

# Harlequin Shrimp (*Caridina spongicola*)

## Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2017

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Xema Romero León 31/01/2008

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## 1 Native Range and Status in the United States

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### Native Range

From De Grave et al. (2013):

“*Caridina spongicola* is endemic to Lake Towuti in Sulawesi (von Rintelen and Cai 2009).”

### Status in the United States

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

## Means of Introductions in the United States

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

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From GBIF (2016):

“KINGDOM Animalia  
PHYLUM Arthropoda  
CLASS Malacostraca  
ORDER Decapoda  
FAMILY Atyidae  
GENUS *Caridina*  
SPECIES *Caridina spongicola*”

“TAXONOMIC STATUS accepted species”

### Size, Weight, and Age Range

From Zitzler and Cai (2006):

“Compared to other *Caridina* species, *C. spongicola* is [...] rather small (cl 1.8-2.8 mm).”

### Environment

From von Rintelen and Cai (2009):

“With 203 m in depth, Lake Towuti is distinctly shallower, but with 560 km<sup>2</sup> more than three times as large as Lake Matano and represents the second largest lake in Indonesia (Giesen, 1994).”

From Zitzler and Cai (2006):

“[...] *Caridina spongicola* was found unexceptionally with a currently undescribed freshwater sponge [...] It grows in the outlet of Lake Towuti at depths of 2-5 m. The shrimp either occurs on the sponge or dwells inside its osculae.”

### Climate/Range

From von Rintelen and Cai (2009):

“Temperatures in Lakes Matano, Mahalona, and Towuti vary between 27 and 31°C, a stable thermo- or chemocline is basically missing [...]”

## **Distribution Outside the United States**

### **Native**

From De Grave et al. (2013):

“*Caridina spongicola* is endemic to Lake Towuti in Sulawesi (von Rintelen and Cai 2009).”

### **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 Zitzler and Cai (2006):

“Carapace with three transversal dark brown bands [...], first two usually joint at dorsal surface to form a n-shaped band in lateral view; anterior part of cephalothorax, antennular peduncle, bases of antennae and posterior rostrum similarly pigmented, whereas anterior rostrum, antennae and distal antennules mostly unpigmented; first and second pereopod white with light brown setae, other pereopods white with brown bands; abdomen with a conspicuous white stripe expanding laterally along each side, dorsally densely covered with dark brown bands except for a white patch on third sternum, ventrally uniformly brown; uropods with a characteristic brown band on distal endopod, endopod and exopods with white-pigmented tips, respectively; pleopods and telson colourless; eggs usually dark brown. This colour pattern remains visible even if the shrimps are under stress though the intensity of the colour merely fades.”

From von Rintelen and Cai (2009):

“Rostrum not overreaching scaphocerite or antennular peduncle, body small [...].”

## **Biology**

From Zitzler and Cai (2006):

“During an extensive substrate specific sampling in the Malili lake system in 2003 and 2004, *Caridina spongicola* was found unexceptionally with a currently undescribed freshwater sponge that, according to a preliminary study, belongs to the common Spongillidae (C. Eckert, pers. comm.) [...].”

“A preliminary gut content analysis was carried out to investigate the shrimps’ diet. None of the six dissected guts contained traces of poriferean spicules. The spicules are presumably too big (0.2-0.3 mm; C. Eckert, pers. comm.) to be consumed by the shrimps. On the other hand, a variety of different diatoms, which possibly accumulate on or within the sponge, were found in the guts. These findings suggest that the shrimps do not feed on sponge’s tissue and thus do not

parasitize their hosts. Instead, they appear to be commensals using the sponge's cavities as shelter and the inherent accumulation of diatoms as a food supply.”

“So far, *C. spongicola* is the only freshwater shrimp that associates with sponges.”

“The medium egg size (0.8-0.9 x 0.4-0.6 mm) and small numbers of eggs (12-18) suggests an abbreviated larval development, which is typical for lacustrine species.”

## Human Uses

From AquaticMag (2017):

“It is rare to find Harlequin in the aquatic world. Many breeders will not rare [sic] them due to their complexity in captivity and their low breeding rate. You may find a few places below who sell the freshwater Harlequin Sulawesi Shrimp but their prices are pretty high owing to their rarity.”

## Diseases

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

## Threat to Humans

No information available.

## 3 Impacts of Introductions

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

## 4 Global Distribution

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**Figure 1.** Known global distribution of *Caridina spongicola*. Map from GBIF (2016).

