Technical Reports 38 & 39

HALEAKALA NATIONAL PARK CRATER DISTRICT
RESOURCES BASIC INVENTORY

38. CONIFERS AND FLOWERING PLANTS
   by L. Stemmermann, P. K. Higashino,
   and C. W. Smith

39. FERNS AND FERN ALLIES
   by T. Herat, P. K. Higashino,
   and C. W. Smith

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HALEAKALA NATIONAL PARK CRATER DISTRICT
RESOURCES BASIC INVENTORY:
CONIFERS AND FLOWERING PLANTS

Lani Stemmermann
Paul K. Higashino
Clifford W. Smith
Department of Botany
University of Hawaii at Manoa
Honolulu, Hawaii 96822

ABSTRACT

This report lists all the conifers and flowering plants occurring in the Crater District of Haleakala National Park. Two hundred and five species and varieties were recorded of which 120 are endemic, 11 are indigenous, and 119 are exotic. Thirty-eight of the species are unique to Haleakalā Crater and its environs. At least six species previously found in the area are now absent; three of the six species are now extinct. There are 15 weed species in the area which are potentially serious pests; five of the species are on the State of Hawaii list of noxious weeds. Four resource management recommendations are made to promote the survival of the native flora.
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<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Species unique to the upper elevations of Haleakalā (*) and those species in the Crater District of Haleakalā National Park listed as endangered either in Fosberg and Herbst (1975) or on the USFWS Federal Register List (Anon. 1976, 1980).</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>The number and percentages of endemic, indigenous, and exotic monocotyledons and dicotyledons reported from the Crater District of Haleakalā National Park</td>
<td>12</td>
</tr>
</tbody>
</table>
RECOMMENDATIONS

The Crater District of Haleakala National Park is one of the few easily accessible examples of a tropical alpine ecosystem in the United States. Thirty-eight taxa, of which 23 are varieties of plants found elsewhere, are unique to the Crater or its immediate environs (Table 1). The area is, therefore, a significant biological resource which must be protected from further degradation. With the above in mind the following recommendations are made:

1. The most significant management action that can be taken is the immediate and permanent elimination of all feral herbivores from the area. Apart from the direct damage to plants by consumption, the physical disturbance of the environment, and the degradation of the water cycle, feral herbivores (especially goats and pigs) are the major factor in the introduction and establishment of exotic species. They further interfere with the natural processes of succession and indirectly affect the destiny of the total native biota in the area. Species driven to extinction cannot be replaced. It is essential that a public agency whose major charge is the preservation of the natural environment carry out that responsibility. The longer these feral herbivores remain in the area, the greater the probability that more unique endemic species will become extinct.

2. If the following possibly extinct species are found, they should be propagated:

   Argyroxiphium virescens var. virescens
   Clermontia haleakalensis
   Tetramolopium arbusculum

3. The following species should be considered for reintroduction into the Park in the areas indicated:

   Pu'unianiau  Argyroxiphium virescens
               var. virescens
               Clermontia haleakalensis
               Phytolacca sandwicensis
               var. puberulenta
               Stenogyne haliakalae
               Tetramolopium arbusculum

   East Kaupō Gap in
   damp, protected areas
   below 5000 feet
   Hillebrandia sandwicensis
4. The following species should be controlled or continue to be controlled. This list does not include species that are widespread and probably beyond control:

- Cirsium vulgare
- Eucalyptus spp.
- *Eupatorium adenophorum*
- *Eupatorium riparium*
- *Lantana camara*
- Pennisetum clandestinum
- Pinus spp.
- Ricinus communis
- *Rubus penetrans*
- Rubus rosaefolius
- Schinus terebinthifolius
- *Ulex europaeus*

particularly in areas other than those planted by Hosmer

* Species on the State of Hawaii list of noxious weeds.
INTRODUCTION

Cook, in his voyage to Hawai'i in 1778, did not visit Maui; therefore, neither he nor any of his crew ascended Haleakalā to collect the vegetation of the mountain. Although many of the early explorers visited West Maui, with occasional botanical collections being made in the mountains behind Lahaina, no ascents of Haleakalā were made by foreign travellers until 1828, when a missionary team climbed the mountain. The first of the early naturalists to visit Haleakalā were Messrs. Brackenridge, Drayton, and Pickering of the U. S. Exploring Expedition (USEE) under the command of Captain Charles Wilkes. They spent several days on an excursion to the summit of Haleakalā in February 1841, and descended into the Crater proper, prior to returning to Waikau. They made observations on the geological formations of the Crater and commented that its floor was "entirely bare of vegetation." Even at that time they reported the presence of goats, bullocks, and dogs, so no observations of the vegetation of the Crater were ever recorded by visiting naturalists prior to the establishment of feral mammals in the area.

Only a few plants were noted in the narrative of the Expedition*, including "two species of Pelargonium [Geranium], one with dark crimson, the other with lilac flowers; the Argyroziophium (sic) began to disappear as they ascended, and its place was taken up by the silky species, which is only found at high altitudes. From the cave to the summit they found shrubby plants, consisting of Epacaris [Styphelia], Vaccinium, Edwardsia [Sophora], Compositae, and various rubiaceous plants." They made note also of some sandalwood bushes.

Brackenridge, himself, described a few taxa from this excursion including Amauropelta globulifera (Brack.) Holttum, and Polystichum haleakalensis Brack. Several of the USEE collections were examined and described by A. Gray including, among others, Artemisia mauiense (Gray) Skottsberg, Geranium arboreum Gray, Plantago pachyphylla Gray, Raillardia (sic) menziesii Gray, Stenogyne crenata Gray, and S. rotundifolia Gray. Other collections of the USEE were described by later authors, especially by Hillebrand who had examined Gray's unpublished manuscript on the USEE collections.

* The narrative of the United States Exploring Expedition was written by Wilkes (1845) who did not ascend the mountain. Apparently this excerpt was taken from the journals of Brackenridge or Pickering. The parentheses and brackets are the present authors.
Subsequent to the Wilkes expedition many noted botanists have visited Haleakalā and have made collections of the vegetation in the area. Included in the list of botanists, with dates of some of their visits taken from dates on herbarium specimens made during visits to the Crater, are the following:

<table>
<thead>
<tr>
<th>Botanist</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. Hillebrand</td>
<td>date not known</td>
</tr>
<tr>
<td>W. T. Brigham, T. Anderson, and R. Hosmer</td>
<td>1909</td>
</tr>
<tr>
<td>H. L. Lyon</td>
<td>1909</td>
</tr>
<tr>
<td>J. F. Rock</td>
<td>1910, 1911, 1918</td>
</tr>
<tr>
<td>C. N. Forbes</td>
<td>1910, 1919, 1920</td>
</tr>
<tr>
<td>A. S. Hitchcock</td>
<td>1916</td>
</tr>
<tr>
<td>G. C. Munro</td>
<td>1918, 1928</td>
</tr>
<tr>
<td>C. Skottsberg</td>
<td>1922</td>
</tr>
<tr>
<td>E. L. Caum</td>
<td>1922</td>
</tr>
<tr>
<td>O. Degener (with others, including, at times, A. Greenwell, W. Flemming, Hatheway, Salucop, Ordonez, and I. Degener)</td>
<td>1927, 1939, 1948, 1950, 1954, 1959</td>
</tr>
<tr>
<td>D. D. Keck</td>
<td>1933</td>
</tr>
<tr>
<td>F. R. Fosberg</td>
<td>1933, 1936</td>
</tr>
<tr>
<td>H. St. John</td>
<td>1936, 1945</td>
</tr>
<tr>
<td>E. Y. Hosaka</td>
<td>1937</td>
</tr>
<tr>
<td>L. Cranwell, O. Selling, and C. Skottsberg (Hawaiian Bog Survey)</td>
<td>1938</td>
</tr>
<tr>
<td>G. Webster and R. L. Wilber</td>
<td>1948</td>
</tr>
<tr>
<td>A. Chock</td>
<td>1951</td>
</tr>
<tr>
<td>S. Carlquist</td>
<td>1953, 1966</td>
</tr>
<tr>
<td>S. Sohmer</td>
<td>1969</td>
</tr>
<tr>
<td>R. Vogel and J. Hendrickson</td>
<td>1969</td>
</tr>
<tr>
<td>D. Herbst</td>
<td>1970</td>
</tr>
<tr>
<td>Present study, RBI</td>
<td>1975, 1976, 1977</td>
</tr>
</tbody>
</table>
Although this cannot be considered an exhaustive list, it does indicate the attention the Crater's flora has received in the last century. Several research projects have occurred adjacent to the Park and within the Kipahulu section of the Park, including S. Forehand's (1970) study of the Kalapawili grasslands; two NSF-Student originated projects—the Upper Hāna Rain Forest Project, 1973 (Yoshinaga, in prep.) and the Manawainui Project, 1976 (Peterson 1976); and The Nature Conservancy-sponsored study of Kipahulu Valley, 1967 (Warner 1967).

