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OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

AQUACULTURE DEVELOPMENT  
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AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
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HISTORIC PRESERVATION  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT  
WATER RESOURCES MANAGEMENT

April 9, 2001

Ms. Genevieve Salmonson, Director  
Office of Environmental Quality Control  
235 South Beretania Street, Suite 702  
Honolulu, Hawaii 96813

Dear Ms. Salmonson,

Subject: Finding of No Significant Impact (FONSI) for Keauhou Koa Timber Stand  
Improvement at the 1978 Koa Reforestated Parcel, Hawaii, TMK: (3) 9-9-01:004,  
Keauhou Ranch, Hawaii.

The Department of Land and Natural Resources has reviewed the comments received during the 30-day public comment period which began on February 23, 2001. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the April 23, 2001, OEQC Environmental Notice. ✓

Enclosed are a completed OEQC Publication Form, four copies of the final EA, and the project summary on disk. Please call Lance De Silva at (808) 974-4221 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael Buck".

Michael Buck, Administrator  
Division of Forestry and Wildlife

APR 23 2001

**FILE COPY**

2001-04-23-HI-~~FEA~~

**FINAL ENVIRONMENTAL ASSESSMENT:**

for

**KEAUHOU KOA TIMBER STAND IMPROVEMENT**

at

**1978 KOA REFORESTED PARCEL, KEAUHOU RANCH, HI**

April 9, 2001

Prepared by: Lance K. De Silva  
The Hawaii Forestry and Communities Initiative

**DRAFT ENVIRONMENTAL ASSESSMENT**

**KEAUHOU KOA TIMBER STAND IMPROVEMENT  
at  
1978 REFORESTED PARCEL, KEAUHOU RANCH, HI**

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## I. SUMMARY

**Project Name:** Keauhou Koa Thinning Demonstration

**Applicant:** Kamehameha Schools

**Approving Agency:** Department of Land and Natural Resources

**Anticipated Determination:** Finding of No Significant Impact

**Project Location:** Eastern portion of Keauhou Ranch Area, southeast flank of Mauna Loa (approximately 30 miles (48 km) southwest of Hilo). Specifically located in 1978 planting parcel in the Koa Reforestation Project Area. Surrounding area adjoins the koa-ohia forest of the Kilauea Forest Reserve to the east and Keauhou Ranch to the west. Project site encompasses 22 ac. (9 ha).

**Tax Map Key Numbers:** TMK: (3) 9-9-01:004

**Land Use Classification:** Agriculture - Private Ownership (Kamehameha Schools)

**Agencies and Organizations Consulted During EA Process:**

**Federal:** Hawaii Volcanoes National Park  
Resource Management  
United States Department of Agriculture  
Natural Resources Conservation Service  
United States Geological Survey  
Pacific Islands Ecosystem Research Center  
United States Forest Service  
Institute of Pacific Islands Forestry

**State:** Department of Land and Natural Resources  
Department of Forestry and Wildlife  
Historic Preservation Division - Hilo  
Na Ala Hele Trails and Access  
Department of Business, Economic Development and Tourism  
The Hawaii Forestry and Communities Initiative  
University of Hawaii, Manoa  
College of Tropical Agriculture and Human Resources

**Private:** The Kamehameha Schools  
Hawaii Agriculture Research Center  
Winkler Wood Products  
Earth Justice Legal Defense Fund  
Sierra Club- Moku Loa Group

## **Project Action Summary:**

Kamehameha Schools (KS), in cooperation with Hawaii Forestry and Communities Initiatives (HFCI) and Hawaii Agriculture Research Center (HARC) proposes to conduct a koa (*Acacia koa*) timber stand improvement (TSI) demonstration to improve stand vigor and growth. Koa trees in the project area currently appear to be under stress due to high stocking levels. The proposed TSI techniques (thinning, fertilization and herbicide) are intended to reduce inter- and intra-specific competition for nutrients, water, and light and, thereby, mitigate current conditions that are inhibiting stand productivity and preventing growth increment from being concentrated on trees that have high potential commercial value. The response of koa to TSI treatments will be monitored.

The main treatment in the demonstration project is thinning, which will be done at three levels— no thin, area thin, and singletree thin. Sub-treatments within main treatments will include (1) a control, (2) phosphorus fertilization, (3) herbicide application to suppress competing grasses, and (4) fertilization plus herbicide application. Each experimental unit will be a 197- by 197-ft (60- x 60-m) plot containing at least 20 leave trees that are well distributed throughout the plot. Four sub-plots 82- by 82-ft (25- x 25-m) will be nested within each main plot and one sub-treatment will be applied at random to each of the four subplots. Main plots will be replicated four times. Two additional 197- by 197-ft (60- by 60-m) plots will be single tree thinned using chainsaw felling to show that residual tree response is similar regardless of whether non-leave trees are felled or girdled. Leave trees will be selected according to tree vigor, stem form, and length of clear stem. Criteria for leave trees are based on selecting koa that will potentially produce the best saw timber at maturity. Responses to TSI will be determined by measuring individual leave-tree height, stem diameter, estimated bole volume stand basal area, leaf area, crown diameter and crown volume. Data will be collected pre-treatment, and then annually for a minimum of five years. The total project site encompasses approximately 22 ac (9 ha). Approximately 15-20 trees that are cut or girdled in the various thinning plots of this project will be used to provide wood samples for laboratory analyses of koa wood properties.

Implementation of the TSI demonstration will be conducted in a manner that complies to the *State's Best Management Practices for Maintaining Water Quality in Hawaii* for activities such as site preparation and regeneration, thinning, soil erosion control, and use of fuels and chemicals.

Information obtained in this study will be made public via internet postings, the University of Hawaii extension service, HFCI reports, and/or other appropriate means on an annual basis.

## **Project Purpose and Need:**

The purpose of this study is to demonstrate that koa stand vigor and wood production in the project area can be improved by using various TSI methods. Koa trees in the project area currently appear to be under stress due to high stocking levels, and individuals with high potential commercial value cannot reach that potential because of competition for resources. TSI treatments are intended to reduce intra- and inter-specific competition for available nutrients, water, and light, thus allowing superior growth of the residual trees, improved stand health and vigor, and higher economic value of leave trees.

# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

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**Funds:** HFCI - \$10,000, KS - \$8,000, HARC - \$2,500

**Permits/Approvals Required:** No permits or approvals are required for this project.

## **II. INTRODUCTION**

### **A. BACKGROUND INFORMATION**

#### **1. Kamehameha Schools and Partners**

Kamehameha Schools (KS) in cooperation with The Hawaii Forestry and Communities Initiatives (HFCI) and Hawaii Agriculture Research Center (HARC), have developed plans to conduct a koa (*Acacia koa*) timber stand improvement (TSI) demonstration in Keauhou. KS is a private organization responsible for managing approximately 225,000 ac (91,000 ha) of land, 100 miles (160 km) of stream, and 63 miles (100 km) of ocean frontage, statewide. HARC, formally known as Hawaii Sugar Planters' Association (HSPA), is a private, non-profit 501(c)5 organization. HARC specializes in horticultural crop research including agronomy and plant nutrition, plant physiology, breeding, genetic engineering and tissue culture, and control of diseases and pests through integrated pest management. In addition to sugarcane, HARC conducts research in forestry, coffee, forage, vegetable crops, tropical fruits, and many other diversified crops. HFCI is a statewide coalition of people and organizations interested in community-based forestry economic development and diversification.

#### **2. Project Site and Surrounding Area**

In 1974, planning was initiated for a koa reforestation area (KRA) on KS lands at Keauhou Ranch. The KRA was established to provide opportunities for research and education. In November 1976, land managers for KS mechanically scarified the first of many 12 to 49 ac (5 to 20 ha) blocks to stimulate the natural regeneration of koa. Areas within the KRA where natural koa regeneration was sparse were supplemented with hand planting of koa seedlings by KS students, faculty and staff as part of an educational and hands-on workshop. Since the first plantings in 1977, supplemental plantings have been conducted on approximately 50 ac (20 ha) annually. The current result of natural koa regeneration from land scarification and supplemental planting efforts is a 1,200 ac (486 ha) mosaic of densely stocked even-aged, koa/ohia overstory with a mixed-species understory (koa/ohia montane forest). The KRA is sectioned into parcels based on the years the parcel was planted. To date, no TSI practices such as thinning or weeding have been implemented to improve the vigor of these stands. However, small mammal (rat and mongoose) control practices to prevent damage to koa seedlings have been implemented within the area. Since the initiation of small mammal control, use of portions of the KRA by endangered birds such as the `akiapola`au, has increased.

### III. DESCRIPTION OF THE AFFECTED ENVIRONMENT

#### A. PROJECT LOCATION

The project site is located within the 1978 parcel of KRA, which is located on the eastern portion of Keauhou Ranch. The area is on the southeast flank of Mauna Loa above Kilauea Volcano, approximately 30 miles (56 km) southwest of Hilo and within the Ka'u district of Hawaii county. It is situated at approximately 5,500 ft (1,650 m) elevation. The State of Hawaii's Tax Map Key number for this area is (3)-9-9-01:004. The proposed project requires up to 22 ac (9 ha) within the 1,200 ac (486 ha) KRA, or approximately 2% of the entire area. Areas adjoining the KRA include the koa-ohia forest of the Kilauea Forest Reserve to the east and Keauhou Ranch to the west. Maps depicting the project site, access roads, boundaries, and topographic features are in Appendix A.

#### B. PHYSICAL SITE CHARACTERISTICS

Topography in the 1978 parcel is mildly undulating, with slopes averaging 5% to 15%. The underlying lava bedrock is a'a. No streams have been identified in or around the area.

The climate in the area is cool and mesic. Rainfall in the area averages about 98 inches per year (2,500 mm per year), while temperatures range from an average annual maximum of 64°F (18°C) to an average annual minimum of 46°F (8°C).

The project area is comprised of the Kiloa (rKXD) soil type<sup>1</sup>. Kiloa is a well-drained, highly acidic, extremely stony organic soil that is shallow to fragmental a'a lava, about 10 inches (25 cm) thick. It occurs on moderately sloping to moderately steep uplands. Slightly weathered ash and cinders are in the voids of the lava. Permeability is rapid, so surface runoff is very low, leaching potential is severe and the erosion hazard is slight. Numerous lava flows dissect the area creating a mosaic of soil ages<sup>2</sup>.

#### C. BIOLOGICAL RESOURCES

##### 1. Flora

The 1978 parcel and its surrounding environment contain a variety of native and non-native tree and shrub species including the endangered *Vicia menziesii*, (listed as a State and Federal endangered species). The 1978 parcel is located in a Koa/Ohia Montane forest with koa and ohia (*Metrosideros polymorpha*) dominating the overstory. Koa trees in the area appear to show symptoms of stress, such as juvenile leaf growth on stems of adult trees. The stress may be attributed to the high stocking level, which is about 1,000 trees per acre (2,047 per ha). The understory and groundcover layers of this area include native plant species such as, maile (*Alyxia oliviformis*), kawa'u (*Ilex anomala*), hapu'u (*Cibotium* spp.) and naio (*Myoporum sandwicense*), and non-native species such as blackberry (*Rubus* spp.), sweet vernalgrass (*Anthoxanthum odoratum*), sheep sorrel (*Rumex acetosella*), kikuyu grass (*Pennisetum clandestinum*), bull thistle (*Cirsium vulgare*) and sowteat strawberry (*Fragaria vesca*)<sup>3</sup>. Appendix B provides a comprehensive list of species that have been observed in the project area.

## 2. Fauna

In 1994, KS wildlife biologists began to conduct population surveys of threatened, rare and endangered birds in the area. Variable circle plot sampling and random observations conducted semi-annually have been the methods of choice.

There are several native and non-native birds that have been observed in or around the proposed project area (Appendix C). Common native birds inhabiting the area include the apapane (*Himatione sanguinea*), amakihi (*Hemignathus virens*), 'elepaio (*Chasiempis sandwichensis ridgewayi*), 'i'iwi (*Vestiaria coccinea*), and 'oma'o (*Myadestes obscura*). Three endangered bird species also use this and nearby areas: 'akiapola'au (*Hemignathus munroi*), Hawaii Creeper (*Oreomystis mana*), and 'io (*Buteo solitarius*) or Hawaiian Hawk. The 'akiapola'au has not been observed to date in the 1978 parcel, but has been observed nesting in adjacent 1977 and 1979 parcels. 'Akiapola'au nest almost exclusively in large ohia trees. The Hawaii Creeper and 'io have also been observed in nearby areas<sup>4</sup>.

Common non-native birds such as the house finch (*Carpodacus mexicanus*), barn owl (*Tyto alba*), northern cardinal (*Cardinalis cardinalis*), Japanese white eye (*Zosterops japonicus*), and other bird species also inhabit the area.

Populations of non-native mammals such as cattle, pigs, rats, mongoose and cats are small, probably as a result of animal control programs that KS has implemented to reduce the detrimental effects of non-native fauna to development of young koa.

## **D. CULTURAL AND SOCIAL RESOURCES**

### 1. Public Land Use

The Keauhou Ranch, including the project site, is closed to the public. KS may grant access to the site on a case-by-case basis.

### 2. Education and Research

The koa stands in the KRA, including the proposed project area, provide excellent educational opportunities for Hawaii's youth as well as organizations and institutions, for the study of koa/ohia montane forest communities. In 1977, the KRA was established for research and education. Currently, as well as in years past, KS conducts koa tree plantings, four times a year using its students, faculty and staff. Through this program, KS has had the opportunity to educate and bring awareness to the students, faculty and staff of the cultural and biological significance of Hawaii's native koa/ohia montane forests. In addition, institutions and organizations such as the U.S. Fish and Wildlife Service, U.S. Forest Service and students of Harvard University have been using this area for years to conduct ecosystem, endangered species, and biomass production research.

### **3. Historical and Archeological Resources**

No archaeological or historic site resources have been observed in or near the 22 acres of the proposed project site. The State Historic and Preservation Office has no record of historical or archeological sites in the area and considers it unlikely that any exist, due to its location and history. In years past, KS land managers prepared sites by mechanically scarifying many 12 to 50 ac (5 to 20 ha) blocks. Blocks prepared in 1977 and 1978 were cleared by bulldozers so existing historical sites are unlikely to have survived in those areas.

The DLNR-Na Ala Hele Trails and Access Division, speculate that Pu'u O'o trail once ran through parts of Keauhou Ranch. The trail was believed to have expanded from the eastern slope of Mauna Loa, through the ranch and down to Keauhou Landing. Information hints that cattle ranchers would use this trail to drive their cattle from the mountain areas to the sea at Keauhou Landing. However, the portion that was located in the ranch area no longer exists. Maps show that this section of the Pu'u O'o Trail is now used as a 4 wheel drive Keauhou Ranch access road [see Appendix A]. A 3.5 mile (5.6 km) section of the trail which is located outside of the ranch (mauka from the ranch) is now managed by the DLNR - Na Ala Hele Trails and Access Division as a horse trail. Pu'u O'o trail does not pass through the project location and will not be impacted by the project.

### **4. Sensitive & Significant Areas**

The project site and its surroundings are not located in or nearby a sensitive area. Sensitive areas include the following: flood plains, tsunami zones, beaches, streams, rivers, oceans, estuaries, anchialine ponds, fresh or coastal waters, erosion prone areas and geologically hazardous land. However, the project area is adjacent to the 1977 and 1979 blocks, which do contain the endangered `akiapola`au.

### **5. Cultural Practices and Features**

The project site was evaluated as part of the EA process to determine what values could exist in terms of cultural importance, traditional gathering, or symbolic significance to native Hawaiians. Sources consulted included: *Maps*-USGS Survey Map of Hawaii (1913), Hawaii Territory Survey Map of Hawaii (1928), *Published materials*-lease transcripts (V. Kamamalu/Kekuanaoa 1863), boundary descriptions of the Keauhou ahupua'a (K.K. Sworn 1873), and the book titled, "The Polynesian Family System in Ka'u, Hawaii" written by E.S.C. Handy and Mary Kawena Pukui<sup>5</sup>. Assessment and research of information encompassed the Ka'u district and Keauhou ahupua'a.

There is little information on traditional uses and cultural significance for the Keauhou ahupua'a. Native Hawaiians in Ka'u viewed the mountain areas as the heavily forested zone (waoakua, forest of gods), where great koa trees were cut for canoe hulls. It is unlikely that the KRA is part of this heavily forested zone. A former resident of Keauhou (1863) recalls looking for uwau (petrel) and nene (geese) for dinner<sup>6</sup>. Historically, ranching was the primary lifestyle in the area. Much of the area's written history revolves

around the ranching era. It is believed that ranchers used the Pu'u O'o trail and other smaller trails in the area to drive their cattle from the upper slopes of Mauna Loa to the sea at Keauhou Landing. No information was found regarding past gathering and traditional uses for the specific project site.

Currently, the project area and ranch is closed to the public, with the exception of KS students and faculty and staff brought up by KS for the annual koa planting efforts. In addition to reforesting the area, KS teaches their students and faculty and staff traditional practices such as maile and ohelo berry gathering.

## **E. ECONOMIC RESOURCES**

In 1991, the forest industry in Hawaii contributed approximately \$29 million and 736 jobs to the State's economy and at the time koa was the main resource<sup>7</sup>. The forest industry payroll exceeded \$21 million and the average salary was over \$14 per hour. The ratio of value to land area for koa forestland is one of the highest of all rural/agricultural land uses. The forest industry, koa in particular, has the potential to provide employment for the community and also provide a use for vacant and/or under-utilized agricultural lands in Hawaii. The economics of plantation forestry has now gained credibility in Hawaii as a result of a multi-million dollar eucalyptus plantation project by Prudential Timber Company on KS lands.

Various TSI techniques can reduce the intra- and inter-specific competition for available nutrients, water, and light, allowing superior growth for crop trees, which in the long term should lead to improved stand health and higher economic value of the trees.

Trees killed during TSI operations in this project will have no economic value due to their small size. However, koa harvested in the future will potentially carry a high economic value. Data collected from this project will allow land owners to qualitatively evaluate the efficacy of several TSI techniques for establishing and managing future high quality koa stands.

## **F. ACCESS ROADS**

Keauhou Ranch road is located off State Highway 11, at the 30 mile (48 km) marker-turn off known as Pi'i Mauna Drive. Pi'i Mauna Drive passes through the Volcano Country Club and connects to Keauhou Ranch road. The single-lane unimproved road provides access to the project area. Both Keauhou Ranch and KS maintain the road.

## **IV. PROJECT DESCRIPTION**

Despite its very high economic value, very little is known about the silvicultural practices and management of koa. There are no recommended practices for improving stand quality in dense young koa stands. Because landowners lack such silvicultural information, young stands have been left to develop without TSI and may have growth rates that are only a small fraction of their potential. The management goal for this project

is to be able to develop appropriate, practical management strategies and silvicultural techniques for koa through demonstration. Additional objectives include:

- Measure growth response of koa to thinning, fertilization and herbicide treatments
- Assess the suitability of applied silvicultural techniques for improving the quality of young koa stands for even-aged forestry and/or ecosystem restoration
- Determine wood properties of koa trees in the 1978 block at Keauhou

## V. PROPOSED ACTION

### A. PROJECT PARAMETERS

The project will be located in the 1978 parcel and will encompass approximately 22 ac (9 ha). About 45% of this area will be held in reserve as a buffer for actively managed demonstration plots, or to provide alternate study sites if threatened or endangered species are encountered within the active demonstration plots. These reserves may therefore never be used during this demonstration project.

The first phase of the project will involve *pre-thinning* measurement of the koa trees within the designated project area. To insure the protection of endangered plant species and other notable resources in the area, survey crews will properly identify and flag their locations. If such locations are identified, the effected plot will be set aside, and an alternate block will be selected within the buffer area. Within selected plots, leave trees will be selected and flagged based on criteria explained in Section "C" below. The target number of leave trees is at least 20 for each main plot.

Thinning will be conducted using two methods: stem bark girdling and felling. Girdled trees will be left standing to serve as insect habitat. Felling will be accomplished with a chainsaw. Post-thinning measurements will be conducted annually for at least five years, or longer if funding permits.

