

REVISED  
ENVIRONMENTAL IMPACT STATEMENT  
for the proposed  
Expansion of Hapu'u Harvesting Activities  
at Kilauea Forest Reserve  
Ka'u District, Island of Hawaii

Office of Environmental Quality Control  
Office of the Governor  
550 Halekiauwi Street  
Tani Office Building, Third Floor  
Honolulu, Hawaii 96813



DECEMBER, 1978

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## SUMMARY

This Revised EIS was prepared and submitted to the Environmental Quality Commission, pursuant to Chapter 343, HRS, relating to Environmental Impact Statements. The approving agency is the Board of Land and Natural Resources (BLNR), whose mailing address is: P.O. Box 621, Honolulu, Hawaii 96809. The BLNR is considering a request by Kamehameha Schools/Bernice Pauahi Bishop Estate for the purpose of commercially harvesting hapu'u on 300 acres of Conservation designated lands in the Kilauea Forest. The request is identified as: "Conservation District Use Application for Private Recreational Use for Commercial Logging Operations and Portable Sawmills, Kilauea, Crater, Ka'u, Hawaii."

The Kamehameha Schools/Bernice Pauahi Bishop Estate is the landowner of record. On July 1, 1966, License 27 was issued by the Estate to Niu Nursery to harvest hapu'u. The lease agreement is for twenty (20) years and covers 2,956 acres (of which the 300 acres requested is a portion).

The preparer of this Revised EIS is Environmental Communications, Inc., whose mailing address is P.O. Box 536, Honolulu, Hawaii 96809.

This Revised EIS is an applicant action as defined in the State's Environmental Quality Commission's, Environmental Impact Statement Regulations.

Proposed Action: Request to the BLNR that commercial hapu'u harvesting be allowed in a 300-acre area in the Kilauea Forest. The present 150 acres on which hapu'u has already been harvested (for the past seven years)<sup>1</sup> will

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<sup>1</sup> The initial 150 acres were approved by the BLNR in 1971 in order to monitor and allow data gathering to determine the impact of selective hapu'u harvesting.

be exhausted in about three (3) years and additional acreage is needed in order to continue the hapu'u industry; Niu Nursery produces 95 percent of the hapu'u marketed in the State. The proposed area will be harvested in the manner presently employed. That is, only the fallen or downed portions of the hapu'u are harvested. The immature or standing tree hapu'u will not be disturbed unless it must be cleared for a skid trail or the main haul road. Light tractors and "cats" are used to minimize the impact on the forest area. The hapu'u is carefully removed (only two to three acres are harvested at any one time), cut into one-foot logs, split into quarters and cored, then placed into bins which are sledged out of the skid trail onto the main haul road. After this operation, efforts are made to rehabilitate the skid trail by scattering live fern tops and allowing the surrounding plants to "close" the trail via regrowth. A total of sixteen (16) conditions were imposed by the BLNR so that harvesting operations would not adversely affect the hapu'u ecosystem and to attempt to harvest hapu'u utilizing a sustained harvesting approach.<sup>1</sup>

Project Location: The requested site is situated in the Kilauea Forest Reserve, on the island of Hawaii. The site is a 300-acre section bordering the southeast boundary of the existing 150-acre harvesting operation.<sup>2</sup> It is 3.5 miles north of the Kilauea Military Camp, abutting the Upper O'iaa Forest Reserve on the northeast and the land of Keauhou on the west. The present and proposed harvesting areas are bordered by forest and pasture lands.

<sup>1</sup> The initial intent was for sustained harvesting, although present research has not shown whether or not it is possible.

<sup>2</sup> The original 150-acre area presently being harvested was approved for the purpose of research.

Statement of Need: The acreage requested is necessary to continue providing hapu'u to orchid and other flower growers throughout Hawaii. Niu Nursery currently produces 95 percent of the marketed hapu'u in the State; all of their hapu'u is obtained from the Kilauea area. In their thirty (30) years of marketing hapu'u, they have found the hapu'u from this area is best for potting orchids and other flowers. Hapu'u itself is considered to be the most desirable potting material because it lasts five (5) years or more and is relatively inexpensive. (\$.40 of hapu'u per potted, mature orchid plant).

It is estimated that hapu'u industry sales are over \$370,000 annually; more importantly, it affects a portion of the flower industry, which had in 1976, estimated sales of \$2.5 million.

Affected Environment: The hapu'u forest is dominated by giant tree ferns (*Cibotium chamissoi*, *Cibotium glaucum*). The overstory vegetation consists primarily of scattered ohia trees with multiple stems and stilt roots. The understory in the area is primarily very dense growth of hapu'u with occasional specimens of olomea, pilo, puahanui, kolea, clermontia, ohelo, mamake, olapa, akala, puhe, mapele, ohe ohe, alani, hame, Hawaiian mint, maile and various other small fern species and plants.\* Rainfall is 110 inches annually; fog is frequent.

Avifauna seen on the project site (by Dr. Berger) included the Hawaiian Hawk, the Hawaiian Thrush (Apapane), Iiwi, Japanese White-eye, Red-billed Leiothrix, and Ricebird or Spotted Munia. There were signs of the presence of Japanese Blue Pheasant. Additionally, other birds sighted at higher elevations in the Kilauea area included: the Hawaii Creeper, Hawaii Akepa, Akiapolaau, and Ou.\*

\*Scientific names are provided in the text; assumably, these birds are also present in the proposed 300-acre site. The Hawaii Creeper, Hawaii Akepa, Akiapolaau and Ou are endangered species.

Probable Impacts:

- (1) No adverse or significant impact was foreseen in the following areas: climate, avifauna, air quality, water quality and noise.
- (2) Exotic weeds are invading the hapu'u forests along the main haul road and the harvested area. Because there are little or no exotic weeds in the undisturbed portions of the hapu'u harvesting area prior to harvesting, an adverse negative impact is the invasion of exotic weeds.
- (3) Hawaii's only endangered plant species on the Federal list of endangered plants, *Vicia menziesii*, may exist on the requested 300-acre site. A botanical survey will determine its existence on the site.<sup>1</sup> If it is assumed that species are located in the 300-acre area and that mitigation measures are not taken or shown to be effective, this endangered plant species may be damaged or destroyed in the 300-acre area.
- (4) The hapu'u industry would continue to flourish if the request is approved. Potential sales could be well over \$600,000 annually; it would also affect a growing and profitable flower industry. In total, the hapu'u harvesting and processing (shredding, packaging in Honolulu) affects an equivalent of fifteen (15) full-time jobs. Indirectly, the hapu'u industry affects over 1,000 jobs in the flower and related (retail sales) industries.

Mitigation Measures: The following mitigation measures were recommended:

- (1) Determine the existence of *Vicia menziesii* and other rare and/or endangered endemic plants on the project site. Protect the areas where these plants are located.

<sup>1</sup> The findings of the botanical survey are provided in Exhibit VI.

- (2) Establish a herbicide program with the requested assistance of the Department of Agriculture's weed control branch.<sup>1</sup>
- (3) Harvest only 90 percent of the fallen hapu'u logs. The remaining 10 percent would remain to serve as a seed bed for the ferns and plants in the hapu'u forest.
- (4) Continue the conditions of the harvesting operations and the periodic inspections by the foresters in order to monitor harvesting operations and determine if any adverse problems may exist or are occurring.
- (5) Allow private and university-oriented research in the hapu'u ecosystem.
- (6) No re-disturbance of a harvesting area should be permitted.
- (7) No planting of trees or manipulations other than fern top establishment and weed control measures should be allowed.

Alternatives: Three (3) basic alternatives were considered: a different site, an alternative potting medium and no action.

Unresolved Issues: Three (3) unresolved issues have been recognized. First, is the question as to the uniqueness of this hapu'u forest. Second, whether or not the hapu'u forest will be destroyed due to harvesting operations. And third, should the proposed project be discontinued unless the results of the research have determined that there is no significant impact on the hapu'u forest.

Commenting Agencies and Individuals: A total of nineteen (19) letters were received in response to the EIS Preparation Notice for this project. Of these nineteen letters, eight (8) provided substantive comments. Dispositions to these comments were provided and where appropriate, it was noted that the information requested would be incorporated into the EIS.

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<sup>1</sup> Such a herbicide program must be carefully planned and implemented because desirable plant species could also be eliminated.

There were a total of twenty-three (23) responses to the EIS. Of these, twelve (12) provided substantive comments. Dispositions to these comments were provided, and where necessary, corrections and additions were made to the Revised EIS. On December 6, 1978, Environmental Communications, Inc. requested an extension from the BLNR to the fourteen (14) day deadline with respect to submittal of the Revised EIS. This extension was approved on December 6, 1978. The Revised EIS was submitted to BLNR and the State Environmental Quality Commission on December 20, 1978.



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## I. PROJECT DESCRIPTION

### A. Project Location

As shown on Figures 1 and 2, the area of the proposed hapu'u harvesting is situated in the Kilauea Forest Reserve on the island of Hawaii. The requested site is a 300-acre section bordering the southeast boundary of the existing 150-acre harvesting operation. It is 3.5 miles north of the Kilauea Military Camp, abutting the Upper O'laa Forest Reserve on the northeast and the land of Keauhou on the west. The present and proposed harvesting areas are bordered by forest and pasture lands.

### B. Statement of Objectives<sup>1</sup>

The giant tree ferns (*Cibotium chamissoi*, *Cibotium glaucum*),<sup>2</sup> locally referred to as hapu'u, yield fiber material from their trunks which serve as a potting medium for the growing of orchids, anthuriums, bromeliads and other ornamental flowers. Hapu'u is considered premium potting material for orchid and anthurium growers. When orchids and anthuriums are planted in this medium, the fibers remain viable and whole for five (5) years or more.<sup>3</sup> This quality is extremely important for the following reasons:

1. Rotted fiber becomes water-logged and will cause plant roots to rot. The host material used prior to hapu'u was osmunda, a fibrous material harvested from bogs in countries such as Japan,

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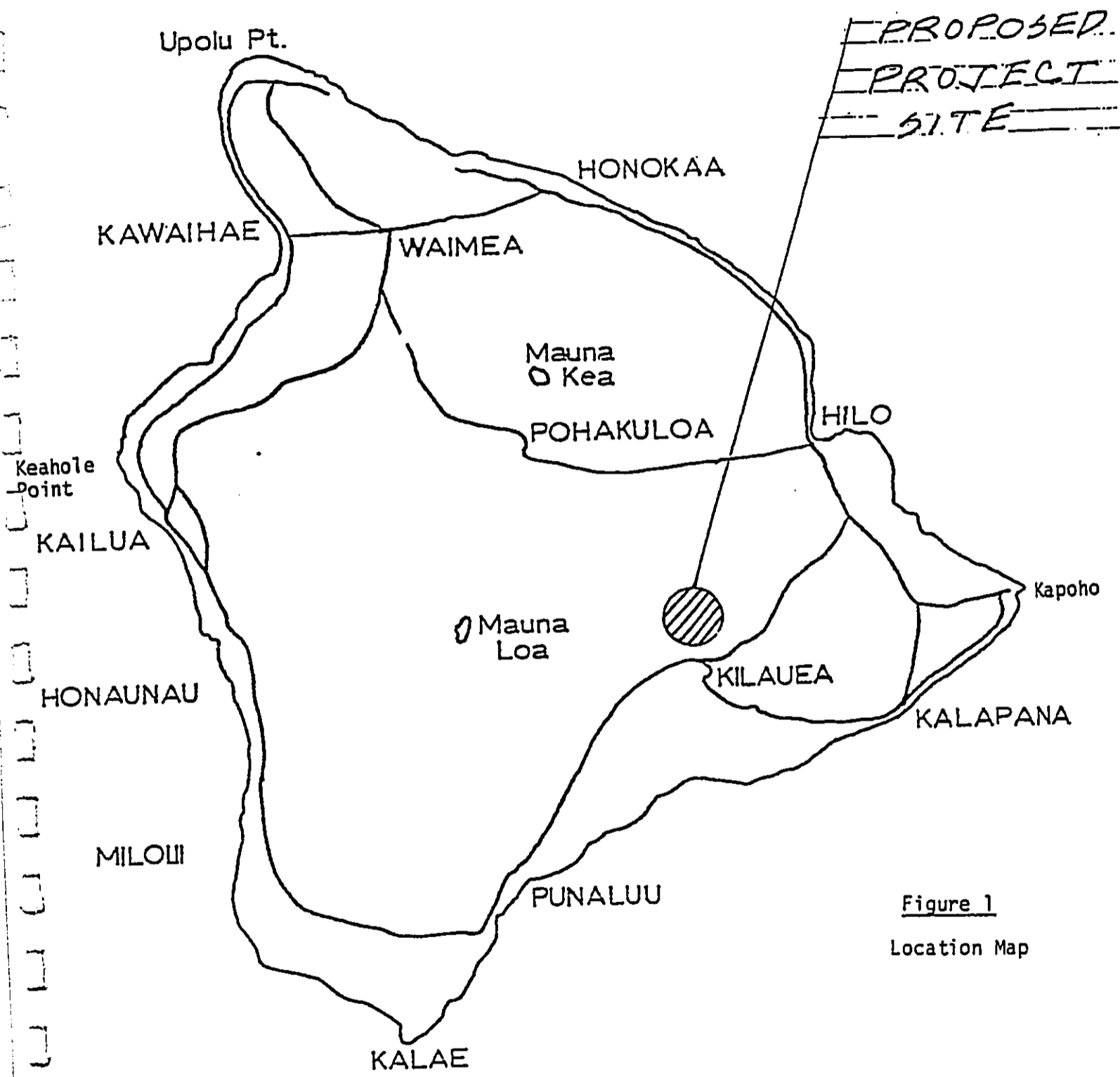
<sup>1</sup> Information on hapu'u as a potting medium was provided by Mr. T.Y. Goo, founder and past President of Niu Nursery.

<sup>2</sup> In discussion with Dr. Charles Lamoureaux, Professor of Botany, University of Hawaii at Manoa, he identified these two species as those being harvested for their hapu'u fiber.

<sup>3</sup> Although it is not uncommon for the hapu'u to be used for 10 to 15 years.

Germany and the U.S. (Florida). This material decayed within a year of planting and necessitated the removal of all decayed material around the roots causing considerable damage to the plant roots, thus setting back plant growth. The periodic repotting (once every 1 to 2 years) of every orchid

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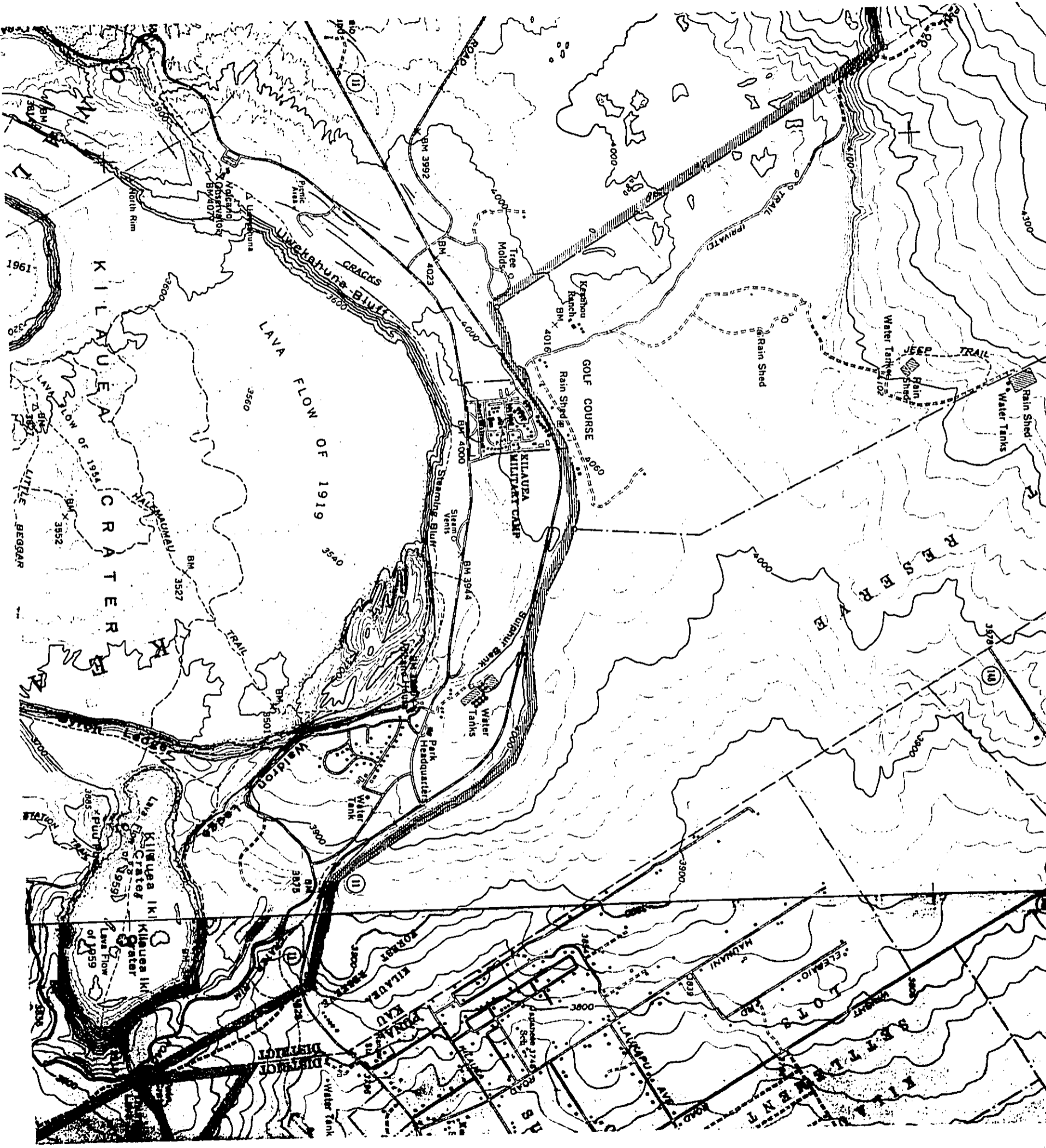


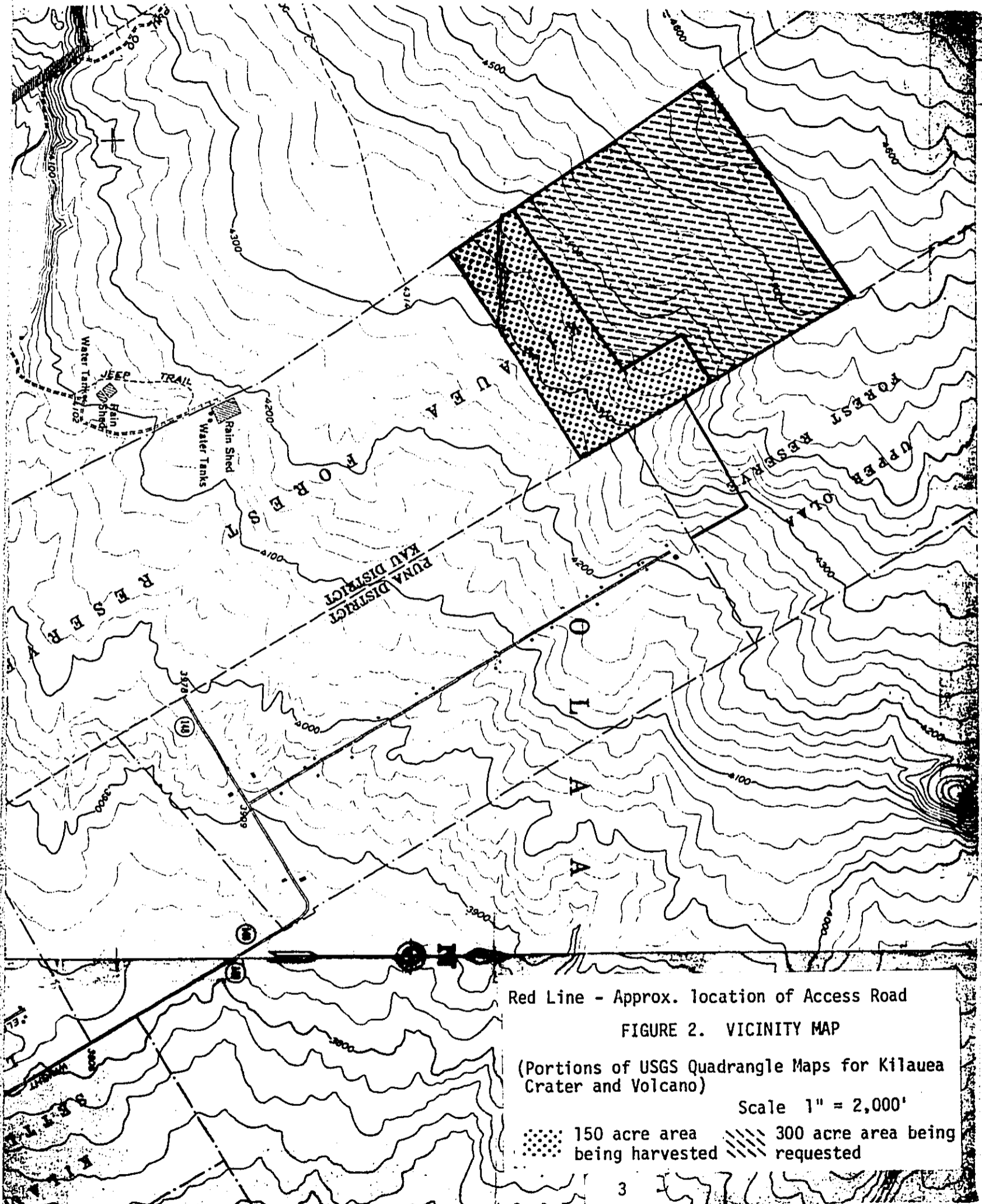
PROPOSED  
PROJECT  
SITE

Figure 1  
Location Map

SCALE: 1 inch=approximately 12 miles







Red Line - Approx. location of Access Road

FIGURE 2. VICINITY MAP

(Portions of USGS Quadrangle Maps for Kilauea Crater and Volcano)

Scale 1" = 2,000'

150 acre area being harvested
  300 acre area being requested



plant was a considerable and costly task.

2. Mature orchid plants may be divided yearly, or once every two years, in order to propagate more plants. The divided plants in the hapu'u are repotted undisturbed.<sup>1</sup> These plants are able to produce flowers with a new lead growth without going through a resting period, thus insuring the grower a greater number of flowers.

There is no question that hapu'u is unmatched as a potting medium. For plant exporters whose plants are shipped all over the world, their buyers are most satisfied when their plants arrive with healthy root structures growing in hapu'u.<sup>2</sup>

Additionally, despite its premium value as a potting medium, hapu'u is relatively inexpensive to the grower. It is estimated, based on market cost, that an average potting container of hapu'u costs about \$.40.

Harvesting hapu'u is a small (\$371,250.00),<sup>3</sup> but viable industry<sup>4</sup> which has gained Statewide prominence and is considered a valuable part of Hawaii's economy. The non-commercial anthurium, orchid and bromeliad growers are directly dependent on locally produced hapu'u products.

In the past, the hapu'u harvested was uncontrolled and hapu'u was removed thoroughly from a site. Later the site was abandoned and/or con-

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<sup>1</sup> At present, hapu'u is the only known potting medium which can allow divided plants to remain undisturbed after repotting.

<sup>2</sup> Orchids exported in hapu'u require an inspection certificate from the State Department of Agriculture's Plant Quarantine Branch. Additionally, an approved form providing clearance for the exported plants is required.

<sup>3</sup> Niu Nursery figures only. Based on the harvesting of 55,000 cubic feet of hapu'u per year at the average retail price of \$6.75.

<sup>4</sup> Niu Nursery estimates that they represent 95% of the hapu'u harvested commercially.

verted to a more land intensive use. Eventually, the harvesters found that hapu'u forests were getting less accessible and merchantable hapu'u stands in private ownerships gradually became harder to come by.

As stated in the Division of Forestry's progress report, "Kilauea Hapu'u Harvesting Status Report," dated January 27, 1977, "A sustained-yield hapu'u management program was viewed as a possible solution. Here, stringent conditions are specified in a harvesting plan. Probably the most important stipulation is the selective harvesting method, where only the merchantable and inactive portion of the fern is removed, and the tract can be managed for subsequent hapu'u resources." (It should be noted that it would be premature to claim that a "sustained yield hapu'u management program" is viable. Data is still being gathered and evaluated to determine the impact of the selective harvesting on the hapu'u forest.)

C. Project Background

Previous to the use of fern fiber, orchid growers imported osmunda fiber from Europe and Florida. It proved unsatisfactory due to its high shipping cost and rapid decay in a tropical climate. Anthurium growers used taro peeling, but the supply became limited and difficult to obtain, so some other medium had to be considered. Azalea and chrysanthemum growers used peat moss from Canada; however, the cost of peat was too expensive due to the high shipping cost.<sup>1</sup>

The first inexpensive source of fern for Niu Nursery was furnished by inmates of the Kulani Correctional Facility. The first purchase of fern chunks from this source was in the early 1950's; this remained the chief source of supply for Niu Nursery until the 1960's when the facility phased out its hapu'u harvesting operation.

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<sup>1</sup> The cost of shipping was as great as the cost of the peat moss itself. (This was attributed to the shipping costs being calculated on cubic volume instead of net weight.)

To replace this source, Niu Nursery's search led them to the Wright Road area (adjacent to Kulani Correctional Facility). From 1961 to 1970, hapu'u was harvested on farm lots sold to farmers by the State, thereby helping them to clear their land for crop planting. This supply source is no longer available. Additionally, it was not a source of premium hapu'u. During this period, Niu Nursery cut 1,500 to 2,000 cubic feet of fern per acre. Of this amount, 20 percent was mature and excellent fern material.<sup>1</sup> The immature tree fern produces a very soft fiber with a great deal of yellow fuzz on it. It makes for very poor potting material because the fern sours quickly and

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<sup>1</sup> That is, the fallen or downed portions of the hapu'u.

decays, causing root damage to the orchids, which requires periodic repotting. Some of the poor grade fern material harvested here was used as soil conditioners.

In 1966, Niu Nursery, Ltd. attempted to secure a long-term supply of hapu'u for its operation by negotiating a hapu'u harvesting contract with the Bernice P. Bishop Estate for the entire Kilauea Forest Reserve tract (approximately 2,956 acres).<sup>1</sup> This land is within the Conservation District and is subject to Regulation 4 of the Department of Land and Natural Resources; specifically, in the Protective (P) and Resource (R) sub-zones. Any proposed land use change on Conservation zoned land requires approval of the BLNR.

On April 16, 1971, the Bishop Estate submitted an application requesting hapu'u be harvested on their Kilauea holding (TMK 9-910:7). A public hearing was held by the Board of Land and Natural Resources on August 3, 1971. The testimonies and comments submitted by the environmental organizations and some individuals were against the harvesting of hapu'u. The reasons cited for their opposition were the need to preserve the pristine condition of the hapu'u forest, the adverse impact it would have on the forest (introduction of exotic weeds) and on the native fauna, and the unknown nature of a sustained-yield management program. On October 8, 1971, the Board of Land and Natural Resources reduced the harvesting acreage request from 2,956 to 150. The 150 acres were to serve as a "test" to determine the success of a sustained-yield management program, and to study the impacts of hapu'u harvesting. The Board also included sixteen (16) conditions (see Exhibit I) that would be supportive of a selective harvesting operation which was hoped to cause minimal impact; the Division of Forestry was designated the enforcing body.

Summarizing the progress of the current hapu'u harvesting operations since the Board's approval,<sup>2</sup> the staff Summary to the Board of Land and

<sup>1</sup> The 150 acres has provided Niu Nursery the opportunity to selectively harvest the mature and fallen logs which are the source of the most desirable potting material, an up-grade from the quality of ferns from the cleared farm lots.

<sup>2</sup> Correspondence of July 27, 1978, REF: HA-5/12/78-1054

Natural Resources noted:

"A review of the 16 conditions of use, then imposed, reveals that the hapu'u harvesting operations were placed under the close supervision of the Division of Forestry, DLNR, whose responsibility amongst others, was to monitor the effect of the harvesting on forest regeneration and noxious weed infestation. To this end, the Forestry Division devised a study plan, later becoming the Hapu'u Harvesting Plan agreed to by the trustees of the Bishop Estate on February 24, 1972 and subsequently approved by the State Forestry on March 10, 1972. However, before implementing the plan, the Institute of Pacific Islands Forestry, a federal entity, called upon for assistance, then conducted a supplementary research whose objective was to secure before and after effect data.

At this writing, the previously approved application, filed as CDUA-HA-71/4/16-192, indicates three status reports were written by the Forestry Division. Of the three, two are appended to the basic file, prepared in 1975 and 1976(?). Reference is made to an initial report presented to the Land Board in September, 1974.

In summarizing both reports, despite moderate success in the regrowth of hapu'u from live fern tops and reasonable economic (sic, return?) from the logging operations and returns, primarily due to the sustained-yield plan prescribed by the Division of Forestry, noxious weed infestation continues to be a problem for which effective controls have yet to be developed. Although herbicides have been employed along working roadways, the invasion and control of noxious weeds will be constantly monitored.

The 1975 report notes that woody native species are taking advantage of temporarily exposed areas. Such species include mamaki (sic, mamake), kopiko, olomea, pilo, ohia, etc. Additionally, the report states that the operation employed the services of four men for two years with about 55,200 cubic feet of hapu'u fiber harvested at at return of \$6,624 to the landowner. The later report shows that Niu Nursery since September, 1974 to December 31, 1976 harvested 123,392 cubic feet of hapu'u products from approximately 31 acres, yielding \$7,022 in revenue to Bishop Estate, an average net return of \$226.54 per acre."

Table I shows the amount of hapu'u harvested since the harvesting operations began.

At this time, the current request for an additional 300 acres is essential for the long-range operational sustainment of the Niu Nursery hapu'u business. Expenditures for processing equipment and new warehouse space would not be feasible unless a long-term supply of hapu'u can be secured. (It is estimated that if present harvesting continues, the

TABLE 1  
 AMOUNT OF HAPU'U HARVESTED AND REVENUE TO THE BERNICE P. BISHOP ESTATE

<u>YEAR</u>	<u>AMOUNT OF CUBIC FEET REMOVED</u>	<u>REVENUE TO BISHOP ESTATE</u>
1971 (3 month period)	6,400	\$ 192.00
1972	12,288	368.64
1973	68,096	2,042.88
1974	61,440	4,140.80
1975	51,840	3,113.60
1976	50,176	3,431.40
1977	47,488	3,706.32
1978 (Jan.-Apr.)	15,616	835.34

remaining 30 to 45 acres out of the original 150-acre area will be exhausted within two years.)

D. General Description of the Action's Technical, Economic, Social and

Environmental Characteristics

Because the action involves the harvesting of the hapu'u, the operational procedure is described below. It is felt that this description and the photographs (on pages 11, 12 and 13) will orient the reviewer to the harvesting process, which is, in effect, the proposed action.

These harvesting practices are presently taking place, and if the application is approved, they will continue.

The Kilauea hapu'u harvesting operation as approved (1971 for 150 acres) by the Board of Land and Natural Resources stems from a selective harvesting approach. Only the mature or downed portion of the hapu'u is removed.<sup>1</sup> This mature or downed portion is the premium product being sought, for although some of the fern is still alive,<sup>2</sup> the adventitious root (the fiber) which surround the trunk are decaying and provide a material which can be easily shredded and used for potting. Standing, live hapu'u are not logged, but left to grow and produce additional fiber. These currently marginal specimens will hopefully continue to grow.

Access to the present harvesting site is via a solid road base of rock and gravel. Permission was granted Niu Nursery in May, 1966 for a right-of-way over a section of the proposed Wright Road extension. This rock and gravel road is approximately 3,500 feet in length (from the end of

<sup>1</sup> The average diameter of the hapu'u logs being harvested is between 10 to 12 inches. Normally logs less than 8 inches are not taken.

<sup>2</sup> The tree fern continues to grow even though a portion which is fallen may be decaying; the portion which is still growing is left unharvested and continues to grow.

Wright Road to the maintenance shed).<sup>1</sup> The access road is shown in Figure 2.

From the maintenance shed (where the harvesting equipment is kept and the hapu'u stored in containers), access to the harvesting site is via the

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<sup>1</sup> This access road will also be used for the 300-acre site. No other access road is planned.

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main haul road. The main haul road is unpaved and approximately ten (10) to twelve (12) feet wide. Presently, the main haul road is about 4,000 feet in length. This road is primarily used to haul the hapu'u out of the harvesting site to the maintenance shed. From the main haul road, the skid trails are cleared (about six feet wide) to allow the harvesters to enter an area where the hapu'u is found.

The operational procedure is as follows:<sup>1</sup>

1. The harvesters conduct a systematic search for downed logs. These logs are then carefully removed with minimal disturbance to the growing portion of the fern.
2. The cut logs are winched out to the skid trail. The skid trail is a partially cleared path (about six feet wide) from the haul road leading into the site of the hapu'u harvesting. In order to minimize residual forest damage, the logs are carefully guided out. This reduces the rehabilitation work and also shows a long-range management, sustained-yield concern.
3. The skid trails are located approximately 200 feet apart, perpendicular to the main haul road. The logs are winched out as much as 100 feet.
4. As the logs come out to the skid trail or landing, they are immediately cleared of all dirt and other foreign debris with hoes and cane knives.
5. Once there is an adequate accumulation of logs, the entire crew concentrate their efforts into cutting the logs in foot-long lengths. These are stacked and the core is cut out.
6. These logs are then loaded into cord-size containers and sledged

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<sup>1</sup> As abstracted from the Division of Forestry report, "Kilauea Hapu'u Harvesting Status Report," January 27, 1977. This is presently being practiced by the harvesters.



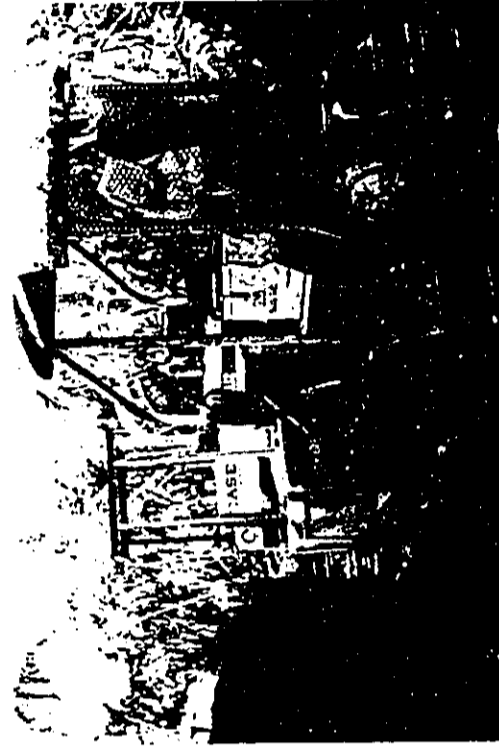
1 Maintenance shed where harvesting equipment and supplies are kept.



2 The beginning of the main haul road.



3 The skid road being used (10/7/78).



4 Light harvesting equipment, "cats" are used to minimize impact in the harvesting area.



5 Downed logs are found and cleared in the forest.



6 Downed logs are carefully removed, leaving the growing portions (as indicated).



7 The logs are winched out to the skid trail.



8 Logs being cleared of dirt and other foreign debris using hoes and cane knives.



9 The crew then cuts the logs into foot-long lengths.



10 Cross-section of a cut log.



11 Log sections are stacked and cored with cane knives.



12 The resulting "chunks" of hapu'u are put into bins and sledged out.

out to the main haul road to be stored in the maintenance shed.

7. With the use of small tractors, a filled container is carefully replaced with an empty one. The emphasis again is to minimize vegetation damage. The Board specified the use of these lighter machinery which is in harmony with the over-all operation.

Condition number 6 of the Conditional Use Permit approved in 1971, states that only one tractor is to be used. As was pointed out by the Office of Environmental Quality Control (OEQC) in their comments on the EIS, photo number four shows two tractors in the harvesting area. This matter was referred to Mr. T. Y. Goo of Niu Nursery, who provided us with the following information.

"Only one tractor is used at any one time for the harvesting operations. The second tractor is in the harvesting area primarily to tow the other tractor when it gets stuck in muddy areas." Mr. Goo indicated that the district Forestry office is aware of this situation and that Niu Nursery has not received any complaints about this second tractor in the field.

8. After the area has been selectively harvested, the skid trails and openings are scattered with live fern tops. Two to three months later, the area begins to revegetate.

The logs are sent to Honolulu (at least on a weekly basis) via barge, in bins of 128 cubic feet.

The harvesting crew consists of three (3) full-time workers. Two to three part-time workers are also involved during summer vacations and on weekends. The harvesting crew work as independent contractors (paid on the basis of hapu'u harvested) and must adhere to the conditions (Exhibit I) established by the Board of Land and Natural Resources. Some skill and ability in operating harvesting equipment, in addition to a sound

physical condition, are job qualifications.

If the additional 300 acres is approved, the harvesting crew will remain the same.<sup>1</sup>

The proposed action, if approved, will require either a relocation and/or expansion of the maintenance shed. The present maintenance shed (shown in photograph 1), is approximately 500 square feet. If the project is approved, it is likely that the shed would be enlarged to approximately double that size, and for security purposes, enclosed and the equipment locked up. The relocation/expansion of the maintenance shed is not anticipated to be a significant impact because the area cleared would be less than 20,000 square feet and the structure erected within a few days, without the use of heavy equipment.

In Honolulu, the hapu'u is taken to the Niu Nursery warehouse (located near the airport) where it is graded. Depending on its quality, the hapu'u is either shredded, ground for use as a soil conditioner or left in chunks and packaged to be distributed and sold to commercial outlets and nurseries throughout the State. The equivalent of ten (10) full-time jobs are directly supported by the processing, packaging and distribution of the hapu'u at Niu Nursery.

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<sup>1</sup> Work efficiency measures will be put into effect (e.g. hiring someone else to take the hapu'u to the harbor, leaving the tractor in the working area) so that the amount of hapu'u harvested will likely increase.

Personnel in Honolulu (Niu Nursery) may increase to the equivalent of three (3) to four (4) full-time jobs should the additional 300 acres be approved and harvesting increases.

The yield is expected to be approximately 7,680 cubic feet per month, or a yearly volume of 92,160 cubic feet. The 1978 retail dollar value<sup>1</sup> of this hapu'u is approximately \$622,080 (\$6.75 per cubic foot).

E. Use of Public Funds or Lands for the Proposed Action

No public funds or lands will be directly utilized for the hapu'u harvesting. However, indirectly, State monies will be expended through the processing of the Conservation District Use Application and the further follow-up of State foresters in insuring that the conditions of harvesting the hapu'u are met.<sup>2</sup> The time and monies involved in this respect are dependent on the number of visits made and time spent by the foresters at the harvesting site. This cannot be estimated at this time.

F. Phasing and Timing of the Proposed Action

The remaining portions to be harvested from the present 150 acres will be exhausted in two years. However, a continual source of hapu'u must be obtained in order for Niu Nursery to fulfill its' sales commitments. If the 300-acre expansion is approved, Niu Nursery expects the acreage to be harvested over the next twenty-five (25) to thirty (30) years.

Comments on the EIS noted that this appeared to be a much longer time period considering the planned increase in hapu'u production. A check with Mr.

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<sup>1</sup> Based on an average retail price of \$6.75 per cubic foot.

<sup>2</sup> If the CDUA is approved and this becomes a condition that the BLNR mandates.

T. Y. Goo of Niu Nursery (from whom the information was originally obtained), indicates that the information on the output of hapu'u logs and the time required for harvesting is correctly stated. He stated that the harvesting contractor has generally surveyed the 300 acres involved and found that the density and amount of fallen hapu'u logs are much greater in this area. The harvesting contractor estimates that it would require 25 to 30 years to harvest, notwithstanding a greater rate of harvesting. Niu Nursery's present plan no longer calls for additional personnel on the harvesting crew (as indicated in the EIS). The work hours for the present crew are expected to increase by incorporating production efficiency measures (e.g. allowing the tractor to remain in the harvesting area, having people other than the harvesters take the hapu'u logs to the pier).

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## II. DESCRIPTION OF THE ENVIRONMENTAL SETTING

### A. General Site Observations

Based on general site observations, it was noted that the hapu'u forest (the 150 acres being harvested)<sup>1</sup> consists of dense vegetation dominated by the giant tree fern (many of which are eight to fifteen feet high).

The overstory vegetation consists primarily of scattered ohia trees with multiple stems and stilt roots. A few naios, kopikos and kaus also occur. The understory in the proposed harvesting area is primarily very dense growth of hapu'u with occasional specimens of olomea, pilo, puahanui, kolea, clermontia, ohelo, mamake, olapa, akala, opuhe, mapele, ohe ohe, alani, hame, Hawaiian mint, maile and various other small fern species and other plants.<sup>2</sup> (More information on flora is provided in the Botanical Survey, Exhibit VI.)

### B. Physical Geography

1. Soil. The U.S. Soil Conservation Service and the University of Hawaii Agricultural Experiment Station, in a report entitled, "Soil Survey of the Island of Hawaii," indicate that the soils are Puaulu silt loam, 0-10 percent slopes and Piihonua silty clay loam, 6-10 percent slopes. Puaulu silt loam averages more than 60 inches deep, and its' erosion hazard is slight. Piihonua silty loam is more than 40 inches deep over unconforming 'pahoehoe' or 'aa' lava, and its' erosion hazard is moderate. Alternate agricultural land uses for both of these soils include truck crops,

<sup>1</sup> Based on personal communication with State foresters, the 300 acres consist of similar forest types with koa trees being more noticeable as the elevation increases.

<sup>2</sup> The scientific names for these species are identified in Table 2.

TABLE 2\*

Partial List of Plants Found in the Vicinity of the  
Proposed 300-Acre Site

<u>Hawaiian Name</u>	<u>Scientific Name</u>
olomea	<u>Perrotletia sandwicensis</u>
pilo	<u>Coprosma rhynchocarpa</u>
puahanui	<u>Broussaisia arguta</u>
kolea	<u>Myrsine sandwicensis</u>
clermontia	<u>Clermontia sp.</u>
ohelo	<u>Vaccinium sp.</u>
mamake	<u>Pipterus albidus</u>
olapa	<u>Cheirodendros trigynum</u>
akala	<u>Rubus sp.</u>
mapele	<u>Cyrtandra sp.</u>
ohe ohe	<u>Tetraplasandra meiandra</u>
alani	<u>Pelea clusiafolia</u>
hame	<u>Antidesma sp.</u>
Hawaiian mint	<u>Stenoqyme or Phyllostegia</u>
maile	<u>Alyxia olaeiformis</u>

\*A more complete list of species is provided in Exhibit VI.

orchards and vineyards, and pasture with productivity ratings of "fair" to "very poor", according to the Detailed Land Classification, Island of Hawaii, Land Study Bureau, University of Hawaii, Bulletin No. 6.

The area's soil was created by a prehistoric lava flow (Hawi Series) in the Pleistocene period (radioactive age less than 1,000,000 years ago).<sup>1</sup>

2. Rainfall. The average annual rainfall is about 110 inches. Fog is common throughout the year.
3. Flora. (A copy of the report on the botanical survey of the 300-acre area proposed harvesting site is found in Exhibit VI.) Based on general observations by the harvesters and foresters,<sup>2</sup> the following information on flora was obtained.

The hapu'u being harvested is commonly referred to as giant tree ferns (*Cibotium chamissoi*, *Cibotium glaucum* and *Cibotium hawaiiense*). All of the Hawaiian *Cibotium* species are endemic to the Hawaiian islands.<sup>3</sup> Several dozen varieties of smaller fern also inhabit the area. In addition to these species of plants, several aggressive exotic weed species are also present in the harvesting area. These include a group of grasses, sedges, rushes, fireweed, pluchea and buddleja. It is felt that all of these species (save possibly the weeds) are found in the

<sup>1</sup> Volcanoes in the Sea (The Geology of Hawaii), Gordon A. Macdonald and Agatin T. Abbott, University of Hawaii Press, Honolulu, 1970.

<sup>2</sup> Personal communications. Also the Forestry Division's 1975 status report on harvesting, the Summary of the CDUA application to BLNR dated July 27, 1978, and the EA document prepared by the applicant.

<sup>3</sup> The Phytosociological Position of Tree Ferns (*Cibotium Spp.*) in the Montane Rain Forests on the Island of Hawaii, a dissertation submitted to the graduate division of the University of Hawaii in partial fulfillment of the requirements for the degree of Doctor of Philosophy, by Richard E. Becker, December, 1976. Page 37.

proposed 300-acre harvesting site.

During the EIS Consultation Period, a comment<sup>1</sup> received on the EIS Preparation Notice indicated that "*Vicia menziesii*, Hawaii's only federally declared endangered plant, has been found within a few miles of the proposed harvest site and may be found there also." Information from Dr. Charles Lamoureux<sup>2</sup> also indicates that several *Vicia menziesii* plants were found in the area above the proposed 300-acre harvesting area at the 5,200 foot elevation. The botanical study which surveyed the proposed 300-acre site for the presence of *Vicia menziesii* is incorporated into the Revised EIS as Exhibit VI.

4. Fauna. Dr. Andrew J. Berger,<sup>3</sup> was retained to evaluate the possible impact of hapu'u harvesting on the fauna. In his report (incorporated into this EIS as Exhibit II), Dr. Berger provides the following information on the avifauna (birdlife) in the area:

"Large, old ohia trees (*Metrosideros collina*) are so widely scattered that there is no closed canopy formed by ohia or any other tree species, as there is at the higher elevations. The canopy in the harvest area is formed by the tree ferns themselves.

The endemic Hawaiian honeycreepers forage in the crowns of the large ohia trees (Berger, 1972b). The Hawaiian Thrush (*Phaeornis o. obscurus*) does use the tree fern stratum and the males also use the larger ohia trees as song perches. The introduced Japanese

<sup>1</sup> Fish and Wildlife Service, U.S. Department of the Interior, letter to Environmental Communications, Inc., dated September 19, 1978.

<sup>2</sup> Professor of Botany, University of Hawaii at Manoa. Personal communication, October 10, 1978.

<sup>3</sup> Professor of Zoology, University of Hawaii at Manoa.

White-eye (Zosterops japonica) and the Red-billed Leiothrix (Leiothrix lutea) are common species in the tree fern layer.

I saw only four species of endemic bird species during my field trip on July 31, 1978: the Hawaiian Hawk (Buteo solitarius), the Hawaiian Thrush, Apapane (Himatione sanguinea), and Iwi (Vestiaria coccinea). We watched a pair of hawks soaring over the forest from the base camp for the logging operation. Several thrushes were calling and singing, and I watched one bird initiate a flight song from the top of a tall ohia tree. Apapane and Iwi were common and conspicuous as they called while foraging in the Ohia trees. Other species of endemic birds have been seen at higher elevations in the Kilauea Forest Reserve and in the O'laa Forest Reserve (Katahira, 1978). These include the Hawaii Creeper (Loxops maculata mana), Hawaii Akepa (Loxops coccinea coccinea), Akiapolaau (Hemignathus wilsoni), and Ou (Psittirostra psittacea).

I saw three species of introduced birds (Japanese White-eye, Red-billed Leiothrix, and Ricebird or Spotted Munia, Lonchura punctulata) and observed pheasant tracks in the mud at several places along the main jeep road. Mr. Lee said that he had seen the Japanese Blue Pheasant (Phasianus versicolor) on several occasions." (Note: In the statement above regarding the sighting of the Hawaii Creeper, Hawaii Akepa, Akiapolaau and Ou, Berger implies that these birds are also likely to exist in the 300-acre site. These four endemic bird species are endangered.)

Dr. Berger also noted the presence of feral pig (Sus scrofa) in the area in his report.

No studies were conducted on invertebrate fauna (e.g. insects). It is our understanding that there are many endemic species of

flies in this area.

C. Environmental Quality

1. Air Quality. No air quality data for the area is available;  
hence, no air quality measurements or estimations were prepared  
for the EIS. It is felt that because this area is in a forest reserve

with agricultural and open space uses, the ambient air quality should be well within the ambient air quality standards established by the State Department of Health.<sup>1</sup> No continual or point source of air emissions was noted, and aside from the natural, infrequent volcanic haze during eruptions, no other sources of air pollutants exist.<sup>2</sup>

2. Noise. Again, because of the surrounding land uses, no noise pollution was observed, nor has it been noted by the harvesters over the years. The only noise noted in the area was that created by the harvesting equipment (e.g. tractor, portable saws). This noise can be heard within a 500 foot radius of the working equipment.<sup>3</sup> Because of the smaller and lighter equipment, the noise created is not felt to be significant or adverse. It is contained within the harvest area and does not affect any residences.
3. Water Quality. There are no streams in the proposed project area. This area is not a source of potable water. The rainfall is absorbed by the vegetation (the ferns, moss, rotting leaves) and the soil in the harvesting area. No large ponding<sup>4</sup> was observed in the harvesting area. Although the main haul road is frequently muddy, there were no signs of erosion to the road and the surrounding area.

<sup>1</sup> Chapter 43, Public Health Regulations.

<sup>2</sup> Although the equipment used for harvesting creates fugitive dust (when the road is dry), the impact is (1) within the project site, (2) localized and short-term, and (3) does not affect the surrounding area.

<sup>3</sup> At this distance (500 feet), only a low buzzing sound can be heard from the main haul road.

<sup>4</sup> Except in an open grassy area in the vicinity of the maintenance shed where the entire section was cleared and not rehabilitated. This ponding was approximately eight feet in diameter and the water appeared to be two to three inches deep.

4. Aesthetics. The opponents of this project<sup>1</sup> have continually stated that this hapu'u forest is unique and should be preserved. On the other hand, Niu Nursery has felt that based on the harvesting methods, controlled by the 1971 conditions, the hapu'u forest is not being damaged. Although these are opinions, it should be emphasized that in the opinion of the preparers of this EIS, the hapu'u forest, before harvesting and after harvesting and revegetation, is aesthetically pleasing. The main haul road provides access and a trail on which one can view a segment of the hapu'u forest. Additionally, it is difficult for the layman<sup>2</sup> to determine the skid trails which were cut three (3) to four (4) years ago, since they have been rapidly covered by vegetation. The hapu'u canopy which was partially cleared for the skid trail is growing back, based on reports from the harvesting contractors.

The upper elevations beyond the 300-acre proposed hapu'u harvesting site are acknowledged as having one of the finest stands of koa trees in the State. This upper area is felt to be, by conservation groups, unique and of significant importance to maintain.

D. Historical/Archaeological Sites

There are no known sites of historical/archaeological significance in the existing and proposed harvesting area.<sup>3</sup>

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<sup>1</sup> Various individuals and conservation groups opposed to the 1971 processing of the Conservation District Use Permit.

<sup>2</sup> Although the former skid trails would be easily identified by a botanist, forester or other individuals who have expertise in plant and trail identification.

<sup>3</sup> Based on the files and information from the Historic Preservation Office.



### III. THE RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA

The present 150-acre harvesting area and the requested 300-acre area for the proposed hapu'u harvesting are both within the State's Conservation District designation. This designation is reserved for lands which are protected by the State because of their watershed value, susceptibility to natural disasters, Federal or State park use, conservation, preservation, and enhancement of scenic, historic or archaeological sites or unique ecological significance, importance as a shoreline resource, topographical and other environmental factors which make these lands normally unadaptable for urban, rural or agricultural use, lands with a general slope of 20 percent and lands suitable for farming and other agricultural uses (including growing of commercial timber). This designation encompasses a variety of lands for different reasons (as summarized above). The Board of Land and Natural Resources is the designated body which has the discretionary power to determine if a specific use within the Conservation District is compatible with the goals of the Conservation District.

If it is determined, by the BLNR, that the project area is unique and that it represents a hapu'u ecosystem found nowhere else, governmental policies (The Hawaii State Plan, 1978) would appear to dictate that these lands be preserved in their natural state for future generations.

The present Regulation 4, (effective, June, 1978), provides for land use within the Conservation District, sub-zones, uses, appeals, enforcement and penalty, pursuant to Chapter 183-41 HRS, as amended, and identifies the 300-acre area into two sub-zones, Protective (P) and Resource (R). In

Mae Mull's November 21, 1978 comments regarding the EIS, she correctly describes the amount of area in these sub-zones, and the intended uses within these sub-zones. Her comments are quoted below.

"Vital information for reviewers and decisionmakers is missing in Section III, The Relationship of the Proposed Action to Land Use Plans, Policies and Controls for the Affected Area. A major undisclosed fact is that the 300-acre site straddles two subzones of the Conservation District that have different objectives and permitted uses.

A comparison of the Vicinity Map (Fig. 2) with the Regulation 4 map delineating subzones shows that more than two-thirds of the upper portion of the site requested falls within the Protective (P) Subzone, while the lower portion adjacent to the existing logging site is in the Resource (R) Subzone.

Regulation 4 (p. 4) states the objective of the Protective Subzone as follows:

'The objective of this subzone is to protect valuable resources in such designated areas as restricted watersheds, fish, plant and wildlife sanctuaries, significant historic, archaeological, geological, and volcanological features and sites, and other designated unique areas.'

Consumptive uses are not permitted in the "P" Subzone, except programs for control of animal, plant and marine populations. Growing and harvesting forest products is not a permitted use in the "P" Subzone. I raised this issue in comments on the EIS Preparation Notice, but it was not addressed in the consultant's 'disposition' reply.

Regulation 4 states the objective of the Resource (R) Subzone as follows: (p. 5)

'The objective of this subzone is to develop, with proper management,

areas to ensure sustained use of the natural resources of those areas.'

Growing and harvesting of forest products is a permitted use in the Resource Subzone. In determining whether hapu'u logging can be allowed as a conditional use in the Protective Subzone, it appears that the Board of Land and Natural Resources is restrained by the following rules excerpted from Section 6. Standards; Land Use Conditions and Guidelines of Regulation 4 (p. 11):

'B. Guidelines

1. All applications shall be reviewed in such a manner that the objective of the subzone(s) is given primary consideration.

C. Deviation

Deviation from any of the conditions provided herein may be considered by the Board, only when supported by a satisfactory written justification that:

3. The deviation does not conflict with the objective of the subzone'

(Figure 3 shows the location of the proposed stie in "P" and "R" subzones.)

