

stem. This species is distinguished from related species by its succulence, basally clustered fleshy leaves, shorter floral tube, and large leafy calyx lobes when in fruit (Wagner *et al.* 1999).

Little is known about the life history of *Hedyotis st.-johnii*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Currently, there are a total of eleven occurrences, containing approximately 227 to 292 individuals, on State-owned land in Nualolo Valley, Nualolo Kai, Kaahole Valley, Keawanui, Kawaiula Valley, Milolii Spring, Makaha Point, Polihale Spring, Kalepa Valley, and Nakeikionaiwi Caves within the Na Pali Coast State Park and Puu Ka Pele Forest Reserve (GDSI 2000; HINHP Database 2000).

This plant grows in the crevices of north-facing, near-vertical coastal cliff faces within the spray zone in sparse dry coastal shrubland at elevations between 0 and 187 m (0 and 613 ft). Associated native plant species include *Artemisia australis*, *Bidens* spp., *Capparis sandwichiana* (maiapilo), *Chamaesyce celastroides*, *Eragrostis variabilis*, *Heteropogon contortus*, *Lipochaeta connata* (nehe), *Lycium sandwicense* (ohelo kai), *Myoporum sandwicense* (naio), *Nototrichium sandwicense* (kului), or *Schiedea apokremnos* (maolioli) (56 FR 49639; K. Wood, pers. comm., 2001).

The major threats to this species are herbivory and habitat degradation by feral goats; competition from nonnative plant species, especially *Pluchea carolinensis*; landslides; fire; trampling and grazing by cattle (*Bos taurus*); and a risk of extinction due to naturally occurring events, such as landslides or hurricanes, as well as decreased reproductive vigor because of the small population sizes and restricted distribution (Service 1995; 56 FR 49639).

#### *Hesperomannia lydgatei* (NCN)

*Hesperomannia lydgatei*, a member of the aster family (Asteraceae) is a sparsely branched, small, long-lived perennial tree 2 to 4 m (6.5 to 13 ft) tall with lance-shaped or elliptic leaves. The flower heads are clustered at the ends of branches and pendant (hanging) when mature. The species is distinguished from other members of this endemic Hawaiian genus by its pendant flower heads, longer and narrower hairless flower stalks, and shorter involucrel (floral) bracts (Wagner *et al.* 1999).

Almost no mature fruits develop, and it is possible that *Hesperomannia*

*lydgatei* is self-infertile and fails to set seed unless cross-pollinated with other individuals. The flower heads with long, tubular yellow florets suggest pollination by long-tongued insects such as moths or butterflies, although field observation is required to confirm this. Absence of the appropriate pollinator(s) could be responsible for the observed lack of viable seeds. The plume-like hairs crowning the fruit strongly suggests dispersal by wind, as in many members of the aster family. This species grows almost exclusively along streams, however, so dispersal by water currents is also likely. Specific details regarding growth rates, age trees begin flowering in the wild, length of time they remain reproductive, and longevity of the plants are unknown (Service 1994).

Historically, *Hesperomannia lydgatei* was found in the Wahiawa Mountains of Kauai. Currently, this species is known from State (Halelea Forest Reserve) and privately owned lands in the Pali Elele, Waiole Valley, Wahiawa and Kapalaoa areas. There are four occurrences containing a total of 304 individual plants (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 1999).

*Hesperomannia lydgatei* is found at elevations between 207 and 1,570 m (680 and 5,151 ft) along streambanks and forested slopes in rich brown soil and silty clay in *Metrosideros polymorpha* or *M. polymorpha-Dicranopteris linearis* lowland wet forest. Associated native plant species include *Adenophorus periens* (pendent kihi fern), *Antidesma platyphyllum*, *Broussaisia arguta*, *Cheirodendron* spp., *Cyanea* spp., *Dubautia knudsenii*, *Dubautia laxa*, *Dubautia pauciflora*, *Dubautia raillardii* (naenae), *Elaphoglossum* spp., *Freycinetia arborea*, *Hedyotis terminalis*, *Labordia lydgatei* (kamakahala), *Machaerina angustifolia*, *Peperomia* spp., *Pritchardia* spp., *Psychotria hexandra*, or *Syzygium sandwicense* (HINHP Database 2000; Service 1994; K. Wood, pers. comm., 2001).

Threats to the species include nonnative plants, feral goats, rats, landslides, and erosion (Service 1994).

#### *Hibiscadelphus woodii* (hau kuahiwi)

*Hibiscadelphus woodii*, a member of the mallow family (Malvaceae), is a small branched, long-lived perennial tree with a rounded crown. *Hibiscadelphus woodii* differs from the other Kauai species in the genus by characteristics of the leaf surface and whorled leaves and by bract and flower color (Bates 1999; Lorence and Wagner 1995).

Flowering material has been collected in March, April, and September, but no fruit set has been observed in spite of efforts to manually outcross the flowers. A museum specimen of a flower contains three adult Nitidulidae (sap) beetles, probably an endemic species. The damage by these larvae may be responsible for the observed lack of fruit set in *Hibiscadelphus woodii* (Lorence and Wagner 1995; Service 1998a). No additional life history information for this species is currently known.

*Hibiscadelphus woodii* has been found only at the site of its original discovery on State-owned land in the left branch of Kalalau Valley, within the Na Pali Coast State Park on Kauai. Only two trees of this species are currently known (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 2001).

*Hibiscadelphus woodii* is found at elevations between 219 and 1,197 m (717 and 3,926 ft) on basalt talus or cliff walls in *Metrosideros polymorpha* montane mesic forest. These forests contain one or more of the following associated native plant species: *Artemisia australis*, *Bidens sandwicensis* (kookoolau), *Carex meyenii*, *Chamaesyce celastroides* var. *hanapeensis* (akoko), *Dubautia* spp., *Hedyotis* spp., *Lepidium serra*, *Lipochaeta* spp. (nehe), *Lobelia niihauensis* (NCN), *Lysimachia glutinosa* (kolokolo kuahiwi), *Melicope pallida* (alani), *Myrsine* spp. (kolea), *Nototrichium* spp. (kului), *Panicum lineale*, *Poa mannii* (NCN), or *Stenogyne campanulata* (NCN) (HINHP Database 2000; Lorence and Wagner 1995; 61 FR 53070; K. Wood, pers. comm., 2001).

Major threats to *Hibiscadelphus woodii* are habitat degradation by feral goats and pigs; competition from the nonnative plant species *Erigeron karvinskianus*; nectar robbing by the Japanese white-eye (*Zosterops japonicus*), an introduced bird; and a risk of extinction from naturally occurring events (e.g., rock slides), and reduced reproductive vigor due to the small number of existing individuals at the only known site (Lorence and Wagner 1995; 61 FR 53070).

#### *Hibiscus clayi* (Clay's hibiscus)

*Hibiscus clayi*, a member of the mallow family (Malvaceae), is a long-lived perennial shrub or small tree. This species is distinguished from other native Hawaiian members of the genus by the lengths of the calyx, calyx lobes, and capsule and by the margins of the leaves (Bates 1999).

Little is known about the life history of *Hibiscus clayi*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific