

of tan-colored scales on its frond (Wagner and Wagner 1992).

Little is known about the life history of *Ctenitis squamigera*. Its reproduction cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Ctenitis squamigera* was recorded from Kauai, Oahu, Molokai, Maui, Lanai, and the island of Hawaii. Currently, it is found on Oahu, Molokai, Maui, and Lanai. On Lanai, there are two occurrences totaling 42 individual plants on privately owned land in the Waiapaa-Kapohaku area on the leeward (southwestern) side of the island, and in the Lopa and Waiopa Gulches on the windward (northeastern) side (GDSI 2000; HINHP Database 2000; 59 FR 49025).

This species is found in the forest understory at elevations between 640 and 944 m (2,099 and 3,096 ft) in diverse mesic forest and scrubby mixed mesic forest. Associated native plant species include *Alyxia oliviformis*, *Antidesma* spp., *Blechnum occidentale* (NCN), *Boehmeria grandis* (akolea), *Carex meyenii* (NCN), *Coprosma* spp., *Cyrtandra* spp., *Doodia* spp., *Freycinetia arborea*, *Melicope* spp., *Metrosideros polymorpha*, *Microlepia* sp. (NCN), *Myrsine* spp., *Nephrolepis* sp. (kupukupu), *Nestegis sandwicensis*, *Peperomia* sp. (ala ala wai nui), *Perrottetia sandwicensis*, *Pipturus albidus*, *Pittosporum* spp., *Pneumatopteris sandwicensis*, *Psychotria* spp., *Sadleria* spp., *Selaginella* sp. (lepelepe a moa), *Syzygium sandwicensis*, *Wikstroemia* spp., or *Xylosma* sp. (HINHP Database 2000; 59 FR 49025).

The primary threats to this species on Lanai are habitat degradation by axis deer and mouflon sheep; competition with nonnative plant species, especially *Psidium cattleianum* and *Schinus terebinthifolius*; fire; decreased reproductive vigor; and extinction from naturally occurring events due to the small number of existing populations and individuals (Culliney 1988; HINHP Database 2000; Service 1998a; 59 FR 49025).

*Cyanea grimesiana* ssp. *grimesiana* (haha)

*Cyanea grimesiana* ssp. *grimesiana*, a short-lived perennial and a member of the bellflower family (Campanulaceae), is a shrub with pinnately divided leaves. This species is distinguished from others in this endemic Hawaiian genus by the pinnately lobed leaf margins and the width of the leaf blades. This subspecies is distinguished from the other two subspecies by the

shape and size of the calyx lobes, which overlap at the base (Lammers 1999).

On Molokai, flowering plants have been reported in July and August. Little else is known about the life history of *Cyanea grimesiana* ssp. *grimesiana*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

*Cyanea grimesiana* ssp. *grimesiana* was historically and is currently known from Oahu, Molokai, Lanai, and Maui. Currently on Lanai there are two occurrences with at least three individuals on privately owned land in Kaiholena Gulch and Waiakeakua Gulch (HINHP Database 2000; Service 1999; 61 FR 53108;).

This species is typically found in mesic forest, often dominated by *Metrosideros polymorpha* or *Metrosideros polymorpha* and *Acacia koa* (koa), or on rocky or steep slopes of streambanks, at elevations between 667 and 1,032 m (2,188 and 3,385 ft). Associated native species include *Antidesma* spp., *Bobea* spp., *Myrsine* spp., *Nestegis sandwicensis*, *Psychotria* spp., or *Xylosma* sp. (Service 1999; 61 FR 53108).

The threats to this species on Lanai are habitat degradation and/or destruction caused by axis deer and mouflon sheep; competition with various nonnative plants; random naturally occurring events causing extinction due to the small number of existing individuals; fire; landslides; and predation by rats (*Rattus rattus*) and various species of slugs (Service 1999; 59 FR 53108).

*Cyanea lobata* (haha)

*Cyanea lobata*, a short-lived member of the bellflower family (Campanulaceae), is a sparingly branched perennial shrub with smooth to somewhat rough stems and oblong, irregularly lobed leaves. This species is distinguished from other species of *Cyanea* by the size of the flower and the irregularly lobed leaves with petioles (Lammers 1990).

*Cyanea lobata* is known to flower from August to February, even in individuals as small as 50 cm (20 in) in height. Little else is known about the life history of *Cyanea lobata*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Degener 1936; Rock 1919; Service 1997; 57 FR 20772).

Historically, *Cyanea lobata* was known from Lanai and West Maui. It was last seen on Lanai in 1934 (GDSI

2000; HINHP Database 2000; Service 1997; 57 FR 20772).

This species occurs in gulches in mesic to wet forest and shrubland at elevations between 664 and 1,032 m (2,178 and 3,385 ft) and containing one or more of the following associated native plant species: *Antidesma* spp., *Athyrium* spp. (akolea); *Cyrtandra* spp., *Freycinetia arborea*, *Metrosideros polymorpha*, *Morinda trimera* (noni kuahiwi), *Peperomia* spp., *Pipturus albidus*, *Pleomele fernaldii* (halapepe), *Psychotria* spp., *Touchardia latifolia* (olona), or *Xylosma* spp. (HINHP Database 2000; Service 1997; 57 FR 20772; J. Lau, pers. comm., 2001; and R. Hobdy, pers. comm., 2001).

The threats to this species on Lanai included habitat degradation by axis deer and mouflon sheep (Service 1997; 57 FR 20772).

*Cyperus trachysanthos* (puukaa)

*Cyperus trachysanthos*, a member of the sedge family (Cyperaceae), is a short-lived perennial grass-like plant with a short rhizome. The stems are densely tufted, obtusely triangular in cross-section, tall, sticky, and leafy at the base. This species is distinguished from others in the genus by the short rhizome, the leaf sheath with partitions at the nodes, the shape of the glumes (floral bracts), and the length of the stems (Koyama 1999).

Little is known about the life history of *Cyperus trachysanthos*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Cyperus trachysanthos* was known on Niihau and Kauai, and from scattered locations on Oahu, Molokai, and Lanai. Currently it is found on Kauai, Niihau and Oahu. It was last observed on Lanai in 1919 (GDSI 2000; HINHP Database 2000).

*Cyperus trachysanthos* is usually found in seasonally wet sites (mud flats, wet clay soil, or wet cliff seeps) on seepy flats or talus slopes in *Heteropogon contortus* (pili) grassland at elevations between 0 and 46 m (0 and 151 ft). *Hibiscus tiliaceus* (hau) is often found in association with this species (Koyama 1999; 61 FR 53108; J. Lau and K. Wood, pers. comms., 2001).

On Lanai, the threats to this species included the loss of wetlands and habitat degradation by axis deer and mouflon sheep (Service 1999; 61 FR 53108; R. Hobdy in litt. 2002).

*Cyrtandra munroi* (haiwale)

*Cyrtandra munroi* is a short-lived perennial and a member of the African