RESULTS

The following Provisional List of the Conifers and Flowering Plants of the Crater District of Haleakala National Park (Appendix I) was compiled as the result of observations made during approximately 30 field days in the Park by the authors and numerous other collectors working as part of the Resources Basic Inventory (RBI) program during the summers of 1975, 1976, and 1977. Collections were made of most of the listed taxa which have been incorporated in the herbaria of Haleakala National Park, the University of Hawaii (HAW), and the B. P. Bishop Museum (BISH), Honolulu. The taxonomy follows that of St. John (1973); Hawaiian names are from Porter (1972) and St. John (1973). The rare or endangered status of the species was checked in Fosberg and Herbst (1975), and U. S. Fish and Wildlife Service (USFWS) (Anon. 1976, 1980). The List includes only those taxa noted within the Crater District of the Park during the RBI investigations. For each, the following information is provided:

1. Name (in regular type). As accepted in St. John (1973) or in subsequent publications.

2. Status. Endemic species are those restricted to one or more of the Hawaiian Islands. Indigenous species (varieties, etc.) are native to Hawai'i but are also found outside of the Hawaiian Islands.

3. Comments. These may be of a general distributional, ecological, morphological, or historical nature and are self-explanatory. Generalized distribution in the Hawaiian Islands of all species is also given.

For each species and variety, a map showing distribution within the Crater District is provided in Appendix II. Previous records have been included when they were clearly identified as having been collected within the Crater. Unfortunately, most of the earlier collections were simply labeled "Haleakala" without any further information. The List does not include taxa presently known only from Kipahulu, the Upper Hāna Rain Forest, Waikau, or Ke'anae (Ko'olau) Gap outside the 1979 boundaries of the Park.
This List has undoubtedly overlooked the occurrence of some plants in the Park, as will become evident as it is used. Records of forestry plantings in the Park made by Hosmer and others include many species of conifers and eucalypts. Many of the plantings did not survive but a few have been shown to invade areas where they were not planted. The U. S. Forest Service irregularly monitors the growth of those plantings. This survey has not thoroughly investigated any of the areas that clearly have been planted such as the forestry plantations at 8500 feet, at Hosmer Grove, or at the garden areas near the living quarters of Park personnel. Species that have escaped into the Park are recorded.

The Abundance Ratings of species naturalized throughout Haleakala National Park are as follows:

<table>
<thead>
<tr>
<th>Abundance Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOMINANT</td>
<td>The characteristic species of a widespread vegetation type; occurring in large numbers with greater than 75% cover</td>
</tr>
<tr>
<td>ABUNDANT</td>
<td>Occurring locally in large numbers with greater than 75% cover, but not a characteristic species of a widespread vegetation type</td>
</tr>
<tr>
<td>COMMON</td>
<td>Of widespread occurrence in the Park with up to 75% cover in some areas</td>
</tr>
<tr>
<td>OCCASIONAL</td>
<td>Occurring throughout the Park in many vegetation types but with less than 25% cover</td>
</tr>
<tr>
<td>UNCOMMON</td>
<td>Occurring in low numbers in several areas, or with several individuals in only one or two localities</td>
</tr>
<tr>
<td>RARE</td>
<td>Restricted in distribution within the park to only one or two localities, and occurring there in low numbers</td>
</tr>
</tbody>
</table>

No attempt has been made to interpret the distribution of species into communities, etc., in this report as this analysis was incorporated into the supporting documentation of Whiteaker's (1980) vegetation map of the Crater District.

The plants of Haleakalā Crater and its immediate environs are well known. For example, to most people silverswords are almost synonymous with Haleakalā. In fact, 38 taxa are unique to the area (Table 1); 17 have been proposed for endangered status on the Federal Register List (Table 1; Anon. 1976); and Fosberg and Herbst (Table 1; 1975) consider a further six species need protection.

Forty-six percent of the species in the Crater District are exotic (Table 2). This percentage is probably low because it includes 12 of 45 unverified species recorded by Mitchell (1945) but not seen during the RBI. If Mitchell's unverified species were to be excluded from the overall figures, the percentage of exotic species would increase to 51.
Several of the species listed by Mitchell were undoubtedly present, having been recorded by previous workers including Degener (1933-present) and Rock (1913). Those species are:

* Argyroxiphium virescens
  var. virescens
* Clermontia haleakalensis
* Hillebrandia sandwicensis
* PhytoLacca sandwicensis
  var. puberulenta
* Stenogyne haliakalae
* Tetramolopium arbusculum

The loss of those species from the Crater District is a matter of some concern and their reintroduction where possible should be a significant management goal. Three of those species (*) are believed to be extinct; however, they may still be present on the north face of the mountain outside Park boundaries.

On the other hand, some of the species listed by Mitchell may have been collected outside the Crater District proper. A number of them may have been misidentified because of the confused state of their taxonomy. However, whatever the status of the uncertain species on Mitchell's (1945) list they were not encountered during the RBI. The majority of those species are endemic (31, plus 2 indigenous, 11 exotic, and 1 not known). Of the 31 endemic species, 11 are on the Federal Register's list of endangered species. The presence and/or uncertain status of the taxonomy of those species in the Park does not preclude the fact that the Park, in its pristine condition, may have been a marginal environment for many of them. The destruction of the habitat and opening of the vegetation cover by feral herbivores may have resulted in changes in the microhabitats to the point that those species may no longer have been able to establish themselves. Consequently, once the original stock died the species were lost.

The genus Raillliardia presents a special problem. At least five of the species described are hybrids. In the pristine environment the hybrids probably did not become established. The parents were also probably isolated by a number of ecological factors. However, the gross disturbance of the environment by feral herbivores has resulted in the breakdown of the barriers to reproduction and the consequent establishment of hybrids. Similar situations have occurred elsewhere (e.g., see Epling 1947 and Chase & Raven 1975).

If grasses are excluded, the monocotyledon flora is almost totally native (Table 2). Most of the grasses were probably introduced to improve the pasture years ago when cattle were grazed in the Crater. The large number of exotic dicotyledons were probably introduced at the same time. Many of those species are quite typical members of pasturelands in north temperate regions. Many of those species will always remain in the Park; however, some may be crowded or shaded out if the native vegetation is allowed to recover in the absence of feral pigs and goats.
Fifteen of the species in the Crater District are weeds with a potential to become serious resource management problems in the future. Five species—Maui pā'makani (Eupatorium adenophorum), Hāmākua pamakani (E. riparium), lantana (Lantana camara), prickly Florida blackberry (Rubus penetrans), and gorse (Ulex europaeus) are on the State of Hawaii list of noxious weeds. Two species—pines and eucalypts—are trees that have escaped into the Park. Five species—bull thistle (Cirsium vulgare), kikuyugrass (Pennisetum clandestinum), castor bean (Ricinus communis), thimbleberry (Rubus rosaefolius), and Christmas berry (Schinus terebinthifolius) are presently established in the Park at manageable levels but could, if left uncontrolled, spread rapidly into adjacent areas, ultimately infesting significant portions of the Park. Finally, three species—prickly pear (Opuntia megacantha), white passionflower (Passiflora ?subeltata), and Kentucky bluegrass (Poa pratensis)—have the potential to become serious pests and merit close surveillance.

ACKNOWLEDGMENTS

We thank the Superintendent and staff of Haleakala National Park for their cooperation and assistance during the field studies. We are especially appreciative of the generosity of the maintenance crew after the storm tore our basecamp to shreds at Paliku during the first year of the study.

The helpful review comments of this manuscript by Dr. Dennis Fenn, Dr. Charles Lamoureux, Mr. John Kjargaard, and Mr. Dave Dunatchik are appreciated. As usual, Ms. J. Saito's assistance in editing and producing the final manuscript were extremely helpful.

The study was sponsored by National Park Service Contract Number CX 8000 7 0003. Without their assistance the scope and detail of the study would not have been possible.

LITERATURE CITED


Degener, O. 1933-present. Flora Hawaiensis. Published privately.


TABLE 1. Species unique to the upper elevations of Haleakalā (*) and those species in the Crater District of Haleakalā National Park listed as endangered either in Fosberg and Herbst (1975) or on the USFWS Federal Register List (Anon. 1976, 1980).