### B. TSI OPERATIONS

The main objective of this project is to demonstrate that one or more TSI treatment will accelerate growth of leave trees. Treatments were chosen to alleviate light, nutrient, and water limitations on growth of leave trees by reducing inter- and intra-specific competition and by supplementing soil phosphorus with P fertilizer. The demonstration uses a split-plot design with two to four replicates per main treatment. Thinning regime constitutes the main treatment and understory regime the sub-treatment. The project will consist of 14 main plots - 4 replications for each of the 3 thinning regimes and two additional main plots designated for chainsaw fell-singletree thin. Each main plot will be 197- by 197-ft (60- by 60-m) in size and nested within each will be four sub-plots 82- by 82-ft (25- by 25-m in size) surrounded by buffer zones (see Appendix D for diagram of the proposed layout). During a five-year period, periodic measurement of various tree dimensions, including merchantable bole volume, and statistical analysis of the resulting data will be used to evaluate treatment effects.

## 1. Thinning treatments

Three thinning treatments will be applied to main plots:

- Control
- Singletree thinning
- Area thinning

The control treatment will involve identifying and marking leave trees, but no thinning will be done. The singletree thinning treatment involves girdling or felling **only** those neighbor trees that are competing with leave trees for resources. Any neighboring non-leave tree that has part of its canopy inside a leave tree's zone of exclusion is a competitor and will be killed. The zone of exclusion will be variable and equal to 1.25 times the average crown diameter of the leave tree. Non-competing trees (i.e., those not in an exclusion zone) will not be killed. The area thinning treatment involves killing all non-leave.

The demonstration area (approximately 984- by 984-ft [300- by 300- m] in size) will be divided into 197- by 197-ft (60- by 60-m) main plots. Field surveys and flow maps will be used to identify plots that occur on common lava flows. We will select 14 plots that occur on the same lava flow. Our intent is to minimize below ground differences due to flow age. If the area is dissected by so many flows that we can't find 14 plots on the same flow, then we will assign treatments such that each replicate set occurs on the same flow.

Each of the three thinning treatments will be assigned to four randomly selected main plots (three treatments replicated four times; 12 plots in all). Girdling, which involves cutting away the bark and cambium in a ring around the tree to interrupt the flow of water and nutrients, will be used to kill trees. A partially replicated singletree thinning treatment will be applied to the two remaining main plots, but non-leave trees will be cut down with a chainsaw rather than girdled. Our intent in adding this supplemental treatment is to show that leave tree response is independent of the method used to kill non-leave trees.

## 2. Fertilizer and herbicide sub-treatments

Four sub-treatments will be applied to sub-plots within main plots:

- Control
- Fertilizer
- Grass herbicide (to release grass competition)
- Fertilizer plus grass herbicide (combination)

No fertilizer or herbicide will be applied to sub-plots assigned to the control sub-treatment. Sub-plots assigned to the fertilizer sub-treatment will receive 536 lb P per ac per yr (600 kg P per ha per yr) applied as triple-superphosphate in three separate applications: just after thinning (268 lb P per ac or 300 kg P per ha) and again 6 and 12 months later (134 lb P per ac or 150 kg P per ha each time). The fertilizer will be hand broadcast within the area defined by the drip-line of each leave tree. Fusillade grass herbicide (specific to grasses) will be used to eliminate grasses that are competing with koa leave trees for nutrients and water. The herbicide will be applied semi-annually for five

years in accordance with the manufactures label and sprayed within the defined drip-line of each leave tree. Sub-plots assigned to the combination sub-treatment will receive both fertilizer and herbicide. All operations for this project will be conducted in accordance with the State of Hawaii's Best Management Practices for Maintaining Water Quality in Hawaii.

### **C. CRITERIA FOR LEAVE TREES**

Leave trees represent future crop or harvest trees. They should be the healthiest, most vigorous, straightest stemmed, and most defect-free trees found in the project area.

There are a large number of variables that can be used to assess tree quality. The criteria set forth below are related to selecting koa with the best potential for sawtimber when the trees reach maturity.

- 1) The first 10 ft (3.3 m) of each leave tree will have the following characteristics:
  - No live branches.
  - No branch stubs 2.4 inches (>6 cm) diameter at point of attachment.
  - No external indicators of disease or insect damage such as swellings, oozing sap, or unhealed wounds.
  - Bark surface is smooth and non-fissured.
- 2) No juvenile foliage along the main stem or in the main canopy (juvenile foliage in trees of the size found at Keauhou indicates a tree under some type of stress.)
- 3) Stem lean less than five degrees from vertical.

### **D. WOOD PROPERTY ANALYSIS**

In addition to the prescribed treatments, 15-20 trees in the project area will be selected for immediate harvest and sampled to determine wood properties. These samples will be collected from the best of the trees that will be girdled or felled.

### **E. ADDITIONAL AREA**

Adjacent to the planned area, an additional 9.8 ac (4 ha) will be reserved for plot selection. If any endangered species are found in a plot during plot layout or thinning operations (including bird nests), the plot will be abandoned, and an alternate one selected from the additional area. The additional area represents about 45% of the 22-ac (9-ha) demonstration area.

### **F. ROADS**

No new roads or skid trails will be built for this project because there will be no logs or trees removed from the area. The area is already accessed by using the single-lane unimproved 4-wheel drive road.



## VI. ENVIRONMENTAL IMPACTS OF PROPOSED ACTION; PLANNED MITIGATION MEASURES

### A. IMPACTS ON PHYSICAL RESOURCES

Growth responses in residual trees after thinning operations of young well-stocked stands of many timber species have been widely documented in silvicultural studies throughout the world. The treatments and thinning regimes of this demonstration project will be implemented and managed in a manner sensitive to the surrounding environment and with the intention of keeping environmental impacts to a minimum.

#### 1. Soil & Water Quality

There will be little to no impact to both soils and water quality in the project area. Because stem girdling requires little to no soil movement, impact to soil resources will be minimal to none. Two main plots are designated for chainsaw felling, but no trees will be removed from the site.

There are no streams or waterways located in the project area. The expected impact from this operation on water quality is very minimal to none. Leaching and potential surface runoff loss for the triple-superphosphate is slight when applied to the Kiloa soil type. Because no new roads or skid trails are proposed for this project, and because no wheeled or tracked vehicles will be used off trail, soil and water quality will not be influenced by demonstration activities.

### B. IMPACTS ON BIOLOGICAL RESOURCES

#### 1. Flora

The project is not expected to have any significant adverse impacts on either native (other than koa) or non-native plants in the project area, other than grasses. The impact on grasses will be severe within dripline areas of designated leave trees. Elsewhere in the study area grasses will be unaffected. In plots where trees are felled, damage to understory plants may be severe for isolated individuals, but for most damage will be slight and short lived.

There is only one known endangered plant species growing in the project area-*Vicia menziesii*. To insure its protection, crews will survey the project area prior to any thinning treatments and flag the location of the species. A buffer zone of 50 ft (15 m) of undisturbed vegetation will be given to the individuals or populations of these endangered plants. A new block will be chosen on a case-by-case basis. Any additional threatened and endangered species that are found will also be buffered to avoid disturbance.