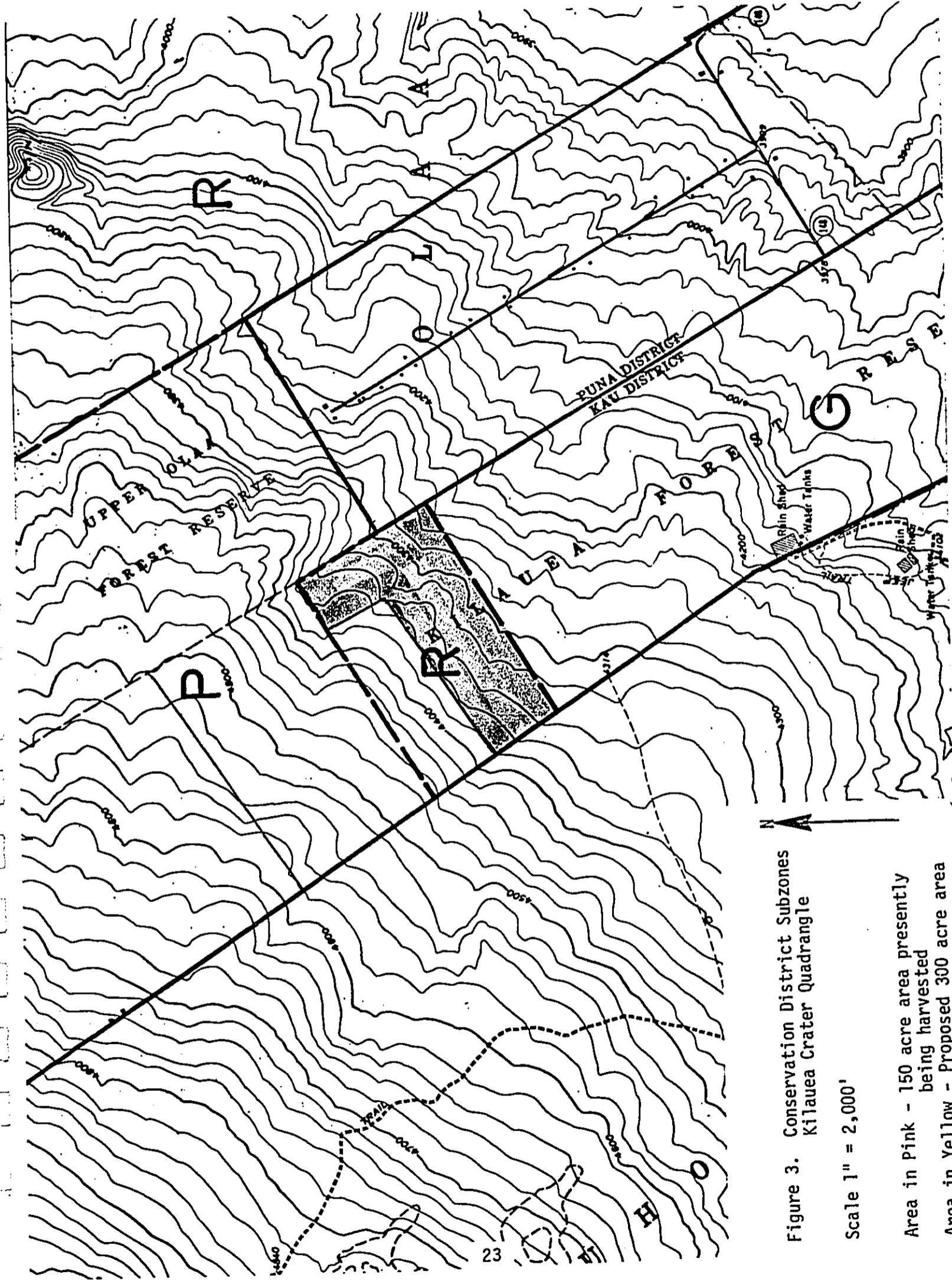


Figure 3. Conservation District Subzones  
Kilauea Crater Quadrangle

Scale 1" = 2,000'

Area in Pink - 150 acre area presently  
being harvested

Area in Yellow - Proposed 300 acre area

#### IV. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

##### A. Impact on Climate

Actual harvesting activities take place in two (2) or three (3) acres. After harvesting the area, the fern tops are scattered, and the skid trail closed before going into another harvesting area. Because no large area (3+ acres) is denuded for any long period of time (two months or more), and the harvesting is controlled,<sup>1</sup> no impact on climatic conditions has been noticed in the present 150-acre being harvested. It is not anticipated that the proposed 300-acre harvesting area will affect the climate.

##### B. Impact on Flora

Impact on the hapu'u ecosystem was a major concern in several letters commenting on the EIS Preparation Notice. This concern is a valid one; however, much of the information on hapu'u regrowth, sustained yield data, et cetera, is not available. In 1971, when the Board of Land and Natural Resources permitted the harvesting of the 150-acre parcel, their main intent was to provide an area on which selected harvesting could be practiced, and the results of regrowth and impact on the harvested area studied by the Forestry Division of the State Department of Land and Natural Resources.

In a memorandum (October 24, 1977) regarding the hapu'u harvesting operations<sup>2</sup> the foresters stated:

"As the purpose for allowing the initial harvesting of 150 acres was to determine the very things we are studying, I must also point out that we do not yet have a final answer for the Board. This is due

<sup>1</sup> Approximately 60% of the canopy (rough estimate by harvesters) remains in the harvested area.

<sup>2</sup> Inter-departmental memorandum to Leonard Bautista from Edwin Petteys and Patrick Costales, Timber Survey Forester.

to two reasons. First, the harvesters often re-disturb the areas that were logged some time before. Such an action effectively nullified any vegetative establishment and second, growth of the recovering vegetation just takes time, not enough of which has passed."

(Note: Several comments on the EIS expressed concern about the harvesters redisturbing the area and that was one of the reasons for the lack of data. As background information, it should be clearly understood that the re-harvesting was done independently by one of the two harvesting contractors. Initially, there were two operators who were contracted to harvest hapu'u; one of these contractors relogged previously harvested areas and was terminated after three years of repeated problems and substandard work. The other contractor, Lee Brothers, is still harvesting hapu'u for Niu Nursery. On February 25, 1977, the BLNR acknowledged their excellent work in harvesting the hapu'u.)

Because of the small amount of literature and research regarding the hapu'u regrowth, much of the questions relating to hapu'u and the hapu'u ecosystem remain unanswered. In order to address the comments on hapu'u, we have provided below a disposition to the questions on hapu'u harvesting which were asked by various reviewers of the EIS Preparation Notice.

(Refer to Exhibit V which provides the preliminary information on the data collected by the Division of Forestry.)

1. The approximate time it took for the forest to reach this stage of growth.

This is unknown and cannot be estimated. Becker's dissertation<sup>1</sup> does indicate: "In wetter areas tree ferns are found on both aa and pahoehoe lava flows that are less than 150 years old. The tree ferns become more abundant as primary succession proceeds and are a dominant life form in the climax montane tropical rain forest."

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<sup>1</sup> Op cit, page 80.

2. Length of time it takes a tree fern to reach maturity and yield premium fibers.

Becker's dissertation<sup>2</sup> states:

"Growth rates.--Hawaiian tree fern growth rates, as mentioned previously, were estimated by a stem analysis method by Ripperton (1924). He gave trunk height growth rates of 4.35 inches (11.05 cm) per year. He also said that this rate was practically constant for all elevations from sea level to 3,500 ft. This is unlikely as there is an average temperature difference of at least 6.8°C (12.3°F) between elevations. This figure is based on a lapse rate of 3.5°F. per 1,000 ft. elevation change. The growth rates obtained by Wick and Hashimoto (1971) were much less than Ripperton's. They estimated that it would require 80 years for a tree fern to reach a merchantable size of 8 inches (20.3 cm) in base diameter. Crookes and Dobbie (1963) gave growth rates for New Zealand tree ferns and said that the rates varied considerably with different species."

In a discussion with Dr. Charles Lamoureux, he noted that the report by Wick and Hashimoto was inadequate. Tree ferns do not increase in diameter at a steady, yearly rate. (For example, the trunk diameter of *C. hawaiiense* normally remains the same, but it continues to grow in height.)

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<sup>2</sup>

Op cit, pages 59-60.

3. Length of time tree trunks and tops recover from being severed to resume normal growth, and percent of tops that regrow to normal after being replanted.

This is not known; the Forestry Division's continued research on the 150-acre area harvested may provide some answers with respect to this question. (See Exhibit V.)

4. Rate of growth and spread of exotic weeds throughout the 150-acres being harvested.

The October 24, 1977 memorandum<sup>1</sup> from the Forestry Division stated:

Data show that exotic vegetation, much of it weeds, has come into harvested areas. Because measurements of areas that have not been harvested do not show this, we feel that the exotics are, for whatever reason, a result of harvesting activity. We cannot at this time make a pronouncement as to the long-term trends of exotic vegetation in the harvested areas. It could eventually be overtopped by the newly growing hapu'u and fade away, or it could take over the area to the detriment of a hapu'u ecosystem. Only additional measurements in the future will be able to show what direction the exotic vegetation will take. These measurements must wait a few more years to allow the trends to establish themselves."

5. Effects of herbicides on the hapu'u harvesting area.

This is unknown and must be studied when a herbicide program is initiated and its effects monitored. A herbicide program may be adverse to the forest in that both weeds and endemic plant species may be eliminated.

6. Examples of former tree fern forests where growth has reverted back to its natural state after careful removal of hapu'u logs.

There are no examples, that we know of, for the following reasons:

(1) Other areas harvested were converted to another use (e.g. pasture lands, agricultural lands, farm lots) and (2) the 150-acre area presently being harvested is the only known area where selective hapu'u harvesting has taken place.

In relationship to this question, we note that Becker<sup>2</sup> provides the following information on secondary successions of tree ferns: "Secondary successions. --Tree ferns also play a significant role in secondary succession. They are able to recover from grass fires in New Guinea (Holttum 1963) and from land clearing in New Zealand (Pope 1924). In Hawaii, *Cibotium* has been observed to recover from almost total burial in volcanic ash fallout (Smathers 1972,

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<sup>1</sup> Op cit

<sup>2</sup> Op cit



Smathers and Mueller-Dombois 1973, 1974). Mechanical damage must have been very severe on the tree ferns when the pulu industry was in operation. Large quantities of pulu were gathered from the tree fern forests in the Kilauea area of Hawaii between 1867 and 1884 (Degener 1945). In the ninety years since the demise of the industry, the forests have regrown to almost, but not totally, eradicate any sign of the industry (R. and P. Apple 1973)."

7. Native plants displaced by the invasion of aggressive exotic species in areas of operation.

See response to item 4.

8. Factors which contribute to or detract from favorable growth conditions.

A major factor is the need for fern tops to grow under relatively dense shade (provided by the larger hapu'u in the forest).

As Becker noted:<sup>1</sup>

"Growth forms.--Wick and Hashimoto (1971) noted that tree ferns growing in the open had shorter fronds and smaller trunks than those growing under a forest canopy. Friend (1974) made a similar observation for his tree fern grown in full sunlight in the greenhouse, compared to those he had in shaded conditions. Pope (1924) said that two of the New Zealand tree fern species were common in open partially cleared bush, and ever grew in swamps but here they were, 'rather scrubby and forlorn.' "

As stated previously, approximately 80% (rough estimate) of the canopy remains after the site is harvested.<sup>2</sup> However, it is not known whether this provides enough shade to allow for normal plant growth and/or regrowth.

9. What is the time period necessary to obtain a second crop? (If this has been considered a sustained-yield operation.)

This is unknown; however, it is recognized that hapu'u grows very slowly and that a fifty (50) + year period<sup>3</sup> may be necessary to allow for the harvesting of a second crop.

10. Regeneration growth rates of harvested hapu'u areas, compared with areas not impacted in any way.

This information is not known.

11. The influence of forest composition and relative maturity of hapu'u

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<sup>1</sup> Op cit

<sup>2</sup> This information was obtained from the harvesting contractors.

<sup>3</sup> See footnote 1 on page 38-b.

on hapu'u regeneration and growth rates.

This information is not known.

12. What is the relationship of the hapu'u in the ecosystem?

(By this we would assume the relationship of the logs taken from the hapu'u forest.) In discussion with the State Foresters and Dr. Charles Lamoureux, the role of the fallen and decaying hapu'u as a nursery for other ferns and plants in the forest was noted. From these fallen and eroding logs, many plants and the fern themselves establish seedlings which will grow on the logs, getting their nutrients from this source. For example, many of the older ohia trees found in the 150-acre harvesting site have roots, which from their shape, indicate their growth on a fallen hapu'u log. This role of the hapu'u will be affected if the harvesters removed 100% of the fallen logs. However, the harvesters do not remove logs which are decaying (this material would be too soft and in any case undesirable for use as a potting material). It is recognized that if all the matured fallen hapu'u is removed, this would disrupt its' role as a nursery at another stage of the forest's growth. For this reason, it is recommended that the selected harvesting include leaving 10% of the fallen matured hapu'u fern (which normally would be taken) so that the remnant fern will provide the seed bed necessary for the forest to continue to be nurtured. This would partially mitigate the impact on the other logs' role as a nursery.

13. Other hapu'u forests of this type on the island of Hawaii.

The staff report to the Board of Land and Natural Resources (dated October 8, 1971) states:

"It has been stated that the area is a unique hapu'u forest and should be acquired for scientific and aesthetic purposes. Information available indicates, however, that there are similar hapu'u forests in the area. Also, approximately four miles from the subject area is a 2,600 acre forest area which is proposed for inclusion within the Natural Area Reserve System, and about 3/4 miles away, is a 9,655 forest area set aside to the National Park. There are no known programs to acquire this area."

Comments (dated November 21, 1978) from Mae Mull stated that these areas are not similar to the 300 acres on which commercial hapu'u harvesting is being proposed. If this is correct, the quoted paragraph above is wrong. Another area which does have a Cibotium forest classification (rather than this area which is considered a Cibotium-Metrosideros forest) is found in the O'laa Forest Reserve (State-owned), adjacent to the Volcano Farm Lots. Mr. Richard Lee, a resident of the Volcano Farm lots and a partner in the firm doing the hapu'u harvesting, has walked through and is familiar with this area and noted that it contains even more tree ferns than the present (150-acre) and proposed (330-acre) sites.

We note that the 2,600-acre site (4 miles from the area), which in 1971 was proposed to be included within the Natural Area Reserve System (NARS), has now been included within the NARS.

14. Hapu'u harvesting plans appear to indicate that the entire 2,956 acres leased by Niu Nursery will be eventually harvested. What are the impacts on this total area being harvested?

The plans for hapu'u harvesting were discussed with the management of Niu Nursery. They have indicated that the 300-acre area being requested will be sufficient for the foreseeable future, and that no hapu'u harvesting is planned in the area beyond the 4,600 foot elevation. In any event, they recognize that beyond the 4,600 foot level, the forest does not contain the density of hapu'u logs which would make harvesting operations economically feasible under today's market.<sup>1</sup>

The DLNR in their comments on the EIS noted, "In line with 52, this again states that 300 acres will be sufficient. This also states that the 4,600 foot elevation line is their cutoff for harvesting. The map (Figure 2) indicates a significant acreage between the upper boundary of the 300-acre area and 4,600 feet in elevation, notable in the northeast. Is this area to be considered in the future? If so, when? If not, why was 4,600 feet used as a cutoff?" Niu Nursery's President, Sidney Goo, has indicated that presently they do not plan to request additional acreages beyond the 300 acres. He also noted that at this time, it is unknown whether or not additional acreages above the 300 acre site will be requested in the future. The 4,600 foot contour line was used on the basis that information from various individuals indicates that beyond this elevation, the hapu'u forest does not contain the density of hapu'u logs which would make harvesting operations economically feasible.

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<sup>1</sup> The density of hapu'u logs differ significantly in various portions of the present harvesting area. The determination of feasibility depends on a large area in which the hapu'u logs can be found. The Lee Brothers, the harvesting contractors, have surveyed much of the 300-acre site and found that the amount of harvestable hapu'u is much greater in density than the present harvesting area. No density per acre was given by the harvesters.

Much data remains to be gathered in the study of the hapu'u and hapu'u ecosystem. Such extensive studies will require a great deal of time over a long time span (twenty years or more). (The Division of Forestry's data will not provide answers to all questions raised on this project. The data collected will however, likely indicate the change in plant composition, invasion of weeds, and possibly the regeneration/nonregeneration of the hapu'u. They have indicated that their study on these aspects will be completed within a few years. See Exhibit V.) It is felt that the inclusion of this type of data is unreasonable in the EIS, considering the amount of monies, manpower and length of time needed to gather and evaluate the results of this data.

Impact on endemic plants in the area would be adverse because they would be disturbed <sup>1</sup>during the harvesting process and because the harvesting area is being invaded by exotic weeds.<sup>2</sup> Once the hapu'u ecosystem is disturbed by harvesting activity, the ecosystem will not remain the same. The ecosystem changes due to (1) the withdrawal of hapu'u logs; (2) the destruction of plants caused during the harvesting operations (especially along the skid trails); (3) the introduction of exotic weeds; and (4) the opening of certain areas in which the feral pigs may invade and cause damage. The forest, due to these negative impacts, transforms into a secondary forest, where the natural processes of succession, adaptation and evolution are permanently altered.

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<sup>1</sup> It should be noted that harvesting is restricted to the tree ferns only, and no other plant species is taken.

<sup>2</sup> Providing competitive plant growth.

C. Impact on the Fauna<sup>1</sup>

That many species of endemic birds (including several classified as threatened or endangered) inhabit the Kilauea and O'laa Forest Reserves, as well as surrounding area, has been well documented (Berger, 1972a; Conant, 1975, Katahira, 1978). However, to the best of my knowledge, what is completely lacking are published studies of the breeding biology, ecology, and annual cycle of these endemic birds in this forest complex on the eastern flank of Mauna Loa. Consequently, we have virtually no acceptable evidence concerning the limiting factor or factors for any of these bird species.

The Ou (*Psittirostra psittacea*) is one of the rarer of the Hawaiian honeycreepers on the island of Hawaii; it has been observed on several occasions in the O'laa Forest Reserve. Nothing is known about the breeding biology of this finch-billed honeycreeper, so that we do not know whether it nests in the O'laa Forest Reserve or whether it simply feeds there. The point here is that we have no data on the relationships of the endemic forest birds to the predominant tree fern forests that make up much of the O'laa Forest Reserve and the lower portion of the Kilauea Forest Reserve where the tree ferns are being harvested.

It also should be pointed out that a large population of endemic birds inhabit the Keauhou Ranch, where large segments of the original forest have been decimated by logging, by pasturing, or both. Conant (1975:69) wrote: "With the exception of the 'Amakihi the Acacia-Metrosideros-Cibotium montane rain forest of Kilauea Forest Reserve (Transect 91) and its logged replicate on upper Keauhou Ranch (Transect 92) were the ecological optima of endemic passerines of the east flank of Mauna Loa." If the greatly disturbed habitat of the upper Keauhou Ranch provides "optimum habitat for all endemic forest

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<sup>1</sup> This section provides the finding of Dr. Berger's study (Exhibit II). Major portions are incorporated without the use of quotations.

birds encountered in the study except the Pueo and "Amakihi" (Conant, 1975:94), it is very difficult to see how rigidly controlled tree fern harvesting at lower elevations in the Kilauea Forest Reserve could have a serious deleterious effect either on the forest itself or on the birds that inhabit it.

#### The Status and Future of Endangered Birds on the Island of Hawaii

During the past several years, personnel of the U.S. Fish and Wildlife Service have been conducting the most systematic and detailed censuses of all bird species found in the forests of the island of Hawaii ever attempted in Hawaii. In fact, no similar attempt has been made, so far as I know, to census all birds in comparable ecosystems in any other part of the world. When these field studies are completed and the data are analysed and published, we will, for the first time have a good idea of the distribution and abundance of all bird species--both endemic and exotic--in the major forest areas of the island of Hawaii. This information by itself, however, will not tell us why some species (e.g., the Apapane) are so abundant in suitable habitat and why other species (e.g. the Ou) are so rare; it undoubtedly will not tell us what the limiting factors are, or in other words, what can be done to effect an increase in the populations of certain species so that they can be removed from their threatened or endangered status, which is the goal of each of the eight Hawaiian Recovery Teams appointed by the U.S. Fish and Wildlife Service of the Department of the Interior.

It is possible that additional species will become extinct before the information that is needed to save them can be obtained; in fact, certain species may already be doomed to extinction regardless of any efforts to save them. In any event, it seems certain to me that we cannot expect to save some of the endangered or threatened species until we know more about their basic biology: breeding habits, ecology and the entire annual life

cycle of the species. This information can be acquired only by intensive field studies by highly competent ornithologists.

It is now generally recognized that the most sensible way to attempt to save either a plant or animal species is to do everything possible to preserve the total ecosystem. Most, if not all of the components of any ecosystem are interdependent. In view of the history of introductions of exotic plants and animals to the Hawaiian Islands during almost two centuries, there are probably no pristine areas such as existed before 1778 remaining.

Berger summarized his findings on the impact of harvesting hapu'u on birds, as follows:

Based on my experience and opinion, the rigidly controlled (as at the present time) harvesting of selected tree fern trunks at lower elevations of the Kilauea Forest Reserve does not constitute a threat either to the tree fern association or to the birds that inhabit it.<sup>1</sup>

Berger also provided the following information as it pertains to the impact on avifauna

- (1) Monitoring of pig activity--and control of population size when indicated--seems advisable in all rain forests on the eastern flank of Mauna Loa in order to avoid "a deterioration of the native montane rain forest ecosystem." (Cooray, page 8 this report)
- (2) Therefore, primarily because of the many introduced plants and animals in Hawaii, it seems probable that some management practices will be essential in order to further prevent degradation

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<sup>1</sup> No data from extensive research in the area is available to substantiate this position; this statement was provided on the basis of Dr. Berger's experience and present knowledge of the area.

of all of the remnant rain forests and their endemic animal inhabitants. One cannot reasonably expect static conditions to prevail in Hawaiian biological systems that have been subjected to the devastating pressures created by the exotic plants and animals (primarily mammals) brought to the Hawaiian Islands by man.

- (3) Careful studies of the ecology and general biology of birds-- both endemic and introduced--in the tree fern association of the lower portion of the Kilauea Forest Reserve and the O'iaa Forest Reserve are badly needed.

(Comments on the EIS questioned whether data was available from the Division of Fish and Game, DLNR, citing that condition number 9 of the Conditional Use Permit issued in 1971 requested that: "The Division of Fish and Game shall monitor the effect of harvesting on birdlife in the area." We (Environmental Communications, Inc. and Dr. Berger) are not aware of any data or evaluation of harvesting activities on birdlife which has been prepared by the Division of Fish and Game.)

Impact on Native Insects. In Dr. Sheila Conant's comments on the EIS dated November 8, 1978, she noted that no information was provided on native insects in the proposed 300-acre site. She also noted that Drosophila flies were collected in this area for research in genetics. She recommended that Drs. Hampton Carson, Elmo Hardy and Kenneth Kaneshiro be contacted to comment on this proposal. All three have been contacted and have expressed concern about the impact of the proposed harvesting operations on their Drosophila fly collection. Dr. Carson has indicated that Drosophila flies are collected in the 300-acre area. It is possible that harvesting activities will disturb native insects in the area; thus the proposed harvesting will have a negative impact on the gathering of Drosophila flies and subsequently, the research for which they are collected. Other native insect species will likely be dis-



turbed by harvesting activities which would result in a change in number, and distribution of these insects. There is also the threat of exotic insect species invading the area, along with exotic weeds.

D. Impact on Air Quality

Impact on air quality is expected to be minimal. As stated earlier, the harvesting area is limited to two (2) to three (3) acres at one time<sup>1</sup> and light machinery is used. Smoke or fugitive dust created by the machinery when the main haul road and skid trails are dry will settle quickly and does not appear to disturb the forest. The wet ground (80% of the time) also mitigates fugitive dust.

E. Impact on Ambient Noise

Noise from the harvesting machinery is detectable within several hundred feet of the operating equipment. The noise quickly dissipates into the forest and is absorbed to some degree by the dense vegetation. No adverse or significant impact on noise levels in the forest is expected.

Comments on the EIS from OEQC indicated their concern about the noise created by the harvesting activities on the avifauna. Berger states that, based on his personal experience and Federal research, noise in general, does not have any detectable detrimental effects on birds or their eggs.

F. Impact on Water Quality

As previously noted, no streams exist on the project site. Additionally, in 1971 when the entire parcel (2,900+ acres) was requested for hapu'u harvesting, the State Department of Land and Natural Resources staff report<sup>2</sup> stated:

"It has been stated that the subject area is part of the upper Hilo watershed and harvesting will adversely affect the water supply of the area. Discussion with DOWALD, and the County Board of Water Supply's comments indicate that the proposed harvest use will not

<sup>1</sup> This practice will continue.

<sup>2</sup> October 8, 1971, page 10.

adversely affect the water sources of the area. Under controlled conditions, soil erosion problems will be minimized."

The County's Department of Water Supply (personal communications) indicates that it is unlikely that a controlled herbicide program would significantly or adversely affect the water resource of this area.

G. Impact on Aesthetics

This remains an unresolved issue. Conservation groups have indicated that the hapu'u forest will be destroyed by hapu'u harvesting, whereas in an

interdepartmental memorandum dated September 30, 1977 to Roger Evans, Planning Office, from William H. Sager, State Forester, Mr. Sager wrote:

"The area logged by Lee Brothers requires a close look to detect any disturbance. Visual inspection of the area logged by Lee Brothers shows minimal disturbance and an excellent stand of hapu'u. We cannot, at this time, confirm our impression with scientific evidence from the monitor transects, but we do believe the logging techniques developed by Lee Brothers to protect the stand are working and long-term management for hapu'u production is practical and (these practices) should be continued."

(The Division of Forestry indicated that they no longer subscribed to this position, and that preliminary data indicated that weeds are invading the harvesting area. Because there are little or no weeds in the portions which have not been harvested, the weeds are the result of the harvesting operations. Also refer to Exhibit V, for the current Division of Forestry's position on the preliminary findings and available data.)

There are no other native Hawaiian or Pacific Ocean plants ecologically similar to hapu'u that have been studied to determine whether they may be harvested on a sustained-yield basis.

#### H. Economic Impacts

Presently, the Niu Nursery accounts for 95% of the hapu'u harvesting in the State. This totals about 55,000 cubic feet<sup>1</sup> of hapu'u, which retails at about \$6.75 per cubic foot, totalling \$371,250.00. If the 300-acre harvesting area is approved, the yield is expected to be approximately 7,680 cubic feet per month or a yearly volume of 92,160 cubic feet. The 1978 retail dollar value of this hapu'u is approximately \$622,080.00.<sup>2</sup>

The hapu'u may also affect a portion of the flower industry which uses hapu'u as a potting medium. Based on a review of flowers which

<sup>1</sup> An average annual yield calculated on the previous seven (7) years.

<sup>2</sup> Based on an average retail price of \$6.75 per cubic foot.

wholly and partially use hapu'u as a potting medium, it is estimated that this portion of the flower industry represents \$2.5 million dollars in sales and approximately 876 workers. It is likely that this portion of the flower industry will be adversely affected by the demise of the hapu'u industry, although the severity of the impact cannot be estimated. (Refer to Exhibit III.)

Approximately fifteen (15) full-time jobs will be lost if the operation ceases. Moreover, jobs in the flower industry (which uses hapu'u), estimated at 876 and jobs related to the industry (retail sales, clerk, delivery) estimated at 150, may also be affected.

Sales tax derived from hapu'u sales is estimated to be over \$16,700.00.<sup>1</sup> Approximately \$118,000 in sales tax is derived from that portion of the flower industry utilizing hapu'u as a potting medium.

State personnel time may be utilized if State foresters continue to monitor the harvesting operations in the proposed 300-acre harvesting area. This time and the amount of monies it represents cannot be estimated.

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<sup>1</sup> The sales tax from hapu'u was computed by multiplying the retail cost of the hapu'u (\$6.75/cubic foot) with the 4% retail tax and .5% wholesale tax.

V. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The probable adverse environmental effects are identified in Section IV and summarized below. Additionally, other temporary harvesting impacts are also discussed.

A. The harvesting operations (as stated, approximately two [2] to three [3] acres) leave the site partially cleared and visual impact following the harvesting operations appears to be adverse; however, the vegetation grows back rapidly.<sup>1</sup> These past skid trails are, in most cases, so completely overgrown with vegetation that most individuals would not be able to determine it was once a harvested area. Additionally, it is noted that the regrowth of vegetation on the skid trail includes ferns (from the scattered tops) and similar plants found in the harvesting site previously, as well as exotic weeds. The normal growth of the plants, their rate of maturity, are yet to be studied, but at this point the growth appears to be rapid.

B. There have been weeds invading the harvesting area along the main haul road. And although some herbicides have been used, the need for a more thorough method of herbicide use and weed control is recognized. Because weeds are invading the forest, the State foresters have recommended a plan for weed eradication be prepared and followed. Herbicide use must be programmed and implemented with care, since herbicides improperly applied may destroy the endemic species of plants as well as the exotic weeds.

C. Because of the uncertainty of hapu'u regeneration and growth, and the hapu'u ecosystem, the specific long-range impact on the hapu'u forest is

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<sup>1</sup> Based on observations of the harvesters on the skid trails opened three (3) years or more ago.

yet unknown. On one hand, the forest may not be significantly affected and will continue to produce hapu'u logs which can be reharvested in the future (fifty [50]+ years)<sup>1</sup>, and on the other, the hapu'u ecosystem

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<sup>1</sup> Comments from DLNR questioned this figure (50+ years). This time interval was estimated as the time period necessary before a second crop of hapu'u could be harvested. This information was based on the 80 years necessary for the diameter of the hapu'u to attain a harvestable size (8+ inches), as given by Becker. Assuming that a second crop would be those matured hapu'u left standing and that their growth rate is normal, a second harvest may be possible in 50+ years.

may be destroyed due to the harvesting, the selected-approach method notwithstanding. Unfortunately, the 150-acre area has not provided all the answers in this regard, and additional time and research is necessary to reach a more sound and supported conclusion. (See Exhibit V.)

D. The fallen hapu'u being removed may affect the forest at a future stage because it presently acts as a nursery for ferns and other plants. As previously discussed, this is a potential threat, and it is being recommended that to mitigate this possible impact the harvesters take only 9 out of 10 fallen logs. The one (1) remaining should provide some mitigation to this impact serving as a seed bed from which ferns and other plants may nurture. These remaining logs should be left randomly distributed towards this function.

E. Hawaii's only endangered plant species on the Federal list of endangered plants, *Vicia menziesii*, may exist on the requested 300-acre site. If it does exist on the site and is not protected, this and other endangered endemic species of plants may be damaged and/or destroyed. More seriously, the environment in which they thrive on may be altered to the point where it would no longer be a suitable habitat for these endangered plants.

In the section on mitigation measures, we recommended that if endangered plants exist on the 300-acre site, a critical habitat be designated so that this and other rare and endemic plant species will be protected. Designation of a critical habitat is, in any event, a legal requirement for those endangered plant species on the Federal list. (Refer to Exhibit VI, a copy of the recently completed botanical survey, for more information.)



## VI. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the hapu'u harvesting in Kilauea are discussed below. These alternatives were either used, studied or sought at one time by Niu Nursery. Consequently, their present action indicates that the hapu'u harvesting on Kilauea is the most feasible and desirable course of action. In discussion with top management personnel of Niu Nursery, it was their feeling that should hapu'u harvesting not be approved in the additional 300-acre parcel, it is most likely that no feasible alternatives exist and that the hapu'u industry will be terminated. (Niu Nursery provides approximately 95 percent of the hapu'u being marketed.)

### A. Site Alternatives

Hawaiian Cibotium species are endemic to the Hawaiian Islands. Other tree fern and/or fern forests exist in tropical areas throughout the world, but the fiber produced is often too brittle to serve as premium potting material for Hawaiian orchids and other flowering plants. Additionally, the cost of shipping the alternative fibers is as great as the potting materials themselves, as in the case of peat moss.

Niu Nursery did search for tree fern in other areas of Hawaii (Kauai, other portions of the island of Hawaii), and it was determined<sup>1</sup> that the best potting fiber came from the fallen hapu'u logs found in the Kilauea area. Harvesting hapu'u in any forest reserve in the Kilauea area is likely to be met with opposition from conservation groups.

It is also noted that Keauhou Ranch is presently clearing lands which contain hapu'u. Although this could be a source of hapu'u, discussions with Niu Nursery have indicated that hapu'u from land clearing operations is not desirable because only 20 percent of the hapu'u harvested will be excellent as a potting medium; 80 percent would be immature and not ideal (see earlier discussions, I.B & I.C).

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<sup>1</sup> By Niu Nursery

B. Alternatives to Hapu'u as a Potting Medium<sup>1</sup>

When orchids and anthuriums are planted in hapu'u, the fibers will remain viable and whole for five (5) years or more. This quality is extremely important for the following reasons:

1. Rotted fiber becomes water-logged and will cause plant roots to rot. Our potting material prior to using hapu'u was osmunda, a fibrous material harvested from bogs in countries such as Japan, Germany and the U.S. (Florida). This material decayed within a year of planting and necessitated the removal of all the decayed material around the roots causing considerable damage to the plant roots, thus setting back plant growth. The yearly re-potting of every orchid plant was a considerable and costly task.
2. Mature orchid plants may be divided yearly in order to propagate more plants. The divided plants in the hapu'u are repotted undisturbed. These plants are able to produce flowers with new lead growth without going through a resting period, thus insuring the grower a greater number of flowers. This cannot be achieved with other potting mediums.

There is no question that hapu'u is unmatched as a potting medium. For plant exporters whose plants are shipped all over the world, their buyers are most satisfied when their plants arrive with healthy roots growing in hapu'u.

Additionally, despite its' premium value as a potting medium, hapu'u is relatively inexpensive to the grower. The hapu'u supporting a mature orchid plant costs about \$.40.

There are no satisfactory alternatives to hapu'u when the above-mentioned facts are considered. Of course there are substitutes, such as California fir

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<sup>1</sup> This section was prepared by Mr. T.Y. Goo, founder and past president of Niu Nursery. It is based on his lengthy experience in the horticultural business. It is also noted that Mr. Goo holds a Bachelor's of Science Degree in Agriculture.

bark. However, the freight cost from California is equal to the cost of the bark itself; the price is normally cheaper than hapu'u. In spite of its availability, fir bark is almost never used in Hawaii because of its many unsatisfactory qualities. It cannot be compressed around the plant to hold it upright until the roots begin to develop. Also, it does not foster luxurious growth in our type of open hothouses.

Rocks and cinders are other very poor substitutes for hapu'u. These substitute media require constant fertilization to maintain minimum growth. A great amount of this fertilizer is lost, since unlike hapu'u, these media are unable to absorb and hold the fertilizer until the plant roots can use it. Therefore, though the materials themselves are inexpensive, the cost of plant maintenance is very high. Besides the cost of fertilizer, the man hours for fertilizing must also be considered. Finally, there is the problem of dividing mature plants growing in cinders and rocks without greatly disturbing the plant roots.

In their general comments on the EIS, the Department of Land and Natural Resources also suggested a review of the following inexpensive potting mediums.

- "1. Sugar cane leaves or bagasse.
2. Seaweed - tons of seaweed are being cleaned up off the public beaches by City and County personnel and sent to the dump. (It is said that all that is needed is to wash off the salt from the dried seaweed and it makes either a good mulch or orchid growing media that costs nothing.)
3. Pine or eucalyptus bark substitute that could be developed from locally planted tree stands.
4. Mixture of hapu'u with another substance. This would extend the hapu'u supply and limit the impact upon the native forest."

In response to their comments, Environmental Communications, Inc. reviewed these potting mediums and provided the following disposition on their quality as potting mediums:

"Specifically, sugar cane bagasse is being marketed on a limited basis as a potting medium. Information we have indicates that the bagasse requires daily watering and decays rapidly. Seaweed may be a potential substitute, but to our knowledge, is not on the market. Much of its future potential is dependent on the cleaning and method of drying the seaweed. The third, pine or eucalyptus bark is considered similar to fir bark, which is presently marketed (normally cheaper than hapu'u). Even with this cheaper product on the market, hapu'u is sold at a steady rate. All three mediums would have the disadvantage of disturbing the divided plants which require periodic repotting (item 2, page 4). Mixture of hapu'u with other substances is already being done by many orchid growers.

The DLNR also commented that, "By limiting and/or denying such requests, we encourage the conversion to other materials and prevent unnecessary modification of the native forest." This is correct; at the same time, the following impacts would also be probable: (1) A portion of the expanding flower industry (using hapu'u as a medium) would be adversely affected for a period of time before a suitable substitute is found; (2) More individuals would be trespassing and removing hapu'u from State and private forest lands; and (3) An imported product (e.g. fir bark) will likely replace hapu'u due to the reliability of the suppliers and availability of the product.

C. No Action Alternative

If the 300-acre site is not approved for harvesting, it is likely that hapu'u operations at Niu Nursery will be terminated upon completion of the harvesting of the remaining 30-45 acres out of the original 150 acres approved by the Board of Land and Natural Resources in 1971. This would

mean the virtual demise of the hapu'u industry. Although Niu Nursery markets hapu'u only in the State, the loss of hapu'u sales would represent approximately \$370,000, per annum, and the potential sales of hapu'u (from the 300-acres) may well represent \$600,000, per annum. More importantly, the hapu'u used as a potting medium will need to be replaced by the flowering industry (cattleyas, cymbidiums, Vanda, Miss Joaquim, 20% of the anthuriums, bromeliads, dendrobium and other potted orchid plants). This industry (in 1976) represented \$2.5 million dollars and over 1,000 jobs<sup>1</sup> in and related to the industry. The failure to approve the additional 300 acres for harvesting does not mean that the entire industry will collapse; however, it does indicate that the industry will most likely be adversely affected until a substitute for hapu'u is found, and the cost of flowers and plants may eventually increase if the potting medium requires periodic (once every one or two years) repotting (thus requiring more labor). It is the general opinion of the various nursery and orchid growers that this set back may be economically damaging to the industry, in that smaller businesses may falter, affecting the industry at large for several years.

A no-action alternative may result in the conservation of the 300 acre portion of the hapu'u forest. This will allow any current on-going studies to continue. It would also remain in a relatively pristine state for future research studies on this Cibotium-Metrosideros forest. The resources will be preserved for future generations to enjoy and/or extract from. If the CDUA is not approved, it is possible that the applicant may consider other actions, including the selling of the entire 2,956 acres to private interest or perhaps to The Nature Conservancy, who in the 1970's proposed to purchase it. (It has been stated, however, that the intent of

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<sup>1</sup> Includes the hapu'u industry jobs, that portion of the flowering industry using hapu'u and the indirect jobs generated by both industries.

The Nature Conservancy was to harvest the land themselves; refer to the response to Mae Mull's comments dated November 21, 1978.)

It should also be noted that the farming of hapu'u is not feasible due to the long period necessary for the hapu'u to grow and produce premium fibers for potting purposes. This time is estimated to be approximately eighty (80) years or more. (Based on the growth rate to a diameter of harvestable size. Wick and Hashimoto study, cited by Becker.)

VII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT  
AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The harvesting of the 150-acres and the continued harvesting of the 300-acres being requested can be considered local short-term uses of our environment. It is hoped that the selective harvesting approach will not destroy the hapu'u ecosystem, not only from a conservation standpoint but from a forest management position as well. The destruction of the hapu'u forest will result in no further or a limited amount of hapu'u being produced. This could result in the eventual demise of the hapu'u industry in Hawaii. Because this result is undesirable to both the conservation groups and the hapu'u industry, the harvesting process is tedious and requires great care in order to adhere to the strict conditions established by the Board of Land and Natural Resources. Based on the adherence of these conditions by the Lee Brothers (harvesting contractors), the Board has commended their work. Therefore, the selective harvesting approach is expected to yield hapu'u not only for short-term use, but will also, if successful, result in the continuance of long-term productivity of this area.

In reference to the comments received during the EIS Consultation Period regarding the period of sustained yield (i.e. when a second harvesting can be done), it must be stated that if the hapu'u regenerates normally, the time period before a second harvest may take place is 50+ years, see page 38. A second harvest would be based on the immature ferns (those not initially harvested) growing and eventually falling. Perhaps the third or fourth harvest, if regeneration is successful, will become the tops of those ferns that were initially harvested.<sup>1</sup>

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<sup>1</sup> It would be premature at this time to state that sustained harvesting would occur. These statements are provided on the basis that the hapu'u forest regenerates normally, to a density which would allow harvesting to be economically feasible.

### VIII. MITIGATION MEASURES PROPOSED TO MINIMIZE IMPACT

These have been mentioned previously, but are also summarized below.

- A. Protect any rare or endangered plant species on the 300-acre site. Identify and locate *Vicia menziesii* and other rare endemic plant species,<sup>1</sup> to determine their existence in the requested 300-acre site. If these rare endemic species are found, limit harvesting to those areas where they are not located so that they cannot be damaged or destroyed.
- B. Establish a herbicide control program. Request the assistance of the State Department of Agriculture's weed control branch to prepare a herbicide plan in order to control weed growth.
- C. Continue to impose the sixteen (16) conditions, established by the Board of Land and Natural Resources.
- D. Allow private and university-oriented research in the hapu'u ecosystem.
- E. During harvesting, harvest only nine out of 10 selected hapu'u logs. The one (representing 10%) remaining log will be left to decay, thus partially mitigating the impact of removing the logs as seed beds. Decaying logs serve as seed beds as they produce the organic material needed to nurture ferns and other plants. This selective process should be done randomly so as not to create to equally distribute the number of remaining logs.
- F. Based on the need to retain the hapu'u forest, harvesters should be allowed to replant only fern tops and not any species of woody trees.
- G. No re-disturbance of a harvesting area should be permitted. Once harvested, an area should not be touched again.

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<sup>1</sup> Refer to the findings of the botanical survey, Exhibit VI.



## IX. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

As indicated in Section VII, if the selective harvesting and the harvesting operations are proven successful, (e.g. the fern tops grow normally and produce healthy and numerous tree ferns) and the hapu'u can be harvested on a sustained yield basis, the hapu'u taken from this area can be considered a renewable resource. The hapu'u logs taken from the are an irretrievable resource. If the hapu'u forest is damaged, either by exotic weed infestation or the harvesting operations) then the hapu'u taken must also be considered a non-renewable resource. At this time, information is not available which could decisively determine which of these outcomes will likely occur. It is noted that despite the fact that the area in which selective harvesting occurred is growing back rapidly, the eventual growth rate to maturity, as well as their condition upon reaching maturity, has not been established.

Also, Becker's dissertation notes that the harvesting (apparently done with mechanical equipment) of pulu in the 1860's to 1880's in the Kilauea area was not significantly noticeable in his field investigations (the hapu'u apparently grew back with little signs of being harvested).<sup>1</sup>

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<sup>1</sup> The conditions under which regrowth occurred would likely be quite different, especially when one considers that at the time (1860's) there was not as great a number of exotic weeds.

X. AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL  
POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS  
OF THE PROPOSED ACTION

As has been mentioned several times before, the Board of Land and Natural Resources at the time of their 1971 approval for the 150-acre site, issued sixteen (16) conditions relating to the harvesting operations. Spot checks by the Forestry Division have indicated that the harvesting contractor is adhering to all of the conditions established by the Board. It is recommended that these conditions continue to be followed and that periodic spot checks by the Forestry Division be maintained,<sup>1</sup> so that any adverse impacts occurring can be immediately recognized and mitigated where possible.

Additionally, the Board will continue to have the authority to stop the harvesting operations should significant adverse environmental impacts occur.

Pending final determination of the botanical survey (see Exhibit VI) to establish the presence of *Vicia menziesii* in the 300-acre parcel, it would be required by law to establish a critical habitat for this endangered specie.

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<sup>1</sup> This condition is based on the discretion of the BLNR.

## XI. ORGANIZATIONS AND PERSONS CONSULTED

In September, 1977, the application for expansion of the hapu'u harvesting area was filed by Bishop Estate. This application was withdrawn because of the lack of an environmental assessment. After the environmental assessment was prepared, a letter from the Department of Land and Natural Resources, dated May 23, 1978, informed the applicant that an environmental impact statement would be required due to the foreseeable significant adverse impact on the environment.

An EIS Preparation Notice for the proposed project was included in the EQC Bulletin of June 8, 1978 and June 23, 1978. Several organizations and persons requested to be "consulted parties."

The following organizations and individuals were sent a copy of the EIS Preparation Notice for their review and comments:

### Federal Agencies:

Hawaii Volcanoes National Park  
U.S. Forest Service  
U.S. Fish and Wildlife  
U.S. Department of the Army

### State Agencies:

Department of Land and Natural Resources  
DOWALD  
Land Management  
Natural Area Reserves  
Fish and Game  
Historic Sites Section  
State Parks  
Forestry Division  
Department of Health  
Department of Agriculture  
Department of Hawaiian Home Lands  
Department of Accounting and General Services  
Department of Transportation  
Office of Environmental Quality Control  
Water Resources Research Center

County Agencies:

Planning Department  
Department of Water Supply  
Department of Research and Economic Development  
Department of Parks and Recreation  
Department of Public Works  
Mayor's Office

Organizations and/or Individuals who have requested to be consulting parties:

Sheila Conant, Ph.D.  
Alfred S. Tong  
Moku Loa Group, Sierra Club  
Hawaii Audubon Society  
Dana Peterson and Susan Harada  
Geary Mizuno\*

<sup>1</sup> Mr. Mizuno made a request (9/27/78) to be a consulting party after the deadline date (6/23/78). However, his name is included on this list because his request was made at the same time he provided comments on the EIS Preparation Notice, which he submitted within the time period allotted for review and comments regarding the EIS Preparation Notice (8/25/78-9/21/78).

10-11-78 10:00 AM

XII. REPRODUCTION OF COMMENTS AND RESPONSES MADE DURING  
THE CONSULTATION PROCESS

The following agencies provided responses to the EIS Preparation Notice. An asterisk (\*) before the agency name indicates that no comments were provided by that agency. When an agency/individual did have comments, a disposition to those comments are provided immediately following their letter.

<u>Agency/Individual</u>	<u>Date of Letter</u>	<u>Date Received</u>
*Land Use Commission	8/28/78	8/29/78
*Hawaii County Dept. of Water Supply	8/28/78	8/30/78
*Department of the Army	8/30/78	9/01/78
Planning Department	9/01/78	9/06/78
*Department of Hawaiian Home Lands	9/01/78	9/06/78
*Department of Public Works, County of Hawaii	9/05/78	9/07/78
U.S. Department of Agriculture, Forest Service	9/07/78	9/08/78
U.S. Department of the Interior, National Park Service	9/08/78	9/11/78
*Department of Health, State of Hawaii	9/11/78	9/13/78
*Department of Defense, State of Hawaii	9/12/78	9/13/78
*Department of Parks and Recreation, County of Hawaii	9/15/78	9/19/78
*Department of Transportation, State of Hawaii	9/11/78	9/19/78
Fish and Wildlife Service, U.S. Department of Interior	9/19/78	9/20/78
*Department of Agriculture, State of Hawaii	9/20/78	9/22/78
Dana Peterson	9/20/78	9/25/78
Alfred S. Tong	9/27/78	9/28/78
Geary S. Mizuno	9/27/78	10/02/78
Mae E. Mull, Hawaii Audubon Society	9/27/78	10/02/78
*Andrew Chang, Department of Social Services & Housing, State of Hawaii	9/19/78	10/05/78



August 28, 1978

GEORGE B. ABUYOSHI  
Governor  
CHARLES W. DUKE  
Chairman  
SHINICHI NAKAGAWA  
Vice Chairman

COMMISSION MEMBERS:  
James Carras  
Colelio Machado  
Shinsei Miyasato  
Mitsuo Owa  
George Pascoa  
Carol Whitesell  
Edward Yamal  
GORDAN FURUTANI  
Executive Officer

DEPARTMENT OF PLANNING  
AND ECONOMIC DEVELOPMENT  
LAND USE COMMISSION

Suite 1775, Pacific Trade Center, 190 S. King Street, Honolulu, Hawaii 96813

August 28, 1978

Mr. F. J. Rodriguez, President  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, HI 96809

Dear Mr. Rodriguez:

Thank you for providing us with an opportunity to comment on your Environmental Impact Statement Preparation Notice for the Proposed Hapu'u Harvesting Activities on the Big Island. At this time, we have no comments on this matter.

Sincerely,  
*Gordan Furutani*  
GORDAN FURUTANI  
Executive Officer

Mr. F. J. Rodriguez  
President  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, HI 96809

EIS PREPARATION NOTICE FOR THE PROPOSED  
EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, MA'U DISTRICT, HAWAII

We have no comments to offer on this proposed EIS Preparation Notice.  
Thank you for giving us the opportunity for this review.

*Akira Fujimoto*  
Akira Fujimoto  
Manager  
GX

cc - L. Bautista (Department of Land and Natural Resources)

... Water brings progress... AUG 30 1978

REMOVED v/zl/rb



DEPARTMENT OF THE ARMY  
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII  
FORT SHAFTER, HAWAII 96809



AUG 30 1978

AFZU-FZ-EE

Mr. F. J. Rodriguez  
President  
Environmental Communications, Inc.  
Post Office Box 536  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

We have reviewed the Environmental Impact Statement Notice for the Proposed Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve, Kauai District, Hawaii. It appears that all matters of concern to this command will be addressed.

Thank you for the opportunity to comment.

Sincerely,

JOHN E. PEARSON, JR.  
LTC, CE  
Acting Director of Facilities Engineering

Copy furnished:

Board of Land and Natural  
Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

SEP 1 1978



PLANNING DEPARTMENT

25 AUPUNI STREET • IIII, HAWAII 96720

HERBERT T. MATAYUKU  
Mayor

SIDNEY M. LUKI  
Deputy Mayor

DIANE KAHUHA  
Deputy Mayor

September 1, 1978

Mr. F. J. Rodriguez  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

EIS Preparation Notice for the Proposed Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve, Kauai District, Hawaii

Thank you for notifying us of the EIS preparation for the subject proposal. The following are our comments and concerns which should be addressed in the EIS. Basically the EIS should cover all applicable points of concern included under Section 1:31 of the EIS regulations:

1. In 1971, when the Board of Land and Natural Resources approved the initial action for Hapu'u harvesting, in the present 150-acre parcel, the purpose of the project was to obtain data on crop regeneration and commercial feasibility. This data, and associated conclusions of the study, should be incorporated into the EIS.
2. The introduction of exotic weed species into remote areas is a major environmental impact. The tendency of seeds to "hitchhike" and the present lack of an effective weed control program are recognized. Thus, the problem with exotic weeds should be fully discussed in the EIS. It is assumed in the subject document that exotic weeds will be eliminated through floral succession. Supportive data for this conclusion should be provided.
3. The EIS should include a survey of endemic flora and fauna. Although harvesting activity will be confined to 450 acres of approximately 20,000 acres of similar

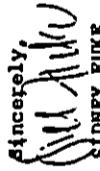
SEP 6 1978

Mr. F. J. Rodriguez  
Page 2  
September 1, 1978

forest type, the side effects of harvest operations may extend beyond the boundaries of the proposed 450 acres (300 + 150), resulting in a significant impact.

4. The subject document suggests that impact upon the avian fauna will be insignificant due to a harvest rate of 20 - 25 acres per year. However, general harvesting activity may affect birdlife in the surrounding areas. Impacts due to the presence of men and equipment will possibly extend beyond the boundaries of the project site.

Please note that the above reflect major concerns, and are not meant to preclude other points of concern which have not been addressed. We look forward to the drafting of the EIS for this proposal. Should you have any questions concerning the above, please contact us.

Sincerely,  
  
SIDNEY FUKU  
Director

BS:ak  
cc: Roland Higashi  
Mildred Yamamoto  
Leonard Bautista

53

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

F. J. RODRIGUEZ  
PRESIDENT

October 16, 1978

Mr. Sidney Fuke  
Planning Department  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

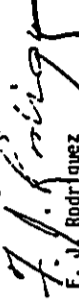
RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE

Dear Mr. Fuke,

Thank you for your letter of September 1, 1978, regarding the above-referenced EIS Preparation Notice. We have reviewed your comments and would like to provide the following disposition.

1. Most of the information regarding hapu'u growth and its' harvesting on a sustained yield basis is still unknown. The Forestry Division has not been able to make a determination on the final results of this kind of information from the 150 acre area which has been harvested over the past seven (7) years, and it is likely that a greater amount of time will be required before a trend can be established.
2. We have recommended throughout the EIS that a herbicide program be established with the cooperation of the Forestry Division. The results of weed control and the effectiveness of the herbicide program is also recommended to be monitored.
3. We have recommended to Hiu Nursery that a qualified botanist or a team of botanists be retained to determine the existence of *Vicia monastensis* and other rare endemic plants on the project site. (They have indicated their willingness to do this.) Secondly, we have recommended that hapu'u harvesting be limited to the areas where these plants are not located (should they be found within the 300-acre site). In this way, these plants will not be affected by the harvesting. This mitigation measure is discussed in the EIS.
4. In regard to your comments on avifauna, we note that Dr. Andrew Berger has been retained to prepare a study on the impact of the harvesting operations on avifauna. Dr. Berger's findings and report will be incorporated into the EIS.

Yours very truly,

  
F. J. Rodriguez

FJR/dhk



GEORGE B. ANTONIN  
Commissioner of Public Works

PROJECT OFFICES

WAIKANA OFFICE  
P. O. BOX 125  
WAIKANA, HAWAII 96793

KAUAI OFFICE  
P. O. BOX 100  
KAUAI, HAWAII 96741

MAUI OFFICE  
P. O. BOX 100  
MAUI, HAWAII 96753



STATE OF HAWAII  
DEPARTMENT OF HAWAIIAN HOME LANDS  
P. O. BOX 109  
HONOLULU, HAWAII 96809

September 1, 1978

Mr. Fred Rodriguez, President  
Environmental Communications Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

SUBJECT: Proposed Napu'u Harvesting Program  
Comments in EIS Preparation Notice

Reference is made to your letter of August 25, 1978, relative to the above subject project.

The Department of Hawaiian Home Lands has reviewed the Environmental Impact Statement and has no comments since it does not involve our lands.

Aloha Pūmehana,  
(With warm regards)

*Mary S. Jones*  
MERRY S. JONES, CHAIRMAN

MMK:kt

SEP 6 1978

SEP 7 1978

HERBERT MATAYOSHI  
Member  
EDWARD K. HARADA  
Chairman  
ARTHUR I. SENOJO  
Honorary Board Member

DEPARTMENT OF PUBLIC WORKS

COUNTY OF HAWAII - 25 ALUAKI STREET - HONO, HAWAII 96720 - TELEPHONE (808) 581-6321



PROJECT OFFICES

HONO OFFICE  
P. O. BOX 22  
KALANIANA'OLE MAUI BUILDING  
HONOLULU, HAWAII 96809

MOLOKAI OFFICE  
P. O. BOX 100  
MOLOKAI, HAWAII 96761

KAUAI OFFICE  
P. O. BOX 200  
LALE, KAUAI 96741

September 5, 1978

Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Attention: Mr. F. J. Rodriguez, President

SUBJECT: EIS PREPARATION NOTICE FOR THE PROPOSED EXPANSION  
OF HAPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST  
RESERVE, KA'U DISTRICT, HAWAII

Thank you for your August 25, 1978 letter, submitting the subject EIS preparation notice for our review and comment.

We have reviewed the EIS preparations notice and have no comments to offer.

*Edward Harada*  
EDWARD HARADA  
Chief Engineer

cc Mr. L. Bautista

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION  
INSTITUTE OF PACIFIC ISLANDS FORESTRY  
1151 PUNCHBOWL STREET, ROOM 322, HONOLULU, HAWAII 96813

1950  
(PIF)

September 7, 1978



Mr. F. J. Rodriguez  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Thank you for sending a copy of the "EIS Preparation Notice for the Proposed Expansion of Ikapu'u Harvesting Activities at Kilauea Forest Reserve, Ka'u District, Hawaii" for our comments.

This preparation notice is well prepared and states the situation and concerns related to harvesting and management of Ikapu'u.

