

Cardinal shrimp (*Caridina dennerli*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, July 2017

Web Version, 11/17/2017



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1 Native Range and Status in the United States

Native Range

From Wowor et al. (2013):

“Indonesia (Sulawesi)”

“The species is endemic to Lake Matano (164.1 km²) 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. This species is in trade in the U.S.

From BreedInUSA (2017):

“SULAWESI CARDINAL SHRIMP [...] ON SALE! \$14.98”

“Native to Sulawesi Indonesia the Cardinal Shrimp is new to the hobby in late 2007 to the USA end of the hobby although there have been other attempts overseas to keep and breed these beautiful, but small shrimp.”

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 (2016):

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

“TAXONOMIC STATUS accepted species”

Size, Weight, and Age Range

From von Rintelen and Cai (2009):

“Carapace length 1.5-3.4 mm [...]”

Environment

From von Rintelen and Cai (2009):

“*C. dennerli* is a hard substrate dweller (rocks) occurring in different water depths (from shallow water to approx. -10 m), on or under small rocks, and between boulders.”

“[...] a stable thermo- or chemocline is basically missing [in Lakes Matano, Mahalona, and Towuti] (isothermal mixing; also constant with depth in Lake Matano: pH 7.4 and conductivity 224 μ S). However, the concentration of dissolved oxygen is not maintained with depth (Crowe et al., 2008).”

Climate/Range

From von Rintelen and Cai (2009):

“Temperatures in Lakes Matano, Mahalona, and Towuti vary between 27 and 31°C [...]”

Distribution Outside the United States

Native

From Wowor et al. (2013):

“Indonesia (Sulawesi)”

“The species is endemic to Lake Matano (164.1 km²) 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 von Rintelen and Cai (2009):

“*C. dennerli* has one of the most conspicuous colour patterns among the ancient lake species [...]. Body and most appendages are primarily dark red to purple; body covered with several white conspicuous spots and one distinct white dot on the dorsodistal part of the abdomen. Chela and carpus of the first and second pereopod bright white and distinctly contrasting the otherwise red colour. Antenna, antenulla, and scaphocerite also white. When feeding, the white chelipeds were observed to be always clearly visible, whereas the rest of the (dark coloured) body was more or less camouflaged; eggs are also dark red. Under stress, red body colour can change to blue, but only temporarily. This change of colour was observed in a small water tank minutes after being caught.”

“The slightly falciform rostrum is a more constant character in *C. dennerli* than in other species. Thus, it is already distinguishable in most cases at first sight.”

Biology

From von Rintelen and Cai (2009):

“lacustrine specialist”

“When disturbed, it tries to escape side- or downwards rather than in other directions, but frequently stays attached to a rock when it is uplifted.”

“Ovigerous females with 8-14 eggs (n=7 females); egg size 1.0-1.2 x 0.5-0.7 mm (n=88, eggs with and without eyes).”

Human Uses

From Wowor et al. (2013):

“*Caridina dennerli* is available in the aquarium trade, but some (estimated 20%) of the trade is from captive breeding in Europe, the rest is still wild caught though the current levels of harvesting are thought not to have a considerable impact.”

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

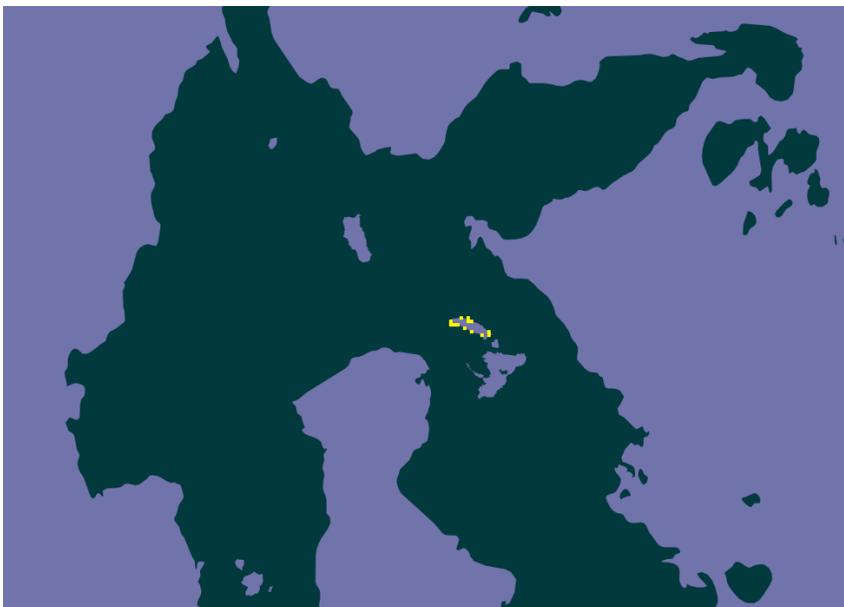


Figure 1. Known global distribution of *Caridina dennerli* on the Indonesian island of Sulawesi. Map from GBIF (2016).