## **2. Fauna**

This project is expected to have minimal impact on the native bird populations. In fact, the project could encourage the use of the area by the native birds. KS wildlife biologists have observed that the endangered birds prefer nesting and foraging in larger trees. In the short term, thinning may decrease canopy arthropods that are used as food by native birds, but the expanding canopies of residual trees should allow arthropod populations to build up again in a few years. Standing dead trees created by girdling may attract some insect species that are used as food by bark foraging birds like the 'akiapola'au and Hawaii creeper. Prior to thinning, crews will survey the project area and identify any endangered species' nest or roost sites. These sites will be flagged and not included in the active demonstration area—an alternative plot will be selected. Chainsaw felling will be conducted from September through December to avoid disturbing breeding 'akiapola'au. Because native birds, especially the endangered 'akiapola'au, prefer nesting in larger ohia trees, all large ohia trees will be left untouched.

Non-native birds in the area appear to be common, and a project of this scale is not likely to have a major impact on their populations. These birds also inhabit adjacent koa reforestation parcels. KS already implements a small mammal control program targeting non-native mammals in the area. This project is not likely to cause an additional impact on small mammal populations. Hawaiian hoary bats (*Lasiurus cinereus semotus*) have not been observed in the proposed area.

## **C. IMPACTS ON CULTURAL AND SOCIAL RESOURCES**

### **1. Public Land Use**

The project will not curtail any public uses. The area is currently closed to the public. Access is gained by KS permit approval only.

### **2. Education and Research**

There will be positive educational and research impacts both directly and indirectly from this demonstration. Research and education will continue in the reforestation area. KS will continue to conduct its annual koa-planting program with their students, faculty and staff. The information gained from this project could substantially advance our understanding of koa stand management. Such information will be made available to the public and ultimately encourage landowners to effectively manage large-scale koa plantations.

### **3. Historic and Archaeological Resources**

There are no known historic or archaeological sites in the project area or its nearby surroundings. If evidence of historic and/or archaeological sites is found, operations in the area will be halted and the State Historic and Preservation Division will be notified immediately for further evaluation.

#### **4. Cultural Resources**

Due to the fact that the ranch area is closed to the public and that the site area was previously cleared by heavy machinery, it is unlikely that this project will have any impact on native Hawaiian gathering and/or other traditional uses.

### **D. IMPACTS ON ECONOMIC RESOURCES**

The proposed project could indirectly have a positive impact to Hawaii's economy. There will be no revenue directly gained from this study. Thinned trees will not have commercial value and will be left standing or on the ground. Presently, the demand for koa exceeds the available supply. This has resulted in shortages and significant increases in koa prices. Koa stumpage (value in the forest) has increased from approximately \$0.40/board foot in 1986 to \$3.00/board foot today, while finished koa lumber sells in the range of \$10-\$35/board foot - a higher value than most timber species. These very high prices could make sustainable koa management a viable option for many landowners.

### **E. FIRE POTENTIAL & SAFETY RISK**

#### **1. Fire**

The project site is located in a cool and moist environment where wildfires occur only during drought conditions. Though wildfires are rare, there is still potential for wildfires to occur. Road networks are currently maintained allowing quick and safe access to the area. Operations within the project area will adhere to the State's Best Management Practices to insure the control and prevention of possible fire hazards.

#### **2. Safety Risks**

Girdled trees may take several years to fall. Within this time period, KS students, faculty and other personnel, forestry workers and researchers will be visiting the project site. Safety risks may increase as girdled trees become unstable over time. Trees that are leaning on adjacent trees may also pose safety hazards. Strong winds in the area may knock over these trees causing them to fall. Access to the project site will be limited during the study to reduce accident potential. Project personnel will be required to wear hard hats while working in the area and be aware of potential hazardous trees. All other visitors will be advised to wear hardhats in the forest. KS will supply hardhats to students and faculty during educational activities in the demonstration area.

## **VII. ALTERNATIVES TO THE PROPOSED ACTION**

Several management alternatives have been considered, including the following:

### **A. NO ACTION ALTERNATIVE**

This alternative represents the continuation of current management activities for the area including koa reforestation, research and education. The positive impacts of this alternative include no disturbance to KRA and its existing environment.

Negative impacts include the continued decline in the health of these koa/ohia stands, increased susceptibility of trees to insects and diseases, and the loss of economic potential for the community and Hawaii's forest industry.

### **B. CHAINSAW FELLING ALTERNATIVE**

For this alternative, chainsaw felling would be implemented for all thinning activity, replacing girdling. Parameters of the project such as, area, size and TSI treatments and thinning regimes would remain the same as the proposed action.

The positive impacts of this alternative include a safer working environment and a prompt completion of the thinning operation. Undesirable trees would be felled, reducing the risk of having unstable trees falling on project personnel and others visiting the project.

The negative impacts include greater damage to understory native vegetation from fallen trees, loss of potential insect habitat/forage sources (standing dead trees) for native birds, and temporary soil disturbance. Chainsaw felling treatments may disturb the environment to a higher degree compared to stem girdling.

### **C. CHEMICAL INJECTION ALTERNATIVE**

The third and most economical alternative is to chemically killing non-leave trees by injecting herbicide into the stem cambium. However, there is a chance that neighboring leave trees will be poisoned. Root grafting between neighboring trees may allow poison to move into non-target trees. Root grafting is a fusion between root tissues of two different trees. Also, the herbicide may leach into the soil from poisoned roots and be taken up by the roots of non-target trees. There is also a remote possibility that herbicide would get into native birds via insects that fed on koa tissues containing the herbicide.

## **VIII. DETERMINATION**

The expected determination for the project will be a Finding of No Significant Impact. Every phase of the proposed action, including the expected primary and secondary consequences, and the cumulative effects were considered.

**1. The proposed project does not involve irrevocable commitment to loss or destruction of any natural or cultural resource.**

Besides koa, the proposed project is not expected to have significant impact on native plant species within the area. Unlike mechanical harvesting, stem girdling allows trees to die and fall at their own rate. The intent behind the recommended technique of stem girdling is that it will have the least impact in contrast to other thinning options. The proposed project will have little to no impact on other resources or values in the project area and its nearby surroundings. Any disturbance that occurs is likely to be temporary.

No new roads or skid trails will be built for this project, therefore there will be minimal impact on water quality and soil resources. The plots involving chainsaw felling will be installed in a manner that adheres to the State's BMP to minimize soil movement, erosion and compaction during tree thinning. To minimize water quality degradation from the fertilizer and herbicide treatments, applications will only be placed within the dripline area of the designated leave trees in each block.

Fences currently exist around the entire KRA to keep out animals that graze on or strip bark from koa, such as cattle. The proposed project will not affect large mammal activity.

