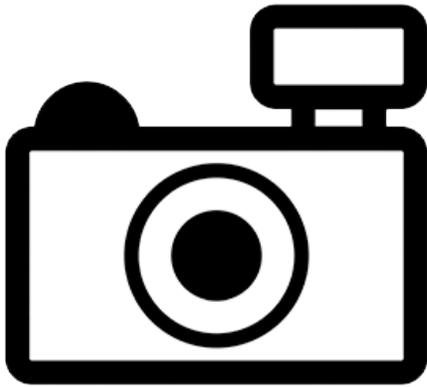


Red Goldflake Shrimp (*Caridina spinata*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2017
Web Version, 11/17/2017



No Photo Available

1 Native Range and Status in the United States

Native Range

From De Grave et al. (2013):

“The species is endemic to Lake Towuti (Sulawesi), a small lake (561.1 km²) [...]”

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

Taxonomic Hierarchy and Taxonomic Standing

From GBIF (2017):

“KINGDOM Animalia
PHYLUM Arthropoda

CLASS Malacostraca
ORDER Decapoda
FAMILY Atyidae
GENUS *Caridina*
SPECIES *Caridina spinata*

“TAXONOMIC STATUS accepted species”

Size, Weight, and Age Range

From von Rintelen and Cai (2009):

“Carapace length 3.0-5.0 mm (n=17).”

Environment

From De Grave et al. (2013):

“*Caridina spinata* is a hard substrate dweller, primarily on rocks, with adults preferring deeper water (3-5 m).”

From von Rintelen and Cai (2009):

“With 203 m in depth, Lake Towuti is distinctly shallower, but with 560 km² more than three times as large as Lake Matano and represents the second largest lake in Indonesia (Giesen, 1994).”

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):

“The species is endemic to Lake Towuti (Sulawesi), a small lake (561.1 km²) [...]”

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 von Rintelen and Cai (2009):

“Body and appendages mainly crimson to deep red [...], often with two to three bright yellow or orange transversal stripes at the end of the carapace and the abdomen and a few dots of the same colour on various body parts or body appendages, e.g. tips of the uropods. Chelae and uropods can be completely yellow or orange. This combination of red-crimson and yellow or orange is unique in the ancient lake species, although a red body colouration is common in rock dwellers. Antennules usually transparently white. Eggs coloured as body. This colour pattern remains visible even if the shrimp is under stress, the intensity of the colour might fade.”

“Rostrum long, reaching beyond end of scaphocerite, first and second pereopod conspicuously slender”

Biology

From von Rintelen and Cai (2009):

“*C. spinata* is a hard substrate dweller on rocks. Whereas juveniles were also frequently observed in shallow water zones (above approx. 3-5 m), adults seem to prefer boulders in deeper water zones, where they often occur in syntopy with *C. profundicola* and sometimes with other rock dwellers from Lake Towuti. When disturbed, *C. spinata* tries to hide in nearby gaps between rocks (usually boulders). Like in other typical rock dwellers from the Malili lakes it rather escapes side- or downwards than in other directions.”

“[...] *C. spinata* always appears rather active.”

Human Uses

From De Grave et al. (2013):

“The species is available in the aquarium trade (all wild harvested).”

Diseases

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

Threat to Humans

No information available.

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 *Caridina spinata* on the Indonesian island of Sulawesi. 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 match (Sanders et al. 2014; 16 climate variables; Euclidean distance) was low throughout the contiguous U.S. The climate match was highest, but still low, in Florida, along the Gulf Coast, and along the southern Atlantic Coast. Climate 6 score indicated a low climate match for the contiguous U.S. overall. Scores of 0.005 or less are classified as low match; Climate 6 score for *C. spinata* was 0.000.

