

environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Hibiscus clayi* was known from scattered locations on Kauai: the Kokee region on the western side of the island, Moloaa Valley to the north, Nounou Mountain in Wailua to the east, and as far south as Haiku near Haliu Stream. At this time, only one occurrence on State land in the Nounou Mountains, with a total of four individuals, is known to be extant (GDSI 2000; HINHP Database 2000).

*Hibiscus clayi* generally grows on slopes at elevations between 9 and 765 m (29 and 2,509 ft) in *Acacia koa* or *Diospyros* spp.-*Pisonia* spp.-*Metrosideros polymorpha* lowland dry or mesic forest with *Artemisia australis*, *Bidens* spp., *Cyanea hardyi* (haha), *Gahnia* spp., *Hedyotis acuminata* (au), *Munroidendron racemosum* (NCN), *Pandanus tectorius* (hala), *Panicum tenuifolium* (mountain pili), *Pipturus* spp., *Pleomele aurea*, *Psychotria* spp., or *Psydrax odorata* (HINHP Database 2000; 59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this species are herbivory and habitat degradation by feral pigs; competition from the nonnative plant species *Araucaria columnaris* (Norfolk Island pine) and *Psidium cattleianum*; trampling by humans; 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 size and restricted distribution (HINHP Database 2000; 59 FR 9304).

*Hibiscus waimeae* ssp. *hannerae* (kokio keokeo)

*Hibiscus waimeae* ssp. *hannerae*, a member of the mallow family (Malvaceae), is a gray-barked tree with star-shaped hairs densely covering its leaf and flower stalks and branchlets. The long-lived perennial species is distinguished from others of the genus by the position of the anthers along the staminal column, length of the staminal column relative to the petals, color of the petals, and length of the calyx. Two subspecies, ssp. *hannerae* and ssp. *waimeae*, both endemic to Kauai, are recognized. Subspecies *hannerae* is distinguishable from ssp. *waimeae* by its larger leaves and smaller flowers (Bates 1999).

Little is known about the life history of *Hibiscus waimeae* ssp. *hannerae*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Hibiscus waimeae* ssp. *hannerae* was known from Kalihiwai and adjacent valleys, Limahuli Valley, and Hanakapiai Valley. This subspecies is no longer extant at Kalihiwai. Currently, there are two occurrences containing 27 individuals on State (Na Pali Coast State Park) and privately owned lands in Hanakapiai Valley, Limahuli Valley, and Pohakuao (Bates 1999; GDSI 2000; HINHP Database 2000).

*Hibiscus waimeae* ssp. *hannerae* grows at elevations between 174 and 1,154 m (570 and 3,787 ft). It is found in *Metrosideros polymorpha*-*Dicranopteris linearis* or *Pisonia* spp.-*Charpentiera elliptica* (papala) lowland wet or mesic forest with *Antidesma* spp., *Bidens* spp., *Bobea* spp., *Cibotium* spp., *Cyanea* spp., *Cyrtandra* spp., *Perrottetia sandwicensis*, *Pipturus* spp., *Psychotria* spp., *Sadleria* spp., or *Syzygium sandwicensis* (Bates 1999; HINHP Database 2000; Service 1998a; K. Wood, pers. comm., 2001).

Major threats to *Hibiscus waimeae* ssp. *hannerae* are habitat degradation by feral pigs, competition with nonnative plant species, and a risk of extinction from naturally occurring events (e.g., landslides and hurricanes) and/or reduced reproductive vigor due to the small number of remaining populations (HINHP Database 2000; 61 FR 53070).

*Kokia kauaiensis* (kokio)

*Kokia kauaiensis*, a member of the mallow family (Malvaceae), is a small tree. This long-lived perennial species is distinguished from others of this endemic Hawaiian genus by the length of the bracts surrounding the flower head, number of lobes and the width of the leaves, the length of the petals, and the length of the hairs on the seeds (Bates 1999).

Little is known about the life history of *Kokia kauaiensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Kokia kauaiensis* was found as seven scattered occurrences on northwestern Kauai. Currently, there are a total of 21 occurrences with 166 to 171 individuals, found in Pohakuao, the left branch of Kalalau Valley, Paaiki Valley, Kuia Valley, Koaie Canyon, Kipalau Valley, and Kawaiiki Valley, all on State-owned land within Kuia NAR, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 1999).

*Kokia kauaiensis* typically grows in diverse mesic forest at elevations between 215 and 1,049 m (707 and

3,441 ft). Associated native plant species include *Acacia koa*, *Alyxia oliviformis*, *Antidesma* spp., *Bobea* spp., *Chamaesyce celastroides*, *Claoxylon sandwicense*, *Dicranopteris linearis*, *Diellia pallida*, *Diospyros hillebrandii*, *Diospyros sandwicensis*, *Dodonaea viscosa*, *Flueggea neowawraea* (mehamehame), *Hedyotis* spp., *Hibiscus* spp. (aloalo), *Isodendron laurifolium* (aupaka), *Lipochaeta fauriei* (nehe), *Melicope* spp., *Metrosideros polymorpha*, *Nestegis sandwicensis*, *Nototrichium* spp., *Pisonia* spp., *Pleomele aurea*, *Pterulia sandwicensis*, *Psydrax odorata*, *Pteralyxia kauaiensis*, *Rauvolfia sandwicensis*, *Santalum freycinetianum* var. *pyrularium* (iliahi), *Streblus pendulinus* (aia), *Syzygium sandwicensis*, *Tetraplasandra* spp., or *Xylosma* spp. (Bates 1999; HINHP Database 2000; Service 1998a; K. Wood, pers. comm., 2001).

Competition with and habitat degradation by invasive nonnative plant species, substrate loss from erosion, habitat degradation and browsing by feral goats and deer, and seed predation by rats are the major threats affecting the survival of *Kokia kauaiensis* (HINHP Database 2000; Service 1998a; Wood and Perlman 1993).

*Labordia lydgatei* (kamakahala)

*Labordia lydgatei*, a member of the logania family (Loganiaceae), is a much-branched perennial shrub or small tree with sparsely hairy, square stems. The small size of the flowers and capsules borne on sessile (attached to the base) inflorescences (a flower cluster) distinguish it from other members of the genus growing in the same area (Wagner *et al.* 1999).

Immature fruits were seen on two plants during surveys in 1991 and 1992 by botanists from NTBG, and remnants of old fruiting bodies were seen on another, suggesting that the plants are able to self-fertilize. It is also suspected that the fruits of this species are adapted for bird dispersal. Due to a lack of bird or other native pollinators, pollination may be inhibited. Microhabitat requirements for seed germination and growth may also be extremely specific. Virtually nothing is known about the life history or ecology of this species (Service 1994).

This species was originally known from the Wahiawa drainage, Waioli Stream Valley, and Makaleha Mountains on Kauai. *Labordia lydgatei* is currently known from six occurrences, consisting of 37 individual plants, located on State (Lihue-Koloa and Haleleale Forest Reserves) and privately owned lands at Pali Elele, Waioli Valley, Lelewi, Lumahai Valley, and Kapalaoa (GDSI