

Ridge, Kapakahi Gulch, Halemano-Opaeula Ridge, Kawaihoa Trail, Kaimananui Gulch, and upper Palolo Valley to Niu Valley (EDA Database 2001; GDSI 2001; HINHP Database 2001; Service 1998b).

Hesperomannia arborescens on Oahu is found in association with *Acacia koa*, *Antidesma platyphyllum*, *Bobea elatior*, *Broussaisia arguta*, *Cheirodendron* sp., *Cibotium* sp., *Coprosma* sp., *Dicranopteris linearis*, *Dubautia* sp., *Hedyotis terminalis*, *Hibiscus arnottianus*, *Labordia sessilis* (kamakahala), *Machaerina angustifolia*, *Melicope* sp., *Metrosideros polymorpha*, *Myrsine* sp., *Nestegis sandwicensis*, *Perottetia sandwicensis*, *Pipturus* sp., *Psychotria mariniana*, *Scaevola gaudichaudiana*, *Scaevola glabra* (ohe naupaka), *Syzygium sandwicensis*, *Tetraplasandra oahuensis*, and *Wikstroemia* sp. It typically grows on steep slopes, ridge tops, and gulches in lowland wet forests and occasionally in shrublands between 110 and 1,147 m (361 and 3,762 ft) in elevation (HINHP Database 2001; Service 1998b; Wagner *et al.* 1999).

The major threats to *Hesperomannia arborescens* are habitat degradation by feral pigs and goats; competition with the nonnative plant species *Axonopus fissifolius*, *Clidemia hirta*, *Leptospermum scoparium*, and *Psidium cattleianum*; fire; impact by humans; and a risk of extinction due to random environmental events or reduced reproductive vigor due to this species' limited numbers (HINHP Database 2001; 59 FR 14482).

Hesperomannia arbuscula (NCN)

Hesperomannia arbuscula, a long-lived perennial member of the aster family (Asteraceae), is a small shrubby tree, 2 to 3.3 m (7 to 11 ft) tall. This species can be distinguished from other members of the genus by the erect flower heads and the leaves, usually hairy beneath, which are one to two times as long as wide (Wagner *et al.* 1999).

Hesperomannia arbuscula usually flowers in the spring depending on precipitation. Seeds mature in about six weeks and trees live for about 10 to 15 years. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

Historically, *Hesperomannia arbuscula* was known from the central and southern Waianae Mountains, from Makaleha to Puu Kanehoa on Oahu, and from West Maui. This species is currently known to be extant on the Makaha-Waianae Kai Ridge and in

Kaluaa and Kapuna Gulches on Oahu and on West Maui. The 6 known occurrences on Oahu contain between 90 and 92 individuals on State, private, city, and county lands (GDSI 2001; HINHP Database 2001).

Hesperomannia arbuscula on Oahu typically grows on slopes and ridges in dry to wet forest dominated by *Acacia koa* and *Metrosideros polymorpha* at elevations of 370 to 1,053 m (1,214 to 3,454 ft). Associated native species include *Alyxia oliviformis*, *Antidesma* sp., *Bidens* sp., *Bobea elatior*, the endangered *Cyanea longiflora*, *Diospyros hillebrandii*, *Freycinetia arborea*, *Hedyotis terminalis*, *Hibiscus* sp., *Psychotria* sp., and *Syzygium sandwicensis* (HINHP Database 2001; Service 1998b; Wagner *et al.* 1999).

The major threats to *Hesperomannia arbuscula* on Oahu are habitat degradation by feral pigs; competition from the nonnative plant species *Clidemia hirta*, *Lantana camara*, *Psidium cattleianum*, *Rubus argutus*, and *Schinus terebinthifolius*; trampling by humans; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of remaining occurrences and individuals (HINHP Database 2001; 56 FR 55770).

Hibiscus brackenridgei (Mao hau hele)

Hibiscus brackenridgei, a short-lived perennial member of the mallow family (Malvaceae), is a sprawling to erect shrub or small tree. This species differs from other members of the genus in having the following combination of characteristics: Yellow petals, a calyx consisting of triangular lobes with raised veins and a single midrib, bracts attached below the calyx, and thin stipules that fall off, leaving an elliptical scar.

Three subspecies of *Hibiscus brackenridgei* are now recognized: *brackenridgei*, *molokaiana*, and *mokuleianus*. When we listed this species in 1994, only two subspecies, *brackenridgei* and *mokuleianus*, were recognized. Subsequently we became aware of Wilson's (1993) taxonomic treatment of this group, in which *H. brackenridgei* ssp. *molokaiana* was recognized as distinct from *H. brackenridgei* ssp. *brackenridgei*. Wilson's (1993) treatment is cited in the supplement in the revised edition of the *Manual of the Flowering Plants of Hawaii* as the basis for recognizing *H. brackenridgei* ssp. *molokaiana*. We will address this name change in a future **Federal Register** notice (Bates 1999; HINHP Database 2000; Wagner *et al.* 1999; Wilson 1993).

Hibiscus brackenridgei is known to flower continuously from early February through late May, and intermittently at other times of year. Intermittent flowering may possibly be related to day length. Little else is known about the life history of this plant. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1999).

This species was historically known from Kauai, Oahu, Molokai, Lanai, Maui, and the island of Hawaii. *Hibiscus brackenridgei* ssp. *mokuleianus* is currently known from Oahu, Lanai, Maui, and Hawaii; it may possibly occur on Kauai. On Oahu, there are a total of fewer than 206 individual plants in 5 occurrences at Kaumokunui, Kawaiu, Palikea, Kihakapu, and Kaimuhole Gulches on State and private lands. *Hibiscus brackenridgei* ssp. *molokaiana* is currently known from Oahu. There are a total of five individual plants in one occurrence in Makua Valley on land under Federal jurisdiction (GDSI 2001; HINHP Database 2001; Joel Lau, pers. comm., 2001).

Hibiscus brackenridgei ssp. *mokuleianus* on Oahu occurs on slopes, cliffs, and arid ledges in lowland dry forest and shrubland from 24 to 490 m (79 to 1,607 ft) in elevation. Associated native plant species include *Bidens amplexans* (kookoolau), *Chamaesyce* sp., *Diospyros hillebrandii*, *Dodonaea viscosa*, *Doryopteris* sp., *Erythrina sandwicensis*, *Heteropogon contortus*, *Hibiscus brackenridgei* ssp. *molokaiana*, *Lepidium bidentatum*, *Melanthium remyi*, *Pleomele halapepe*, *Psydrax odorata*, *Reynoldsia sandwicensis*, *Sida fallax*, or *Waltheria indica*. *Hibiscus brackenridgei* ssp. *molokaiana* occurs in dry shrublands between 23 and 580 m (75 to 1,902 ft) elevation. Associated native plant species include *Dodonaea viscosa*, *Doryopteris* sp., *Heteropogon contortus*, *Sida fallax*, and *Waltheria indica* (GDSI Database 2001; HINHP Database 2001; EDA, *in litt.* 2001).

The primary threats to *Hibiscus brackenridgei* ssp. *mokuleianus* on Oahu are habitat degradation and possible predation by pigs, goats, cattle, and rats; competition with the nonnative plant species *Ageratum conyzoides* (maile honohono), *Aleurites moluccana*, *Caesalpinia decapetala*, *Coffea arabica*, *Grevillea robusta*, *Hyptis pectinata*, *Leucaena leucocephala*, *Melia azedarach*, *Neonotonia wightii* (NCN), *Panicum maximum*, *Passiflora edulis*, *Passiflora suberosa*, *Schinus terebinthifolius*, *Spathodea campanulata* (African tulip tree),