

plant species, including *Blechnum occidentale*, *Cyperus meyenianus* (NCN), *Grevillea robusta* (silk oak), *Lantana camara*, *Morella faya*, *Passiflora tarminiana*, *Rubus argutus*, or *Setaria palmifolia* (palm grass); and random naturally occurring events that could cause extinction and/or reduced reproductive vigor due to the small number of existing individuals (Service 1996; 59 FR 56333).

*Diplazium molokaiense* (NCN)

*Diplazium molokaiense*, a short-lived perennial member of the woodfern family (Dryopteridaceae), has a short prostrate rhizome and green or straw-colored leaf stalks with thin-textured fronds. This species can be distinguished from other species of *Diplazium* in the Hawaiian Islands by a combination of characteristics, including venation pattern, the length and arrangement of the sori, frond shape, and the degree of dissection of the frond (Wagner and Wagner 1992).

Little is known about the life history of *Diplazium molokaiense*. Its reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998c).

Historically, *Diplazium molokaiense* was found on Kauai, Oahu, Molokai, Lanai, and Maui. Currently, this species is only known from Maui. It was last seen on Kauai in 1909 (HINHP Database 2000).

This species occurs in brown soil with basalt outcrops near waterfalls in lowland or montane mesic *Metrosideros polymorpha*-*Acacia koa* forest at elevations between 476 and 1,284 m (1,562 and 4,212 ft) (HINHP Database 2000; Service 1998a; K. Wood, pers. comm., 2001).

The primary threats on Kauai are habitat degradation by feral goats and pigs and competition with nonnative plant species (HINHP Database 2000; Service 1998a; 59 FR 49025).

*Euphorbia haeleeleana* (akoko)

*Euphorbia haeleeleana*, a member of the spurge family (Euphorbiaceae), is a dioecious tree with alternate papery leaves. This short-lived perennial species is distinguished from others in the genus in that it is a tree and by the large leaves with prominent veins (Wagner *et al.* 1999).

Individual trees of *Euphorbia haeleeleana* bear only male or female flowers, and must be cross-pollinated from a different tree to produce viable seed. *Euphorbia haeleeleana* sets fruit between August and October. Little else is known about the life history of this species. Reproductive cycles, longevity,

specific environmental requirements, and limiting factors are unknown (Service 1999; Wagner *et al.* 1999).

*Euphorbia haeleeleana* is known historically and currently from northwestern Kauai and the Waianae Mountains of Oahu. On Kauai, there is a total of 23 occurrences with 597 individuals occurring on State-owned land. It is found at Pohakuao, Kalalau Valley, Hipalau Valley, Koaie Canyon, Mahanaloa Valley, Kuia Valley, Poopooiki Valley, Nualolo Trail, Makaha Valley, and Haeleele Valley within the Kuia NAR, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve (HINHP Database 2000; Service 1999; 61 FR 53108; K. Wood, *in litt.* 1999;).

*Euphorbia haeleeleana* is usually found in lowland mixed mesic or dry *Diospyros* forest that is often codominated by *Metrosideros polymorpha* and *Alphitonia ponderosa*. This plant is typically found at elevations between 284 and 1,178 m (931 and 3,866 ft). Associated native plant species include *Acacia koa*, *Antidesma platyphyllum*, *Carex meyenii*, *Carex wahuensis*, *Claoxylon sandwicense*, *Diplazium sandwichianum*, *Dodonaea viscosa*, *Erythrina sandwicensis*, *Kokia kauaiensis*, *Pisonia sandwicensis*, *Pleomele aurea*, *Pouteria sandwicensis*, *Psychotria greenwelliae*, *Psychotria mariniana*, *Pteralyxia kauaiensis*, *Rauvolfia sandwicensis*, *Sapindus oahuensis*, *Tetraplasandra kawaiensis*, or *Xylosma* spp. (61 FR 53108; K. Wood, pers. comm., 2001).

Threats to this species on Kauai include habitat degradation and destruction by deer, feral goats, and pigs; seed predation by rats; fire; and competition with nonnative plants (Service 1999; 61 FR 53108).

*Flueggea neowawraea* (mehamehame)

*Flueggea neowawraea*, a member of the spurge family (Euphorbiaceae), is a large dioecious tree with white oblong pores covering its scaly, pale brown bark. This long-lived perennial species is the only member of the genus found in Hawaii and can be distinguished from similar Hawaiian species in the family by its hairless whitish lower leaf surfaces and round fruits (Hayden 1999; Linney 1982; Neal 1965; Service 1999).

Individual trees of *Flueggea neowawraea* bear only male or female flowers, and must be cross-pollinated from a different tree to produce viable seed. Little else is known about the life history of this species. Reproductive cycles, longevity, specific environmental requirements, and

limiting factors are unknown (Hayden 1999).

Historically, *Flueggea neowawraea* was known from Kauai, Oahu, Maui, Molokai, and the island of Hawaii. Currently, it is known from Kauai, Oahu, east Maui, and Hawaii. On Kauai, this species is reported from Limahuli Valley, Pohakuao, the left branch of Kalalau Valley, Kuia and Paaiki Valleys, Kipalau Valley, Koaie Falls, Kawaiiki Valley, and Waimea Canyon. There are 10 occurrences with 62 known individuals occurring on State (Alakai Wilderness Preserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve) and privately owned lands. However, it has been estimated that the total number of individuals may be slightly over 100 (GDSI 2000; HINHP Database 2000; Hayden 1999; Service 1999; K. Wood, *in litt.* 1999).

*Flueggea neowawraea* occurs in dry or mesic forests at elevations between 210 and 1,178 m (689 and 3,865 ft). Associated native plant species include *Alectryon macrococcus*, *Antidesma platyphyllum*, *Bidens sandwicensis*, *Bobea timonioides*, *Caesalpinia kawaiensis*, *Charpentiera* spp., *Diospyros* spp., *Diplazium sandwichianum*, *Freycinetia arborea*, *Hibiscus* spp., *Isodendron laurifolium*, *Kokia kauaiensis*, *Melicope* spp., *Metrosideros polymorpha*, *Munroidendron racemosum*, *Myrsine lanaiensis*, *Nesoluma polynesianum*, *Nestegis sandwicensis*, *Tetraplasandra* spp., *Pittosporum* spp., *Pouteria sandwicensis*, *Pritchardia minor*, *Psychotria* spp., *Psydrax odorata*, *Pteralyxia kauaiensis*, *Rauvolfia sandwicensis*, *Streblus pendulinus*, *Xylosma crenatum*, or *Xylosma hawaiiense* (HINHP Database 2000; Service 1999; 59 FR 56333; K. Wood, pers. comm., 2001).

The threats to this species on Kauai include the black twig borer; habitat degradation by feral pigs, goats, deer, and cattle; competition with nonnative plant species; fire; small population size; depressed reproductive vigor; and a potential threat of fruit predation by rats (HINHP Database 2000; Service 1999; 59 FR 56333).

*Gouania meyenii* (NCN)

*Gouania meyenii*, a member of the buckthorn family (Rhamnaceae), is a shrub with papery leaves with smooth margins. This short-lived perennial species is distinguished from the two other Hawaiian species of *Gouania* by its lack of tendrils on the flowering branches, the absence of teeth on the leaves, and the lack or small amount of hair on the fruit (Wagner *et al.* 1999).