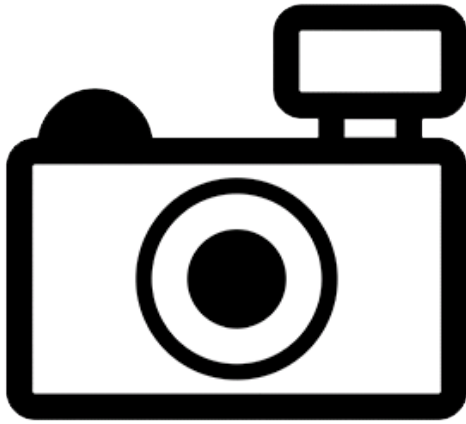


# ***Corbicula madagascariensis* (a clam, no common name)**

## **Ecological Risk Screening Summary**

U.S. Fish & Wildlife Service, September 2011  
Revised, February 2019, March 2019  
Web Version, 7/11/2019



No Photo Available

## **1 Native Range and Status in the United States**

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### **Native Range**

From Glaubrecht et al. (2006):

“A third species, *C. madagascariensis* Smith, 1882, occurs on Madagascar (Mandahl-Barth 1988; Daget 1998; Korniushev 2004).”

From Smith (1882):

“Twenty miles from Antananarivo (Johnson).”

### **Status in the United States**

*Corbicula madagascariensis* has not been reported as introduced or established in the United States. *C. madagascariensis* has not been found in trade.

## Means of Introductions in the United States

*Corbicula madagascariensis* has not been reported as introduced or established in the United States.

## Remarks

From Máiz-Tomé et al. (2018):

“One species, the endemic *Corbicula madagascariensis*, is known from Madagascar (Glaubrecht et al. 2006). Once a widespread species, its distribution seems presently to be reduced to a dozen locations.”

“Two endemic Malagasy bivalves, the sphaeriid *E. degorteri* and the cyrenid *C. madagascariensis*, were also assessed as Endangered.”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

According to Van Damme (2016), *Corbicula madagascariensis* (Smith, 1882) is the current and valid name of this species.

From EOL (2019):

“[Superkingdom] Eukaryota  
  Opisthokonta  
    [Kingdom] Metazoa  
      [Subkingdom] Bilateria  
        [Infrakingdom] Protostomia  
          Spiralia  
            [Phylum] Mollusca  
              [Class] Bivalvia  
                [Subclass] Heterodonta  
                  [Infraclass] Euheterodonta  
                    [Superorder] Imparidentia  
                      [Order] Venerida  
                        [Superfamily] Cyrenoidea  
                          [Family] Cyrenidae  
                            [Genus] *Corbicula*  
                              [Species] *Corbicula madagascariensis* Smith 1882”

### Size, Weight, and Age Range

From Smith (1882):

“Length 118 millim., width 14, diameter 7.”

## Environment

No information on the environment was found for *Corbicula madagascariensis*.

## Climate/Range

No information on climate or range was found for *Corbicula madagascariensis*.

## Distribution Outside the United States

### Native

From Glaubrecht et al. (2006):

“A third species, *C. madagascariensis* Smith, 1882, occurs on Madagascar (Mandahl-Barth 1988; Daget 1998; Korniushev 2004).”

From Smith (1882):

“Twenty miles from Antananarivo (Johnson).”

### Introduced

*Corbicula madagascariensis* has not been reported as introduced or established anywhere outside of their native range.

## Means of Introduction Outside the United States

*Corbicula madagascariensis* has not been reported as introduced or established anywhere outside of their native range.

## Short Description

From Smith (1882):

“Shell a little inequilateral, rounded and narrow in front, much broader, squarish, and subtruncate posteriorly, arcuate along the ventral margin, finely concentrically striated; yellowish, greenish down the posterior side. Umbones a little prominent, incurved, situated a little anteriorly. Interior lilac, with two or three rather distant concentric purple zones, stained with dark purple down the posterior side, and with a smaller stain of the same colour at the anterior side.”

“The concentric striae are deep and regular upon the umbones; but towards the ventral margin they become less regular and finer, and in front are rather more strongly developed than towards the posterior side.”

