Arthropod Sampling at the Faulkes Telescope Facility Haleakalā High Altitude Observatories Maui, Hawai'i

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Prepared for

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Introduction

The Haleakalā volcano on the island of Maui is one of the highest mountains in Hawai`i, reaching an elevation of 10,023 feet (3,055 m) at its summit on Pu`u `Ula`ula. Near the summit is a volcanic cone known as Kolekole with some of the best astronomy viewing in the world. Among the Observatories is the Faulkes Telescope.

The Faulkes Telescope Facility houses the largest educational outreach optical telescope in the world. This new 2-meter telescope was financed largely by private funds from the United Kingdom (UK) through the Faulkes Educational Trust. The Faulkes Telescope Corporation, a nonprofit Hawai'i corporation, built, owns, and operates the telescope. The Faulkes Telescope is operated remotely over the Internet, without need for permanent on-site operational staff.

To improve the telescope, two concrete pads adjacent to the telescope have been proposed where additional equipment will be placed.

The University of Hawai`i Institute for Astronomy desires to protect the cultural resources and native Hawaiian ecosystems during any development at the Haleakalā High Altitude Observatories Site. Therefore, Las Cumbres Observatory Global Telescope Network, the lessee for the Faulkes Telescope, has funded this arthropod study.

An inventory and assessment of the arthropod fauna at the HO site was conducted in 2003 as part of the Long Range Development Plan (LRDP) for the Haleakalā High Altitude Observatories. This inventory and assessment was updated in December 2005 to provide a more detailed description of the arthropod fauna at the two proposed ATST sites, and identify Hawaiian native arthropod species or habitats, if any, that could be impacted by construction or operation of the ATST. In an effort to be complete, supplemental sampling was conducted in 2007 to provide a seasonal component and additional nighttime sampling not included in the previous two inventories.

Sampling of arthropod habitats was conducted under a permit obtained from the Department of Land and Natural Resources (Permit # FHM10-229) issued in June, 2010. Sampling began on November 15, 2010 and was completed on November 19, 2010.

Procedures

Three pitfall traps were installed at the proposed construction site. The traps (300 ml [10 oz], 80 mm diameter cups) were filled with soapy water solution as preservative. Concerns about endangered native birds precluded the use of ethylene glycol. The traps were spaced at least 2 m apart, and left open for four days.

Time was spent sampling under rocks, in leaf litter, and on foliage to locate and collect arthropods. Hand picking, while sorting through leaf litter and bunch grasses, and searching beneath stones was the most effective sampling for litter and soil associated forms.

Foliage of various common plant species was sampled by beating sheet. A one-meter square beating sheet or insect net was placed under the foliage being sampled and the branch hit sharply three times using a small plastic pipe. After the initial collection the foliage was beat again to dislodge persistent individuals. Care was taken to avoid sensitive plants and to leave all vegetation intact.

Aerial nets and sweep nets were used as necessary to capture flying insects and arthropods that occur on grasses.

Night collecting can be aided by a UV light source. Small handheld ultraviolet blacklights were also used for additional sampling for foliage and ground-dwelling arthropods.

Sampling was conducted over five days and four nights in November 2010, starting on November 15, 2010 and ending on November 19, 2010. Care was taken to avoid disturbing nearby cultural sites.

Results

Insects were in low abundance during this sampling, likely due to the timing of the sampling. The sparse vegetation at the site provides little habitat for active arthropod populations.

Native Hawaiian arthropods observed at the site include two species of true bugs, *Nysius coenosulus* and *N. communis*, wolf spiders, *Lycosa hawaiiensis*, and planthoppers of the genus *Nesosydne*. All are common on

foliage near the summit of Haleakalā and occur elsewhere in Hawai`i. No non-indigenous species were detected at the site.

Discussion

The results of the surveys indicate there are no special concerns or legal constraints related to arthropods in the Project areas. No species listed as endangered or threatened species were detected at the Project construction areas.

No obvious threats to species survival were evident at the Faulkes Telescope Site. The loss of habitat at the facility will be minor, and the persistence of native Hawaiian arthropods in the larger ecosystem should not be threatened by construction and operational activities.

One of the biggest concerns of past evaluations was the presence of ants. None were found during this study, but ants are reported from nearby National Park facilities. With some practical precautions, the site should remain ant free.