In 1972 a Research Study Plan to monitor the effects of Ikapu'u (Treefern) harvesting on Forest Regeneration and Plant Succession was undertaken as a joint venture by personnel from the Hawaii Division of Forestry and the Institute of Pacific Islands Forestry. A number of years are required to measure results from this type study due to the slow growing characteristics of the Ikapu'u. The Hawaii Division of Forestry has taken on the task of doing re-measurement of the sampled areas.

During preparation of the Environmental Impact Statement, it would be desirable to incorporate information and findings from the above-mentioned study. Several of the items discussed in the preparation notice appear to be very important. Close evaluation of the exotic weed invasion impacts and the influences of reharvesting an area once regeneration of a new crop has started should be included in the EIS.

Finally, I am sure it must have been an oversight on your part that the Division of Forestry was not included on the list of State agencies to be consulted in preparation of the EIS. (Item H on page 11)

Please feel free to contact me if you need any assistance in the preparation of the EIS.

Sincerely,

*Robert V. Clayton*

ROBERT V. CLAYTON  
Pacific Islands Forester  
State & Private Forestry

SEP 8 1978

000023

SEP 11 1978

SEP 11 1978



United States Department of the Interior

NATIONAL PARK SERVICE  
HAWAII VOLCANOES NATIONAL PARK  
HAWAII 96715

IN REPLY REFER TO:  
12419

September 8, 1978

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

October 16, 1978

Robert V. Clayton  
Forest Service  
U.S. Department of Agriculture  
1151 Punchbowl Street, Room 323  
Honolulu, Hawaii 96813

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE  
EIS PREPARATION NOTICE

Dear Mr. Clayton,

Thank you for your letter of September 7, 1978, regarding the above-referenced EIS Preparation Notice.

We have obtained a copy of the 1972 study on the effects of hapu'u harvesting on forest regeneration and plant succession. We will incorporate the appropriate sections of this study in our report. Also, we have included for extensive reference purposes, a doctorate dissertation by Richard Becker entitled, "The Phytosociological Position of Tree Ferns *Cibotium* spp. on the Montane Rain Forests on the Island of Hawaii, a dissertation submitted to the graduate division of the University of Hawaii in partial fulfillment of the requirements for the degree of Doctor of Philosophy, December, 1976, which includes an evaluation of articles and studies prepared on hapu'u harvesting.

Also, we included the Forestry Division in the EIS list, their omission in the EIS Preparation Notice was an oversight.

Yours very truly,  
*F. D. Rodriguez*  
F. D. Rodriguez

FJR/dhk

Environmental Communications, Inc.  
Post Office Box 536  
Honolulu, Hawaii 96809

Gentlemen:

Thank you for your letter of August 25 with the information on hapu'u harvesting at Kilauea Forest Reserve.

We have reviewed the data presented and offer the following comments:

page 2 - Location: The map (figure 2) indicating the existing harvest site and the proposed site appears to be inaccurate and should be checked. Based on our examination of 1977 USGS aerial photos we believe the sites are actually about one half mile further northwest.

page 4, paragraph 4 - Need for the Proposed Action and Project Background: The practicability of establishing a sustained yield operation is highly dependent upon the growth rate of the replanted fern tops. The proposal should detail all information on this subject to give some idea of the length of time before an area can be reharvested. Hapu'u tree ferns are very slow growing and quite possibly could take all of Kilauea Forest Reserve to affect a truly sustained yield operation.

page 9, paragraph 3 - Identification and Summary of Major Impacts and Alternatives Considered: Reference is made to exotics including fireweed (*Nyctelia foaya*). The extremely aggressive exotic tree ferns invaded much of Volcano as well as Hawaii Volcanoes National Park. It comes in immediately after disturbance, grows quickly and can attain dense stands to the detriment of slower growing natives. We would assume it could take over the proposed harvest sites also. Therefore, provisions must be made for its control otherwise it will pose difficult problems for native forest regeneration objectives.

page 10, paragraph 3: What constitutes "ample refuge" for native

SEP 11 1978

Hawaiian birdlife is open to question and opinions specific to this should be requested from U. S. Fish and Wildlife Service, National Park Service, U. S. Forest Service and other active ornithologists studying native birds in Hawaii. It is our opinion that 20,000 acres may be marginal for some of the rarer Hawaiian birds.

In summary, the National Park Service is concerned about the disappearance of native forest adjacent or near Hawaii Volcanoes' 10,000 acre Olanua tract. The health and vigor of native vegetation communities and birdlife within the tract are influenced by adjacent land management practice. Any further disturbances to Kilnua Forest Reserve must be carefully scrutinized to be certain the short term benefits truly outweigh potential losses to Hawaii's already imperiled native flora and fauna.

Thank you for the opportunity to review the proposal.

Sincerely yours,



Robert D. Barber  
Superintendent

cc:  
Board of Land and Natural Resources  
Post Office Box 621  
Honolulu, Hawaii 96809  
Attention: Mr. L. Bautista

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

October 16, 1978

F. J. RODRIGUEZ  
PRESIDENT

National Park Service  
Hawaii Volcanoes National Park  
U.S. Department of the Interior  
Hawaii 96718

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE

Dear Sirs:

Thank you for your letter of September 8, 1978, regarding the above-referenced EIS Preparation Notice. We have reviewed your comments and would like to provide the following responses:

1. The location of the project site on Figure 2 of the EIS Preparation Notice was incorrect and will be noted in the EIS. A corrected map will be included in the EIS.
2. Most of the information regarding hapu'u regrowth and its' harvesting on a sustained-yield basis is still unknown. The Forestry Division has not been able to make a determination on the final results of information of this kind, from the 150 acre area which has been harvested over the past seven (7) years, and it is likely that a greater amount of time will be required before a trend can be established.
3. We have recommended throughout the EIS that a herbicide program be established with the cooperation of the Forestry Division. The results of weed control and the effectiveness of the herbicide program is also recommended to be monitored.
4. In regard to your comments on avifauna, we note that Dr. Andrew Berger has been retained to prepare a study on the impact of the harvesting operations on the avifauna. Dr. Berger's findings and report will be incorporated into the EIS.

Finally, we note your concern about the protection of this hapu'u forest. We recognize its' importance as not only a marketable resource, but also as a resource in terms of its' aesthetic value. The EIS will discuss both these aspects and the potential, probable impacts of this proposed harvesting.

Yours very truly,

  
F. J. Rodriguez

FJR/dhk

GEORGE R. ARYTORSH  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. Box 3219  
HONOLULU, HAWAII 96809

September 11, 1978

LEAHUA H. ARYTORSH  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF DEFENSE  
OFFICE OF THE ADJUTANT GENERAL  
P.O. Box 536  
Honolulu, Hawaii 96809

HIKING

SEP 11 1978

Mr. F. J. Rodriguez, President  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, HI 96809

Dear Mr. Rodriguez:

Subject: Request for Comments on Proposed Environmental Impact  
Statement (EIS) for the Proposed Expansion of Hapu'u  
Harvesting Activities at Kilauea Forest Reserve,  
Ka'u District, Hawaii

Thank you for allowing us to review and comment on the subject  
proposed EIS. Please be informed that we have no comments or objections  
to this project at this time.

We realize that the statements are general in nature due to  
preliminary plans being the sole source of discussion. We, therefore,  
reserve the right to impose future environmental restrictions on the  
project at the time final plans are submitted to this office for review.

Sincerely,

*James S. Kihagali*  
JAMES S. KIHAGALI, Ph.D.  
Deputy Director for  
Environmental Health

Mr. F. J. Rodriguez, President  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

EIS Preparation Notice for the Proposed Expansion  
of Hapu'u Harvesting Activities at Kilauea Forest  
Reserve, Ka'u District, Hawaii

Thank you for your letter of August 25, 1978 regarding the above subject.  
We have no comments to offer on this project.

Yours truly,

*Valentine A. Stiefmahn*  
VALENTINE A. STIEFMANN  
Major General, HANG  
Adjutant General

SEP 13 1978

SEP 13 1978



DEPARTMENT OF PARKS & RECREATION  
 COUNTY OF HAWAII

Herbert Matayoshi, Mayor  
 Milton Hakoda, Director

September 15, 1978

Environmental Communications, Inc.  
 P. O. Box 536  
 Honolulu, Hawaii 96809

SUBJECT: Hapu'u Harvesting Activities  
Kilauea Forest Reserve, Ma'u

We have reviewed the EIS preparation notice and have no adverse comments to offer.

Thank you for the opportunity to review the report.

MILTON T. HAKODA  
 Director

cc: Mr. L. Baulista  
 Board of Land & Natural Resources  
 P. O. Box 621  
 Honolulu, Hawaii 96809

25 AUPUNU STREET • HILO, HAWAII 96720 • TELEPHONE 961-8311

SEP 19 1978

September 11, 1978

STP 8.5061

Mr. F. J. Rodriguez  
 President  
 Environmental Communications, Inc.  
 Post Office Box 536  
 Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice  
 Proposed Expansion of Hapu'u Harvesting  
 Activities, Kilauea Forest Reserve  
 Ka'u District, Hawaii

In reference to your letter of August 25, 1978, regarding the above-captioned action, we have no comments to offer which could be incorporated into the Environmental Impact Statement.

Very truly yours,

*R. Higashionna*  
 R. Higashionna

SEP 19 1978

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
300 ALA MOANA BOULEVARD  
P. O. BOX 50187  
HONOLULU, HAWAII 96850  
Division of Ecological Services  
Room 6307

IN REPLY REFER TO:  
ES

September 19, 1978

Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Attn: P.J. Rodriguez

Re: Proposed Expansion  
of Hapu'u Harvesting  
Activities at  
Kilauea Forest  
Reserve, Ka'u  
District, Hawaii

Dear Mr. Rodriguez:

We have reviewed the environmental impact statement for the proposed hapu'u harvest project dated 25 August 1978 and offer the following comments/information at this time.

The Service's principal concern with this project is its potential impact on federally recognized endangered birds and plants and plants being proposed for endangered species status.

The document you transmitted states that based on existing operation modes "from general observations, the impact on the native avian population is relatively insignificant". This statement is unsubstantiated in this document. No information was provided on pre- and post-bird population census in and around the area used as test sites. Information gathered during the U.S. Fish and Wildlife Service's Mamakua Forest Bird survey during 1977 indicates that federally declared endangered birds were sighted within approximately one mile of the proposed hapu'u harvest area.

While the hapu'u forest is not primary bird habitat, harvesting procedures could disturb the feeding, nesting and movement of these and other native birds beyond the initial harvest area. Range determinations for the endangered birds found in this area will be completed in 1979.

The presence of exotic birds would be encouraged by the clearing required for transporting the harvested hapu'u and the inevitable invasion by exotic weeds. It has been noted by Service personnel that these birds are found in forest areas adjacent to roadways. The role of exotic avifauna in the transmission of disease is as yet unknown. But their increased propensity to native species should be reduced as a precautionary measure. We suggest that you contact Mr. Eugene Kridler, the Services Endangered Species Program Coordinator for additional information at the following address:

Mr. Eugene Kridler  
U.S. Fish & Wildlife Service (SE)  
300 Ala Moana Blvd., Room 5302  
P. O. Box 50167  
Honolulu, Hawaii 96850  
Telephone: 546-5615

There appears to be some confusion as to the species of hapu'u being harvested. Information from our Division of Endangered Species indicates that Cibotium glaucum may be the hapu'u selected for harvest. It is doubtful that C. splendens occurs on the Big Island.

Vicia menziesii, Hawaii's only federally declared endangered plant, has been found within a few miles of the proposed harvest site and may be found there also. A special effort should be made to determine whether or not this plant is present.

Although the proposed hapu'u harvest project would affect a relatively small area, it could preclude expansion to significantly larger proportions as indicated by previous requests. The Service would like to remain informed on the progress and impacts of the current project and any future plans for expansion.



Save Energy and You Serve America! SEP 20 1978

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

F. J. RODRIGUEZ,  
PRESIDENT

October 16, 1978

Thank you for the opportunity to comment.

Sincerely yours,

*Maurice H. Taylor*

Maurice H. Taylor  
Field Supervisor

Fish and Wildlife Service  
U.S. Department of the Interior  
P.O. Box 50167  
Honolulu, Hawaii 96850

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE

cc: HA  
SE  
Board of Land and Natural Resources  
HDF&G

Dear Sirs,

Thank you for your comments of September 19, 1978, regarding the above-referenced EIS Preparation Notice. We have reviewed your comments and provide the following dispositions:

1. In regard to your comments on avifauna, we note that Dr. Andrew Berger has been retained to prepare a study on the impact of the harvesting operations on avifauna. Dr. Berger's findings and report will be incorporated into the EIS.
2. In discussion with Dr. Charles Lamoureux, Professor of Botany at the University of Hawaii at Hanoa, he identified the two species harvested on the Big Island for their hapu'u fiber as *Cibotium chamissoi* and *Cibotium glaucum*. As you stated, *C. glaucum* probably does not occur on the Big Island, and has been misidentified by several botanists in their reports.
3. We have recommended to Niu Nursery that a qualified botanist or team of botanists be retained to determine the existence of *Vicia merriami* and other rare endemic plants on the project site. (They have indicated their willingness to do this.) Secondly, we have recommended that hapu'u harvesting be limited to the areas where these plants are not located (should they be found within the 300-acre site.) In this way, these plants will not be affected. This mitigation measure is discussed in the EIS.
4. In discussions with the management of Niu Nursery, it was felt that the 300-acre area being requested would be a sufficient source of hapu'u for twenty-five years or more. Beyond the 300-acres (above the 4,600 foot elevation), the hapu'u is not as dense as in the lower elevations, thus hapu'u above this point is not economically feasible,



Fish and Wildlife Service  
U.S. Department of Interior  
October 16, 1978  
Page Two

in terms of harvesting. This will be indicated in the EIS.  
We appreciate your concern in this matter.

*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

GEORGE B. ARMITAGE  
COMMISSIONER



STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE  
1428 SO. KING STREET  
HONOLULU, HAWAII 96814

PHILIP J. JAMES, JR.  
1230 MAUNA KILAUEA DRIVE, SUITE 101  
HONOLULU, HAWAII 96813  
REPRESENTATIVE FOR THE FARMERS

HONOLULU FARMERS  
WALTER S. HIGGINS  
MEMBER AT LARGE  
EMERY L. HARRISON  
MEMBER AT LARGE  
COLLEEN D. PETERSON  
MEMBER AT LARGE  
EUGENE HIGASHIMOTO  
MEMBER AT LARGE  
JAMES E. HARRIS  
MEMBER AT LARGE  
FRED M. OKASAKI  
MEMBER AT LARGE  
WILLIAM THOMPSON  
MEMBER AT LARGE

September 20, 1978

Mr. F. J. Rodriguez, President  
Environmental Communications Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice for the  
Proposed Expansion of Ilapu'u  
Harvesting Activities at Kilauea  
Forest Reserve, Ka'u District, HI

The Department of Agriculture has reviewed the subject  
notice and has no comments to offer.

We appreciate the opportunity to comment.

Many thanks,

*John Farias, Jr.*

JOHN FARIAS, JR.  
Chairman, Board of Agriculture

cc: Board of Land and Natural Resources

SEP 23 1978

4. How much of the related horticultural industry is involved; i.e. what will be the direct economic result if hāpu'u fiber is no longer available, or is in short supply? How many directly related jobs, and how much in revenue?  
5. What exactly is the amount of "revenue in form of taxes to the State" mentioned on p.10? I suspect this is an insignificant amount.

The existence of a proven "sustained yield" (vs. "creeping decimation") method of hāpu'u harvesting also needs to be convincingly documented in your EIS. Questions that need to be answered include --  
1. Reasons for reducing in 1971 the originally requested 2,956 acres to a 150 acre "test" included the "unknown nature of the sustained-yield management program" (p.5). What evidence is there that the nature of the program is any less "unknown" seven years later?  
2. Why is it estimated "that if present harvesting continues, the remaining portions of the 150-acre area will be exhausted within three years" (p.6)? Is this sustained yield? If harvesting began in 1971 when DLNR ok'd the "test" acreage (p.5), then the useful life of an 150-acre plantation appears to be only 10 years under present methods. Could one then extrapolate that the useful life of the proposed new 300 acres would be 20 years? When this is exhausted, what then? Will the original 150 acres be ready for a second harvest, or will new acreage be needed? Provide documentation, not speculation!

3. It is stated (on p. 10) that "of major consideration will be the potential to harvest hāpu'u for the entire 2,956-acre parcel". This could be construed as evidence that the present harvest methods require continual expansion to be economically productive (if so, this is not valid sustained yield!). This statement should be better explained.

4. What is the survival rate and rate of growth for the live fern tops which are scattered on the exposed soil of the skid trails (p.8)? Define the "moderate success" stated in the 1978 DLNR staff summary (p.6). Hāpu'u is known to prefer shade. Are the skid trails open to sunlight? What factors contribute to or detract from favorable growth conditions for the live tops? Should these tops perhaps instead be planted at the original growth site (i.e. planted immediately upon removal) for better yield?

5. What constitutes the second crop in your sustained yield program -- fallen individuals that were on the first harvest "standing live hāpu'u" (p.7 (b)), or secondary growth on the scattered live tops (p.8(1))? What is the time span until the second crop is harvested? Has a second crop ever been harvested yet by the applicants? If so, what was the associated yield vs. the first-crop yield? What was the time span between first and second harvests? Exactly how many acres are needed for an economically viable sustained yield, based on known growth rates and the yield of secondary harvests?

6. Why is the following phrasing used in item (b) on p.7 -- "These currently marginal specimens would continue to grow and produce 'future' crops"? Most importantly, why is "future" in parenthesis? Further, why are standing live hāpu'u considered "marginal"?

7. What is known quantitatively about hāpu'u ecology? Include as reference all scientific papers and State resource management documents referring to this topic. What is known about requirements for growth and reproduction, rates of growth under different conditions, the effect of exotic species (weeds, introduced pathogens, feral pigs, etc), the role of the hāpu'u in the overall native ecosystem (such as the "burne-log" role with native tree species), etc. All statements and assumptions relating to a supposed sustained-yield methodology must rest on firm ground!

Other points which ought to be further discussed or documented are related to the implied minor effect on the native ecosystem. The pertinent questions include --

1. What evidence do you have for the assumption that "the exotic weeds will eventually disappear due to the dominance of the overtopping tree fern" (p.10)?

Ms. Dana Peterson  
2641 Hāmeu'u Drive  
Honolulu HI 96817

Environmental Communications, Inc.  
PO Box 536  
Honolulu HI 96809

20 September 1978

Dear Sirs --

I would like to comment on your EIS Preparation Notice for the PROPOSED EXPANSION OF HĀPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST RESERVE, KA'U DISTRICT, HAWAII. I write to you as an individual, at this time representing only myself as a concerned citizen. My interest and concern with your proposal stems from my training as a field ecologist in Hawaii, and my commitment to ensure the survival of Hawaii's endemic flora and fauna.

The only justification for the expansion of hāpu'u harvesting in the Kilauea Forest Reserve centers around projections of need for hāpu'u fibers by the local horticultural industry and a "sustained yield" method of harvesting. To justify the radical disruption of native rainforest (which is valuable intact for both the survival of native species and as superb watershed), a valid "need" for hāpu'u fiber and the ability to fill this need without continued expansion in acreage must be convincingly and conclusively documented. In your preparation notice such detailed documentation is not well alluded to, and without the insertion of such documentation into the EIS, the proposal has no right to be approved.

The native rainforest ecosystem present in the Kilauea Forest Reserve is, according to your preparation notice (p.3), composed 90% (by weight) of hāpu'u. By no stretch of the imagination can harvest techniques directed toward such a major ecosystem component fail to disrupt the system. The "rare and endangered" classifications for the Hawaiian flora is still in an unsettled condition, so to say that there are no such species in the proposed project area says absolutely nothing about the importance of protecting that ecosystem. Native Hawaiian ecosystems are by nature delicate and easily disrupted, and relatively undisturbed systems (such as in the Kilauea Forest Reserve) occupy fewer and fewer acres every year. A native ecosystem, once disrupted, rarely recovers its former vigor. To disrupt yet another area of this uniquely Hawaiian resource, to permanently deny future generations its scientific, cultural, recreational and watershed values, should require ironclad justification.

The "need" for hāpu'u fiber must be well documented in your EIS. Questions that ought to be answered include --

1. What alternative "host materials" are available or potentially available to the local horticultural industry? What are their sources and relative benefits and drawbacks (both regarding economics and productivity)?

2. It is stated in your preparation notice that there are 10 full-time workers involved (p.10) and that previously only 4 workers were involved (p.6). If the proposed project is not ok'd, what exactly will be the resultant loss in present and potential jobs, both immediately and in the long term?

3. What percentage of the statewide hāpu'u harvesting does the applicant account for at the present time, and how much will they account for if the proposed project is ok'd? Yield by volume and by monetary value for the applicant vs. the entire industry should be presented.

SEP 25 1978

comment on hapu'u harvesting EIS p.3

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

F. J. RODRIGUEZ,  
PRESIDENT

October 16, 1978

Ms. Dana Peterson  
2641 Mamau'u Drive  
Honolulu, Hawaii 96817

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE

Dear Ms. Peterson,

Thank you for your comments dated September 20, 1978, with respect to the above-referenced EIS Preparation Notice. We have reviewed your concerns and provide a disposition on your comments below.

1. The EIS will contain a statement of objectives which will identify the need for the hapu'u harvesting. If will not however, go into lengthy explanations or testimonials for the need of hapu'u. We feel that such arguments, from this standpoint, may appear to bias the EIS so as to take the position of judging the validity of the project. Such testimonials must come from individuals affected by the hapu'u industry during the public hearing for the Conservation District Use Application. We will incorporate information which will adequately address the need of the project only to the degree which we find necessary.

Items 1, 2 and 3 of the first page and items 4 & 5 of page 2 of your letter will be discussed and/or included in the EIS.

2. Your letter, page 2, items 1 through 7 (in the middle of the page).

Items 1 and 2: Most of the information regarding hapu'u growth and its harvesting on a sustained yield basis is still unknown. The Forestry Division has not been able to make a determination on the final results of this kind of information from the 150 acre area which has been harvested over the past seven (7) years, and it is likely that a greater amount of time will be required before a trend can be established.

Item 3: In discussions with the management of Niu Nursery, it was felt that the 300-acre area being requested would be a sufficient source of hapu'u for twenty-five (25) years or more. Beyond the 300-acres (above the 4,600 elevation), the hapu'u is not as dense as in the lower elevations, thus hapu'u harvesting above this point is not economically feasible. Therefore, no plans to harvest hapu'u beyond the 300-acres are presently being requested. This will be indicated in the EIS.

The explanation of height difference (6 ft. buddleja vs. 10-15 ft. hapu'u) is totally irrelevant if the weed is shade-tolerant.

2. You admit that "one area that could stand improvement is wayide weed control" (p. 10). Definitely! What methods will be employed to increase this control?

3. One basis for your assumption that "the impact on the native avian population is relatively insignificant" is that "birdlife seeks the tree forest and do not thrive on hapu'u" (p.10). What about exotic weeds displacing native middle-storey nectar sources such as pūhānuī and clermontia, or fruit sources such as 'ohelo, 'akala, nalo, pīlo and mānaki? What about the loss of the "nurse-log" role of the hapu'u for the tree species (especially the 'ōhi'a, the major avian food-source)? The nurse-log phenomenon naturally occurs most often on the downed logs, which are preferred for harvesting (p.7 (c)).

4. On p.6 it is stated that "woody native species are taking advantage of temporarily exposed areas". Some quantitative data please! To what extent is this occurring? Is this phenomena temporary? What is the survival rate of these new plants? How well do they compete with the rapid growth of weed species in the same area?

Last, but certainly not least: One of the most central concepts of the EIS procedure is the consideration of alternatives to a proposed action. Now, then, can you so blatantly state, on p.11, that "No other alternatives have been considered"? This implies a serious misunderstanding of the purpose of preparing an EIS in the first place! I hope your EIS corrects this oversight.

Thank you for the opportunity to comment on your EIS preparation notice. I hope you consider these points as constructive criticism, not as near-sighted opposition. Should you be able to adequately justify your proposed action, I would be happy to support your project, for I fully realize the need to expand and diversify our local economy. We must, however, be very careful not to compromise those values and resources that are uniquely Hawaiian in a blind search for profit! As associates of the Bishop Estate, which has assisted in saving and perpetuating much that is truly Hawaiian, I believe that you can share this point of view. The native Hawaiian ecosystems are unique to our islands, and once decimated can never be regained...

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I will eagerly await your final EIS statement. Please retain me as a "consulted party" and send me a copy of the EIS (or notify me as to where I might review one) when it is available.

Again, thank you very much.

Z KŪPA'A KE ALOHA 'AIIHA , E KĀLAWA I KA IHOHUA I

Sincerely,  
*Dana Peterson*  
Ms. Dana Peterson

cc: State Board of Land and Natural Resources  
(attn: Mr. Rautiata)

Ms. Dana Peterson  
October 16, 1978  
Page Three

pursue. Since they represent private business interests, their alternatives are limited, unlike a governmental agency that represents the total public good and is not accountable as a private business enterprise.

Thank you for your comments and concern. The EIS will be available shortly and will be sent to you for further comments and review.

Yours very truly,

*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

Ms. Dana Peterson  
October 16, 1978  
Page Two

Item 4: There is no data available on the survival and/or growth rate for hapu'u tops. The subjective opinion of the State forester is that it is high (almost 100%). The skid trails are open to sunlight for the time in which an area (three to four acres) is being harvested. These skid trails are about six feet wide and based on observations by the harvesters, the skid trails are quickly revegetated after harvesting is completed. As you have stated, the favorable growth conditions for hapu'u include a well shaded area. Most tops are planted in the area where they are harvested.

Item 5: At this time no information is available which can answer these questions.

Item 6: Future, in this case, means that harvesting this present area (when ferns fall) and age on the ground, which rids them of the fuzz between the fibers of younger fern) will not take place for another estimated forty (40) years or more. The term marginal means that their future use is questionable.

Item 7: We have included, for extensive reference purposes, a doctorate dissertation by Richard Becker entitled "The Phytosociological Position of Tree Ferns *Cibotium* Sp. on the Montane Rain Forests on the Island of Hawaii." This dissertation includes references and evaluation of articles and studies prepared on hapu'u harvesting. This document, along with others (identified in the EIS), will provide a good basis for reference in this specific area, in which little recent research or literature has been published.

3. Page 3, bottom, item 1: We have no evidence that the exotic weeds will eventually disappear, and have indicated same in the EIS.
- Page 3, top, item 2: We have recommended throughout the EIS that a herbicide program be established with the cooperation of the Forestry Division. The results of weed control and the effectiveness of the herbicide program is also recommended to be monitored.
- Page 3, items 3 and 4: In regard to your comments on avifauna, we note that Dr. Andrew Berger has been retained to prepare a study on the impact of the harvesting operations on the avifauna. Dr. Berger's findings and report will be incorporated into the EIS.
4. Comment regarding alternatives: The EIS Preparation Notice is a preliminary document and a full discussion of the alternatives to the proposed action is not required at this point in the EIS stage. Also, this is not an agency action, it is an applicant action. We feel we cannot in all sincerity or integrity, identify alternatives which the private applicant and Lessee (Niu Nursery) are not able to

September 27, 1978

Environmental Communications, Inc.  
Post Office Box 536  
Honolulu, Hawaii 96809

COMMENTS ON E.I.S. PREPARATION NOTICE FOR THE PROPOSED EXPANSION OF  
HAPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST RESERVE, KAU DISTRICT, HAWAII

Dear Sir:  
To help complete the E.I.S. for the above please include the following  
subjects:

1. Location of all hapu'u fern forests throughout Hawaii where it is predominately (*Cibotium splendens*) tree ferns of this density.
2. Copy of aerial photograph of the 300 acre section and surrounding 200,000 acres which would show the lighter green color of the tree fern forest tops.
3. Location of similar tree fern forests elsewhere in the world and potential for harvesting.
4. Approximate length of time in years it has taken this forest to reach this stage of growth, length of time it takes a tree fern to reach maturity to yield great A filters, length of time tree trunks and tops recover from being severed to resume normal growth and per cent of tops that regrow to normal after being replanted.
5. Rate of growth and spread of exotic weeds throughout the 150 acres being harvested.
6. Effects of herbicides in areas of hapu'u harvesting damage.
7. Average useful life of hapu'u logs and chips when used for orchid growing.
8. Protection of hapu'u harvesting area from illegal entry by others.
9. Natural and controlled growth of orchids elsewhere where Hawaiian tree fern hapu'u is not available.
10. Possible effects of moving new processing machinery into untouched forest areas.
11. Examples of former tree fern forests where growth has reverted back to its natural state after careful removal of hapu'u logs.
12. Estimated economic loss to Hawaii from not harvesting hapu'u since demand for it began.
13. Examples of other native Hawaiian or Pacific Ocean plants that have recovered or have been taken on a sustained yield basis.
14. The increase in the market value of hapu'u since it was first begun to be used as a forest product.
15. Number of Hawaii island residents directly benefitted by the hapu'u harvesting operation and the amounts of hapu'u being used from this operation by the residents of the island of Hawaii in comparison with the amounts being used by the residents of Oahu, the mainland and elsewhere.
16. Reasons, evidence and testimony which the Hiu Nursery and Bishop Estate have given to justify that this expansion is necessary.
17. Job qualifications for employment by Hiu Nursery for work in hapu'u harvesting.
18. Animal populations in the proposed area for harvesting compared to populations in the area already harvested.
19. Native plants displaced by the invasion of aggressive exotic species in areas of operation.

Yours truly,  
Alfred S. Tong

(On record as a requestee to be consulted)  
member American Forestry Ass'n., The American Horticultural Society

SEP 28 1978

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

October 16, 1978

F. J. ROYAL  
PRESIDENT

Mr. Alfred S. Tong

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE

Dear Mr. Tong,

Thank you for your letter of September 27, 1978, commenting on the EIS Preparation Notice for the above-referenced project. We have reviewed your questions and provide a point by point discussion of your concerns.

1. There was some confusion about the species of tree fern being harvested. It has now been determined that *Cibotium ohamae* and *Cibotium glaucum* are being harvested. *C. glaucum* probably does not exist on the island of Hawaii. The location of other hapu'u fern forests, of this density, on the island of Hawaii will be discussed in the EIS.
2. A color aerial photograph of the 300 acre section and the surrounding area would be too expensive to provide in the EIS, and therefore we cannot comply with this request.
3. The Hawaiian *Cibotium* species are endemic to the Hawaiian Islands.
4. This information is not available.\*
5. This information is not available.\*
6. This information is not available.\*
7. Once planted in hapu'u, the orchid roots stay live for five (5) years or more.
8. The entrance to the rock and gravel road (at the end of Wright Road) is chained and "No Trespassing" signs are prominently placed at the beginning of the harvesting area. It was observed, by the harvesters, that periodic evidence of illegal entry is found (boot prints).
9. Orchids, in their natural state, grow on tree trunks or in the shade of forest areas.

\* The circumstances of its unavailability will be included in the EIS.

Orchids grown elsewhere in sphagnum moss, osunda, fir bark etc. are available to local growers, but the high cost of these media as compared to hapu'u, in addition to the fact that hapu'u is so much superior a medium precludes their use.

10. Based on the 150-acre site in which hapu'u harvesting has taken place over the past seven (7) years, no impact because of equipment used has been observed. Only equipment used for cutting, transporting the logs and bins are used in the harvesting area; no processing equipment will be moved into the forest area.
11. There are no known examples of former tree fern forests where growth has reverted to its natural state after the selective removal of hapu'u logs.
12. Niu Nursery sales in the early 1950's amounted to approximately \$50,000. Today, the market value of hapu'u is over \$370,000.
13. This information would not be very useful unless the plants were ecologically similar to hapu'u.
14. See response #12, above.
15. This information must be estimated; based on these estimations (by Niu Nursery) the hapu'u industry itself can be valued at \$370,000 (1978), and it affects a portion of the flower industry which represents \$2.5 million dollars worth of flowers and plants (1976 data). This translates to about 1,000 jobs in that portion of the flower industry.
16. This information will be incorporated into the EIS. Testimonies, arguments in favor of the project et cetera, must be appropriately provided to the Board of Land and Natural Resources as the approving agency, rather than an EIS.
17. Harvesting hapu'u in the Kilauea forest area is not a desirable occupation. It is heavy manual labor; the area is wet and cold. Under these circumstances, very few people accept employment in hapu'u harvesting.  
Some skill and ability in operating harvesting equipment, in addition to a sound physical condition are job qualifications.

18. This information is not available.\*
19. This information is not available.\*

The EIS should be available shortly and a copy will be sent to you for your review and comments.

Yours very truly,

*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

\* The circumstances of its unavailability will be included in the EIS.

September 27, 1978

Hr. L. Bautista  
Board of Land and Natural Resources  
State of Hawaii  
P.O. 621  
Honolulu, Hawaii  
96809

Sir:

I would like to comment on the EIS Preparation Notice entitled PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST RESERVE, KA'U DISTRICT, HAWAII. I would also like to request that a copy of the final EIS submitted by the applicant to the Board of Land and Natural Resources be sent to me at the following address:

Geary S. Mizuno  
633 Maryland Ave. NE  
Washington, D.C.  
20002

In general, I find the EIS notice to be deficient in two areas:  
1. Assessment of the probable effects of the harvesting activities on the stability of the Kilauea Forest native ecosystem; 2. Assessment of the feasibility and probable impacts of alternatives to the requested expansion of harvesting activities. My comments on particular sections of the notice follow.

1. Description of the Affected Area; Site Observations. p.3.

Methodology and sampling technique used in the site observations are not specified; this suggests that the 90% composition by weight figure is purely speculative or at least unsupported by data resulting from an accepted procedure. In any case, the particular measure used for expressing the composition of the forest may be acceptable for evaluating the economic viability of the tract in hapu'u harvesting, but is NOT useful for evaluating the impact of harvesting on the native vegetation.

The use of Hawaiian, instead of scientific, names in identifying plants occurring in the site suggests that no real effort was made to properly identify these plants. This is readily inferable from the use of the phrase "Hawaiian mint" (p. 3) when there are two relatively common genera of Hawaiian mints - with many rare and endangered species and varieties. No checklist of plants is appended to the report. Therefore, there is no basis for believing that the statement, "The species of shrubs found here... are (not) rare or endangered species" p. 3, is accurate.

OCT 2 1978

September 27, 1978

Environmental Communications, Inc.  
P.O. 536  
Honolulu, Hawaii  
96809

Sirs:

I am enclosing a copy of comments sent to the Board of Land and Natural Resources regarding the EIS Preparation Notice entitled, PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST RESERVE, KA'U, HAWAII.

I believe that you, and your client the B.P. Bishop Estate will be interested in my comments.

While I realize that it is past the date for which comments must be received to be incorporated into the EIS, I believe that you should consider the issues I have raised, for I intend to also submit comments on the final EIS.

Thank you for your attention to this matter.

Sincerely,

Geary S. Mizuno

OCT 2 1978

2. Need for the Proposed Action and Project Background, pp. 4-7.

The EIS notice refers to the "unknown mature of a sustained-yield management program", p. 5. To date, there is no public-released data and evaluation of the sustained-yield management concept in Hapu'u harvesting. Similarly, there has been no information released to the public concerning the results of the 150 acre test of the sustained-yield management concept. Specifically these issues and questions have yet to be addressed:

- a. regeneration rates of harvested hapu'u areas, compared with areas not impacted in any way.
- b. growth rates of hapu'u in harvested areas, as compared with growth in areas not impacted.
- c. the influence, if any, of forest composition and relative maturity of hapu'u on hapu'u regeneration and growth rates.
- d. assessment of regeneration, growth of other native species, and changes in forest structure which are associated with harvesting.
- e. exotic plant invasion, and effects on forest structure.
- f. assessments of effects of hapu'u harvesting on endemic avian and insect populations, and hydrological conditions in the affected area.
- g. cost (including "external costs" not borne by the applicant and his agents) analyses for the hapu'u harvesting.
- h. benefits to be derived by harvesting.

7 years have passed since the initiation of harvesting, and the Board still has no data for determining whether the sustained-yield concept is a viable one in the hapu'u harvesting industry.

The Board's staff summary of the present 150 acre test program (p. 5 of EIS notice) is inadequate in this regard. First, it is based on reports the latest of which are dated 1976. Hence the information provided is two years out of date.

Second, the staff report terms hapu'u regrowth "moderately successful", but "success" is not further defined. What exactly is successful regrowth?

Third, the staff report acknowledges a problem with noxious weeds, but no exact data is given describing the problem. Information on control measures and impact on the spread of the weeds is also not provided.

The EIS notice should not have used the staff report for the purpose of evaluating the present 150 acre harvesting operation. First, if the reports made by the Div. of

Forestry are available, they should have been directly evaluated by Environmental Communications Inc. In addition, copies of the reports should have been appended to the EIS notice, and become part of the application record. That Environmental Communications did not do so suggests that their research has not been complete, and that their EIS notice does not adequately evaluate the impact of the harvesting activities on the native ecosystem.

The notice states that the 150 acre test site will be exhausted within three years. This would mean that the expected lifetime for a 150 acre tract is 30 years for a first harvest of hapu'u; 20 years for a 300 acre tract. The notice fails to state the time needed to regenerate hapu'u on the already-harvested areas (i.e., the time between harvests). This is crucial, since this determines how many acres must be devoted to harvesting under a sustained-yield management program. In the instant case, it appears that 30 years is the minimum time between harvests—assuming that production is to be kept constant and at the same level of harvesting over the 30 year period as during the first ten year period (1971-1981).

3. Identification and Summary of Major Impacts and Alternatives considered, pp. 8-11.

A. "the immediate visual impact... (is of a) permanent nature".  
p. 8.

The sentence is a contradiction in terms: an immediate (implying temporary) impact is never a permanent one.

B. "All harvesting operations leave the land in an impoverished condition... hapu'u harvesting is no exception". p. 8.

There is no documentation for this statement. Not all crops involve harvesting that leaves land in an "impoverished condition"—for example, fruit harvesting.

C. "The harvesting setback... is a temporary phenomenon... expediting environmental revitalization (and subsequent sentence in paragraph)." pp. 8-9.

The statement on the temporary nature of the harvesting impact is directly contradictory to the initial statement that visual impact is permanent.

Second, there is no documentation to support the statement that the impact is temporary. The term, "rapid environmental recovery" is not defined.

D. "The area will revert to its original composition, or nearly so..." p. 9.

No documentation is provided for this statement.



E. "The partially damaged residual forest also recovers rapidly". p. 9.

The term, "rapidly" is not defined in this context. No documentation is provided for this statement.

F. "...some of these (invasive) grasses are endemic species and have been on the site. p. 9.

No documentation is provided for this statement. Some additional facts also need to be stated: the relative abundance of endemic/indigenous grasses as compared to exotic grasses in these invasive stands; the species which are involved in the invasive process, etc.

G. "It is assumed that the exotic weeds will eventually disappear due to the dominance of the... tree fern. (and subsequent sentences in the paragraph). p. 10.

No documentation has been provided for this statement.

H. "One area that could stand improvement is wayside weed control. p. 10.

The statement fails to accurately describe the problem: identity, population, distribution and spread of the exotic plants. Nor does the statement provide any information on prior and current control measures, success, and possible alternative control measures.

I. "Economic benefits include revenue in form of taxes to the State". p. 10.

This statement fails to consider the costs to the State of the operation, including the Forestry personnel assigned to monitor the project, as well as the time needed for evaluation of the harvesting operation's use permits. Finally, external costs to the public, and other non-quantifiable costs are not mentioned.

J. "No other alternatives have been considered". p. 11.

This is totally unacceptable. The Hawaii EIS law provides that EIS statements MUST consider alternatives, even if the alternatives eventually prove to be unacceptable, or unfeasible.

To conclude, I find that the present EIS notice is unacceptable for failing to consider alternatives to the requested action. In addition, it fails to answer some crucial questions about-

the feasibility of sustained-yield management and harvesting of hapu'u.

I believe that the State must pursue alternatives in agriculture in order to provide a more broad-based, balanced (diversified) economic base for its people. This must be balanced against the need for protection of the natural environment and this is especially crucial in Hawaii, with the world's most unique environment.

Thank you very much for allowing me to express my views.

Sincerely,

Geary S. Hizuno

cc Env. Comm. Inc.

Mr. Geary Mizuno  
October 16, 1978  
Page Two

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

October 16, 1978

Mr. Geary S. Mizuno  
633 Maryland Avenue, NE  
Washington, D.C. 20002

RE: Hapu'u Harvesting/Kilauea Forest Reserve

Dear Mr. Mizuno,

Thank you for your comments dated September 27, 1978 regarding the above-referenced EIS Preparation Notice. We will be sending you a copy of the EIS upon its completion for your review and comments. Below, we are providing a disposition to your comments on a point-by-point basis.

1. The EIS Preparation Notice is a preliminary document which describes the project and its general, probable impacts. We feel that you have misinterpreted the general statements which were made, and in fact, have taken the phrases cited out of context. The EIS Preparation Notice was prepared after reviewing several other previous documents (from the State Forestry Division and the Environmental Assessment, which was not prepared by us), and if our more detailed review shows the statement(s) to be incorrect or confusing, they will be corrected in the EIS. Additionally, a botanical survey will be conducted in order to determine if any rare or endangered endemic species of flora are located on the project site. (This is discussed in more detail in the EIS.)

2. Portions of the EIS provide responses to these concerns. We have also stated that in many cases, there is no data available with respect to many of these questions and that several more years (as much as ten) may be required to establish a reasonable and supportable answer.

In regards to your comments on the use of the report by the Division of Forestry, please be advised that we disagree that this report should have been evaluated by us. The Forestry Division already has personnel and the expertise to prepare such reports, and is also the designated governmental agency chosen to perform this function under State law. Also, as we have indicated above, the EIS Preparation Notice is a preliminary document and was not intended to be a detailed review of information and data available regarding the environmental impacts of the proposed harvesting.

3. Again, we feel that the cited statements (A, B, C) were taken out of context and a careful reading of the sentences before and after these phrases qualify our intent. The remaining concerns (D, E, F, G, H, I) will either be revised (if our review indicates that they are speculative and cannot be supported) or discussed in more detail in the EIS. (For a response to J, see disposition below.)

Again, we reiterate that the EIS Preparation Notice is a preliminary document and a full discussion of the alternatives to the proposed action is not required at this point in the EIS stage. Furthermore, your statement that "The Hawaii EIS law provides that EIS statements MUST consider alternatives even if the alternatives eventually prove to be unacceptable or unfeasible . . ." is incorrect. The State's Environmental Impact Statement Regulations state: (Underscore added)

g. Alternatives to the proposed action. Any known alternatives for the action which could feasibly attain the objectives of the action - even though more costly - shall be described and explained as to why they were rejected.

For agency actions, this discussion must include where relevant, those alternatives not within the existing authority of the agency.

A rigorous exploration and objective evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid or reduce some or all of the adverse environmental benefits, costs, and risks shall be included in the agency review process in order not to prematurely foreclose options which might enhance environmental quality or have less detrimental effects. Examples of such alternatives include: the alternative of no action or of postponing action pending further study; alternatives requiring actions of a significantly different nature which would provide similar benefits with different environmental impacts; alternatives related to different designs or details of the proposed action which would present different environmental impacts; alternative measures to provide for compensation of fish and wildlife losses, including the acquisition of land, waters, and interests therein. In each case, the analysis shall be sufficiently detailed to allow the comparative evaluation of the environmental benefits, costs, and risks of the proposed action and each reasonable alternative.

Also, this is not an agency action. It is an applicant action. We feel we cannot in all sincerity or integrity, identify alternatives which the private applicant and the Lessee (Hui Nursery) are not able to pursue. Since they represent private business interests, their alternatives are limited, unlike

Sub-part E, 1:42, 9

Mr. Geary Mizuno  
October 16, 1978  
Page Three



For the Protection of Hawaii's Native Wildlife

## HAWAII AUDUBON SOCIETY

September 27, 1978

P. O. Box 22833  
Honolulu, Hawaii 96822  
P. O. Box 275  
Volcano, Hawaii 96785

Mr. F. J. Rodriguez  
Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Re: EIS Preparation Notice for the Proposed Expansion of Hapu'u Harvesting  
Activities at Kilauea Forest Reserve, Kona District, Hawaii.

Dear Mr. Rodriguez:

The Hawaii Audubon Society requests that the following comments be considered  
in the preparation of the Environmental Impact Statement on the proposed action  
named above.

The description of the 300-acre requested logging site (p. 2) and the map of  
the area delineating the existing 150-acre harvest site and the proposed 300-  
acre site appear to be in error. The proposed site is abutted on the east by  
the State-owned Upper Oles Forest Reserve, not by the Volcano Farm Lots.  
As a point of reference, the hauling road from the present harvest site across  
Upper Oles Forest Reserve to Wright Road (extended) is at about 4400 feet in  
elevation at its highest point.

The actual boundaries of the present and proposed sites appear to be about  
100 feet higher in elevation than are shown on the map. This would put the  
highest point of the 300-acre expansion area at about 4550 feet elevation --  
as, in fact, was delineated on the quadrangle map that accompanied the Bishop  
Estate's Conservation District Use Application in September 1977.

A reading of the subzone maps that are a part of Regulation 4, Governing Land  
Use in the Conservation District, indicates that the highest point in elevation  
along the boundary between the Resource Subzone and the Protective Subzone in  
the Kilauea Forest Reserve is at about 4450 feet. If the map comparisons are  
correct, then about two-thirds of the requested 300 acres actually fall within  
the Protective Subzone where harvesting is not a permitted use.

It is misleading to say that the harvesting areas are bordered by approximately  
"20,000 acres of similar forest type" (pp. 2 and 10). Scientists have fre-  
quently commented on the significant differences in the composition of lowland  
forest ecosystems over short distances because of the varying ages and depths  
of lava flows and ash falls that form the substrate, and because of the dramatic  
changes in rainfall and temperature over short elevational gradients. Those  
factors help in understanding why the species composition of forests -- plants,  
birds, insects and other biota -- vary considerably within the Kilauea Forest,  
nearby State-owned forests and the Oles Tract of the National Park Service.

Until a thorough botanical survey of the requested area is completed, it is  
premature to say that "the species of shrubs found here are common throughout  
the Hawaiian rain forest and none are rare or endangered species" (p. 3).  
The plant list that precedes the quotation is obviously inadequate and incomplete.

a governmental agency that represents the total public good and is not  
accountable as a private business enterprise.

Yours very truly,

*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

OCT 2 1978

Several rare plants have been found in the area, and the presence of endangered species cannot be disclaimed before competent botanists have surveyed the site. For precise identification, the scientific names of all plants should accompany the Hawaiian names in an authoritative list.

It is inaccurate to say that a "similar forest type" bordering the logging area provides "ample refuge" (p. 10) for birds. In fact, loss of habitat results in a reduction or elimination of bird populations on this oceanic island. "Ample refuge" simply does not exist -- not when ten forest bird species that occurred only on Hawaii Island are considered extinct and another seven forest bird species on this island are considered endangered. Out of 23 different kinds of endemic birds with forest habitats on Hawaii Island, only six species are not yet listed as on the road to extinction.

While hapu'u is not a source of nectar, forest birds are known to use *Cibotium* for nesting material, nesting, perches for resting, grooming and sunning, and as a source of insect and other arthropod food. We anticipate that the EIS will list and discuss the status of native forest birds whose presence has been recorded in Kilauea Forest Reserve and surrounding areas.

Data on hapu'u growth rates are insufficient for a claim of "sustained yield" (pp. 5-7) management. A 1971 US Forest Service note on small-scale research, "Fronid Development and Stem Growth of Treefern in Hawaii," found that growth of the treefern bole is very slow. Annual base diameter growth averaged less than 0.1 inch, and bole height growth averaged less than 2 inches per year, according to the report by Herbert L. Wick and George T. Iiashimoto. At this rate it would take an 80-year cycle to produce a merchantable treefern at least 8 inches in base diameter. What are the average diameter and length of the hapu'u logged at the Kilauea site since 1971?

The 150-acre site was permitted by the Board of Land and Natural Resources in 1971 as a test harvest area for the primary purpose of providing the needed research data on the growth patterns of hapu'u. We expect that the accumulated research findings will be revealed in the EIS, along with an objective evaluation of the significant effects of hapu'u logging on the physical environment.

As we wrote on this issue a year ago, a continuing concern of the Society is the piecemeal loss of original 'ohi'a-hapu'u and koa forests with little recognition of the valuable functions fulfilled by these remnant, diversified forests in non-consumptive use. Parcel by parcel the unique 'ohi'a-hapu'u and koa systems, with their myriad interdependent life forms, are permanently altered by mechanical operations. Exotic grasses and weeds move in to the disturbed areas, followed by other introduced organisms. Rare endemic birds and plants with restricted distributions inevitably disappear.

Only 2800 acres of unmanipulated native forest is left in the Kilauea Reserve. The Hishop Estate owns no land that is comparable to this in wealth of native flora and fauna. Considering the paltry sum that accrues to the Estate from the logging license, there is hope that the Trustees will choose the far greater value of preserving the remainder of the forest in its natural processes of adaptation and succession as a rich and permanent heritage of Kamehameha Schools -- for the biological study and enrichment of generations of Hawaiian students and teachers. This feasible option deserves full discussion in the EIS as an alternative to the proposed project.

Aloha, Mae E. Mull  
Hawaii Representative

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. MOOREHEAD, PRESIDENT

October 16, 1978

Ms. Mae E. Mull  
Hawaiian Audubon Society  
P.O. Box 275  
Volcano, Hawaii 96785

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE

Dear Ms. Mull,

Thank you for your letter of September 27, 1978, commenting on the EIS Preparation Notice for the above-referenced project. We have reviewed your comments and are providing the following disposition.

1. The map (Figure 2) was incorrect, and will be corrected in the EIS.
2. Based on discussions with the planning office staff, Department of Land and Natural Resources, it is our understanding that harvesting is a permitted use in the Conservation District.
3. The statement regarding the 20,000 acres of forest of "similar" type is incorrect and will not be included in the EIS.
4. A botanical consultant will be retained to determine the existence of rare or endangered endemic plant species in the 300-acres proposed to be harvested. If rare or endangered endemic plants are found, we are recommending that hapu'u harvesting not be done in those areas.
5. Dr. Andrew Berger has been retained to prepare a study on the impact of harvesting operations on the avifauna. His study and findings will be incorporated into the EIS.
6. In our discussion with Dr. Charles Lamoureux, Professor of Botany, University of Hawaii at Honoa, he noted that tree ferns do not increase in diameter, with age.
7. The data regarding the growth patterns of hapu'u is still unavailable. The reasons for this will be discussed in the EIS.

The EIS will be available shortly, and a copy will be sent to you for review and comments.

Yours very truly,  
F. J. Rodriguez

FJR/dhk

GEORGE B. ARYOSH  
CONFIDENTIAL



ANDREW I. CHANG  
DIRECTOR OF SOCIAL SERVICES AND HOUSING

STATE OF HAWAII  
DEPARTMENT OF SOCIAL SERVICES AND HOUSING

September 19, 1978

Environmental Communications, Inc.  
P. O. Box 536  
Honolulu, Hawaii 96809

Attention: Mr. F. J. Rodriguez, President

Gentlemen:

Subject: EIS Preparation Notice for the Proposed  
Expansion of Hapu'u Harvesting Activities  
of Kilauea Forest Reserve, Ka'u District,  
Hawaii

The Department of Social Services and Housing has reviewed the above  
subject material and has no comments to offer.

Thank you for allowing us the opportunity to evaluate the EIS  
Preparation Notice.

Sincerely,

*Richard K. Parfimerian*  
ANDREW I. T. CHANG  
for Director

cc: DIARR-L. Bautista

OCT 5 1978

### XIII. SUMMARY OF UNRESOLVED ISSUES

There are three (3) unresolved issues. These are identified and discussed below.

- (1) This hapu'u forest is unique and must be preserved.

Based on the 1971 staff report to the BLNR, this is incorrect. The report notes at least two other areas where such hapu'u forests exist; both areas are in protected uses (one in the Volcanoes National Park, the other in a State Forest Reserve). However, several conservation groups, as well as scientists have argued about the uniqueness of this hapu'u forest.

In 1971, in regard to the initial CDDA, many of the opponents of hapu'u harvesting operations in this area provided extensive statements of the potential and significant adverse impacts which may result from hapu'u harvesting. Much of the testimonies and comments were from scientists and experienced conservationists. Because of the extensiveness of their comments, a summary of their basic reasons for opposing the project is incorporated into Exhibit IV of this Revised EIS. A reader requiring elaboration on these comments should refer to the written comments which were submitted to the BLNR at that time.

How the issue will be resolved prior to commencement of the action.

It is felt that the BLNR action will determine whether or not the hapu'u forest involved will be preserved.

- (2) The hapu'u ecosystem will be destroyed because of harvesting.

The data is simply unavailable to support any conclusion as to the ultimate impact of harvesting operations on the hapu'u ecosystem. In many places the introduction of exotic weeds and plants invaded and eventually destroyed the native forests. We do not know the sensitivity of the hapu'u ecosystem. Becker's dissertation indicated that the harvesting of hapu'u for pulu (the soft wool-like hair covering the frond bases and trunk apices of the tree ferns) in the 1860's and 1880's in the Kilauea area is not noticeable today. Yet the circumstances may have been quite different (i.e. perhaps at that time there were less exotic weeds to invade the area after harvesting). Hence, we cannot support any conclusion as to the impact on the hapu'u ecosystem.

In light of these unresolved issues, the applicant, at this time, requires a firm commitment of the hapu'u harvesting area for the long-range operational sustainment of Niu Nursery's hapu'u business.

- (3) Several individuals, organizations, and governmental agencies similarly commented that the EIS was inadequate, citing as one of the reasons, that data was not available to determine the impact of the harvesting operations on the hapu'u forest. In many cases, these organizations recommended that (a) studies be prepared to ascertain the impact on the hapu'u project (such studies included, native insect survey, a detailed botanical survey, biomass survey, a more detailed avifauna survey, study of the regeneration of hapu'u, survey of other areas for similar forest types); and/or (b) the harvesting of hapu'u be disapproved until data being gathered by the Division of Forestry proves conclusive.

The response provided to the reviewers by Environmental Communications, Inc. on the request for additional studies was as follows:

"The EIS document, in our understanding, is a full disclosure document. Wherever possible, we have attempted to provide whatever data we found to be available which would assist us in evaluating the potential impact. Unfortunately, there is a scarcity of credible data in this area; additionally, the actual obtaining of such data, for the purposes of preparing the EIS, would have required years of research (e.g. biomass relationship to the hapu'u forest) and available monies. Pragmatically, such studies and data would be so time consuming and financially uneconomical (to the entire hapu'u harvesting operations) that we based our analysis on data which was already available. We do not feel it was within the intent of the EIS law and regulations to burden the applicant to the point where an EIS is as costly, or even more so than the economic returns potentially possible from the project itself. Therefore, it would be better said that this EIS document discloses, to the extent possible, that much important information is lacking in order to come to any final conclusions on the impact of the hapu'u harvesting operations. However, it has identified the range of probable impacts which may occur. In the course of this EIS, the lessee has retained technical subconsultants on matters which were significant. These subconsultants prepared studies oriented to a shorter time period; by so doing, we find that this effort was realistic and provided some insight into the probable impacts of this proposed hapu'u harvesting operation."