## Biology

From Glaubrecht et al. (2006):

“Based on rare material from Madagascar we here present evidence for prolonged incubation interpreted as being indicative of euviviparous reproduction in *C. madagascariensis* Smith, 1882. This mode is not only novel for corbiculids from the Ethiopian biogeographical region, but

suggests — in combination with a mtDNA phylogeny — a more complicated pattern of the evolution of reproductive modes in corbiculids than previously assumed.”

From Glaubrecht et al. (2007):

“In addition to their extraordinary invasive potential, “Asian clams” are also interesting for their only recently discovered wide spectrum of reproductive strategies. This developmental plasticity involves sexually reproducing species, either gonochoristic or hermaphroditic, and a variety of reproductive features, such as oviparity (e.g., in *Polymesoda*, *Batissa*, *Corbicula japonica*, *C. sandai*), ovoviviparity (in the majority of *Corbicula* species, such as *C. fluminalis* and *C. fluminea*), as well as euviviparity (in *Neocorbicula*, *C. madagascariensis* and *C. linduensis*); [...]”

## Human Uses

No information on human uses of *Corbicula madagascariensis* was found.

## Diseases

No information on diseases for *Corbicula madagascariensis* was found. **No OIE-reportable diseases (OIE 2019) were found to be associated with *C. madagascariensis*.**

## Threat to Humans

No information on *Corbicula madagascariensis* threats to humans was found.

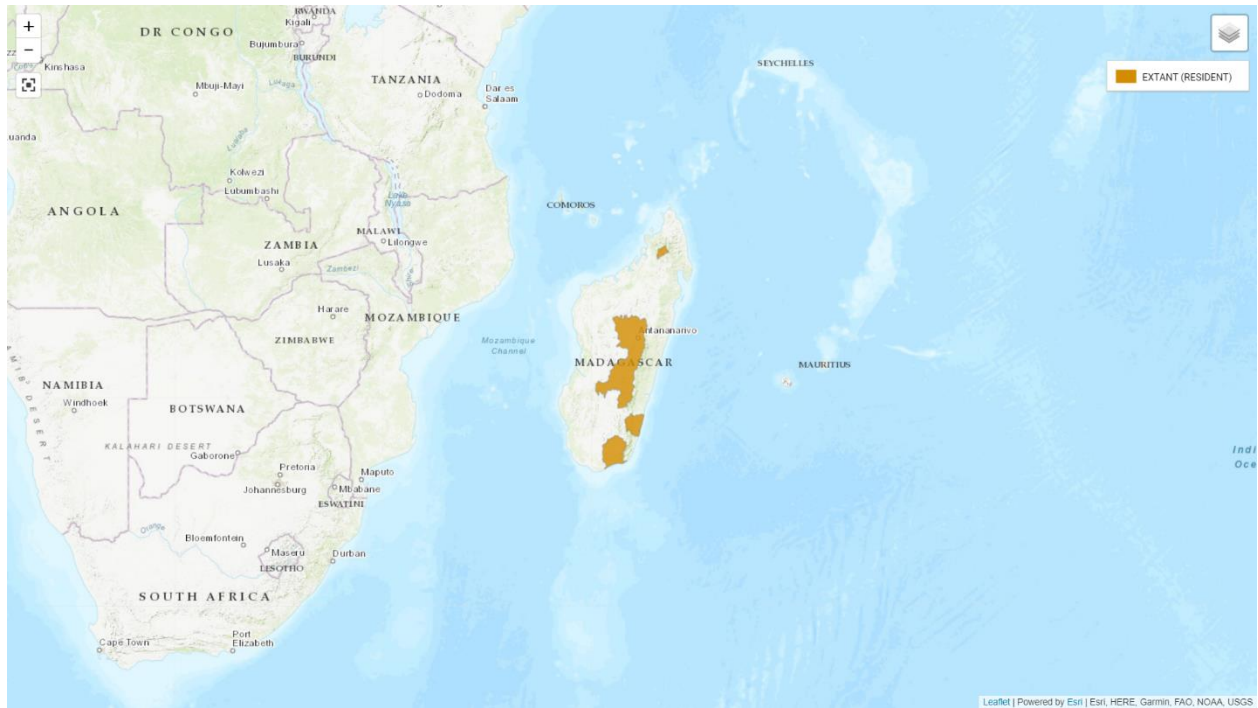
# 3 Impacts of Introductions

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*Corbicula madagascariensis* has not been reported as introduced or established outside of their native range.