<table>
<thead>
<tr>
<th>Species</th>
<th>F &amp; H</th>
<th>USFWS 1976</th>
<th>USFWS 1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Argyroxiphium sandwicense var. macrocephalum</td>
<td>x</td>
<td>x</td>
<td>3B</td>
</tr>
<tr>
<td>* A. virescens var. virescens</td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>* Artemisia mauliens</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* Bidens pentamera</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* Chenopodium oahuense var. discospermum</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coprosma montana var. crassa</td>
<td>x</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* Deschampsia australis f. haleakalensis</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* D. australis subsp. nubigena var. tenuissima</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* Geranium arboreum</td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>* G. cuneatum var. tridens</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* G. multiflorum</td>
<td>x</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td>* Gouldia terminalis var. parviflora</td>
<td>x</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* Metrosideros collina var. haleakalensis</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Species/Var.</td>
<td>1</td>
<td>2</td>
<td>3B</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---</td>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td><em>Panicum</em> (new species or variety)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Plantago pachyphylla</em></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>P. princeps var. laxifolia</em></td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td><em>Railliardia coriacea</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>R. demissifolia var. demissifolia</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>R. demissifolia var. verticillata</em></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>R. x dolosa</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>R. lonchophylla var. lonchophylla</em></td>
<td>x</td>
<td>x</td>
<td>3B</td>
</tr>
<tr>
<td><em>R. lonchophylla var. stipitata</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>R. montana var. longifolia</em></td>
<td>x</td>
<td>x</td>
<td>3B</td>
</tr>
<tr>
<td><em>R. montana var. robustior</em></td>
<td>x</td>
<td>x</td>
<td>3B</td>
</tr>
<tr>
<td><em>R. platyphylla var. trilloidea</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>R. reticulata</em></td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td><em>R. rockii</em></td>
<td>x</td>
<td>x</td>
<td>3B</td>
</tr>
<tr>
<td><em>R. thrysiflora</em></td>
<td>x</td>
<td>x</td>
<td>3B</td>
</tr>
<tr>
<td><em>Sanicula sandwicensis</em></td>
<td>x</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td><em>Santalum haleakalae</em></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Schidea haleakalensis</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>F &amp; H</td>
<td>USFWS 1976</td>
<td>USFWS 1980</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>* Silene hawaiensis var. kaupana</td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>* Stenogyne crenata</td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>S. haliakalae</td>
<td>x</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td>* S. rotundifolia var. rotundifolia</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S. rotundifolia var. oblonga</td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>* S. sessilis var. hexanthoides</td>
<td>x</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>* Tetramolopium arbusculum</td>
<td>x</td>
<td>x</td>
<td>1</td>
</tr>
</tbody>
</table>

Categories of plants listed in USFWS-1980:

1. USFWS presently has sufficient information on hand for the taxon to support the biological appropriateness of being listed as Endangered or Threatened species.

2. Probably appropriate for being listed but sufficient information not available.

3A. No longer being considered. USFWS has persuasive evidence of extinction. If rediscovered, such plants will be given high priority for listing.
3B No longer being considered. On the basis of current taxonomic understanding these names do not represent species.

3C No longer being considered. Taxa which have proven to be more abundant or widespread than was previously believed OR those which are not subjected to any identifiable threat.

Both Geranium multiflorum var. superbum & G. m. var. ovatifolium are listed in Fosberg & Herbst (1975), USFWS-1976, and in USFWS-1980 as '2'.

Only Dubautia lonchophylla (= Raillardiæa) is listed in Fosberg & Herbst (1975), USFWS-1976, and USFWS-1980, without regard to variety.

Both Dubautia thyrsiflora (= Raillardiæa) var. cernua & D. t. var. thyrsiflora are listed in Fosberg & Herbst (1975), USFWS-1976, and in USFWS-1980 as '3B'.

No variety listed in any of the three sources.
TABLE 2. The number and percentages of endemic, indigenous, and exotic monocotyledons and dicotyledons reported from the Crater District of Haleakala National Park.

<table>
<thead>
<tr>
<th>STATUS</th>
<th>Endemic</th>
<th>Indigenous</th>
<th>Exotic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>Monocotyledons (excluding grasses)</td>
<td>12 (67)</td>
<td>5 (28)</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Monocotyledons</td>
<td>17 (31)</td>
<td>5 (9)</td>
<td>32 (59)</td>
</tr>
<tr>
<td>Dicotyledons</td>
<td>103 (55)</td>
<td>6 (3)</td>
<td>79 (42)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>120 (50)</td>
<td>11 (5)</td>
<td>111 (46)</td>
</tr>
</tbody>
</table>
APPENDIX I

A PROVISIONAL LIST
OF THE CONIFERS AND FLOWERING PLANTS
OF THE CRATER DISTRICT OF HALEAKALA NATIONAL PARK

GYMNOSPERMAE

Unidentified Gymnosperm spp.

ARaucariaceae
(Araucaria Family)

Araucaria

bidwillii Hook. Monkey puzzle Exotic
Behind Research Center.

Cupressaceae
(Cypress Family)

Cedrus

deodara (Lamb.) Loud. Deodar cedar Exotic
Confined to Hosmer Grove area.

Thuja

occidentalis L. Eastern arborvitae Exotic
Confined to Hosmer Grove area.

Pinaceae
(Pine Family)

Pinus

contorta var. latifolia Engelm. Lodgepole pine Exotic
Confined to Hosmer Grove area.
Monterey pine

Hosmer Grove, Research Center, and plantation at 8500 feet. Seeds distributed into Park at 7000 feet where they germinate. All trees should be cut down before they impact the native scrubland.

Western white pine

Confined to Hosmer Grove area.

Douglas fir

Confined to Hosmer Grove area.

Japanese cedar

Confined to Hosmer Grove and planted area at 8500 feet.
FLOWERING PLANTS
MONOCOTYLEDONAE

CYPERACEAE
(Sedge Family)

Carex

*alligata* F. Boott
Hawaiian sedge
Endemic
Known only from Kuiki where it is found in wet spots in the forest. Listed as *C. sandwicensis* Boeck. by Mitchell (1945).

*macloviana* D'Urv.
var. *subfusca* (W. Boott) Kuek.
St. Malo's sedge
Indigenous
Occasional in mesic to exposed areas throughout the Crater District, more frequent in Palikū area.

*meyeni* Nees
Occasional in wet forest between E. Kaupō Gap and Kuiki.

*wahuensis* C. A. Mey.
Occasional throughout Crater and outer slopes.

Cladium

*angustifolia*  
See *Machaerina angustifolia* (Gaud.) Koyama.

Cyperus

*brevifolius* (Rottb.) Hassk.  
Kili'o'opu, kyllinga
Indigenous
Uncommon in lower E. Kaupō Gap.

*neo-kunthianus* Kuek.
Endemic
Listed by Mitchell (1945) but not seen during RBI.
Fimbriastylis

dichotoma (L.) Vahl  Tall fringe rush
Indigenous
Occasional along trails, particularly at base of Halema' u Trail.

Gahnia

gahniaeformis (Gaud.) Heller
See Machaerina gahniaeformis (Gaud.) Kern.

Machaerina

angustifolia (Gaud.) Koyama  Indigenous
Uncommon in exposed scrubby areas at Hosmer Grove.
Listed under Cladium by Mitchell (1945).

gahniaeformis (Gaud.) Kern  Endemic
Widespread below 8000 feet particularly Hosmer Grove and E. Kaupō Gap. Listed under Gahnia by Mitchell (1945).

Oreobolus

furcatus Mann  Endemic
Known only from Kuiki in the Crater District.

Uncinia

uncinata (L. f.) Kuek.
var. uncinata  Indigenous
Occasional in damp shaded protected areas throughout the Crater District.

GRAMINEAE
(Grass Family)

Agrostis

alba L.  Redtop, herdgrass
Exotic
Common in introduced grasslands at Hosmer Grove and below Palikū.
avenacea Gmel.  

He‘u-pueo  Exotic  
Widespread weedy grass, occasional in goat infested areas particularly W. Kaupō Gap. Listed by Mitchell (1945) as A. rectofracta (Willd.) Link.

rectofracta (Willd.) Link  
See Agrostis avenacea.

sandwicensis Hbd.  
Hawaiian bent  Endemic  
Occasional in cinder desert.

Aira  
caryophyllea L.  
Silver hairgrass  Exotic  
Occasional in dry scrub areas throughout the Crater District.

Anthoxanthum  
odoratum L.  
Sweet vernal grass  Exotic  
Common in introduced grasslands and along trails.