Substantial loss of canopy arthropod habitat will be incurred in area-thinned plots (3.6 ac/1.5 ha altogether) and light to moderate loss of habitat will be incurred in singletree-thinned plots (5.3 ac/2.2 ha). In the first case, recovery of canopy arthropod habitat (i.e., expansion of canopies of residual trees) will be slow relative the second case, but in both cases complete recovery is expected within 10 years. Standing dead trees may attract some insect species, thus providing enhanced foraging opportunities for bark gleaners such as the endangered `akiapola`au and Hawaii creeper.

There are no known historical or archaeological sites in the project area. If evidence of historical and/or archaeological sites are found, then operations will be halted and findings will be immediately reported to the State Historic Preservation Division.

**2. The proposed project does not curtail the range of beneficial uses of the environment.**

Public access to the KMA is currently controlled and will not change due to this project. Conditions in the larger KMA will basically remain undisturbed. The proposed project site will encompass approximately 22 ac/9 ha (1.8%) of the 1,200 total acres (486 ha) in KRA, and only 9 ac (3.7 ha) will be thinned (0.8% of the total acreage). Trees that are girdled will die and fall to the ground at different rates, gradually reducing the number of standing stems in thinned areas. Research and education in the KMA will resume after installation of the thinning treatments.

**3. The proposed project does not conflict with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.**

The proposed project will have very minimal impact on the existing environment and at the same time improve the growth potential of koa wood resources. The restoration of Hawaii's native koa/ohia forests is one of many forest management goals of KS. Reducing overstory cover has the potential to increase growth of established native understory species. Hawaii's

communities and economy could benefit as a result of the information gained from conducting this project. This study could help landowners more effectively manage their lands for koa plantations.

**4. The proposed project does not substantially affect the economic or social welfare of the community or state.**

An important goal of this project is to provide information on management of second growth koa forests that will help improve the economic and social welfare of the community and State. The project itself will not generate revenue, however the information that will be obtained could have significant benefits to the forest industry and community. Showing landowners that they can improve the value of koa stands at minimum cost may encourage them to reforest and manage their land for koa, instead of non-native timber species. Because koa is in high demand, new employment opportunities may be created for the management of sustainable koa forests.

**5. The proposed project does not substantially affect public health.**

Efficient herbicide and fertilizer use will be required to adhere to manufacture's label instructions to minimize water quality degradation. All activities pertaining to the project will comply with the State's BMP. All safety and health laws and regulations regarding workers will be strictly enforced. *Access to the public is closed.*

**6. The proposed project does not involve substantial secondary impacts; such as population changes or effects on public facilities.**

Conditions in the area will essentially remain the same. Access to the site area is closed to the public. Permits are required with approval from KS to visit the area.

**7. The proposed project does not involve a substantial degradation of environmental quality.**

Adherence to the State's BMP and sound forest management will insure that environmental quality is maintained. Thinning will decrease the current density of trees in the area, however it, along with fertilization and grass control, will most likely improve the vigor of residual koa forests by alleviating inter- and intra-specific competition for water, nutrients and light.

**8. The proposed project does not have considerable cumulative adverse effects.**

Cumulative effects of the project are expected to be positive. An immediate benefit of this project is improved vigor and productivity of the thinned koa plots. Another benefit of this project is information leading to development of silvicultural practices for sustainable koa stand management. Such practices will encourage landowners to reforest and manage their lands for koa and eventually increase the value of the koa industry and benefits to the community.

**9. The proposed project does not substantially affect a rare, threatened, or endangered species, or its habitat.**

The project site is located between endangered `akiapola`au nesting sites located nearby. Populations of the endangered plant *Vicia menziesii* are also located near the project area. To insure protection of these endangered species, nesting sites and plant locations will be flagged and a 50 ft radius buffer zone will be established around them. Plant and wildlife specialists are conducting ongoing population surveys for protected flora and fauna in the area.

**10. The proposed project does not detrimentally affect air or water quality or ambient noise levels.**

There will be no impact on air quality. Efficient and safe herbicide and fertilizer use will be required to insure minimal impact to the water quality. Chemicals will not be applied in rainy conditions to avoid or minimize chemical runoff. The project location is very remote - there should be no outside detection of noise during thinning or tree measurement operations.

**11. The proposed project does not affect nor is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.**

The proposed project area is not located in or near environmentally sensitive areas. It is however located on the southeast flank of Mauna Loa, which is volcanically active. An eruption uphill of the project site has potential to send lava over the demonstration area. Such risk is unavoidable on Mauna Loa.

**12. The proposed project does not affect scenic vistas or view-planes identified in county or state plans or studies.**

The project area is not identified as a scenic vista or view plane. Even if viewed from above, visual impacts will be minimal - due to the relatively small size of the proposed project area. In thinned blocks, girdled trees will fall to the ground over several years. The only exception will be the plots that will be chainsaw felled.

**13. The proposed project does not require substantial energy consumption.**

Fuel and oil required for chainsaws and vehicles during the demonstration project will be minimal.

