

nonnative 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 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999; Smith 1985; Stone 1985; Vitousek 1992; Wagner *et al.* 1985).

Current threats to these species include nonnative grass- and shrub-carried wildfire; browsing, digging, rooting, and trampling from feral ungulates (including goats, cattle, and pigs); direct and indirect effects of nonnative 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 nonnative insect pollinators for food, and predation of native insect pollinators by nonnative 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 nonnative arthropods, mollusks, and rats, and photosynthesis and water transport are affected by nonnative insects, pathogens, and diseases. Many of these factors interact with one another, thereby compounding effects. Such interactions include nonnative plant invasions altering wildfire regimes; feral ungulates carrying weeds and disturbing vegetation and soils, thereby facilitating dispersal and establishment of nonnative plants; and numerous nonnative insect species feeding on native plants, thereby increasing their vulnerability and exposure to pathogens and disease (Bruegmann *et al.* 2001; Cuddihy and Stone 1990; D'Antonio and Vitousek 1992; Howarth 1985; Mack 1992; Scott *et al.* 1986; Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999; Smith 1985; Tunison *et al.* 1992);

(2) The recommendations from the HPPRCC in its 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 nonnative species threats, wildfire, and land use changes; and

(3) The management actions needed for assurance of survival and ultimate recovery of these plants. These actions are described in our recovery plans for these 47 species (Service 1994, 1995a, 1996a, 1996b, 1996c, 1997a, 1998a, 1998b, 1998c, 1999), 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 general, taking all of the above recommended management actions into account, the following management actions are important in providing a conservation benefit to the species: feral ungulate control; wildfire management; nonnative 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 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 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 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999). On a case-by-case basis, these actions may rise to different levels 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 47 species of plants are found on Federal, State, and private lands on the island of Hawaii. Information received in response to our public notices; meetings with Hawaii District DOFAW staff; the May 28, 2002, proposal; public comment periods; and the October 29 and 30, 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 lands in question do not require special management or protection.

#### *Lands Under U.S. Army Jurisdiction*

The Army has one installation under its jurisdiction on the island of Hawaii: Pohakuloa Training Area (PTA). All of the PTA lands are administered by the Army Garrison, Hawaii, for various types of routine military training. The following discussion analyzes current management plans for lands under U.S. Army jurisdiction on the island of Hawaii and assesses whether they meet

the Service's requirements for adequate management or protection.

#### *(1) Plan Provides Conservation Benefit to the Species*

The Sikes Act Improvements Act of 1997 (Sikes Act) requires each military installation that includes land and water suitable for the conservation and management of natural resources starting November 17, 2001 to complete an Integrated Natural Resources Management Plan (INRMP). An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found there. Each INRMP includes an assessment of the ecological needs on the installation, including needs to provide for the conservation of listed species; a statement of goals and priorities; a detailed description of management actions to be implemented to provide for these ecological needs; and a monitoring and adaptive management plan. Bases that have completed and approved INRMPs that adequately address the needs of the species may not meet the definition of critical habitat discussed above, because they may not require special management or protection. We would not include these areas in critical habitat designations if they meet the following three criteria: (1) A current INRMP must be complete and provide a conservation benefit to the species, (2) there must be assurances that the conservation management strategies will be implemented, and (3) there must be assurances that the conservation management strategies will be effective, by providing for periodic monitoring and revisions as necessary. If all of these criteria are met, then the lands covered under the plan would not meet the definition of critical habitat because special management is not needed.

Critical habitat was proposed at PTA for 10 of the 47 species addressed in this rule (*Asplenium fragile* var. *insulare*, *Hedyotis coriacea*, *Neraudia ovata*, *Portulaca sclerocarpa*, *Silene hawaiiensis*, *Silene lanceolata*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Tetramolopium arenarium*, and *Zanthoxylum hawaiiense*). Critical habitat was proposed for two additional species (*Isodendron hosakae* and *Vigna o-wahuensis*) on lands the Army is in the process of acquiring. The Army has completed an INRMP (Army 2001) and an Ecosystem Management Plan (Army 1998) for PTA. These plans encompass management actions that will benefit the 10 listed plant species for which critical habitat has been proposed on current Army lands and they have written a letter committing to amend