Bromus  
rigidus Roth  
Ripgutgrass  Exotic  
Common along trails, dry grasslands, and dry scrub areas.

Cynodon  
dactylon (L.) Pers.  
Bermuda grass  Exotic  
Common along lower elevation roads and trails.
Dactylis

*glomerata* L.  
Cocksfoot, orchardgrass  
Exotic  
Common in mesic introduced grasslands at base of Halema'ūu Trail.

Danthonia

*pilosa* R. Br.  
Hairy oatgrass  
Exotic  
Occasional in grass in dry to mesic scrub in Hosmer Grove area.

*semiannularis* (Labill.) R. Br.  
Wallabygrass  
Exotic  
Occasional in grass in dry to mesic scrub in Hosmer Grove area.

Deschampsia

*australis* Nees ex Steud.  
Endemic  
Common, locally dominant, throughout the Crater District in *Deschampsia* grasslands. The taxonomy of this species is quite confused. Two subspecific taxa, *f. haleakalensis* (Skotts.) Skotts. and *ssp. nubigena* var. *tenuissima* (Skotts.) Skotts., are endemic to E. Maui.

Digitaria

*violascens* Link  
Kūkaipua'a-uka  
Exotic  
Occasional in E. and W. lower Kaupō Gap, weedy.

Eragrostis

*brownei* (Kunth) Nees in H. & A.  
Brown's lovegrass  
Exotic  
Occasional along trails, dry scrub, particularly in eastern half of the Crater District.
grandis Hbd.  
Large Hawaiian lovegrass  
Endemic  
Uncommon, Kaupō and Palikū cliffs.

**Festuca**

dertonensis (All.) Aschers. & Graebn.  
Common along trails, dry scrubland, principally East part of Crater.

elatior L.  
Tall fescue  
Occasional, introduced grasslands, as between bottom of Halemau'u Trail and Hōlua Cabin.

megalura Nutt.  
Foxtail fescue  
Common everywhere.

rubra L.  
Red fescue  
Occasional in introduced damp grasslands.

**Gastridium**

ventricosum (Gouan) Schinz & Thell.  
Nittgrass  
Occasional in W. Kaupō Gap.

**Holcus**

lanatus L.  
Yorkshire fog, velvetgrass  
Exotic  
Common everywhere.

**Lolium**

multiflorum Lam.  
Italian ryegrass  
Exotic  
Rare, near Kapalaoa, only a single specimen found.
Panicum

sp.

Endemic
This is a new variety or species from W. Kaupō Gap, uncommon.

Paspalum

dilatatum Poir.

Paspalum grass
Exotic
Occasional along road near HQ.

larranagai Arech.
See Paspalum urvillei Steud.

orbiculare Forst. f.
Mau’u laiki, ricegrass
Exotic
Occasional, lower E. Kaupō Gap.

urvillei Steud.
Vaseygrass
Exotic
Listed as P. larranagai by Mitchell (1945). Not seen in RBI.

Pennisetum

clandestinum Hochst. ex Chiov.
Kikuyugrass
Exotic
Common along trails throughout the Crater District. Also dominant in lower E. Kaupō Gap. This species has recently been declared a noxious weed by the U. S. Department of Agriculture in all states except Hawai’i. See Recommendations.

Phalaris

tuberosa L.
Large canarygrass
Exotic
Locally common at Palikū.
**Poa**

*annua* L.  
Annual bluegrass  
Exotic  
Common in front of cabins; occasional along wet trails.

*compressa* L.  
Canada bluegrass  
Exotic  
Listed by Mitchell (1945) but not seen during RBI.

*pratensis* L.  
Kentucky bluegrass  
Exotic  
Locally, common throughout the Crater District in wet areas, i.e., under trees, mesic grasslands, pit craters, abundant in Kaluanui where this species is apparently crowding out the native *Deschampsia*. Though not on the State's noxious weed list the spread of this species in certain areas such as Kaluanui, should be monitored.

**Rhynchelytrum**

*repens* (Willd.) C. E. Hubb.  
Natal redtop  
Exotic  
Common in W. Kaupō Gap.

**Sacciolepis**

*indica* (L.) Chase  
Glenwoodgrass  
Exotic  
Occasional in damp areas, lower E. Kaupō Gap.

**Sporobolus**

*africanus* (Poir.) Robyns & Tournay  
African dropseed  
Exotic  
Common along trails throughout Crater, especially lower Kaupō Gap.

*indicus* (L.) R. Br.  
West Indian dropseed  
Exotic  
Common along trails.
Trisetum

flavescens (L.) Beauv.  Yellow oatgrass  Exotic
Currently at Waikau but not in the Crater District.  Tentative identification awaiting confirmation.

glomeratum (Kunth) Trin. in Steud.  He'u-pueo, pili-uka, mountain pili  Endemic
Occasional in desert and dry scrub.

IRIDACEAE  (Iris Family)

Sisyrinchium

acre Mann  Mau'u-la'ili, Hawaiian sisyrinchium  Endemic
Uncommon, only found near Waikau.  Listed as depleted in Fosberg and Herbst (1975).  It is not included on the Federal Register List (Anon. 1976).

JUNCACEAE  (Rush Family)

Juncus

bufonius L.  Common toad rush  Exotic
Occasional along moist trails in eastern half of the Crater.

Luzula

campestris
var. hawaiensis (Buch.) Deg. & Fosb.  See Luzula hawaiensis Buch. var. hawaiensis.

hawaiensis Buch.
var. hawaiensis  Endemic
Occasional in most vegetated areas.  Listed as L. campestris var. hawaiensis by Mitchell (1945).
LILIACEAE  
(Lily Family)

**Astelia**

*forbesii* Skottsb.  
Endemic  
Occasional.  
Rain forest species confined to Palikū cliffs.  
Three subspecies are listed in Fosberg and Herbst (1975) as of uncertain status or with a localized distribution.  
None of the subspecies are listed on the Federal Register List (Anon. 1976).

**Dianella**

*sandwicensis* H. & A.  
Uki, 'uki-'uki,  
Hawaiian dianella  
Endemic  
Occasional between Pu'umaile and Palikū.

**Pleomele**

*aurea* (H. Mann) N. E. Br.  
Halapepe  
Endemic  
Uncommon, Kaupō Trail. Frequently referred to as *Dracaena aurea* H. Mann.

**Smilax**

*sandwicensis* Kunth  
var. *sandwicensis*  
Hoi-kuahiwi, aka'awa  
Endemic  
Occasional, Kaupō Trail.
FLOWERING PLANTS
DICOTYLEDONAE

ANACARDIACEAE
(Mango Family)

Schinus
terebinthifolius Raddi
Christmas berry
Exotic
Single specimen seen, W. Kaupō Gap ca. 4400 feet.
It should be removed. See Recommendations.

APOCYNACEAE
(Periwinkle Family)

Alyxia
olivaeformis Gaud.
Maile
Endemic
Uncommon, Kaupō Trail.

AQUIFOLIACEAE
(Holly Family)

Ilex
anomala H. & A.
Kāwa'u, ka'awa'u
Endemic
Occasional, Palikū, Palikū cliffs, and in gullies of
E. Kaupō Gap.

ARALIACEAE
(Ginseng Family)

Cheirodendron
trigynum (Gaud.) Heller
Olapa
Endemic
Occasional at Palikū and Palikū cliffs.
The variety oblongum Sherff was included in Mitchell (1945)
but recent unpublished work suggests that this variety may
not be distinct. Cheirodendron gaudichaudii (DC.) Seem.
listed by Mitchell is considered a synonym of C. trigynum.
ASCLEPIADACEAE
(Milkweed Family)

Gomphocarpus

physocarpus E. Mey.

Balloon plant

Occasional near the Crater District boundary, W. Kaupō Gap.

BEGONIACEAE
(Begonia Family)

Hillebrandia

sandwicensis Oliver

Pua-maka-nui

Endemic

Mitchell (1945) listed this species along Kaupō Trail at 3900 feet in a cave. Not seen during RBI. See Recommendations.

CACTACEAE
(Cactus Family)

Opuntia

megacantha Salm-Dyck

Pa-nini, prickly pear

Exotic

Occasional, presumably controlled; Lā'ie Cave, lower mid-Kaupō Gap.

CAMPANULACEAE
(Bellflower Family)

Clermontia

haleakalensis Rock

Haleakala clermontia

Endemic

Endemic to E. Maui.

Lobelia

grayana E. Wimm.

Endemic

neriifolia Gray
See Lobelia grayana.

