

section 7 consultations. Additionally, we contacted the major private landowner on Lanai by mail and we met with the landowner's representatives in April 2000 and August 2002 to discuss their current management for the plants on their lands. We also met with Maui County DOFAW office staff to discuss management activities they are conducting on Lanai. In addition, we reviewed new biological information and public comments received during the public comment periods and at the public hearings.

Pursuant to the definition of critical habitat in section 3 of the Act, the primary constituent elements as found in any area so designated must also require "special management considerations or protections." Adequate special management or protection is provided by a legally operative plan that addresses the maintenance and improvement of the essential elements and provides for the long-term conservation of the species. We consider a plan adequate when it: (1) Provides a conservation benefit to the species (*i.e.*, the plan must maintain or provide for an increase in the species' population or the enhancement or restoration of its habitat within the area covered by the plan); (2) provides assurances that the management plan will be implemented (*i.e.*, those responsible for implementing the plan are capable of accomplishing the objectives, have an implementation schedule and have adequate funding for the management plan); and, (3) provides assurances that the conservation plan will be effective (*i.e.*, it identifies biological goals, has provisions for reporting progress, and is of a duration sufficient to implement the plan and achieve the plan's goals and objectives). If an area is covered by a plan that meets these criteria, it does not constitute critical habitat as defined by the Act because the primary constituent elements found there are not in need of special management.

In determining whether a management plan or agreement provides a conservation benefit to the species, we considered the following:

(1) The factors that led to the listing of the species, as described in the final rules for listing each of the species. Effects of clearing and burning for agricultural purposes and of invasive non-native plant and animal species have contributed to the decline of nearly all endangered and threatened plants in Hawaii (Cuddihy and Stone 1990; Howarth 1985; Loope 1998; Scott *et al.* 1986; Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; Smith 1985;

Stone 1985; Vitousek 1992; Wagner *et al.* 1985).

Current threats to these species include non-native grass- and shrub-carried wildfire; browsing, digging, rooting, and trampling from feral ungulates (including axis deer and mouflon sheep); direct and indirect effects of non-native plant invasions, including alteration of habitat structure and microclimate; and disruption of pollination and gene-flow processes by adverse effects of mosquito-borne avian disease on forest bird pollinators, direct competition between native and non-native insect pollinators for food, and predation of native insect pollinators by non-native hymenopteran insects (ants). In addition, physiological processes such as reproduction and establishment continue to be negatively affected by fruit- and flower-eating pests such as non-native arthropods, mollusks, and rats, and photosynthesis and water transport are affected by non-native insects, pathogens, and diseases. Many of these factors interact with one another, thereby compounding effects. Such interactions include non-native plant invasions altering wildfire regimes, feral ungulates carrying weeds and disturbing vegetation and soils, thereby facilitating dispersal and establishment of non-native plants, and numerous non-native insect species feeding on native plants, thereby increasing their vulnerability and exposure to pathogens and disease (Brueggemann *et al.* 2001; Cuddihy and Stone 1990; D'Antonio and Vitousek 1992; Howarth 1985; Mack 1992; Scott *et al.* 1986; Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; Smith 1985; Tunison *et al.* 1992);

(2) The recommendations from the HPPRCC in their 1998 report to us ("Habitat Essential to the Recovery of Hawaiian Plants"). As summarized in this report, recovery goals for endangered Hawaiian plant species cannot be achieved without the effective control of non-native species threats, wildfire, and land use changes; and

(3) The management actions needed for assurance of survival and ultimate recovery of Hawaii's endangered plants. These actions are described in our recovery plans for these 32 species (Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001), in the 1998 HPPRCC report to us, and in various other documents and publications relating to plant conservation in Hawaii (Cuddihy and Stone 1990; Mueller-Dombois 1985; Smith 1985; Stone 1985; Stone *et al.* 1992). In addition to monitoring the plant populations, these actions include, but are not limited to: (1) Feral ungulate control; (2) nonnative

plant control; (3) rodent control; (4) invertebrate pest control; (5) fire management; (6) maintenance of genetic material of the endangered and threatened plant species; (7) propagation, reintroduction, and augmentation of existing populations into areas deemed essential for the recovery of these species; (8) ongoing management of the wild, outplanted, and augmented populations; and (9) habitat management and restoration in areas deemed essential for the recovery of these species.

In general, taking all of the above recommended management actions into account, the following management actions are ranked in order of importance: Feral ungulate control; wildfire management; non-native plant control; rodent control; invertebrate pest control; maintenance of genetic material of the endangered and threatened plant species; propagation, reintroduction, and augmentation of existing populations into areas deemed essential for the recovery of the species; ongoing management of the wild, outplanted, and augmented populations; maintenance of natural pollinators and pollinating systems, when known; habitat management and restoration in areas deemed essential for the recovery of the species; monitoring of the wild, outplanted, and augmented populations; rare plant surveys; and control of human activities/access (Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). On a case-by-case basis, some of these actions may rise to a higher level of importance for a particular species or area, depending on the biological and physical requirements of the species and the location(s) of the individual plants.

As shown in Table 2, the 32 species of plants are found on private lands on the island of Lanai. Information received in response to our public notices; meetings with representatives of the landowner and Maui County DOFAW staff; the December 27, 2000, and March 4, 2002, proposals; public comment periods; and the March 22, 2001, and August 1, 2002, public hearings, as well as information in our files, indicated that there is limited ongoing conservation management action for these plants, except as noted below. Without management plans and assurances that the plans will be implemented, we are unable to find that the land in question does not require special management or protection.

Private Lands

Two species (*Bonamia menziesii* and *Hibiscus brackenridgei*) are reported from The Nature Conservancy of