## 4 Global Distribution

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**Figure 1.** Map of Southern Africa. According to Van Damme (2016), *Corbicula madagascariensis* is endemic to Madagascar. Map from Van Damme (2016). No georeferenced observations were available for *Corbicula madagascariensis* to use as source locations for the climate match. Source points for the climate match were chosen to represent the described range in Madagascar.

## 5 Distribution Within the United States

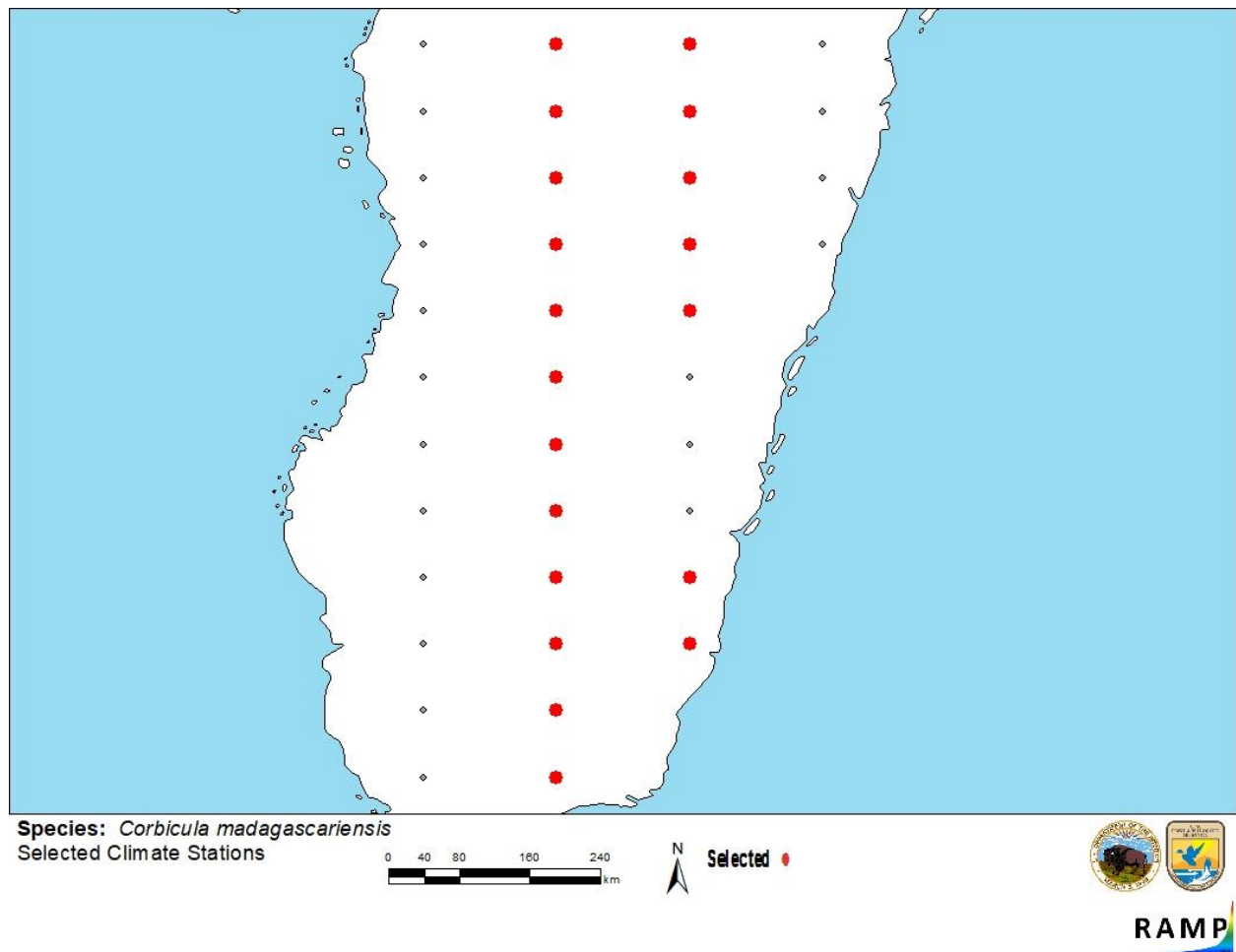
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*Corbicula madagascariensis* has not been reported within the United States.

