

life history of *Colubrina oppositifolia*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (HINHP Database 2001; Service 1996a; 59 FR 10305).

Historically and currently, *Colubrina oppositifolia* is known from Oahu, Maui, and the island of Hawaii. Currently on Maui, there are two occurrences containing one individual each on privately owned land in Honokawai in Lahaina District and in Auwahi in Hana District (GDSI 2001; HINHP Database 2001; Service 1996a; Warshauer 1998; 59 FR 10305).

The habitat of this species is lowland dry and mesic forest dominated by *Diospyros sandwicensis*, at elevations between 192 and 929 m (630 and 3,047 ft) and containing one or more of the following associated native plant species: *Bidens micrantha* ssp. *micrantha* (kookoolau); *Canavalia* spp. (awikiwiki); *Dodonaea viscosa*; *Freycinetia arborea* (ieie); *Metrosideros polymorpha*; *Microlepia strigosa*; *Pleomele auwahiensis*; *Psydrax odorata*; *Reynoldsia sandwicensis*; or *Wikstroemia* spp. (HINHP Database 2001; Service 1996a; 59 FR 10305; R. Hobdy, pers. comm., 2001).

The threats to this species on Maui are habitat destruction by feral pigs, competition with the nonnative plants *Lantana camara* and *Schinus terebinthifolius*, the black twig borer, Chinese rose beetle (*Adoretus sinicus*), fire; and its small number of occurrences and limited distribution (Service 1996a; 59 FR 10305).

#### *Ctenitis squamigera* (Pauoa)

*Ctenitis squamigera* is a short-lived perennial of the woodfern family (Dryopteridaceae). *Ctenitis squamigera* can be readily distinguished from other Hawaiian species of *Ctenitis* by the dense covering of tan-colored scales on its frond (Degener and Degener 1957; 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; 59 FR 49025).

Historically, *Ctenitis squamigera* was recorded from the islands of Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii. It is currently found on Oahu, Lanai, Molokai, and Maui. On Maui, there are 12 occurrences with 41 individuals on State (West Maui Forest Reserve) and privately owned lands at Honolua, Kahana, Honokawai, Wahikuli, Kapilau Ridge, Paupau, and Hukoula within the West Maui

Mountains Watershed Partnership (GDSI 2001; HINHP Database 2001; Service 1998a; 59 FR 49025; J. Lau in litt. 2000; J. Lau, pers. comm., 2000; H. Oppenheimer, in litt. 2000; K. Wood, pers. comm., 2000).

This species is found in the forest understory of *Metrosideros polymorpha* montane wet forest or diverse mesic forest at elevations between 74 and 1,593 m (243 and 5,226 ft) and containing one or more of the following native plant species: *Alyxia oliviformis*; *Antidesma* spp. (hame); *Bobea* spp. (ahakea); *Canavalia* spp.; *Coprosma* spp.; *Dicranopteris linearis*; *Doodia* spp. (okupukupu lauii); *Dryopteris* spp. (NCN); *Freycinetia arborea*; *Hedyotis terminalis*; *Hibiscus kokio* ssp. *kokio* (kokio); *Myrsine* spp.; *Peperomia* spp. (ala ala wainui); *Pittosporum* spp. (hoawa); *Pleomele* spp. (hala pepe); *Pritchardia* spp.; *Psychotria* spp.; *Remya mauensis*; *Sadleria* spp.; *Schiedea pubescens* var. *pubescens* (NCN); or *Xylosma* spp. (HINHP Database 2001; Service 1998a; 59 FR 49025; R. Hobdy, pers. comm., 2001; H. Oppenheimer, pers. comm., 2000).

The primary threats to *Ctenitis squamigera* are habitat degradation by feral pigs, goats, and axis deer; competition with nonnative plant species, especially *Psidium cattleianum* and *Schinus terebinthifolius*; fire; and extinction from naturally occurring events caused by the small number of existing occurrences and individuals (Service 1998a; 59 FR 49025).

#### *Cyanea grimesiana* ssp. *grimesiana* (Haha)

*Cyanea grimesiana* ssp. *grimesiana*, a short-lived member of the bellflower family (Campanulaceae), is a perennial 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 1990).

On Molokai, flowering plants have been reported in July and August. Little else is known about the life history of *Cyanea grimesiana* ssp. *grimesiana*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999; 61 FR 53108).

Historically and currently, *Cyanea grimesiana* ssp. *grimesiana* is known from Oahu, Molokai, Lanai, and scattered locations on Maui. Currently on Maui, there are two occurrences with a total of five individuals on privately

owned land in Iao Valley and Kapilau Ridge (GDSI 2001; HINHP Database 2001; Service 1999; 61 FR 53108).

This species is typically found on rocky or steep slopes of stream banks in wet forest gulch bottoms often dominated by *Metrosideros polymorpha* at elevations between 312 and 1,617 m (1,024 and 5,305 ft) and containing one or more of the following associated native plant species: *Antidesma* spp.; *Bobea* spp.; *Myrsine* spp.; *Nestegis sandwicensis*; *Psychotria* spp.; or *Xylosma* spp. (Service 1999; 61 FR 53108; R. Hobdy, pers. comm., 2001).

The threats to this species on Maui are habitat degradation and/or destruction caused by axis deer, goats, and pigs; competition with various nonnative plants; random naturally occurring events that could cause extinction caused by the small number of existing individuals; trampling by hikers; landslides; rats; and slugs (Service 1999; 61 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 is no longer extant on Lanai. On Maui, there are currently 5 occurrences with a total of 12 individuals on privately owned land within the West Maui Mountains Watershed Partnership at Kaulalewelewe, Honolowai, Honokohau, and Waikapu (GDSI 2001; HINHP Database 2001; Lammers 1999; Service 1997; 57 FR 20772).

This species has been seen and collected on steep stream banks in deep shade in wet forest at elevations between 204 and 1,530 m (669 and 5,020 ft) and containing one or more of the following associated native plant species: *Antidesma* spp.; *Athyrium* spp. (akolea); *Clermontia kakeana*; *Cyrtandra* spp.; *Freycinetia arborea*; *Metrosideros polymorpha*; *Morinda trimera* (noni