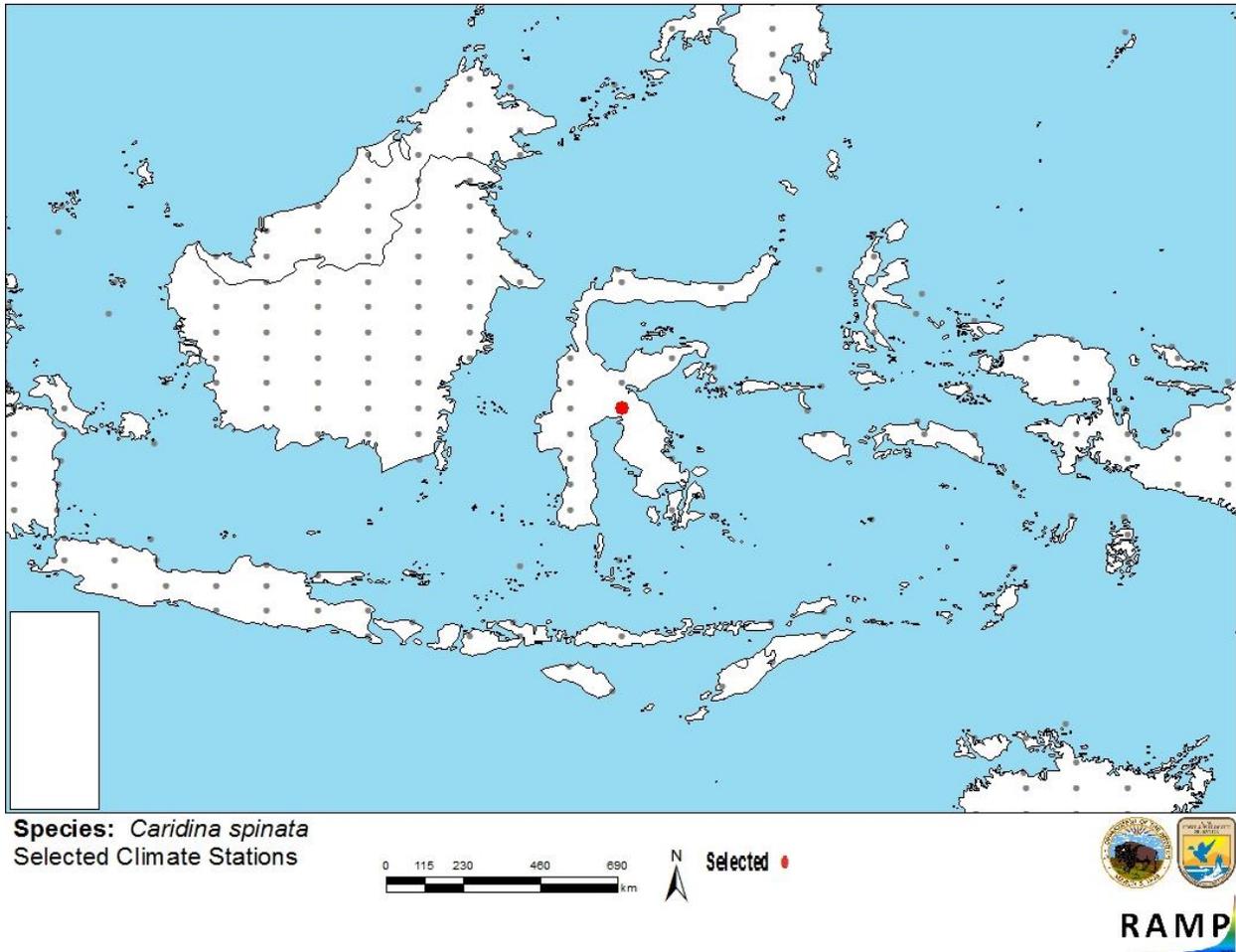


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Caridina spinata* climate matching. Source locations from GBIF (2016).

