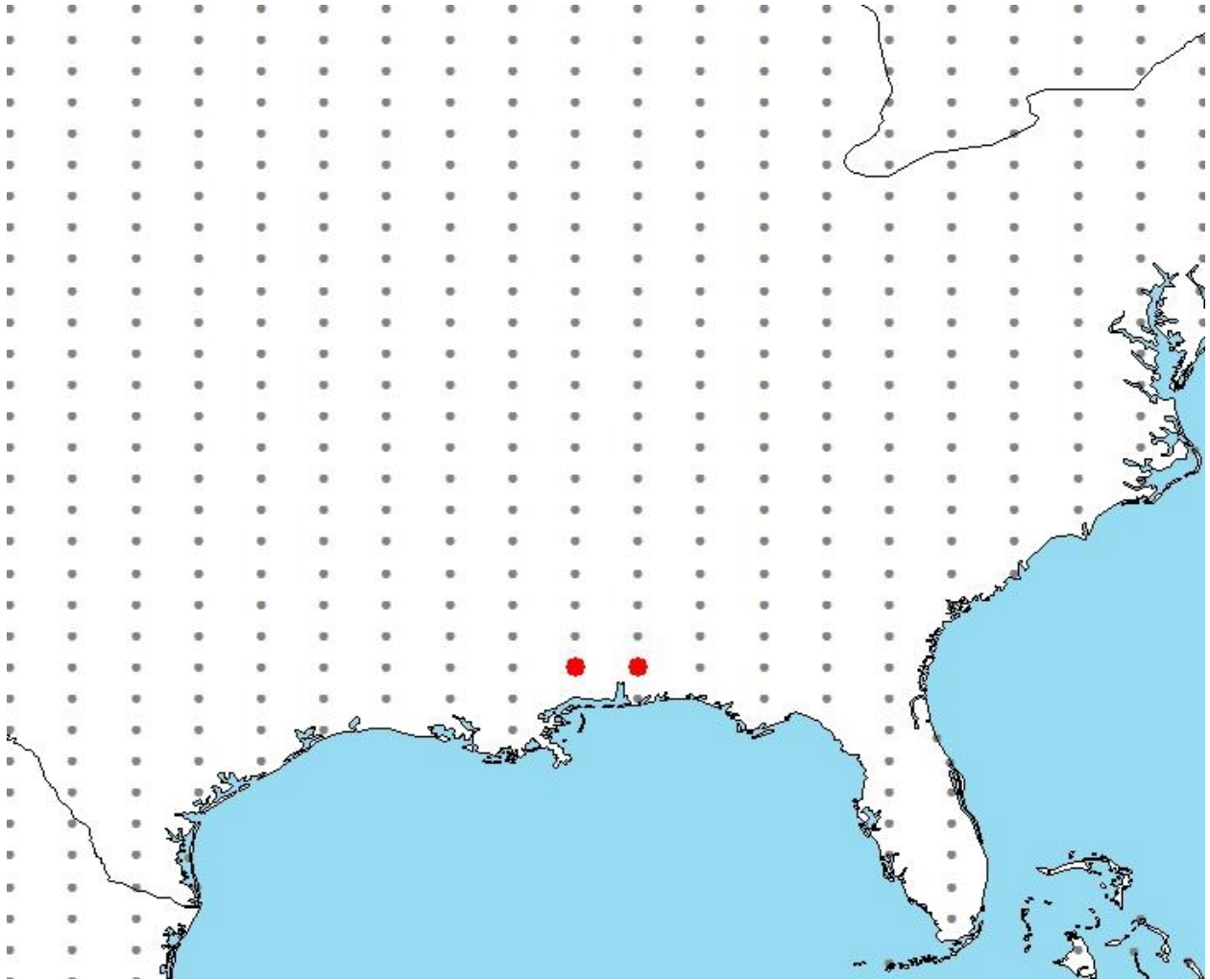


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Cambarellus diminutus* climate matching. Source locations from National Museum of Natural History (2016).