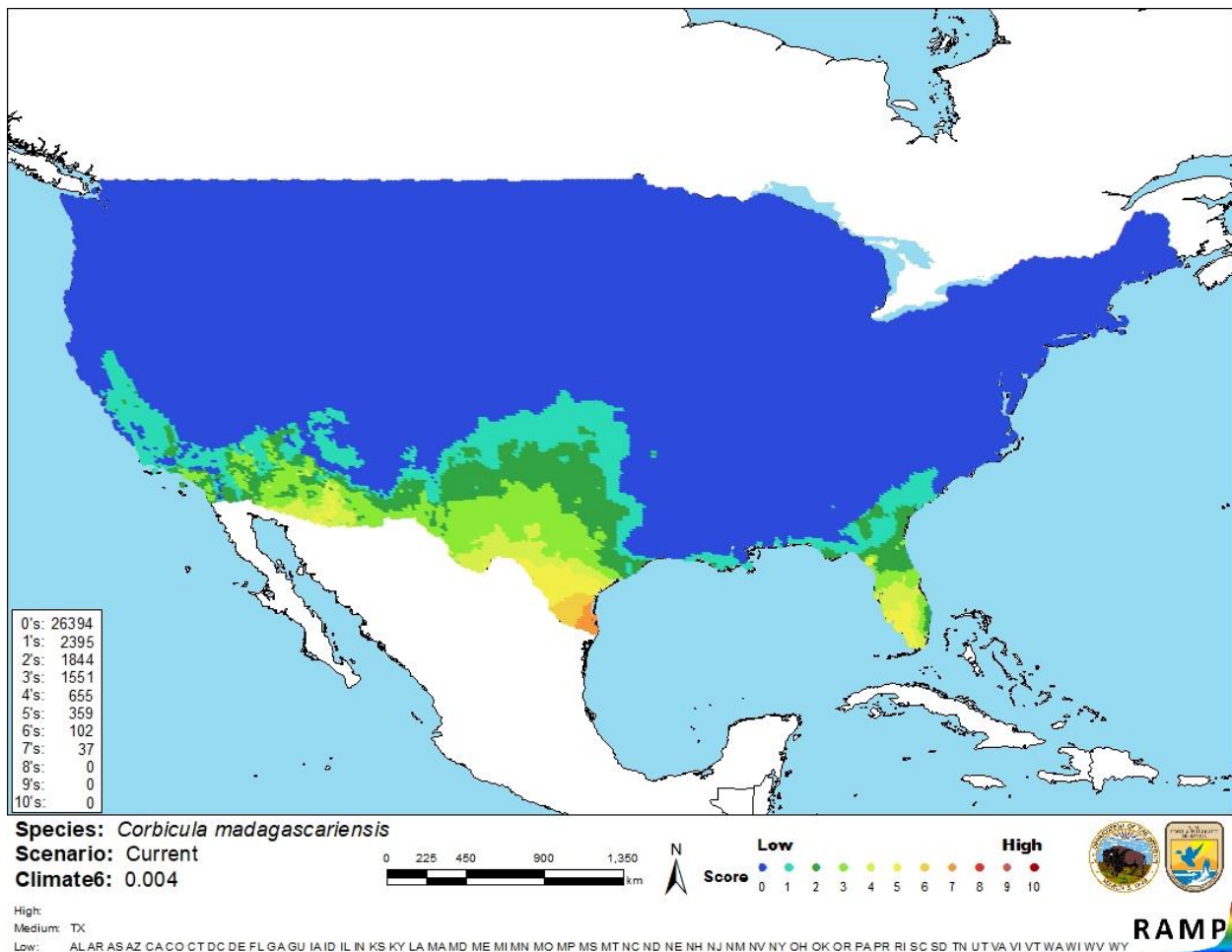
## 6 Climate Matching

### Summary of Climate Matching Analysis

The climate match for the contiguous United States for the majority of the country is low with portions of southern Florida, New Mexico, and Texas having medium match. The very southernmost areas of Texas had a high climate match. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.004, low (scores between 0.000 and 0.005, inclusive, are considered low). All States had low individual Climate 6 scores except for Texas, which has a medium individual Climate 6 score. Due to a lack of georeferenced observations for the species the climate match was based on the provided description of the range.



