

Swamp Dwarf Crayfish (*Cambarellus puer*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2014

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1 Native Range, and Status in the United States

Native Range

From Alvarez et al. (2010):

“This species is known from Brazos and Brazoria counties, Texas, eastward through the coastal plain to the Mississippi basin and from the lower part of the delta to Johnson County, Illinois (Taylor *et al.* 2004, Fetzner 2008, Burr and Hobbs 1984, Hobbs 1990). In addition, this species is a native of the Mississippi River lowlands in Missouri (B. DiStefano pers. comm. 2010).”

Status in the United States

From Morehouse and Tobler (2013):

“*Cambarellus puer* occurs from southern Illinois and Missouri southward along the Mississippi River to Louisiana and westward to southeastern Oklahoma and eastern Texas. Current records indicate a very limited distribution in Oklahoma. It is known from a single location: a swampy area with dense vegetation along the Little River in McCurtain County. [...] This species has not been collected in Oklahoma since 1975.”

Faulkes (2015a) reports that *C. puer* is not found in the pet trade in the United States, citing Faulkes (2015b).

Means of Introductions in the United States

This species has not been reported as introduced outside of its native range in the United States.

Remarks

From NatureServe (2017):

“Some populations now in nw LA and sw AR may represent a different undescribed species.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

“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 puer*”

“Taxonomic Status: valid”

Size, Weight, and Age Range

From Morehouse and Tobler (2013):

“The body size of adults rarely exceeds 37 mm in total length. Females are typically slightly larger than males.”

Environment

From Alvarez (2010):

“Freshwater.”

From NatureServe (2017):

“Tolerant of warm water, low gas levels, but seems to require submergent vegetation.”

Distribution Outside the United States

Native

The native range of this species does not extend outside of the United States.

Introduced

No introductions of this species into natural habitats have been reported.

According to Patoka et al. (2014), *C. puer* is available in the pet trade in the Czech Republic. Its wholesale availability is reported as “very rare”.

Means of Introduction Outside the United States

No introductions of this species into natural habitats have been reported.

Short Description

From NatureServe (2017):

“Hooks on 2nd & 3rd pereopods; mesial process subacute and straight, although directed at 90 degree angle to pleopod, widely separated from other two elements.”

From Morehouse and Tobler (2013):

“The carapace is laterally compressed and moderately arched dorsoventrally with strong cervical spines and areola is open. The rostrum is flat and terminates in small spines at base of the acumen. The acumen is equal to or slightly longer than the width of the rostrum at the marginal spines. Chelae are small and slender with short fingers. The fingers and palm have rounded mesial and lateral margins with single setae covering dorsal surfaces, but lack longitudinal ridges and rows of tubercles. The dactyl is equal in length or shorter than the mesial margin of palm. In form I males, gonopods terminate in three caudodistally recurved elements of moderate and

equal length. In females, the annulus ventralis is movable, subcircular, with a flattened or shallowly notched caudal edge, and has a strongly elevated central region (Taylor & Schuster, 2004).”

“The background color of the dorsal and lateral surfaces of the abdomen, carapace, and chelae range from orange-red to light brown and gray [...]. The ventral surface is white to cream in color. The tips of the chelae lack orange coloration. *Cambarellus puer* populations exhibit a pigmentation polymorphism, where the carapace and abdomen either have two brown to black stripes or two rows of spots running their entirety. These alternative color patterns are controlled by a single mendelian gene, with the striped phenotype being dominant over the spotted one (Volpe & Penn, 1957). The polymorphism appears to be selectively neutral, and mating between the two color phenotypes is random (Pflieger, 1996).”

Biology

From Alvarez et al. (2010):

“This species inhabits well vegetated swamps, ditches (including roadside ditches), ponds and lowland streams with muddy substrate (Taylor, Jones and Bergey 2004, Fetzner 2008, [Pflieger] 1996).”

“This species has been described as abundant (Taylor *et al.* 2007).”

From NatureServe (2017):

“Year round breeder without seasonal peaks in SE LA (Black, 1966); first major sperm production in 1st year, followed by second major output one year later.”