As for the comment regarding the suspension of the approval until the results of monitoring conducted by the Division of Forestry have been finalized, Niu Nursery (lessee) has indicated that the approval is being sought now because it is essential they obtain a harvesting site for the long-range operational sustainment of their business.

How the issue will be resolved prior to commencement of the action:

This issue will be resolved if one (1) the Department of Land and Natural Resources provides an acceptance/non-acceptance of the Revised EIS, and if accepted, the BLNR makes a determination of approving/non-approving the CDUA for the proposed project.



XIV. LIST OF NECESSARY APPROVALS

The proposed action requires a Conservation District Use Permit. The Conservation District Use Application is presently on file with the Board of Land and Natural Resources for their review, public hearing and acceptance/denial.

XV. REPRODUCTION OF COMMENTS AND RESPONSES MADE DURING  
THE EIS REVIEW PERIOD

On October 20, 1978, sixty-five (65) copies of the EIS were transmitted to the State Environmental Quality Commission (EQC). In addition to these copies, six (6) copies of the EIS were provided to the State Department of Land and Natural Resources, the approving agency. The copies provided to the EQC were distributed; notice of the filing of the EIS was published in the EQC Bulletin of October 23, 1978. The deadline for responses to the EIS was November 22, 1978.

The following pages identifies the agencies and persons providing a written response to the EIS. Copies of the dispositions to the comments received are provided immediately after a copy of the letter. When the letter indicated that the agency had "no comments" no response was provided.

CORRESPONDENCE RECEIVED (11/29/78) ON THE ENVIRONMENTAL  
 IMPACT STATEMENT FOR THE PROPOSED EXPANSION  
 OF HAPU'U HARVESTING ACTIVITIES AT  
 KILAUEA FOREST RESERVE,  
 Kau'u District, Islan of Hawaii

<u>COMMENTING AGENCY</u>	<u>DATE OF LETTER</u>	<u>DATE RECEIVED</u>
*State of Hawaii, Department of Health	10/27/78	10/30/78
*U.S. Department of the Army, Engineering and Housing	11/01/78	11/06/78-DLNR 11/08/78-Plng. Ofc.
*State of Hawaii, Department of Accounting and General Services	11/01/78	11/02/78-DLNR 11/08/78-Plng. Ofc.
*State of Hawaii, Department of Social Services & Housing, Hawaii Housing Authority	11/01/78	11/02/78-DLNR 11/08/78-Plng. Ofc.
*State of Hawaii, Department of Transportation	11/01/78	11/09/78-DLNR 11/13/78-Plng. Ofc.
*U.S. Navy, Department of Engineering	11/02/78	11/06/78-DLNR 11/08/78-Plng. Ofc.
*County of Hawaii, Department of Water Supply	11/02/78	11/06/78-DLNR 11/08/78-Plng. Ofc.
*State of Hawaii, Department of Defense, Office of the Adjutant General	11/03/78	
*State of Hawaii, Department of Agriculture	11/03/78	11/08/78-DLNR 11/13/78-Plng. Ofc.
Sheila Conant, Ph.D.	11/08/78	11/16/78-DLNR 11/21/78-Plng. Ofc.
County of Hawaii, Planning Department	11/09/78	11/14/78
*U.S. Department of Agriculture	11/13/78	11/15/78-DLNR

Note: Plng. Ofc. = Planning Office, DLNR

<u>COMMENTING AGENCY</u>	<u>DATE OF LETTER</u>	<u>DATE RECEIVED</u>
*U.S. Department of the Air Force	11/13/78	11/16/78-DLNR 11/21/78-Plng. Ofc.
U.S. Department of the Interior, Fish and Wildlife Service	11/15/78	11/16/78
U.S. Department of the Army, Corps of Engineers	11/17/78	
Alfred S. Tong	11/20/78	11/22/78
Hawaii Audubon Society	11/21/78	11/28/78
Dana Peterson	11/21/78	11/22/78-DLNR
Conservation Council of Hawaii, Hawaii Chapter	11/21/78	11/27/78
U.S. Department of Agriculture, Forest Service	11/22/78	11/22/78-DLNR
Environmental Center, University of Hawaii	11/22/78	
State of Hawaii, Office of Environmental Quality Control	11/22/78	11/24/78
Department of Land & Natural Resouces	12/05/78	12/08/78

GEORGE B. ARBUTHNOT  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. Box 2019  
HONOLULU, HAWAII 96811

October 27, 1978

GEORGE A. L. YUEN  
DIRECTOR OF HEALTH  
ANDREW W. MARRIS, M.D., M.P.H.  
Deputy Director of Health  
HENRY M. THOMPSON, M.A.  
Deputy Director of Health  
JAMES S. KUMAGATA, Ph.D., P.E.  
Deputy Director of Health

In reply, please refer to  
File # 112-21-22

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DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

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Office of the Governor  
State of Hawaii  
Environmental Quality Commission  
550 Halekuanila Street, Room 301  
Honolulu, Hawaii 96813

MEMORANDUM

To: Environmental Communications, Inc.  
From: Deputy Director for Environmental Health  
Subject: Environmental Impact Statement (EIS) for Expansion of Hapu'u  
Harvesting Activities at Kilauea Forest Reserve, Ka'u District,  
Island of Hawaii

Thank you for allowing us to review and comment on the subject EIS.  
On the basis that the project will comply with all applicable Public  
Health Regulations, please be informed that we have no objections to  
this project.

We realize that the statements are general in nature due to preli-  
minary plans being the sole source of discussion. We, therefore,  
reserve the right to impose future environmental restrictions on the  
project at the time final plans are submitted to this office for review.

James S. Kumagata  
JAMES S. KUMAGATA, Ph.D.

cc: Office of Environmental Quality Control  
L. Baucista, DLR

Gentlemen:

Reference is made to your 20 October 1978 letter requesting comments on  
the Environmental Impact Statement (EIS) for the Proposed Expansion of  
Hapu'u Harvesting Activities at Kilauea Forest Reserve, Ka'u District,  
Island of Hawaii.

Review of the EIS reveals no significant environmental impacts on nearby  
Army installations. The Kilauea Military Camp is the only Army facility  
in close proximity to the proposed action. If described mitigating actions  
are adhered to, no USASCH installation will be adversely affected.

Since USASCH will not be affected by the action, no substantive comments  
are offered.

In accordance with your request, the EIS is being returned.

Thank you for giving USASCH the opportunity to review the document.

Sincerely,

Original signed by

CARL P. RODOLPH  
Colonel, CE  
Director of Engineering and Housing

JE Pearson, Jr  
ATC, CE

1 Incl  
As stated

Copies furnished (no incl)  
Board of Land and Natural Resources  
1131 Punchbowl Street  
Honolulu, Hawaii 96813

Kaehaeha Schools/Bernice Pauahi Bishop Estate  
Kapalama Heights  
Honolulu, Hawaii 96817

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DEPT. OF LAND AND NATURAL RESOURCES  
STATE OF HAWAII (P) 2304-B

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DEPT. OF LAND AND NATURAL RESOURCES  
STATE OF HAWAII

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DEPT. OF LAND AND NATURAL RESOURCES  
STATE OF HAWAII

Kamehameha Schools/Bernice  
Pauahi Bishop Estate  
Kapalama Heights  
Honolulu, Hawaii 96817

Gentlemen:

Subject: EIS for the Proposed Expansion of  
Hapu'u Harvesting Activities at  
Kilauea Forest Reserve

We have reviewed the subject statement and have determined that the action will not have any adverse environmental effects on any existing or planned facilities serviced by our department.

Thank you for this opportunity to comment.

Very truly yours,

HIDEO MURAKAMI  
State Comptroller

Lt:jnt 4-6  
cc: DLNR

MEMORANDUM

TO: Board of Land and Natural Resources

FROM: Franklin Y. K. Sunn, Executive Director

SUBJECT: Environmental Impact Statement  
Title: Expansion of Hapu'u Harvesting Activities at  
Kilauea Forest Reserve  
Location: Ka'u District, Island of Hawaii  
Classification: Applicant Action

The Hawaii Housing Authority has reviewed the above subject Environmental Impact Statement and has no comments to offer.

Thank you for allowing us the opportunity to review the EIS.

*Franklin Y. K. Sunn*  
Executive Director

cc: Kamehameha Schools  
DSSH  
EQC

November 1, 1978

HEADQUARTERS  
FOURTEENTH NAVAL DISTRICT  
BOX 110  
Pearl Harbor, Hawaii 96860

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& NATURAL RESOURCES  
STATE OF HAWAII

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Environmental Quality Commission  
Office of the Governor  
State of Hawaii  
550 Halekuanila Street, Room 301  
Honolulu, Hawaii 96813

Gentlemen:

Environmental Impact Statement for the proposed  
Expansion of Hapu'u Harvesting Activities at  
Kilauea Forest Reserve  
Ka'u District, Island of Hawaii

The Environmental Impact Statement for the proposed Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve forwarded by your letter of 20 October 1978 has been reviewed, and the Navy has no comments to offer. However, the subject EIS will be retained by this Command for record purposes.

The opportunity to review the subject EIS is appreciated.

Sincerely,

L. H. RUFF  
CAPTAIN, CEC, USN  
District Civil Engineer  
By direction of the Commandant

Copy to:  
State of Hawaii  
Board of Land and Natural Resources  
Kamehameha Schools/Bernice Pauahi Bishop Estate

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STATE OF HAWAII H-5155

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Mr. Donald J. Rescher, Chairman  
Environmental Quality Commission  
550 Halekuanila St., Room 301  
Honolulu, Hawaii 96813

Dear Mr. Rescher:

Subject: Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve

Thank you very much for giving us the opportunity to review the Environmental Impact Statement concerning the above-captioned action. We have no comments to offer which would improve the document.

Very truly yours,

*L. H. Ruff*

ALS: jk

cc: Lt-P  
DLNR  
Kamehameha Schools/Bernice Pauahi Bishop Estate

VALENTINE A. SUTERMAN  
MAJOR GENERAL  
ADJUTANT GENERAL



STATE OF HAWAII  
DEPARTMENT OF DEFENSE  
OFFICE OF THE ADJUTANT GENERAL  
575 BUNNARD ROAD, HONOLULU, HAWAII 96813

03 NOV 1978

GEORGE R. ARYOSH  
GOVERNOR

HIZING

Office of Environmental Quality Control  
550 Halekauwila Street, Room 301  
Honolulu, Hawaii 96813

Gentlemen:

We have received the enclosed Environmental Impact Statement's and have no comments to offer for the following:

1. Village Park - Draft Environmental Impact Statement
2. Supplemental EIS for Proposed Interim Group Cesspool System, Hanakuli Residence Lots, 4th & 5th Series, Hanakuli, Waianae.
3. Helicopter Landings on the Na Pali Coast, Na Pali Coast, Kauai
4. Expansion of Hehu'u Harvesting Activities at Kailua Forest Reserve, Ka'u District, Hawaii
5. Citron-Date Housing Project - McCully, Honolulu, Hawaii
6. Centry-Waipio, Waipio, Oahu

Sincerely,

*Wayne R. Tohyasu*  
WAYNE R. TOHYASU  
Captain, CE, HARBG  
Contr & Eng Officer

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DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII  
P. O. BOX 1800  
78 NOV 6 9:37 AM '78  
1400 HAWAII 96810  
20 ALPINE STREET

Rec'd Pmg. Ofc. NOV 8 1978

By: *[Signature]*

Cardon \_\_\_\_\_

Adj \_\_\_\_\_

Popper \_\_\_\_\_

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File In \_\_\_\_\_

Return to \_\_\_\_\_

DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

Environmental Quality Commission  
Office of the Governor  
550 Halekauwila Street, Room 301  
Honolulu, HI 96813

EIS FOR THE PROPOSED EXPANSION OF HEHU'U HARVESTING  
ACTIVITIES AT KILAUEA FOREST RESERVE

Our acknowledgment of no comments as stated in our letter of August 28, 1978 on the environmental preparation statement pertains likewise to this Environmental Impact Statement.

*Akira Fujimoto*  
Akira Fujimoto  
Manager

EX

copy - Board of Land and Natural Resources  
Kamehameha Schools/B. P. Bishop Estate

... Water l. ings progress...

P.K



GEORGE R. ANTONSON  
GOVERNOR

May I have a copy of this EIS?



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STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE  
1428 SO. KING STREET  
HONOLULU, HAWAII 96814  
STATE OF HAWAII

November 3, 1978

MEMORANDUM

To: Department of Land and Natural Resources  
Subject: EIS for Expansion of Iiia'u Harvesting Activities at Kilauea Forest Reserve, Ka'u, Hawaii  
The Department of Agriculture has no comments to offer on the subject EIS.

We appreciate the opportunity to review the statement, herein returned for your files.

JOHN FARRAS, JR.  
Chairman, Board of Agriculture

cc: Kamehameha Schools

Read Pmg. Of: NOV 13 1978  
Gordon Enale  
Lan Pove  
Return to: HA-1054

JOHN FARRAS, JR.  
CHAIRMAN, BOARD OF AGRICULTURE  
YUKIO KITAGAWA  
DEPUTY TO THE CHAIRMAN

BOARD MEMBERS:  
SUZANNE D. PETERSON  
EMMETT MONGGOD  
SIDNEY GOO  
FEDERICO GALDONES  
JAMES F. NIGHIDA  
FRED M. OOSAWAKA

11/10/78



University of Hawaii at Manoa

Department of General Science  
Dean Hall 2 • 2450 Campus Road  
Honolulu, Hawaii 96822

November 8, 1978

Board of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813  
Kamehameha Schools  
Bernice Pauahi Bishop Estate  
Kapalama Heights  
Honolulu, Hawaii 96817

Read Pmg. Of: NOV 21 1978  
By: Gordon  
Return to: HA-1054

Dear Sirs and Madams:

I offer the following comments on the Environmental Impact Statement prepared by Environmental Communications Inc. for the proposed "Expansion of Iiia'u Harvesting Activities at Kilauea Forest Reserve."

At this point it is clear that invasion of exotic plants subsequent to Iiia'u harvesting is unavoidable. Although herbicides will be used to reduce the problem, it is unknown how effective they will be or how detrimental they will be to native plants. In light of this situation, openly admitted by the applicant, it is pointless to continue insisting that the Iiia'u forest will not be adversely affected. In fact, facilitation of exotic plant invasion is approached in seriousness only by feral pig damage as the most important adverse influence an action could have on the integrity of a native Hawaiian rain forest. With these ideas in mind it is important, indeed necessary, to point out that the Iiia'u harvesting industry carefully controlled and minimally damaging as the applicant may claim, is an exploitative practice. The result? Eventually, though it may be some years ahead, we will no longer have an undisturbed Iiia'u forest. Indeed, we may have little Iiia'u of harvestable quality, and, almost surely, populations of endangered and rare organisms will be adversely affected. This is something all parties involved find distinctly undesirable. Decision on the application must face this issue squarely.

In her letter of 27 Sept. 1978, Mrs. Mae Hull (for the Hawaii Audubon Society) pointed out that part of the proposed 300-acre site may be in the Protective Subzone of the Conservation District (Regulation 4, DLNR), where harvesting is not a permitted use. This question was not addressed on the EIS. Surely the DLNR will not break its own regulation in granting a permit for harvesting on any part of the 300 acres that falls within the Protective Subzone.

AN EQUAL OPPORTUNITY EMPLOYER

I concur with Dr. Andrew Berger that there is insufficient information to show that the proposed harvesting directly and adversely affects native birds. As a scientist, I am by nature, too cautious to conclude that lack of information assures there will be no effect (or that there will be a beneficial effect) on the avifauna in the long term. I think, as Dr. Berger points out, the effects on the avifauna will remain unknown for some time. I should point out that, on the basis of a single day's observation, it must not be assumed that the only endangered species in the area is *Rufous solitarius* ('Io), and I hope this is clear from Dr. Berger's report. I have seen *Psittirostra phoenicea* ('O'u) less than half a mile from the border of the proposed harvesting site. (Incidentally, I do not regard this to be positive indication that the 'O'u is favorably affected by disturbance to native forest.)

Putting the difficult question of avifaunal status aside, I should like to point out that the possible adverse effects of the proposed action on native plants, especially endangered and rare species, is much more serious. This problem has been capably addressed by several other individuals, so I will not comment extensively. Commendably, efforts to avoid damaging individuals of *Vicia menziesii* will be made. Beyond this, I suggest that a thorough survey of plant life be made and that other species, especially those differing from *Vicia* in their degree of endangerment only by virtue of a lack of legal sanction, will also be protected. A number of unusual *Lobelia* occur in the adjacent 'Ola'a Tract (pers. obs.). Such plants should be protected.

Nothing at all has been said of possible effects on the native insect fauna. Researchers from the *Drosophila* Evolution Project at the University of Hawaii (e.g., Drs. Hampton Carson, Elmo Hardy, and Ken Kaneshiro) regularly collect live specimens of and study species of *Drosophila* flies in 'Ola'a Tract and Milewa Forest Reserve. They should be asked to comment on this proposal. Patrick Conant (MS thesis, Department of Entomology, UHM) has found *Drosophila silvestris* using tree fern fronds as an integral substrate for reproductive behavior.

It is probably obvious that I oppose the proposed harvesting project. At the same time I recognize there are benefits for the State of Hawaii in supporting diversified agriculture (e.g., flower industry) and sustained-yield yield commercial forestry projects, provided they are not implemented at the expense of more valuable land management practices. I would much prefer to see the forest in question remain undisturbed. However, in the event that the permit may be granted, I would like to offer the following suggestions.

Should the Board grant this permit, it should increase or modify the conditions of the original permit to assure that acceptable experimental design and data collection for the feasibility study of a sustained-yield hapu'u industry are implemented. (Actually the Board should demand that such a study be completed on the original 150 acres before the new permit is granted.) If the harvesting method interferes with the study, harvesting should be modified to avoid this. The main reason for granting the first permit was to test the sustained-yield idea, but apparently action to assure that acceptable testing was carried out was not taken. If it was, where are

the data and what do they tell us? We need to see a plan for data collection, comparison of logged and unlogged areas, etc. It is totally unsatisfactory to present subjective opinions of occasional site visitors as evidence of substantive vegetation changes. The Division of Forestry has been charged with monitoring the project, and it should be conducting a scientifically acceptable study, possibly with financial or other assistance from the applicant. The public cannot be expected to continue to approve exploitation of its irreplaceable natural resources on the basis of the mere assertion that such resources might, after all, be replaceable. We can't afford to wait until resources are depleted to find out that they are not replaceable.

I am not satisfied that the EIS adequately addresses all (even many) of the relevant issues, nor that the excellent questions raised by other reviewers have been satisfactorily answered.

Mahalo for the opportunity to comment.

Aloha,

*Sheila Conant*  
Sheila Conant, Ph.D.  
Assistant Professor

SC/ga

cc: Jaquelin Hiller, Environmental Center  
Environmental Quality Commission  
Dr. Hampton Carson, UHM  
Dr. Ken Kaneshiro, UHM  
Dr. Elmo Hardy, UHM

Professor Sheila Conant  
December 20, 1978  
Page Two

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. J. RODRIGUEZ,  
PRESIDENT

Professor Sheila Conant  
Department of General Science  
University of Hawaii at Manoa  
Dean Hall 2  
2450 Campus Road  
Honolulu, Hawaii 96822

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Professor Conant,

We received (on November 16, 1978) your letter of November 8, 1978 regarding the above-referenced EIS. Your position against the proposed project and your concern about the damage to the hapu'u forest will be acknowledged in the Revised EIS. We have provided dispositions to your more specific comments below.

1. Third paragraph of page 1: Regulation 4. It is our understanding that the Conservation District Use Application (CDUA) for this project was filed prior to the finalization of the revised Regulation 4. This being the case, the proposed project may not be subject to the revised regulation (effective date, June, 1978). However, we do recognize that approximately 200 of the 300 acres fall within the "p" sub-zone, in which harvesting is not a permitted use. If the CDUA is granted, it would be appropriate to redesignate the area in a "q" use. This information will be provided in the Revised EIS.

2. First paragraph on page 2: Avifauna. Dr. Berger has reviewed your comments and provided the following information:

"A one-day field trip into an area is not adequate for determining all species of birds found in the area. A minimum of four trips at different times of the year would have been required, but there was not time to permit that many trips. Nevertheless, I believe that my experience does justify my conclusion.

I did not, of course, imply that no other native birds were found in the area. I said, 'I saw only four species of birds during my field trip on July 31.' I pointed out that other species had been seen in adjacent areas at least during some time of the year. Nowhere did I say that any bird species 'is favorably affected by disturbance to native forest.'"

3. Second paragraph on page 2: Flora. Dr. Gerald Carr has been retained to identify and locate any endangered plant species on the proposed 300-acre site. We have provided a copy of your letter to him for his information. Dr. Carr's report will be appended to the Revised EIS.

4. Third paragraph on page 2: Native Insect fauna. We have not conducted a survey or study of the native insect fauna. The applicant's financial sponsorship of such a study would be so costly and time-consuming that the harvesting of hapu'u would be unprofitable. (It is our opinion that although there is a need for scientific research, the intent of the EIS process is to conduct reasonable research efforts and not to substantially burden the applicant with costly research studies which must be done prior to approval of a project.)

We have spoken to Drs. Carson, Hardy and Kanehiro. Dr. Carson has indicated that *Drosophila* flies are being collected in the 300-acre area proposed for extension. We will indicate this in the Revised EIS, and state that the proposed harvesting will have a negative impact on the gathering of *Drosophila* flies. Other native insect species will likely be disturbed by harvesting activities which would result in a change in number, distribution and exotic species possibly invading the area.

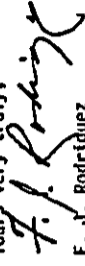
5. Fifth paragraph, page 2: Research. Research has been conducted by the Division of Forestry. However, their data is preliminary and basically unavailable for use at this time. (See attached letters from the Division of Forestry.)

6. Second paragraph, page 3: Inadequacy of the EIS. We find that we have attempted to provide a response to all of the substantive comments on the EIS Preparation Notice. For the most part, either no answers to many of the questions presently exist or extensive research must be conducted in order to obtain them. (Refer to our disposition on item 4.)

Because you have not specifically identified the "excellent questions raised" but not addressed, we are unable to provide a specific responses.

A copy of your letter and this response will be included in the Revised EIS.

Yours very truly,



F. J. Rodriguez

FJR/dhk  
Enclosures

Environmental Quality Commission  
Office of the Governor  
550 Halekaunila Street  
Room 101  
Honolulu, Hawaii 96813  
Gentlemen:

November 9, 1978

EIS - Proposed Expansion of Hapu'u Harvesting  
Activities at Kilauea Forest Reserve, Ka'u  
District, Island of Hawaii

We have reviewed the subject EIS and have the following com-  
ments/concerns. Please note that references to page numbers and  
section designations are as indicated in the subject document.

07

1. Page 111 - Probable Impacts: Is *Vicia menziesii* the only endangered native plant species on the Federal list of endangered plants?
2. Page 17 - Physical Geography: The area's soil was created by a prehistoric lava flow of the Kau series, and not of the Heaui series as indicated in the subject EIS.
3. Page 19 - Air Quality: The proposed harvesting area is zoned agricultural and is designated conservation by the County General Plan. However, since the subject area is within the State designated conservation district, and subject to Regulation Number 4 of the Department of Land and Natural Resources, this classification takes precedence over the County zoning. It would be more appropriate to discuss the conservation district subzone in this case.
4. Page 21 - Aesthetics: Subjective opinions should not be included in the EIS. It is also unclear as to

Environmental Quality Commission  
Page 2  
November 9, 1978

- whether the hapu'u forest is aesthetically pleasing before and/or after harvesting.
5. Page 22 - Section III: It should be noted that the State Conservation District is further divided into subzone categories. The subject area should be discussed as to the specific subzone applicable and the relationship of the proposed activity to the permitted uses within this subzone (see #3).
  6. Pages 25-28: It is evident in this section that very little data on hapu'u regeneration and growth is available, as well as herbicide effects and weed control. Consequently, any conclusions indicating that the recent harvesting operations have not been environmentally detrimental are premature.
  7. Page 29: It has been noted that a botanical survey will be conducted and incorporated into the revised EIS. Please be advised that this botanical survey should be general and not only concerned with identifying and locating *Vicia menziesii*.
  8. Page 30-31: The lack of data on the characteristics of certain endangered avifauna, as well as inadequate data on hapu'u (#6 above), tend to make any conclusions indicating that harvesting would be beneficial to endemic birds, premature and/or possibly incorrect.
  9. Page 31: The proposal that koa seedlings would be planted in the open spaces created through the harvesting operation must be elaborated on. It was noted in the Conservation District Use Application (CDUA) that the proposed activity did not include a koa planting program. Also noted in the CDUA were the proposed expansion of the warehouse and new machinery, in addition to the proposal to hire three (3) more workers. The proposed activity should be fully addressed in the subject EIS.
  10. Page 35: - Impact on Noise: The impact of the proposed activity on noise should be elaborated on. Basically the assessment should consider the type of equipment in use and the work period (i.e. hours/day; seasonal-yearly work periods).
  11. Page 37: Although the demise of the hapu'u industry will

NOV 14 1978

Environmental Quality Commission  
Page 3  
November 9, 1978

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. J. RODRIGUEZ,  
PRESIDENT

probably have some effect on the related flower industry, it should be pointed out that the actual loss will probably not involve 2.5 million dollars in sales and 876 workers. Unless these calculations can be documented to show the direct relationship of the flower/nursery industry to the existence of the hapu'u industry, it is rather misleading to include these figures.

12. Page 43: The estimated growth time of 50 years or more may be too low. Considering that very little regrowth data is available, previously cited data (page 29) would tend to set the growth time at about 80 or more years. The rationale used in determining this time period (50 years) should be elaborated on.
13. Page 46: Reference is made to the use of mechanical equipment during the 1860's to 1880's for pulu harvesting. The type of mechanical equipment should be identified and documented in the EIS.
14. It has been noted in the EIS that references are made toward a hapu'u growth study (1972) and several inter-departmental memorandums. It would be helpful to have the study and the memorandums incorporated into the EIS, possibly as an exhibit.

OO  
OO

An environmental impact statement is in essence designed to identify and assess the impacts of a proposed action on the environment (i.e. socio-economic, biological, resource, etc.). However, in the subject EIS the relative lack of data on hapu'u regrowth, avifauna and botanical characteristics of the area, make evaluation of this document extremely difficult. We hope that the above comments/concerns will be of some use to you in the preparation of a revised EIS which will hopefully clarify the entire project and its impacts.

Should you have any questions concerning the above, please contact us.

Sincerely,

*Sidney Funks*

SIDNEY FUNKS  
Director

BS/VK/abk  
cc: ELMR (Attention L. Bautista)  
Roland Higashi  
Mildred Ysanoto  
F.J. Rodriguez

Mr. Sidney Fuke, Director  
Planning Department  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

RE: ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED EXPANSION  
OF HAPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST RESERVE,  
KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. Fuke:

Thank you for your letter of November 9, 1978, commenting on the above-referenced EIS. We have reviewed your Department's concerns and provide the following point-by-point discussion of your comments.

1. Page 111. At this time, *Vicia menziesii* is the only endangered native plant specie on the Federal list of endangered plants. It is our understanding that several other endangered plants are being proposed to be included on the Federal list.
2. Page 17. The reference cited, Volcanoes in the Sea (Geology of Hawaii), by Gordon A. MacDonald and Agatin I. Abbott, indicates that the area was created by the Hawi volcanic series. Refer to Figure 17B, page 291, of the cited text. This book, written by two well known authorities of Hawaiian geology, is felt to be one of the more recent reference texts on the geology of Hawaii. If there is a dispute as to which series is correct, we would appreciate obtaining your source for our use.
3. Page 19. The sentence on pages 19 and 20 will be revised to read: "It is felt that because this area is in a forest reserve with agricultural and open space uses, the ambient air quality should be well within the ambient air quality standards established by the State Department of Health." The conservation district classification will be discussed.
4. Page 21. We disagree. The appearance of a forest, particularly a rain forest like the Kilauea Forest, is appealing to the average person. Our position is that the method of harvesting does not significantly affect the appearance of the forest on an overall basis, i.e., aesthetics.

We must assume that the comments relative to the expansion of the maintenance and warehousing are for the anticipated expansion at Kilauea, since the jurisdiction of Hawaii County would not reach Oahu.

Your comments relating to the maintenance shed and the increase in the harvesting equipment are valid, and we note that there is a need to clarify and expand the discussion of this matter in the EIS.

The proposed action, if approved, will require either a relocation and/or expansion of the maintenance shed. The present maintenance shed (shown in photograph 11), is approximately 500 square feet. If the project is approved, it is likely that the shed would be enlarged to approximately double that size, and for security purposes, enclosed and the equipment locked up. The relocation/expansion of the maintenance shed is not anticipated to be a significant impact because the area cleared for the maintenance area would be less than 20,000 square feet and the structure erected within a few days, without the use of heavy equipment.

Recent discussions with Miu Nursery have indicated that no additional men will be hired to join the present crew in the harvesting area. We note that presently, on weekends and during the summer, there is a six-man crew working in the harvesting area.

10. Page 35. As stated on page 11 (photos 1 and 4), page 14 (item 7), page 20 (item 2), page 77 (Exhibit 1, conditions 5 and 6), the equipment used is lighter equipment (called "cats") and portable saws. Also, the noise generated is discussed in item 2, on page 20.

11. Page 37. We concur with this comment and will clarify this on pages 36, 37 and 94.

12. Page 43. A fifty (50)+ year figure was utilized based on the most ideal growing conditions, but it is an estimate only. Also, see the last paragraph on page 25.

13. Page 46. The type of mechanical equipment used to harvest pulu in the 1860's to 1880's was not mentioned in Becker's dissertation.

14. Several of the more extensive departmental memorandums will be provided as exhibits in the Revised EIS.

Personnel will be increased to take the hapu'u to the barge harbor and release the harvesting crew from this task. Other labor saving measures will also be implemented so that there is an increase in the hapu'u harvested, without increasing the harvesting crew.

5. Page 22, Section III. The subzones of the Conservation District will be discussed in this section.

6. Pages 25-28. We concur and have so indicated this conclusion on pages 11 (item 2 under Probable Impacts), pages 14-15 (last sentence on page 14, first sentence on page 15), page 29 (first paragraph), pages 38 and 39 (items A and C), page 46 (last two sentences of the first paragraph) as well as in the various responses (Section XII) to reviewers' comments on the EIS Preparation Notice.

7. Page 29. Page 39 states: "In the section on mitigation measures, we have, in discussions with botanical scientists, determined that a botanical survey be prepared and that this plant and other rare endemic plant species be located (if they exist on the site), so that their disturbance and/or destruction can be prevented by not harvesting hapu'u in that particular area." (Underscore added for emphasis.) Additionally, page 45, item A, reiterates this statement. The botanical survey will not be a general vegetation survey. The Forestry Division has an adequate understanding of the types of vegetation located in the area having prepared a timber survey in the early 1970's. The botanical survey we propose would be to identify and locate plants which are endangered endemic species and are proposed for inclusion in the State and/or Federal list of endangered species.

8. Page 30-31. This evaluation was prepared by Dr. Andrew J. Berger, one of Hawaii's foremost ornithologists. The basis for his conclusions is provided in the report, "A Report on the Miu Nursery, Ltd. Kilauea Hapu'u Harvesting Site, Kilauea Forest Reserve, Hawaii," dated September 1, 1978. This report is completely reproduced and appears as Exhibit II in the EIS.

9. Page 31. The Forestry Division initially planted koa seedlings in certain specific areas. (For example, seedlings were planted at the entrances of various skid trails.) This was part of their research effort and not the applicant's action. Also, there was no "koa planting program," only a few seedlings were planted at specific locations by the State foresters. Although Berger indicated that koa trees would be more beneficial to the avifauna, we found that the planting of koa seedlings may damage and/or destroy the hapu'u ecosystem, thus we recommended (page 45, item F): "Based on the need to retain the hapu'u forest, harvesters should be allowed to replant only fern tops and not any species of woody trees." (Underscore added for emphasis.)

Mr. Sidney Fuke  
December 20, 1978  
Page Four

Lastly, we find that the EIS is an informational document which attempts to disclose objective information on the project and its environmental impacts. In this case, much information is lacking, but this is duly noted and discussed on pages 24 to 29.

Thank you for your comments and we hope that we have answered your questions.

Yours very truly,  
*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

*P.O.*  
*-d*

UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

P. O. Box 50004, Honolulu, HI 96813

Board of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, HI 96813

Kamehameha Schools  
Bernice Pauahi Bishop Estate  
Kapalama Heights  
Honolulu, HI 96817

Gentlemen:

Subject: Expansion of Hapu'u Harvesting Activities at Waipua Forest Reserve, Ka'u District, Island of Hawaii

We reviewed the subject environmental impact statement and have no comments to offer.

Thank you for the opportunity to review this document.

Sincerely,

*Jack P. Kanals*  
Jack P. Kanals  
State Conservationist

cc: Office of Environmental Quality Control  
550 Hahaione Street, Room 301  
Honolulu, HI 96813

9374

Rec'd Reg-016

By \_\_\_\_\_

Date \_\_\_\_\_

Nov 15, 1978

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& NATURAL RESOURCES  
STATE OF HAWAII



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United States Department of the Interior

FISH AND WILDLIFE SERVICE  
100 ALA MOANA BOULEVARD  
P. O. BOX 50187  
HONOLULU, HAWAII 96850  
Division of Ecological Services  
ROOM 6307

Rec'd Pkg. 016 NOV 21 1978 417  
DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 15TH AIR BASE WING HQ RB5H  
HICKAM AIR FORCE BASE, HAWAII 96111  
Project: 13 NOV 1978  
Ltr: 14-1054  
File: 14-1054

ATTN: DEEV (Mr. Makashima, 449-1831)

SUBJECT: Environmental Impact Statement (EIS) for the Proposed Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve, Kauai District, Island of Hawaii  
re: Board of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

- 1. This office has reviewed the subject EIS and has no comment to render relative to the proposed project.
- 2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your project and thank you for the opportunity to review the document.

ROBERT Q. K. CHING  
Chief, Engrg & Envtl Png Div  
Directorate of Civil Engineering

Cy to: Kamehameha Schools/Bernice Pauahi Bishop Estate  
Kapalama Heights  
Honolulu, Hawaii 96817

RECEIVED  
28 NOV 16 11:02  
DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

November 15, 1978

Environmental Communications Inc.  
1152 Bishop Building, Suite 508  
P. O. Box 536  
Honolulu, Hawaii 96809

Re: Hapu'u Harvesting/  
Kilauea Forest  
Reserve, Island of  
Hawaii

Dear Sir:

We received your 16 October 1978 disposition, regarding our comments on the referenced project.

Providing the precautions you listed are implemented, damage to endangered species in the area should be minimal. However, we would like to point out that at the present time no mitigation measures are recognized where federally declared endangered species and their critical habitat are affected. (Disposition #3).

We would appreciate receiving any additional survey information (location of the endangered *Vicia menziesii* and other proposed endangered plants) as it becomes available.

Sincerely,  
Maurice H. Taylor  
Field Supervisor



NOV 16 1978

Save Energy and You Serve America!





DEPARTMENT OF THE ARMY  
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS  
BUILDING 230  
FT. SHAFTER, HAWAII 96859

17 November 1978

PODED-PV

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

November 17, 1978

Mr. Maurice H. Taylor  
Field Supervisor  
United States Department of the Interior  
Fish and Wildlife Service  
300 Ala Moana Boulevard  
P.O. Box 50167  
Honolulu, Hawaii 96850

RE: HAPU'U HARVESTING/KILAUEA FOREST RESERVE,  
ISLAND OF HAWAII

Dear Mr. Taylor,

We are in receipt of your letter dated November 11, 1978, regarding the above-referenced project.

This office will provide you with the findings with respect to *in situ* *manatees* upon completion of the botanical survey in the subject area. This information will also be incorporated into the Final EIS, providing it is available at the time of printing.

92

Yours very truly,  
*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

Environmental Quality Commission  
Office of the Governor  
State of Hawaii  
550 Halekuali Street, Room 301  
Honolulu, Hawaii 96813

Gentlemen:

Thank you for the opportunity to comment on the EIS for the proposed expansion of Hapu'u harvesting activities at Kilauea Forest Reserve.

Although the Corps has no jurisdiction over this area of the forest, we do have a continuing interest in natural resource management on the island of Hawaii, particularly as it may relate to our on-going Hilo Area Comprehensive Study. Our specific comments on the EIS are attached (Inclosure 1).

Sincerely yours,

*[Signature]*  
KISOK CHUNG  
Chief, Engineering Division

1 Incl  
As stated

NOV 21 1978

COMMENTS ON EIS FOR EXPANSION OF  
HAPU'U HARVESTING AT KILAUEA FOREST RESERVE

Comment Page  
4 29(para 1)

The authors of the EIS feel that gathering sufficient data to evaluate impacts on the forest is "unreasonable"; yet, this was the basis for conditions agreed to by the harvester at the time of original permit approval. If the pertinent research was properly planned and executed by qualified investigators, the data would speak for themselves.

Comment Page  
1 23

We believe it is appropriate to weigh the pros and cons of selective harvesting versus conservation of the hapu'u forest in the EIS since a primary purpose for an EIS involves disclosure of beneficial and adverse impacts of a full range of alternatives. Both qualitative (including subjective) and quantitative data should be evaluated.

2 24-25

The 1971 Board restriction of harvesting to 150 acres of hapu'u forest was intended to develop data on the harvesting operation and its impact on the forest. The Forestry Division memo quoted in the EIS makes it clear that actions of the harvesters were in part responsible for their inability to obtain the pertinent data. The fact that the growth rate of recovering vegetation was too slow to obtain relevant data in time to evaluate expanded harvest in 1978 could have been anticipated at the time of the original permit. It was clearly the responsibility of the harvester, with assistance from the Forestry Division, to design and implement a research plan that would generate the data necessary to objectively evaluate subsequent harvest expansion requests. Failure to do so because of circumstances that could have been predicted does not appear to be a valid justification for approval of an expansion permit before the data are available.

3 28(112)

Although the authors of the EIS concur that fallen hapu'u acts as a nursery for other forest plants, including ohia, the conclusion is reached that harvesting only 90% of the fallen hapu'u will allow the forest to regenerate. Restated another way, the conclusion is reached that 10% of the fallen hapu'u can perform the same ecological role in the forest as does 100% of the fallen logs. Even in the absence of data, this position appears unsupported. Would not a harvest ratio of 50% be more defensible ecologically?

5 30-34

Condition 9 (pg 77) of the 1971 BLNR approval was that the Division of Fish and Game "shall monitor the effect on harvesting on birdlife in the area." There is no evidence that this was ever done. Yet, in the discussion of potential impacts of hapu'u harvesting on avifauna, the lack of pertinent data is again invoked as justification for expansion of harvesting. Dr. Berger states that "the most sensible way to attempt to save either a plant or animal species is to do everything possible to preserve the total ecosystem." Yet, in the same discussion, he advocates harvesting of hapu'u as a method to "increase the heterogeneity" of the forest. In view of our very limited understanding of the hapu'u forest ecosystem, it seems premature to recommend means to "improve" it. It should also be noted that no studies were conducted to evaluate the impact of hapu'u harvesting on less conspicuous invertebrate fauna.

6 36

Reference is again made to the need for long term (20+ years) studies to evaluate effects of harvesting on the hapu'u forest ecosystem; yet, there is no assurance that such studies will be conducted. It seems reasonable to place the burden of responsibility for such research on the applicant who alters the forest and the agencies who authorize the action.

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

Mr. Kisuk Cheung, Chief  
Engineering Division, Corps of Engineers  
December 20, 1978  
Page Two

F. J. RODRIGUEZ,  
PRESIDENT

Mr. Kisuk Cheung, Chief  
Engineering Division  
Pacific Ocean Division, Corps of Engineers  
U.S. Department of the Army  
Building 230  
Fort Shafter, Hawaii 96858

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

We have received a copy of your letter dated November 17, 1978, to the State Environmental Quality Commission (EQC) on the above-referenced EIS. Below, we have provided an item-by-item response to your comments.

Comment 1, page 23. The pros and cons of selective harvesting versus conservation of the hapu'u forest were discussed in the CDMA hearings of 1971 and 1978. We will discuss the arguments generally brought before the Board of Land and Natural Resources (BLNR) in the Revised EIS.

Comment 2, pages 24-25. Initially, there were two operators who were contracted to harvest hapu'u; one of these contractors relogged previously harvested areas and was terminated after three years of repeated problems and substandard work. The other contractor, Lee Brothers, is still harvesting hapu'u for Miu Nursery. On February 25, 1977, the BLNR acknowledged their excellent work in harvesting operations.

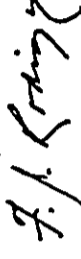
Comment 3, page 28 (#12). The 10% figure does not have data to support it. It was used merely to indicate that some mitigation would be exercised if one out of ten harvestable logs would not be taken. If a greater percentage was left to remain, the economic feasibility of taking the hapu'u logs would be placed in jeopardy.

Comment 4, page 29 (paragraph 1). See the attached letter of November 30, 1978, from the Division of Forestry to Environmental Communications, Inc.

Comment 5, pages 30-34. We do not find that Dr. Berger advocates the harvesting of hapu'u as a means to "improve" the environment supporting the avifauna; much of his findings are based on the information which was available to him. This evaluation of the situation was based on his expertise in his field. It will be noted that no studies were conducted on invertebrate fauna.

Comment 6, page 36. See the Division of Forestry memorandum of October 24, 1977 (attached) for information on long-term studies. We note that the Forestry Division's data may be evaluated and released within the next few years and a period of twenty years to obtain information on the hapu'u ecosystem may not be involved. This will be noted in the Revised EIS.

Yours very truly,



F. J. Rodriguez

FJR/dhk  
Enclosure

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. J. RODRIGUEZ,  
PRESIDENT

Environmental Communications, Inc.

P. O. Box 536

Honolulu, Hawaii 96809

Dear Sir:

The October 1978 EIS is understandably incomplete  
and biased.

Comments were sent to the addresses of the Accepting  
Authority and Proposing Party as given and directed by  
the E Q C office.

Yours sincerely,

Alfred S. Tong

104 Alae St.

Hilo, Hawaii 96720

Mr. Alfred S. Tong  
104 Alae Street  
Hilo, Hawaii 96720

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. Tong,

We are in receipt of your letter dated November 20, 1978, informing us  
that your comments regarding the above-referenced EIS had been sent to  
the offices of the "Accepting Authority and Proposing Party as given and  
directed by the EQC office." No specific comments accompanied your  
general opinion that the EIS was "inadequate and biased," nor were they  
received. Therefore, your concerns could not be specifically addressed  
in the revised EIS document.

Yours very truly,



F. J. Rodriguez

FJR/dhk

NOV 23 1978

1153 BISHOP BUILDING, SUITE 508 • P. O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 531-1351



For the Protection of Hawaii's Native Wildlife

## HAWAII AUDUBON SOCIETY

November 21, 1978

P. O. Box 3013  
Honolulu, Hawaii 96813  
P. O. Box 275  
Volcano, Hawaii 96785

Board of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813  
(Accepting Authority)

Re: Draft Environmental Impact Statement for the Proposed Expansion of Ikapu'u Harvesting Activities at Kilauea Forest Reserve, Ka'u District, Hawaii

A review of the draft EIS for the proposed project reveals several deficiencies in complying with the Environmental Impact Statement Regulations (1970) of the Environmental Quality Commission.

The regulations provide under Content Requirements (pp. 14-18) that:

"The EIS shall, at a minimum, contain the following information:

- c. Description of environmental setting, including a description of the environment in the vicinity of the action, as it exists before commencement of the action, from both a local and regional perspective. Special emphasis shall be placed on environmental resources that are rare or unique to the region and the project site. . . ."

The draft EIS fails to meet this requirement:

- (1) There is no botanical survey of this primary native forest for reviewers to evaluate. Essential to informed decisionmaking on the proposal is an annotated list of plant species that occur in the parcel and the vicinity, indicating relative abundance and pinpointing those with proposed endangered species status. Even if the consultant's recommendation that a survey be included in the final EIS is carried out, reviewers will have lost the opportunity to assess its quality and make recommendations for the management of rare species.

The project applicant knew in January 1978 when the EIS determination was made that an authoritative botanical survey -- conducted by field botanists competent in the identification of rain forest plant species -- would be required for an adequate EIS.

In addition to the possible presence of the endangered *Vicia manniana*, field botanists have reported a rare *Tetraplasandra* species and a rare *Stenogyne* species in the proposed site. Other species with proposed endangered status may well be present.

In the lengthy discussion under Impact on Flora (pp. 24-29) the effects of logging operations on endemic plants other than tree ferns are given short shrift.

- (2) The one-day bird survey along haul roads and akid trails in the existing logging area is scarcely sufficient for the draft EIS Summary (p. iii) to conclude that "no adverse or significant impact was foreseen" on avifauna -- not when the ornithologist under contract to Hiu Nursery apparently did not enter the 300-acre requested site. 'Io (Hawaiian hawk), seen at the present

harvesting site (pp. iii, 81), is not identified as an endangered species. Also, four Hawaiian honeycreepers reported by different observers in the vicinity of the proposed logging site are named (p. iii, 81), but are not identified as endangered species: Hawaii Creeper, Hawaii 'Akepa, 'O'u and 'Akiapola'u.

What could provide valuable information on the impact on avifauna of past, present and future logging would be the periodic reports in fulfillment of condition 9 in the list, "Conditions Established by the Board of Land and Natural Resources for the Ikapu'u Harvesting Operations (1971)" -- p. 77 of the draft EIS. Condition D reads: "The Division of Fish and Game shall monitor the effect of harvesting on birdlife in the area."

In the 44-page discussion under Impact on the Fauna (pp. 30-34), not a single bird species is mentioned as occurring in either the present or proposed sites. As for other fauna, only pigs, rats and mongooses are presumed present by implication.

- (3) The 300-acre parcel in question is part of the remnant, unmanipulated Kilauea Forest Reserve that has been identified repeatedly by biologists and conservation writers since 1970 as diversified primary forest, housing a unique assemblage of endemic plants, birds and invertebrates, having high priority for protection from exploitation. This assessment over eight years appears in communications with the Board of Land and Natural Resources, the Bishop Estate, Hawaii County, and in reports of the International Biological Program (ISLAND ECOSYSTEMS) and other publications.

In addition, the biological value of the Kilauea forest, as contrasted with its commercial logging value, is attested to by the fact that in the early 1970s The Nature Conservancy made persistent and strenuous efforts to purchase this unique forest for ecological protection in perpetuity. Although the Estate Trustees chose not to sell at that time, the biological value of Kilauea continues to exist and taken on even greater importance as native habitats are eliminated on its western and southern borders.

In spite of this well-publicized background, the draft EIS errs and exhibits inappropriate bias when it labels such biological assessments as "the subjective opinions of the opponents of the project" (p. iv).

Concerns expressed by responsible writers for an objective environmental description and for recognition of the effects of Ikapu'u harvesting on a unique natural environment are denigrated again as "subjective" (pp. 33, 75), or misinterpreted as an "impact on aesthetics" (p. 33).

Such tactics are not in conformity with the EIS Regulations (p. 14) which require that:

"The Environmental Impact Statement shall contain a public explanation of the environmental consequences of the proposed action. The contents shall fully debate the environmental implications of the proposed action and shall discuss all relevant and feasible consequences of the action. In order that the public can be fully informed and that the agency can make a sound decision based upon the full range of responsible opinion on environmental effects, this Statement must include responsible opposing views, if any, on significant environmental issues raised by the proposal."

Other hapu'u forests of this type on the island of Hawaii (p. 28). The accuracy of this major claim presented in three different places in the draft EIS with slightly different wording (pp. iv, 28, 75) must be challenged. The incorrect assertion is to the effect that the proposed logging site is not unique because there are two other hapu'u forests of this type on the island of Hawaii. The October 8, 1971 staff report to the Board of Land and Natural Resources on the CHUA for hapu'u harvesting in 2,950 acres of the Kilauea Forest Reserve is quoted (p. 28) in identifying those two areas as follows:

"... Approximately four miles from the subject area is a 2,000 acre forest area which is proposed for inclusion within the Natural Area Reserve System, and about 3/4 miles away, is a 9,655 forest area set aside to the National Park. . . ."

The first area obviously is Pu'u Maku'ole, reached via Steinback Highway and Disappointment Road. I know this area rather well, having visited it regularly in company with William Hall for biological study since 1972 and occasionally in the company of biologists. This area is quite unlike the Kilauea site in plant species composition, distribution and abundance.

Tree ferns are far less dense at Pu'u Maku'ole than at the proposed Kilauea site, allowing a wide diversity of other fern species, ground cover plants, shrubs and middle-story trees. This 'ohi'a-dominated forest is distinctly dissimilar to the Kilauea hapu'u forest, with only scattered 'ohi'a. The tree fern, *metu* (*Cibotium hawaiiense*), is common in parts of Pu'u Maku'ole but apparently is absent from the Kilauea site, for example.

The second area listed is the 'Ola'a Tract off Wright Road in the community of Volcano which was conveyed by the State to the National Park Service a number of years ago. I frequently visit parts of this parcel which is different from the Kilauea site in several ways. Useful botanical data for comparison are available in "A Preliminary Biocological Survey of the 'Ola'a Tract, Hawaii Volcanoes National Park," by James B. Jacob and Frederick H. Warshauer, 1978.

These three sites are different in age, climate and elevation; thus their vegetation structure and composition are also different --- as are their faunal components.

Vital information for reviewers and decisionmakers is missing in Section III, The Relationship of the Proposed Action to Land Use Plans, Policies and Controls for the Affected Area. A major undisclosed fact is that the 300-acre site straddles two subzones of the Conservation District that have different objectives and permitted uses.

A comparison of the Vicinity Map (Fig. 2) with the Regulation 4 map delineating subzones shows that more than two-thirds of the upper portion of the site requested falls within the Protective (P) Subzone, while the lower portion adjacent to the existing logging site is in the Resource (R) Subzone.

Regulation 4 (p. 4) states the objective of the Protective Subzone as follows:

"The objective of this subzone is to protect valuable resources in such designated areas as restricted watersheds, fish, plant and wildlife sanctuaries, significant historic, archeological, geological and volcanological features and sites, and other designated unique areas."

Consumptive uses are not permitted in the "P" Subzone, except programs for control of animal, plant and marine populations. Growing and harvesting forest products is not permitted use in the "P" Subzone. I raised this issue in comments on the EIS Preparation Notice, but it was not addressed in the consultant's "disposition" reply.

Regulation 4 states the objective of the Resource (R) Subzone as follows: (p. 5)

"The objective of this subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas. Growing and harvesting of forest products is a permitted use in the Resource Subzone. In determining whether hapu'u logging can be allowed as a conditional use in the Protective Subzone, it appears that the Board of Land and Natural Resources is restrained by the following rules excerpted from Section 6, Standards; Land Use Conditions and Guidelines of Regulation 4 (p. 11):

"B. Guidelines

1. All applications shall be reviewed in such a manner that the objective of the subzone(s) is given primary consideration.

C. Deviation

Deviation from any of the conditions provided herein may be considered by the Board, only when supported by a satisfactory written justification that:

3. The deviation does not conflict with the objective of the subzone. . . ."

Another potential constraint on hapu'u logging in the relatively intact primary forest are the provisions of the Hawaii Endangered Species Act (Act 65, 1973) which prohibit the taking of an endangered plant species on any lands. "Take" in this sense means "to cut, collect, uproot, destroy, injure, or possess endangered or threatened species of plants, or to attempt to engage in such conduct." "Plant" means "any member of the plant kingdom, including roots, seeds and other parts thereof."

Because the Department of Land and Natural Resources is charged with the administration and enforcement of Act 65, the Division of Forestry is exercising extreme caution in permitting the renewal of bulldozing for koa planting on a Kaulaou Ranch plot of 100 acres where ten scattered plants of the endangered *Vicia menziesii* were discovered recently. It seems likely that DLNR will exercise prudent caution on the Kilauea site as well, since it is promising *Vicia* habitat.

In addition, I have been told that it is the policy of the present State Forester to give equal protection to proposed endangered plant species.

To more fully inform reviewers, the Vicinity Map (Fig. 2) should delineate the subzones of the Conservation District for the whole Kilauea Forest Reserve --- including the grazing parcels waka'i of the present logging area the Upper 'Ola'a Forest Reserve and the 'Ola'a Tract. The Agriculture land use designations for the adjacent Kaulaou Ranch and the Wright Road Farm lots should also be shown.

When adjacent land use is graphically presented in this way, the following statement in the draft EIS (pp. ii, i) appears to be in error: "The present

and proposed harvesting areas are bordered by approximately 20,000 acres of forest land. In fact, the lands on the western, southern and part of the eastern borders have been substantially cleared and are in agricultural use. You would have to reach far beyond the northern and eastern site borders to arrive at anything approaching "20,000 acres of forest land."

The requested site is three miles north of Kilauea Military Camp, not "two miles" as stated on pages 11 and 1. Also, the scale on the location map (Fig. 1) errs in giving a 1/2 inch approximately 100 miles. For comparison, it is about 30 highway miles from Hilo to Kilauea.

The prevailing assumption throughout the Draft EIS is that if the standing tree ferns and the cut tops continue to grow in length and eventually produce merchantable downed logs, then there will be no damage or destruction to the Hapu'u forest -- and if sustained yield can be achieved in 50-80 years, there will have been no loss.

Many native in conservation of unique island resources have a different perspective on commercial exploitation of the Kilauea site. We see the proposed site as a primary native forest, relatively unaltered by the hand of man or by his introductions. To bulldoze swaths through this forest is to transform it to a degraded secondary forest where the natural processes of succession, adaptation and evolution are forever altered.

Once mechanical clearing and logging operations disturb a lowland forest, it can never be restored to its original natural state. The machine operations permanently alter the workings of the interdependent ecosystem components. Rare endemic species can be eliminated before their presence is even recognized. Aggressive foreign weed species of plants, birds and insects are then invited to invade the previously closed native system. Native Hawaiian ecosystems are small in size and the degradation or destruction of any one of them that remains in an irreplaceable loss to the natural heritage of us all.

The previously recommended land use alternative available to the land owner/applicant -- to maintain the Kilauea Forest Reserve in a natural state of native wilderness for the educational enrichment of Kamehameha Schools -- is not treated in the draft EIS or in the "disposition" letter from the consultant.

Thank you for giving these comments careful consideration in the revision of the draft EIS.

Mae E. Mull  
Mae E. Mull  
Island of Hawaii Representative  
Hawaii Audubon Society

copies:  
Bernice P. Bishop Estate  
Environmental Communications, Inc.  
Environmental Quality Commission

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. J. ROSSIGNOL  
PRESIDENT

Mrs. Mae E. Mull  
Hawaii Audubon Society  
P.O. Box 275  
Volcano, Hawaii 96785

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mrs. Mull,

We received (on November 28, 1978) your letter of November 21, 1978 regarding the above-referenced EIS. The following responses are provided to your comments:

1. Botanical Survey. Dr. Gerald Carr has been retained to identify and locate any endangered plant species on the proposed 300-acre site. We have provided a copy of your letter to him for his information. Dr. Carr's report will be appended to the Revised EIS. To the contrary, the applicant and Miu Nursery did not know that a botanical survey would be needed until August, 1978. We note that the harvesters are harvesting only tree ferns, and no other plants. Impact on other endemic plants in the area would be adverse because they would be disturbed during the harvesting process and after the harvesting when exotic weeds provide competitive plant growth.

