

there are 101 plant species that, at the time of listing, were reported from the island of Oahu and are at issue in this final rule. These species and their distribution by island are identified in Table 1 in the **Federal Register** notice proposing this critical habitat designation (67 FR 37107–37272; chart page 37108).

Fifty-seven of these species are endemic to the island of Oahu, while 44 species are reported from one or more other islands, as well as Oahu. Each of these species is described in more detail below in the section “Discussion of Plant Taxa.” Although we considered designating critical habitat on Oahu for each of the 101 plant species, for the reasons described below, the final designation includes critical habitat for 99 of 101 plant species. We have designated critical habitat on other islands (Kauai, Niihau, Maui, and Molokai) for species that are also reported from Oahu. Critical habitat may be designated for the species that are also reported from the island of Hawaii in a subsequent rulemaking.

#### *The Island of Oahu*

The island of Oahu was formed from the remnants of two large shield volcanoes, the younger Koolau volcano to the east and the older Waianae volcano to the west (60 FR 51398; Service 1995a, 1996b). Their original shield volcano shape has been lost as a result of extensive erosion, and today these volcanoes are called mountains or ranges and consist of long, narrow ridges. The Koolau Mountains were built by eruptions that took place primarily along a northwest-trending rift zone and formed a range now approximately 60 kilometers (km) (37 miles (mi)) long (Service 1996b). Median annual rainfall for the Koolau Mountains varies from 100 to 710 centimeters (cm) (40 to 280 inches (in)), most of which is received at higher elevations along the entire length of the windward (northeastern) side (Service 1996b).

The Waianae Mountains were built by eruptions that took place primarily along three rift zones. The two principal rift zones run in a northwestward and south-southeastward direction from the summit, and a lesser one runs to the northeast. The range is approximately 32 km (20 mi) long. The caldera lies between the north side of Makaha Valley and the head of Nanakuli Valley (MacDonald *et al.* 1983). The Waianae Mountains are in the rain shadow of the parallel Koolau Mountains and receive much less rainfall, except for Mt. Kaala, the highest point on Oahu at an elevation of 1,225 meters (m) (4,020 feet

(ft)) (Wagner *et al.* 1999). The median annual rainfall for the Waianae Mountains varies from 51 to 190 cm (20 to 75 in), with only the small summit area of Mt. Kaala receiving the highest amount (Service 1995a).

#### *Discussion of the Plant Taxa*

##### **Species Endemic to Oahu**

*Abutilon sandwicense* (No common name (NCN))

*Abutilon sandwicense*, a member of the mallow family (Malvaceae) and a short-lived perennial, is a shrub that grows to 3 m (5 ft) tall and is covered with short glandular hairs. This species is distinguished from others in the genus by the green or reddish-brown tipped petals that extend beyond the sepals (Bates 1999).

*Abutilon sandwicense* has been observed flowering in winter and spring. By summer, most plants have flowered, and the fruits have usually dried up by fall. Fruit capsules develop within six weeks. Although seedlings are often initially abundant, few plants appear to survive to maturity for unknown reasons (56 FR 55770). Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors.

Historically, *Abutilon sandwicense* was known from nearly the entire length of the Waianae Mountains, from Makaleha Valley to Nanakuli Valley. This species is now known from Huliwai Gulch, Kaawa Gulch, Kaimuhole Gulch, Palikea Gulch, Makaha Valley, Makaha-Waianae Kai Ridge, Makaleha Valley, Manuwai Gulch, Halona subdistrict, Mikilua subdistrict, Alaihehe Gulch, and Nanakuli Valley on Federal, State, private, city, and county lands. The 30 known occurrences contain an estimated 253 to 263 individuals (Bates 1999; Hawaii Heritage Program (HINHP) Database 2001).

*Abutilon sandwicense* typically grows on steep slopes or gulches in dry to mesic lowland forest between 149 and 875 m (489 and 2,870 ft) elevation. Associated native species include *Antidesma pulvinatum* (hame), *Diospyros sandwicensis* (lama), *Elaeocarpus bifidus* (kalia), *Eugenia reinwardtiana* (nioi), *Hibiscus arnottianus* (kokio keokeo), *Metrosideros polymorpha* (ohia), *Myrsine lanaiensis* (kolea), *Nestegis sandwicensis* (olopua), *Pipturus albidus* (mamaki), *Pisonia* sp. (papala kepau), *Pittosporum* sp. (hoawa), *Pleomele* sp. (hala pepe), *Psydrax odorata* (alahee), *Rauvolfia sandwicensis* (hao),

*Reynoldsia sandwicensis* (ohe), and *Sapindus oahuensis* (lonomea) (Bates 1999; HINHP Database 2001; Environmental Division of the U.S. Army (EDA), *in litt.* 2001).

The major threats to *Abutilon sandwicense* are competition from the nonnative plant species *Ageratina riparia* (hamakua pamakani), *Aleurites moluccana* (kukui), *Clidemia hirta* (Koster's curse), *Ficus microcarpa* (Chinese banyan), *Grevillea robusta* (silk oak), *Hyptis pectinata* (Comb hyptis), *Ipomoea* sp. (morning glory), *Kalanchoe pinnata* (air plant), *Leucaena leucocephala* (koa haole), *Melia azedarach* (chinaberry), *Melinis minutiflora* (molasses grass), *Montanoa hibiscifolia* (tree daisy), *Oplismenus hirtellus* (basketgrass), *Panicum maximum* (Guinea grass), *Passiflora suberosa* (huehue haole), *Pimenta dioica* (allspice), *Psidium cattleianum* (strawberry guava), *Psidium guajava* (guava), *Rivina humilis* (coral berry), *Schinus terebinthifolius* (Christmasberry), *Syzygium cumini* (Java plum), and/or *Toona ciliata* (Australian red cedar); fire; damage from the black twig borer (*Xylosandrus compactus*) and Chinese rose beetle (*Adoretus sinicus*); habitat degradation and/or destruction by feral pigs (*Sus scrofa*) and goats (*Capra hircus*); and trampling by feral cattle (*Bos taurus*) (Service 1998b; 56 FR 55770).

*Alsiniidendron obovatum* (NCN)

*Alsiniidendron obovatum*, a member of the pink family (Caryophyllaceae) and a short-lived perennial, is a branching subshrub growing to 3 ft (1 m) tall with thick, somewhat fleshy leaves. This species and *Alsiniidendron trinerve* can be distinguished from other members of the genus by their shrubby habit and fleshy purple sepals surrounding the capsule. This species differs from *A. trinerve* in having a more crowded inflorescence (flowering part of plant) with shorter peduncles (flower stalks) and sepals with a rounded tip (Wagner *et al.* 1999).

*Alsiniidendron obovatum* generally flowers after about two years of growth. Plants flower and fruit year round, but flowering is usually heavier in winter and spring depending on the level of precipitation. Plants survive three to six years, unless there are drought conditions. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (56 FR 55770).

Historically, *Alsiniidendron obovatum* was known from the northern and southern ends of the Waianae Range. This species remains in Keawapilau