“Found commonly in sluggish streams, sloughs, roadside ditches; will burrow during dry periods. In Missouri it avoids the central, more intensively ditched and drained part of the lowlands but is frequently found in roadside ditches, ponds, and cypress swamps, with some occurrences in slow-flowing bayous and creeks in Louisiana (Pflieger, 1996). In Texas, it occurs in shallow waters with aquatic plant cover and underground cells into which individuals can take refuge during droughts or in dry summers (Johnson and Johnson, 2008).”

“Food Comments: No data; probably opportunistic, mostly detritus.”

From Morehouse and Tobler (2013):

“The majority of the information known about *C. puer* has been collected in Louisiana (Black, 1966), Illinois (Page, 1985), and Missouri (Pflieger, 1996). Ovigerous females have been collected from February to May, with egg diameters range from 1.0 to 1.1 mm (Black, 1966; Page, 1985). Black (1966) reported two periods of reproductive activity in Louisiana, one in late winter to early spring and another in mid-summer. Males require 13 to 14 molts to achieve sexual maturity, and most males will not breed during their first year of life (Pflieger, 1996). *Cambarellus puer* lives approximately 15 to 18 months after hatching (Black, 1966).”

Human Uses

According to Faulkes (2015a), *C. puer* is present in the pet trade in Germany and the Czech Republic, but not in the United States, Brazil, Ireland, the United Kingdom, the Netherlands, Greece, Slovakia, Turkey, or Singapore.

According to Patoka et al. (2014), the wholesale availability of *C. puer* in the Czech Republic is reported as “very rare”.

Diseases

No information available. No OIE reportable diseases have been documented for this species.

Threat to Humans

No information reported for this species.

3 Impacts of Introductions

According to Patoka et al. (2014), *C. puer* has a potential invasiveness (FI-ISK score) of 3 and a risk category (FI-ISK category) of Medium for the Czech Republic. The abbreviation “FI-ISK” stands for the Freshwater Invertebrate Invasiveness Scoring Kit. Non-indigenous crayfish traded in the Czech Republic ranged in FI-ISK score from 3 (lowest) to 27 (highest), and were classified into risk categories of Medium and High.