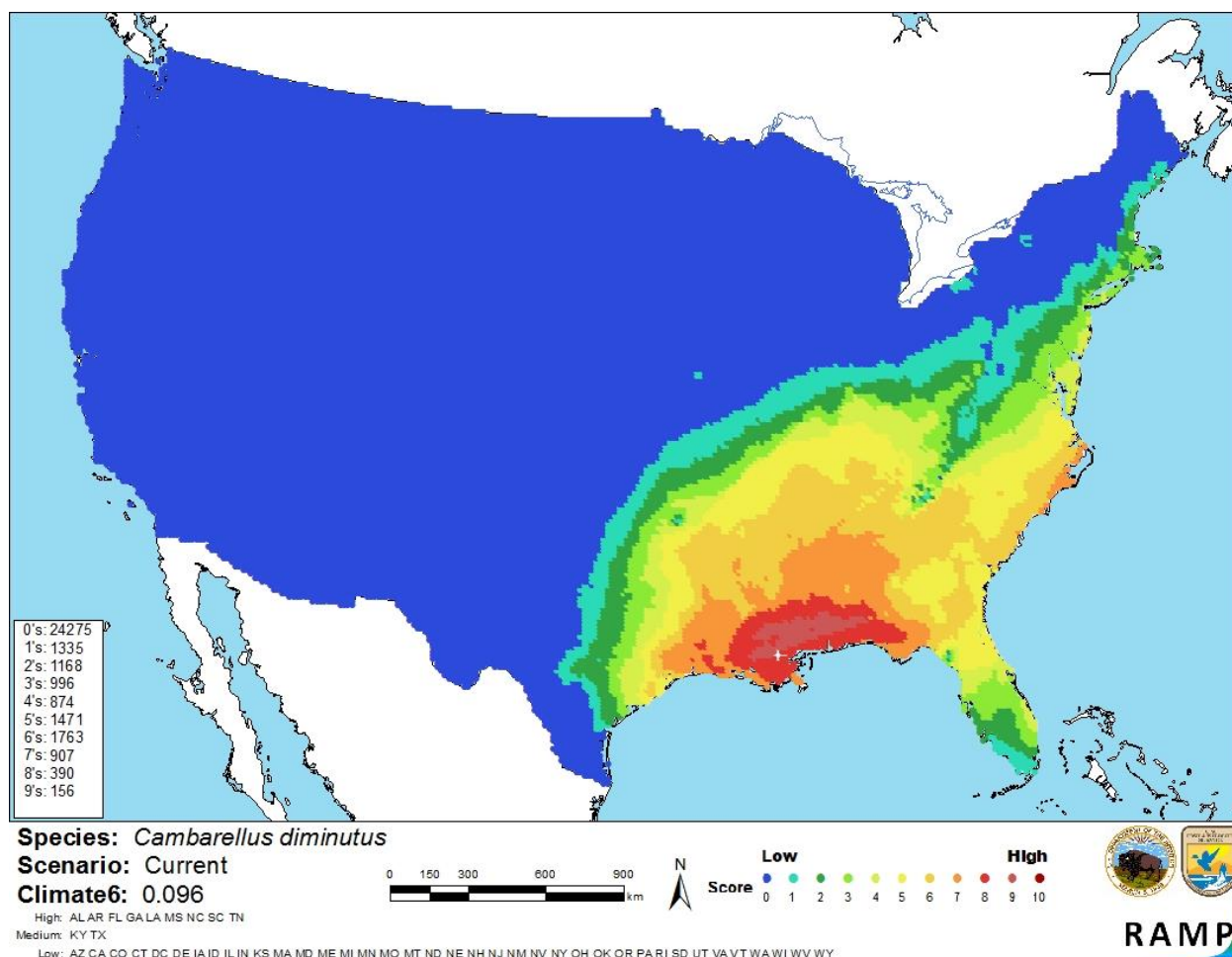


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Cambarellus diminutus* in the continental United States based on source locations reported by National Museum of Natural History (2016). 0= Lowest match, 10=Highest match.

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

Little is known about the biology of *Cambarellus diminutus*. The native range is highly restricted and no established populations have been reported elsewhere in the world. Certainty of this assessment is high.

8 Risk Assessment

Summary of Risk to the Continental United States

Cambarellus diminutus is a small freshwater crayfish native to southern Alabama and Mississippi. It is known from less than 20 locations, but can be abundant at those locations. *C. diminutus* is present but rare in the pet trade in the U.S. and Europe. There is potential for species introduction to new ecosystems through aquarium releases and escape from garden ponds, but no established populations have been reported outside the native range. Researchers based in the Czech Republic reported a medium risk category according to the Freshwater Invertebrate Invasiveness Scoring Kit (FI-ISK). Climate match with the United States is medium, with highest match centered around the species' native range. Without any evidence of population establishment outside the native range and a low rate of trade, overall risk posed by this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): High**
- **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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