CARYOPHYLLACEAE
(Pink Family)

Arenaria
serpyllifolia L.
Thyme-leaved sandwort
Exotic
Occasional along trails and in goat habitat throughout
the Crater District.

Cerastium
vulgatum L.
Hehine-hauli,
larger mouseear chickweed
Exotic
Occasional along trails and in goat habitat throughout
the Crater District.

Polycarpon
tetraphyllum (L.) L.
Allseed
Exotic
Occasional along trails and in goat habitat throughout
the Crater District.

Schiedea
haleakalensis Deg. & Sherff in Sherff
Haleakala schiedea
Endemic
Uncommon on vertical walls, found between Sliding Sands
and Hōlua, and on wall of W. Kaupō Gap. This species is
listed as of uncertain status in Fosberg and Herbst (1975).
It is not included on the Federal Register List (Anon.
1976).

Silene
gallica L.
Small-flowered catchfly
Exotic
Occasional along trails and in goat habitat throughout
the Crater District.
hawaiensis Sherff
var. kaupoana (Deg. & Sherff in Sherff)
Deg. & Sherff in Sherff

Endemic

Endemic to East Maui.
Listed as S. struthioides Gray by Mitchell (1945).

struthioides Gray
See Silene hawaiensis var. kaupoana.

CHENOPODIACEAE
(Goosefoot Family)

Chenopodium

ambrosioides L.
Mexican tea
Exotic
Occasional W. Kaupō Gap. Also near Lā'ie Cave.

hybridum L.
Maple-leaved goosefoot
Exotic
Listed by Mitchell (1945) but not seen during RBI.

oahuense (Meyen) Aellen
var. discosperma Fosb.

'Āweoweo
Endemic
Uncommon at Nā mana o ke akua (the type locality of the variety) and in Lā'ie kipuka. The variety is listed as local, rare, and protected in Fosberg and Herbst (1975). It is not included on the Federal Register List (Anon. 1976). St. John gives an incorrect location for this taxon.
COMPOSITAE
(Sunflower Family)

Argyroxyphium

sandwicense DC.
var. macrocephalum (Gray) Hbd.

Hinahina, 'āhinahina, silversword

Endemic

Occasional on loose cinder cones throughout west-central part of Crater. Also on vertical cliffs above Kapalaoa, and on Kalapawili Ridge. Listed as a local and depleted but protected species in Fosberg and Herbst (1975). However, the Federal Register List (Anon. 1976) lists Argyroxiphium macrocephalum Gray, which is the name used for Maui silversword if it is to be considered distinct from the Mauna Kea silversword. The listing indicates that the Maui silversword should be considered rare and endangered. No longer being considered for endangered species status (Anon. 1980).

virescens Hbd.
var. virescens

Greensword

Endemic

Endemic to E. Maui.

Reported by Mitchell (1945) as present at 'Palikū-Kuiki.' Not seen by RBI team. Thought to be extinct by most field botanists. See Recommendations. USFWS presently has sufficient information on hand for the taxon to support the biological appropriateness of being listed as Endangered or Threatened species.

Artemisia

australis Less.

Hinahina-kuahiwi

Endemic

Occasional in shaded gulches, E. Kaupō Gap.

mauiensis (Gray) Skottsbd.

Maui wormwood

Endemic

Endemic to E. Maui.

Occasional steep cliffs throughout the Crater; above Palikū, Waikau, Halemau'u Trail, etc. Both varieties are listed as rare in Fosberg and Herbst (1975). Neither variety is included on the Federal Register List (Anon. 1976).
Bidens

pentamera (Sherff) Deg. & Sherff in Sherff
Ko'oko'olau

Endemic

Endemic to E. Maui.
Mitchell (1945) reported it above Hōlua cabin. Not seen by RBI team.

pilosa L.

Kī-nehe, Spanish needle
Exotic
Localized population above Hōlua Cabin; occasional along trails and increasing in abundance toward lower elevations of Kaupō Gap.

sp.

Not fertile.
Occasional on west wall of Kaupō Gap. Degener also collected a sterile specimen in this locality.

Centaurea

melitensis L.

Napa thistle, yellow star thistle
Exotic
Listed by Mitchell (1945) but not seen during RBI.

Cirsium

vulgare (Savi) Tenore

Pua-kala, bull thistle, spear thistle
Exotic
Uncommon E. and W. Kaupō Gap, also heavily goat infested areas. A troublesome weed which has invaded the Crater District. See Recommendations.

Dubautia

fallax Sherff
See Railliautia x fallax (Sherff) Sherff.

plantaginea Gaud.

Occasional, vertical cliffs E. Kaupō Gap.
Listed as of uncertain status in Fosberg and Herbst (1975) but not listed on the Federal Register List (Anon. 1976).
Erigeron

*bonariensis* L.  
*Ilioia, hairy horseweed*  
Exotic  
Occasional in dry scrub and weedy areas, especially W. Kaupō Gap. Synonym *Coryza bonariensis* (L.) Cronq.

canadensis L.  
*Canada fleabane*  
Exotic  
Listed by Mitchell (1945) but not seen during RBI.

Eupatorium

*adenoaphorum* Spreng.  
*Maui pā'īmakani*  
Exotic  
Common to abundant at medium to low elevations throughout the Crater District, occasional up to 8500 feet. This species has been declared a noxious weed by the State of Hawaii. See Recommendations.

*riparium* Regel  
*Hāmākua pamakani*  
Exotic  
Occasional near Hosmer Grove. See Recommendations.

Galinsoga

*ciliata* (Raf.) Blake  
*Galinsoga*  
Exotic

Gnaphalium

*japonicum* Thunb.  
Exotic  
Stables area, and in goat infested areas.

*purpureum* L.  
*Purple cudweed*  
Exotic  
Occasional in areas heavily disturbed by goats and horses.
sandwicensium Gaud.  
'Ena'ena, Hawaiian cudweed  
Endemic
Occasional on Sliding Sands trail, rock deserts. 
The variety of the Haleakalā specimen has not been identified yet. The variety lineatum Sherff, which is present on E. Maui, is listed as of uncertain status in Fosberg and Herbst (1975). It is not included on the Federal Register List (Anon. 1976).

Heterotheca

grandiflora Nutt.  
Telegraph plant  
Exotic
Common to abundant along trails and in disturbed habitats throughout the Crater.

Hypochaeris

radicata L.  
Hairy Cats-ear, gosmore  
Exotic
Common throughout the Crater District.

Lapsana

communis L.  
Nipplewort  
Exotic
Occasional in shaded disturbed habitats.

Madia

sativa Molina  
Tarweed  
Exotic
Rare. Trailside between Nā mana o ke akua and 'O'ilipu'u.

Raillerydia

(Most botanists include this genus in Dubautia but this list follows St. John's treatment with which we do not agree on this point).

coriacea Sherff  
Kūpaoa  
Endemic
Endemic to E. Maui. 
Listed in Mitchell (1945) but not seen during RBI. 
Probably a hybrid.
**demissifolia** Sherff

var. *demissifolia*  
Cliff railliardia  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Probably belongs in *R. menziesii* Gray.

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**demissifolia**  

var. *verticillata* Sherff  
Kūpaoa  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Listed as of uncertain status in Fosberg and Herbst (1975).  

---

*x dolosa* Deg. & Sherff in Sherff  
Kūpaoa  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.

---

**lonchophylla** Sherff  

var. *lonchophylla*  
Kūpaoa  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Listed by Fosberg and Herbst (1975) and on Federal Register List (Anon. 1976). Probably a hybrid.  
No longer being considered for endangered species status (Anon. 1980).

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**lonchophylla**  

var. *stipitata* (Sherff) Sherff  
Kūpaoa  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Probably a hybrid.
**menziesii** Gray

*Na'ena'e*  
Endemic

Common.  
Occasional throughout Crater District above 7000 feet.  
The variety of the Haleakalā specimen has not been iden-
tified yet. The variety *angustifolia* Sherff, which is  
present on E. Maui, is listed as of uncertain status in  
Fosberg and Herbst (1975). It is not included on the  

**montana**  
var. *longifolia* Sherff

*Kūpaoa*  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Listed by Fosberg and Herbst (1975) and on Federal Register  
List (Anon. 1976). Type locality is in Kaupō Gap.  
Probably a hybrid.  
No longer being considered for endangered species status  
(Anon. 1980).

**montana**  
var. *robustior* Sherff

*Kūpaoa*  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Listed by Fosberg and Herbst (1975) and on Federal Register  
List (Anon. 1976). Type locality is on Pu'unianiau.  
Probably a hybrid.  
No longer being considered for endangered species status  
(Anon. 1980).