4 Global Distribution

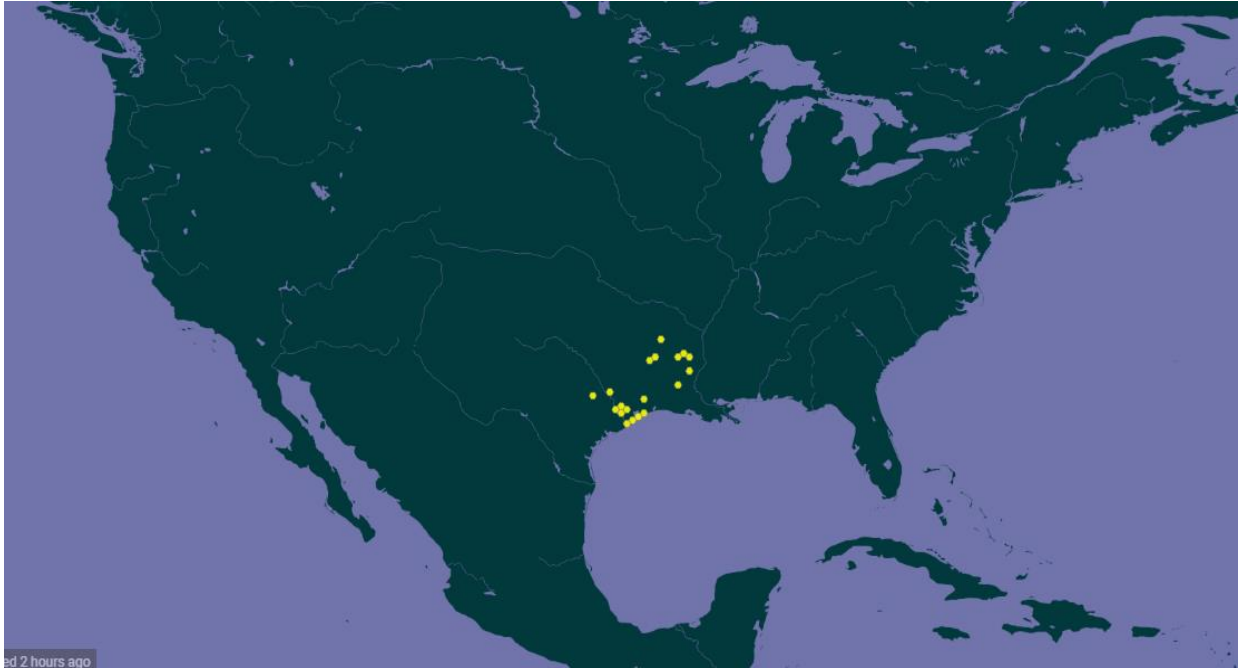


Figure 1. Map of known global distribution of *Cambarellus puer*. Map from GBIF Secretariat (2017). NatureServe (2017) lists established populations that are not represented on the map, which include the southernmost part of Illinois, south eastern Missouri (Lowland Faunal Region) (Pflieger 1996), the westernmost part of Kentucky (Taylor and Schuster 2004), and Broken Bow, Oklahoma (Taylor et al. 2004).

5 Distribution Within the United States

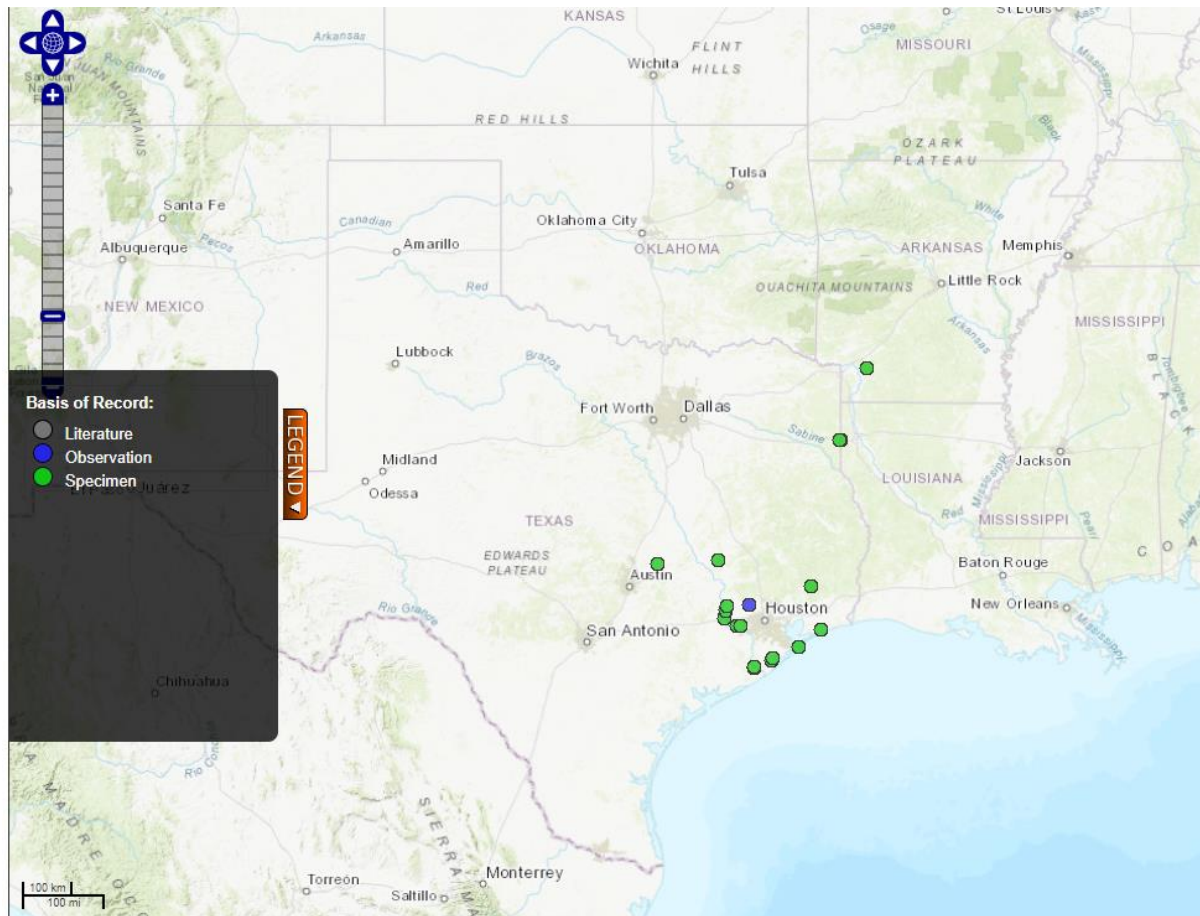


Figure 2. Distribution of *Cambarellus puer* in the south-central United States. Map from BISON (2017).

