

## Anchialine Ponds

### Anchialine Pond Amphipods

*Gamarella* (=Nuuanu) *amikai*

*Grandidierella* *koa*

*Grandidierella* *palama*

*Liagoceradocus* *lonomaka*

*Parhyale* *hawaiensis*

*Paramoera* *lokowai*

*Paramoera* *paakai*

*Paramoera* *rua*

*Rotomelita* *ana*

*Rotomelita* *lokoa*

*Carnarimelita* *janstocki*



*Parhyale hawaiensis*  
Courtesy Alivia Price, Nipam Patel

#### SPECIES STATUS:

IUCN Red List - Not considered

All Endemic except *Parahyale*

**SPECIES INFORMATION:** This group of species lives in anchialine ponds and lava tube caves which have a mix of freshwater and seawater. *Gamarella* and *Parhyale* have been found in the open seas as well. All species are endemic except *P. hawaiensis*. *R. ana*, *P. lokowai*, and *L. lonomaka* are blind. Little is known about the biology or ecology of these species though *C. janstocki* is unusual in being predatory, apparently in part on the anchialine pond shrimp *Halocaridinia rubra*. It is found in pools with a salinity of around 14 parts per thousand. None of the species have Hawaiian or English common names.

**DISTRIBUTION:** Currently they are known to occur in a few anchialine ponds on Maui and the island of Hawai'i, though specific research on these species ecology is rare. *G. amikai* has been found in an artificial pond on Kaho'olawe. *R. ana*, *P. rua*, and *G. palama* occur in a single lava tube cave in eastern Maui near Wainapanapa. *C. janstocki* is found in a number of pools in the Kohanaika area of west Hawai'i. *R. lokoa* and *P. paakai* have the most widespread distribution on the island of Hawai'i.

**ABUNDANCE:** Abundance of anchialine amphipods appears to have never been recorded.

**LOCATION AND CONDITION OF KEY HABITAT:** Anchialine ponds are found in geologically young lava fields. The lava in these areas has fissures that connect the ponds to the ocean. Lava tubes can also have anchialine pools. Thus these ponds are always close to the sea and have varying salinity levels and tidal influence. Most ponds are less than 100 square meters (1000 square feet) in size and less than 1.5 m (five feet) in depth. Many ponds have been filled

or had non-native species introduced. One pond was created accidentally by a large bomb explosion on Kaho‘olawe and subsequently colonized. It is not clear to what extent these amphipods use hypogeal (underground) habitats so the relative importance of these two habitat types is unknown. All ponds are important but key ones include those in ‘Ahihi-Kina‘u Natural Area Reserve (NAR) and Wainapapa area state lands on Maui; Manuka NAR, Waikoloa Anchialine Pond Preserve, the Ka Lae area near South Point on Department of Hawaiian Home Lands property, and in the Kaloko-Honokohau National Historic Park and Hawaii Volcanoes National Park, all on the island of Hawai‘i.

#### **THREATS:**

- Habitat destruction has reduced available habitat for anchialine pond amphipods. On the island of Hawai‘i much development has occurred in the major area for anchialine pools between Kawaihae and Kailua-Kona leading to the filling in of many pools;
- Pollution of pools by refuse and human use of the water;
- Introduced fishes (Tilapia, koi, mosquitofish and guppies) and Tahitian prawns may be a major predatory threat and alter the habitat use of remaining amphipods. Over 90 percent of the anchialine ponds on the Kona coast of Hawai‘i are contaminated with non-native species.

**CONSERVATION ACTIONS:** The goals of conservation actions are to not only protect current populations, but to also establish further populations to reduce the risk of extinction. In addition to common statewide and island conservation actions, specific actions include:

- Fencing the pools in ‘Ahihi Kina‘u NAR, and possibly elsewhere;
- Educating people to the value of, threats to and conservation actions to protect the ponds;
- Restoration of habitat by removal of introduced species;
- Creation of man-made pools should be explored.

#### **MONITORING:**

- Develop surveys of population and distribution in known and likely habitats;
- Develop quantitative abundance survey methods.

#### **RESEARCH PRIORITIES:**

- Improve understanding of life history and biology of anchialine pond amphipods and the role of interstitial underground waters;
- Understand the ecological importance of interactions with introduced competitors and predators;
- Research the life history of introduced competitors and predators to develop removal or control strategies;
- Partner with the Environmental Protection Agency to develop acceptable alternatives to, or methods to use rotenone in removing introduced fishes.

#### **References:**

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