**platyphylla** Gray  
var. *platyphylla*  

*Flat-leaved railliardia*  
Endemic

The variety *platyphylla* endemic to E. Maui is listed in  
Fosberg and Herbst (1975). It is not listed on the  

**platyphylla**  
var. *trillioides* Deg. & Sherff in Sherff  

*Flat-leaved railliardia*  
Endemic

Endemic to E. Maui.  
Listed in Mitchell (1945) but not seen during RBI.  
Probably not a distinct taxon.
reticulata Sherff

Kūpaoa

Endemic

Endemic to E. Maui.
Listed in Mitchell (1945) but not seen during RBI.
USFWS presently has sufficient information on hand for the
taxon to support the biological appropriateness of being
listed as Endangered or Threatened species.

rockii Sherff

Kūpaoa

Endemic

Endemic to E. Maui.
Listed in Mitchell (1945) but not seen during RBI.
Listed in Fosberg and Herbst (1975) and on Federal Register
No longer being considered for endangered species status
(Anon. 1980).

scabra DC.

Occasional Palikū gulches.

thyrsiflora Sherff

Kūpaoa

Endemic

Endemic to E. Maui.
Listed in Mitchell (1945) but not seen during RBI.
Listed in Fosberg and Herbst (1975) and on Federal Register
No longer being considered for endangered species status
(Anon. 1980).

Raillietia

x fallax (Sherff) Sherff

Endemic

Listed by Mitchell (1945) as Dubautia fallax but not seen
during RBI.

Senecio

sylvaticus L.

Wood groundsel

Exotic

Listed by Mitchell (1945) but not seen during RBI.
**Sonchus**

asper (L.) Hill

Spiny sow thistle

Exotic

Occasional along Kaupō Trail.

oleraceus L.

Pua-lele, sow thistle

Exotic

Occasional in shaded disturbed areas.

**Taraxacum**

officinale (L.) Weber in Wiggers

Lau-lele, dandelion

Exotic

Occasional, damp exposed substrate.

**Tetramolopium**

arbusculum (Gray) Sherff

Endemic


humile (Gray) Hbd.

var. humile

Alpine tetramolopium

Endemic

Endemic to E. Maui.

Common above diurnal frostline at approximately 8000 feet.

**Youngia**

japonica (L.) DC.

Oriental hawksbeard

Exotic

Occasional shaded disturbed areas.

**CONVOLVULACEAE**

(Morning-glory Family)

**Ipomoea**

sp.

Sterile material from Kaupō Gap.
CRUCIFERAE  
(Mustard Family)

Capsella

bursa-pastoris (L.) Medik  
Shepherd's purse  
Exotic  
Occasional especially where horses have travelled.

Coronopus

didymus (L.) Sm.  
Swine cress  
Exotic  
Listed by Mitchell (1945) but not seen during RBI.

Descurainia

sp..  
Exotic  
New State record.  
Uncommon near stables. Plants have been uprooted and destroyed.

Lepidium

auriculatum Regel & Koern  
Listed by Mitchell (1945) but name not recognized by St. John (1973).

virginicum L.  
var. virginicum  
Wild peppergrass  
Exotic  
Occasional in areas heavily browsed by goats.

Sisymbrium

altissimum L.  
Jim Hill mustard  
Exotic  
Listed by Mitchell (1945) but not seen during RBI.

officinale (L.) Scop.  
Hedge mustard  
Exotic  
Occasional, goat browsed exposed areas, central crater.
CUCURBITACEAE
(Squash Family)

Sicyos

sp.: Endemic
Occasional in Kaupō Gap. Sterile material, probably one of the two listed by Mitchell (1945).

EPACRIDACEAE
(Epacris Family)

Styphelia
douglasii (Gray) F. Muell. ex Skottsb. Kāwa'u Endemic

tameiameiae (Cham.) F. Muell. Pūkiawe Indigenous
Common throughout Crater District. There are no clear cut distinctions between this and the former species.

tameiameiae var. brownii (Gray) St. John Endemic
Listed by Mitchell (1945) but not seen during RBI. It is doubtful that this is a valid taxon.

ERICACEAE
(Heath Family)

Vaccinium

berberifolium (Gray) Skottsb. Barbery-leaved 'Ōhelo Endemic
Common on outer north face, particularly in disturbed rocky areas. Occasional in Kaupō Gap.

calycinum Sm. 'Ōhelo-kau-lā'au Endemic
Rain forest specimen. Occasional at Paliku and adjacent areas.
dentatum Sm.  
Endemic  
Occasional in shaded areas at Hosmer Grove.

reticulatum Sm.  
'Ohelo  
Endemic  
Common throughout the Crater District.

EUPHORBIACEAE  
(Spurge Family)

Euphorbia  

celastroides Boiss. in A. DC.  
var. amplexens Sherff  
Endemic  
Common in W. Kaupō Gap with scattered specimens elsewhere in the Gap.

Ricinus  

communis L.  
Castor bean  
Exotic  
Locally common, potentially troublesome weed currently confined to lower E. Kaupō Gap. See Recommendations.

GENTIANACEAE  
(Gentian Family)

Centaurium  

erythraea Rafn.  
European centaury  
Exotic  
Occasional along trails at lower elevations, W. Kaupō.

GERANIACEAE  
(Geranium Family)

Erodium  

cicutarium (L.) L'Hér. ex Ait.  
Heron's bill, filaree  
Exotic  
Along trails, common at HQ and stables area and between Nā mana o ke akua and 'O'ilipu'u, occasional in W. Kaupō Gap.
Geranium

arboreum Gray

Red-flowered native geranium
Endemic

Endemic to E. Maui.
Uncommon, gullies near Hosmer Grove.
This species is listed as rare and endangered both in
Fosberg and Herbst (1975) and on the Federal Register List

carolinianum L.
var. australe (Benth.) Fosb.

Carolina crane's bill
Exotic

Occasional in shaded disturbed habitats.

cuneatum Hook.
var. tridens (Hbd.) Fosb.

Hinahina, nohu-anu
Endemic

Variety endemic to E. Maui.
Common on outer NW face below 8000 feet.

multiflorum Gray

Occasional near Palikū and along Waikau Trail to
Halema'u'u Trail. Four varieties—canum Hbd., forbesii
(Deg. & Deg.) St. John, ovatifolium (Gray) Fosb., and
superbum (Deg. Deg. & Greenw. In Deg. & Deg.) St. John—are endemic to E. Maui. The variety superbum does not
exist in the Crater. There are several plants which are
very close to variety canum, whereas the remainder have a
mixture of the characteristics of canum, forbesii, and
ovatifolium. The varieties forbesii, ovatifolium, and
superbum are listed in Fosberg and Herbst (1975). The
varieties ovatifolium and superbum are included on the
Federal Register List (Anon. 1976). The variety canum is
listed in Mitchell (1945).
Probably appropriate for being listed but sufficient infor-
mation not available.

Pelargonium

?hortorum Bailey

Fish geranium, laniuma
Exotic

In residence area.
GOODENIACEAE
(Naupaka Family)

Scaevola
chamissoniana Gaud.
var. bracteosa Hbd.
Naupaka-kuahiwi
Endemic
Uncommon along Kaupō Trail.

LABIATEAE
(Mint Family)

Lepechinia
hastata (Gray) Epling
Pakaha
Indigenous
Indigenous to Maui and Baja California islands.
Rare in the Crater District--small population noted in
lower W. Kaupō Gap within the Crater District. Included in
Fosberg and Herbst (1975). Not included on Federal
Register List (Anon. 1976).

Mentha
rotundifolia (L.) Huds.
Apple-mint
Exotic
Occasional at Palikū.

Plectranthus
parviflorus Willd.
Spurflower
Exotic
Occasional in Kaupō Gap in exposed rocky habitats.

Prunella
vulgaris L.
Self-heal
Exotic
Occasional herb in damp shaded areas.
Stenogyne

*crenata* Gray

Crenate-leaved stenogyne

Endemic

Vine occasionally associated with māmane groves and occasionally also with *Santalum*. Two varieties have been described from Haleakalā, var. *crenata* and var. *muricata* Deg. & Sherff in Deg. Both varieties are included in Fosberg and Herbst (1975) and on the Federal Register List (Anon. 1976, 1980).

*haliakalae* Wawra

Haleakala stenogyne

Endemic


*rotundifolia* Gray

var. *rotundifolia*

Pua'a-i-naka, round-leaved stenogyne

Endemic

Endemic to E. Maui. Uncommon in gullies near Palikū.

