

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Vetericaris chaceorum*

COMMON NAME: Anchialine pool shrimp

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: ____

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, Procarididae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Hawaii

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Hawaii

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

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

BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (# populations, #individuals/population), etc.):

Vetericaris chaceorum is a (Kensley and Williams 1986) mono-specific genus and has only been recorded from Lua o Palahemo, a single high salinity anchialine pool located in the South Point area of Hawaii Island. The taxonomic description of *Vetericaris chaceorum* is derived from two collected individuals (Kensley and Williams 1986). Total length is approximately 5.0 centimeters (2.0 inches), not including the primary antennae which are approximately the same length as the shrimp's total length. Based on a number of morphological characters, this genus is considered primitive (Kensley and Williams 1986). In the limited observations, *Vetericaris chaceorum* was observed to swim in midwater, never being stationary on the substrate. The shrimp uses its primary thoracic appendages (pereopodal exopods) as well as its abdominal appendages (pleopods) for propulsion in a forward direction. Use of tail-beats for back-ward propulsion was never observed. Large chelapeds (claws) are lacking. While gut contents included fragments of other crustaceans, no feeding has been observed and it is not known if this species is a predator, scavenger, or both. Nothing is known about the reproductive biology of *V. chaceorum*.

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 ranging from 2 parts per thousandth (ppt) to concentrations just below that of sea water (32 ppt)(Brock et al. 1987). Anchialine pools are typically subject to tidal fluctuations. Except for some records of endemic eels, anchialine pools do not support native species of fish although some species of alien fish have been introduced and are currently recognized as problems (Bailey-Brock and Brock 1993; Richard Brock, Univ. of Hawaii, pers. comm., 1998). Although anchialine pools are widespread, being found in areas such as Saudi Arabia, Madagascar, Fiji, and other Indo-Pacific islands, the total area occupied by them globally is extremely small (Maciolek 1983). While at least one species of anchialine shrimp, *Calliasmata pholidota* (present in the Lua o Palahemo anchialine pool), has a disjunct, global distribution 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 over 90% 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 (R. Brock, pers. comm., 1998).

Vetericaris chaceorum has only been reported from a single location, Lua o Palahemo, on the island of Hawaii. Unlike most anchialine pools in Hawaii, which are no more than a few meters in depth, Lua o Palahemo is a lava tube which reaches a depth of nearly 40 meters (m) (131 feet (ft)) and extends for a submerged, subterranean length of nearly 300 m (984 ft). Salinities within this single pool range from 20 ppt at the surface to 30 ppt at its deepest, most seaward location. Dissolved oxygen was recorded to range from 6.0 parts per million (ppm) at the surface to 0.3 ppm at the deepest sample station (Kensley and Williams 1986).

As well as being very restricted in range, relatively few individuals were encountered by Kensley and Williams (1986). There were only five detections of *Vetericaris chaceorum* during three separate dives (SCUBA). While this shrimp likely occurs in greater abundance within the

crevices and cracks of the Lua o Palahemo lava tube system, it has not been observed in other anchialine pools anywhere in Hawaii. Its highly restricted range, along with present threats and lack of protection make this species highly vulnerable to extinction.

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change):

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

Development of coastline areas has been responsible for the destruction or degradation of anchialine pools on all of the Hawaiian Islands (Bailey-Brock and Brock 1993). Dr. R. Brock (pers. comm., 1998) estimates that up to 90 percent of the pools on the island of Hawaii may have been destroyed from such activities or the introduction of alien fish into anchialine pools. The South Point area of Hawaii, or Ka Lae, has been utilized as ranch land (Kahuku Ranch) for over a century, hence, land uses have greatly altered the terrestrial habitat. Lua o Palahemo now lies within lands administered by the State of Hawaii Department of Hawaiian Homes Land (DHHL). Since European contact, human use of this anchialine pool, including dumping of refuse, has degraded this habitat (R. Brock, pers. comm., 1998).

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

Vetericaris chaceorum has been collected, on a very small scale, for scientific/educational purposes on only a few occasions. There is no record of collection for commercial or recreational purposes.

C. Disease or predation.

Predation is considered to be the greatest threat to intact anchialine pool ecosystems (Bailey-Brock and Brock 1993; R. Brock, pers. comm., 1998). Anchialine pools have been used to discard or hold bait-fish and/or aquarium fish. These fish either directly consume the native shrimp or, as with introduced tilapia (*Oreochromis mossambica*), out-compete the native herbivorous species of shrimp which typically serve as the prey-base for the rarer, predatory species of shrimp. Introduction of alien fish may have occurred at Lua o Palahemo.

D. The inadequacy of existing regulatory mechanisms. No current protection.

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

The South Point area of Hawaii is an area that could be destroyed by on-going volcanic activity and/or land subsidence. However, these are not considered to be imminent threats.

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 (Estimate proportion Federal/state/local government/private, identify non-private owners): Lua o Palahemo occurs on State land which is administered by the State of Hawaii DHHL.

PRELISTING (Describe status of conservation agreements or other conservation activities): No conservation agreements between Federal or State agencies have been drafted or initiated and no conservation activities have been conducted.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

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.

Brock, R.E., J.E. Norris, D.A. Ziemann, and M.T. Lee. 1987. Characteristics of water quality in anchialine ponds of the Kona, Hawaii, coast. *Pacific Science* 41:200-208.

Kensley, B. and D. Williams. 1986. New shrimps (families Procarididae and Atyidae) from a submerged lava tube on Hawaii. *J. Crustacean Biol.* 6: 417-437.

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

LISTING PRIORITY (* after number)

THREAT

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 6, 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: M. Richardson

Comments:

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