2. Dr. Berger provided the following response:

"A one-day field trip into an area is not adequate for determining all species of birds found in the area. A minimum of four trips at different times of the year would have been required, but there was not time to permit that many trips. Nevertheless, I believe that my experience does justify my conclusion."

It is true that I did not specifically refer to Io (Hawaiian Hawk), or several species of honeycreepers. The interested reader also could refer to the references I cited (Berger, 1972a; Conant, 1975; Katahira, 1978) to find out which were endangered and which were not.

I pointed out that other species had been seen in adjacent areas, implying that they may well occur in the harvest area at least during some time of the year."

(Note: Pages two and three of the letter to Mrs. Mull were revised due to the incorrect reference to Mrs. Mull as the speaker at the July 27, 1978 Public Hearing.)

Mrs. Mae E. Mull  
December 20, 1978  
Page Two

Revised 1/4/79

The four (4) endangered species will be identified in the Revised EIS.

We are not aware of any data or evaluation of the harvesting activities on birdlife which has been prepared by the Division of Fish and Game.

3. Value of the hapu'u forest and The Nature Conservancy attempt to purchase the land.

We would concur that many of the ardent opponents of this project have submitted a great number of opinions as to the value or uniqueness of the hapu'u forest. These are, for the most part, opinions from a variety of conservationists and scientists. No supportive data and scientific information is provided with their general comments; therefore, these are felt to be "learned opinions." If there were such information as alluded to in your comments, many of the questions raised could be responded to. However, that no answers presently exist, attests to the lack of information in this area.

We attempted to omit many of the testimonies and comments from various individuals because much of the assessments were not substantiated and consisted of a volume of material which was submitted to the BLNR. We will include in the Revised EIS, the staff report for the 1971 and 1977 applications (CDUA).

In the 1970's, The Nature Conservancy did approach the Bernice P. Bishop Estate (Board of Trustees) to purchase the land. At the public hearing in Hilo on July 27, 1978, it appears that The Nature Conservancy planned to harvest the area rather than preserve it. The discussion below is a portion of the transcript of the hearing which pertains to the purchase offer from The Nature Conservancy. (Note: Quentin Tomich represented the Hawaii Conservation Council.)

"HIGASHI: In item 4, you are proposing the most economical use of the land probably would be to sell it to a conservation foundation and invest the money elsewhere. Then do you use this philosophy in all the conservation lands that the most economical way would be to sell it to some conservation foundation.

TOMICH: No not necessarily. In this case, there was a firm offer from The Nature Conservancy. I believe to buy the whole Kilauea Forest Reserve, but the deal didn't go through.

HIGASHI: For how much money?

Replaces page 99

R-99A



Revised 1/4/79 -

Mrs. Mae E. Mull  
December 20, 1978  
Page Three

TOMICH: Oh, I don't have figures. Bishop Estate was definitely interested.

THOMPSON: OK, let me tell you about that. They had offered about \$400,000. I was at the meeting. A representative from The Nature Conservancy was there and Bishop Estate asked them what will you use the land for. They said they would harvest the land themselves and this is why Bishop Estate turned down The Nature Conservancy deal. I was there at the meeting. What Bishop Estate is doing is preserving the land. You know this selective harvesting thing. You know I'm surprised, I walked up the area today and I couldn't find the trails. They pointed out to me this is where they harvested the area. I couldn't see it. It was covered with hapu'u.

TOMICH: I was concerned about the point that came out that they were going to harvest the koa forest but I heard about it and I asked the representative about it later and the explanation to that was that they were basing the price on the estimate of what koa was in there. The Bishop Estate got their own figures so The Nature Conservancy thought they should get their figures.

THOMPSON: But what you're saying is that The Nature Conservancy wasn't going to preserve the area as it was. What you say here is wrong. They were going to harvest the area. This is why Bishop Estate turned around and said why should we sell it to them. They're going to harvest there, why can't we do it ourselves, and this is exactly what Bishop Estate is doing to them.

TOMICH: Well, my only concern was that there may have been a misunderstanding.

THOMPSON: It was clear.

TOMICH: In the business of buying koa forest to harvest it, I'm sure they're not.

In any event, the Trustees of the Bishop Estate chose not to sell the land.

4. Other similar hapu'u forests. The basis for similarity was the forest type (e.g. tree fern) which identifies the proposed project site. It is our understanding that these areas are similar forest types. Further, the Olaa Forest Reserve, in the vicinity of the Volcano Farm lots, also

Replaces page 99

R-99B

The four (4) endangered species will be identified in the Revised EIS.

We are not aware of any data or evaluation of the harvesting activities on bird-life which has been prepared by the Division of Fish and Game.

3. Value of the hapu'u forest and The Nature Conservancy attempt to purchase the land.

We would concur that many of the ardent opponents of this project have submitted a great number of opinions as to the value or uniqueness of the hapu'u forest. These are, for the most part, opinions from a variety of conservationists and scientists. No supportive data and scientific information is provided with their general comments; therefore, these are felt to be "learned opinions." If there were such information as alluded in your comments, many of the questions raised could be responded to. However, that no answers presently exist, attests to the lack of information in this area.

We attempted to omit many of the testimonies and comments from various individuals because much of the assessments were not substantiated and consisted of a volume of material which was submitted to the BLNR. We will include in the Revised EIS, the staff report for the 1971 and 1977 applications (CDUA).

In the 1970's, The Nature Conservancy did approach the Bernice P. Bishop Estate (Board of Trustees) to purchase the land. As you were told by William Thompson, Chairman BLNR, at the public hearing in Hilo on July 27, 1978, it appears that Nature Conservancy planned to harvest the area rather than preserve it. The discussion below is a portion of the transcript of the hearing which pertains to the purchase offer from Nature Conservancy:

"HIGASHI: In item 4, you are proposing the most economical use of the land probably would be to sell it to a conservation foundation and invest the money elsewhere. Then do you use this philosophy in all the conservation lands that the most economical way would be to sell it to some conservation foundation.

HULL: No not necessarily. In this case, there was a firm offer from The Nature Conservancy. I believe to buy the whole Kilauea Forest Reserve, but the deal didn't go through.

HIGASHI: For how much money?

HULL: Oh, I don't have figures. Bishop Estate was definitely interested.

THOMPSON: OK, let me tell you about that. They had offered about \$400,000. I was at the meeting. A representative from The Nature Conservancy was there and Bishop Estate asked them what will you use the land for. They said they would harvest the land themselves and this is why Bishop Estate turned down The Nature Conservancy deal. I was there at the meeting. What Bishop Estate is doing is preserving the land. You know this selective harvesting thing. You know I'm surprised, I walked up the area today and I couldn't find the trails. They pointed out to me this is where they harvested the area. I couldn't see it. It was covered with hapu'u.

HULL: I was concerned about that point that came out that they were going to harvest the koa forest but I heard about it and I asked the representative about it later and the explanation to that was that they were basing the price on the estimate of what koa was in there. The Bishop Estate got their own figures so The Nature Conservancy thought they should get their figures.

THOMPSON: But what you're saying is that The Nature Conservancy wasn't going to preserve the area as it was. What you say here is wrong. They were going to harvest the area. This is why Bishop Estate turned around and said why should we sell it to them. They're going to harvest there, why can't we do it ourselves, and this is exactly what Bishop Estate is doing to them.

HULL: Well, my only concern was that there may have been a misunderstanding.

THOMPSON: It was clear.

HULL: In the business of buying koa forest to harvest it, I'm sure they're not.

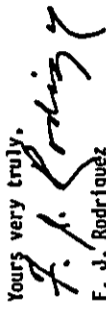
In any event, the Trustees of the Bishop Estate chose not to sell the land. Having been informed of The Nature Conservancy's plan to apparently harvest the land (as indicated by William Thompson), we fail to understand your persistence in stating, "The Nature Conservancy made persistent and strenuous efforts to purchase this unique forest for ecological protection in perpetuity." (underscore added for emphasis.)

4. Other similar hapu'u forests. The basis for similarity was the forest type (e.g. tree fern) which identifies the proposed project site. It is our understanding that these areas are similar forest types. Further, the Olaa Forest Reserve, in the vicinity of the Volcano Farm lots, also

Mrs. Mae E. Mull  
December 20, 1978  
Page Five

was decided at that meeting (several years ago), and as far as I know, the Trustees have never considered it again."

A copy of your letter and our response will be included in the Revised EIS.

Yours very truly,  
  
F. J. Rodriguez

FJR/dhk

Mrs. Mae E. Mull  
December 20, 1978  
Page Four

has a similar hapu'u forest of some several hundred acres. (Personal observation, Richard Lee-harvesting contractor). Mr. Lee, who lives in this area, notes that the tree fern forest in the State-owned Olaa Forest Reserve contains an even greater density of hapu'u than that of the Kilauea Forest.

5. Regulation 4, Conservation District Subzones. It is our understanding that the Conservation District Use Application (CDUA) for this project was filed prior to the finalization of the revised Regulation 4. This being the case, the proposed project may not be subject to the revised regulation (effective date, June, 1978). However, we do recognize that approximately 200 of the 300 acres fall within the "P" sub-zone, in which harvesting is not a permitted use. If the CDUA is granted, it would be appropriate to redesignate the area to "R." This information will be provided in the Revised EIS.

The Revised EIS will include a map of the Conservation District's sub-zones.

6. Endangered species. There were several statements in the EIS which recognized that endangered plant species may be in the 300-acre site. We proposed that the species, if found, be protected.

7. The pasture and forest land uses surrounding the project site will be stated.

8. The site is approximately 3.5 miles north of Kilauea Military Camp. This correction and correct scale for Figure 1, will be provided in the Revised EIS.

9. Alteration of the hapu'u forest due to mechanical harvesting. Your statement is basically true. It can be argued, however, that there probably are not Hawaiian forests on the Big Island that are still in their "original natural state." The mere presence of pigs and exotic birds makes them already altered, and it has been documented how serious pigs are in a Hawaiian rain forest.

10. Preservation of the Kilauea Forest Reserve for the educational enrichment Kamehameha Schools.  
We did not respond because it was felt that if this idea was acceptable to the Board of Trustees, they would have discontinued their efforts in obtaining the CDUA. Berger also noted:

"I think I attended the first meeting with the Trustees of Bishop Estate (foresters etc.) when it was suggested that the Kilauea Forest Reserve be used for 'the educational enrichment of Kamehameha Schools.' Nothing

type are mentioned (p.28). National Park lands are clearly protected in perpetuity. Is the 2,600 acre area "proposed for inclusion within the Natural Areas Reserve System" still only a proposed NAR, or is it actually under complete State protection? More importantly, how can you define "similar" when obviously no competent botanical survey has been done for the harvesting area and no data is reported for the "similar" forests??

It is apparent from the EIS that it is not known with any precision what components are characteristic of the flora in the subject area. To use as a definition of the ecosystem "it is roughly estimated that 90% of the vegetation (by weight) consists of hapu'u" (p.16) is grossly inadequate. First it shows subjective and approximate survey technique ("roughly estimated"), and second, it shows purely economic, rather than ecologic, interest ("by weight"). The "percent cover" technique is much more appropriate to ecosystem analysis (see Mueller-Dombois and Ellenberg, 1974, "Aims and Methods of Vegetation Ecology"). Weight is only of interest for economic yield (and possibly for a complex biomass yield study, which is hardly relevant here).

In addition, to use only Hawaiian nomenclature for the associated native species in the hapu'u ecosystem (p.16) is not at all precise, and makes comparison with the "similar" forest areas more difficult. For example, you mention "Hawaiian mint", yet there are 61 native species (and 70 additional varieties) of the mint family in Hawaii. To which are you referring?? By way of further example, there are 13 species of *Psychotria* (you mention "kopiko"), 18 of *Coprosma* (pilo), 40 of *Clermontia*, 80 of *Pelea* (alaki), etc. (see St. John, 1973, "List and Summary of the Flowering Plants in the Hawaiian Islands").

Further, "percent cover" analysis for all of the species present (not just the hapu'u) must be done to enable an accurate comparison with data from "similar" forests under protection. What must be compared is not just the species present, but how abundant they are in relation to each other. For instance, a forest with an overstory composed of 75% hapu'u and 10% 'ohi'a is not the same as one composed of 55% hapu'u and 35% 'ohi'a.

As to whether the careful harvesting techniques of Niu Nursery will promote a "sustained yield" of hapu'u, this cannot possibly be known at the present time. Throughout the disposition of questions in section IV-B (pp. 24-29), it is quite clear that it is really unknown how fast hapu'u grow, whether the harvesting techniques will leave enough for healthy regrowth, whether the exotic weeds will eventually take over the ecosystem, or whether leaving 10% of the downed logs leaves enough for the "nurse-log" role of the hapu'u the ecosystem. Of course, this lack of knowledge is due in large part to the relatively short span of time since harvesting began (7 years) relative to the presumed rate of hapu'u regrowth ("50 years or more", p.43, or "a 60 to 80 year period, p.27"). A second crop, and complete data on its growth, would not be available until anywhere from the year 2021 to 2051.

Ms. Dana Peterson  
2641 Nāmau'u Drive  
Honolulu 96817  
HI

21 November 1978

RECEIVED

78 NOV 22 P 4: 13

Board of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu HI 96813  
DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

Dear Sirs --

I would like to make comments on the EIS for "Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve, Ka'u District, Island of Hawaii", representing my own views as a concerned individual. I greatly appreciate your willingness to review my concerns on this matter, and accordingly have endeavored to explain them as briefly as possible.

I find the EIS adequate insofar as its presentation of the available information. What I find at fault is the serious inadequacy of available information, a situation which I feel the Board could, and should, set the wheels in motion to remedy.

It is clear that resources and/or ecosystems on State Conservation lands should be protected if they are unique, a situation that the applicant readily acknowledges (p.22). Further, if the resources and ecosystems on Conservation lands are not readily renewable, they ought not to be recklessly depleted (as noted on p.23). The Board's decision-making process on the applicant's request should then presumably follow the following outline --

1. Is the native hapu'u ecosystem in question one that is protected in another location in a permanent reserve (or reserves)?
  - a. If no, then harvesting and associated disruptive influences ought not to be allowed, at least until reserves elsewhere can be set aside.
  - b. If yes, then --
    - a. Is the harvesting technique one that will allow for a renewal of the hapu'u ecosystem over time?
    - a. If no, then it must be recognized that allowing harvesting will allow permanent depletion of the hapu'u and destruction of the hapu'u ecosystem, producing only temporary monetary gain.
    - b. If unknown, then it must be recognized that allowing harvesting may well result in the above situation.
    - c. If yes, then harvesting could be allowed.

The problem is, neither of these primary questions can be answered from the EIS. The first question could be answered after competent botanical surveys, but the latter cannot really be answered for at least another 20 years, and only then if well-designed test plot evaluation methodology is begun now.

As to the first question; nearby acreages of "similar" forest

Should the decision be made now to allow continued harvesting until such time as the regrowth/ecosystem recovery data is available, then it must be recognized that more than 300 acres is really involved in such a decision. One would presume that, should the 300 acres be harvested before enough data is available, an OK would be given to harvest more acreage based on precedent. When you compare the above-mentioned estimates for regrowth time (50 to 80 years) and the estimated harvest time for the 300 acres (25 to 30 years, p.15), it can be seen that anywhere from 100 to 800 additional acres could be harvested before it is really known whether or not the hapu'u is being permanently depleted or the ecosystem irreparably altered. If it turns out that the harvesting methods do not yield the hoped-for results, a total acreage of 550 to 1150 acres (since 1971) will have been permanently damaged. This of course must be weighed against supporting the local horticultural industry for the next 50 or more years.

In general, I am quite pleased by the mitigation measures proposed in the EIS (p.45), and would strongly urge that they be required and enforced. In only two instances would I suggest expansion of what is suggested, for items B and D. For the first, regarding preparation of a weed control plan, I would strongly suggest adding "implementation", so that it reads "prepare and implement...(etc.)". This mitigating measure is extremely important to the future health of the hapu'u ecosystem, for once exotic weeds get a hold, they are almost impossible to eradicate.

As for item D, regarding study by Forestry of the harvesting effects, I am very concerned about the exact nature of the evaluation methodology, for methodology determines quality of data. Good quantitative data will not only be valuable for future land managers, Board decisions and hapu'u harvesters, but will allow greater understanding of the recuperative powers of native forest under selective harvesting stress. To be of value, the methodology must produce quantitative, accurate and controlled data over the long-term. Among other things it must include a number of permanent representative control and harvested plots; must monitor growth rates of a great many tagged hapu'u of all ages, both harvested and unharvested; must measure regrowth rates and species composition of vegetation on abandoned skid trails; and must pay special attention to species of exotic plants, their patterns of spread, and the effects on native species of the herbicides used in the control program. I would like to suggest that not only a very detailed plan for methodology be made, but that it be made available for review by concerned individuals and organizations.

If a decision-making process along the lines of the one I mentioned earlier is followed, I cannot fault the Board's decision, as long as the mitigating measures are improved as suggested and implemented. I certainly hope that the harvesting methodology turns out to promote "sustained yield" of hapu'u!

Thank you very much for the opportunity to comment, and thank you for your patience in reviewing my concerns!

Very sincerely,  
Ms. Dana Peterson

cc:Bishop Estate  
(proposing party)

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. A. ROBINSON,  
PRESIDENT

Ms. Dana Peterson  
2641 Hama'u Drive  
Honolulu, Hawaii 96817

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Ms. Peterson,

Thank you for your comments of November 2, 1978, with regard to the above-referenced EIS. In order to more clearly understand the availability of data and the basic information available from the Division of Forestry, we have enclosed their memorandum of November 24, 1977 to the Planning Office, and a letter we received dated November 30, 1978.

We would like to provide the following item-by-item response to your comments, in which reference is made to the two correspondences mentioned above. For your convenience, we have restated your comments in *italic type*, followed by our response in regular type.

*I find the EIS adequate insofar as its presentation of the available information. What I find at fault is the serious inadequacy of available information, a situation which I feel the Board could, and should, set the wheels in motion to remedy.*

See the Division of Forestry's letter of November 30, 1978 to Environmental Communications, Inc. (ECI), and their memorandum of October 24, 1977 to the Planning Office.

*It is clear that resources and/or ecosystems on State Conservation Lands should be protected if they are unique, a situation that the applicant readily acknowledges (p.23). Further, if the resources and ecosystems on Conservation Lands are not readily renewable, they ought not to be recklessly depleted (as noted on p. 23). The Board's decision-making process on the applicant's request should then presumably follow the following outline--*

1. Is the native hapu'u ecosystem in question one that is protected in another location in a permanent reserve for reserves?

a. *If no, then harvesting and associated disruptive influences ought not to be allowed, at least until reserves elsewhere can be set aside.*

b. *If yes, then --*

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As indicated below by your comments, we find that item 13 on page 28 indicates that there are other similar hapu'u ecosystems which are under federal protection.

2. Is the harvesting technique one that will allow for a renewal of the hapu'u ecosystem over time?

- a. If no, then it must be recognized that allowing harvesting will allow permanent depletion of the hapu'u and destruction of the hapu'u ecosystem, producing only temporary monetary gain.
- b. If unknown, then it must be recognized that allowing harvesting may well result in the above situation.
- a. If yes, then harvesting could be allowed.

This is unknown (b). We will state in the Revised EIS that the hapu'u harvesting operations, even if implemented under the strict set of conditions established by BLNR, may well result in the eventual destruction of the hapu'u ecosystem.

*The problem is, neither of these primary questions can be answered from the EIS. The first question could be answered after competent botanical surveys, but the latter cannot really be answered for at least another 20 years, and only then if well-designed test plot evaluation methodology is begun now.*

We concur with this synopsis. In discussions with the Division of Forestry, they feel that a twenty (20) year period for the results of their data being analyzed is too lengthy; their data may lead to conclusions within a few years (see their letter to ECI and their October 24, 1977 memorandum.)

*As to the first question; nearby acreages of "similar" forest type are mentioned (p. 28). National Park Lands are clearly protected in perpetuity. Is the 2,600 acre area "proposed for inclusion within the Natural Areas Reserve System" still only a proposed NAR, or is it actually under complete State protection? More importantly, how can you define "similar" when obviously no competent botanical survey has been done for the harvesting area and no data is reported for the "similar" forests?*

We are checking the status of the 2,600 acre area and will include this information in the Revised EIS. The basis for similarity was the forest type (e.g. tree fern) which identifies the proposed project site. It is our understanding that these areas are similar forest types. Further, the Olaa Forest Reserve, in the vicinity of the Volcano Farm lots, also has

a similar hapu'u forest of some several hundred acres. (Personal observation, Richard Lee-harvesting contractor) Mr. Lee, who lives in this area, notes that the tree fern forest in the State-owned Olaa Forest Reserve contains an even greater density of hapu'u than that of the Kilauea Forest.

*It is apparent from the EIS that it is not known with any precision what components are characteristic of the flora in the subject area. To use as a definition of the ecosystem "it is roughly estimated that 90% of the vegetation (by weight) consists of hapu'u" (p. 16) is grossly inadequate. First it shows subjective and approximate survey technique ("roughly estimated"), and second, it shows purely economic, rather than ecologic interest ("by weight"). The "percent cover" technique is much more appropriate to ecosystem analysis (see Huellner-Dembols and Eitenberg, 1974, "Aims and Methods of Vegetation Ecology"). Weight is only of interest for economic yield (and possibly for a complex biomass yield study, which is hardly relevant here).*

No information was available on the species number and distribution. This sentence describes, to a general reader, the hapu'u forest without the use of technical terms. This was felt to be especially important in order to convey the intensity of hapu'u in this area. We do not feel this statement is irrelevant since it establishes, in the reviewer's mind, the enormous and significant dominance of hapu'u in this area; however, the statement will be deleted.

*In addition, to use only Hawaiian nomenclature for the associated native species in the hapu'u ecosystem (p. 16) is not at all precise, and makes comparison with the "similar" forest areas more difficult. For example, you mention "Hawaiian mint," yet there are 61 native species (and 70 additional varieties) of the mint family in Hawaii. To which are you referring?? By way of further example, there are 13 species of *Poucoctria* (you mention "kopiko"), 18 of *Coprosma* (pilo), 40 of *Clermontia*, 80 of *Elea* (alani), etc. (see St. John, 1973, "List and Summary of the Flowering Plants in the Hawaiian Islands").*

As indicated above, information on plant species in the harvesting site is not available; the common names of plants compiled in the EIS were obtained from various reports and memorandums prepared by the Forestry Division and/or the applicant. We will attempt to provide a more detailed list of plants in the Revised EIS.

*Further, "percent cover" analysis for all of the species present (not just hapu'u) must be done to enable an accurate comparison with data from "similar" forests under protection. What must be compared is not just the species present, but how abundant they are in relation to each other. For instance, a forest with an overstory composed of 75% hapu'u and 10% ohia is not the same as one composed of 55% hapu'u and 35% ohia.*

Ms. Dana Peterson  
December 20, 1978  
Page Four

Information from the harvesting contractors for Hiu Nursery indicates that in the 300-acre site for proposed expansion, the overstory consists of 80 to 90 percent hapu'u and 10 to 15 percent ahia, with a very small percentage of koa trees.

As to whether the careful harvesting techniques of Hiu Nursery will promote a "sustained yield" of hapu'u, this cannot possibly be known at the present time. Throughout the disposition of questions in section IV-B (pp. 24-29), it is quite clear that it is really unknown how fast hapu'u grow, whether the harvesting techniques will leave enough for healthy regrowth, whether the exotic weeds will eventually take over the ecosystem, or whether leaving 10% of the downed logs leaves enough for the "nurse-log" role of the hapu'u in the ecosystem. Of course, this lack of knowledge is due in large part to the relatively short span of time since harvesting began (7 years) relative to the presumed rate of hapu'u regrowth ("50 years or more," p. 43, or "a 60 to 80 year period," p. 27). A second crop, and complete data on its growth, would not be available until anywhere from the year 2021 to 2051.

There will be no claims in the Revised EIS that the harvesting operations would be performed on a sustained yield basis. It will be acknowledged in the Revised EIS that if regrowth is successful, there can be, in the long-run, successive harvesting. Documentation in the CDUA previously granted for harvesting on the 150 acres indicates that the idea of sustained harvesting was based on the BLNR concept that "sustained harvesting" should be the goal. We would suggest that the EIS utilize the term "selective harvesting" and not indicate that sustained harvesting will be practiced. (Of course a sustained harvesting operation would be ideal, but as stated by the comment above, this would be premature. If this is acceptable, various sections/sentences in the EIS would be changed to reflect the foregoing.)

Regarding the remaining comments you provided on the last page (3) of your letter, we feel that reference should be made to the attached correspondence from the Division of Forestry. Please be assured that their initial study plan (which we have reviewed) includes the evaluation methodology which you have outlined in your third paragraph.

Your concerns and comments are appreciated.

Yours very truly,

*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk  
Enclosures

Environmental Communications, Inc.  
P.O. Box 536  
Honolulu, Hawaii 96809

Tues. Nov 21, 1978

Dear Mr. Rodriguez,  
A response from the Conservation Council of Hawaii, Big Island Chapter, dated October 2, 1978, concerning the Kapa's harvesting EIS was determined past the deadline. Also mentioned was that most of the questions asked were answered in the EIS.  
However, could you please answer the questions that were not and and incorporate them in the final EIS.

Maab, Kalahele  
Joyce K. Kalahele  
11 Conservation Council of Hawaii, Big  
Island Chapter  
P.O. Box 1222  
Hilo, Hawaii 96720

NOV 27 1978

Attn:  
Mr. Rodriguez

Environmental Communications, Inc.  
P.O. Box 536  
Honolulu, Hawaii 96809



Conservation Council of Hawaii, Hawaii Chapter  
P.O. Box 1222  
Hilo, HI 96720

F. J. RODRIGUEZ  
PRESIDENT

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

Mr. Lawrence K. Katahira  
Conservation Council of Hawaii  
Hawaii Chapter  
P.O. Box 1222  
Hilo, Hawaii 96720

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. Katahira,

We are in receipt of your postcard dated November 21, 1978 regarding the  
above-referenced project. Your concerns have been noted and wherever  
possible, addressed in the revised EIS document.

Yours very truly,

*F. J. Rodriguez*  
F. J. Rodriguez

FJR/dhk

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hr

RECEIVED  
UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
PACIFIC DIVISION  
INSTITUTE OF PACIFIC ISLANDS FORESTRY  
1155 PUNAHONO STREET, ROOM 322, HONOLULU, HAWAII 96813

78 NOV 22 P 3: 58

1950  
(PIF)

November 22, 1978



DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

William T. Thompson, Chairman  
Department of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Bill:

Thank you for the opportunity to review the Draft E.I.S. for Hapu'u  
Harvesting, prepared by Environmental Communicators, Inc. Enclosed on  
a separate sheet are comments formulated during my review, keyed to  
the E.I.S. report pages. Due to the short time to comments I limited  
my specific comments to the summary although the same apply throughout.

Please feel free to contact me at 546-5669 if you have any questions  
regarding the review comments.

Sincerely,

*Bob*

ROBERT V. CLAYTON  
Pacific Islands Forester  
State & Private Forestry

Enclosure



Review Comments on the E.I.S. For Hapu'u Harvesting  
Kilauea Forest Reserve

(Draft Copy)

Dated: October, 1978

the potential impacts on this ecosystem is not apparent. Other alternative materials were discussed in the E.I.S. but in a rather negative way. For example on page 42, the reference to fir bark "(even though it's only a waste product of lumbering.)"

And finally the bird section is very superficial and completely ignores the current intensive research activities work that are on-going, by Dr. C. J. Ralph and others at the Institute of Pacific Islands Forestry, on just those factors that Dr. Berger says are in need of study. (page 89).

Page	Paragraph	Comment
11	1	The purpose of the initial 150 acres of harvesting for research appears to be lost. Research follow through to determine the sustained harvest approach is not finished at this time. Harvesting of an additional area does not appear to be wise until many of the answers related to reestablishment and rate of growth of Hapu'u are answered, let alone the resolution of the other problems related to weeds and impacts on potentially endangered native plant species. (See pages iii, iv, and 21-23.)
11	2	The statement related to 20,000 acres of forest land bordering the area tends to mislead the reader. I understand the area is bordered on two sides by pasture land. On October 16, F. J. Rodriguez wrote to the Hawaiian Audubon Society and in I may quote stated, "3. The statement regarding the 20,000 acres of forest of "similar" type is incorrect and will not be included in the E.I.S." The whole point here is that the E.I.S. could easily say what is surrounding the area and let the reader draw the conclusion.
iii		(2) and (3) under Probable Impacts The initial work done in Hapu'u research indicates that weed invasion is significant, such more time is needed to assess that significance over the long-term.
iv		(2) under Mitigation Measures: Unfortunately herbicide are not able to distinguish weeds from native plants. The problems could very likely be compounded, not decreased.
iv 83		(5) same section. No further harvesting appears to be needed just time to evaluate the present harvest activities as was originally proposed.

General comments:

There are numerous other items in the E.I.S. that conflict with one another and are either false or partially true, at best. A thorough understanding of

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. J. RODRIGUEZ,  
PRESIDENT

Mr. Robert V. Clayton  
U.S. Department of Agriculture  
Forest Service  
1151 Punchbowl Street, Room 323  
Honolulu, Hawaii 96813

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. Clayton,

Thank you for your letter of November 22, 1978, regarding the above-referenced EIS. We have reviewed your comments and would like to present the following point-by-point disposition.

Page ii, paragraph 1. Re: Initial research motives for approving the 150 acres. This is so stated in the EIS, on page 6, lines 20-21. Also, we will include a footnote on page ii which will state that the original 150-acre area presently being harvested was approved for the purpose of research.

Page ii, paragraph 1. Re: Harvesting of additional area should wait until answers are found on reestablishment, et cetera. Several reviewers have this or a similar viewpoint. We will recognize this position in the Revised EIS.

Page ii, paragraph 2. Re: Pasture lands bordering the site. This was an oversight and will be corrected in the Revised EIS.

Page iii. Re: Weed invasion. The source of your information would be appreciated, as the available data we have indicates that there is weed invasion, but the term "significant" was not applied as such. In various areas we quote directly from memorandums prepared from Forestry Division regarding this aspect.

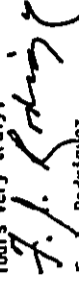
Page iv. Re: Herbicide. This is correct and we will recognize this in the Revised EIS.

Mr. Robert V. Clayton  
December 20, 1978  
Page Two

Page iv. Re: Evaluation of harvesting operations impact requires additional time, not more harvesting. From a research standpoint, we concur. The lessee, Kiu Nursery, envisions this proposed project to be a commercial venture, and as such, no further research on the 300-acres is necessary, only time to evaluate the effect on the 150-acre site.

On November 30, 1978, Caroleen Toyama met with you and discussed your remaining concerns about the "conflicts" which you state appear in the EIS. Many of the statements which you pointed out will be clarified in the Revised EIS. Your suggestions for improving the EIS are appreciated and will be incorporated into the revised document, which will be provided to your office, per your request.

Yours very truly,

  
F. J. Rodriguez

FJR/dhk



# University of Hawaii at Manoa

Environmental Center  
Crawford 317 • 2550 Campus Road  
Honolulu, Hawaii 96822  
Telephone (808) 948-7301

Office of the Director

Board of Land and  
Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

November 22, 1978  
RE:0763

Dear Sir:

Review of Draft Environmental Impact Statement  
Expansion of Hapu'u Harvesting Activities at Kilauea Forest Reserve  
Ka'u District, Hawaii

The Environmental Center of the University of Hawaii has reviewed the above cited Environmental Impact Statement with the assistance of the following members of the University community: Clifford W. Smith, Botany; Shella Conant, General Sciences; Barbara Vogt and Jacquelin Miller, Environmental Center.

Several of our reviewers have expressed major concerns with the adequacy of this EIS and recommend that a more complete assessment be prepared in order to responsibly evaluate the potential environmental impacts that are attendant to this project. Following are the major reasons for this recommendation:

Essential information on the biota is not provided in the EIS. An assessment of the potential environmental impacts of this type of project is impossible without knowing what biota are present on the site. Protection for rare, endangered, or threatened plants should be of high priority. Where is the catalogue of plants and insects of the area? Recommending a plant inventory after the EIS is completed is not satisfactory and certainly does not fulfill the requirements of the EIS regulations.

In addition, as a scientific document the EIS should be as precise and accurate as possible. There are several mistakes that need correction. In Figure 1, the scale appears to be approximately 7 to 8 times greater than actual representation. The legend for Figure 2 is incorrect in that the harvesting and the previously harvested areas are switched on the plate. The scale on the revised Figure 2 does not agree with the acreage cited. The use of common names within the text without reference to scientific names is imprecise and confusing.

Nowhere is it substantively indicated what the effect of the previous six years harvesting has had on the ecosystem. The conditions established by DLNR in 1971 stipulated that the Division of Forestry should "monitor the effect of harvesting on the forest regeneration and noxious infestation." Where are the DLNR reports? They should be appended to the EIS. If such reports are not available, then quantitative summaries of the findings should be presented.

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Board of Land and  
Natural Resources

- 2 -

November 22, 1978

We disagree strongly that it is "inappropriate to weigh the pros and cons of selective harvesting versus conservation of the hapu'u forest." On page 23, sub-part E, 1:42c, of the regulations, it specifically points out that "Consideration of all phases of the action and consideration of all the consequences on the environment; secondary or indirect, as well as primary or direct shall be included."

Although some type of hapu'u harvesting may well be an acceptable and permissible use of a conservation district, we do not feel that this EIS adequately addresses the relevant impacts of the proposed expansion of the harvesting either for the immediate future or for the long term effects. The unanswered questions raised in the preparation stage and cited on pages 24 through 28 are of particular concern. The lack of hard data from the previous seven years of harvesting to support the conclusions that continued hapu'u harvest will be environmentally tolerable is a serious deficiency in the EIS. The 16 conditions cited repeatedly as being established by DLNR to assure proper harvesting operations should be listed in the EIS. The specific records, or summaries thereof, of the monitoring of these 16 conditions should also be included in the EIS.

Yours truly,

Doak C. Cox  
Director

DCC:ck

cc: Clifford W. Smith  
Shella Conant  
Barbara Vogt  
Jacquelin Miller  
Office of Environmental Quality Control  
Joseph Halbig

Mr. Doak C. Cox  
December 20, 1978  
Page Two

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

Doak C. Cox, Director  
Environmental Center  
University of Hawaii at Manoa  
Crawford 317, 2550 Campus Road  
Honolulu, Hawaii 96822

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. Cox,

Thank you for your comments on the above-referenced EIS. We have reviewed your concerns on the inadequacy of the document; however, we disagree with this position. The EIS document, in our understanding, is a full disclosure document. Wherever possible, we have attempted to provide whatever data we found to be available which would assist us in evaluating the potential impact. Unfortunately, there is a scarcity of credible data in this area; additionally, the actual obtaining of such data, for the purposes of preparing the EIS, would have required years of research (e.g. biomass relationship to the hapu'u forest) and available monies. Pragmatically, such studies and data would be so time consuming and financially uneconomical (to the entire hapu'u harvesting operations) that we based our analysis on data which was already available. We do not feel it was within the intent of the EIS law and regulations to burden the applicant to the point where an EIS is as costly, or even more so than the economic returns potentially possible from the project itself. Therefore, it would be better said that this EIS document discloses, to the extent possible, that much important information is lacking in order to come to any final conclusions on the impact of the hapu'u harvesting operations. However, it has identified the range of probable impacts which may occur. In the course of this EIS, the Lessee has retained technical subconsultants on matters which were significant. These subconsultants prepared studies oriented to a shorter time period; by so doing, we find that this effort was realistic and provided some insight into the probable impacts of this proposed hapu'u harvesting operation. Additionally, we have made many changes in the text of the EIS document to incorporate the many comments which were received.

To specifically respond to your comments, we are providing the following item-by-item disposition.

First page, third paragraph: Information on biota.

Other than what was provided in the EIS, we had no other information on biota content for the subject 300-acre parcel. A botanical study is being prepared. We find your question on the "catalogue of plants and insects in the area" unreasonable.

First page, fourth paragraph: Figures 1 and 2, use of common names.

Figure 1 will be corrected. Figure 2 was corrected and a revised map (enclosed) should have been sent to your office within three (3) days after you received the EIS. Scientific names will be provided.

First page, fifth paragraph: Information of the availability of BLHR reports.

In response to your questions on the data from Forestry, we note that a recently prepared position paper on this project (from Forestry) has been prepared and appended to the text of the EIS. Raw data from monitoring this project has not been made available due to the preliminary and highly technical nature of the botanical data.

Second page, first paragraph: Pros and cons of selective harvesting versus conservation of the hapu'u forest.

We will omit this statement and provide a summary of the pros and cons of selective harvesting versus conservation of the hapu'u forest. Much of this information will be abstracted from the testimonies given on the CDUA. Also, the section on alternatives will discuss the conservation of the hapu'u forest.

Second page, last paragraph: Deficiency of data, listing of 16 conditions.

See our responses in the beginning of this letter in regard to the lack of data. Also, we bring to your attention that the list of 16 conditions is provided in the EIS as Exhibit I.

In closing, we must restate that as the preparers of this EIS, we find that the lack of scientifically monitored and evaluated research data is often a problem. Primary data collections are highly desirable in providing the accuracy of content requirements; however, the task of data collecting is often too lengthy and expensive to achieve. We feel that it was not the intent of the EIS procedure to stop a project on the basis that it could not afford extensive scientific efforts. Instead, we find that the EIS procedure should disclose the best available information and determine the probable impacts of the proposed project. We feel that we have done this, and moreover, have discussed the range of impacts which can occur.

Yours very truly,

F. J. Rodriguez

FJR/dhk  
Enclosure

GEORGE R. ANTONIOS  
GOVERNOR



STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
OFFICE OF THE GOVERNOR  
151 HOLEIUALEA ST.  
HONOLULU, HAWAII 96813

RICHARD L. O'CONNELL  
DIRECTOR  
TELEPHONE NO.  
645-6915

November 22, 1978

MEMORANDUM

TO: William Y. Thompson, Chairman  
Department of Land and Natural Resources

FROM: Richard L. O'Connell, Director  
Office of Environmental Quality

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT; PROPOSED EXPANSION  
OF HAPU'U HARVESTING ACTIVITIES AT KILAUEA FOREST  
RESERVE, KA'U, HAWAII

We have reviewed the subject environmental impact statement. At present, we consider this document to be a far from adequate EIS. The statement contains numerous incorrect statements, findings based on conjecture, and exhibits an apparent disregard for the spirit and intent of Chapter 343, Hawaii Revised Statutes and the EIS Regulations. The EIS appears to give little attention to available information or comments and suggestions made during the consultation process.

EQC Regulations clearly point out (section 1:40).

"The EIS requires more than the preparation of a document, but involves the entire process of research, discussion, preparation of a statement and review. The EIS process shall at a minimum involve: identifying environmental concerns, obtaining various relevant data, conducting necessary studies, receiving public and agency input, evaluating alternatives, and proposing measures for minimizing adverse impacts. An EIS is meaningless without the conscientious application of the EIS process as a whole, and should not be merely a self-serving recitation of benefits and a rationalization of the proposed action."  
(emphasis added).

Mr. William Y. Thompson  
Page 2  
November 22, 1978

The Environmental Quality Commission established the consultation process so that EIS's filed with the Commission would be fully acceptable prior to the review process. We note that many of the comments and suggestions made by persons during the consultation process are dismissed either as being unanswerable or with the comment that they would be discussed in the EIS. Unfortunately, it appears that few of these concerns were addressed in the EIS. Since the seven-year research program by Department's own Division of Forestry has much of this requested information, we do not understand why it was not used.

Our detailed comments are enclosed. As indicated by those comments, we feel this EIS needs great improvement in order for it to be considered an adequate document that meets the requirements of Chapter 343 and the EIS regulations. We recommend that consideration be given to using this document as an EIS preparation notice. Alternatively, the applicant should request the approving agency to extend the comment period beyond fourteen days as provided for in EQC Regulations (section 1:62) to allow time for the preparation of adequate responses.

We trust that our comments will prove useful in the revision of the EIS. Thank you for allowing us to review this document.

Sincerely,

Richard L. O'Connell  
Director

Enclosure

cc: Environmental Communications, Inc.  
P.O. Box 536  
Honolulu, HI 96809

NOV 24 1978

Office of Environmental Quality Control  
 Comments on EIS  
 Proposed Expansion of Hapu'u Harvesting  
 Activities at Kilauea Forest Reserve,  
 Ka'u, Hawaii

November 21, 1978

1. Page 1. The CDUA request is in error. There is "no private recreational use" being applied for.
2. We note that the lease expires in 1986, yet the harvesters are estimating 20-30 more years of harvesting on the proposed 300-acre site. When will the lease be renegotiated? How much acreage would the new lease cover? Is the 1986 date the reason for the proposed doubling of the intensity of the harvesting activities?
3. It should be clearly pointed out on this page that the present 150 acre site was granted a CDUA for experimental harvesting of Hapu'u. The preliminary findings of the Division of Forestry should be clearly stated with regard to an expanded harvesting operation. The present request then could be properly viewed as a non-experimental harvesting request for the area covered by the lease. As such, it is purely a proposed commercial venture. It is therefore important that any decisions made by the Board should stem from the findings made by the Division of Forestry on the experimental harvesting.
4. The statement is made that the 150-acre site "will be exhausted in about three (3) years and additional acreage is needed in order to continue the hapu'u industry." Why is the CDUA being requested now rather than in a year or two when more research data would be available?
5. Page 11. It is misleading to state that the 300-acre site "is bordered by 20,000 acres of forest land," since a good portion of this land is Keaouhou ranchland.
6. Page 11. The statement, "90 percent of the vegetation (by weight) consists of ferns," is meaningless. Of what relevance is the weight of the plants? The species numbers and distribution is important.
7. Scientific names should also be used for the identified species.
8. The statement, "no data is available which would support or not support the belief that the hapu'u harvesting will be damaging or destroy the hapu'u ecosystem," is incorrect. The exact reason for the experimental harvesting of the

- 150-acre site was to generate this type of data. The same holds for the next statement, "nor is there data available which establishes the growth rate and sustained yield harvesting period for hapu'u." We strongly recommend that the Division of Forestry's views on these statements be presented in the Revised EIS. If the Division concurs with these statements, the Board should not consider additional harvesting until these data are known.
9. The listing of an endangered plant species is not, in itself, an impact of the proposed project, as stated. The project may indeed impact this species if it is located on the proposed site.
10. Page 1. No citation is given for the two reasons stated for the necessary quality of hapu'u fibers.
11. Page 5. It is Kulanani Honor Camp not Prison.
12. Page 6. In what conservation district sub-zone is the 300-acre site located? Is harvesting activity a permitted use in such a sub-zone?
13. Page 7. The line ending with "...reasonable economic" is missing a word. We believe it to be "return."
14. Page 9. What is the average diameter of the hapu'u being harvested? What is considered too small? What is the density (fern logs per acre) that the harvesters consider to be economically feasible? We note (page 28) that above 4,600 feet, "the forest does not contain the density of hapu'u logs which would make harvesting operations economically feasible."
15. The location of the access road and the proposed access road through the 300-acre site should be shown on the figure.
16. Page 11. The statement is made that the present harvesting operations are shown in the photos. Photo number four clearly shows two tractors on the 150-acre site. This is an apparent violation on the Board's condition number 6 set down in 1971 that only one tractor be used. Why are two tractors being used?
17. Page 14. What species of plants revegetate the harvested areas? Are exotic species among these?
18. Page 15. There are inconsistencies regarding the potential output of harvested logs and the time required for harvesting. It has taken seven years to date, to harvest most of the 150-acre site, which has an estimated life of two more years. Thus, ten years are required to harvest 150 acres at the present average rate of 55,000 cubic feet/year. The proposal

yield basis have little meaning when there is no discussion of the effects of the removal of the key element of the ecosystem, the fallen hapu'u. What makes the hapu'u forest unique is not just the aesthetics, but also its ecology. The hapu'u harvested in Hawaii is only found in Hawaii and as such is unique. By removing a substantial portion of the biomass from the site, a significant portion of the nutrients being circulated in this ecosystem is thereby removed. We note that this point is not discussed, nor is any mention made of supplementing this nutrient loss through fertilizer application. As with other tropical forest ecosystems, a major portion of the nutrients is contained in the standing biomass, not in the soil. Once removed, it takes a long time to replace. Did the Division of Forestry experiments cover this important topic? Does the applicant plan on doing any experimental tests? We doubt if any second, third or fourth "crop" can be harvested from these sites without generating a long-term impact on the nutrient level of this ecosystem.

24. Page 22. There is no information preceding the statement, "Therefore, the Board of Land and Natural Resources has the discretionary power. . ." to indicate the role of the Board in the Conservation districts. The discussion on the bottom of this page is irrelevant.

25. The claim is made that uniqueness of the site can only be subjectively determined. However, if proper botanical studies had been done, there would be a sound basis to judge whether this ecosystem is unique. The statement, ". . . it would be inappropriate to attempt to weigh the pros and cons of selective harvesting versus conservation of the hapu'u forest in the EIS," is incorrect. This is one of the major reasons for preparing the EIS.

26. The statement, ". . . and in the absence of supportive data, the Board must determine the future use of the 300-acre site and the conditions which must govern that use," fails to account for the research work performed by the Division of Forestry. This statement should be deleted, for data is available, although conclusive long-term findings are lacking. We note that this lack of complete data, in part, the fault of the harvesters. This is clearly stated on page 25, in the quote by the Forestry Division. It appears that previously harvested areas where studies were being conducted were redisturbed by the harvesters. This effectively nullified the reestablishment of vegetation for quite some time.

27. Page 28. A discussion should be presented regarding the leaving of 10% of the logs to ". . . provide the seed bed necessary for the forest to continue to be nurtured." This figure seems to have no data to support it.

states that the crew will double (page 14), the productivity will increase (page 15) and that the yield is expected to increase to 92,160 cubic feet/year, a substantial increase. Yet, we find that the applicant is stating that the 300-acre site will last 25-30 years (page 15). Such a length of time (25-30 years) could only occur if the density of tree fern lots was significantly greater than that found on the 150-acre site. This discrepancy should be thoroughly clarified in the Revised EIS.

19. Page 16. A major failing of this EIS is the lack of a documented botanical survey for the proposed site. This should be considered a basic requirement in this case. The species cited as being present on the site are apparently incomplete and nothing is said about their relative abundance and distribution. Again, no scientific names are used. How can the impacts on the subject site be evaluated when the contents of the site are not completely known? Appending a botanical survey report to the Revised EIS will not be adequate in this regard, for it will not allow for the review of it by others before acceptability of the EIS is determined.

Page 17. What foresters are being referred to in the section on flora? Is this information in available reports?

Page 18. The need for a botanical survey is again demonstrated, especially with regard to the listed endangered plant *Vicia menziesii* known to be found in the general area. This was pointed out during the consultation phase, yet no survey work was done prior to preparation of this EIS.

20. What decibel levels of noise do the tractors and saws generate? How can an operation that generates noise for "up to 25-30 years," be considered temporary? This is especially so if any form of sustained yield harvesting program is conducted.

21. The water quality section fails to discuss any possible contamination by the use of herbicides. Have any water quality studies been conducted?

22. There is no documentation to support the statements, "the skid trails which were cut three (3) or four (4) years ago, since they have been completely covered over by what appears to be the same plant materials originally found under the hapu'u before harvesting," and "the hapu'u canopy which was partially cleared for the skid trail has also grown back." These statements should be verified by the Division of Forestry.

23. It is our feeling that the impact of the invasion of exotic species into this area is being understated. Another area needing discussion is that of the hapu'u forest ecosystem. Claims that the harvesting is being conducted on a sustained-



- 28. In item number 13 it is stated, "information available indicates. . ." What information is this? No references are cited.
- 29. Future areas for logging appear to lie below the 4600 foot contour line. This is an estimated 200 acres in addition to the 300 acres in the present application. Will these 200 acres be applied for in the future? We do not believe, as shown in comment #2, that the 300-acre site will last 25-30 years. All sites considered, this adds up to 650 acres of land that might be harvested. Is this figure enough acreage to sustain the hapu'u harvesting industry? Will the State's flower growers be forced to find alternatives to hapu'u? As stated previously, any notion that the harvesting is a sustained-yield operation is only speculative at best.
- 30. Page 29. Who determined that more than 20 more years of study is necessary? We note that a Division of Forestry statement is quoted on page 26 as saying a few more years are necessary to allow for the trends to establish themselves. We suggest that this matter be resolved and discussed in the revised EIS.
- 31. Page 31. Who plans on planting koa seedlings in the cleared areas? If this site is to be managed for the production of hapu'u logs, then why are koa going to be planted? This would be a great change in the existing ecosystem.
- 32. Page 32. The "we" being referred to in the first complete paragraph on this page should be identified.
- 33. The biased opinion of the consultant which refers to other conservationists in this State should have been edited from this section. It lends nothing to the discussion on the impact of the project on the fauna.
- 34. Page 33. The statement, "Judging from all reports prepared by the Division of Forestry, the tree fern harvesting in recent years has not been detrimental to the tree fern forest," is inconsistent with all the earlier statements that no information is available on this subject. This quoted statement is also incorrect. The fact is that the Division of Forestry does have the information and it shows clearly that exotic species are moving into the harvested areas. We strongly suggest that the applicant correct this matter.
- 35. Page 35. "Impact on Noise," should read impact on ambient noise levels. We note that there is no discussion on the impact of noise on the fauna, especially the native birds in the area. A discussion is recommended.

- 36. We note that there is no discussion on the potential use of herbicides as it affects water quality. A discussion is recommended.
- 37. Page 37. It should be pointed out that only \$16,706 were paid to the State in excise taxes for the actual sale of hapu'u, the rest of the figure is for taxes from flower sales.
- 38. Page 38. What forest vegetation is referred to in paragraph A7 who did the observations? The statement that the skid trail regrowth does not include weeds is inconsistent with Division of Forestry information. The statements regarding the growth rate of hapu'u are also inconsistent, "growth appears to be rapid," vs. "hapu'u grows very slowly." (page 27) These inconsistencies need to be corrected.
- 39. Page 43. If, as stated, it takes 50 or more years to produce premium fibers for potting purposes, it appears that the potential 650 acres (see comment 29) will be harvested, if permitted, well before the growth cycle on the first 150-acre site is completed. Where will the applicant go next to harvest hapu'u?
- 40. Page 44. The statements about second, third and fourth harvests of the same areas are conjectural at this time.
- 41. Page 46. It should be clearly stated that the harvesting of hapu'u logs is an irrefragable commitment of this resource. It does not depend on whether exotic species of plants are invading the harvested area.
- 42. The relevance of pulu harvesting over 100 years ago, when there were far fewer exotic species available to compete with the native species is questionable. The problem of exotics is much greater now.
- 43. Page 75. The statement under discussion, "this hapu'u forest is unique and must be preserved," needs qualification. Is it unique ecologically, because of it only being found in Hawaii? We do not consider one sentence on each viewpoint a discussion as required by the EIS regulations. There is nothing written on what overriding reasons there are for proceeding with the action with these issues being unresolved as required by the EIS Regulations. This entire section needs considerable attention and discussion.
- 44. Page 76. We note that the latest COUA which this EIS covers was denied without prejudice by the Board on October 27, 1978. Therefore, we recommend that when the applicant reapplies for the proposed activity, the current document be used as an EIS preparation notice. This might enable the applicant to adequately meet the EIS Regulations at that time. This would also allow the applicant to consult with the Division of Forestry.



45. Page 92. The list of literature cited appears to be incomplete.

ENVIRONMENTAL  
COMMUNICATIONS  
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F. J. RODRIGUEZ,  
PRESIDENT

December 20, 1978

Mr. Richard L. O'Connell, Director  
Office of Environmental Quality Control  
Office of the Governor  
550 Halekaunila Street, Room 301  
Honolulu, Hawaii 96813

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. O'Connell,

We have received a copy of your memorandum dated November 22, 1978, to William Y. Thompson, Chairman, Department of Land and Natural Resources, regarding the above-referenced EIS. Your concerns expressed on the EIS clearly point out that your office has found this document to be inadequate. We do not share this position and feel that the following discussion provides information relevant to our position.

When the EIS project was initiated by our firm (mid-July, 1978), we obtained from the Department of Land and Natural Resources (DLNR), their files on the project (relating primarily to the previous CDMA hearings and various letters and studies). We made copies of these materials (e.g. studies, reports, memos, transcripts) for our use in the EIS process. (No information from the Forestry Division's research efforts was included in this file.) To our knowledge, this file constituted the available information on the hapu'u operations and the project. The EIS Preparation Notice, dated August, 1978, was based primarily on the material from this file. (Other information was obtained from Bishop Estate and Iiu Nursery.) During the EIS Preparation Notice Review Period (from August 25, 1978 to September 21, 1978), we researched various available documents on hapu'u, most noteworthy of these being a recent (December, 1976) dissertation by Richard E. Becker, entitled, The Phytosociological Position of Tree Ferns (Cibotium Spp.) in the Montane Rain Forests on the Island of Hawaii. This dissertation not only incorporated the past studies on hapu'u, but also provided an evaluation of many of these past studies. In addition to this research in the library, we met (on October 10, 1978) with Leonard Bautista, Planning Office, DLNR, and Patrick Costales and Edwin Petkeys, Forestry Division, DLNR, to specifically request that Forestry Division provide the available data/information which could

Hamilton Library, University of Hawaii

1132 BISHOP BUILDING, SUITE 508 • P. O. BOX 538 • HONOLULU, HAWAII 96813 • TELEPHONE (808) 521-6341

3. It should be clearly pointed out on this page that the present 150 acres site was granted a CDUA for experimental harvesting of hapu'u. The preliminary findings of the Division of Forestry should be clearly stated with regard to an expanded harvesting operation. The present request then could be properly viewed as a non-experimental harvesting request for the area covered by the lease. As such, it is purely a proposed commercial venture. It is therefore important that any decisions made by the Board should stem from the findings made by the Division of Forestry on the experimental harvesting.

In a letter to the Bernice P. Bishop Estate, dated October 31, 1971, Sumao Kido, then Chairman of the Board of Land and Natural Resources, stated: "At its meeting of October 8th, 1971, the Board of Land and Natural Resources approved your request for harvesting use, for an area of approximately 150 acres only. This area is to be harvested under controlled conditions for the purpose of obtaining data on the regrowth of hapu'u and to determine the feasibility of commercial harvesting of our hapu'u forest areas without damaging them. Also, the area to be harvested shall be the makai sector of the proposed harvesting area as shown on the attached map." We will note that the 150 acres being presently harvested was granted primarily to obtain data on the regrowth of hapu'u and to determine the feasibility of commercial harvesting of the hapu'u forest without damaging them. (This is also noted on page 6, lines 20-21 of the EIS.) We will request from the Forestry Division, their "preliminary findings" with regard to the expanded harvesting operations. It is our feeling that both the 150 acre area being harvested and the additional 300 acres are both commercially oriented; although the initial 150 acres emphasized the monitoring of impact. In the case of the 300 additional acres, less or no research will be provided, as determined by the BLNR, if a CDUA is approved. Also it is inappropriate to state, "The present request then could be properly viewed as a non-experimental harvesting request for the area covered by the lease." (Underscore added for emphasis.) Your comment should be limited to only 300 acres being requested under the CDUA request; if not, it implies that the applicant intends to harvest the total 2,956 acres covered by the lease from the Bishop Estate to Miu Nursery. (See page 28, item 14 on the bottom of that page.) We feel that the BLNR will probably base their decision on various factors and it may be unrealistic for the Board to base their decision from only one source. However, this is a decision that only the Board can make, and in this regard we have revised Section III, so as not to appear to advise the Board in their action.

be used in response to the comments submitted by various individuals and agencies. A copy of their response (October 10, 1978), to the various comments is attached. As one can see, there were no conclusive findings which appeared to be available. Also, we note that we did not receive a copy of the Study Plan, as was indicated in their response. Additionally, we had no knowledge that there was a seven (7) year study/data document in the files of the Forestry Division.