*rotundifolia*

var. *oblonga* Sherff

Pua'a-i-naka

Endemic

Listed by Mitchell (1945) but not seen during RBI. Listed by Fosberg and Herbst (1975) and on Federal Register List (Anon. 1976, 1980).

*sessilis*

var. *hexanthoides* Deg. & Sherff in Sherff

Endemic

Endemic to E. Maui. Listed by Mitchell (1945) but not seen during RBI. Listed by Fosberg and Herbst (1975) but not on Federal Register List (Anon. 1976).
LEGUMINOSAE  
(Pea Family) 
SUBFAMILY Caesalpinoideae

Cassia

laevigata Willd.  
See Cassia occidentalis L.

occidentalis L.  
'Auko'i, coffee senna  
Exotic
Potentially problematic shrub.  
Occasional in lower E. Kaupō Gap. Listed as C. laevigata  
by Mitchell (1945) from same locality.

SUBFAMILY Mimosoideae

Acacia

koa Gray  
Koa  
Endemic
Confined to E. Kaupō Gap within the Crater District.  
Common but probably depleted from former range.

SUBFAMILY Papilionoideae

Desmodium

uncinatum (Jacq.) DC.  
Hawaiian tick-trefoil,  
Spanish clover  
Exotic
Shrubby herb occasional in lower E. Kaupō Gap.

Medicago

lupulina L.  
Black medic, trefoil  
Exotic
Occasional herb near stables and disturbed dry areas.

Sophora

chrysophylla (Salisb.) Seem.  
Māmane, mamamo  
Endemic
Locally common throughout most of the Crater but depleted  
from former range.
**Trifolium**

*Trifolium arvense* L.  
Rabbit-foot clover  
Exotic  
Occasional herb near barracks area.

*Trifolium dubium* Sibth.  
European yellow clover  
Exotic  
Occasional to common herb along almost all trails and roads.

*Trifolium procumbens* L.  
Hopclover  
Exotic  
Listed by Mitchell (1945) but not seen during RBI.

*Trifolium repens* L.  
White clover  
Exotic  
Occasional to common herb along almost all trails and roads.

**Ulex**

*Ulex europaeus* L.  
Gorse, furze  
Exotic  
This species has been declared a noxious weed by the State of Hawaii. Currently controlled in only known locality just below HQ. See Recommendations.

**LOGANIACEAE**  
*(Strychnine Family)*

*Labordia*  
sp.  
Endemic  
Listed by Mitchell (1945) but not seen during RBI.

**LORANTHACEAE**  
*(Mistletoe Family)*

*Korthalsella*  
complanata (v. Tiegh.) Engler  
Hulumoa, mistletoe  
Endemic  
Uncommon parasite in Kaupō Gap up to Paliku.
LYTHRACEAE
(Loosestrife Family)

Lythrum

maritimum HBK.

Pūkāmole
Exotic
Occasional herb in areas where goat browsing is common in Kaupō Gap.

MALVACEAE
(Mallow Family)

Malva

parviflora L.

Little mallow
Exotic
Locally common herb in stable area and uncommon along trails in Crater.

MENISPERMACEAE
(Moonseed Family)

Cocculus

ferrandianus Gaud.

Huehue
Endemic
Occasional vine in lower Kaupō Gap.

MYOPORACEAE
(Naio Family)

Myoporum

sandwicense Gray

Naio
Endemic
Uncommon tree in lower Kaupō Gap. Naio was probably more common in the Kaupō Gap in the past.

MYRSINACEAE
(Myrsine Family)

Myrsine

lanaiensis Hbd.

var. lanaiensis

Kolea
Endemic
Locally common tree in dry forest area of Kaupō Gap.
**Metrosideros**

*collina* (J. R. & G. Forst.) Gray ssp. *polymorpha* (Gaud.) Rock

var. *typica* Rock

"Ōhi'a-lehua, lehua

Rain forest tree confined to Palikū, Hosmer Grove, and occasional in Kaupō Gap, including cliffs.

*collina*

var. *glaberrima* (Lévl.) Rock

"Ōhi'a-lehua, lehua

Endemic

Rain forest tree confined to Palikū, Hosmer Grove, and occasional in Kaupō Gap.

*collina*

var. *haleakalensis* Rock

"Ōhi'a-lehua, lehua

Endemic


*sp.*

"Ōhi'a-lehua, lehua

Endemic

Occasional on W. Kaupō cliffs. Not accessible to RBI.

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**Eucalyptus**

*globulus* Labill.

Blue gum

Exotic

Tree plantation at 8500 feet and Hosmer Grove.

*robusta* Sm.

Swamp mahogany

Exotic

Hosmer Grove.

*spp.*

Exotic

Hosmer Grove Plantation, several species are present, some of which are weedy. See Recommendations.

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**Lessertiana** A. DC.

Kōlea-lau-nui

Endemic

Occasional tree at Palikū and on cliffs by trail from Pu'umāmane to Waikau.

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**MYRTACEAE**

(Myrtle Family)
NYCTAGINACEAE
(Four o'clock Family)

Pisonia

brunoniana Endl.  
Pāpala-kēpau  
Endemic

Uncommon, lower Kaupō Gap.

ONAGRACEAE
(Evening Primrose Family)

Epilobium

cinereum A. Rich.  
pūkāmole, willow herb  
Exotic

Occasional herb in disturbed areas throughout Crater District. Listed as E. oligodontum in Mitchell (1945).

oligodontum  
See Epilobium cinereum.

Oenothera

laciniata Hill  
Evening primrose  
Exotic

Included by Mitchell (1945) from Kapalaoa, probably O. stricta Ledeb. in Link.

stricta Ledeb. in Link  
Evening primrose  
Exotic

Common herb along trail and disturbed areas throughout the Crater District, misspelled as striata by Mitchell (1945).

OXALIDACEAE
(Wood Sorrel Family)

Oxalis

corniculata L.  
'Ihi, lady's sorrel  
Exotic

Occasional herb of damp shaded disturbed areas such as La'ie Cave and in W. Kaupō Gap.
PASSIFLORACEAE  
(Passion Flower Family)

Passiflora

?subpeltata Ortega  
White passionflower  
Exotic  
Potentially problematic?; presently an uncommon vine,  
E. Kaupō Gap.

PHYTOLACCACEAE  
(Pokeweed Family)

Phytolacca

sandwicensis Endl.  
var. puberulenta (Deg.) St. John  
Pōpolo-ku-mai  
Endemic  
Listed by Mitchell (1945) but not seen during RBI.  
See Recommendations.

PIPERACEAE  
(Pepper Family)

Peperomia

cockiana  
var. ovatilimba (C. DC.) Yuncker  
'Ala'ala-wai-nui  
Endemic  
Listed by Mitchell (1945) but not seen during RBI.

erthroclada C. DC.  
'Ala'ala-wai-nui  
Endemic  
Occasional, Palikū gulches.

globulanthera C. DC.  
'Ala'ala-wai-nui  
Endemic  
Listed by Mitchell (1945) but not seen during RBI.

leptostachya H. & A.  
'Ala'ala-wai-nui  
Indigenous  
Occasional, gulches E. Kaupō Gap.

tetraphylla (Forst. f.) H. & A.  
Indigenous  
Listed by Mitchell (1945) but not seen during RBI.
tetraphylla
   var. parvifolia (C. DC.) Deg. & Deg.
   Indigenous
   Listed by Mitchell (1945) but not seen during RBI.

sp.
   Endemic
   Gulches E. Kaupō Gap.

Pittosporaceae
(Pittosporum Family)

Pittosporum

confertiflorum Gray
   Hō'awa
   Endemic
   Uncommon tree in dry central to West part of Crater; Pu'umaile and near Hōlua. This species should be much more common throughout the Crater and Kaupō Gap. It has probably suffered from the impact of feral herbivores.

Plantaginaceae
(Plantain Family)

Plantago

lanceolata L.
   Narrow-leaved plantain
   Exotic
   Common herb along trails and in disturbed habitats. Abundant below Kalahaku Lookout.

major L.
   Broad-leaved plantain
   Exotic
   Occasional; Palikū Horse Pasture.

pachyphylla Gray
   Manene
   Endemic
   Uncommon herb in lava fields near Waikau, and in the forest on Kuiki. The variety of the Haleakalā specimen has not been identified yet. The variety maviensis, which is present on E. Maui, is listed in Fosberg and Herbst (1975) but not on the Federal Register List (Anon. 1976).

princeps C. & S.
   var. laxifolia Gray
   Ale
   Endemic
   Rare woody herb on cliffs of W. Kaupō Gap. This variety is included both in Fosberg and Herbst (1975) and on the Federal Register List (Anon. 1976, 1980).
virginica L.