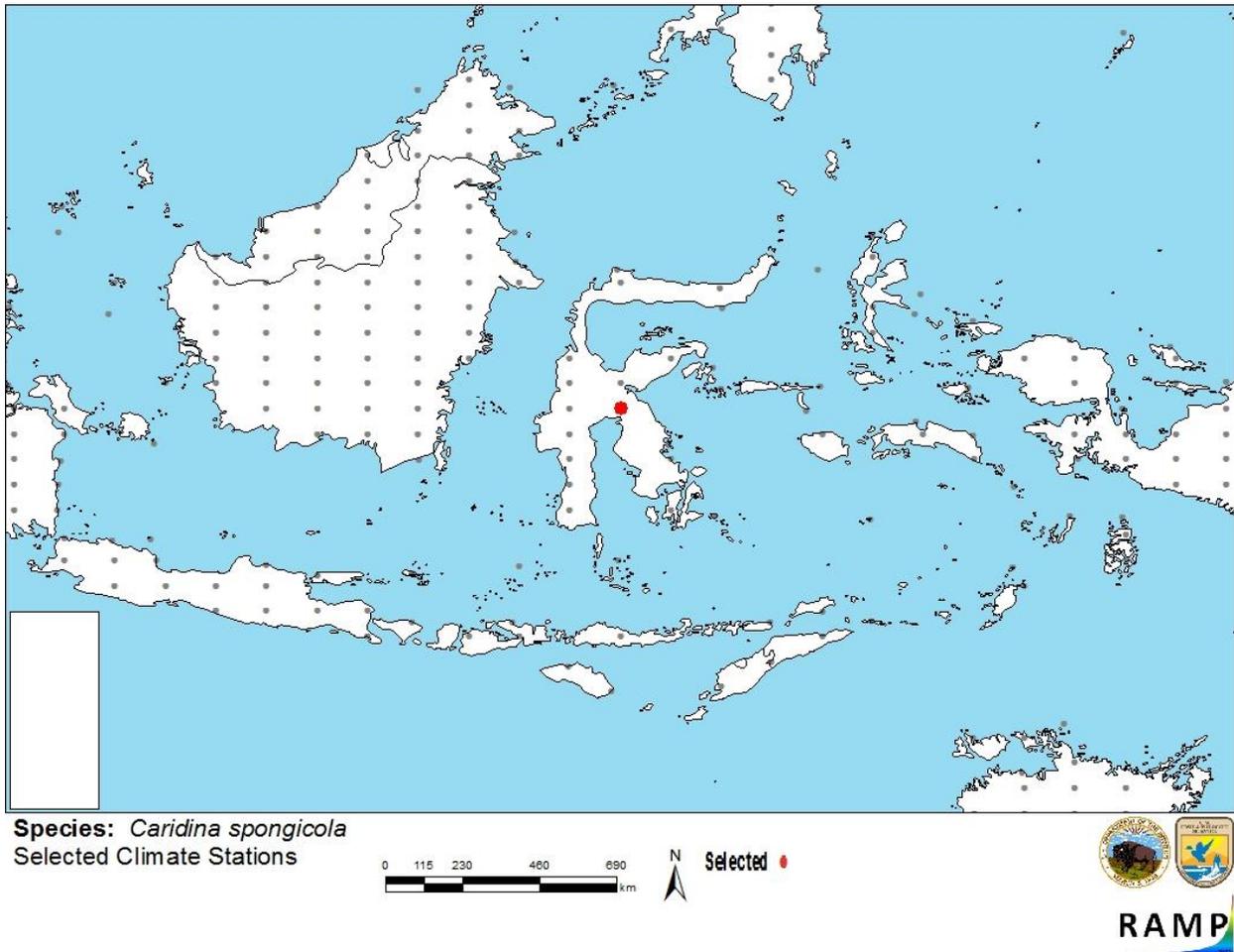
## 5 Distribution Within the United States