Upon completion of the Draft EIS (primarily for the client's and DLNR's internal review, October 12, 1978), we provided copies to DLNR for their review and comments by October 17, 1978. Several comments were received during this period from Miu Nursery and technical advisors; comments from the Division of Forestry reached us only after the 17th (about October 20), by which time the EIS was printed and delivered to the Environmental Quality Commission (EQC). Therefore, we did not have the opportunity to address and alter the EIS to respond to their concerns in the Draft EIS.

Based on your comments indicating the availability of data from the Division of Forestry, we requested additional data from that Division. Their response to us (attached), dated November 30, 1978, is self-explanatory; no further documents are available for our use in the Revised EIS.

Below, we have addressed your comments on a item-by-item basis. For your convenience, we have restated DEQC's comments in *italic*, and our response follows in regular type.

1. *Page i. The CDUA request is in error. There is no "private recreational use" being applied for.*

We will bring this error to the attention of the Planning Office, DLNR. Because this is the present title of the CDUA, we cannot make a change until DLNR has retitled the CDUA.

2. *We note that the lease expires in 1986, yet the harvesters are estimating 20-30 more years of harvesting on the proposed 300-acre site. When will the lease be renegotiated? How much acreage would the new lease cover? Is the 1986 date the reason for the proposed doubling of the intensity of the harvesting activities?*

The lease will probably be renegotiated upon the approval of the additional 300 acres for hapu'u harvesting. The new lease would probably cover only the area being harvested (150 acres) and the additional 300 acres, for a total of 450 acres. Doubling the intensity of harvesting activities is not based on the expiration of the present lease. (Information from Sidney Goo, President of Miu Nursery.)

4. The statement is made that the 150-acre site "will be exhausted in about three (3) years and additional coverage is needed in order to continue the hapu'u industry." Why is the CDMA being requested now rather than in a year or two when more research data would be available? As stated in the last paragraph on page 7, "At this time, the current request for an additional 300 acres is essential for the long-range operational sustenance of the Miu Nursery hapu'u business." It should be recognized that business commitments must sometimes be made years in advance and that the securing of this 300 acres cannot be done on a last-minute basis.

5. Page II. (Site, page ii.) It is misleading to state that the 300-acre site "is bordered by 20,000 acres of forest land," since a good portion of this land is Keauhou ranchland.

This section on the project location will be revised to read, "The site is a 300-acre section bordering the southeast boundary of the existing 150-acre harvesting operation. It is approximately 3.5 miles north of the Kilauea Military Camp, abutting the Upper Oiaa Forest Reserve on the northeast and the land of Keahou on the west. The present and proposed harvesting areas are bordered by forest and pasture lands."

6. Page iii. The statement, "90 percent of the vegetation (by weight) consists of ferns" is meaningless. Of what relevance is the weight of the plants? The species number and distribution is important.

No information was available on the species numbers and distribution. This sentence describes, to the general reader, the hapu'u forest without the use of technical terms. This was felt to be especially important in order to convey to the reader, the intensity of hapu'u in this area. We felt this statement established, in the reviewer's mind, the enormous and significant dominance of hapu'u in this area. Because of the objections raised, we have deleted this sentence.

7. Scientific names should also be used for the identified species.

We take this to mean the plants identified in the second paragraph on page iii (since the birds are later identified by scientific names). This will be included in the Revised EIS.

8. The statement, "no data is available which would support or not support the belief that the hapu'u harvesting will be damaging or destroy the hapu'u ecosystem," is incorrect. The exact reason for the experimental harvesting of the 150-acre site was to generate

this type of data. The same holds for the next statement, "nor is there data available which establishes the growth rate and sustained yield harvesting period for hapu'u." We strongly recommend that the Division of Forestry's views on these statements be presented in the Revised EIS. If the Division concurs with these statements, the Board should not consider additional harvesting until these data are known.

See the Division of Forestry's letter to Environmental Communications, Inc., dated November 30, 1978. The determination to allow additional harvesting of hapu'u, without this data, rests with the BLNR. We do not feel it is our role to advise the Board turn down the CDMA because of the lack of data, especially in the EIS. You may wish to advise the BLNR of your concern in regard to their CDMA process. The position taken by your office appears more appropriately addressed to the CDMA.

9. The listing of an endangered plant species is not, in itself, an impact of the proposed project, as stated. The project may indeed impact this species if it is located on the project site.

We concur and will restate item 4 to read, "Hawaii's only endangered plant species on the Federal list of endangered plants, *Vicia menziesii* may exist on the requested 300-acre site. A botanical survey will determine its existence on the site. If it is assumed that species are located in the 300-acre area, and that mitigation measures are not taken or shown to be effective, this endangered plant species may be damaged or destroyed in the 300-acre area." This information is also stated on page 39, item E, of the EIS.

10. Page 1. No citation is given for the two reasons stated for the necessary quality of the hapu'u fibers.

On page 41, section VI., B., the same information is provided, and Mr. T.Y. Goo, founder and past president of Miu Nursery, was cited as the source of this information. To provide additional clarification, we will also footnote the source of information on page 1.

11. Page 6. It is Kulanui Honor Camp not Prison.

It is neither Kulanui Honor Camp nor Kulanui Prison. Personal communications with the Corrections Division, Department of Social Services and Housing, State of Hawaii, regarding the proper term for this facility, resulted in the correct name, which is, "Kulanui Correctional Facility." We will use this term in the Revised EIS.

12. Page 6. In what conservation district sub-zone is the 300-acre site located? Is harvesting activity a permitted use in such a sub-zone? This information will be included in the Revised EIS.
13. Page 7. The line ending with "... reasonable economic" is missing a word. We believe it to be "return."
- This comment refers to the quote from the DLMR staff report. The missing word is an oversight in the original report, which was simply quoted as found.
14. Page 9. What is the average diameter of the hapu'u being harvested? What is considered too small? What is the density (fern logs per acre) that harvesters consider economically feasible? We note (page 28) that above 4,600 feet, "the forest does not contain the density of hapu'u logs which would make harvesting operations economically feasible."

These questions were addressed to Mr. T. Y. Goo of Niu Nursery, who collaborated with the harvesters in providing the response below. The average diameter of hapu'u being harvested is approximately 10 to 12 inches. The diameter alone is not a criteria for the harvesters, although much of the hapu'u with a diameter of less than 8 inches is normally not taken. The density of hapu'u logs differ significantly in various portions of the harvesting site; the determination of feasibility depends on a large area in which the hapu'u logs can be found. No density per acre was given by the harvesters.

15. The location of the access road and the proposed access road through the 300-acre site should be shown on the figure.

The location of the access road to the 300-acre site will be the same as the present access road from the end of Wright road to the present maintenance shed. No other access road is planned. This will be noted in the Revised EIS.

16. Page 11. The statement is made that the present harvesting operations are shown in the photos. Photo number four clearly shows two tractors on the 150-acre site. This is an apparent violation of the Board's condition number 6 set down in 1971 that only one tractor be used. Why are two tractors being used?

Only one tractor is used at any one time. Mr. T. Y. Goo of Niu Nursery provided the following response. Only one tractor is used at any one time for the harvesting operations. The second tractor is in the harvesting area primarily to tow the other tractor when it gets stuck in the muddy areas. He noted that the district forestry office is aware of this situation and that Niu Nursery has not received any complaints about this second tractor in the field.

17. Page 14. What species of plants reseedate the harvested areas? Are exotic species among these?

We do not presently have this information. See Division of Forestry's letter to Environmental Communications, Inc., dated November 30, 1978.

18. Page 15. There are inconsistencies regarding the potential output of harvested logs and the time required for harvesting. It has taken seven years to date, to harvest most of the 150-acre site, which has an estimated life of two more years. Thus, ten years are required to harvest 150 acres at the present average rate of 55,000 cubic feet/year. The proposal states that the area will double (page 14), the productivity will increase (page 15) to 92,160 cubic feet/year, a substantial increase. Yet, we find that the applicant is stating that the 300-acre site will last 25-30 years (page 15). Such a length of time (25-30 years) could only occur if the density of tree fern logs was significantly greater than that found on the 150-acre site. This discrepancy should be thoroughly clarified in the Revised EIS.

A check with Mr. T. Y. Goo of Niu Nursery (from whom the information was originally provided), indicated that the information on the output of hapu'u logs and the time required for harvesting is correctly stated in the EIS. He stated that the harvesting contractors have generally surveyed the 300 acres on which the additional hapu'u harvesting is being requested, and have found that the density and amount of fallen hapu'u logs are much greater and would require 25 to 30 years to harvest, even at a greater rate of harvesting. As stated earlier, Niu Nursery's present plans no longer calls for additional personnel on the harvesting crew. The work hours for the present crew are expected to increase by incorporating production efficiency measures (e.g. allowing the tractor to remain in the harvesting area, having people other than the harvesters take the hapu'u logs to the pier).

19. Page 16. A major failing of this EIS is the lack of a documented botanical survey for the proposed site. This should be considered a basic requirement in this case. The species cited as being present on the site are apparently incomplete and nothing is said about their relative abundance and distribution. Again, no scientific names are used. How can the impacts on the subject site be evaluated when the contents of the site are not completely known? Appending a botanical survey report to the Revised EIS will not be adequate in this regard, for it will not allow for the review of it by others before acceptance of the EIS is determined.

The botanical study is presently being conducted so that the BLNR will be provided with its findings as soon as it is completed. The EIS recognizes as a possible adverse impact, the destruction of rare endemic plant species.

Page 17. What foresters are being referred to in the section of flora? Is this information in available reports?

This information is based on personal communications with the Hawaii District office of the Forestry Division, also the plant species indicated in the 1975 status report on harvesting, the Summary of the CDUA application to the BLNR dated July 27, 1978, and the Environmental Assessment on the Kilauea Hapu'u Harvesting Operations, CDUA - 11A-71/4/16-192 prepared by the Bernice P. Bishop Estate.

Page 18. The need for a botanical survey is again demonstrated, especially with regard to the listed endangered plant *Vicia menziesii* known to be found in the general area. This was pointed out during the consultation phase, yet no survey work was done prior to the preparation of the EIS.

See response provided for item 16.

20. What decibel levels of noise do the tractors and saws generate? How can an operation that generates noise for "up to 25-30 years," be considered temporary? This is especially so if any form of sustained yield harvesting program is conducted.

No noise measurements were taken. We feel that the existing description is sufficient; the term temporary will be eliminated.

21. The water quality section fails to discuss any possible contamination by the use of herbicides. Have any water quality studies been conducted?

No water quality studies were conducted. The impact on the herbicide program will be discussed with the Department of Water Supply, County of Hawaii. There should be no problem since this area is not a source of potable water, nor are there any surface waters.

22. There is no documentation to support the statements, "the skid trails which were cut three (3) or four (4) years ago, since they have been completely covered over by what appears to be the same plant materials originally found under the Hapu'u before harvesting," and "the Hapu'u canopy which was partially cleared from the skid trail has also grown back." These statements should be verified by the Division of Forestry.

This was taken out of context. Before this quoted section, the EIS states, "Additionally, it is difficult for the layman to determine the skid trails which were cut three (3) to four (4) years ago. . ." (Underscore added for emphasis.) A. Berger and C. K. Toyama, involved in the preparation of the EIS, have been in the area and both could not determine where there had been skid trails. Perhaps a technical person (forester, botanist, naturalist) can find traces of the old skid trail, but as stated, "it is difficult for the layman to determine the skid trails. . ." Additionally, we note that the transcript to the BLNR Public Hearing on the CDUA, July 27, 1978, in Hilo, William Thompson, Chairman of the BLNR, stated at one point, "You know I'm surprised, I walked up to the area today and I couldn't find the trails. They pointed out to me this is where they harvested the area. I couldn't see it. It was covered with Hapu'u."

23. It is our feeling that the impact of the invasion of exotic species into the area is being understated. Another area needing discussion is that of the Hapu'u forest ecosystem. Claims that the harvesting is being conducted on a sustained yield basis have little meaning when there is no discussion of the effects of the removal of the key element of the ecosystem, the fallen Hapu'u. What makes the Hapu'u forest unique is not just the aesthetics, but also its ecology. The Hapu'u harvested in Hawaii is only found in Hawaii and as such is unique. By removing a substantial portion of the biomass from the site, a significant portion of the nutrients being circulated in this ecosystem is thereby removed. We note that this point is not discussed, nor is any mention made of supplementing this nutrient loss through fertilizer application. As with other tropical forest ecosystems, a major portion of the nutrients is contained in the standing biomass, not in the soil. Once removed, it takes a long time to replace.

With regard to the first sentence of this comment, we will emphasize in the text of the Revised EIS, that exotic weeds are found predominantly along the main haul road, but are also found in the area of the sites which were formerly harvested as well.

The Hapu'u forest ecosystem was discussed in the EIS, as much as possible, in consideration of the lack of information available at the time of the preparation of the EIS, specifically, page 28 of the EIS. For us to have discussed this matter further would have been redundant, since there is little or no information available on this subject. There were no claims that the harvesting operations would be performed on a sustained yield basis. It is only acknowledged in the EIS that if regrowth is successful, in the long-term there can be successive harvesting. We note that the applicant did not

Initially to harvest on a sustained yield basis.

In order to clarify and not conject that there is optimism for a sustained harvest, we will omit the concept of sustained yield and not indicate that sustained harvesting will be practiced. Of course a sustained harvesting operation would be ideal, but may be a premature thought at this time.

We do not have information which would confirm or deny your discussion on the importance of the hapu'u logs in the total biomass/hapu'u ecosystem. Your statements, "As with other tropical forest ecosystems, a major portion of the nutrients is (sic are) contained in the standing biomass, not in the soil. Once removed, it takes a long time to replace . . ." are conjecture.

Did the Division of Forestry experiments cover this important topic?

Refer to the Division of Forestry's letter of November 30, 1978.

Does the applicant plan on doing any experimental tests?

Miu Nursery does not.

We doubt if any second, third or fourth "crop" can be harvested from these sites without generating a long-term impact on the nutrient level of this ecosystem.

See the responses above.

24. Page 22. There is no information preceding the statement, "Therefore (sic Therefore) the Board of Land and Natural Resources has the discretionary power. . ." to indicate the role of the Board in the Conservation Districts. The discussion on the bottom of this page is irrelevant.

The sentence referred to will be revised to read, "The Board of Land and Natural Resources is the designated body which has the discretionary power to determine if a specific use within the Conservation District is compatible with the goals of the Conservation District."

The discussion on the bottom of page 22, as well as on page 23 will be deleted.

25. The claim is made that uniqueness of the site can only be subjectively determined. However, if proper botanical studies had been done, there would be a sound basis to judge whether this ecosystem is unique. The statement, " . . . It would be inappropriate to attempt to weigh the pros and cons of selective harvesting versus conservation of the hapu'u forest in the SIS, " is incorrect. This is one of the major reasons for preparing the SIS.

What we meant to relay was that the term "unique" as applied to the hapu'u forest is subjective, since its definition seems to differ with both opponents and proponents of the project. We disagree that a botanical study or studies would have provided an answer to this question, since the uniqueness of an area must be judged on not only what is found in that area, but what exists in other areas, (i.e. whether there are other similar forests of this type). This would require several botanical surveys of other hapu'u forests on the island. The quoted sentence referred to the subjective nature of the term unique, and the emotional pros and cons of selective harvesting versus conservation. Much testimony on this was provided on the CDOA (both 1971 and 1978). We will provide further information on selective harvesting versus conservation in Section VI. Alternatives to the Proposed Action.

26. The statement, " . . . and in the absence of supportive data, the Board must determine the future use of the 300-acre site and the conditions which must govern that use." fails to account for the research work performed by the Division of Forestry. This statement should be deleted, for data is available, although conclusive long-term findings are lacking.

We explained the circumstances and our coordination efforts with the Division of Forestry in the beginning of this letter. Reference should be made to the response provided to us by the Division of Forestry dated November 30, 1978.

We note that this lack of complete data, is in part, the fault of the harvesters. This is clearly stated on page 25, in the quote by the Forestry Division. It appears that previously harvested areas where studies were being conducted were redisturbed by the harvesters. This effectively nullified the reestablishment of vegetation for quite some time.

This is correct. Initially, there were two operators who were contracted to harvest hapu'u; one of these contractors relogged previously harvested areas and was terminated after three years of repeated problems and substandard work. The other contractor,

Lee Brothers, is still harvesting hapu'u for Niu Nursery. On February 25, 1977, the BLNR acknowledged their excellent work in harvesting operations.

27. Page 28. A discussion should be presented regarding the leaving of 10% of the logs to, "... provide a seed bed necessary for the forest to continue to be nurtured." This figure seems to have no data to support it.

The 10% figure does not have data to support it. It was used merely to indicate that some mitigation would be exercised in that one out of ten harvestable logs would not be taken.

28. In item number 13 it is stated, "information available indicated. . . ." What information is this? No references are cited.

The quote is cited as being from the BLNR staff report (dated October 9, 1971).

29. Future areas for logging appear to lie below the 4,600 foot contour line. This is an estimated 200 acres in addition to the 300 acres in the present application. Will these 200 acres be applied for in the future? We do not believe, as shown in comment #2, that the 300-acre site will last 25-30 years.

Niu Nursery's President, Sidney Goo, has indicated that presently, they do not have plans to request additional acreage beyond the 300 acres. He also noted that at this time it is unknown whether or not additional acreage above the 300-acre site will be requested in the future.

All sites considered, this adds up to 650 acres of land that might be harvested. Is this figure enough acreage to sustain the hapu'u harvesting industry? Will the State's flower growers be forced to find alternatives to hapu'u?

Mr. T. Y. Goo of Niu Nursery indicated that he does not have any answers to these questions, and would doubt that other agronomists would have any either.

As stated previously, any notion that the harvesting is a sustained yield operation is only speculative at best.

This is answered in our response to item 23.

30. Page 29. Who determined that more than 20 more years of study is necessary? We note that a Division of Forestry statement is quoted on page 26 as saying a few more years are necessary to allow for the trends to establish themselves. We suggest that this matter be resolved and discussed in the revised EIS.

During our meeting with the Forestry staff, they indicated that the studies would be long-term. Based on our discretion, it was felt that long-term would be 20+ years. Apparently, this is incorrect. If Forestry tells us how long it would take them to yield results from their research, we will take out that reference and use their estimate.

31. Page 31. Who plans on planting koa seedlings in the cleared areas? If this site is to be managed for the production of hapu'u logs, then why are koa going to be planted? This would be a great change in the existing ecosystem.

Although Berger indicated that koa trees would be more beneficial to the avifauna (thus making recommendation for koa planting understandable, from an ornithological standpoint), we found that the planting of koa seedlings may damage and/or destroy the hapu'u ecosystem, and therefore recommended (page 45, item F), "Based on the need to retain the hapu'u forest, harvesters should be allowed to replant only fern tops and not any species of woody trees." (Underscore added for emphasis.)

32. Page 32. The "we" being referred to in the first paragraph on this page should be identified.

The term "we" will be deleted in the narrative of the Revised EIS.

33. The biased opinion of the consultant which refers to other conservationists in this State should have been edited from this section. It lends nothing to the discussion on the impact of the project on the fauna.

This will be deleted in the narrative of the Revised EIS.

34. Page 33. The statement, "judging from all reports prepared by the Division of Forestry, the tree fern harvesting in recent years has not been detrimental to the tree fern forest," is inconsistent with all the earlier statements that no information is available on this subject. This quoted statement is also incorrect. The fact is that the Division of Forestry does have the information and it shows clearly that exotic species are moving into the harvested areas. We strongly suggest that the applicant correct this matter.

As indicated in the beginning of this letter, we are reviewing the information from the Division of Forestry. Also, the statement quoted above was based on a memorandum dated September 30, 1977, from William H. Sager, State Forester, to Roger Evans, Planner, which stated, "b. Present conservative logging practices used by Lee Brothers appear to assure continued growth of hapu'u and very little adverse effect on the native component of the plant community." However, it is our understanding (through personal communication) that forestry no longer holds this position. (We did not know this prior to the preparation of the EIS.) As indicated in our response to item 23, we will emphasize the invasion of exotic species in the harvesting area.

35. Page 35. "Impact on Noies," should read Impact on ambient noise levels. We note that there is no discussion on the impact of noise on fauna, especially the native birds in the area. A discussion is recommended.

(The following response was obtained from Dr. Andrew J. Berger.) In their testimony before BLNR, concerning Paiko Lagoon, both Ronald L. Wallace (Fish & Game) and A. J. Berger cited personal experience and federal research to show that noise in general (including airplanes flying overhead) doesn't have any detectable detrimental effects on birds or their eggs. Walker verified this at Keeki Lagoon on Oahu and Berger verified it at Kanaha Pond on Maui.

36. We note that there is no discussion on the potential use of herbicides as it affects water quality. A discussion is recommended.

See our response to item 21.

37. Page 37. It should be pointed out that only \$18,708 were paid to the State in excise tax for the actual sale of hapu'u, the rest of the figure is for taxes from flower sales.

This will be included in the Revised EIS.

38. Page 38. What forest vegetation is referred to in paragraph A? Who did the observations? The statement that the ekid trail regrowth does not include weeds is inconsistent with Division of Forestry information.

The section is recognized to be incorrect and will be rewritten to be consistent with the Division of Forestry memorandum of October 24, 1977.

The statements regarding the growth rate of hapu'u are also inconsistent, "growth appears to be rapid," vs. "hapu'u grows very slowly." (page 27) These inaccuracies need to be corrected.

We do not find the statement to be inconsistent with our previous statements on the slow growth of hapu'u since we have stated, "The normal growth of the plants, their rate of maturity, are yet to be studied, but at this point the growth appears to be rapid." (Underscore added for emphasis.)

39. Page 43. If, as stated, it takes 50 or more years to produce premium fibers for potting purposes, it appears that the potential 660 acres (see comment 29) will be harvested, if permitted, well before the growth cycle on the first 150-acre site is completed. Where will the applicant go next to harvest hapu'u?

Mr. T. Y. Goo of Kiu Nursery indicated that at this time this is unknown.

40. Page 44. The statements about second, third and fourth harvests of the same areas are conjectural at this time.

See response to item 23.

41. Page 46. It should be clearly stated that the harvesting of hapu'u logs is an irreplaceable commitment of this resource. It does not depend on whether exotic species of plants are invading the harvested area.

We concur, and will state, "The hapu'u logs taken from the area are an irreplaceable resource. If the hapu'u forest is damaged (either by exotic weed infestation or the harvesting operations), then the hapu'u harvested must also be considered a non-renewable resource.

42. The relevance of pulu harvesting over 100 years ago, when there were far fewer exotic species available to compete with the native species is questionable. The problem of exotics is much greater now.

True, this is why we have so noted this thought on page 75 of the EIS.

43. Page 75. The statement under discussion, "this hapu'u forest is unique and must be preserved," needs justification. Is it unique ecologically, because of it only being found in Hawaii? We do not consider one sentence on each viewpoint a discussion as required under EIS Regulations. There is nothing written on what overriding reasons there are for proceeding with the action with these issues being unresolved as required by the EIS Regulations. This entire section needs considerable attention and discussion.



Mr. Richard L. O'Connell  
December 20, 1978  
Page Sixteen

GEORGE R. ARISTON  
GOVERNOR OF HAWAII



W. Y. THOMPSON, Chairman  
BOARD OF LAND & NATURAL RESOURCES  
EDGAR A. HAHARA  
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. BOX 621  
HONOLULU, HAWAII 96808

DIVISIONS:  
CONSERVATION  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

December 5, 1978

We feel that we have discussed these "unresolved issues" throughout the text. As the title of this Section suggests, the brevity of our discussions is a summary of the unresolved issues. The first issue cannot be resolved since there are differing viewpoints as to whether the hapu'u forest is unique or not. The second issue cannot be resolved at this time because there is no conclusive data which would support a finding that the hapu'u ecosystem will be damaged or destroyed in the long term future.

44. Page 76. We note that the latest CDUA which this EIS covers was denied without prejudice by the Board on October 27, 1978. Therefore, we recommend that when the applicant resubmits for the proposed activity, the current document be used as an EIS preparation notice. This might enable the applicant to adequately meet the EIS Regulations at that time. This would also allow the applicant to consult with the Division of Forestry.

The CDUA was denied without prejudice by the DLMR until the EIS process is completed. We feel that it is unnecessary to go back to the EIS Preparation Notice since we have made efforts to coordinate our work with the DLMR, including Forestry (as stated in the beginning of this letter). All other information obtained will be included in a Revised EIS.

45. Page 92. The list of literature cited appears to be incomplete.

The literature cited is part of Exhibit II, Andrew Berger's study. Many publications were cited in Becker's dissertation which were quoted verbatim, without including the specific reference to the publication. In order to clarify this, we will include a partial list\* of Becker's bibliography.

Yours very truly,

*F. J. Rodriguez*



\*A partial list which will identify only those authors/publications quoted in the EIS.

Mr. Fred Rodriguez  
Environmental Communications, Inc.  
1152 Bishop Building  
Suite 508  
Honolulu, HI 96809

Dear Mr. Rodriguez:

Attached are comments from our Divisions of Forestry and Fish and Game, which you may consider as a departmental response to your Draft EIS for Hapu'u Harvesting on the island of Hawaii, Conservation District Use Application, HA-5/12/78-1054.

Thank you for allowing us to provide our input to your Draft EIS. Should you have any questions, please feel free to call on us.

Very truly yours,

*W. Y. Thompson*  
W. Y. THOMPSON  
Chairman of the Board

DEC 08 1978

HAPU'U HARVESTING, ISLAND OF HAWAII

General Comments:

There is an overall trend suggesting that permission for hapu'u harvesting on conservation lands is becoming more and more difficult to obtain. Also land having good harvestable hapu'u is getting hard to find. The following factors are contributing to this:

1. Regeneration and growth of hapu'u appears to be very slow, which suggests that many years are necessary between harvests on the same land area.
2. Plant species composition in previously harvested sites is altered.
3. New environmental laws protect these forests.
4. Limited resources require increased management and cost efficiency to justify land use.

These factors suggest that it is only a matter of time before hapu'u will become:

1. too expensive for harvest, and/or
2. a less expensive substitute will take its place on the market.

Several items in this EIS suggest a determination to pursue continued hapu'u harvest rather than being innovative in adapting new substitutes for hapu'u. For instance, no mention is made of the following inexpensive substitute:

1. Sugar cane leaves or bagasse.
2. Seaweed - tons of seaweed are being cleaned up off the public beaches by City and County personnel and sent to the dump. (It is said that all that is needed is to wash off the salt from the dried seaweed and it makes either a good mulch or orchid growing media that costs nothing.)
3. Pine or eucalyptus bark substitute that could be developed from locally planted tree stands.

4. Mixture of hapu'u with another substance. This would extend the hapu'u supply and limit the impact upon the native forest.

By limiting and/or denying such requests, we encourage the conversion to other materials and prevent unnecessary modification of the native forest.

Another item not addressed in the EIS is the problem of shipping hapu'u under the International Convention of the Endangered Species Act. Tree ferns and orchids are included under prohibitions that export to foreign countries. According to the EIS, they have been exporting these materials, with no mention of necessary export permits and certificates.

A herbicide program is mentioned as a mitigation measure to control the weeds along the road. Unfortunately, herbicides eliminate not only weeds but also native plants that may be regenerating in the forest openings caused by hapu'u removal. These openings are only enlarged by the use of herbicides allowing a larger area conducive for weed growth. As a result, weeds regenerate in a larger area than originally disturbed. Hand removal of these plants before they flower is the best method of weed control. Unfortunately, the person doing the weeding has to know which small plants are weeds and which are not. Weeding needs to be done on a time schedule that does not allow flowering and reproduction of these plants.

No mention of cleaning equipment, clothes, and shoes is made to prevent further spread of weeds. These efforts are particularly necessary when equipment and personnel are moving from one disturbed area into a new native area. Clinging soil on the wheels and the undersides of vehicles should be washed clean before entering new habitats.

The number of unknowns to the environmental questions raised in the proposed EIS (pages 21-23) suggests much more data needs to be accumulated before requests such as this are approved.

Specific Comments:

1. Berger states he only saw four species of endemic birds during his field trip into the area (pg. 19). It is unrealistic to assume that these species are the only birds present as his one field trip was taken after the peak of the forest bird breeding season (April-May); consequently, birds would generally be less conspicuous and easily overlooked. The Elepaio, a native forest bird, is frequently seen in this forest (pers. obs.).

2.	Berger implies that other endemic birds (Hawaii creeper and akapa, akiapolaau and Ou) are found only at higher elevations and not in the proposed harvest area or peripheral parcels (Berger Report, pg. 3). Both the ou and akiapolaau have been seen within one mile of the area (pers. obs.). Since little is known about the ecology of these species in particular, data should be gathered from the area prior to any disturbance which could bias the data.	Page 18
3.	Berger states that the harvesting of selected tree fern trunks does not constitute a threat to the tree fern association or the birds that inhabit it (pg. 33). No data from research in that area is presented to substantiate this statement.	33
4.	Although it is stated that the original purpose of the 150-acre tract was to serve as a "test" site in determining the success of a sustained-yield management program, and to study the impact of hapu'u harvesting (pg. 6), no data, findings or recommendations from this research is presented supporting further expansion of harvesting for any reason.	40
5.	Because research monitorings in the 150-acre tract were frequently disturbed by harvest crews (pg. 24-25), no information could be contributed to either support or reject the concept that harvesting, on a sustained-yield or any other system, could be accomplished without irreversible harm to the existing <i>Metrosideros-Cibotium</i> forest. However, the absence of information or supporting data is hardly sufficient justification to continue a project which may have already done irreversible damage to the product it desires to sustain (pg. 26, item 4).	40
6.	Exotic weeds are also found in harvested areas.	42
7.	Herbicide programs should also indicate the expertise of the Department of Agriculture's weed control branch.	-6-
8.	Unattached word string.	P. ii, 23.
9.	The present and proposed harvesting areas are bordered on 2 sides by pasture. This is not clear from the existing statement.	P. ii, 24.
10.	The proper name for the facility is Kulani not Kalani. Isn't the facility also called the "Kulani Honor Camp" rather than "Kulani Prison"?	P. ii, 24.
11.	Our preliminary data does not support this statement. Weeds have been added to disturbed areas.	18
12.	The statement implies that the canopy has grown back completely. This is not so.	18
13.	We have no plans or desires to monitor in the 300-acre area and we are on record as stating such.	32
14.	Not only forest vegetation, but also weeds. Regrowth is not to a once again positive native condition by any means.	33
15.	It (regrowth) does indeed include weeds.	33
16.	Weeds exist not only along roads but also in harvested areas.	33
17.	See comment 7.	40
18.	See comment 16.	40
19.	Additional conditions were suggested in an October 24, 1977 memo. Some of the conditions cited in that (those not involved with research) should also be considered.	40
20.	We will only at the Board's request, continue our studies in the 150-acre area.	40
21.	See comment 19.	42
22.	Dr. Berger's report. This is not only a quote out of context, but also expresses a position that we no longer subscribe to. We do not want an expanded area under the auspices of research. It will serve no purpose.	-6-
23.	To date, it would be only opinion to say that skid trails are rehabilitated. It would be more proper to say that efforts are being made to rehabilitate the skid trails by planting fern tops and encouraging (if being done) adjacent growth.	P. ii, 23.
24.	Somewhere, it should be clearly stated that the Board, in their approval for the first 150 acres, allowed harvesting for the purposes of research. The 16 conditions were a portion of this grant. Intentions towards sustained harvesting shouldn't even be considered until research is complete.	P. ii, 24.

- P. ii, 25. This statement lacks precision. The site is bordered on two sides by pasture. The implications offered by the existing statement are erroneous.
- P. iii, 26. The statement is so vague as to be meaningless.
- P. iii, 27. On the contrary, our preliminary data shows a strong influx of weeds into harvested areas. This can certainly be interpreted as damaging to the ecosystem. We lack the data that will tell us of the long-term effects of harvesting.
- P. iii, 28. Exotic weeds were found (and still are) in areas of harvesting. Their presence is not limited to the main haul road.
- P. iv, 29. Weed control programs should be the problem of the harvesters. They should get advice from DOA's weed control branch, along with WDP, but we should have no responsibility to control weeds, or help them to do so.
- P. iv, 30. How will this be determined? Who will monitor this?
- P. iv, 31. We suggest that, if harvesting is allowed, the following conditions should be added:
1. A detailed plan of the harvesting be made and provided to WDP, (Hawaii Division of Forestry), and subject to WDP approval. The plan should show the road network to be used, and the area to be harvested should be divided into some form of harvesting units. The plan of harvesting should show how those units will be harvested.
  2. No re-disturbance of a harvesting area should be permitted. Once harvested, an area should not be touched again.
  3. No planting of trees or manipulations other than fern top establishment and weed control measures should be allowed.
  4. If research data show that permanent damage is being done to the hapu'u ecosystem, the Board should be capable of withdrawing harvesting approval immediately.
- P. v, 32. See comment 27.
- P. i, 33. See comment 25.
- P. 5, 34. The proper title is Kulani Honor Camp, not Kulani Prison.
- P. 5, 35. See 34.
- P. 7, 36. Missing word.
- P. 7, 37. Sentence is meaningless.
- P. 7, 38. Misspelled plant (maki) mamake - preliminary data does show an increase in woody native species in disturbed or harvested areas.
- P. 10, 39. While this pattern may be the ideal, it is certainly not followed on the ground.
- P. 15, 40. See 31.
- P. 16, 41. See 26.
- P. 16, 42. Misspelling - mamake.
- P. 20, 43. Any proposed herbicide program must consider water quality.
- P. 21, 44. Disagree, skid trails are visible, and data shows that regrowth is not "same plant materials originally found under the hapu'u before harvesting." Data shows the addition of exotic weeds. See also 15A.
- P. 21, 45. Poorly stated. Canopy is growing, but "grown back" implies that it is now as before. Not so. Statements like this should be supported by data, but are not.
- P. 22, 46. Question the propriety of indicating what the Board must and must not consider. Is this proper in an EIS?
- P. 24, 47. Preliminary data is indeed available. See also 27.
- P. 25, 48. What report by Wick and Washimoto?
- P. 25, 49. Quote about diameter increase must be out of context. Treefern must increase in diameter with age. How otherwise do we get treefern? They do not spring full-sized from spores.
- P. 27, 50. Not entirely. See 27, 28, 32, etc. The point is that there is data relevant to some aspects of the question.
- P. 27, 51. Question the value of "approximate rough estimates." As to the knowledge of shading effects, we hope our long-term data will shed some light on the matter.

- P.14, 52. (Apologies for back tracking.) The present 150 acres will, in sum, take about ten years to harvest. The future 300 acres is supposed to last 25 to 30. That seems overlong. Especially in light of a doubling of crew size, and an increase in annual yield from 55,000 cubic feet (now) to 92,160 cubic feet (future, P.36,16A). How can this be? Will harvesting be more intense? Will more be reviewed from the 150 acre area?
- P.28, 53. In line with 52, this again states that 300 acres will be sufficient. This also states that the 4,600 foot elevation line is their cutoff for harvesting. The map (figure 2) indicates a significant acreage between the upper boundary of the 300-acre area and 4,600 feet in elevation, notable in the northeast. Is this area to be considered in the future? If so, when? If not, why was 4,600 feet used as a cutoff?
- P.26, 54. Page 24, 47 implies data is not available yet this quoted memorandum states the existence of such data concerning exotic weed invasion.
- P.28, 55. See 30.
- P.28, 56. The implication is that the two areas mentioned have similar hapu'u forests as the area for harvest. Is this indeed so?
- P.29, 57. What is the basis for this time estimate? We certainly do not expect our ongoing projects will take that long to yield results.
- P.29, 58. See 31.
- P.31, 59. What is with the koa planting? To this point, nothing has been said except that which concerns hapu'u harvesting and sustained yield operations in hapu'u. Koa plantings would be a grave adjustment to the hapu'u ecosystem. This is inconsistency at its highest.
- P.31, 60. How would the planting of koa facilitate regeneration of ohia?
- P.31, 61. "heterogeneity" in the hapu'u area? Is it planned to enhance bird habitat? This whole business of tree planting and enhancement is not only new, but, to this point, not addressed in terms of its changes and impacts on the existing ecosystems. The tree enhancement is: (1) a drastic change to what exists and (2) mutually exclusive with regards to a sustained-yield hapu'u operation (or even an attempt).
- P.31, 62. Object to the use of the word "I" unless authorship is also given.
- P.32, 63. Object to "we". See 62.
- P.32, 64. The essay on birds goes from tiresome to irrelevant about here. Much of this is not germane to the project.
- P.32, 65. This statement is damning to the harvester's own cause.
- P.33, 66. Not true! See 27, 28, 32, 47, etc.
- P.33, 67. The harvesting area should not be hung out as needed for bird/fern association studies.
- P.33, 68. Sentence does not seem linked in with chain of thought to here. Irrelevant and overstated.
- P.33, 69. Harvesting areas are not necessary for studies and control areas to protect T&E birds. See 67.
- P.33, 70. See 59, 60, 61. What are the goals of the effort? Sustained hapu'u yield? Bird support? Tree introductions? The introduction of such ideas renders the overall objectives unclear.
- P.34, 71. Is, then, hapu'u harvesting being touted as one of the desirable "management practices"? Weak ground indeed.
- P.36, 72. Disagree. We have the data and no one asked us. We feel that the practices deserve careful scrutiny before continuation.
- P.36, 73. Again the 20-year figure. Origin? See 57.
- P.36, 74. We have made more than one conclusion. See 27, 28, 32, 47, 50, 66, etc. for one main example.
- P.37, 75. Disagree. Why should we monitor the 300-acre area? This is private business. See 31 to 58, etc.
- P.38, 76. "Forest vegetation" is erroneous. With the existing weed content, just "vegetation" would be more proper.
- P.38, 77. Absolutely wrong! Weeds do indeed exist. This is an out-and-out falsehood. See 27, 28, 32, 47, 50, 56, etc.
- P.38, 78. Also harvested areas. See 27, 28, 32, 47, 50, 66, etc.
- P.38, 79. That time again. See 57, 58.
- P.38, 80. How is this interval established? What is its basis?

- P.39, 81. The non-harvesting in a particular area may well be insufficient. Actions around endangered species may require much more than that. For instance, depending on what "critical habitat" can be determined to be, rather large areas may need to be protected.
- P.43, 82. Basis for the figure? See 80, etc.
- P.44, 83. If it is unknown, why 80 and 82 statements? Contradictory.
- P.44, 84. Conjecture of no value.
- P.46, 85. Past history cannot be used as a guide for regrowth. When hapu'u was harvested in the 1860's, there were far fewer exotic weeds available to compete for habitat.
- P.47, 86. Monitoring by Forestry again. Why? See 31, 29, 58, 69.
- P.75, 87. We can certainly make (and have done so) conclusions as to the impact on the hapu'u ecosystem. What we cannot do at this time is assess the ultimate impact.
- P.83, 88. Again, we had best state our present position. We no longer support the position cited. "We consider the 300 acres a purely commercial venture as opposed to the original 150 acres, which was for research purposes. As such, then, this new area should not in any way be considered as an expansion of the original study area. We do not need it for further study." The quote as used is out of context and is no longer valid.
- P.87, 89. See 59, 60, 61.
- P.90, 90. A vicious circle seems to exist. Does one build roads into native forests with little or no exotic plants to control exotic plants?

SUMMARY

It is clear that the EIS falls far short in its presentation. It appears to be more of a position paper than an EIS. It is rife with errors, misconceptions, unsupported suppositions, quotes out of context, and bias. We are treated to repetitive essays which border on the irrelevant. We are given surprises such as the koa planting proposal on P. 31, which cast an entirely different light on the EIS to that point. Existing information on record has been ignored. Some has been distorted.

We feel that the Draft EIS inadequately addresses the proposed project.

A brief word on "data." Data does indeed exist that conclusively shows the presence of exotic weeds in disturbed (harvested) areas. This is in contrast to the almost complete absence of such weeds in the 150-acre study area in areas that are as yet undisturbed. Such data is, of course, incomplete and preliminary as sufficient time has not yet elapsed for trends to run their natural course. Statements regarding the dearth of data should be qualified with the above in mind.

Mr. W. Y. Thompson, Chairman  
December 20, 1978  
Page Two

ENVIRONMENTAL  
COMMUNICATIONS  
INC.

December 20, 1978

F. J. RODRIGUEZ,  
PRESIDENT

1. A portion of the expanding flower industry will be adversely affected for the period of time before a suitable substitute is found.

2. More individuals will be trespassing and removing hapu'u from State and private forest lands.

3. An imported product (e.g. fir bark) will likely replace hapu'u due to the reliability of the suppliers and availability of the product.

We have discussed the exporting of orchids in hapu'u with the personnel of the State Department of Agriculture's (DOA) Plant Quarantine Branch. The orchid in hapu'u requires an inspection certificate from the DOA and clearance from the country the plant is being exported to. This will be noted in the Revised EIS.

Weeding by hand and the constant cleaning of equipment, clothes and shoes would be highly uneconomical for the harvesting contractors, and would significantly add to the consumer's cost of the final hapu'u product.

We have reviewed your concerns on the inadequacy of the document; however, we disagree with this position. The EIS document, in our understanding, is a full disclosure document. Wherever possible, we have attempted to provide whatever data we found to be available which would assist us in evaluating the potential impact. Unfortunately, there is a scarcity of credible data in this area; additionally, the actual obtaining of such data, for the purposes of preparing the EIS, would have required years of research (e.g. biomass relationship to the hapu'u forest) and available monies. Pragmatically, such studies and data would be so time consuming and financially uneconomical (to the entire hapu'u harvesting operations) that we based our analysis on data which was already available. We do not feel it was within the intent of the EIS law and regulations to burden the applicant to the point where an EIS is as costly, or even more so than the economic returns potentially possible from the project itself. Therefore, it would be better said that this EIS document discloses, to the extent possible, that much important information is lacking in order to come to any final conclusions on the impact of the hapu'u harvesting operations. However, it has identified the range of probable impacts which may occur. In the course of this EIS, the lessee has retained technical subconsultants on matters which were significant. These subconsultants prepared studies oriented to a shorter time period; by so doing, we find that this effort was realistic and provided some insight into the probable impacts of this proposed hapu'u harvesting operation. Additionally, we have made many changes in the text of the EIS document to incorporate the many comments which were received.

Our response to your specific comments are attached.

Thank you for your comments.

Yours very truly,  
F. J. Rodriguez  
F. J. Rodriguez

FJR/dhk

Mr. William Y. Thompson, Chairman  
Department of Land and Natural Resources  
State of Hawaii  
P.O. Box 621  
Honolulu, Hawaii 96809

RE: EIS FOR THE PROPOSED EXPANSION OF HAPU'U HARVESTING ACTIVITIES  
AT KILAUEA FOREST RESERVE, KA'U DISTRICT, ISLAND OF HAWAII

Dear Mr. Thompson,

We are in receipt of your transmittal of December 5, 1978, with respect to the above-referenced EIS. In response to your general comments, we note that hapu'u as a potting medium is highly desirable by orchid growers. There are cheaper (in purchasing price) potting mediums, but hapu'u, for the reasons cited on pages 41 and 42, is considered the best. Your comments imply that eventually, hapu'u will (for several reasons) be unavailable as a potting medium. Although this may be true, we question whether this would actually occur in the short-term future. (Hapu'u is harvested by various individuals on Hawaii.)

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On the question of other potting mediums:

We recognize that other alternative potting mediums exist; however, as stated above, hapu'u is considered the best. Specifically, sugar cane bagasse is being marketed in small quantities. Information we have indicates that the bagasse requires daily watering and decays rapidly. Seaweed may be a potential alternative, but to our knowledge is not on the market. Much of its future potential is dependent on the cleaning and method of drying the seaweed. The third, pine or eucalyptus bark is considered similar to fir bark, which is presently marketed (normally cheaper than hapu'u). Even with this cheaper product on the market, hapu'u is sold at a steady rate. All three mediums would have the disadvantage of disturbing the divided plants which require periodic repotting (item 2, page 4). Mixture of hapu'u with other substances is already being done by many orchid growers. We concur that denying the request would encourage the conversion to other materials; at the same time, we would also anticipate the following likely impacts:

whatever reason, a result of harvesting activity. We cannot at this time make a pronouncement as to the long-term trends of exotic vegetation in the harvested areas. It could eventually be overtopped by the newly growing hapu'u and fade away, or it could take over the area to the detriment of a hapu'u ecosystem. Only additional measurements in the future will be able to show what direction the exotic vegetation will take. These measurements must wait a few more years to allow the trends to establish themselves."

7. We concur and have made the appropriate correction in the Revised EIS.  
8. Location of the "unattached word string" is unknown to us.  
9. Bordening land uses in pasture will be acknowledged.

10. Personal communications with the Corrections Division, State Department of Social Services and Housing regarding the proper term for this facility, resulted in the correct nomenclature, which is, "Kulani Correctional Facility." We will use this term in the Revised EIS.

11. See our response to item 9.

12. There is no statement as identified in your comments on page 18.

13. This position will be noted in the Revised EIS.

14. The information used by Berger was based on previous memorandums from the Division of Forestry. It is our understanding that the Division no longer subscribes to this position; it will be omitted in the Revised EIS.

15. See our response to item 6.

16. See our response to item 6.

17. See our response to item 7.

18. See our response to item 6.

19. These additional conditions, save one, are included on page 45. The one condition not included will be listed in the Revised EIS.

20. We will note this position.

21. See response to item 19.

22. See response to item 14.  
(We note that the pages cited in your comments, numbers 11 through 22, are incorrect and appear to refer to an earlier pre-draft EIS.)

1. In response to this comment, Berger has indicated that, "I did not, of course, imply that no other native birds were found in the area. I said, 'I saw only four species of birds during my field trip on July 31.' I pointed out that other species had been seen in adjacent areas, implying that they may well occur in the harvest area at least during some time of the year."

Berger also noted that, "A one-day field trip into an area is not adequate for determining all species of birds found in the area. A minimum of four trips at different times of the year would have been required, but there was not time to permit that many trips. Nevertheless, I believe that my experience does justify my conclusion."

2. Condition number 9 of the Conditional Use Permit issued in 1971 reads: "The Division of Fish & Game shall monitor the effect of harvesting on birdlife in the area." We are not aware of any data or evaluation of harvesting activities on birdlife which has been prepared by the Division of Fish & Game.

3. See response to comment 1, above (second paragraph).

4. This is true. The Division of Forestry has provided us with their position on the information and data which does exist (see Attachment A - letter dated November 30, 1978), as well as findings which they have prepared (see Attachment B - letter dated October 27, 1977). Both will be included in the Revised EIS.

5. Initially, there were two operators who were contracted to harvest hapu'u; one of these contractors relogged previously harvested areas and was terminated after three years of repeated problems and sub-standard work. The other contractor, Lee Brothers, is still harvesting hapu'u for Niu Nursery. On February 25, 1977, the BLHR acknowledged their excellent work in harvesting operations.

Item 4, page 26, referred to in your comments, contains a quotation from the Division of Forestry memorandum of October 24, 1977.

6. We note that exotic weeds are especially noticeable along the main haul road. We will include Forestry's observations that exotic weeds have also invaded the harvested area. We would not agree however, with the interpretation that the hapu'u ecosystem is being damaged; certainly this appears to be the case for now, but as was pointed out in the Division's letter of October 24, 1978, to Leonard Bautista:

"Data shows that exotic vegetation, much of it weeds, has come into harvested areas. Because measurements of areas that have not yet been harvested do not show this, we feel that the exotics are, for



23. We concur; more specific language will be used. The statement referred to will be revised to read, "After this operation, efforts are made to rehabilitate the skid trail by scattering live fern tops and allowing the surrounding plants to 'close' the trail via regrowth."
24. This is so stated in the EIS, on page 6, lines 20-21. Also, we will include a footnote on page 11, which states, "The original 150-acre area presently being harvested was approved for the purpose of research." We disagree, the applicant (Hui Nursery) did not intend to harvest on a sustained yield basis. Documentation in the CDUA previously granted for harvesting on the 150 acres indicates that the idea of sustained harvesting was based on the BLNR concept that "sustained harvesting" should be the goal. We would suggest that the EIS utilize the term "selective harvesting" and not indicate that sustained harvesting will be practiced. (Of course a sustained harvesting operation would be ideal, but as stated by the comment above, this would be premature. If this is acceptable, various sections/sentences in the EIS would be changed to reflect the foregoing.)
25. See our response to item 9.
26. Apparently, the reference is to a sentence which describes the area. If so, we would disagree that it is "so vague as to be meaningless." These sentences describe, to a general reader, the hapu'u forest without the use of technical terms. This was felt to be important especially to those reviewers who are unfamiliar with a hapu'u forest. Because of various objections, the use of the "90 percent by weight" phrase will be deleted.
27. See our response to item 6.
28. See our response to item 6.
29. See our response to item 7. Reference to the Division of Forestry with respect to their assistance in the proposed weed control program will be deleted in the Revised EIS.
30. If this becomes a condition, we would anticipate that the district foresters presently monitoring the harvesting operations would check on this aspect also.
31. On page 45 of the EIS (Item C), we state, in regard to mitigation measures, "Continue to impose the sixteen (16) conditions, established by the Board of Land and Natural Resources." One of those sixteen conditions, Number 4, reads (page 77 of the EIS), "Prior to initiating harvest operations, the user shall submit a harvesting plan to the Division of Forestry."
- Regarding: 2. "No re-disturbance of a harvesting area should be permitted. Once harvested, an area should not be touched again." We concur; this condition will be recommended in Section VIII, page 45.
- Regarding: 3. "No planting of trees or manipulations other than fern top establishment and weed control measures should be allowed." This is included in the EIS, page 45, item F: "Based on the need to retain the hapu'u forest, harvesters should be allowed to replant only fern tops and not any species of woody trees."
- Regarding: 4. "If research shows that permanent damage is being done to the hapu'u ecosystem, the Board should be capable of withdrawing harvesting approval immediately." Again, this was part of the original 16 conditions for which we have recommended (page 45, item C) continuance. Specifically, this is condition number 15 (page 78): "The permit shall be revoked should it be shown that harvesting is adversely affecting the hapu'u forest."
32. See our response to item 6.
33. See our response to item 9.
34. See our response to item 10.
35. See our response to item 10.
36. This quote is from the DLNR staff report; the missing word was in the original report and was simply quoted as found.
37. This is a direct quote from the cited DLNR document.
38. Apparently, this was a typographical error; we picked it up as "maki," whereas the staff (DLNR) report spells it "mamaki." The solution to this would be to pick up our typo and after mamaki, put in parentheses sic, correct spelling mamake.
39. This is the first indication that the harvesters are not following these procedures. After all, these procedures are identified in their own Division of Forestry report, "Kilauea Hapu'u Harvesting Status Report," dated January 27, 1977. Also, the Lee Brothers have been commended by the DLNR for their excellent harvesting work. This comment needs further elaboration.
40. See our response to item 31.
41. See our response to item 26.
42. This will be corrected.
43. This will be checked with the Department of Water Supply, County of Hawaii. There should be no problem since this area is not a source of potable water, nor are there any surface waters.

44. The EIS states, "Additionally, it is difficult for the layman to determine the skid trails which were cut three (3) to four (4) years ago. . . ." (Underscore added for emphasis.) A. Berger and C. K. Toyama, involved in the preparation of the EIS, have been in the area and both could not determine where there had been skid trails. Perhaps a technical person (forester, botanist, naturalist) can find traces of the old skid trail, but as stated, "it is difficult for the layman to determine the skid trails. . . ." Additionally, we note that the transcript to the BLNR Public Hearing on the CDUA (July 27, 1978) in Hilo, William Thompson, Chairman of the BLNR, stated at one point, "You know I'm surprised, I walked up the area today and I couldn't find the trails. They pointed out to me this is where they harvested the area. I couldn't see it. It was covered with hapu'u."
45. We will correct the statement to read, "The hapu'u canopy, which was partially cleared for the skid trail, is growing back, based on reports from the harvesting contractors."
46. This discussion merely states the role of the BLNR, as it would pertain to any Conservation designated lands which require a CDUA. Also, the use of the word "must" was not used in a dictatorial sense, as alluded to in the comment.
47. See our response to item 6, and Attachments A & B.
48. This was one of the publications reported in Becker's dissertation. It is listed in his bibliography as, "Hick, H.L., and G.T. Hashimoto. 1971. Frond development and stem growth of tree fern in Hawaii. U.S.D.A. For. Ser. Res. Note PSW-237 1971. 4p." If it would be useful, we could incorporate a partial list of Becker's bibliography for reference as an Exhibit; (it is a lengthy bibliography, 27 pages).
49. This statement is clarified by the statement, "Tree ferns do not increase in diameter at a steady, yearly rate. . . ."
50. See Attachments A & B.
51. This information was obtained from the harvesting contractors. The source will be footnoted.
52. A check with Mr. T.Y. Goo of Niu Nursery (from whom the information was originally obtained), indicates that the information on the output of hapu'u logs and the time required for harvesting is correctly stated in the EIS. He stated that the harvesting contractors have generally surveyed the 300 acres on which the additional hapu'u harvesting is being requested, and have found that the density and amount of fallen hapu'u logs are much greater in this area. They estimate that it would require 25 to 30 years to harvest, notwithstanding a greater rate of harvesting. Niu Nursery's present plan no longer calls for additional personnel on the harvesting crew. The work hours for the present crew are expected to increase by incorporating production efficiency measures (e.g. allowing the tractor to remain in the harvesting area, having people other than the harvesters take the hapu'u logs to the pier).
53. Niu Nursery's president, Sidney Goo, has indicated that presently they do not plan to request additional acreages beyond the 300 acres. He also noted that at this time it is unknown whether or not additional acreages above the 300 acre site will be requested in the future.
54. When we requested information with which to respond to various individuals, Forestry Division responded:  
"We are getting data on existing weeds. No final answer yet."  
This was in response to Mizuno's comment, "e. exotic plant invasion, and effects on forest structure."  
Does the observation of exotic weed invasion by the Forestry Division constitute substantive data? For example, can they identify prominent weeds, their amount and density? Their observations of weeds in the harvesting area should be noted more implicitly in the Revised EIS, but we would argue that this could be called conclusive information on the long-term impact of exotic weeds on the ecosystem.  
Refer also to Attachment A.
55. See our response to item 30.
56. Unusually enough, the comment is based on a staff report to the BLNR (October 8, 1971) which was quoted. Apparently, the information originated from the Forestry Division itself during the 1971 CDUA review. Also, in talking with the Forestry staff on Hawaii, it was indicated that there are several hapu'u forests of this nature in the area, most of them on State/Federal owned lands which would be under protection.
57. During our meeting with the Forestry staff (prior to preparing the EIS), they indicated that the studies would be long-term. Based on our discretion, it was felt that long-term would be 20 years +. Apparently, this is incorrect. If they tell us how long it would take them to yield results from their research, we will take out that reference.
58. See our response to item 31.
59. Although Berger indicated that koa trees would be more beneficial to the avifauna (thus making recommendations for koa planting understandable, from an ornithological standpoint), we found that the planting of koa seedlings may damage and/or destroy the hapu'u ecosystem, and therefore recommended (page 45, item F): "Based on the need to retain the hapu'u forest, harvesters should be allowed to replant only fern tops and not any species of woody trees." (Underscore added for emphasis.)

