

Fish and Wildlife Service, Endangered Species Field Station, 300 Ala Moana Boulevard, Room 6307, Honolulu, Hawaii.

**FOR FURTHER INFORMATION CONTACT:** Mr. Sanford R. Wilbur, Endangered Species Program, Region 1, U.S. Fish and Wildlife Service, Department of the Interior, 500 N.E. Multnomah Street, Suite 1692, Portland, Oregon 97232 (501/231-6131).

**SUPPLEMENTARY INFORMATION:**

**Background**

*Bidens cuneata* Sherff and *Schiedea adamantis* St. John are known from a single, small population each, growing on the rim of Diamond Head Crater, Honolulu, Hawaii. The continued existence of these species is threatened by several factors documented in recent status reports (Takeuchi 1980a, 1980b), and summarized below:

1. Both species' populations are located just below the trail following the crater crestline. Passage of hikers and sightseers through this summit area results in soil compaction and removal of vegetative cover, thus promoting runoff and the consequent erosion of habitat. The State intends to develop Diamond Head into a public park and recreation area. Although the State does not plan to develop those portions of the trail near the plants, the development will increase the number of persons using the area and necessitate measures to protect these two species from human impacts.

2. Due to the dry conditions that generally exist in the area, fire hazards are a significant potential threat. This threat will increase as the number of persons using the area increases.

3. Pressures attributable to the presence of exotic vegetation and the concomitant competition for soil moisture and space also are probable threats.

4. The extremely small numbers of extant individuals and their limited distribution also threaten the continued existence of these species. A single fire or natural fluctuations in the number of individuals in the community could cause their demise.

Both plants are of great scientific interest because they are members of families that have undergone much evolutionary diversification in Hawaii. Both are members of genera that would make excellent models for the study of evolution and adaptive radiation in insular floras. The Hawaiian species of *Bidens* have been and are presently being used for such studies (Gillet and Lim 1970). Additionally, *Schiedea*, an endemic genus of the carnation family,

has an unusual floral structure for that family, and is of scientific interest due to its breeding systems.

Section 12 of the Endangered Species Act of 1973 (the Act) directed the Secretary of the Smithsonian Institution to prepare a report on those plants considered to be endangered, threatened or extinct. This report, designated as House Document 94-51, *Report on Endangered and Threatened Plant Species of the United States*, included a list of those plants considered by the Smithsonian Institution to qualify for endangered or threatened status. The Service accepted the report as a petition within the context of section 4(c)(2) of the Act, and it was the principal basis for a notice published in the July, 1, 1975, **Federal Register** (40 FR 27824-27924) indicating that over 3,000 plant taxa were being considered for listing as endangered or threatened.

Subsequently, in the June 16, 1976, **Federal Register** (41 FR 24524-24572), the Service published a proposal advising that sufficient evidence was then on file to support determinations that 1,783 plant taxa were endangered species as defined by the Act. That is, each of the included taxa was in danger of extinction over all or a significant portion of its range because of one or more of the factors set forth in Section 4(a)(1) of the Act. The proposal solicited comments, suggestions, objections and factual information from all interested persons.

Notification of the proposal and a solicitation for comments or suggestions were sent to the Governor of Hawaii and other interested parties on July 1, 1976. A public hearing regarding the proposal was held on July 14, 1976, in Honolulu, Hawaii. *Bidens cuneata* and *Schiedea adamantis* were included in House Document 94-51, the July 1, 1975, notice of review and the June 16, 1976, proposal.

Following the June 16, 1976, proposal, hundreds of comments were received from individuals, conservation organizations, botanical groups, and business and professional organizations. Few of these comments were specific in nature in that they did not address specific plant species. Most comments addressed the program or the concept of endangered plants and their protection and regulation.

These comments were summarized in the April 26, 1978, **Federal Register** publication of a final rule that also determined 13 plant species to be endangered or threatened (43 FR 17909-17916).

The 1978 Amendments to the Act subsequently required that all proposals

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**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

**Endangered and Threatened Wildlife and Plants; Final Rule To List *Bidens Cuneata* and *Schiedea Adamantis* as Endangered Species**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** The Service determines two plants, *Bidens cuneata* Sherff (cuneate bidens) and *Schiedea adamantis* St. John (Diamond Head schiedea), to be endangered. These two species are known from a single small population each, restricted to the rim of Diamond Head Crater, Oahu, Hawaii. This action is being taken because of the threat to the plants resulting from habitat degradation and potential fire hazards. This rule will implement the full protection provided by the Endangered Species Act of 1973, as amended.

**DATE:** The effective date of this rule is March 19, 1984.

**ADDRESSES:** The complete file for this rule is available for inspection by appointment during normal business hours at the Service's Office of Endangered Species, 1000 North Glebe Road, Arlington, Virginia. Active files on these species are maintained at the U.S.

over two years old be withdrawn. A one year grace period was given to proposals already over two years old. On December 10, 1979, the Service published a notice withdrawing the portion of the June 16, 1976, proposal that had not been subject to final action, along with four other proposals that had expired (44 FR 70796-70797).

