

occurrences with a total of 12 individuals within the East Maui Watershed Partnership in Honomanu, Wailuaiki, Kipahulu Valley, Koukouai, and Puu Ahulili, on Federal (Haleakala National Park) and privately owned lands (GDSI 2001; HINHP Database 2001; Service 2001; Warshauer 1998; 64 FR 48307).

Typical habitat for this species is montane wet forest dominated by *Metrosideros polymorpha*, with a *Cibotium* spp. and/or native shrub understory, or closed *Acacia koa*-*M. polymorpha* wet forest, containing one or more of the following associated native plant species: *Athyrium microphyllum* (akolea), *Broussaisia arguta*, *Cheiodendron trigynum*, *Cyanea aculeatiflora* (haha), *Cyanea kunthiana* (haha), *Dicranopteris linearis*, *Diplazium sandwichianum*, *Melicope* spp., *Myrsine* spp. (kolea), or *Vaccinium* spp.; and at elevations between 767 and 1,553 m (2,515 and 5,095 ft) (HINHP Database 2001; R. Hobdy, pers. comm., 2001; Service 2001; 64 FR 48307).

The threats to this species are habitat degradation and destruction by feral pigs; landslides; competition with the nonnative plant *Ageratina adenophora* (Maui pamakani); rats; and slugs (Service 2001; 64 FR 48307).

*Cyanea mceldowneyi* (Haha)

*Cyanea mceldowneyi*, a member of the bellflower family (Campanulaceae), is a short-lived, unbranched perennial shrub with rough to prickly stems. This species is distinguished from other species of *Cyanea* by the combination of a densely armed trunk; long (4 cm (1.6 in)), white corollas; and leaf blade size and shape (Lammers 1999; Service 2001).

Little is known about the life history of *Cyanea mceldowneyi*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1997; 57 FR 20772).

Historically, *Cyanea mceldowneyi* was known from rainforest west of Waikamoi to Honomanu on northwestern Haleakala. Currently, this species is known from 11 occurrences with a total of 36 individuals on State (Makawao Forest Reserve and Hanawi NAR) and privately owned lands within the East Maui Watershed Partnership at Kahakapao Gulch, Opana Gulch, Waikamoi, Puohokamoa, Makapipi, and the flats above Kuhiwa Valley (GDSI 2001; HINHP Database 2001; Lammers 1999; Service 1997; Warshauer 1998; 57 FR 20772).

The habitat of this species is montane wet and mesic forest with mixed *Metrosideros polymorpha*-*Acacia koa* containing one or more of the following associated native plant species: *Broussaisia arguta*, *Cheiodendron trigynum*, *Cibotium* spp., *Clermontia arborescens*, *Cyrtandra* spp. (haiwale), *Dicranopteris linearis*, *Diplazium sandwichianum*, *Hedyotis* spp., or *Melicope clusiifolia*, at elevations between 779 and 1,357 m (2,555 and 4,453 ft) (R. Hobdy, pers. comm., 2001; Service 1997, 57 FR 20772).

The threats to this species are habitat degradation and physical destruction by feral pigs, small number of occurrences and individuals, human activities, and competition with nonnative plant species, especially *Setaria palmifolia* (palmgrass) (Service 1997; 57 FR 20772).

*Dubautia plantaginea* ssp. *humilis* (Naenae)

*Dubautia plantaginea* ssp. *humilis*, a short-lived perennial of the aster family (Asteraceae), is a dwarf shrub less than 80 cm (30 in) tall with hairless or strigillose (bulbous-based hairs, all pointing in the same direction) stems. This species differs from other Hawaiian members of the genus by the number of veins in the leaves and by the close resemblance of the leaves to the genus *Plantago*. The subspecies *humilis* differs from the other two subspecies (*D. plantaginea* ssp. *magnifolia* and *D. plantaginea* ssp. *plantaginea*) by having fewer heads per inflorescence, but more florets per head (Carr 1985; Carr 1999b; Service 2001).

Little is known about the life history of *Dubautia plantaginea* ssp. *humilis*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 2001; 64 FR 48307).

*Dubautia plantaginea* ssp. *humilis* has only been reported from Iao Valley on West Maui. The two occurrences with 60 to 65 individuals in total are on privately owned land (GDSI 2001; HINHP Database 2001; Service 2001; 64 FR 48307).

The typical habitat of the species is wet, barren, steep, rocky, wind-blown cliffs containing one or more of the following associated native plant species: *Bidens* spp. (kookoolau), *Carex* spp. (NCN), *Eragrostis variabilis* (kawelu), *Hedyotis formosa* (NCN), *Lysimachia remyi* (NCN), *Metrosideros polymorpha*, *Pipturus albidus*, *Plantago princeps* (laukahi kuahiwi), or *Pritchardia* spp. (loulu), at elevations between 266 and 1,593 m (873 and 5,226 ft) (HINHP Database 2001; Service

2001; 64 FR 48307; R. Hobdy, pers. comm., 2001).

Threats to *Dubautia plantaginea* ssp. *humilis* include landslides and competition from nonnative plant species. Random environmental events, such as landslides, are a threat because of the limited number of individuals and occurrences and their narrow distribution (Service 2001; 64 FR 48307).

*Geranium arboreum* (Nohoanu)

*Geranium arboreum*, a long-lived perennial member of the geranium family (Geraniaceae), is a many branched, spreading, woody shrub about 1.8 to 3.7 m (6 to 12 ft) tall. This species can be distinguished from other *Geranium* species by its red petals with the upper three petals erect and the lower two reflexed, causing the flower to appear curved (Wagner *et al.* 1999).

*Geranium arboreum* is the only species in its genus that appears to be adapted to bird-pollination. Native honeycreepers appear to be a major pollination vector. *Geranium arboreum* from the southwest area of Haleakala in the Kula Forest Reserve produce seeds that are larger and fuller than seeds from the northwest extension of its distribution. Native honeycreepers are reasonably abundant in both areas. Little else is known about the life history of *Geranium arboreum*. Flowering cycles, other pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Funk 1982, 1988; Service 1997; 57 FR 20772).

The original range and abundance of the species is unknown, but late 19th and early 20th century collections indicate that it once grew on the southern slopes of Haleakala and that its distribution on the northern slopes extended beyond its presently known range. Currently, there are 12 occurrences totaling 158 individuals, within the East Maui Watershed Partnership on State (Kula and Kahikinui Forest Reserves), private, and federally owned or leased (Haleakala National Park) lands. These occurrences are found in Kahua, Kanahau, Waiohuli, Kaipoioi Gulch, Hapapa Gulch, Keauaiwi Gulch, Kalialinui, and south of Puu Luau and east of Puu Niania (GDSI 2001; HINHP Database 2001; Service 1997; Warshauer 1998; 57 FR 20772).

*Geranium arboreum* grows in steep, damp, and shaded narrow canyons and gulches, steep banks, and intermittent streams in *Sophora chrysophylla* (mamane) subalpine dry shrubland or *Metrosideros polymorpha* montane forest containing one or more of the