60. The openings created to plant koa would also be conducive to the growth of ohia trees. Also see our response to item 59.
61. See our response to item 59.
62. Footnote on page 30 identifies Berger as the author.
63. The term "we" will be omitted.
64. We disagree. Much of the objection raised to the CDMA granted in 1971 centered on the impact to avifauna. We merely reflected information which we felt would be a major concern to various citizen groups and individuals. Besides, this comment reflects a personal opinion which other reviewers may not agree with. If there are other comments which are similar, we will consider deleting this discussion, since the study is incorporated into the EIS as Exhibit II.
65. The statement being referred to is, "To be sure, it is now generally recognized that the most sensible way to attempt to save either a plant or animal species is to do everything possible to preserve the total ecosystem." We do not feel this is "damning" to the harvester's cause. It is simply a statement of truth and fulfills the intent of full disclosure under the requirements of Chapter 343, HRS.
66. See our response to item 6.
67. Berger stated that continued harvesting would "also provide the opportunity for detailed study of the interrelationships between native birds and the tree fern association." (Underscore added for emphasis.) We do not feel that this statement rationalizes the harvesting activities.
68. We cannot find the statement to which this comment is addressed.
69. See our response to item 67.
70. See our response to items 59 and 61.
71. See our response to items 59 and 61.
72. See Attachments A & B, and our response to item 6.
73. See our response to item 57.
74. See Attachments A & B, and our response to item 6.
75. This will be clarified in the Revised EIS.
76. This will be changed to "vegetation."
77. See our response to item 6. The sentence is inconsistent with the other statements in the EIS regarding weeds that have invaded the harvested area. This sentence will be corrected.
78. See our response to item 6.
79. This time does not relate to the time for studies. Just the long-term impact on the hapu'u forest. This will be clarified.
80. The interval which is being questioned is the length of time before a second harvest. This information was obtained from Becker's dissertation in the section dealing with hapu'u regrowth. Given that it takes 80 years before the diameter makes hapu'u harvestable, we assumed that the second crop would be those matured hapu'u left standing; thus a second harvest may be possible in 50+ years. However, this is just an estimate, and it is likely that no second crop would be harvested in our lifetimes.
81. This should be determined if and when endemic, endangered plant species are found in the area. Determination would certainly be brought before the Chairman, BLNR or the BLNR itself.
82. This will be corrected.
83. This will be corrected.
84. This comment relates to the idea of sustained yield. See our response to item 24.
85. This is so stated in the EIS (page 75). "Becker's dissertation indicated that the harvesting of hapu'u for puhi (the soft wool-like hair covering the frond bases and trunk apices of the tree fern) in the 1860's to 1880's, in the Kilauea area, is not noticeable today. Yet the circumstances may have been quite different (i.e. perhaps at that time there were less exotic weeds to invade the area after harvesting). Hence, we cannot support any conclusion as to the impact on the hapu'u ecosystem."
86. Refer to our response to items 13, 29 and 30.
87. This is what we feel we have stated in the EIS; we will emphasize this in the Revised EIS.
88. We will note this position in the Revised EIS. Also see our response to item 14.
89. Refer to our response to item 59.
90. Berger has merely stated that the roads facilitate studies in a dense forest reserve. This is not to say he advocates road building through forest reserves for study purposes.

EXHIBITS

EXHIBIT I

CONDITIONS ESTABLISHED BY THE  
BOARD OF LAND AND NATURAL RESOURCES  
FOR THE HAPU'U HARVESTING OPERATIONS (1971)<sup>1</sup>

1. The user shall maintain a 100 ft. wide buffer zone on the makai, eastern and western borders of the harvest area.
2. Only mature hapuu, as defined by the Division of Forestry, will be harvested. No tops shall be taken.
3. The user shall notify the Dept. of Land and Natural Resources prior to initiation of harvesting operations and upon completion of harvesting operations.
4. Prior to initiating harvest operations, the user shall submit a harvesting plan to the Division of Forestry.
5. All trails for the harvesting use shall be subject to Division of Forestry approval, and use of heavy equipment shall be limited to trails selected by the Division of Forestry.
6. Heavy equipment to be used in the harvest operations shall be limited to one D-4 type tractor for skidding out fern chips and logs.
7. The Division of Forestry shall closely supervise all harvesting work.
8. The Division of Forestry shall monitor the effect of the harvesting on forest regeneration and noxious infestation.
9. The Division of Fish and Game shall monitor the effect of harvesting on birdlife in the area.
10. DLNR personnel shall have free access to the area for enforcement and inspection purposes.
11. The user shall replant harvested areas with fern tops and appropriate plants to aid in regeneration, as directed by the Division of Forestry.
12. All debris from the harvest operations shall be removed to approved disposal sites.
13. The user shall submit a \$5,000 performance bond to the Dept. of Land and Natural Resources to insure compliance with the conditions of this permit.
14. At any time, should it appear that the user is not carrying out the provisions of the permit, or that the harvesting is causing destruction of the forest, all work shall be stopped immediately, and immediate remedial measures shall be taken.

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<sup>1</sup> It is very probable that if the present application is approved, these conditions will remain in force.

15. The permit shall be revoked should it be shown that harvesting is adversely affecting the hapuu forest.
16. The user shall adhere to all applicable Federal, State and County laws, regulations, and ordinances.

## EXHIBIT II

A Report on the Niu Nursery, Ltd.  
Kilauea Hapuu Harvesting Site  
Kilauea Forest Reserve, Hawaii

By Andrew J. Berger  
September 1, 1978

### I. Introduction.

This report was prepared in accordance with a memorandum dated July 25, 1978 (Niu Nursery, Ltd., Kilauea Hapu'u Harvesting Notice to Proceed) from Environmental Communications, Inc., which followed a meeting with Fred J. Rodriguez and Sidney Goo on the morning of June 29, 1978.

On July 31, 1978, Mr. Richard Lee of Lee Brothers served as a guide for Ms. Caroleen Toyama and myself on the harvesting site of the Kilauea Forest Reserve. We hiked the entire length of the main jeep trail and its branches as well as a large number of side trails, both where harvesting had been in process before the recent heavy rains and those side trails where harvesting had been done from several months to several years ago. Mr. Lee also described all aspects of the harvesting procedure in great detail. Because of recent rains there was no harvesting underway on July 31.

### II. The IBP studies in the Kilauea Forest Reserve.

I made my first trip to the Kilauea Forest Reserve (at an elevation of approximately 5,400 feet) with Norman Carlson of the Bernice P. Bishop Estate and Dieter Mueller-Dombois and other personnel of the Hawaii project of the International Biological Program on July 23, 1970. A logging road already existed at this elevation and gave easy access to the forest. I visited this area in order to study birds on November 20, 1970, and on January 11 and June 24, 1971.

In order to make possible systematic studies by IBP personnel,

R. G. Cooray and Jean Craine laid out four 1,000 meter transects downslope from the logging road. Transects 1 and 2 were "flagged" during January 1971; transects 3 and 4 were "flagged" during late June of that year. Detailed studies of the vegetation were made by Maka (1973) and Cooray (1974). Other studies were made of birds, insects, mammals, and other components of the ecosystem (Yamashiro, 1975).

I made periodic census counts of bird species along the four IBP transects during the period of January 11 and July 20, 1972 (Berger, 1972a). I discovered a wide variety of endemic bird species in the forest, including several that are classified as threatened or endangered by the U.S. Fish and Wildlife Service (Federal Register, 42:36420-36431, July 14, 1978). Later studies (with special reference to feeding strategies of the birds) in the forest were made by Dr. Sheila Conant; I am not aware that she has published a detailed report on her findings in the Kilauea Forest Reserve.

Personnel of the Hawaii IBP project were so impressed by the richness of the flora and fauna of this portion of the Kilauea Forest Reserve that a request was made to the Bernice P. Bishop Estate Trustees to either cancel or postpone any plans to harvest the koa trees that form an important part of the forest, at least until a thorough baseline study of the flora and fauna could be completed by IBP personnel. Those studies were completed by 1975 (Yamashiro, 1975; Gagné, 1976).

### III. The Hapuu Harvesting Site

To the best of my knowledge, no detailed botanical study of the tree fern harvest area has been published. There is, however, a great difference in the forest composition between the IBP study site (elevation



approximately 5,400 feet) and the tree fern harvest area (elevations approximately 4,300 to 4,400 feet). In the latter area, tree ferns are the most numerous of the dominant plant species. Large, old ohia trees (Metrosideros collina) are so widely scattered that there is no closed canopy formed by ohia or any other tree species, as there is at the higher elevations. The canopy in the harvest area is formed by the tree ferns themselves.

The endemic Hawaiian honeycreepers forage in the crowns of the large ohia trees (Berger, 1972b). The Hawaiian Thrush (Phaeornis o. obscurus) does use the tree fern stratum and the males also use the higher ohia trees as song perches. The introduced Japanese White-eye (Zosterops japonica) and the Red-billed Leiothrix (Leiothrix lutea) are common species in the tree fern layer.

I saw only four species of endemic bird species during my field trip on July 31, 1978: the Hawaiian Hawk (Buteo solitarius), the Hawaiian Thrush, Apapane (Himatione sanguinea), and Iiwi (Vestiaria coccinea). We watched a pair of hawks soaring high over the forest from the basecamp for the logging operation. Several thrushes were calling and singing, and I watched one bird initiate a flight song from the top of a tall ohia tree. Apapane and Iiwi were common and conspicuous as they called while foraging in the ohia trees. Other species of endemic birds have been seen at higher elevations in the Kilauea Forest Reserve and in the Oloa Forest Reserve (Katahira, 1978). These include the Hawaii Creeper (Loxops maculata mana), Hawaii Akepa (Loxops coccinea coccinea), Akiapolaau (Hemignathus wilsoni), and Ou (Psittirostra psittacea).

I saw three species of introduced birds (Japanese White-eye, Red-billed Leiothrix, and Ricebird or Spotted Munia, Lonchura punctulata) and observed pheasant tracks in the mud at several places along the main jeep road. Mr. Lee said that he had seen the Japanese Blue Pheasant (Phasianus versicolor) on several occasions.

The method of harvesting the tree fern logs has resulted in the creation of some openings in the dense tree fern association, primarily along the main jeep trail, which is relatively narrow and well defined so that there is no widespread disturbance. The several small flocks of Ricebirds or Spotted Munias were seen only along this road, where the birds were feeding on grass seeds. The opening made by this main, but narrow, access road creates more "edge-effect," which undoubtedly causes very little, if any, disturbance for the birds that inhabit this part of the forest. In general, the edge-effect improves habitat for some species of birds. The occurrence along this trail of exotic weed species, however, does constitute a potentially serious problem so that efforts to control or eliminate these plants should be initiated promptly.

The side trails, where the tree fern logs are actually removed, create only a minor and temporary disturbance because of the careful method of harvesting. These side trails are permitted only at 200 foot intervals in the forest. The minor disturbance that does follow removal of selected tree fern logs is soon obliterated by the rapid regrowth of the native vegetation. In a number of instances, we could not detect any sign of past harvesting or disturbance where Mr. Lee pointed out earlier harvesting sites. Some of these sites had been marked by koa (Acacia koa)

trees that had been planted by State Forestry personnel. Koa apparently is not a component of the ohia-tree fern forest at this elevation, but it has been shown to grow very well when seedlings are planted in open areas. This has been well documented in the photographic report of the Division of Forestry dated January 27, 1977 (title: Kilauea Hapu'u Harvesting Status Report) in which the statement appears that "three-year-old koa saplings are up to 20-25 feet."

#### IV. Effects of Harvesting Hapuu

Of critical concern to anyone interested in the endemic Hawaiian biota is the amount of disturbance caused by the harvest of tree ferns in the Kilauea Forest Reserve. The fact seems to be that the disturbance to the forest is minimal and short term in extent. In a memorandum dated September 30, 1977, to Roger Evans, Planner, from William H. Sager, State Forester, Mr. Sager wrote: "The area logged by Lee Brothers requires a close look to detect any disturbance. Visual inspection of the area logged by Lee Brothers shows minimal disturbance and an excellent stand of hapuu. We cannot, at this time, confirm our impression with scientific evidence from the monitor transects, but we do believe the logging techniques developed by Lee Brothers to protect the stand are working and long term management for hapuu production is practical and should be continued." \*

In a later memorandum (October 24, 1977) to Mr. Leonard Bautista from Edwin Q. P. Petteys and Patrick G. Costales, these timber survey foresters wrote that "we would like to suggest that the Board continue to consider this activity [Hapuu harvesting] as a trial to get some answers

\*Note to the reader: The Division of Forestry has indicated in their comments on the EIS that they no longer support the position cited in this memorandum from William H. Sager.

on the feasibility of a renewable hapuu operation. Within this context, we see nothing wrong with a reasonable expansion of harvesting until we get better answers." Petteys and Costales also proposed additional stipulations to be followed by Lee Brothers in order to protect the fern forest.

#### V. Heterogeneity of the Kilauea Forest Reserve

The fact is that the area designated as the "Kilauea Forest Reserve" is not composed of a uniform vegetation type. There certainly is far greater heterogeneity in plant species at the IBP study site at 5,400 feet elevation than at the tree fern harvest area approximately 1,000 feet lower. Dieter Mueller-Dombois (in press) has pointed out that "a displacement of both koa and 'ōhi'a from the rain forest is currently exemplified in the 'Ōla'a forest, which occurs at a lower elevation (1200m) below the Kīlauea rain forest. Here in the 'Ōla'a forest the upper tree synusia is gradually giving way to a pure tree fern forest. ... The primary reason for this appears to be a somewhat less favorable storm pattern in this lower elevation forest, which occurs in a wetter and more continuously cloud-covered area. Associated with this also is a still more favorable tree fern climate and a deeper and thus more productive ash soil, which results in an ecological optimum for tree fern development. Thus the tree ferns, which can be considered the most stable native component of these young Hawaiian rain forests, present a competitive threat to both koa and 'ōhi'a. However, a favorable wind perturbation pattern has maintained a dynamic equilibrium between these three dominant woody species for at least a few thousand years in the Kīlauea forest and there is no indication from our data that this will change for the next several centuries.

"However, two factors may interfere with this prediction; both could be avoided by proper management. One of these interfering factors would be a significantly higher pig population, which without any doubt would disrupt the as yet stable maintenance pattern of the tree ferns."

As pointed out under item III above, tree ferns are the most numerous of the dominant plant species in the harvest area and the large ohia trees are so widely scattered that there is no closed canopy over the tree ferns.

#### VI. Pig Damage in the Rain Forest

Cooray (1974:83-84), also writing about the IBP study site at 5,400 feet elevation, said that "in the Kilauea forest, koa seedlings were found on both logs and mineral soil. But survival chances of seedlings on mineral soil seem to be very low, as indicated by the log-soil distribution. This may be due to the rooting activity of the feral pig (Sus scrofa). Pigs destroy koa seedlings mostly by mechanical damage, by trampling or uprooting seedlings. Pigs sometimes also feed on koa root sprouts. The better establishment of koa seedlings on root collars of wind-thrown emergents may also be related to the protection the seedlings receive from pig damage. ... It could be reasonably assumed that if pig damage is eliminated the survival ratio of koa in the forest would be still more favorable. On the other hand, if pig activity is increased koa will be able to become established only on logs and the species could get rapidly thinned out. This could result in a change of the forest type from an Acacia-Metrosideros-Cibotium to a Metrosideros-Cibotium type [the type found in the tree fern harvest area now]. The

change in forest composition caused by pig digging over long periods of time is not unknown. In Europe, cases are known where high pig rooting activity has caused broad-leaved species to be replaced by spruce . . . ." Cooray added that "the native plant populations seem to be able to maintain stable populations and check the invasion of exotics into the stand. On the other hand, it can be assumed that due to the long time presence of feral pigs, the forest has changed. Because of this the forest can be better described as disclimax, meaning a climax somewhat offset from its normal expression by a stress factor (feral pigs). At the present time the carrying capacity of the forest is not known. But intensive pig rooting activity over long periods can undoubtedly cause a change in the stability relationships, bringing about a deterioration of the native montane rain forest ecosystem." Maka (1973:75-78) also discusses the role of pigs in the regeneration of the most common woody plant species at the IBP study site.

#### VII. Birds and the Kilauea and Oiaa Forest Reserves

That many species of endemic birds (including several classified as threatened or endangered) inhabit the Kilauea and Oiaa Forest Reserves, as well as surrounding areas, has been well documented (Berger, 1972a; Conant, 1975; Katahira, 1978). To the best of my knowledge, however, what are completely lacking are published studies of the breeding biology, ecology, and annual cycle of these endemic birds in this forest complex on the eastern flank of Mauna Loa. Consequently, we have virtually no acceptable evidence concerning the limiting factor or factors for any of these bird species.

The Ou (Psittirostra psittacea) is one of the rarer of the Hawaiian honeycreepers on the island of Hawaii; it has been observed on several occasions in the Olaa Forest Reserve. Nothing is known about the breeding biology of this finch-billed honeycreeper, so that we do not know whether it nests in the Olaa Forest Reserve or whether it simply feeds there. The point here is that we have no data on the relationships of the endemic forest birds to the predominant tree fern forests that make up much of the Olaa Forest Reserve and the lower portion of the Kilauea Forest Reserve where the tree ferns are being harvested.

It also should be pointed out that a large population of endemic birds inhabits the Keauhou Ranch, where large segments of the original forest have been decimated by logging, by pasturing, or by both. Conant (1975:69) wrote: "With the exception of the 'Amakihi the Acacia-Metrosideros-Cibotium montane rain forest of Kilauea Forest Reserve (Transect 91) and its logged replicate on upper Keauhou Ranch (Transect 92) were the ecological optima of endemic passerines of the east flank of Mauna Loa." If the greatly disturbed habitat of the upper Keauhou Ranch provides "optimum habitat for all endemic forest birds encountered in the study except the Pueo and the 'Amakihi" (Conant, 1975:94), it is very difficult to see how the rigidly controlled tree fern harvesting at lower elevations in the Kilauea Forest Reserve could have a serious deleterious effect either on the forest itself or on the birds that inhabit it. Actually, it would seem that the creation of some open spaces in the dense tree fern association would be desirable because koa seedlings could be planted in these openings, which also should facilitate regeneration of ohia trees. \*The presence of more koa and ohia trees in the tree fern

\*This is viewed from the standpoint of creating a better environment for the avifauna. Plantings of koa would very likely have an adverse effect on the hapu'u ecosystem, and for that reason, no plantings other than tree fern tops being scattered is recommended in the text of the Revised EIS.

association undoubtedly would make the lower portions of the Kilauea Forest Reserve much better habitat for nearly all species of Hawaiian honeycreepers. All available information indicates that ohia and koa are of far greater importance to these birds than are the tree ferns. Hence, increasing the heterogeneity of the plant species in this area should make it even more valuable as habitat for the endemic birds.

#### VIII. The Status and Future of Endangered Birds on the Island of Hawaii

During the past several years, personnel of the U.S. Fish and Wildlife Service have been conducting the most systematic and detailed censuses of all bird species found in the forests of the island of Hawaii ever attempted in Hawaii. In fact, no similar attempt has been made, so far as I know, to census all birds in comparable complicated ecosystems in any other part of the world. When these field studies are completed and the data are analyzed and published, we will, for the first time, have a good idea of the distribution and abundance of all bird species—both endemic and exotic—in the major forest areas of the island of Hawaii. This information, by itself, however, will not tell us why some species (e.g., the Apapane) are so abundant in suitable habitat and why other species (e.g., the Ou) are so rare; it undoubtedly will not tell us what the limiting factors are, or, in other words, what can be done to effect an increase in the populations of certain species so that they can be removed from their threatened or endangered status, which is the goal of each of the eight Hawaiian Recovery Teams appointed by the U.S. Fish and Wildlife Service of the Department of the Interior.

It is possible that additional species will become extinct before the information that is needed to save them can be obtained; in fact,



certain species may already be doomed to extinction regardless of any efforts to save them. In any event, it seems certain to me that we cannot expect to save some of the endangered or threatened species until we know more about their basic biology: breeding habits, ecology, and the entire annual life cycle of the species. This information can be acquired only by intensive field studies by highly competent ornithologists.

There are a number of vociferous ecological and environmental critics in Hawaii, but, except for whatever influence they have on political opinion, they add nothing to our knowledge of the interrelationships of the forests and their birdlife. It is only that knowledge that will enable us to make intelligent decisions on what should be done to preserve the unique Hawaiian birds. Fortunately, some studies are now under way. Work on bird blood diseases is now being conducted at Hawaii National Park and personnel of the U.S. Fish and Wildlife Service have placed experimental nest boxes for birds in some areas (both on Hawaii and Kauai).

To be sure, it is now generally recognized that the most sensible way to attempt to save either a plant or animal species is to do everything possible to preserve the total ecosystem. Most, if not all, of the components of any ecosystem are interdependent. In view of the history of introductions of exotic plants and animals to the Hawaiian Islands during almost two centuries, however, there probably are remaining no pristine areas such as existed before 1778.

Judging from all reports prepared by the State Division of Forestry, the tree fern harvesting in recent years has not been detrimental to the tree fern forest. In fact, the continued harvesting in this lower

portion of the Kilauea Forest Reserve would make it possible to prove the feasibility of tree fern harvesting on a sustained basis and also provide the opportunity for detailed studies of the interrelationships between native birds and the tree fern association. Some kind of management technique appears essential in nearly all, if not all, forest areas in Hawaii because of the presence of introduced mammals (e.g., pigs, rats, mongooses) and plants. The main jeep trail through the harvest area provides access to the dense tree fern association and, therefore, will facilitate both biological studies and control activities of exotic plants and animals. In the absence of such efforts, the future of endangered or threatened Hawaiian birds will be bleak, indeed. \*

#### IX. Summary Statement

1. In my opinion, the rigidly controlled (as at the present time) harvesting of selected tree fern trunks at lower elevations of the Kilauea Forest Reserve does not constitute a threat either to the tree fern association or to the birds that inhabit it.

2. If, as Mueller-Dombois (page 6 this report) wrote, dense tree fern growth presents "a competitive threat to both koa and 'ohi'a," regeneration of both koa and ohia in the tree fern association should be a desired goal because these tree species are of prime importance to the Hawaiian honeycreepers.

3. Monitoring of pig activity--and control of population size when indicated--seems advisable in all rain forests on the eastern flank of Mauna Loa in order to avoid "a deterioration of the native montane rain forest ecosystem" (Cooray, page 8 this report).

\*For the clarification of the reader, it is noted that Berger has merely stated that the roads facilitate studies in a dense forest reserve. This is not to say he advocates road building through forest reserves for study purposes.

4. Therefore, primarily because of the many introduced plants and animals in Hawaii, it seems probable that some management practices will be essential in order to prevent further degradation of all of the remnant rain forests and their endemic animal inhabitants. One cannot reasonably expect static conditions to prevail in Hawaiian biological systems that have been subjected to the devastating pressures created by the exotic plants and animals (primarily mammals) brought to the Hawaiian Islands by man.

5. Careful studies of the ecology and general biology of birds-- both endemic and introduced--in the tree fern association of the lower portion of the Kilauea Forest Reserve and the Oloa Forest Reserve are badly needed.

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EXHIBIT III

Economic Estimate of the Hapu'u Industry  
and the Affected Flower Industry\*

Prepared by T. Y. Goo

Hapu'u sales: (Niu Nursery figures only)

55,000 cubic feet  
(This amount represents the average amount of hapu'u harvested over the past several years.)

\$6.75 per cubic feet (retail outlets sell the hapu'u normally between \$6.49 to \$6.99 per cubic feet)

55,000 x \$6.75 = \$371,250.00 per year

Sales of flowers and plants in the hapu'u (as the potted medium)

<u>Flower/Product</u> <sup>1</sup>	<u>Hawaii</u>	<u>Kauai</u>	<u>Maui</u>	<u>Oahu</u>		
Cattleyas	\$3,000			\$51,000	=	\$58,000.00
Cymbidiums	\$136,000				=	136,000.00
Other cut orchids	\$38,000			\$6,000	=	44,000.00
Joaquim	\$448,000	\$3,000		\$24,000	=	475,000.00
Potted plants	\$115,000		\$122,000	\$280,000	=	517,000.00
Vanda leis		\$3,000			=	3,000.00
Orchids			\$3,000		=	3,000.00
Dendrobiums, sprays				\$141,000	=	141,000.00
				TOTAL	=	<u>\$1,373,000.00</u>
Estimated sales of backyard growers (all islands)				TOTAL	=	<u>\$ 750,000.00</u>

Anthuriums

Approximately 20% of the anthurium growers on all islands use hapu'u \* = \$499,000.00

Total of all hapu'u related flower/plant sales = \$2,622,000.00

Taxes generated by hapu'u sales and flower/plant sales

Hapu'u sales \$371,250.00  
Flower sales \$2,622,000.00  
(These flowers are planted in hapu'u)  
Total \$2,993,250 or rounded to \$3,000,000

\$3,000,000.00 x 4% retail tax = \$112,000.00  
\$3,000,000.00 x .5% wholesale tax = 15,000.00

<sup>1</sup> Statistics from the Hawaii Agricultural Reporting Service, Taxes paid to the State \$127,000.00  
"Statistics of Hawaiian Agriculture from sale of hapu'u  
1976". and flower related industry

\*The demise of the hapu'u industry will have some impact on the flower industry; the extent of this impact is unknown and would depend on factors such as the availability and cost of substitute potting mediums, additional or a change in labor requirements due to the change in potting mediums and altered procedures for potting, and the length of the transition period.

EXHIBIT IV

SUMMARY OF COMMENTS ON THE CONSERVATION CONDITIONAL USE PERMITS  
FOR THE PROPOSED PROJECT, 1971 AND 1978, AS PREPARED IN THE  
DLNR PLANNING OFFICE REPORTS



State of Hawaii  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
Honolulu, Hawaii

October 8, 1971

Board of Land and  
Natural Resources  
State of Hawaii  
Honolulu, Hawaii

Gentlemen:

Conservation District Use Application  
for Hapuu Harvesting Use at Kulani,  
Hawaii, by Bernice P. Bishop Estate  
(HA-71/4/16 - 192)

\*APPLICANT: Bernice P. Bishop Estate  
519 Halekauwila Street  
Honolulu, Hawaii 96813

USE REQUESTED: Hapuu Harvesting

LOCATION: Volcano, Hawaii, TMK: 9-9-01:07

AREA: Approximately 2,956 Acres

BACKGROUND: The application for Hapuu Harvesting Use within the Kilauea Forest Reserve was submitted to the department on April 16, 1971. The proposed harvest area is within the Conservation District General Use Subzone, and the Use is one of the permitted uses within this subzone.

DESCRIPTION  
OF AREA:

The area requested for harvesting use involves approximately 2,956 acres within the Kilauea Forest Reserve located about 2 miles mauka of the Kilauea Military Camp.

The area is a narrow, elongated parcel, about seven miles long, and about one mile at the widest point. It abuts farm lots at the south east side. On the north-western parcel are areas presently being logged for koa. The western and northern side of the area are lands presently being used for grazing. On the eastern portion of the area are native forest areas. About one mile to the east is an area under E. O. to the National Park.

Vegetation of the lower portion of the parcel consists of native ohia and koa overstory, and an understory of hapuu, lobelia, olapa and other scrubby native trees. The upper portions of the area has low scrubby ohia and does not contain merchantable tree fern.

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Soil of the proposed harvest area includes lithosol, regosol and reddish-brown. The edaphic features vary from almost bare "aa" to deep reddish brown soil. Average rainfall is about 90 inches and the area is frequently foggy.

Access to the area is through Wright Road Extension.

DESCRIPTION OF PROPOSED USE:

The applicant proposes to divide the subject area into four blocks of approximately 700 acres each. Block one, the makai most area, will be harvested first. Harvest in this block will supply enough hapuu material for a term of five-seven years. It is anticipated that 100-150 acres will be harvested per year.

The harvest license between B. P. Bishop Estate and Niu Nursery is for a term of 20 years terminating in 1986. The terms of the license will permit construction of an access road, sheds and other structures reasonably necessary for operations.

The applicant proposes to selectively harvest only mature and fallen fern. All young and immature fern will not be touched and all fern tops will be left to regenerate new fern plants.

Only light equipment will be used in the harvest operations. Chain saws will be used to cut mature and fallen logs into chips. A small tractor, such as a D-4 tractor mover, will be used to sled out the fern chips and logs.

Prior to the submission of this application, an area of approximately 10-12 acres was cleared by Niu Nursery. The area cleared was for access and equipment storage purposes.

All work was stopped when Niu Nursery was apprised of the need to obtain a Use Permit from this department in March, 1971.

SUMMARY OF COMMENTS RECEIVED:

The Hawaii County Planning Department states that:

1. Little is known of the rate of growth or productivity of tree ferns.
2. Harvesting activities will initiate irreversible ecological changes to the area and it will be impossible to preserve or restore the area to its present condition.
3. There is a unique koa forest at the upper end of the proposed harvest area.

They recommend that:

1. The request for harvesting use be denied.

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2. Harvesting be done in areas where large-scale land clearing is anticipated.
3. Studies be undertaken to learn more about the tree fern and the possibility of cultivation of tree ferns.
4. The subject area be considered for permanent protection by such means as land acquisition, land exchange, lease or by encouraging the rededication of this parcel to the State Forest Reserve System.
5. Commercial harvesting of tree ferns not be permitted in any area of the Conservation District supporting a relatively intact native forest.

The County of Hawaii's Department of Water Supply, State Dept. of Health, DLNR Divisions of Land Management and Water and Land Development have no objections to the proposed use.

The Division of State Parks recommends approval of a portion of the area only.

They suggest that further increments be granted only after the applicant's harvesting operations have been observed to be satisfactory from the standpoint of maintaining and perpetuating the forest.

The Division of Fish and Game states that the subject area is a fairly important habitat for native forest birds. However, none of these birds are among rare and endangered species. Endangered species have been observed in areas adjacent to the proposed area and may possibly occur in the subject area. They state that from the standpoint of bird preservation, it would be desirable to leave the area undisturbed. However, if harvesting is permitted, they urge that the Division of Forestry's recommendations be adopted.

The Division of Forestry recommends approval of the application subject to the following:

1. The Applicant shall submit:
  - a. An agreement on the location of the harvesting units.
  - b. A harvesting schedule.
  - c. A soil erosion and fire protection plan.
  - d. The specification of a merchantable tree fern.
  - e. The utilization standard to be practiced.
2. The use shall be terminated by the department if the applicant does not abide by the conditions imposed in granting the use.

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3. Department personnel shall have access to the area for enforcement and inspection purposes.
4. The applicant shall meet all State and County law, ordinances and regulations.

The Hawaii Volcanoes National Park Service states that the proposed harvest area is a portion of one of the still intact and sizeable, primitive rain forest environments. The area is recognized by the Society of American Foresters as outstanding and worthy of wilderness - type preservation. They express their concern regarding the adverse impact on the ecology of the Kilauea Forest Reserve and adjoining areas that would occur if the entire area is harvested. They suggest that the harvest area be limited and other requirements be imposed such as:

1. Requiring the applicant to replant the harvested lands with appropriate indigenous forest species to aid in regeneration.
2. Allowing the applicant to harvest only mature hapuu.
3. Staggering the harvest program.

The Office of Environmental Quality states that while hapuu harvesting is a perfectly legitimate and worthwhile activity, there is a potential threat of serious environmental consequence. They suggest that the Forestry Division develop reasonable requirements whereby harvesting would be on a selected basis and conducted in such a manner so as to minimize unnecessary disturbances to the environment.

Congresswoman Patsy T. Mink states her concern about the proposed harvesting use. She requests that the permit be denied pending a competent investigation of possible detrimental effects to the natural environment that would result from the harvesting use.

Senator Nadao Yoshinaga requests that serious consideration be given to Drs. Otto and Isa Degner's concerns regarding the the affect of hapuu harvesting on the environment.

Dieter Mueller-Dombois, Scientific Coordinator of the Hawaii International Biological Program;  
Andrew J. Berger, co-director of the IBP; and

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Mr. J. Linsley Gresset, Chairman of the Natural Area Reserves System Commission state that the IBP is presently conducting intensive research studies in the area. The studies have revealed that the Kilauea Forest is the habitat of several endangered species of birds. The proposed harvesting may cause these birds to recede further into the forest area. The harvesting may also open the area to invasion by exotic plants. They suggest the establishment of hapuu farming as an alternative to harvesting from forest areas. (Please note subsequent letter to Mr. Carlson dated Aug. 31, 1971.)

Dr. Otto Degener opposes the proposed harvesting. He believes that the harvesting will wipe out the hapuu, wreck aesthetic values, change the climate of the area, curtail the artesian water supply and wipe out scientific values of the area. He suggests that the area be acquired by either the Federal or State governments.

The Hawaii Audubon Society opposes the hapuu harvesting use. They state that the harvesting could destroy the significant and valuable native forest ecosystem. Once disturbed, the area will be invaded by undesirable exotic plants. They suggest that the area be preserved and protected as one of the few remaining near-virgin forest environments of its type in the area; and that the already disturbed forests in non-conservation areas east of the Kilauea Forest Reserve be used for harvesting instead.

Friends of the Earth opposes the proposed use. They recommend saving the intact virgin forest which contains rare tree fern growth and large mature koa stands, duplicated nowhere else. They suggest that Bishop Estate consider selling the land to the Nature Conservancy.

**SUMMARY OF PUBLIC HEARING:**

In accordance with Act 264, 1969 SLH, a public hearing was held on August 13, 1971, to receive testimony on the application.

Mr. Norman Carlson testified on behalf of Bishop Estate. He made the following statements:

In 1970, the Trustees authorized a study of the biotic problems of the Kilauea Forest Reserve, and a \$5,000 grant was given to the International Biological Program. In 1971, the IBP recommended that a comprehensive ecological study of the area be made, from which the trend of vegetative development could be determined. The study is presently underway.

This area was selected for harvesting because:

1. Niu Nursery has spent considerable money for access to these lands.
2. The forest is decadent and will not revitalize under present conditions. The proposed hapuu harvesting will give the koa and ohia trees a chance to reseed and grow. This will also improve the bird habitat, since hapuu is of little use to birds and koa and ohia are their main food sources.
3. With access to the area, from the harvesting operations, exotic weed growth can be controlled.

Bishop Estate recommends the following revision of the harvest license:

1. Limit the harvest area to 200 acres. At the end of five years, review the harvest operations to determine the effects on the forest.
2. Require that non-usable hapuu materials be left for regrowth of the forest.
3. Require that noxious plants be eliminated from the area.
4. Require that the licensee obtain assistance from the Division of Forestry where regrowth is not adequate.
5. Install sample fenced plots for scientific evaluation of the harvesting.
6. Require that only hapuu be harvested.
7. Allow pig hunting in the area to be regulated by the Hawaii Fish and Game (no hunting in the area at present).

Mr. Sidney Goo, Vice President and General Manager of Niu Nursery, stated the need of the flower growing industry for hapuu media. He stated that the subject area has hapuu which is ideal for potting media use. Mr. Goo also gave details of the proposed harvest operations (included in the description of the use section of this report). He stated that their present harvest operations have not been done on a selective basis since they have an agreement with private landowners to remove all vegetation from the land.

Representatives of the flower industry testifying in favor of the proposed use were: Mr. Richard Kirtch, President and General Manager, William Kirtch Orchids; Mr. Masatoshi Miyamoto, M. Miyamoto Orchids. All supported the proposed use on the basis that the hapuu media is needed for the Flower Industry. They stated that hapuu is the best potting media there is, and it is important for the Flower Industry to be able to grow top quality plants to compete with other flower growers in the world.

TESTIMONIES AGAINST THE PROPOSED USE:

Mr. Robert Chase, representing Life of the Land, stated that the forest area should be kept intact and available for public enjoyment. He suggested that adjacent lands already cleared be used to study hapuu regeneration.

Mr. Roger Baldwin, representing the Hawaii Chapter of the Conservation Council stated they are opposed to the Use on the basis that:

1. The harvesting will destroy a unique native forest which has scientific and aesthetic values;
2. Once harvested, the area will be invaded by other plants and the hapuu will not regenerate;
3. The area is the habitat of the rare o'u bird and is unique in that it is only inhabited by native birds;
4. The forest is part of the Hawaiian cultural heritage;
5. The area is part of the Hilo watershed;
6. The Use will alter the soils of the area;
7. Road construction costs incurred by the licensee do not justify allowing the harvesting use.

They suggest that the area be exchanged with State Land elsewhere.

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Other persons testifying against the proposed use were: Mr. Fred Bianci, U. H. Entomologist; Mr. Ted Hickie, former Park Service Ranger; Mr. Herbert Shipman, hapuu collector; Prof. Millicart, University of Hawaii; Mr. John Tan, former forester; Mr. Al Galworthy, electrical engineer; Mrs. Helen Baldwin; and Prof. Carson, U. of H.

Generally, objections were based on the following:

1. The applicant's past harvesting operations have not been done on a controlled and selective basis.
2. Exotic weeds will enter the area once the area is harvested.
3. The hapuu will never regenerate to its original condition.
4. The area is a virgin, unique hapuu forest and should be preserved for scientific and aesthetic purposes.
5. The area is part of the Hilo watershed.
6. Harvesting will tend to create soil erosion in the area.
7. Rare plants may exist in the harvest area.
8. Hapuu should be farmed rather than harvested from natural forest areas.
9. There are other adjacent areas from which hapuu could be harvested.
10. Very little is known about hapuu regeneration.
11. The orchid industry can find other substitutes for hapuu.

**NEW INFORMATION:**

Following the public hearing, Bishop Estate submitted a synopsis of their discussion with Dr. F. Raymond Fosberg (Research Botanist) regarding the proposed hapuu harvesting.

Dr. Fosberg made the following statements:

1. The hapuu forest is not decadent but is probably stable at the pre or post climax level.
2. Very little is known about hapuu, however, it does have certain unusual characteristics which make it of particular value.



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3. Should substantial quantities of hapuu be removed, it is likely that some exotics would take over and a control program would have to be instituted.
4. All the 3,000 acres should not be harvested.
5. A study should be undertaken to determine what happens to the eleven acres already cleared.

Although Dr. Rosberg could not state whether the proposal to harvest 200 acres with care and with following-up studies, was a good one, he stated that if this alternative were selected, he would be willing to make an on-site study, time permitting, to develop guidelines.

**CONCLUSIONS:**

Strong objections have been raised against the proposed harvesting use on the basis that:

The area is a unique hapuu forest which should be preserved for scientific and aesthetic purposes; harvesting will have an adverse effect on the area as a habitat for rare and endangered species, as well as native birds; the climatic conditions of the area will be changed by harvesting; harvesting will have an adverse effect on the use of the area as a watershed; very little is known about hapuu regeneration, and harvesting may cause irreparable damage to the hapuu forest and adjoining areas; as an alternative to harvesting natural forest areas, the possibility of hapuu farming should be investigated and the flower industry should search for substitutes for hapuu.

It has been stated that the area is a unique hapuu forest and should be acquired for scientific and aesthetic purposes. Information available indicates, however, that there are other similar hapuu forests in the area. Also, approximately four miles from the subject area is a 2,600 acre forest area which is proposed for inclusion within the Natural Area Reserve System, and about 3/4 miles away, is a 9,655 forest area set aside to the National Park. There are no known programs to acquire this area.

Concern has been expressed that harvesting will destroy the forest and that regeneration will not occur. Testimonies received indicate a consensus of opinion that little is known about the growth patterns of hapuu and that more detailed studies are required in this area. The Division of Forestry

has conducted preliminary studies on hapuu growth. They have found that hapuu does regrow, if tops are left in the area. The Division of Forestry is of the opinion that selective harvesting under controlled conditions can be undertaken without adversely affecting the forest. It is pointed out that previous hapuu harvesting, observed by persons who have testified against the harvest use, was not carried out under controlled conditions, or on a selective harvesting basis.

The applicant has indicated willingness to reduce the proposed harvest area to a test plot, in order that the results of commercial hapuu harvesting can be studied, before other areas are committed to this use. It is staff's opinion that test harvesting under controlled conditions will yield valuable information regarding the growth patterns of hapuu, as well as provide important data about the feasibility of controlled commercial hapuu harvesting.

The possibility of commercial harvesting of our hapuu forest should be examined, particularly in view of the importance of hapuu products as a growing media for a major segment of our flower industry (orchid and anthurium).

It has been stated that the flower industry should seek substitutes for hapuu media so our hapuu forests can be left intact. Representatives from the local flower industry have pointed out however, that hapuu makes a particularly good potting media, for which no comparable substitute has been found. They state that hapuu as a potting media is one of the elements which enables them to raise top quality flowers and remain competitive in the market.

It has not been conclusively determined that rare and endangered bird species inhabit the hapuu forest. Expert opinion indicates that birdlife seek tree forests and do not thrive on hapuu. Also, it is the opinion of the Division of Fish and Game that under controlled harvesting conditions, adverse effects to any type of birdlife in the area can be minimized.

It has been stated that the subject area is part of the upper Hilo watershed and harvesting will adversely affect the water supply of the area. Discussion with DOWALD, and the County Board of Water Supply's comments indicate that the proposed harvest use will not adversely affect the water sources of the area. Under controlled conditions, soil erosion problems will also be minimized.

Based on available information, it is staff's opinion that the climate of the area will not be affected by the use if harvesting is controlled and large areas are not denuded.

Based on these considerations, staff is of the opinion that it is important that the Division of Forestry conduct field research to learn more about our hapuu forest, and test the feasibility of commercial hapuu harvesting without destroying the character of our hapuu forests. The applicant's proposal to harvest on a small test scale, presents an excellent opportunity to gain basic data in these areas.

**RECOMMENDATION:**

In view of the above conclusions, it is staff's recommendation that, of the total 2,956 acres requested by Bishop Estate for the harvesting use, the Board approve an area of approximately 150 acres only, and that this area be harvested under controlled conditions for the purpose of obtaining data on the regrowth of hapuu, and to determine the feasibility of commercial harvesting of our hapuu forest areas without damaging them.

It is also recommended that this area be located in the makai sector of the proposed harvesting area, as shown on the attached map.


It is further recommended that this approval be made subject to the following conditions:

1. The user shall maintain a 100 ft. wide buffer zone on the makai, eastern and western borders of the harvest area.
2. Only mature hapuu, as defined by the Division of Forestry, will be harvested. No tops shall be taken.
3. The user shall notify the Dept. of Land and Natural Resources prior to initiation of harvesting operations and upon completion of harvesting operations.
4. Prior to initiating harvest operations, the user shall submit a harvesting plan to the Division of Forestry for approval.
5. All trails for the harvesting use shall be subject to Division of Forestry approval, and use of heavy equipment shall be limited to trails selected by the Division of Forestry.
6. Heavy equipment to be used in the harvest operations shall be limited to one D-4 type tractor for skidding out fern chips and logs.
7. The Division of Forestry shall closely supervise all harvesting work.
8. The Division of Forestry shall monitor the effect of the harvesting on forest regeneration and noxious infestation.


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9. The Division of Fish and Game shall monitor the effect of harvesting on birdlife in the area.
- 10.. DLNR personnel shall have free access to the area for enforcement and inspection purposes.
11. The user shall replant harvested areas with fern tops and appropriate plants to aid in regeneration, as directed by the Division of Forestry.
12. All debris from the harvest operations shall be removed to approved disposal sites.
13. The user shall submit a \$5,000 performance bond to the Dept. of Land and Natural Resources to insure compliance with the conditions of this permit.
14. At any time, should it appear that the user is not carrying out the provisions of the permit, or that the harvesting is causing destruction of the forest, all work shall be stopped immediately, and immediate remedial measures shall be taken.
15. The permit shall be revoked should it be shown that harvesting is adversely affecting the hapuu forest.
16. The user shall adhere to all applicable Federal, State and County laws, regulations, and ordinances.

Respectfully submitted,

  
GORDON SOH, Program Planning  
Coordinator

RECOMMENDED FOR APPROVAL

  
SUNAO KIDO, Chairman



JOHN A. BURNS  
GOVERNOR OF HAWAII



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 621  
HONOLULU, HAWAII 96809

December 29, 1971

DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

REF: HA-71/4/16-192

FINDINGS OF FACT AND DECISION AND ORDER  
CONSERVATION DISTRICT APPLICATION FROM BISHOP ESTATE

I. THE APPLICATION

An application for hapuu harvesting use at Volcano, Hawaii, was submitted by Bishop Estate on April 16, 1971.

A public hearing was held by the Board on August 13, 1971, in accordance with Section 183-41, Hawaii Revised Statutes, as amended by Act 264, 1969 SLH.

II. FINDINGS OF FACT

On the basis of the evidence presented, the Board finds:

1. Use Requested: Hapuu Harvesting
2. Location: Within the Kilauea Forest Reserve, about 2 miles mauka of the Kilauea Military Camp at Volcano, Hawaii, TMK: 9-9-01:07.
3. Area: Approximately 2,956 acres.
4. Subzone: General Use. The Use Requested is one of the permitted uses within this subzone.
5. Landowner: Bishop Estate
6. Description of Area:

The area is a narrow, elongated parcel, about seven miles long, and about one mile at the widest point. It abuts farm lots at the south east side. On the north-west are areas presently being logged for kca. The western and northern side of the area are lands presently being used for grazing. On the eastern portion of the area are native forest areas. About one mile to the east is an area under E.O. to the National Park.

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Vegetation of the lower portion of the parcel consists of native ohia and koa overstory, and an understory of hapuu, lobelia, olapa and other scrubby native trees. The upper portions of the area has low scrubby ohia and does not contain merchantable tree fern.

Soil of the proposed harvest area includes lithosol, regosol and reddish-brown soil. Average rainfall is about 90 inches and the area is frequently foggy.

Access to the area is through Wright Road Extension.

7. Description of Proposed Use:

The applicant proposes to divide the subject area into four blocks of approximately 700 acres each. Block one, the makai-most area, will be harvested first. Harvest in this block will supply enough hapuu material for a term of five to seven years. It is anticipated that 100-150 acres will be harvested per year.

The harvest license between B.P. Bishop Estate and Niu Nursery is for a term of 20 years terminating in 1986. The terms of the license will permit construction of an access road, sheds and other structures reasonably necessary for operations.

The applicant proposes to selectively harvest only mature and fallen fern. All young and immature fern will not be touched and all fern tops will be left to regenerate new fern plants.

Only light equipment will be used in the harvest operations. Chain saws will be used to cut mature and fallen logs into chips. A small tractor, such as a D-4 tractor mover, will be used to sled out the fern chips and logs.

Prior to the submission of this application, an area of approximately 10-12 acres was cleared by Niu Nursery. The area cleared was for access and equipment storage purposes.

All work was stopped when Niu Nursery was apprised of the need to obtain a Use Permit from this department in March, 1971.

8. Representatives of the flower industry testifying in favor of the proposed use were: Mr. Richard Kirtch, President and General Manager, William Kirtch Orchids; Mr. Masatoshi Miyamoto, M. Miyamoto Orchids. All supported the proposed use on the basis that the hapuu media is needed for the flower industry. They stated that hapuu is the best potting media there is, and it is important for the flower industry to be able to grow top quality plants to compete with other flower growers in the world.

The County of Hawaii Dept. of Water Supply; Dept. of Health; and the Divisions of Land Management and Water and Land Development of DLNR, have no objections to the proposed use.

The Hawaii Volcanoes National Park Service, and Divisions of State Parks, Forestry, and Fish and Game of DLNR, recommend approval of only a portion of the area requested for harvesting use, subject to various conditions of use.

The Hawaii County Planning Department; Congresswoman Patsy Mink; Dr. Otto Degener; the Hawaii Audubon Society; Friends of the Earth; Life of the Land; Hawaii Chapter of the Conservation Council; Dieter Mueller-Dombois (Scientific Coordinator of the Hawaii International Biological Program); Andrew J. Berger (Co-Director of the IBP); and Mr. J. Linsley Gresset (Chairman of the Natural Area Reserves System Commission), object to the proposed use.

Other persons objecting to the proposed use were: Mr. Fred Bianci, U. H. Entymologist; Mr. Ted Hickie, former Park Service Ranger; Mr. Herbert Shipman, hapuu collector; Prof. Millicart, U. of H.; Mr. John Tan, former forester; Mr. Al Calworthy, electrical engineer; Mrs. Helen Baldwin, and Prof. Carson, U. of H.

Generally, objections were based on the following:

- a. The applicant's past harvesting operations have not been done on a controlled and selective basis.
- b. Exotic weeds will enter the area once the area is harvested.
- c. The hapuu will never regenerate to its original condition.
- d. The area is a virgin, unique hapuu forest and should be preserved for scientific and aesthetic purposes.
- e. The area is part of the Hilo watershed.
- f. Harvesting will tend to create soil erosion in the area.



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- g. Rare plants may exist in the harvest area.
- h. Hapuu should be farmed rather than harvested from natural forest areas.
- i. There are other adjacent areas from which hapuu could be harvested.
- j. Very little is known about hapuu regeneration.
- k. The orchid industry can find other substitutes for hapuu.

Other persons commenting on the proposed use included Senator Nadao Yoshinaga; the Office of Environmental Quality; and Dr. F. Raymond Fosberg.

9. At the public hearing, Mr. Norman Carlson testified on behalf of Bishop Estate and made the following statements:

In 1970, the Trustees authorized a study of the biotic problems of the Kilauea Forest Reserve, and a \$5,000 grant was given to the International Biological Program. In 1971, the IBP recommended that a comprehensive ecological study of the area be made, from which the trend of vegetative development could be determined. The study is presently underway.

Mr. Carlson stated that this area was selected for harvesting because:

- a. Niu Nursery has spent considerable money for access to these lands.
- b. The forest is decadent and will not revitalize under present conditions. The proposed hapuu harvesting will give the koa and ohia trees a chance to reseed and grow. This will also improve the bird habitat, since hapuu is of little use to birds and koa and ohia are their main food sources.
- c. With access to the area, from the harvesting operations, exotic weed growth can be controlled.

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He recommended the following revision of the harvest license:

- a. Limit the harvest area to 200 acres. At the end of five years, review the harvest operations to determine the effects on the forest.
- b. Require that non-usable hapuu materials be left for regrowth of the forest.
- c. Require that noxious plants be eliminated from the area.
- d. Require that the licensee obtain assistance from the Division of Forestry where regrowth is not adequate.
- e. Install sample fenced plots for scientific evaluation of the harvesting.
- f. Require that only hapuu be harvested.
- g. Allow pig hunting in the area to be regulated by the Hawaii Fish and Game (no hunting in the area at present).

Mr. Sidney Goo, Vice President and General Manager of Niu Nursery, stated the need of the flower growing industry for hapuu media. He stated that the subject area has hapuu which is ideal for potting media use. Mr. Goo also gave details of the proposed harvest operations (included in the description of the use section of this report). He stated that their present harvest operations have not been done on a selective basis since they have an agreement with private landowners to remove all vegetation from the land.

### III. DECISION AND ORDER

Strong objections have been raised against the proposed harvesting use on the basis that:

The area is a unique hapuu forest which should be preserved for scientific and aesthetic purposes; harvesting will have an adverse effect on the area as a habitat for rare and endangered species, as well as native birds; the climatic conditions of the area will be changed by harvesting; harvesting will have an adverse effect on the use of the area as a watershed; very little is known about hapuu regeneration, and harvesting may cause irreparable damage to the hapuu forest and adjoining areas;

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as an alternative to harvesting natural forest area, the possibility of hapuu farming should be investigated and the flower industry should search for substitutes for hapuu.

It has been stated that the area is a unique hapuu forest and should be acquired for scientific and aesthetic purposes. Information available indicates, however, that there are other similar hapuu forests in the area. Also, approximately four miles from the subject area is a 2,600 acre forest area which is proposed for inclusion within the Natural Area Reserve System, and about 3/4 miles away, is a 9,655 forest area set aside to the National Park. There are no known programs to acquire this area.

Concern has been expressed that harvesting will destroy the forest and that regeneration will not occur. Testimonies received indicate a consensus of opinion that little is known about the growth patterns of hapuu and that more detailed studies are required in this area. The Division of Forestry has conducted preliminary studies on hapuu growth. They have found that hapuu does regrow, if tops are left in the area. The Division of Forestry is of the opinion that selective harvesting under controlled conditions can be undertaken without adversely affecting the forest. It is pointed out that previous hapuu harvesting, observed by persons who have testified against the harvest use, was not carried out under controlled conditions, or on a selective harvesting basis.

The applicant has indicated willingness to reduce the proposed harvest area to a test plot, in order that the results of commercial hapuu harvesting can be studied, before other areas are committed to this use. It is the Board's opinion that test harvesting under controlled conditions will yield valuable information regarding the growth patterns of hapuu, as well as provide important data about the feasibility of controlled commercial hapuu harvesting.

The possibility of commercial harvesting of our hapuu forest should be examined, particularly in view of the importance of hapuu products as a growing media for a major segment of our flower industry (orchid and anthurium).

It has been stated that the flower industry should seek substitutes for hapuu media so our hapuu forests can be left intact. Representatives from the local flower industry have pointed out however, that hapuu makes a particularly good potting media, for which no comparable substitutes has been found. They state that hapuu as a potting media is one of the elements which enables them to raise top quality flowers and remain competitive in the market.

It has not been conclusively determined that rare and endangered bird species inhabit the hapuu forest. Expert opinion indicates that birdlife seek tree forests and do not thrive on hapuu. Also, it is the opinion of the Division of Fish and Game that under controlled harvesting conditions, adverse effects to any type of birdlife in the area can be minimized.

It has been stated that the subject area is part of the upper Hilo watershed and harvesting will adversely affect the water supply of the area. DOWALD and the County Board of Water Supply indicate that the proposed harvest use will not adversely affect the water sources of the area. Under controlled conditions, soil erosion problems will also be minimized.

Based on available information, it is the Board's opinion that the climate of the area will not be affected by the use if harvesting is controlled and large areas are not denuded.

Based on these considerations, the Board is of the opinion that it is important that the Division of Forestry conduct field research to learn more about our hapuu forest, and test the feasibility of commercial hapuu harvesting without destroying the character of our hapuu forests. The applicant's proposal to harvest on a small test scale, presents an excellent opportunity to gain basic data in these areas.

In view of the above conclusions, it is the Decision of the Board of Land and Natural Resources to approve , of the total 2,956 acres requested by Bishop Estate for the harvesting use, an area of approximately 150 acres only. This area shall be harvested under controlled conditions for the purpose of obtaining data on the regrowth of hapuu, and to determine the feasibility of commercial harvesting of our hapuu forest areas without damaging them.

This area shall be located in the makai sector of the proposed harvesting area, as shown on the attached map.