6 Climate Matching

Summary of Climate Matching Analysis

Note: There is a lack of georeferenced collection points from the full species distribution as described in the literature. Only documented occurrences were added in for climate matching, therefore the climate match presented is likely an underestimate of the true climate match.

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean distance) was high in the Southeast, from eastern Texas to coastal Georgia and South Carolina. Medium matches occurred in peninsular Florida, the Mid-Atlantic region, the coastal Northeast, and parts of Texas and the Midwest. The western United States, Upper Midwest, and northern New York and New England showed low matches. Climate 6 score indicated an overall high climate match for the contiguous U.S. Scores of 0.103 or greater are classified as high match; Climate 6 score for *Cambarellus puer* was 0.214.

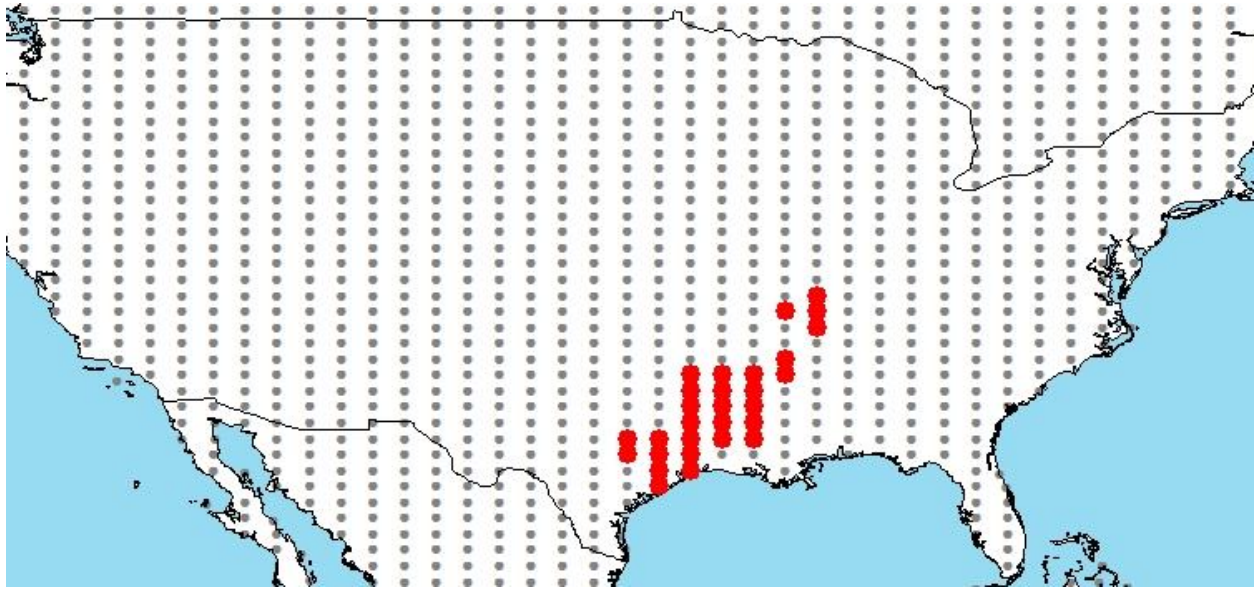


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected in the United States as source locations (red) and non-source locations (gray) for *Cambarellus puer* climate matching. Source locations from GBIF Secretariat (2017). Additional source locations in Illinois, Missouri, Tennessee, northern Arkansas, and Mississippi from Chambers et al. (1979). Additional source location in Kentucky from NatureServe (2017).

