

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Antecaridina lauensis*

COMMON NAME: Anchialine pool shrimp (U.S. pops.)

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: February 2003

STATUS/ACTION (Check all that apply):

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: \_\_\_\_

90-day positive - FR date: \_\_\_\_

12-month warranted but precluded - FR date: \_\_\_\_

Is the petition requesting a reclassification of a listed species?

Listing priority change

    Former LP: \_\_

    New LP: \_\_\_\_

Latest date species first became a Candidate: \_\_\_\_\_

Candidate removal: Former LP: \_\_\_\_ (Check only one reason)

A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

F - Range is no longer a U.S. territory.

M - Taxon mistakenly included in past notice of review.

N - Taxon may not meet the Act's definition of "species."

X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Animal; Crustacea, Atyidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, Islands of Maui and Hawaii; Fiji, Europa Island (Mozambique), Dahlack (Saudi Arabia), Daito Islands and Ryukyu Islands (Japan), Solomon Islands.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, Europa Island (Mozambique), Dahlack (Saudi Arabia), Daito Islands and Ryukyu Islands (Japan).

LEAD REGION CONTACT (Name, phone number): Scott McCarthy (503/231-6131)

LEAD FIELD OFFICE CONTACT (Office, name, phone number): Pacific Islands Office, Christa Russell (808/541-3441)

## BIOLOGICAL INFORMATION:

*Antecaridina lauensis* (Holthuis 1973) is reported from 10 millimeters (mm) (0.40 inches (in.)) to just over 15 mm (0.60 in.) in total length. Coloration of the thorax, abdomen, mouth-parts, and legs are light- to bright-red. At other locations (e.g., Red Sea) this species has been documented to be present in a range of colors, from red to transparent. The relatively small chelae (claws) are noted to be whitish. Black pigments are associated with the eyes. Locomotion is accomplished by walking over the substrate. Observations suggest that *A. lauensis* is herbivorous and most active by night (Holthuis 1973).

Within the Hawaiian Islands, *Antecaridina lauensis* is known to occur in low- to high-salinity (2-30 parts per thousand (ppt)) anchialine pools. Anchialine pools are land-locked bodies of water that occur coastally but are not openly connected to the ocean (Maciolek 1983). They are mixohaline, with salinities typically ranging from 2 ppt to concentrations just below that of sea water (32 ppt), although there are pools recorded as having salinities as high as 41 ppt (Maciolek 1983). Anchialine pools are subject to tidal fluctuations. Except for some records of endemic eels, anchialine pools in Hawaii do not support native species of fish although some species of alien fish have been introduced and are currently recognized as problems (see below). Anchialine pools are very limited in number and the total area occupied by them globally is extremely small. While a number of species of anchialine shrimp (e.g., *Antecaridina lauensis*, *Calliasmata pholidota*) have disjunct, global distributions within these habitats, most geographic locations contain some endemic taxa. In the state of Hawaii, there are estimated to be over 650 anchialine pools, with an estimated 90 percent of these occurring on the island of Hawaii. Unfortunately, approximately 90 percent of the pools on that island have been destroyed or otherwise impacted by development or other human uses (Richard Brock, Univ. of Hawaii, pers. comm., 1998).

*Antecaridina lauensis* has a disjunct, Indo-Pacific distribution, as it has been reported from locations as distant as the Red Sea, islands near Madagascar, the Ryukyu Islands, and the Hawaiian Islands. In Hawaii, *A. lauensis* is known from two pools in the Cape Kinau area (Maui) and two pools on the southern end of the island of Hawaii. While no population estimates are known to exist, only a few individuals are reported to have been seen or collected from the four documented locations in Hawaii. In one of the pools on the southern end of the island of Hawaii *A. lauensis* co-occurs with two other candidate species of anchialine pool shrimp *Calliasmata pholidota* and *Vetericaris chaceorum*. Population numbers and numbers of individuals outside the U.S. are unknown.

## THREATS:

### A. The present or threatened destruction, modification, or curtailment of its habitat or range.

On the island of Hawaii, Dr. R. Brock (pers. comm., 1998) estimates that up to 90 percent of the anchialine pools have been destroyed or altered by human activities. The more recent human modifications of anchialine pools such as those on the island of Hawaii include bulldozing and filling pools. Dumping of refuse and the introduction of alien fish (see Factor C) threaten the known populations of *Antecaridina lauensis* on the island of Hawaii and have impacted other anchialine pools on that island (R. Brock, *in litt.* 1985). Invasion, with human assistance, of these pools by alien fish is an imminent, ever present threat and is the single most important

impact to anchialine pool shrimp and their habitat. The second known location on the island of Hawaii is on private land and its status is not currently known.

