

Gulch, Kahanakaiki Gulch, Makaleha, Kapuna Gulch, and Pahole Gulch on Federal and State lands. The 6 known occurrences contain about 8 to 10 individuals (EDA Database 2001; HINHP Database 2001; Wagner *et al.* 1999).

*Alsinidendron obovatum* typically grows on ridges and slopes in lowland diverse mesic forest dominated by *Acacia koa* (koa) and *Metrosideros polymorpha* between 476 and 943 m (1,561 and 3,093 ft) elevation. Associated native species include *Alyxia oliviformis* (maile), *Antidesma platyphyllum* (hame), *Bidens torta* (kookoolau), *Cibotium chamissoi* (hapuu), *Coprosma* sp. (pilo), *Hedyotis terminalis* (manono), *Ilex anomala* (kawau), *Machaerina* sp. (uki), *Peperomia* sp. (ala ala wai nui), *Perrottetia sandwicensis* (olomea), *Pipturus* sp. (mamaki), *Psydrax odorata*, or the endangered *Cyanea longiflora* (haha) (HINHP Database 2001; EDA, in litt. 2001).

The major threats to *Alsinidendron obovatum* are competition from the aggressive nonnative plant species *Blechnum appendiculatum* (NCN), *Clidemia hirta*, *Grevillea robusta*, *Melinis minutiflora*, *Paspalum conjugatum* (Hilo grass), *Psidium cattleianum*, *Rubus argutus* (prickly Florida blackberry), *Schinus terebinthifolius*, and/or *Stachytarpheta dichotoma* (owi); habitat degradation by feral pigs; trampling by humans; rockslides; and the small number of occurrences and individuals, which make the species highly vulnerable to extinction from random environmental events (Service 1998b; 56 FR 55770).

#### *Alsinidendron trinerve* (NCN)

*Alsinidendron trinerve*, a member of the pink family (Caryophyllaceae) and a short-lived perennial, is very similar in appearance to *A. obovatum* but differs in that it has a more open inflorescence with peduncles more than 2 cm (0.8 in) long and sepals with an acute tip (Wagner *et al.* 1999).

*Alsinidendron trinerve* flowers and fruits throughout the year with the possible exception of fall (56 FR 55770). Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors.

Historically, *Alsinidendron trinerve* was known from the north-central and southern Waianae Mountains. This species is known to be in Makaleha Gulch, on Mt. Kaala and Puu Kalena on Federal and State lands. The 13 known occurrences total between 18 and 34 individuals (EDA Database 2001; HINHP Database 2001).

*Alsinidendron trinerve* typically grows on slopes in wet forest or the wetter portions of diverse mesic forest dominated by *Metrosideros polymorpha* and *Ilex anomala* or *Metrosideros polymorpha* montane wet forest between 833 and 1,233 m (2,732 and 4,044 ft) elevation. Associated native species include *Broussaisia arguta* (kanawao), *Coprosma ochracea* (pilo), *Diplazium sandwichianum* (hoio), *Gunnera* sp. (apeape), *Hedyotis* sp. (NCN), *Machaerina* sp., *Nothoperanema rubiginosa*, *Peperomia* sp., *Perrottetia sandwicensis*, *Phyllostegia* sp. (NCN), *Pipturus albidus*, or *Vaccinium* sp. (ohelo) (HINHP Database 2001; Wagner *et al.* 1999; EDA, in litt. 2001).

The major threats to *Alsinidendron trinerve* are competition from the aggressive nonnative plant species *Buddleia asiatica* (butterfly bush), *Clidemia hirta*, *Kalanchoe pinnata*, and *Rubus argutus*; habitat degradation by feral pigs; trampling by humans along trails; and the small number of extant individuals, which makes the species highly vulnerable to extinction from random environmental events (Service 1998b; 56 FR 55770).

#### *Chamaesyce celastroides* var. *kaenana* (Akoko)

*Chamaesyce celastroides* var. *kaenana*, a member of the spurge family (Euphorbiaceae) and a short-lived perennial, is a low-growing or upright shrub to 5 ft (1.5 m) tall with milky sap. Its leaves fall off during the dry season, are mostly hairless, and are arranged in two opposite rows along the stem. This species is distinguished from other members of the genus in the area in which it grows in that it is a woody shrub rather than an herb or small subshrub (Koutnik and Huft 1999).

*Chamaesyce celastroides* var. *kaenana* has been observed flowering and fruiting throughout the year, probably in response to precipitation. Fruits mature in three to four weeks and plants live from five to 10 years. No additional information is available on flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, or limiting factors (56 FR 55770).

Historically, *Chamaesyce celastroides* var. *kaenana* was known from the northwestern end of the Waianae Mountains as well as from one collection from the southeastern end of the Koolau Mountains. This taxon remains at Kaena Point, Keawaula, Alau Gulch, Waianae Kai, and Kahanakaiki on State land and land under Federal jurisdiction. The 15 known occurrences contain 569 individuals (HINHP Database 2001; Koutnik and Huft 1999).

*Chamaesyce celastroides* var. *kaenana* typically grows in coastal dry shrubland on windward talus slopes, leeward rocky cliffs, open grassy slopes, or on vegetated cliff faces between sea level and 862 m (0 and 2,827 ft) elevation. Associated native species include *Artemisia australis* (ahinahina), *Boerhavia* sp. (alena), *Chamaesyce celastroides* var. *amplectans* (akoko), *Dodonaea viscosa* (aalii), *Gossypium tomentosum* (mao), *Heteropogon contortus* (pili grass), *Jacquemontia ovalifolia* ssp. *sandwicensis* (pauohiika), *Lipochaeta lobata* (nehe), *Myoporum sandwicense* (naio), *Plumbago zeylanica* (ililee), *Psilotum nudum* (moa), *Psydrax odorata*, *Santalum* sp. (iliahi), *Sida fallax* (ilima), or *Waltheria indica* (uhaloa) (HINHP Database 2001; EDA, in litt. 2001).

The major threats to *Chamaesyce celastroides* var. *kaenana* are competition from the nonnative plant species *Acacia confusa* (Formosan koa), *Grevillea robusta*, *Hyptis pectinata*, *Leucaena leucocephala*, *Melinis repens* (natal redtop), *Panicum maximum*, *Pluchea carolinensis* (sourbush), and/or *Schinus terebinthifolius*; fire; and effects of recreational activities (Service 1998b; 56 FR 5577).

#### *Chamaesyce deppeana* (Akoko)

*Chamaesyce deppeana*, a member of the spurge family (Euphorbiaceae) and a short-lived perennial, is an erect subshrub up to 1.2 m (4 ft) tall with fuzzy branches. This species is distinguished from others in the genus by the following combination of characters: Leaves arranged in two rows on opposite sides of the branches, leaves glabrous, leaf apex notched, leaf margin toothed, and cyathia (flower cluster) width (Koutnik and Huft 1999).

*Chamaesyce deppeana* has been observed in flower in May and September. No further information is available on flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

Historically, *Chamaesyce deppeana* was known only from southern Oahu. Because the few collections that were made were collected prior to the 20th century, it was thought to be extinct. In 1986, Joel Lau and Sam Gon of The Nature Conservancy of Hawaii (TNCH) rediscovered *C. deppeana* on State land in the southern Koolau Mountains of Oahu in Nuuanu Pali Wayside State Park near the Pali Lookout, a popular tourist attraction. About 50 individuals grow near there (HINHP Database 2001; Koutnik and Huft 1999).