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 United States except along the Gulf Coast and peninsular Florida, where the match was medium-low. Climate 6 score indicated a low climate match overall for the contiguous U.S. Scores of 0.005 and less are classified as low match; the Climate 6 score for *C. dennerli* was 0.000.

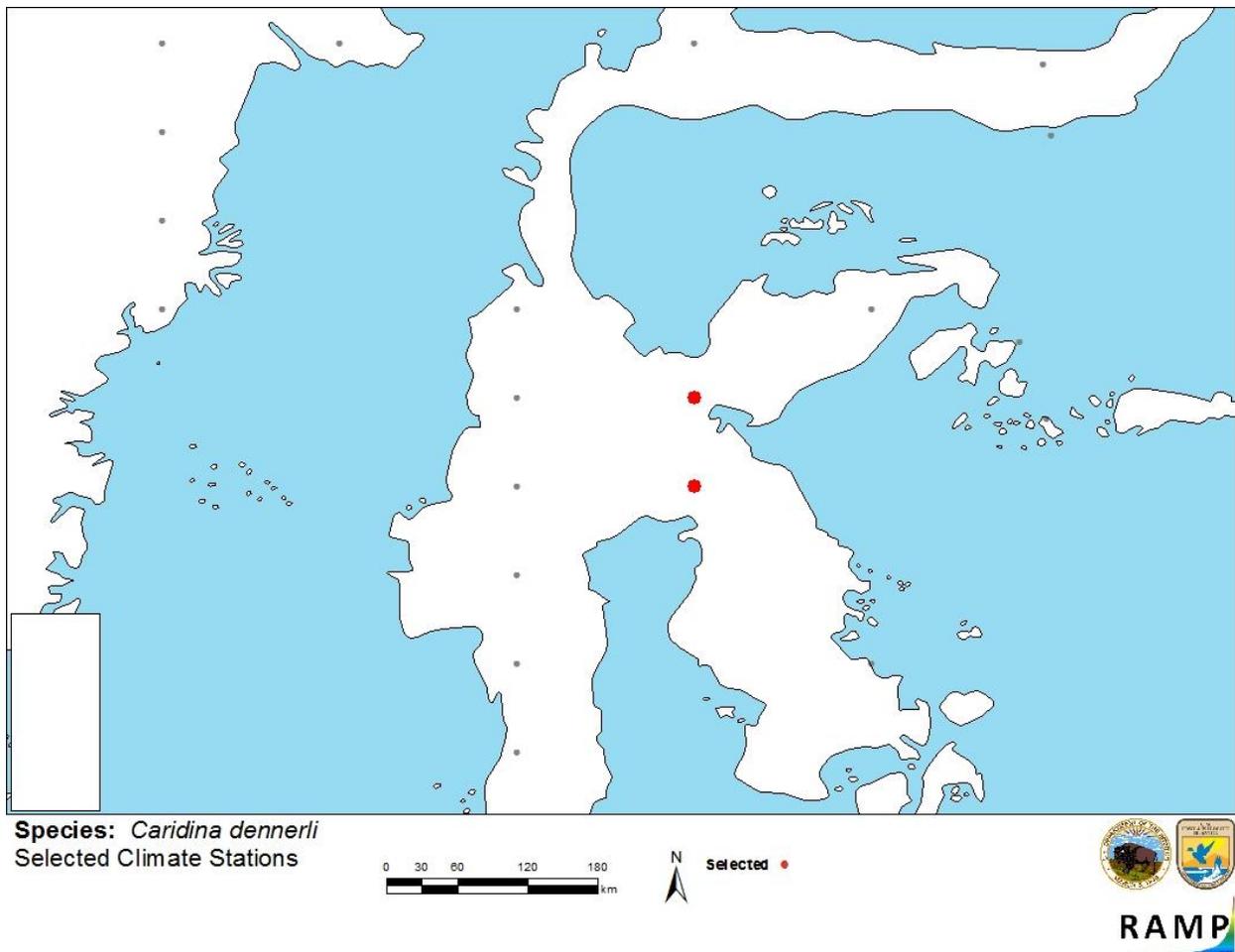


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected on the Indonesian island of Sulawesi as source locations (red) and non-source locations (gray) for *Caridina dennerli* climate matching. Source locations from GBIF (2016).