*Bidens cuneata* and *Schiedea adamantis* were again proposed for endangered status on August 23, 1982 (47 FR 36675-36678), based on information available at the time of the 1976 proposal and information gathered since that time.

#### Summary of Comments and Recommendations

In the August 23, 1982, proposed rule, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. A letter was sent to the Governor of the State of Hawaii on September 2, 1982, notifying him of the proposed rule listing *Bidens cuneata* and *Schiedea adamantis*. Also in that month, notifications were sent to appropriate Federal agencies and other interested parties. Comments were received from the Governor of Hawaii, the Department of Transportation's Federal Aviation Administration and the National Park Service's Cooperative Resources Studies Unit at the University of Hawaii. All comments received have been considered in formulating this final rule.

The Governor of Hawaii concurred that both plants are in danger of extinction and that listing them will aid in their recovery by making them eligible to receive Federal funding. Both species are included in the proposed 10-year threatened and endangered plant action plan of the State's Division of Forestry and Wildlife. He also stated that both plants occur in areas where hiking is discouraged by the Division of State Parks.

Clifford W. Smith, Director of the Cooperative National Park Resources Studies Unit at the University of Hawaii, stated that there is " \* \* \* an overwhelming need to protect these species in their wild condition," and that he knows of no private or state program preserving these plants in their natural habitat. He noted that listing of the plants by the Federal government will also place them under the protection of the State endangered species law.

John H. Gordon, Manager of the Honolulu Sector of the Federal Aviation Administration, appreciated our concern for the plants. He stated that his agency will coordinate any modifications of their Diamond Head facility with the

Service to prevent any harm to the plants.

#### Summary of the Factors Affecting the Species

After a thorough review and consideration of all the available information, the Service has determined that *Bidens cuneata* and *Schiedea adamantis* should be classified as endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations promulgated to implement the listing provisions of the Act (codified at 50 CFR; under revision to accommodate 1982 amendments) were followed. A species may be determined to be an endangered or a threatened species due to one or more of the five factors described in Section 4(a)(1). These factors and their application to *Bidens cuneata* (cuneate bidens) and *Schiedea adamantis* (Diamond Head Schiedea) are as follows:

A. *Present or threatened destruction, modification, or curtailment of its habitat or range.* Direct, human-induced threats probably were not significant before 1906, due to limited use of the crater rim habitat prior to that date. Subsequent to that time, several facilities were constructed on the Diamond Head crestline. These include the FAA link site on the northeast crest and military emplacements along the southern and western ridge summits. It is not known what effects, if any, these constructions may have had on the distribution of *B. cuneata* and *S. adamantis*, although it is of possible significance that no collection of either species has ever been made from the summit region in which these structures were erected. The Service has been assured full cooperation in protecting these species by both State and Federal agencies with management responsibilities on the crater rim. The proliferation of exotic plant species may also have been responsible for serious reductions in the populations as they existed in their original, undisturbed state. This possibility is difficult to evaluate since extensive introduction into the native lowland flora had already occurred by the time of the initial discovery of *Bidens cuneata* in 1903, and *Schiedea adamantis* in 1955. However, very few of the species found associated with the surviving *Bidens cuneata* and *Schiedea adamantis* individuals are native. Throughout the Diamond Head area, there are numerous indications of competitive displacement of natives by introduced species. A hiking trail extends almost entirely around the Diamond Head crater, following its crest. The presence of this

trail constitutes a significant threat, since all reported sightings of the two plant species have been at or near the top of the crater rim in exactly the areas through which the trail passes. Habitat deterioration in the form of soil compaction, promotion of erosion, trampling of plants, and dislodging of rocks due to the passage of hikers are potential threats to the continued existence of these plants. However, Hawaii's Division of State Parks discourages hiking along the crater rim except in a few selected places. The two species do not occur in the approved hiking areas.

B. *Overutilization for commercial, recreational, scientific or educational purposes.* Not known to affect these species.

C. *Disease or predation.* Not known to affect these species.

D. *The inadequacy of existing regulatory mechanisms.* Although *Bidens cuneata* and *Schiedea adamantis* do appear on an informal State list developed by botanists (Fosberg and Herbst 1975), no local, State or Federal laws presently protect these species.

E. *Other natural or manmade factors affecting its continued existence.* Although the principal factor endangering these taxa is past and potential degradation or loss of habitat, it is possible that their reproductive success has been affected by a decline of native pollinating insects. Due to the dry conditions that generally exist in the area, fire is also a significant potential threat. Because of the dry conditions, vegetative litter decomposes very slowly and tends to accumulate over the soil surface. During the months of April-September, the litter dries out and is easily ignited. The location of the *Schiedea* population on windward-facing slopes makes it particularly susceptible to this potential hazard. Any fire originating on the lower rim in the vicinity of the crater entrance would be fanned toward the *Schiedea* population by the prevailing winds. Such a fire could be very severe if it should occur in the dry season following a particularly wet winter, since the volume of litter capable of sustaining a blaze would be especially great. Fire could easily result in the extinction of *Schiedea adamantis*, not only through the immediate destruction of established plants and propagules, but also by initiating a secondary vegetational succession in which the *Schiedea* might be excluded. Fires are less of a threat to the *Bidens*, which grows in a comparatively litter-free area.