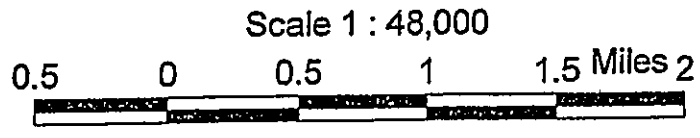
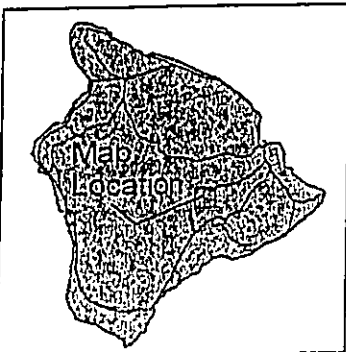
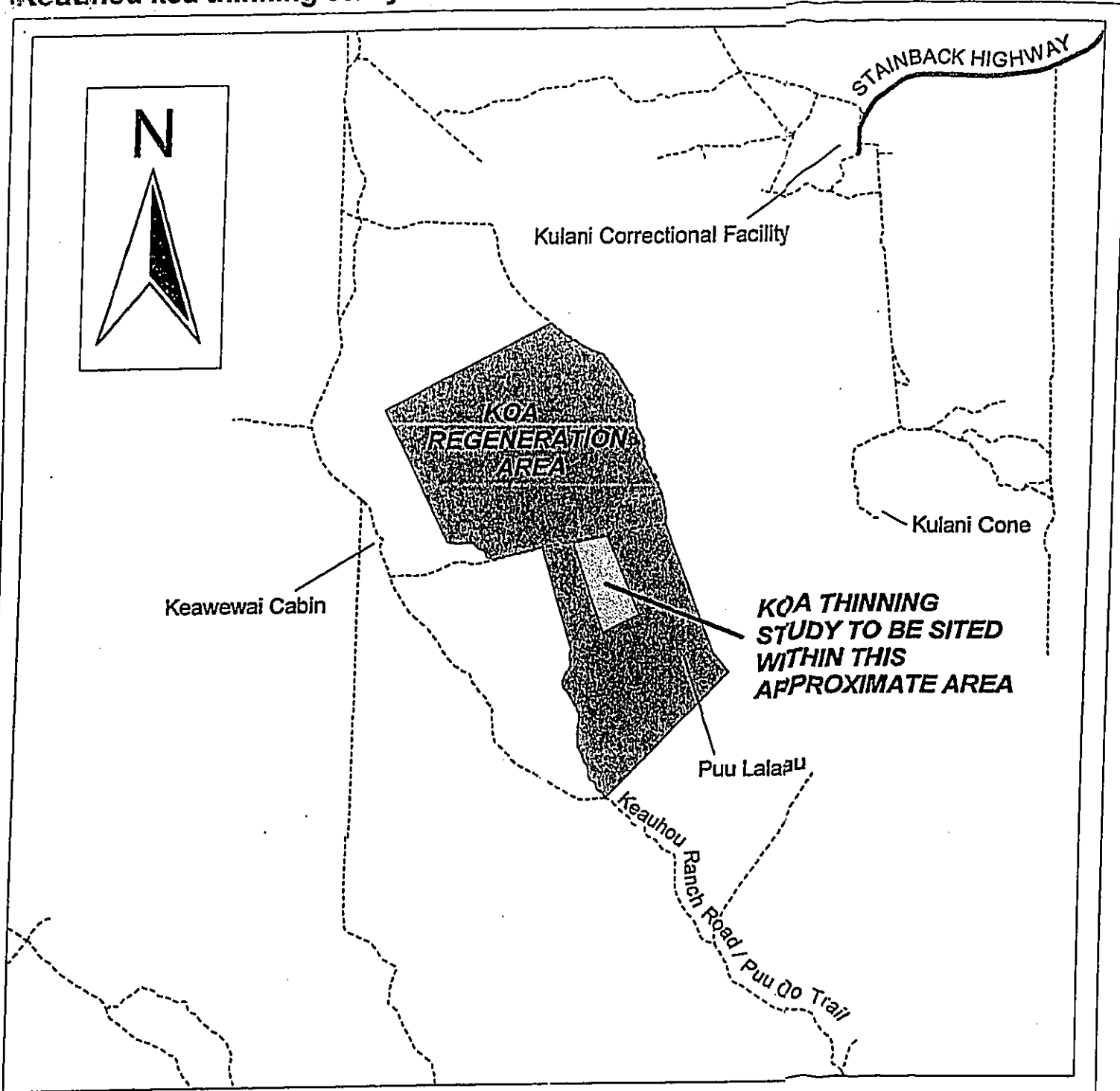
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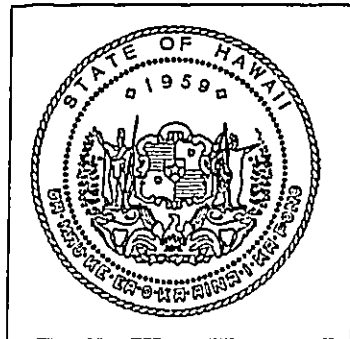