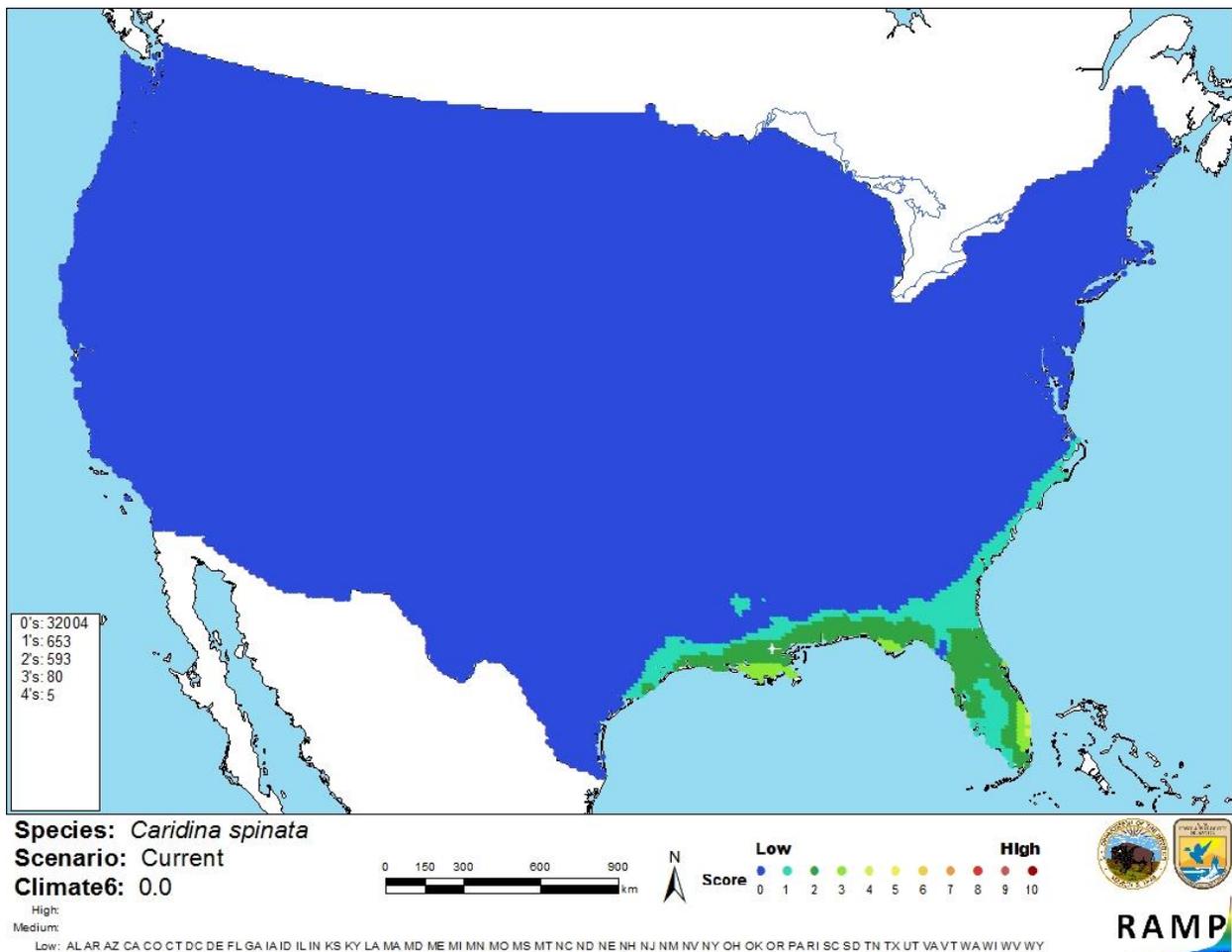


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Caridina spinata* in the contiguous United States based on source locations reported by GBIF (2016). 0=Lowest match, 10=Highest match.

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
≥ 0.103	High

7 Certainty of Assessment

There is little information available on *Caridina spinata*. This species has a very restricted range and has never been reported as introduced or established outside of its native range, so potential impacts of its introduction remain unknown. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Caridina spinata is a freshwater shrimp found only in Lake Towuti in Sulawesi, Indonesia. This species has no documented history of introduction or establishment outside of its native range. Wild-caught individuals are available in the aquarium trade. *C. spinata* has a low climate match with the contiguous United States, with an area of slightly higher match in Florida, along the Gulf Coast, and along the southern Atlantic coast. 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

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

- De Grave, S., D. Wowor, and W. Klotz. 2013. *Caridina spinata*. The IUCN Red List of Threatened Species 2013: e.T197754A2498559. Available: <http://www.iucnredlist.org/details/197754/0>. (August 2017).
- GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Caridina spinata* Woltereck, 1937. Global Biodiversity Information Facility, Copenhagen. Available: <http://www.gbif.org/species/5863056>. (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* 57:343-452.

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.

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.