

Historically and currently, *Melicope pallida* is known from Oahu and Kauai. On Kauai, the species is currently known from the following locations: Pohakuao, the left branch of Kalalau Valley, Honopu Trail, Awaawapuhi Valley, and Koaie Canyon. There is a total of six occurrences with 181 individuals on State-owned land within the Alakai Wilderness Preserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (GDSI 2000; HINHP Database 2000; D.W. Mathias, U.S. Navy (Navy), *in litt.* 1999; K. Wood, *in litt.* 1999).

Melicope pallida usually grows on steep rock faces in lowland to montane mesic to wet forests or shrubland at elevations between 359 and 1,081 m (1,179 and 3,546 ft). Associated native plant species include *Alyxia oliviformis*, *Artemisia australis*, *Boehmeria grandis*, *Carex meyenii*, *Chamaesyce celastroides* var. *hanapeensis*, *Coprosma kauensis* (koi), *Coprosma waimeae*, *Dodonaea viscosa*, *Dryopteris* spp., *Hedyotis terminalis*, *Lepidium serra*, *Melicope* spp., *Metrosideros polymorpha*, *Nototrichium* spp., *Pipturus albidus* (mamaki), *Pleomele aurea*, *Poa mannii*, *Pritchardia minor*, *Psychotria mariniana*, *Sapindus oahuensis*, *Schiedea membranacea*, *Tetraplasandra waialealae*, or *Xylosma hawaiiense* (HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Melicope pallida* are habitat destruction by feral goats and pigs; the black twig borer; fire; susceptibility to extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing populations; and competition with nonnative plant species (Hara and Beardsley 1979; HINHP Database 2000; Medeiros *et al.* 1986; Service 1995; 59 FR 9304).

Peucedanum sandwicense (makou)

Peucedanum sandwicense, a member of the parsley family (Apiaceae), is a parsley-scented, sprawling herb. Hollow stems arise from a short, vertical stem with several fleshy roots. This short-lived perennial species is the only member of the genus in the Hawaiian Islands, one of three genera of the family with species endemic to the island of Kauai. This species differs from the other Kauai members of the parsley family in having larger fruit and pinnately compound leaves with broad leaflets (Constance and Affolter 1999).

Little is known about the life history of *Peucedanum sandwicense*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and

limiting factors are unknown (Service 1995).

Historically and currently, *Peucedanum sandwicense* is known from Molokai, Maui, and Kauai. In 1990, it was discovered on Oahu. On Kauai, there are 15 occurrences on State (Haena State Park, Hono o Na Pali and Kuia NARs, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve) and privately owned lands, containing approximately 156 to 256 individuals, in Maunahou Valley, Limahuli Valley, Hoolulu, Hanakoa, Pohakuao, Kanakou, the left branch of Kalalau Valley, Nualolo Valley, Kuia Valley, Mahanaloa Valley, Koaie Canyon, and Haupu (GDSI 2000; HINHP Database 2000; Service 1995; 59 FR 9304; K. Wood, *in litt.* 1999).

This species grows on cliff habitats in mixed shrub coastal dry cliff communities or diverse mesic forest at elevations between 0 and 1,232 m (0 and 4,041 ft). Associated native plant species include *Acacia koa*, *Artemisia australis*, *Bidens* spp., *Brighamia insignis*, *Carex meyenii*, *Chamaesyce celastroides*, *Diospyros* spp., *Dodonaea viscosa*, *Eragrostis variabilis*, *Hibiscus kokio*, *Lobelia niihauensis*, *Metrosideros polymorpha*, *Panicum lineale*, *Psychotria* spp., *Psydrax odorata*, or *Wilkesia* spp. (Constance and Affolter 1999; HINHP Database 2000; 59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to *Peucedanum sandwicense* on Kauai include competition with introduced plants; habitat degradation and browsing by feral goats and deer; and trampling and trail clearing (Hanakapiai population) (HINHP Database 2000; Service 1995; 59 FR 9304).

Phlegmariurus mannii (wawaeiole)

Phlegmariurus mannii, a member of the clubmoss family (Lycopodiaceae) and a short-lived perennial, is a pendent epiphyte with clustered, delicate red stems and forked reproductive spikes. These traits distinguish it from others in the genus in Hawaii (Holub 1991).

Little is known about the life history of *Phlegmariurus mannii*. Reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1997).

Historically, *Phlegmariurus mannii* was known from Kauai, West Maui, and Hawaii island. Currently, this species is extant on Maui and Hawaii island. It was last observed on Kauai in 1900 (HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Phlegmariurus mannii* on the island of Kauai.

Nothing is known of the threats to *Phlegmariurus mannii* on the island of Kauai.

Phlegmariurus nutans (wawaeiole)

Phlegmariurus nutans is an erect or pendulous herbaceous epiphyte in the clubmoss family (Lycopodiaceae). This species can be distinguished from others of the genus in Hawaii by its epiphytic habit, simple or forking fruiting spikes, and larger and stiffer leaves (Wagner and Wagner 1987).

Phlegmariurus nutans has been observed fertile, with spores, in May and December. Little else is known about the life history of *Phlegmariurus nutans*. Its reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998b).

Historically, *Phlegmariurus nutans* was known from the island of Kauai and from scattered locations in the Koolau Mountains of Oahu. It is currently only known from Oahu. It was last observed on Kauai in 1900 (HINHP Database 2000; Service 1998b).

Phlegmariurus nutans grows on tree trunks, usually on open ridges and slopes in *Metrosideros polymorpha*-*Dicranopteris linearis* wet forests and occasionally mesic forests at elevations between 601 and 1,594 m (1,971 and 5,228 ft). The vegetation in those areas typically includes *Antidesma platyphyllum*, *Broussaisia arguta*, *Cheirodendron fauriei*, *Cibotium* spp., *Diplopterygium pinnatum*, *Hedyotis terminalis*, *Hibiscus kokio* ssp. *kokio*, *Melicope waialealae* (alani wai), *Scaevola gaudichaudii*, *Syzygium sandwicensis*, *Perrottetia sandwicensis*, *Psychotria hexandra*, *Psychotria mariniana*, or *Psychotria wawrae* (K. Wood, pers. comm., 2001).

The primary threat to *Phlegmariurus nutans* is extinction due to naturally occurring events and/or reduced reproductive vigor because of the small number of remaining individuals and limited distribution. Additional threats to this species are feral pigs and the nonnative plants *Clidemia hirta* or *Psidium cattleianum* (Service 1998b).

Plantago princeps (laukahi kuahiwi)

Plantago princeps, a member of the plantain family (Plantaginaceae), is a small shrub or robust perennial herb. This short-lived perennial species differs from other native members of the genus in Hawaii by its large branched stems, flowers at nearly right angles to the axis of the flower cluster, and fruits that break open at a point two-thirds from the base. The four varieties, vars. *anomala*, *laxiflora*, *longibracteata*, and