Dwarf plantain Exotic

POLYGONACEAE
(Buckwheat Family)

Rumex

acetosella L.
Sheep sorrel Exotic
Common throughout the Crater District.

albescens Hbd.

Hu'ahu'a-kō Endemic
Rare NW outer slopes. Mitchell (1945) called this species R. giganteus Ait.

crispus L.
Yellow dock Exotic
Occasional near stable.

giganteus Ait.
See Rumex albescens.

PRIMULACEAE
(Primrose Family)

Anagallis

arvensis L.
Scarlet pimpernel Exotic
Occasional throughout the Crater District.

Lysimachia

hillebrandi Hook. f. ex Gray Pua-hekili Endemic
Listed by Mitchell (1945) but not seen during RBI. According to St. John (1973) this species is not found on Maui.
Occasional, vertical cliffs of Palikū, E. and W. Kaupō, and Ko'olau. A revision of the Hawaiian species of Lysimachia is presently near completion by Dr. H. St. John which should facilitate the identification of the Crater District's taxa.

**RANUNCULACEAE**  
*(Buttercup Family)*

*Ranunculus*

*hawaiensis* Gray  
*Makou, large-flowered native buttercup*  
*Endemic*

Previously common at Pu'unianiau but not located within the Park during RBI.

**ROSACEAE**  
*(Rose Family)*

*Eriobotrya*

*japonica* (Thunb.) Lindl.  
*Loquat*  
*Exotic*

Uncommon E. Kaupō Gap along trail.

*Fragaria*

*chiloensis* (L.) Duch.  
*var. sandwicensis* Deg. & Deg.  
'*Ōheio-papa, Hawaiian strawberry*  
*Endemic*

Occasional at Hosmer Grove, Waikau; rare in gulches near Kapalaoa.

*Osteomeles*

*anthyllidifolia* Lindl.  
*Uulei, 'ūlei, Hawaiian hawthorn*  
*Endemic*

Occasional in dry scrub vegetation.

*Prunus*

*cerasifera* Ehrh. *x salicina* Lindl.  
*Methey plum*  
*Exotic*

Occasional Palikū.
Rubus

**hawaiensis** Gray

var. **hawaiensis**

'Ākala, 'ākalakala

Endemic


**penetrans** Bailey

Prickly Florida blackberry

Exotic

Occasional, Palikū Horse Pasture, lower E. Kaupō Gap.

This species has been declared a noxious weed by the State of Hawaii. See Recommendations.

**rosaefolius** Sm.

Thimbleberry

Exotic

Occasional lower E. Kaupō Gap with Myrsine.

See Recommendations.

RUBIACEAE

(Coffee Family)

Coprosma

**ernodeoides** Gray

var. **mauiensis** St. John

Kūkae-nēnē

Endemic

Occasional cinder desert and dry scrub throughout.

**montana** Hbd.

var. **montana**

Pilo

Endemic

**montana**

var. **crassa** Oliver

Pilo

Endemic

Listed by Fosberg and Herbst (1975) but not on Federal Register List (Anon. 1976).

**ochracea** Oliver

var. **ochracea**

Pilo

Endemic

Kuiki, and above Palikū, occasional.
pubens Gray
Pilo
Endemic
Listed by Mitchell (1945) but not seen during RBI.

stephanocarpa Hbd.
Pilo
Endemic
Occasional E. Kaupō Gap.

sp.
Endemic
Unidentified species with bilobed fruit.
Lower E. Kaupō Gap.

Gouldia
hillebrandii Fosb.
Manono
Endemic
Uncommon above Palikū.

terminalis
var. parvifolia (Wawra) Fosb.
Manono
Endemic
Endemic to E. Maui.
Listed by Mitchell (1945) but not seen during RBI.

Hedyotis
centranthoides (H. & A.) Steud.
Endemic
Uncommon, trail to Kuiki.

centranthoides
f. laevis Fosb.
Endemic
Listed in Mitchell (1945) as H. laevis f. accrescens Fosb., a name not known to us. The f. vestita Fosb. is also unknown to us.

Psychotria
sp.
Endemic
On cliff in E. Kaupō Gap in remnant dry forest.
Sherardia

*arvensis* L.  
*Spurwort*  
Exotic  
Listed by Mitchell (1945) but not seen during RBI.  
Recent collection from lower Kaupō Gap confirms presence in Crater District.

**RUTACEAE**  
(Rue Family)

*Pelea*

*clusiaefolia* Gray  
*Alani*  
Endemic  
Uncommon gullies near Palikū.

*orbicularis* Hbd.  
Endemic  
According to St. John (1973) this species is endemic to W. Maui. The variety of the Haleakalā specimen has not been identified yet. Both varieties are included in Fosberg and Herbst (1975) and on the Federal Register List (Anon. 1976).

**SANTALACEAE**  
(Sandalwood Family)

*Santalum*

*ellipticum* Gaud.  
'Ili-ahi-a-lo'e  
Endemic  
Locally occasional, in a few areas of lower central Kaupō Gap.

*haleakalae* Hbd.  
'Ili-ahi, Haleakala sandalwood  
Endemic  
Endemic to E. Maui.  
Locally occasional, scrub above 6000 feet.  
This species is listed as depleted in Fosberg and Herbst (1975). It is not included on the Federal Register List (Anon. 1976).
Dodonaea

*Dendrocarpa* Sm.

'Α'αλι'i

Endemic

Common throughout the Crater District. The variety of the Haleakalā specimens has not been determined yet. The varieties amplexicaulis and eriocarpa, which occur on E. Maui, are listed as depleted or of uncertain status in Fosberg and Herbst (1975). Neither variety is included on the Federal Register List (Anon. 1976). Mitchell (1945) lists varieties degeneri Sherff and hillebrandii Sherff.

*Sandwicensis* Sherff

A'ali'i

Endemic

Planchonella

*Sp.*

E. Kaupō Gap in remnant dry forest.

Broussaisia

*Arguta* Gaud.

Kanawao

Endemic

Occasional, confined to Palikū gulches.

Physalis

*Peruviana* L.

Poha, husk tomato

Exotic

Occasional along Kaupō Trail.

Solanum

*Nigrum* L.

Exotic

Occasional lower Kaupō Gap along trails.

Listed by Mitchell (1945) as *S. nodiflorum*.
nodiflorum
See Solanum nigrum.

sodomeum L.
Apple of Sodom
Exotic
Occasional lower Kaupō Gap.

UMBELLIFERAE
(Carrot Family)

Poeniculum
vulgare Mill.
Sweet fennel
Exotic
Occasional in stables areas.

Petroselenum
crispum (Mill.) Nym.
Parsley
Exotic
Behind Hōlua Cabin.

Sanicula
sandwicensis Gray
Tall Hawaiian sanicle
Endemic
Rare, 'Ō'ilipu'u and Lā'ie kīpuka.
Formerly reported as 'not uncommon' (Degener 1933-present).
Listed in Fosberg and Herbst (1975) and on the Federal
Register List (Anon. 1976, 1980).

URTICACEAE
(Nettle Family)
Pilea
peploides (Gaud.) H. & A.
var. peploides
Indigenous
Uncommon, localized in gullies at Palikū, Hōlua Spring,
W. Kaupō cliff; damp areas.

Pipturus
sp.
Endemic
Uncommon lower E. Kaupō Gap in gullies.
VERBENACEAE
(Verbena Family)

Lantana

camara L.  
Lantana, lākana, makinolia-hihiu  
Exotic
Presently uncommon at southern boundary of the Crater District in Kaupō Gap. This species has been declared a noxious weed by the State of Hawaii. See Recommendations.

Stachytarpheta

jamaicensis (L.) Vahl  
Jamaica vervain, ʻōwī, oi  
Exotic
Occasional, lower Kaupō Gap.

Verbena

litoralis HBK.  
Haʻuowī, Weed verbena  
Exotic
Occasional in heavily goat infested areas.

VIOLACEAE
(Violet Family)

Viola

tracheliifolia Gingins  
Pamakani  
Endemic
Uncommon, W. Kaupō Cliffs.
APPENDIX II

DISTRIBUTION MAPS OF THE SPECIES

In order to cut the cost of publishing this report the distribution maps of the individual species have been produced as an addendum. Copies have been deposited in the following localities for reference.

Cooperative National Park Resources Studies Unit, University of Hawaii, Honolulu.

Hamilton Library, University of Hawaii, Honolulu.

National Park Service Hawaii State Director's Office, Honolulu.

National Park Service Western Region Office, San Francisco.

Haleakala National Park, Maui.