

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Metabetaeus lohena*

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: October 25, 1999

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, Alpheidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, islands of Maui and Hawaii

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, islands of Maui and 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:

Metabetaeus lohena grows up to 18 millimeters (mm)(0.71 inches (in.)) long and body coloration ranges from pale-pink to brilliant red. There is a conspicuous mandibular spot (Banner and Banner 1960). Chelae (claws) are relatively large and conspicuous. Locomotion is accomplished by crawling along the substrate. It is primarily a predator, feeding largely on the more common anchialine pool shrimp *Halocaridina rubra* (Holthuis 1973). However, as with most decapods, it may occasionally scavenge.

Metabetaeus lohena is known to occur in both low and high salinity anchialine pools on the Hawaiian islands of Maui and Hawaii, and possibly Oahu. Anchialine pools are land-locked bodies of water that occur coastally but are not openly connected to the ocean. They are mixohaline, with salinities ranging from 2 parts per thousandth (ppt) to concentrations just below that of sea water (32 ppt) (Maciolek 1983). Anchialine pools are 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 (see below). 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. While a number of species of anchialine shrimp (e.g., *Calliasmata pholidota*, *Antecaridina lauensis*) 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 over 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. Pools on Oahu have been impacted by or are under current threat from development (Richard Brock, Univ. of Hawaii, pers. comm., 1998).

Historically, *Metabetaeus lohena* has been reported on the islands of Maui, Hawaii, and possibly Oahu, but currently it is absent from most surveyed pools. Due to their rarity, population estimates have never been successfully quantified. Many of the rare species of anchialine shrimp, including *M. lohena*, have merely been noted as present or absent from pools that have been appropriately surveyed (typically with the aid of baiting). Loss of shrimp species from suitable habitat is likely the best, or only, measure of species decline since population sizes are not easily determined.

THREATS:

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

Development of the Kona coastline area on the island of Hawaii in 1985 destroyed some 130 anchialine pools (Brock et al. 1987), and Dr. R. Brock (pers. comm., 1998) estimates that up to 90 percent of the pools on that island many have been destroyed from similar activities or the introduction of alien fish on that island. Development activities on the Ewa Plain on the island of Oahu have impacted anchialine pools in that area and are known to currently threaten at least two pools.

Although there are no records of use of *M. lohena* or other anchialine shrimp, their habitat has suffered from recreational use. Habitat alteration due to recreational use is known to have occurred on the island of Hawaii and Oahu and is often evident in the amount of garbage that has been dumped in these pools. Although not a growing threat, a number of anchialine pools are commonly used as swimming holes and have been used as birthing pools (Brock, in litt. 1985).

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

Not applicable.

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.

D. The inadequacy of existing regulatory mechanisms.

No current protection.

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

Approximately 29 percent of the known anchialine pools on the island of Hawaii occur in areas that could be destroyed by on-going volcanic activity and/or subsidence events. 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: Oahu: 20% state, 80% private; Maui: 22% state, 78% private; Hawaii: 8% Federal, 15% state, 77% private.

PRELISTING: A small number of pools lie within State natural area reserves (NARs) and national parks. At least two State NARs were established, in part, to protect this rare habitat and the unique fauna (Holthuis 1973). No conservation agreements between Federal, State, or private landowners have been drafted or initiated and, aside from placement of some pools/pool systems within State NARs, 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.

Banner, A.H. and D.M. Banner. 1960. Contributions to the knowledge of the Alpheid shrimp of the Pacific Ocean; Part VII. On *Metabetaeus* Borradaile, with a new species from Hawaii. *Pacific Science* 14:299-303.

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.

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

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: _____

Comments:

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