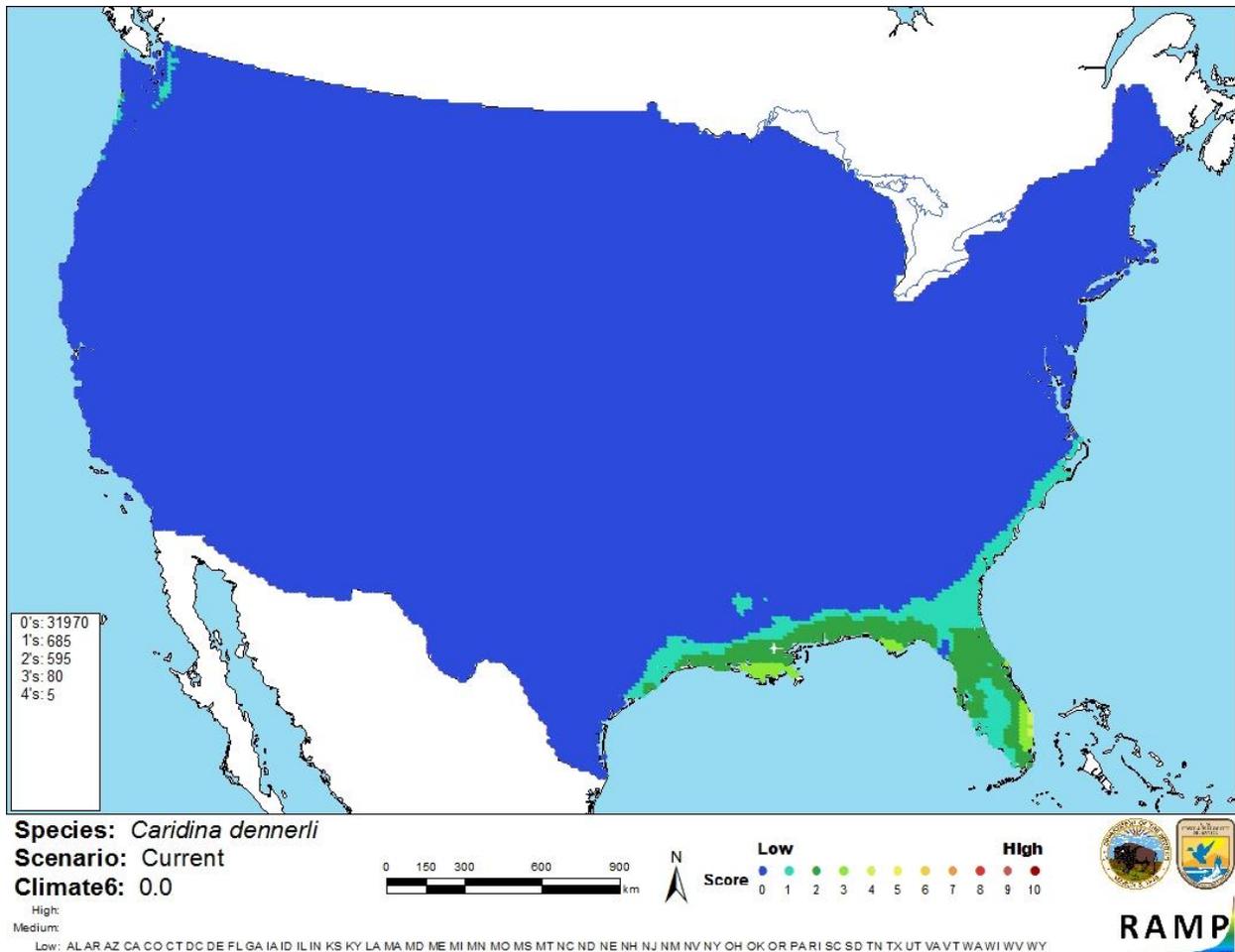


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Caridina dennerli* in the contiguous United States based on source locations reported by GBIF (2016). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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

There is some information available about *Caridina dennerli*. Information about this species, including its physical appearance, habitat, and behavior, is available in the original description of *Caridina* species in Sulawesi, Indonesia. This species has a very restricted and specialized habitat, and it has never been reported outside of its native range, so there is no information available on impacts of introductions of this species. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Caridina dennerli is a small freshwater shrimp native to Lake Matano on the Indonesian island of Sulawesi. This species is present in the aquarium trade in the United States. Despite this, it has never been documented as introduced or established outside of its native range. *C. dennerli* has a low climate match with the United States. Certainty of this assessment is low and 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.

- BreedInUSA. 2017. Sulawesi cardinal shrimp. Available: <http://breedinusa.com/shop/en/shrimps/21-sulawesi-cardinal-shrimp.html>. (July 2017).
- GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Caridina dennerli* von Rintelen and Cai, 2009. Global Biodiversity Information Facility, Copenhagen. Available: <http://www.gbif.org/species/6454959>. (July 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.
- Wowor, D., S. De Grave, and W. Klotz. 2013. *Caridina dennerli*. The IUCN Red List of Threatened Species 2013: e.T198055A2509949. Available: <http://www.iucnredlist.org/details/full/198055/0>. (July 2017).

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.

Crowe, S. A., A. H. O'Neill, S. Katsev, P. Hehanussa, G. D. Haffner, B. Sundby, A. Mucci, and D. A. Fowle. 2008. The biogeochemistry of tropical lakes: a case study from Lake Matano, Indonesia. *Limnology and Oceanography* 53:319-331.