The decision of the Board for approval shall be subject to the following conditions:

1. The user shall maintain a 100 ft. wide buffer zone on the makai, eastern and western borders of the harvest area.
2. Only mature hapuu, as defined by the Division of Forestry, will be harvested. No tops shall be taken.
3. The user shall notify the Dept. of Land and Natural Resources prior to initiation of harvesting operations and upon completion of harvesting operations.
4. Prior to initiating harvest operations, the user shall submit a harvesting plan to the Division of Forestry for approval.
5. All trails for the harvesting use shall be subject to Division of Forestry approval, and use of heavy equipment shall be limited to trails selected by the Division of Forestry.
6. Heavy equipment to be used in the harvest operations shall be limited to one D-4 type tractor for skidding out fern chips and logs.
7. The Division of Forestry shall closely supervise all harvesting work.
8. The Division of Forestry shall monitor the effect of the harvesting on forest regeneration and noxious infestation.
9. The Division of Fish and Game shall monitor the effect of harvesting on birdlife in the area.
10. DLNR personnel shall have free access to the area for enforcement and inspection purposes.
11. The user shall replant harvested areas with fern tops and appropriate plants to aid in regeneration, as directed by the Division of Forestry.
12. All debris from the harvest operations shall be removed to approved disposal sites.

13. The user shall submit a \$5,000 performance bond to the Dept. of Land and Natural Resources to insure compliance with the conditions of this permit.
14. At any time, should it appear that the user is not carrying out the provisions of the permit, or that the harvesting is causing destruction of the forest, all work shall be stopped immediately, and immediate remedial measures shall be taken.
15. The permit shall be revoked should it be shown that harvesting is adversely affecting the hapuu forest.
16. The user shall adhere to all applicable Federal, State and County laws, regulations, and ordinances.

I hereby certify that this is the Findings of Fact and Decision and Order rendered by the Board of Land and Natural Resources on October 8, 1971.

Dated at Honolulu, Hawaii, this 20<sup>th</sup> day of December 1971.

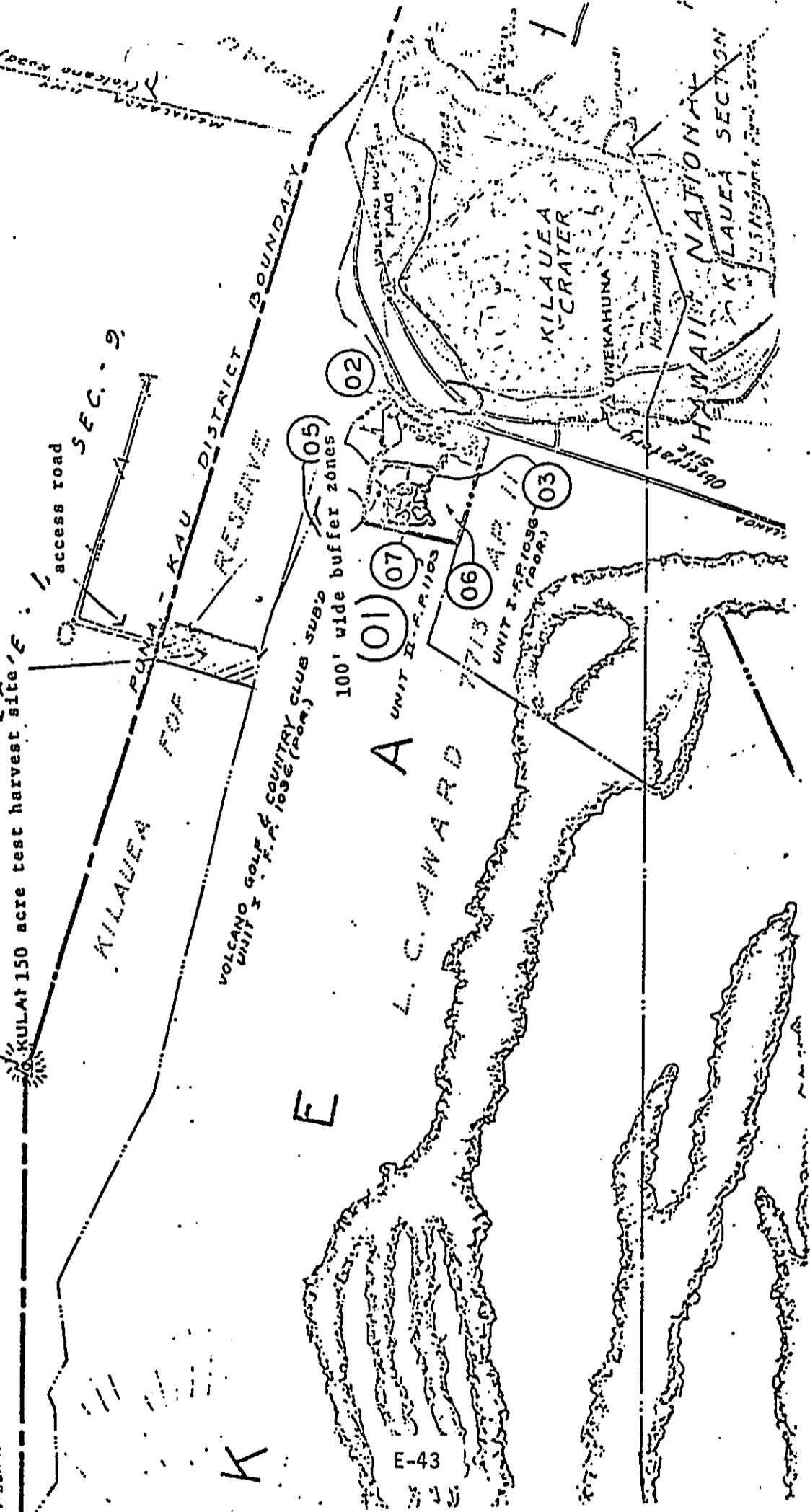
BOARD OF LAND AND NATURAL RESOURCES

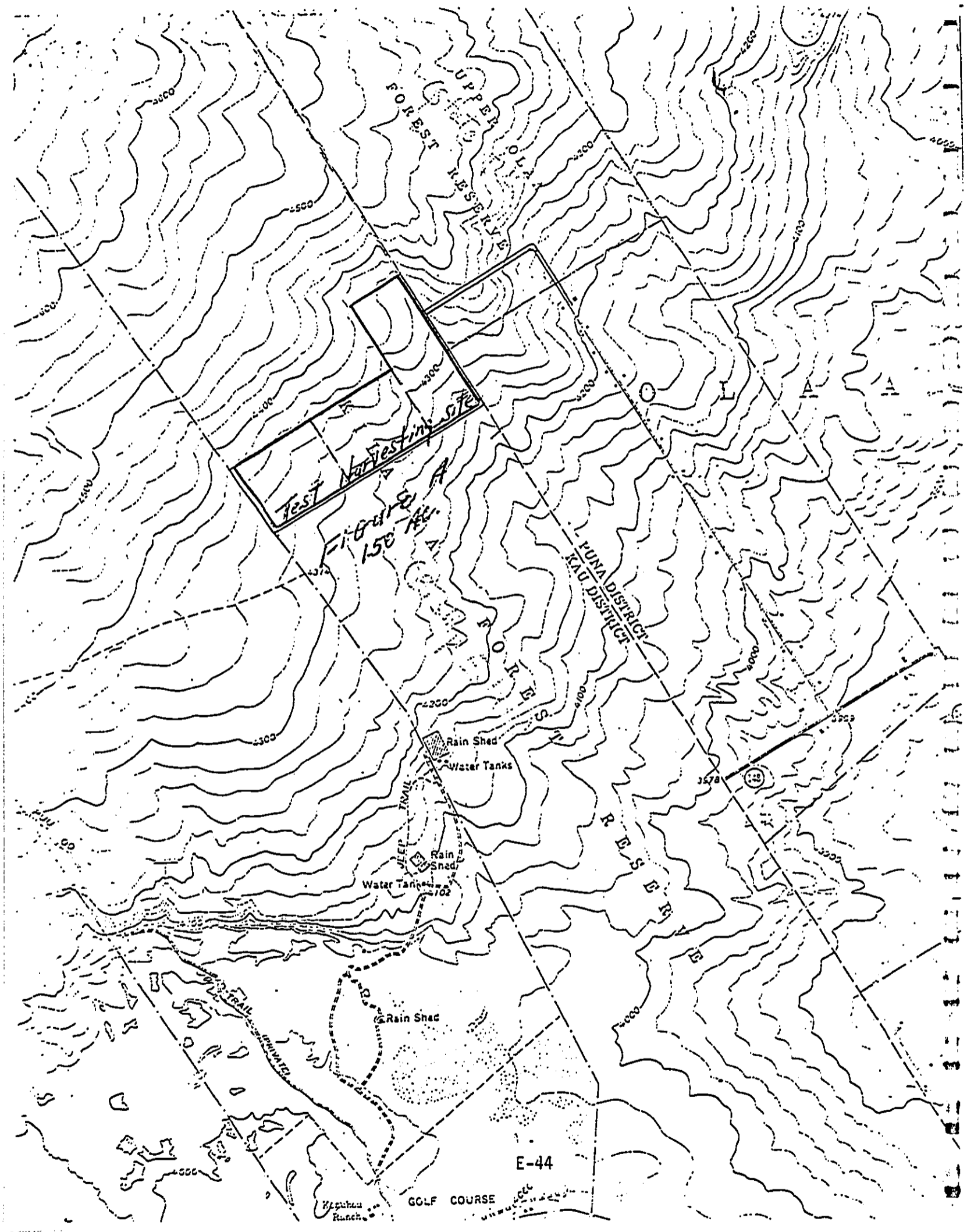


SUNAO KIDO  
Chairman and Member

SOUTH HILO  
- 2, SEC. - 4, PLAT 08  
14' M. I. M. E. A.

HAWAII PRISON

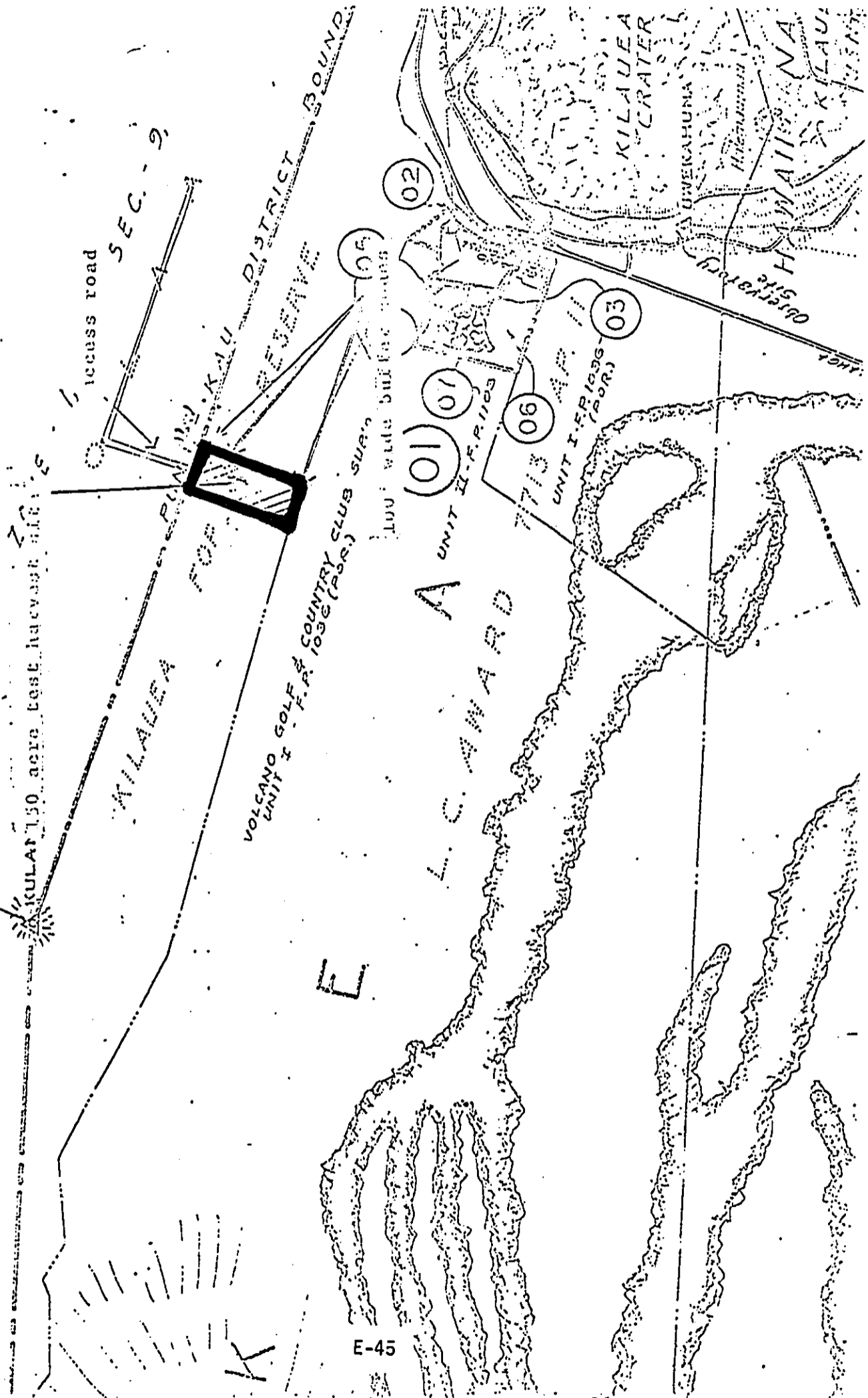






SOUTH HILO  
2, SEC. - 4, PLAT 08  
WAILAUEA

KILAUEA PRISON



GEORGE R. ARIYOSHI  
GOVERNOR OF HAWAII



RECEIVED  
BISHOP ESTATE  
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STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PLANS  
WATER AND LAND DEVELOPMENT

P. O. BOX 421  
HONOLULU, HAWAII 96809

REF: HA-5/12/78-1054  
Expiration Date: 11/8/78

July 27, 1978

*Photo Attached  
111*

Board of Land and  
Natural Resources  
State of Hawaii  
Honolulu, Hawaii

Gentlemen:

SUMMARY

Conservation District Use Application  
for Private Recreational Use for  
Commercial Logging Operations and Portable Sawmills  
Kilauea Crater, Kau, Hawaii

APPLICANT: Kamehameha Schools/Bishop Estate  
519 Halekauwila Street  
Honolulu, Hawaii 96813

USE REQUESTED: Hapu'u harvesting operations.

LOCATION: Portion of TMK 9-9-01: 7

AREA OF PARCELS: Not applicable.

AREA OF USE: 300 Acres.

SUBZONE: General Use.

DESCRIPTION OF AREA:

As shown on Exhibits "A" and "B"

The area of the proposed use is situated in the Kilauea Forest Reserve on the island of Hawaii. Specifically, the requested site is a 300-acre section bordering the northwestern boundary of the existing 150 acre harvesting operation in Kau. This present harvesting area is bordered by approximately 20,000 acres of a similar forest type.

DESCRIPTION OF USE:

According to the applicant the additional 300 acre harvesting expansion proposal is essential for long-range operational sustainment of the program. The present processing facilities in Honolulu are inadequate to cope with current inflation standards of which the anticipated expenditure is unjustifiable without an assurance of continual hapu'u resources.

Board of Land and  
Natural Resources

July 27, 1978

The proposed expansion program will include expanded warehouse and processing space. New machinery will be purchased which will revitalize the overall utilization process. The hiring of three additional field workers are seriously being considered to increase the production and overall capital investment efficiency of the operation. This will help secure on-the-ground, sustained yield management information on hapu'u growth.

COMMENTS TO DATE:

Department of Health: Staff has reviewed this request and foresees no major adverse environmental effects arising from this project.

Please be informed that there are no objections to granting the permit.

Department of Agriculture: No objections to this CDUA.

Hawaii County Planning Department: Concur with the DLNR request to Mr. Lawrence Cunha for the preparation of an environmental impact statement due to anticipated significant adverse effects of the proposed action on the environment.

In 1971, when the Board of Land and Natural Resources approved the initial action for the harvesting of hapu'u, the purpose of this operation was to obtain data on crop regeneration and commercial feasibility. Your suggestion to Mr. Cunha that such data should be incorporated into the environmental impact assessment as a means of fulfilling the purpose of the initial operation approval is strongly agreed with. The following supporting data should be included in the environmental assessment:

1. The presence of exotic weed species in the regeneration area is suggested to be unimportant since plant succession would tend to favor the native hapu'u. The dominating character of the hapu'u is said to be obvious further away from the immediate harvesting site. However, this assumption is irrelevant since only the area subject to harvest would normally have colonization by exotic weeds introduced by a human vector. Thus the assumption that exotic weeds will have no permanent impact on the forest ecosystem, may be incorrect.
2. The impact of hapu'u harvesting on the native avian population is stated to be relatively small. An expert opinion indicates that birdlife does not thrive on hapu'u, but instead on forest trees. Although the birdlife is not directly dependent on hapu'u for survival, side effects of the harvest operation may have an impact. The general harvesting activity may affect the birdlife through the presence of men and equipment.

July 27, 1978

3. The U. S. Forest Service in Hilo has completed a study on the hapu'u growth pattern. The environmental assessment indicates that hapu'u regeneration is rapid but gives no numerical data to support this assumption. Hopefully these comments will be of help and look forward to the drafting of an environmental impact statement for this project. Comments will be withheld on the Conservation District Application itself until the EIS has been completed.

County of Hawaii Department of Water Supply: There are no objections to the subject request.

The Department of Water Supply has no water system in the area.

DOWALD: No objections.

Land Management: The subject request has been reviewed and there are no objections to the on-going operations.

Natural Area Reserves: Since the Department has requested an environmental impact statement of this CDUA, comments will be reserved pending review of that document.

Fish and Game: This project could have an impact on native forest birds; however verification would depend upon an evaluation of the effects of the harvesting measured over a period of several years. The possible impacts could be tolerated on a short term basis assuming only small areas are involved as a test (experimental) to monitor and measure such impacts. Complete comments on this matter are reserved for the review of the EIS which is to be prepared.

ANALYSIS TO DATE:

By letter dated May 23, 1978, the applicant was notified that:

1. The use is permitted under Section 2R(1)(i) of Departmental Regulation No. 4;
2. A public hearing pursuant to Section 183-41, Hawaii Revised Statutes, will be necessary in this instance since the proposed use is commercial in nature; and
3. An environmental impact statement is required in that significant adverse effects to the environment are anticipated.

As a point of clarification, Section 2R(1)(i) of Departmental Regulation No. 4 pertains to logging operations and portable sawmills as a permitted use which cover the basic activities engaged with hapu'u harvesting.

July 27, 1978

The proposal, under consideration, is to expand the hapu'u harvesting operations now ongoing within a 150 acre portion of the property which is adjacent to and makai of the requested site. Exhibit "C", attached, depicts the approximate sites of both the requested 300 acre area and 150 acre sites in relation to current land use districts.

Harvesting of hapu'u was approved for the 150 acre site by the Land Board on October 8, 1971. A copy of the submittal, as agenda item H-4, attached, stresses that the intent and purpose of the Board in approving the application was twofold, to obtain data on the regrowth of hapu'u and to determine the feasibility of commercial harvesting without damage to the forest reserves. A review of the 16 conditions of use, then imposed, reveals that the hapu'u harvesting operations were placed under the close supervision of the Division of Forestry, DLNR, whose responsibility amongst others, was to monitor the effect of the harvesting on forest regeneration and noxious weed infestation. To this end, the Forestry Division devised a study plan, later becoming the Hapu'u Harvesting Plan agreed to by the trustees of the Bishop Estate on February 24, 1972 and subsequently approved by the State Forestry on March 10, 1972. However, before implementing the plan, the Institute of Pacific Islands Forestry, a federal entity, called upon for assistance, then conducted a supplementary research whose objective was to secure before and after effect data.

At this writing, the previously approved application, filed as CDUA HA-71/4/16-192, indicates three status reports were written by the Forestry Division. Of the three, two are appended to the basic file, prepared in 1975 and 1976 (?). Reference is made to an initial report presented to the Land Board in September, 1974.

In summarizing both reports, despite moderate success in the regrowth of hapu'u from live fern tops and reasonable economic from the logging operations and returns, primarily due to the sustained yield plan prescribed by the Division of Forestry, noxious weed infestation continues to be a problem for which effective controls have yet to be developed. Although herbicide have been employed along working roadways, the invasion and control of noxious weeds will be constantly monitored.

The 1975 report notes that woody native species are taking advantage of temporarily exposed areas. Such species include mamaki, kopiko, olomea, pilo, ohia, etc. Additionally the report states that the operation employed the services of four men for two years with about 55,200 cu. ft. of hapu'u fiber harvested at a return of \$6,624 to the landowner. The later report shows that Nui Nursery, since September, 1974 to December 31, 1976, harvested 123,392 cu. ft. of hapu'u products from approximately 31 acres, yielding \$7022 in revenue to Bishop Estate, an average net return of \$226.54 per acre.

July 27, 1978

For the Board's information, the above figures, dividing harvested volume into revenue compute to approximately six cents per cubic foot in contrast to Honolulu retail price of \$5.99 in some outlets. Of course, the retail selling price includes labor, preparation and shipping costs.

It was learned, in consultation with Forestry staff, that the data, to date, on the harvesting activities are not complete and substantial to warrant sound conclusions. The difficulty in completing the data resulted from the indiscriminate harvesting practice of an earlier harvester who reharvested areas earlier subjected to harvesting operations. In doing so, the reharvesting operations disrupted the monitoring of past harvesting effects. While, since then, the harvester has kept to the harvesting plan, data collection must be remonitored.

The sequence of events preceding the application in question are noted as a matter of record as follows:

1. On February 25, 1977, the Land Board acknowledged the excellent work in harvesting operations at the time, and delayed the decision to allow expansion of the use pending receipt of statistical data upon resurvey of monitoring activities.
2. Applicant was notified by letter dated March 22, 1977, that the Attorney General, after reviewing the findings of the earlier application, stated that the Board, in its approval action, did not reserve the right to later increase the area of harvesting and did not authorize the applicant to apply for a modification of the permit to allow an increase in the harvesting area. A new application must be filed and the public hearing requirement pursuant to Section 183-41, HRS, again met.
3. In September, 1977 the application for expansion was filed and subsequently withdrawn due to the inadequacy of the environmental assessment as determined by staff.
4. The applicant, by letter dated July 12, 1978, requested rescheduling of the public hearing, preferring a later date when the EIS is completed and testimony prepared based on the collection of all data. Staff's reply dated July 21, 1978, informed the applicant that the request could not be accommodated due to statutory time constraints and possible conflicts with business schedules of Land Board members.

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. BOX 621  
HONOLULU, HAWAII 96809

CONSERVATION DISTRICT USE APPLICATION

(Print or Type)

1. LAND OWNER (If State land, to be filled in by Govt. Agency in control of property.)  
Mrs. KARENANNA SCHOOLS/BISHOP ESTATE

Address - 512 Halekahuila Street  
Honolulu, Hawaii 96813

Telephone No. 531-1684

SIGNATURE *[Signature]*  
APPLICANT (Date if applicant is landowner)

Name

Address

Telephone No.

Interest in Property  
(If applicant is other than landowner, indicate interest in property; submit written evidence of this interest.)

SIGNATURE

ii. USE REQUESTED (Describe use as listed in Regulation No. 4)

Use Logging Operations & Portable Sawmills  
DNR Regulation No. 4, Section 2B11  
(Site section of Regulation which use is permitted.)

Reviewed by  
Date  
Accepted by  
Date  
File No.  
180 Data  
EIS Required  
EI Required

III. LOCATION (Attach 12 copies of USGS quad map and tax map with area of use clearly marked.)  
Island Hawaii - District Kauai

Tax Map Key 399-001-007

IV. AREA (Indicate whether in acres or square feet.)  
Area of Parcel 2.9564 Acres  
Area of Use 300 Acres

VI. DESCRIPTION OF AREA

1. Boundary Interpretation (If the map is within 40 feet of the boundary of the Conservation District, include map showing interpretation of the boundary by the State Land Use Commission.)

2. Conservation District Subdiv

General Use

3. County General Plan

4. Name of Nearest-Town or Landmark

Volcano Nat'l Park Headquarters

5. Distance from Above-Town or Landmark

5 Miles North

REFERENCES (12 copies each)

6. Description of Parcel

- a. Existing structures/uses. (Attach description or map.)
- b. Existing utilities. (If available, indicate size and location on map. Include electricily, water, telephone, drainage, and sewerage.)
- c. Existing access. (Provide map showing roadways, trails, if any. Give street name. Indicate width, type of paving and ownership.)
- d. Vegetation. (Describe or provide map showing location and types of vegetation. Indicate if rare native plants present.)
- e. Topography; if ocean area, give depths. (Submit contour maps for ocean areas and areas where slopes are 40% or more. Contour maps will also be required for uses involving tall structures, gravity flow, and other special cases.)
- f. If shoreline area, describe shoreline. (Indicate if shoreline is sandy, rocky, rocky, etc. Indicate cliffs, reefs, or other features such as access to shore.)
- g. Existing covenants, easements, restrictions. (If State lands, indicate present encumbrances.)
- h. Historic sites affected. (If applicable, attach map and descriptions.)
7. Adjacent Land Uses/Structures. (Describe or indicate by map.)

VI. DESCRIPTION OF PROPOSED USE

Attach detailed description of proposed use (project).

1. Narrative. (Include description of all proposed utilities, roads, developer schedule, approximate commencement and completion dates; parking; fire protection & other safety measures; signs; lighting; and landscaping. Discuss impact of use on environment, compatibility with the site.)

2. Plans. (All Plans should include north arrow and graphic scale.)

a. Area Plan. (Area plan should include, but not be limited to relationship of proposed uses to existing and future uses in abutting parcels; identification of major existing facilities; names and addresses of adjacent property owners.)

- b. Site Plan. (Site plan maps) should include, but not be limited to, dimensions and shape of lot; setbacks and bounds; including easements and their use; existing features, including vegetation, water area, roads, utilities.)
- c. Construction Plan. (Construction plans should include, but not be limited to, existing and proposed changes in contours; all buildings and structures with indicated use and critical dimensions; open space and recreation areas; landscaping, including buffers; roadways, indicating widths; off-street parking area; existing and proposed drainage; and proposed utilities and other improvements. Name subdivision only, and top construction involved, substitute map of proposed subdivision.)

VII. FILING FEE (Check appropriate box. Make checks payable to Department of Land and Natural Resources.)

- \$10.00 - Permitted Uses
- \$20.00 - New Uses or Amendments to Regulation No. 4

SIGNATURE *James C. ...* Applicant

(All correspondence will be directed to person signing application. Submit 12 copies of completed application and all attachments. Reduce or fold attachments to 8-1/2" x 11". Mail all application and attachments to: Department of Land and Natural Resources, P. O. Box 621, Honolulu, Hawaii, 96809.)

FOR INFORMATION CALL: 548-7417 or 548-7519

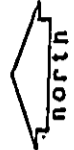
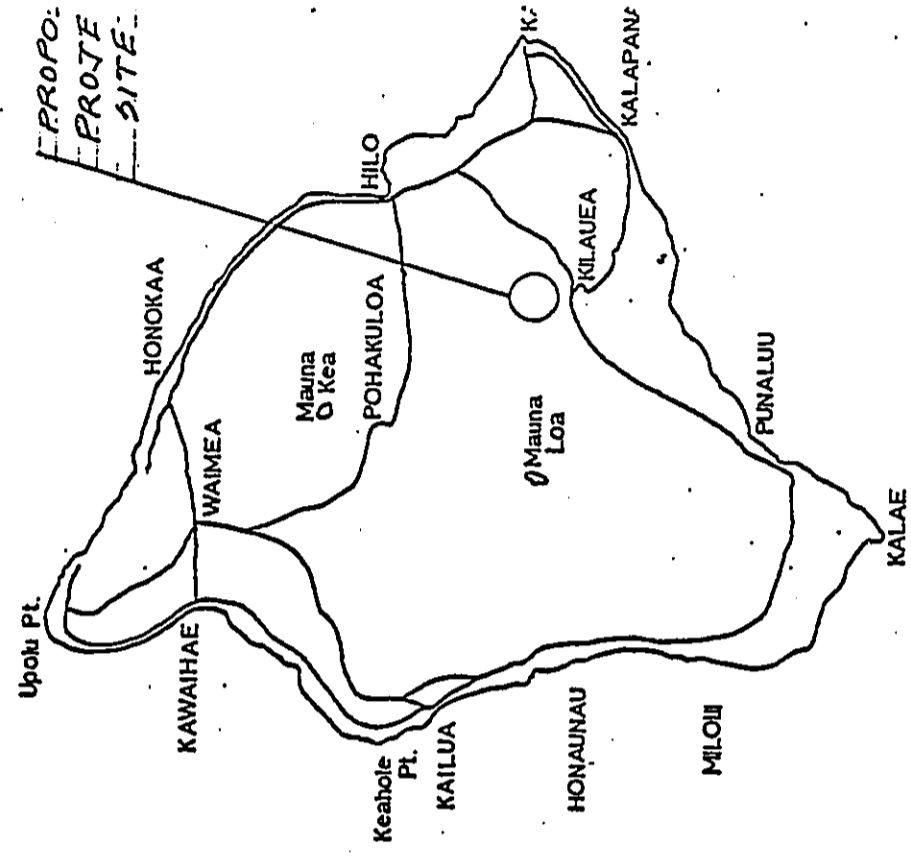


EXHIBIT A



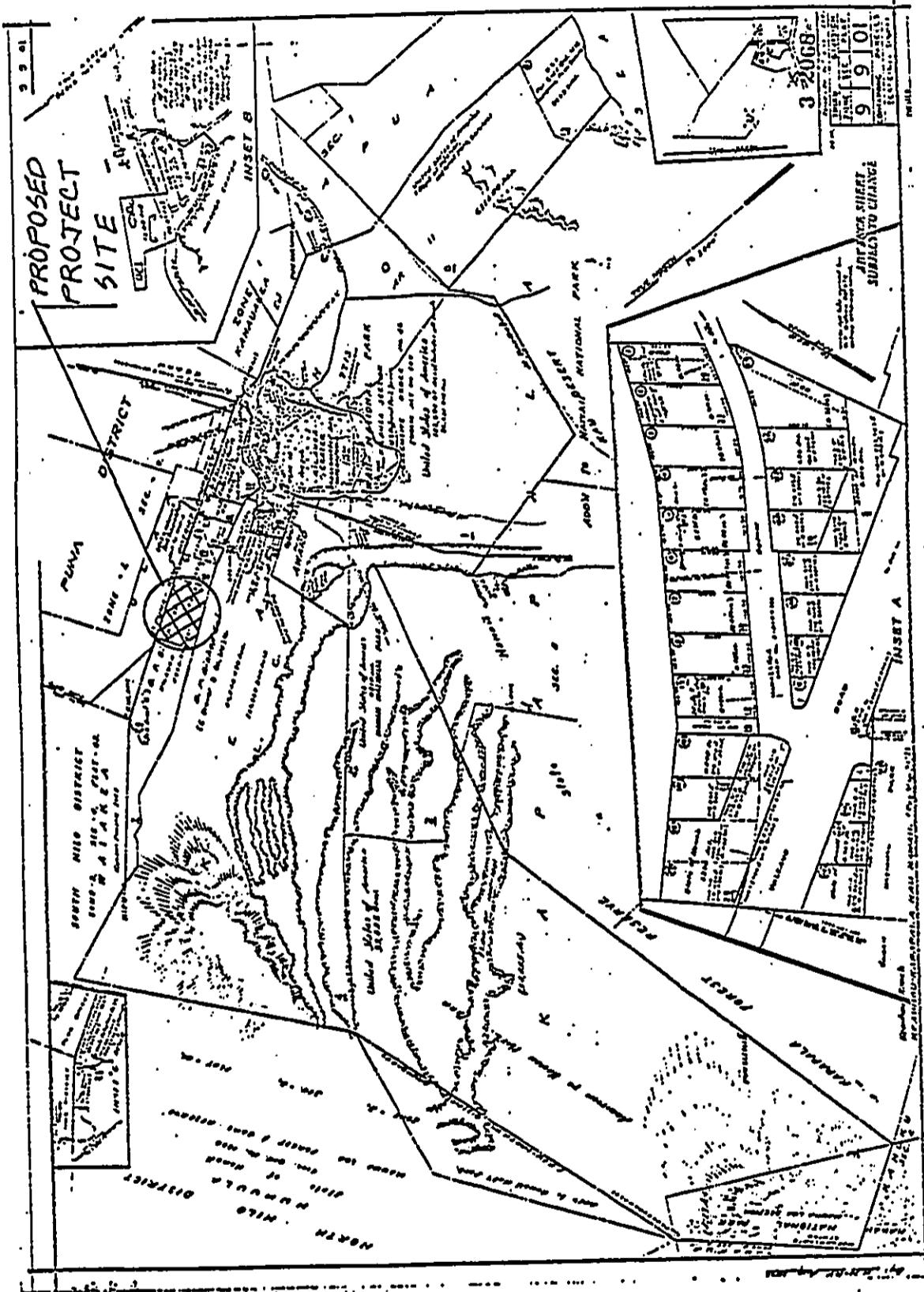


EXHIBIT B

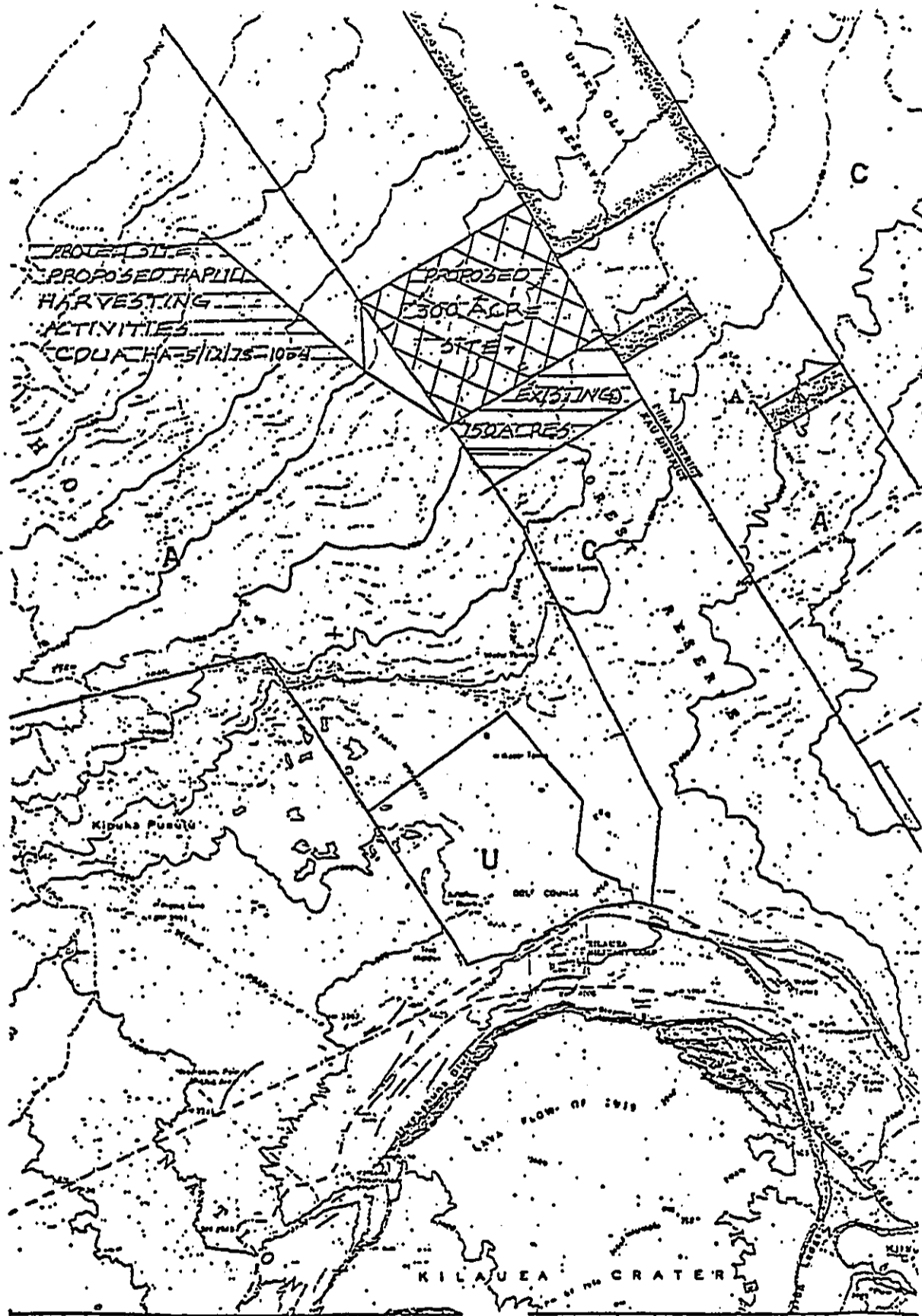


EXHIBIT "C"

EXHIBIT V

VARIOUS LETTERS AND MEMORANDUM FROM DIVISION OF FORESTRY, DLNR  
REGARDING PRELIMINARY FINDINGS AND AVAILABILITY OF DATA FOR  
THE PROPOSED HAPU'U HARVESTING OPERATIONS AT KILAUEA

GEORGE R. ARIYOSHI  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY  
1151 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813

DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

November 30, 1978

Mr. Fred Rodrigues  
Environmental Communications, Inc.  
Box 536  
Honolulu, Hawaii 96809

Dear Fred,

I feel we should clarify both our Kilauea hapuu monitoring findings to date, and our policy regarding the data that has been collected.

Substantially, our findings have not changed from our October 27, 1977 memo to Mr. Len Bautista of our Planning Office. You have a copy of it.

To summarize, two measurements indicate areas that have had harvesting activity show, as part of the recovering vegetative component, an increase in exotic plants. We do not know, until successive measurements are made, what the magnitude of the exotic component will be in the hapuu ecosystem. At this point, however, the data is giving us the start of a trend that we must consider.

In response to your request, three summary tables of our findings were made available to you with the admonition that the material was for your information only. We feel that these tables quickly reflect our stated findings.

As Ed Petteys of my staff explained to you during your November 27 phone call, we have grave reservations about formally releasing our data at this time. First, we feel that at least another measurement should be made and incorporated into the findings before there will be enough information to merit formal release. We anticipate a

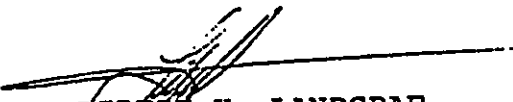
Mr. Fred Rodrigues  
Page 2  
November 30, 1978

remeasurement taking place in 1980. Second, the data will require considerable qualification and explanation when it is issued, and this is best done in the form of a carefully written total document. We do not feel that a vehicle such as an EIS is the proper place for an initial release of our data. It is my understanding that you were in agreement with these concepts.

For now, we suggest that your EIS take our work and general findings into account. Because of our need to deal with our data under carefully controlled conditions, those reviewers wishing to know more about it should be advised to contact us directly. You have the only copies of our preliminary data tables ever to leave this office.

In summary, again, existing data is preliminary and requires considerable explanation. Our general statements indicate a trend that merits consideration, and those findings should be considered in your EIS.

Very truly yours,

  
LIBERT K. LANDGRAF  
State Forester

GEORGE R. ARIYOSHI  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY  
1151 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813

DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

June 21, 1978

MEMORANDUM

TO: MR. NOBUO HONDA, Operations and Admn. Forester

FROM: EDWIN Q. P. PETTEYS, Develop./Tech. Services Forester  
and PATRICK G. COSTALES, Timber Survey Forester

SUBJECT: Hapuu Harvesting

Please reference the attached memo of October 24, 1974 on the same subject. It still reflects our main findings on this topic. In light of Bishop Estate's recent environmental assessment, however, we do wish to amend some of our October 1974 recommendations:

The assessment clearly targets "long-term operational sustainment". In this light, we consider the 300 acres a purely commercial venture, as opposed to the original 150 acres, which was for research purposes. As such, then, this new area should not in any way be considered as an expansion of the original study area. Frankly, we do not need it for further study. This amends our previous recommendations in the first paragraph, and items nos. 2 and 3 on the second page, and the last paragraph on page 3 of the attached.

A comment on Bishop Estate's environmental assessment. There are many statements regarding harvesting, regrowth, weeds, etc. If these are true, there is no need for us to continue our research. We would be most interested to have a ruling on this. Nothing would please us more than to be able to terminate this study and go on to other things.

*Edwin Q. P. Petteys*  
EDWIN Q. P. PETTEYS

*Patrick G. Costales*  
PATRICK G. COSTALES

Attachments

DOCUMENT CAPTURED AS RECEIVED

October 24, 1977

MEMORANDUM

TO: MR. LEONARD BAUTISTA  
FROM: EDWIN O. P. PETTEYS  
PATRICK G. COSTALES, Timber Survey Forester  
SUBJECT: Hapuu Harvesting, Kilauea Forest Reserve

As mentioned in our discussion with you, we would like to make the following statements and suggestions relative to hapuu harvesting in the Kilauea Forest Reserve.

We have made two "passes" through the original hapuu harvesting area, one "before" and one "during" harvesting.

Data show that exotic vegetation, much of it weeds, has come into harvested areas. Because measurements of areas that have not yet been harvested do not show this, we feel that the exotics are, for whatever reason, a result of harvesting activity. We cannot at this time make a pronouncement as to the long-term trends of exotic vegetation in the harvested areas. It could eventually be overtopped by the newly growing hapuu and fade away, or it could take over the area to the detriment of a hapuu ecosystem. Only additional measurements in the future will be able to show what direction the exotic vegetation will take. These measurements must wait a few more years to allow the trends to establish themselves.

As the purpose for allowing the initial harvesting of 150 acres was to determine the very things we are studying, I must also point out that we do not yet have a final answer for the Board. This is due to two reasons. First, the harvesters often re-disturbed areas that were logged some time before. Such an action effectively nullified any vegetative establishment and growth of the recovering vegetation just takes time, not enough of which has passed.

DOCUMENT CAPTURED AS RECEIVED

Memo to Mr. Leonard Bautista.  
Page 2  
October 24, 1977

We would like to suggest that the Board continue to consider this activity as a trial to get some answers on the feasibility of a renewable hapuu operation. Within this context, we see nothing wrong with a reasonable expansion of harvesting until we get better answers.

We suggest that approval of the expanded harvesting be given subject to the following conditions:

1. A detailed plan of the harvesting be provided to the Division of Forestry and be subject to their approval before harvesting can proceed. The plan must show the road network to be used, and the area to be harvested divided into some form of blocks or harvesting units. The order and scheme of harvesting of those units must be shown. Enforcement should be done by Forestry.
2. No disturbance of a harvesting unit after initial harvesting should be permitted. This will keep us out of a big problem we have had in the past.
3. The Research group within the Division must be allowed sufficient time to establish plots in the area before harvesting takes place. Ideally, this should be after the road layout is at least flagged in.
4. No planting of trees or manipulations other than hapuu top establishment and weed control measures should be allowed. Other disturbances merely reduce the area that we have to study.
5. Aggressive weed control measures must be practiced in harvested areas. Could Ag's weed control branch give assistance?
6. If our data at any time in the future shows that there is permanent damage being done or that the harvesters are not complying with conditions, the approval should be capable of being withdrawn immediately.
7. All conditions imposed by the Board in the granting of the original 150 acre approval should also apply.



**DOCUMENT CAPTURED AS RECEIVED**

Memo to Mr. Leonard Bautista  
Page 3  
October 24, 1977

We should point out that, because of the time interval necessary to assess the recovery of the forest, and the past intentions of the Board, we feel that no further acreage be allowed after this 300 acre request, until answers are available. This, if supported, would be important for the harvesters to know, so they can pace their work accordingly. What we should avoid is a full-scale mobilization on their part to harvest the area as quickly as possible, unless they understand that they might have to wait a while.

Please note these are the suggestions from our point of view only. By a copy of this memo, I am requesting that Hawaii District respond and discuss their concerns with you as well.

Thank you for this opportunity to clarify our concerns. If we can be of any assistance, let us know.

EDWIN Q. P. PETTEYS

PATRICK G. COSTALES

cc: Hawaii District

GEORGE R. ARIYOSHI  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF FORESTRY  
1151 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813


DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

December 5, 1978

Mr. F. J. Rodriguez, President  
ENVIRONMENTAL COMMUNICATIONS, INC.  
1152 Bishop Building, Suite 508  
Honolulu, Hawaii 96809

Dear Mr. ~~Rodriguez~~:

Per your request, attached are responses to EQC's circled comments. As you may note, they center on our findings of exotics, and the recovery of the area. I hope the comments are of benefit.

  
LIBERT K. LANDGRAF

Attachment

DEC 07 1978

No. 8 Again, there is some preliminary data available. The trend it reflects is ominous, as it shows an increase in exotics. Long term trends are, as yet, unknown.

In terms of growth and sustained yield data, we concur with the quoted statement.

No. 22 Our comments to planning reflect our disagreement with the statement, which implies that areas recover to an "as before" condition. Our data contradicts this. The hapu canopy, while growing in harvested areas, has not attained its former stature or coverage.

No. 23 We are not engaged in studies of nutrient cycling.

No. 30 We too questioned the 20 year figure in our comments. Our timing is based on the habits of the harvesters, and the natural growth rates of the vegetation. We have not set a date on the completion of our work, due to the factors outside of our control, mainly, the harvesting.

No. 34 See previous comments and quotes regarding data and vegetation.

No. 38 Same as above.

EXHIBIT VI

A Search for Vicia menziesii on the Niu Nursery, Ltd. Kilauea  
Hapu'u Harvesting Site Kilauea Forest Reserve, Hawaii

by Gerald D. Carr  
N. Balakrishnan  
E. Funk

I. Introduction

On November 13, 1978 the senior author was contracted by Sidney Goo to coordinate a search for Vicia menziesii and other rare or endangered plants on the 300 acre site proposed for expansion of hapu'u harvest activities at the Kilauea Forest Reserve, Hawaii.

II. Approach

The lack of discrete boundaries delimiting the 300 acre search area necessitated the establishment of a belt transect across the base of the property. This was accomplished by extending a compass line from a short segment of marked boundary near the entrance to the existing harvest site (NE boundary). This belt transect was flagged with plastic marking tape and stations were marked off at 25 meter intervals. Sampling transects were then run along compass lines from the belt transect to the opposite boundary (SW boundary) which was clearly marked by a fence at the margin of a heavily grazed pasture (Fig. 1). The transects were traversed slowly as plants were observed along the zig-zag compass courses. When the identity of a plant was questionable, samples were taken for subsequent verification. Two of the transects extended beyond the NW boundary of the proposed harvest site and allowed assessment of the adjacent protected area.

### III. Site description

The vegetation may be described as transitional between a Cibotium forest and an open Metrosideros forest. It is comprised largely of a dense canopy of tree ferns (mostly Cibotium glaucum and C. chamissoi) with an understory of numerous smaller ferns, especially Athyrium sandwichianum and an emergent overstory of scattered Meterosideros collina, Cheirodendron trigynum and in the SW portion, Acacia koa.

The site proposed for hapu'u harvest is relatively free of exotic plant species except in localized areas obviously impacted by feral animals or man. For example, one small area adjacent to the pasture has been altered for the production of marijuana (Cannabis sativa). More information on the vegetation as well as geological and climatological data for the area can be derived from the preliminary report of a bioecological survey in the vicinity (Jacobi and Warshauer, 1975).

### IV. Botanical survey

Although a comprehensive list of plants present in the proposed harvest site was not a goal of this survey, a partial list (List 1) is included to further characterize the area botanically.

### V. Rare and endangered plants on the proposed harvest site

A specific goal of this botanical survey was to record any rare and endangered plants as proposed in the FEDERAL REGISTER (June 16, 1976) which might occur in the area scheduled for hapu'u harvest. Of special concern was the possible occurrence there of Vicia menziesii, Hawaii's only officially recognized and protected rare and endangered plant species. However, Vicia menziesii was not detected in the harvest area,

List 1. Plants observed in the proposed hapu'u harvest site.  
(X) = Exotic, all others native.

FERNS AND FERN ALLIES

- Adenophorus tamariscinus
- Asplenium lobulatum
- A. macraei
- A. sp. 1
- A. sp. 2
- (X) Athyrium japonicum
- A. microphyllum
- A. sandwichianum
- Cibotium chamissoi
- C. glauca
- C. hawaiiense
- Coniogramme pilosa
- Ctenitis rubiginosa
- Cyclosorus cyatheoides
- C. dentatus
- Dicranopteris linearis
- Dryopteris kernandiana
- D. parallelogramme
- D. sp.
- Elaphoglossum hirtum
- E. sp.
- Gonocormus minutus
- Grammitis hookeri
- G. tenella
- Marattia douglasii
- Mecodium recurvum
- Microlepia strigosa
- Nephrolepis exaltata
- Polypodium pellucidum
- Psilotum complanatum
- Pteris excelsa
- (X) P. irregularis
- Sadleria cyatheoides
- S. souleyetianum
- Sphaerocionium lanceolatum
- Sphenomeris chinensis
- Vandenboschia davallioides

FLOWERING PLANTS

- Acacia koa
- Alyxia olivaeformis
- Astelia menziesiana
- Broussaisia arguta
- (X) Buddleja asiatica

- (X) Cannabis sativa
- Cheirodendron trigynum
- Clermontia hawaiiensis
- C. montis loa
- C. parviflora
- Coprosma rhynchocarpa
- Cyanea longipedunculata
- C. pilosa
- (X) Cyperus polystachyus
- (X) C. sp.
- Cyrtandra lysiosepala
- C. paludosa
- C. platyphylla
- Embelia pacifica
- (X) Erechtites valerianaefolia
- Freycinetia arborea
- Gouldia sp.
- (X) Hydrocotyle verticillata
- Ilex anomala
- Labordia cf. hedyosmifolia
- (X) Ludwigia octivalvis
- Metrosideros collina
- Myoporum sandwicense
- Myrsine sandwicensis
- Pelea clusiaefolia
- P. pseudoanisata
- Peperomia hypoleuca
- P. leptostachya
- P. sp.
- Ferrottetia sandwicensis
- (X) Physalis peruviana
- Pipturus sp.
- Platydesma spathulata
- Psychotria sp.
- Rubus hawaiiensis
- (X) R. rosaefolius
- Smilax sandwicensis
- Stenogyne calaminthoides
- S. sp.
- Tetraplasandra meiandra
- Uncinia uncinatum
- Vaccinium calycinum
- Xylosma hawaiiense

nor in the immediately adjacent areas sampled in this study. A single specimen of what could be Labordia hedyosmifolia var. kilaueana was found near the NE boundary on transect 5 (see Fig. 1). This taxon is listed in the FEDERAL REGISTER (June 16, 1976, pg. 24553), however, since our specimen was neither flowering nor fruiting, positive identification could not be made. Tetraplasandra meiantra also occurs in the harvest site and several varieties of this species are proposed in the FEDERAL REGISTER, but none of the varieties proposed for protection are reported from the Island of Hawaii (cf. St. John, 1973). It is quite possible that Cyanea tritomantha of the proposed list in the FEDERAL REGISTER occurs within the harvest area, but it was not detected during this limited survey. Finally, we have it on good authority (F. R. Warshauer, personal communication) that a rare, undescribed species of Stenogyne occurs in the vicinity and within the proposed site for hapu'u harvest.

It must be stressed that our failure to detect Vicia menziesii and certain other rare and endangered plants on the site does not mean they are not present. The time and resources allocated for this study in conjunction with the lack of established transects, the indefinite boundaries and the very low visibility in the field make definitive statements untenable. In this kind of work the evidence that something is present is always more definitive than the evidence that something is absent. It should also be stressed that the best time to look for Vicia menziesii would be during its flowering season which has not been the case in this study.



VI. Probability that Vicia menziesii occurs in the harvest site

Although it is possible that Vicia menziesii occurs on the site proposed for expansion of hapu'u harvest activities, it does not seem probable. It had been reported by Hillebrand (1888) to occur at elevations of 7000-8000 feet on Mauna Kea and Mauna Loa. However, it is presently known only from 5300-5600 feet elevation in the Ahupuaa of Keahou where 155 plants have been counted (Derral Herbst, personal communication). There it occurs in what has been described as a wet Metrosideros collina-Acacia koa forest. Vicia menziesii appears to do well only in "mottled sunlight" rather than deep shade as is found in the dense Cibotium stands of the proposed hapu'u harvest site. A further contrast is the lower elevation (ca. 4350-4550 ft.) at the harvest site compared with that of the known habitat of Vicia menziesii.

VII. Possible effect of hapu'u harvesting on the forest

Whereas it has been suggested that the tree ferns are regenerating after the initial harvest, there appears to be no objective study to verify this. Our own brief observations suggest there may be some basis for this claim, but one must be very careful not to underestimate the tenacity of certain exotic weeds and their ability to confound our native ecosystems. Moreover, to acknowledge the potential regeneration of Cibotium, a dominant taxon in this ecosystem, does not endorse the belief that other less frequent, but still important species will return or regenerate. In fact, it would seem certain that some of the rarer species would be completely lost from this vicinity if tree fern harvesting ensues.

If tree fern harvesting is allowed, the control of exotic plant species should be a major concern. List 1 includes several exotic species that were seen in disturbed areas within the proposed harvest site. Of these, Rubus rosaefolius poses perhaps the greatest threat to the native vegetation. Of very great concern are several other nearby exotic species that would be exceedingly detrimental to the native vegetation. These include Rubus penetrans, R. ellipticus, R. glaucus, Passiflora mollissima, P. ligularis, Anemone hupehensis, Eugenia jambos, Eupatorium riparium, Hedychium sp., Myrica faya and Psidium cattleianum (see Jacobi and Warshauer, 1975). Further harvesting of hapu'u will considerably increase the likelihood of invasion by one or more of these noxious species. Therefore, a constant vigil should be maintained and stringent control methods applied where necessary.

#### VIII. Summary

A brief botanical survey of the 300 acre Cibotium/open Metrosideros forest site of the Kilauea Forest Reserve proposed for hapu'u harvest failed to detect the presence of Vicia menziesii or to conclusively demonstrate the presence of any species proposed for protection in the FEDERAL REGISTER (June 16, 1976). This survey and the apparent ecological preferences of Vicia menziesii suggest that it probably is not present on the site proposed for hapu'u harvest. However, there is a good chance that one or more species proposed for protection in the FEDERAL REGISTER is present on the harvest site. Several exotic plant species are flourishing in the area that has already been logged and continued logging will lead to further invasion, quite likely by some very serious noxious weeds from the immediately surrounding area. Strict monitoring

and control of exotics will be of prime importance if logging is continued or expanded.

IX. Literature cited

Hillebrand, W. 1888. Flora of the Hawaiian Islands: A description of their phanerogams and vascular cryptogams. Williams and Norgate, London.

Jacobi, J. and F. Warshauer. 1975. A preliminary bioecological survey of the Ola'a Tract, Hawaii Volcanoes National Park. Prepared for the Hawaii Natural History Association, Hawaii Volcanoes National Park. 97 pp.

St. John, H. 1973. A list and summary of the flowering plants in the Hawaiian Islands. Pac. Trop. Bot. Gard. Mem. 1: 1-519.

FIGURE 1  
MAP SHOWING BELT TRANSECT

