

*cooperi* (Australian tree fern), *Deparia petersenii*, *Elephantopus mollis* (NCN), *Erechtites valerianifolia*, *Melaleuca quinquenervia* (paperbark tree), *Melastoma candidum*, *Oplismenus hirtellus* (basketgrass), *Paspalum conjugatum*, *Paspalum urvillei* (Vasey grass), *Pluchea carolinensis* (sourbush), *Psidium cattleianum*, *Rhodomyrtus tomentosa* (rose myrtle), *Rubus rosifolius*, *Sacciolepis indica*, *Setaria parviflora*, *Stachytarpheta australis*, or *Youngia japonica*; trampling by feral pigs; landslides; seed predation by rats; herbivory by introduced slugs; loss of pollinators; hurricanes; and decreased reproductive vigor, restricted distribution, and extinction due to unforeseen circumstances because of small population size (Service 1994; 56 FR 47695).

#### *Cyrtandra cyaneoides* (mapele)

*Cyrtandra cyaneoides*, a member of the African violet family (Gesneriaceae), is an erect or ascending, fleshy, usually unbranched shrub with opposite toothed leaves which have impressed veins on the lower surface that are sparsely covered with long hairs. This short-lived perennial species differs from others of the genus that grow on Kauai by being a succulent, erect or ascending shrub; a bilaterally symmetrical calyx that is spindle-shaped in bud and falls off after flowering; leaves that are 41 to 56 cm (16 to 22 in) long and 23 to 35 cm (9 to 14 in) wide and have a wrinkled surface; and berries with shaggy hairs (Wagner *et al.* 1999).

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

Historically, *Cyrtandra cyaneoides* was known to occur only along the trail to Waialae Valley on Kauai until recently discovered in other areas. It is currently known from five occurrences, containing about 354 to 454 individuals, on private and State lands (including Halelea Forest Reserve and Alakai Wilderness Preserve) at Pihea, Waioli Valley, Lumahai, the left branch of Wainiha Valley, and Makaleha (GDSI 2000; HINHP Database 2000; 61 FR 53070).

*Cyrtandra cyaneoides* typically grows on talus rubble on steep slopes or cliffs with water seeps running below, near streams or waterfalls in lowland or montane wet forest or shrubland dominated by *Metrosideros polymorpha* or a mixture of *M. polymorpha*, *Cheirodendron* spp., and *Dicranopteris*

*linearis* at elevations between 157 and 1,406 m (514 and 4,614 ft). Associated native species include *Bidens* spp., *Boehmeria grandis* (akolea), *Coprosma* spp., *Cyanea* spp. (haha), *Cyrtandra longifolia* (haiwale), *Cyrtandra kauaiensis* (ulunahale), *Cyrtandra limahuliensis* (haiwale), *Diplazium sandwichianum*, *Freycinetia arborea*, *Gunnera kauaiensis* (ape ape), *Hedyotis terminalis*, *Hedyotis tryblum* (NCN), *Machaerina* spp., *Melicope clusiifolia* (kukaemoa), *Melicope puberula* (alani), *Perrottetia sandwicensis*, *Pipturus* spp., *Psychotria* spp., *Pritchardia* spp. (loulou), or *Stenogyne purpurea* (NCN) (61 FR 53070; K. Wood, pers. comm., 2001).

The major threats to this species are competition with nonnative plant species such as *Deparia petersenii*, *Drymaria cordata* (pipili), *Paspalum conjugatum*, and *Rubus rosifolius*; predation of seeds by rats; reduced reproductive vigor and a risk of extinction from naturally occurring events, such as landslides and hurricanes, due to the small number of populations; and habitat degradation by feral pigs (61 FR 53070).

#### *Cyrtandra limahuliensis* (haiwale)

*Cyrtandra limahuliensis*, a member of the African violet family (Gesneriaceae), is an unbranched or few-branched shrub with moderately or densely hairy leaves. The following combination of characteristics distinguishes this short-lived perennial species from others of the genus: the leaves are usually hairy (especially on lower surfaces), the usually symmetrical calyx is tubular or funnel-shaped and encloses the fruit at maturity, and the flowers are borne singly (Wagner *et al.* 1990).

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

Historically, *Cyrtandra limahuliensis* was known from three locations on Kauai: Wainiha Valley, Lumahai Valley, and near Kilauea River, until it was recently discovered in additional areas. Currently, a total of 13 occurrences, containing approximately 2,746 to 3,024 individuals, are reported on private and State lands (including the Halelea, Kealia, and Lihue-Koloa Forest Reserves) at Limahuli Falls, Lumahai Valley, Waipa Valley, Waioli Valley, Kekoiki, Makaleha, the right fork of Wainiha Valley, Kualapa, Blue Hole, Kepalaoa, and Puu Kolo (GDSI 2000; HINHP Database 2000).

This species typically grows along streambanks in lowland wet forests at

elevations between 208 and 1,594 m (681 and 5,228 ft). Associated native plant species include *Antidesma platyphyllum*, *Bidens* spp., *Boehmeria grandis*, *Charpentiera* spp. (papala), *Cibotium glaucum* (hapuu), *Cyanea* spp., *Cyrtandra kealiae* (haiwale), *Dicranopteris linearis*, *Diplazium sandwichianum*, *Dubautia* spp. (naenae), *Eugenia reinwardtiana* (nioi), *Gunnera kauaiensis*, *Hedyotis terminalis*, *Hibiscus waimeae* (kokio keokeo), *Metrosideros polymorpha*, *Perrottetia sandwicensis*, *Pipturus* spp., *Pisonia* spp., *Pritchardia* spp., *Psychotria* spp., *Touchardia latifolia*, or *Urera glabra* (59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this species are competition from nonnative plant species (*Blechnum occidentale*, *Clidemia hirta*, *Erechtites valerianifolia*, *Hedychium flavescens* (yellow ginger), *Melastoma candidum*, *Paspalum conjugatum*, *Psidium cattleianum*, *Psidium guajava*, *Rubus rosifolius*, or *Youngia japonica*); habitat degradation by feral pigs; natural landslides; and hurricanes (59 FR 9304).

#### *Delissea rhytidosperma* (NCN)

*Delissea rhytidosperma*, a member of the bellflower family (Campanulaceae), is a branched shrub with lance-shaped or elliptic toothed leaves. This short-lived perennial species differs from other species of the genus by the shape, length, and margins of the leaves and by having hairs at the base of the anthers (part of stamen that produces pollen) (Lammers 1999).

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

Historically, *Delissea rhytidosperma* was known from as far north as Wainiha and Limahuli Valleys, as far east as Kapaa and Kealia, and as far south as the Haupu Range, between the elevations of 122 and 915 m (400 and 3,000 ft) on the island of Kauai. Currently, three occurrences on private and State lands (including Kuia NAR), with a total of 11 individuals, are reported from Kuia Valley, Puhakukane, and the Haupu Range (GDSI 2000; HINHP Database 2000).

This species generally grows in well-drained soils with medium or fine-textured subsoil in *Diospyros* (lama) diverse lowland mesic forests or diverse *Metrosideros polymorpha*-*Acacia* *koa* forests at elevations between 167 and 895 m (547 and 2,935 ft). Associated native plant species include grammitid