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

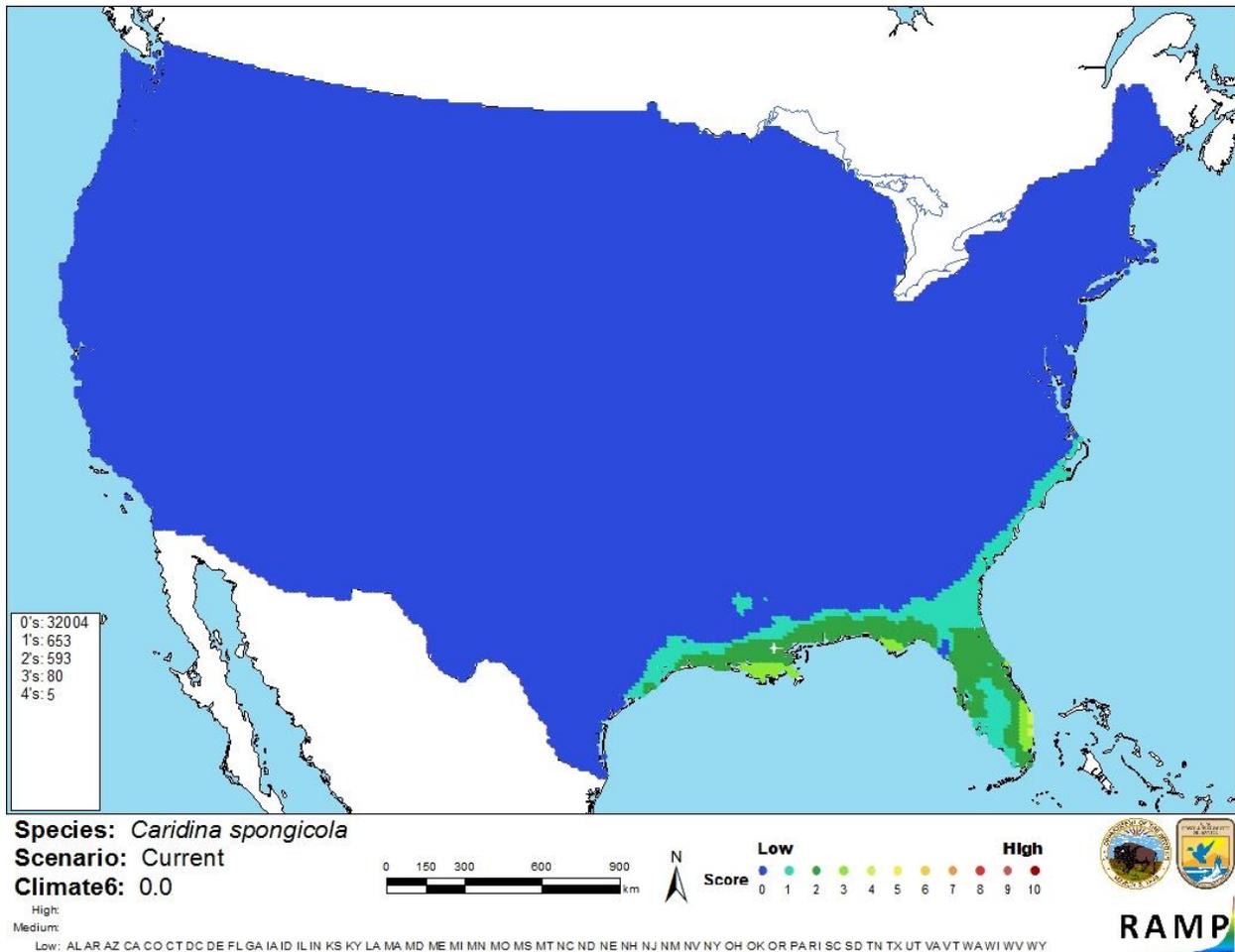
## 6 Climate Matching

### Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the Continental U.S. was 0.000, which is categorically low. The climate match was slightly higher, but still low, in Florida, along the Gulf Coast, and along the southern Atlantic Coast.



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



**Figure 3.** Map of RAMP (Sanders et al. 2014) climate matches for *Caridina spongicola* in the contiguous United States based on source locations reported by GBIF (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
$\geq 0.103$	High

## 7 Certainty of Assessment

*Caridina spongicola* was first described as a species in 2006 and little information on the species is available beyond the original paper. *C. spongicola* has a very restricted range and has never been reported as introduced or established outside of its native range, so potential impacts of introduction remain unknown. Certainty of this assessment is low.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Caridina spongicola* is a freshwater shrimp found only in Lake Towuti in Sulawesi, Indonesia. This species has no documented history of introduction outside its native range, although it is present in low numbers in the aquarium trade. *C. spongicola* has a low climate match with the contiguous United States. Certainty of this assessment is low; further information is needed to adequately assess the risk this species poses. Overall risk assessment category is uncertain.

### Assessment Elements

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

- AquaticMag. 2017. Harlequin shrimp information [text by Jesse M.]. Aquatic Magazine. Available: <https://aquaticmag.com/freshwater/harlequin-shrimp-information/>. (August 2017).
- De Grave, S., D. Wowor, and W. Klotz. 2013. *Caridina spongicola*. The IUCN Red List of Threatened Species 2013: e.T198253A2517818. Available: <http://www.iucnredlist.org/details/198253/0>. (August 2017).
- GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Caridina spongicola* Zitzler & Cai, 2006. Global Biodiversity Information Facility, Copenhagen. Available: <http://www.gbif.org/species/5863064>. (August 2017).
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- von Rintelen, K., and Y. Cai. 2009. Radiation of endemic species flocks in ancient lakes: systematic revision of the freshwater shrimp *Caridina* H. Milne Edwards, 1837 (Crustacea: Decapoda: Atyidae) from the ancient lakes of Sulawesi, Indonesia, with the description of eight new species. *The Raffles Bulletin of Zoology* 57(2):343-452.
- Zitzler, K., and Y. Cai. 2006. *Caridina spongicola*, new species, a freshwater shrimp (Crustacea: Decapoda: Atyidae) from the ancient Malili lake system of Sulawesi, Indonesia. *The Raffles Bulletin of Zoology* 54(2):271-276.

## 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.**

Giesen, W. 1994. Indonesia's major freshwater lakes: a review of current knowledge, development processes and threats. *Mitteilungen des Internationalen Vereins für Limnologie* 24:115-128.