**Figure 2.** RAMP (Sanders et al. 2018) source map showing weather stations in Madagascar selected as source locations (red) and non-source locations (gray) for *Corbicula madagascariensis* climate matching. Source location from Van Damme (2016). No georeferenced observations were available for *Corbicula madagascariensis* to use as source locations for the climate match. Source points for the climate match were chosen to represent the described range in Madagascar.



**Figure 3.** Map of RAMP (Sanders et al. 2018) climate matches for *Corbicula madagascariensis* in the contiguous United States based on source locations reported by Van Damme (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<br>(Sum of Climate Scores 6-10) / (Sum of total Climate Scores) | Climate Match<br>Category |
|------------------------------------------------------------------------------------------|---------------------------|
| $0.000 \leq X \leq 0.005$                                                                | Low                       |
| $0.005 < X < 0.103$                                                                      | Medium                    |
| $\geq 0.103$                                                                             | High                      |

## 7 Certainty of Assessment

Certainty of assessment for *Corbicula madagascariensis* is low. Minimal information is available on this species. *C. madagascariensis* has not been reported as introduced or established anywhere outside of their native range so impacts of introduction cannot be determined. No georeferenced locations were available for the climate match, so the match was based on a description of the species range, contributing to uncertainty.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Corbicula madagascariensis* is a freshwater bivalve, endemic to Madagascar. *Corbicula madagascariensis* has not been reported as introduced or established anywhere outside of its native range, therefore history of invasiveness is uncertain. The overall climate match for the contiguous United States is low. The majority of the contiguous United States had a low climate match with some areas of medium match in southern Florida, the southwest, and southern Texas. No georeferenced locations were available for climate matching. Source locations for the climate match were chosen to represent the distribution of the species as described. The certainty of assessment is low due to lack of information. The overall risk of assessment for *Corbicula madagascariensis* is uncertain.

### Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** Species is endangered.
- **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.**

EOL (Encyclopedia of Life). 2019. *Corbicula madagascariensis* Smith 1882. Available: <https://eol.org/pages/47025160/names>. (March 2019).

Glaubrecht, M., Z. Feher, and T. von Rintelen. 2006. Brooding in *Corbicula madagascariensis* (Bivalvia, Corbiculidae) and the repeated evolution of viviparity in corbiculids. *Zoologica Scripta* 35(6):641–654.

Glaubrecht, M., Z. Feher, and F. Kohler. 2007. Inventorizing an invader: annotated type catalogue of Corbiculidae Gray, 1847 (Bivalvia, Heterodonta, Venerodidea), including Old World Limnic *Corbicula* in the Natural History Museum, Berlin. *Malacologia* 49(2):243–272.

Máiz-Tomé, L., C. Sayer, and W. Darwall, editors. 2018. The status and distribution of freshwater biodiversity in Madagascar and the Indian Ocean islands hotspot. IUCN, Gland, Switzerland.

OIE (World Organisation for Animal Health). 2019. OIE-listed diseases, infections and infestations in force in 2019. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/>. (March 2019).

- Sanders, S., C. Castiglione, and M. Hoff. 2018. Risk assessment mapping program: RAMP, version 3.1. U.S. Fish and Wildlife Service.
- Smith, E. A. 1882. A contribution to the molluscan fauna of Madagascar. Proceedings of the Zoological Society of London 1882:375–389.
- Van Damme, D. 2016. *Corbicula madagascariensis*. The IUCN Red List of Threatened Species 2016: e.T91293514A91293520. Available: <https://www.iucnredlist.org/species/91293514/91293520>. (February 2019).

## 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.**

- Daget, J. 1998. Catalogue Raisonné des Mollusques Bivalves d'Eau Douce Africains. Backhuys, Leiden, the Netherlands.
- Korniushin, A. V. 2004. A revision of some Asian and African freshwater clams assigned to *Corbicula fluminalis* (Müller, 1774) (Mollusca: Bivalvia: Corbiculidae), with a review of anatomical characters and reproductive features based on museum collections. Hydrobiologia 529:251–270.
- Mandahl-Barth, G. 1988. Studies on African freshwater bivalves. Danish Bilharziasis Laboratory, Charlottenlund, Denmark.