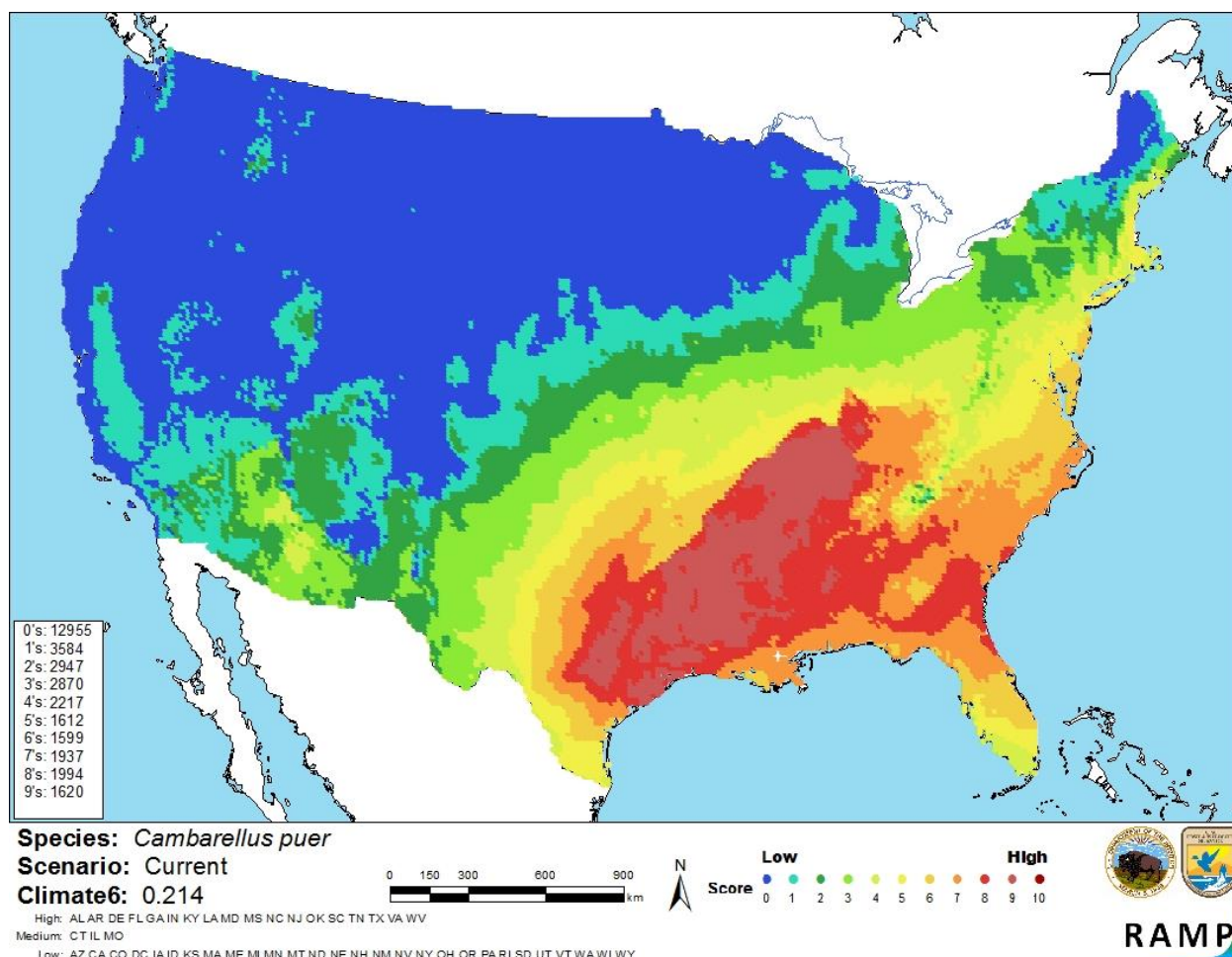


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Cambarellus puer* in the contiguous United States based on source locations reported by GBIF Secretariat (2017), Chambers et al. (1979), and NatureServe (2017). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated 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

Information on the biology and distribution of this species is available. *C. puer* is reported as available on the market for trade in the Czech Republic and Germany; however, little scientific information is available on the impacts of introductions. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Continental United States

Cambarellus puer is a freshwater crayfish native to east-central Texas, eastward through the coastal plain to the Mississippi basin and from the lower part of the Mississippi Delta to Johnson County, Illinois. It is reported to be rarely available on the market for wholesale trade in the Czech Republic, where it has a potential invasiveness (FI-ISK score) of 3 and a risk category (FI-ISK Category) of Medium. Data on impacts of introductions are lacking. Absence of this research makes the certainty of this assessment low. Climate match with the United States is high. Overall risk posed by this species is uncertain.

Assessment Elements

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