Damage from use of anchialine pools for swimming and bathing has been documented in the Hawaiian Islands (R. Brock, *in litt.* 1985). Such impacts to the anchialine pools on the island of Hawaii are possible but have not, at present, been documented. Swimming and bathing is not believed to be a serious problem in the Maui pools where *Antecaridina lauensis* is reported to occur.

The two Maui pools known to contain *Antecaridina lauensis*, were modified by early Hawaiians and later inhabitants of the area, but are within a State Natural Area Reserve (NAR). Dumping does occur on the Maui NAR, however, none has yet occurred within the pools. The status of occupied habitats outside the U.S. is not known.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Not applicable.

C. Disease or predation.

In Hawaii, predation by introduced alien fish is considered to be the greatest threat to native shrimp within intact anchialine pool ecosystems (Bailey-Brock and Brock 1993; R. Brock, pers. comm., 1998). Marine fish are occasionally seen in isolated pools, indicating that people are introducing these fish into the pools (Bill Evanson, pers. comm., 1998). Anchialine pools have been used to discard or hold bait-fish and/or aquarium fish (Bailey-Brock and Brock 1993). These fish either directly consume the native shrimp or as with introduced tilapia (*Oreochromis mossambica*), out-compete the native herbivorous species of shrimp that typically serve as the prey-base for the rarer, predatory species of shrimp. Introduction of alien fish or bait-fish into such pools may be a major contribution to the decline of these shrimp. Information on threats from disease or predation outside the U.S. is not available.

D. The inadequacy of existing regulatory mechanisms.

The two Maui pools are located in a State NAR, and thus receive some degree of protection. The State NARs were created to preserve and protect samples of Hawaiian biological ecosystems and geological formations; and are actively managed and monitored for their unique ecosystems. However, while signs are posted that provide notice to the public that the pools are off limits to bathers and other activities that could damage the pools, the State's NARs have no funding for proper enforcement to stop such activity. One pool on the island of Hawaii occurs on lands managed by a different State agency and is not afforded any protection, while a second pool is located on unprotected, remote private land. No other State or Federal protection measures exist. Protection measures for *Antecaridina lauensis* outside the U.S. are unknown.

E. Other natural or manmade factors affecting its continued existence.

The two Maui pools occur in areas that were volcanically active as little as 250 years ago. The anchialine pool on State land on the island of Hawaii occurs in an area that could be destroyed by on-going volcanic or land subsidence events. However, neither of these pose an imminent threat.

FOR RECYCLED PETITIONS:

- a. Is listing still warranted? \_\_\_
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? \_\_\_
- c. Is a proposal to list the species as threatened or endangered in preparation? \_\_\_
- d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP: In Hawaii, the four anchialine pools known to contain *Antecaridina lauensis* occur on State and private lands.

PRELISTING: In Hawaii, two of the known pools containing *Antecaridina lauensis* lie within a State natural area reserve. The rarity of this and other native species of shrimp contributed to the current protection received by the Maui anchialine pools (Holthuis 1973). No conservation agreements between Federal, State, or private landowners have been drafted or initiated for this species and, aside from placement of some pools within reserves, virtually no conservation activities have been conducted.

REFERENCES:

Bailey-Brock, J.H. and R.E. Brock. 1993. Feeding, reproduction, and sense organs of the Hawaiian anchialine shrimp *Halocaridina rubra* (Atyidae). *Pacific Science* 47:338-355.

Holthuis, L.B. 1973. Caridean shrimps found in land-locked saltwater pools at four Indo-west Pacific localities (Sinai Peninsula, Funafuti Atoll, Maui and Hawaii Islands), with the description of one new genus and four new species. *Zool. Verhadenlingen* 128: 3-55.

Maciolek, J.A. 1983. Distribution and biology of Indo-pacific insular hypogeal shrimps. *Bulletin of Marine Science* 33:606-618.

LISTING PRIORITY (\* after number)

THREAT
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Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2 *
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

**Rationale for listing priority number:**

*Magnitude:*

*Imminence:*

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, removal of candidates, and listing priority changes.

Approve: Rowan Gould March 3, 2003  
Regional Director, Fish and Wildlife Service Date

Concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Director's Remarks:

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Date of annual review: 2/03

Conducted by: \_\_\_\_\_

Comments:

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