The State's intention to develop Diamond Head into a public park and

recreation area will increase the number of persons using the area. The increased levels of human activity in this environment can be expected to increase the fire hazard potential as well as the rate of degradation of the habitat unless control measures are undertaken. Finally, the small number of individuals of both species and their limited distribution must be considered a threat to their existence. A single action could extirpate the taxa, as could natural fluctuations in their populations.

#### Critical Habitat

Section 4(a)(3) of the Endangered Species Act, as amended, requires that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designations of critical habitat are not prudent for these species at this time. The single known remaining wild population of *Bidens cuneata* is estimated to be comprised of 10 mature individuals, while that of *Schiedea adamantis* is estimated to be 78. Both populations are adjacent to a trail used by hikers. Inadvertent or deliberate damage to or destruction of these small populations could result from vandalism or curiosity generated by listing the species. Acts of vandalism to vegetation are well documented in Hawaii, as well as elsewhere. Publication of critical habitat descriptions would pinpoint their exact localities, thus making them more vulnerable and increasing enforcement problems. So few individuals of either species remain that any damage to or destruction of these small populations would seriously jeopardize their survival. Therefore, it would not be prudent to determine critical habitat for either plant at this time.

#### Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for

Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups and individuals. The Endangered Species Act provides for land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such actions are initiated by the Service following listing. The protection required by Federal agencies are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened. Regulations implementing this Interagency Cooperation provision of the Act are codified at 50 CFR Part 402 and are now under revision (see proposal at 48 FR 29989; June 29, 1983). Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species. If a "may effect" situation is determined the Federal agency must enter into formal consultation with the Service. This provision of the Act now applies to *Bidens cuneata* and *Schiedea adamantis*.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of trade prohibitions and exceptions which apply to all endangered plant species. These prohibitions, in general, make it illegal for any person subject to the jurisdiction of the United States to import or export endangered plants; deliver, receive, carry, transport, or ship them in interstate commerce in the course of a commercial activity; or to sell them or offer them for sale in interstate or foreign commerce.

The Act and 50 CFR 17.62 and 17.63 provide for the issuance of permits to carry out otherwise prohibited activities involving endangered species under certain circumstances. Such permits involving endangered species are available for scientific purposes to enhance the propagation or survival of

the species. In some instances, permits may be issued during a specified period of time to relieve undue economic hardship which would be suffered if such relief were not available.

Section 9(a)(2)(B) of the Act, as amended in 1982, states that it is unlawful to remove and reduce to possession endangered plant species from areas under Federal jurisdiction. This new taking prohibition does not apply to the *Bidens* and *Schiedea* species since they are known to occur only on State-owned land.

Requests for copies of the regulations on plants, and inquiries regarding them, may be addressed to the Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, Washington, D.C. 20240. In addition to the protection provided by the Act, the Service will review these plants to determine whether they should be proposed to the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora for placement upon the appropriate appendix(ices) to that Convention, or whether they should be considered under other appropriate international agreements.

#### References

- Fosberg, F.R. and D. Herbst. 1975. Rare and endangered species of Hawaiian vascular plants. *Allertonia* 1(1):1-72.
- Gillett, G.W. and E.K.S. Lim. 1970. An experimental study of the genus *Bidens* (Asteraceae) in the Hawaiian Islands. *U.C. Publ. Bot.* 56:1-55.
- Takeuchi, W. 1980a. Unpubl. status report on *Bidens cuneata* Sherff. U.S. Fish and Wildlife Service, Honolulu.
- Takeuchi, W. 1980b. Unpubl. status report on *Schiedea adamantis* St. John. U.S. Fish and Wildlife Service, Honolulu.

#### Author

The primary author of this rule is Derral Herbst, U.S. Fish and Wildlife Service, P.O. Box 50167, Honolulu, Hawaii 96850 (808/546-7530). It was edited by John L. Paradiso and John J. Fay, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240 (703/235-1975).

**List of Subjects in 50 CFR Part 17**

Endangered and threatened wildlife, fish, marine mammals, plants (agriculture).

**Regulations Promulgation**

**PART 17—[AMENDED]**

Accordingly, Part 17, Subchapter B of Chapter I, Title 50 of the U.S. Code of Federal Regulations, is amended as set forth below:

1. The authority section for Part 17 reads as follows:

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

**§ 17.12 [Amended]**

2. Amend § 17.12(h) by adding the following in alphabetical order under the families Asteraceae and Caryophyllaceae to the List of Endangered and Threatened Plants:

\* \* \* \* \*  
(h) \* \* \*

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Asteraceae—aster family:						
<i>Bidens cuneata</i> .....	Cuneate bidens.....	U.S.A. (HI).....	E.....		NA.....	NA
Caryophyllaceae—pink family:						
<i>Schiedea adamantis</i> .....	Diamond Head schiedea.....	U.S.A. (HI).....	E.....		NA.....	NA

Dated: January 9, 1984.

**G. Ray Arnett.**

*Assistant Secretary for Fish and Wildlife and Parks.*

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