

Database 2001; Service 1998b; 61 FR 53089).

*Myrsine juddii* (Kolea)

*Myrsine juddii*, short-lived perennial a member of the myrsine family (Myrsinaceae), is a many branched shrub ranging from 1 to 2 m (3.5 to 6.6 ft) tall. This species is distinguished from others in the genus by the hairiness of the lower leaf surface and the shape of the leaf base. In addition, the hairy leaves distinguish this species from all other species of *Myrsine* on Oahu (Wagner *et al.* 1999).

*Myrsine juddii* has been reported from only three occurrences in the central Koolau Mountains: the North Kaukonahua-Kahana Summit divide, Peahinaia Trail, and Puu Kainapuaa to Poamoho Trail. These occurrences are found on State and Federal lands. The total number of individuals is thought to be around 5,000 (GDSI 2001; HINHP Database 2001).

*Myrsine juddii* typically grows on ridge crests and gulch slopes in wet forests and shrublands dominated by *Metrosideros polymorpha* or a mixture of *Metrosideros polymorpha* and *Dicranopteris linearis* at elevations between 384 and 867 m (1,260 and 2,844 ft). Associated native plant species include *Cheirodendron platyphyllum*, *Cheirodendron trigynum*, *Machaerina* sp., *Melicope clusiifolia* (kolokolo mokihana), *Psychotria marianiana*, and *Syzygium sandwicensis* (GDSI 2001; HINHP Database 2001; Service 1998b; 61 FR 53089; EDA, *in litt.* 2001).

The primary threats to *Myrsine juddii* are habitat degradation and/or destruction by feral pigs; potential impacts from military activities; competition with nonnative plant species such as *Clidemia hirta* and *Psidium cattleianum*; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of extant occurrences (HINHP Database 2001; Service 1998b; 61 FR 53089).

*Neraudia angulata* (NCN)

*Neraudia angulata*, a short-lived perennial member of the nettle family (Urticaceae), is an erect shrub up to 3 m (10 ft) tall. This species is distinguished from other species in its genus by the conspicuously angled, ridged, fleshy calyx in the female flower. There are two varieties, *N. angulata* var. *angulata* and *N. angulata* var. *dentata*, that differ in the types of leaf hairs on the lower surface of the leaves and the type of leaf margin (Wagner *et al.* 1999).

*Neraudia angulata* flowers and fruits from early spring to summer. Fruits

mature in about one month. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

Historically, *Neraudia angulata* was known from almost the entire length of the Waianae Mountains, from Kaluakauila Gulch nearly to Puu Manawahua. This species is currently known from Kaluakauila Gulch along Makua-Keaau Ridge to Makaha-Waianae Kai Ridge, on Federal, State, city, county, and private lands. The 27 known occurrences are estimated to comprise approximately 51 individuals (EDA Database 2001; GDSI 2001; HINHP Database 2001).

*Neraudia angulata* var. *angulata* typically grows on slopes, ledges, or gulches in lowland mesic or dry forest between 189 and 978 m (620 and 3,208 ft) elevation. Associated native plant species include *Artemisia australis*, *Bidens* sp., *Carex meyenii*, *Diospyros* sp., *Dodonaea viscosa*, *Hibiscus* sp., *Nestegis sandwicensis*, *Pisonia sandwicensis*, *Psydrax odorata*, or *Sida fallax*. *Neraudia angulata* var. *dentata* typically grows on cliffs, rock embankments, gulches, and slopes in mesic or dry forests between 110 and 978 m (361 and 3,208 ft) elevation. Associated native plant species include *Alyxia oliviformis*, *Antidesma pulvinatum*, *Artemisia australis*, *Bidens torta*, *Canavalia* sp., *Carex* sp., *Charpentiera* sp., *Diospyros hillebrandii*, *Diospyros sandwicensis*, *Dodonaea viscosa*, *Eragrostis* sp., *Hibiscus* sp., *Metrosideros polymorpha*, *Myrsine lanaiensis*, *Nestegis sandwicensis*, *Pisonia* sp., *Psydrax odorata*, *Rauvolfia sandwicensis*, *Sapindus oahuensis*, *Sida fallax*, or *Streblus pendulinus* (HINHP Database 2001; Service 1998b; 56 FR 55770; EDA, *in litt.* 2001).

The major threats to *Neraudia angulata* var. *angulata* are habitat degradation by feral goats and pigs; potential impacts from military activities; competition from the nonnative plant species *Ageratina riparia*, *Melinis minutiflora*, *Passiflora* sp., *Psidium cattleianum*, and *Schinus terebinthifolius*; fire; and a risk of extinction from naturally occurring events due to the small number of extant individuals. The major threats to *Neraudia angulata* var. *dentata* are habitat degradation by feral pigs and goats; fire; competition with the nonnative plant species *Ageratina adenophora*, *Ageratina riparia*, *Aleurites moluccana*, *Blechnum appendiculatum*, *Erigeron karvinskianus*, *Leucaena leucocephala*,

*Melinis* sp., *Montanoa hibiscifolia*, *Oplismenus hirtellus*, *Passiflora suberosa*, *Pimenta dioica*, *Psidium guajava*, *Schefflera actinophylla*, *Schinus terebinthifolius*, *Syzygium cumini*, and *Tecoma castanifolia* (yellow elder); and a risk of extinction from naturally occurring events due to the small number of extant individuals (HINHP Database 2001; Service 1998b; 56 FR 55770).

*Phyllostegia hirsuta* (NCN)

*Phyllostegia hirsuta*, a short-lived perennial member of the mint family (Lamiaceae), is an erect subshrub or vine with stems densely covered with coarse or stiff hairs. This species is distinguished from others in the genus by the texture, hairiness, size of the leaves, and the length of the upper bracts (Wagner *et al.* 1999).

*Phyllostegia hirsuta* has been observed in flower in February and in fruit in June. Cultivated material flowered in July. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

Historically, *Phyllostegia hirsuta* was known from widespread locations in the Waianae and Koolau Mountains on Oahu. Currently, this species is found in 26 occurrences with a total of between 214 and 227 individuals from the ridge between Makaha and Waianae Kai to the south fork of North Palawai Gulch in the Waianae Mountains and from Kawainui Gulch in Kawaiolo Training Area to south Kaukonahua drainage in the Koolau Mountains. These occurrences are on Federal, State, city, county, and private lands (EDA Database 2001; GDSI 2001; HINHP Database 2001).

*Phyllostegia hirsuta* is usually found on steep, shaded slopes, cliffs, ridges, gullies, and stream banks in mesic or wet forests dominated by *Metrosideros polymorpha* or a mixture of *Metrosideros polymorpha* and *Dicranopteris linearis* between 195 and 1,202 m (640 and 3,943 ft) elevation. Associated native plant species include *Antidesma platyphyllum*, *Astelia* sp. (painiu), *Broussaiea arguta*, *Chamaesyce multiflora*, *Cibotium* sp., *Claoxylon sandwicense*, *Clermontia kekeana* (oha wai), *Coprosma longifolia*, *Cyanea membranacea*, *Cyrtandra waianaeensis*, *Diplazium sandwichianum*, *Dryopteris unidentata*, *Dubautia laxa*, *Dubautia sherffiana* (naenae), *Elaeocarpus bifidus*, *Freycinetia arborea*, *Hedyotis schlechtendahlana*, *Hedyotis terminalis*, *Hibiscus* sp., *Ilex anomala*, *Labordia kaalae*, *Liparis hawaiiensis* (awapuhiakanalao), *Lysimachia*