

Medeiros *et al.* 1986; Service 1997; 57 FR 20772).

The habitat of *Alectryon macrococcus* var. *macrococcus* on Maui is mesic forests with *Antidesma platyphyllum* (hame), *Antidesma pulvinatum* (hame), *Bobea sandwicensis* (ahakea), *Nestegis sandwicensis*, *Pittosporum confertiflorum* (hoawa), *Pittosporum glabrum* (hoawa), *Pouteria sandwicensis*, or *Xylosma* spp. (maua) at elevations between 1,017 and 3,562 m (1,168 and 3,337 ft). The habitat of *Alectryon macrococcus* var. *auwahiensis* is mesic to wetter mesic and upper dryland forest containing one or more of the following associated native plant species: *Alphitonia ponderosa*; *Diospyros sandwicensis*; *Dodonaea viscosa*; *Osteomeles anthyllidifolia*; *Pleomele auwahiensis*; *Pouteria sandwicensis*; *Santalum ellipticum*; *Streblus pendulinus* (aiiai); or *Xylosma hawaiiense*, at elevations between 333 and 1,210 m (1,092 and 3,969 ft) (HINHP Database 2001; Service 1997; 57 FR 20772; R. Hobdy, pers. comm., 2001; K. Wood, *in litt.* 1999).

The threats to *Alectryon macrococcus* var. *macrococcus* on Maui include feral goats and pigs; nonnative plant species, such as *Melinis minutiflora* (molasses grass), *Pennisetum clandestinum*, *Psidium cattleianum*, or *Schinus terebinthifolius*; damage from the black twig borer; seed predation by rats and mice (*Mus musculus*); fire; seed predation by insects (probably the endemic microlepidopteran *Prays* cf. *fulvocanella*); loss of pollinators; depressed reproductive vigor; and caused by the very small remaining number of individuals and their limited distribution, the likelihood that a single natural or human-caused environmental disturbance could easily be catastrophic. The threats to *A. macrococcus* var. *auwahiensis* on Maui are damage from the black twig borer; seed predation by rats and mice; habitat degradation by feral pigs, deer, and escaped cattle; seed predation by insects (probably *Prays* cf. *fulvocanella*); nonnative plant species; loss of pollinators; depressed reproductive vigor; and caused by the very small remaining number of individuals and their limited distribution, the likelihood that a single natural or human-caused environmental disturbance could be catastrophic (Service 1997; 57 FR 20772).

*Asplenium fragile* var. *insulare* (NCN)

*Asplenium fragile* var. *insulare*, a short-lived perennial member of the spleenwort family (Aspleniaceae), is a fern with a short sub-erect stem with a dull gray or brown main axis with two

greenish ridges. This species is most similar to *A. macraei*. The two can be distinguished by the size and shape of the pinnae and the number of sori (spore-bearing structures) per pinna (Wagner and Wagner 1992).

Little life history information is available for *Asplenium fragile* var. *insulare*. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are largely unknown. Researchers have collected information on species composition, extent of cover, and age-class structure in six sub-populations at Pohakuloa Training Area on the island of Hawaii in order to describe the populations. No gametophytes (gamete-producing life stage) were found, and the age-class structure of the sub-populations sampled was determined to be 100 percent reproductive adults because all the sporophytes (spore-producing life stage) had sori on some fronds (Service 1998a; 59 FR 49025).

*Asplenium fragile* var. *insulare* was known historically and currently from East Maui and the island of Hawaii. Currently, on Maui there are two occurrences with 18 individuals found in Kalialinui within the East Maui Watershed Partnership on private and federally (Haleakala National Park) owned lands (GDSI 2001; Service 1998a; 59 FR 49025).

On Maui, *Asplenium fragile* var. *insulare* is found in streamside hollows and grottos in gulches that occur in mesic to dry subalpine shrubland dominated by *Leptecophylla tameiameia* and *Sadleria cyatheoides*, with scattered *Metrosideros polymorpha*, between 1,682 and 2,407 m (5,518 and 7,896 ft). Associated native plant species include *Dryopteris wallichiana* and *Grammitis hookeri* (makue lau lii) (Service 1998a; 59 FR 49025; R. Hobdy, pers. comm., 2001).

The primary threat to *Asplenium fragile* var. *insulare* on the island of Maui is the risk of extinction caused by random naturally occurring events due to the small number of existing individuals (Service 1998a; Shaw 1992; 59 FR 49025).

*Bidens micrantha* ssp. *kalealaha* (Kookoolau)

*Bidens micrantha* ssp. *kalealaha*, a short-lived member of the aster family (Asteraceae), is an erect perennial herb. This subspecies can be distinguished by the shape of the seeds, the density of the flower clusters, the numbers of ray and disk florets per head, differences in leaf surfaces, and other characteristics (Ganders and Nagata 1999; 57 FR 20772).

*Bidens micrantha* is known to hybridize with other native *Bidens*, such as *B. mauiensis* and *B. menziesii*, and possibly *B. conjuncta*. Little else is known about the life history of *B. micrantha* ssp. *kalealaha*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, and specific environmental requirements are unknown (Ganders and Nagata 1999; Service 1997; 57 FR 20772).

Historically, *Bidens micrantha* ssp. *kalealaha* was known from Lanai, the south slope of Haleakala on East Maui, and from one location on West Maui. Currently, this species remains only on East Maui in Kahua, Nakula, and Haleakala Crater and Kaupo Gap, on State (Kahikinui Forest Reserve) and Federal (Haleakala National Park) lands within the East Maui Watershed Partnership. There are a total of 4 occurrences with less than a total of 2,000 individuals (Ganders and Nagata 1999; GDSI 2001; HINHP Database 2001; Service 1997; 57 FR 20772).

The habitat of *Bidens micrantha* ssp. *kalealaha* on Maui is blocky lava flows with little or no soil development; deep pit craters; sheer rock walls in open canopy *Metrosideros polymorpha*-*Acacia koa* forest; montane shrubland; *Sophora chrysophylla* forests or cliff faces, and containing one or more of the following associated native plant species: *Coprosma montana* (pilo); *Dodonaea viscosa*; *Dubautia platyphylla* (naenae); *Leptecophylla tameiameia*; *Santalum haleakalae* (ilahi); or *Vaccinium reticulatum*. In addition, the habitat of *Bidens micrantha* ssp. *kalealaha* is at elevations between 1,317 and 2,565 m (4,321 and 8,414 ft) (Ganders and Nagata 1999; HINHP Database 2001; Service 1997; 57 FR 20772; R. Hobdy, pers. comm., 2001).

The threats to this species on Maui are habitat destruction by feral goats, pigs, and cattle; competition from a variety of invasive plant species; and fire (Service 1997; 57 FR 20772).

*Bonamia menziesii* (NCN)

*Bonamia menziesii*, a short-lived perennial member of the morning-glory family (Convolvulaceae), is a vine with twining branches that are fuzzy when young. This species is the only member of the genus that is endemic to the Hawaiian Islands and differs from other genera in the family by its two styles, longer stems and petioles, and rounder leaves (Austin 1999).

Little is known about the life history of *Bonamia menziesii*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and