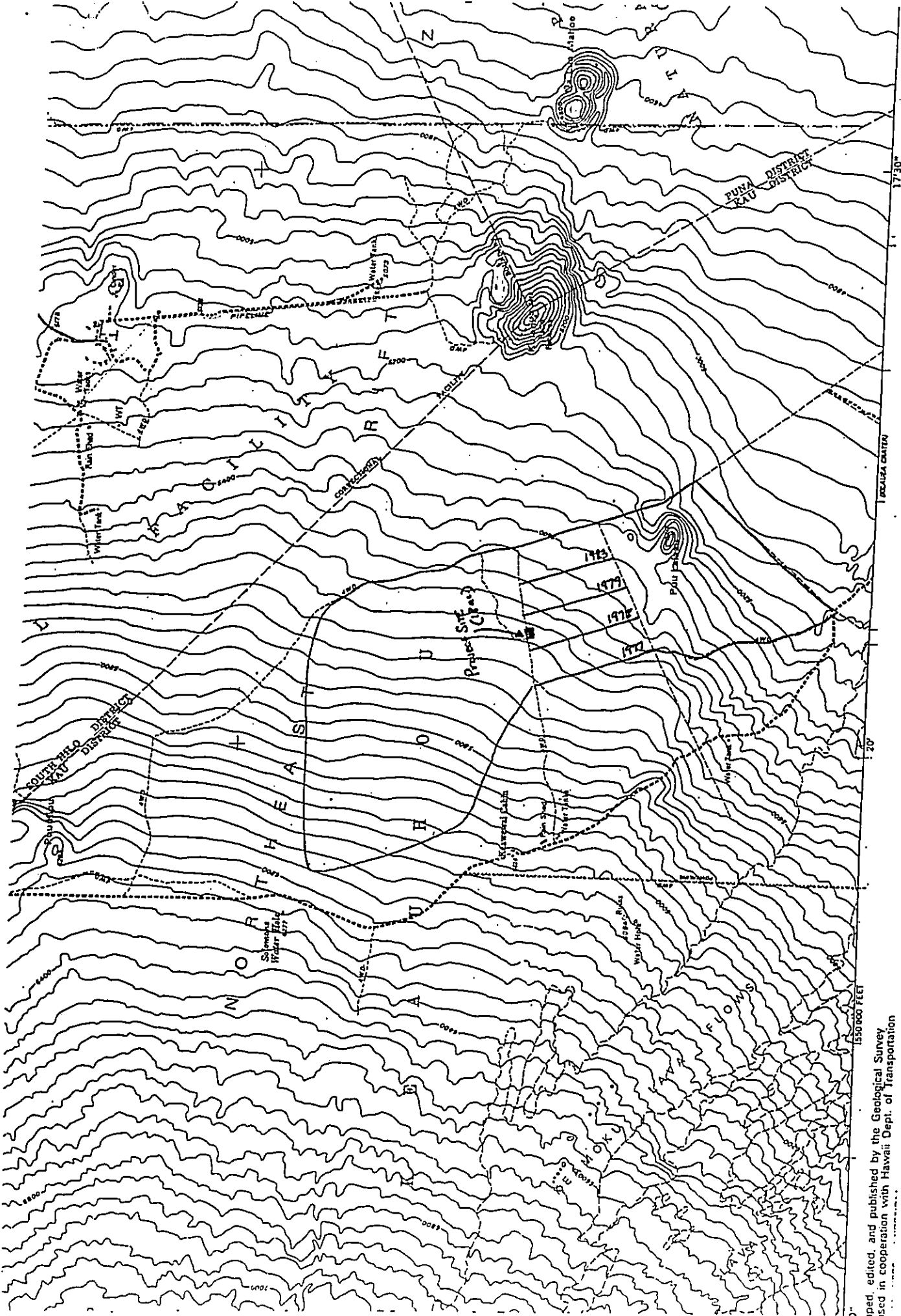
## **APPENDIX A: PROJECT AREA MAPS**

# Keauhou koa thinning study location



Contact:  
M. Constantinides  
(808) 587-4186  
September, 2000





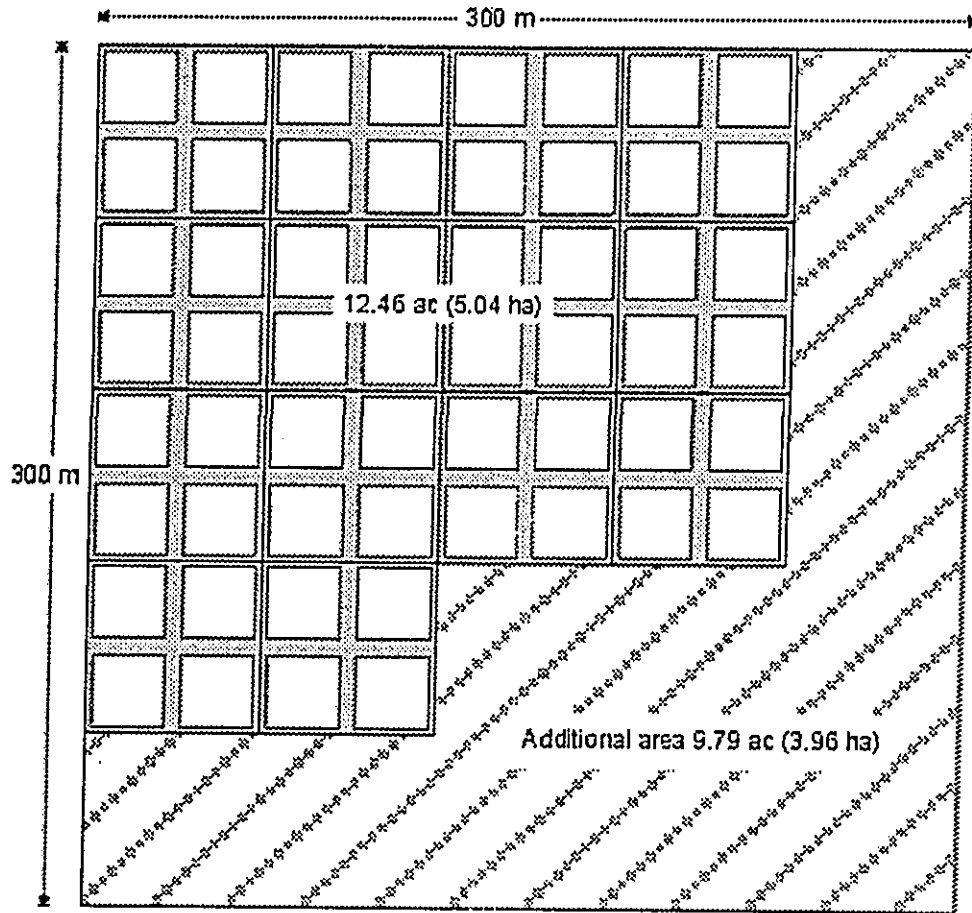
Map prepared, edited, and published by the Geological Survey  
 in cooperation with Hawaii Dept. of Transportation

# PROJECT SITE Map - Keauhou Ranch, HI

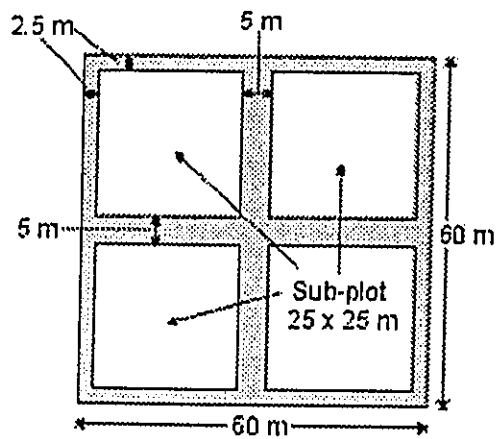
Experimental layout of main plots and sub-plots for the demonstration project. Extra area has been incorporated to allow for repositioning of main plots due to stand, threatened and endangered species, topographic, or lava flow constraints.

### Idealized experimental layout Split-plot design

Main plots (thinning treatments), Sub-plots (understory treatments)



Main plot  
experimental unit  
(0.89 ac/0.36 ha)



**APPENDIX B: FLORA IN STUDY AREA**

**NON-NATIVE PLANTS FOUND IN OR NEARBY PROJECT AREA:**

<b>Family:</b>	<b>Species Name:</b>	<b>Common Name:</b>
<i>Apiaceae</i>	<i>Hydrocotyle bowlesioides</i>	
<i>Asteraceae</i>	<i>Ageratina riparia</i>	Hamakua pamakani
	<i>Cirsium vulgare</i>	Bull thistle
	<i>Erechtites valerianifolia</i>	fireweed
	<i>Hypochoeris radicata</i>	Hairy cat's ear
<i>Chusiaceae</i>	<i>Hypericum parvulum</i>	
<i>Fabaceae</i>	<i>Melilotus indica</i>	
<i>Iridaceae</i>	<i>Crocasmia x crocosmiiflora</i>	
<i>Onagraceae</i>	<i>Ludwigia palustris</i>	Marsh purlane
<i>Poaceae</i>	<i>Anthoxanthum odoratum</i>	Sweet vernalgrass
	<i>Axonopus fissifolius</i>	Narrow-leaved carpet grass
	<i>Ehrharta stipoides</i>	Meadow ricegrass
	<i>Holcus lanatus</i>	common velvet grass
	<i>Pennisetum clandestinum</i>	kikuyu grass
	<i>Schizachyrium condensatum</i>	beardgrass
<i>Polygonaceae</i>	<i>Rumex acetosella</i>	sheep sorel
<i>Rosaceae</i>	<i>Eriobotrya japonica</i>	
	<i>Fragaria vesca</i>	sowteat strawberry
	<i>Rubus argutus</i>	blackberry
<i>Scrophulariaceae</i>	<i>Veronica plebeia</i>	common speedwell

**NATIVE PLANTS FOUND IN OR NEARBY PROJECT AREA:**

<u>Family:</u>	<u>Species Name:</u>	<u>Common Name:</u>
<i>Apocynaceae</i>	<i>Alyxia oliviformis</i>	maile
<i>Aquifoliaceae</i>	<i>Ilex anomala</i>	kawau
<i>Araliaceae</i>	<i>Cheirodendron trigynum</i>	olapa
<i>Aspidiaceae</i>	<i>Ctenitis rubiginosum</i>	pauoa
<i>Dryopteridaceae</i>	<i>Dryopteris glabra</i>	
	<i>Dryopteris fusco-atra</i>	
	<i>Dryopteris hawaiiensis</i>	hawaiian woodfern
<i>Aspleniaceae</i>	<i>Asplenium contiguum</i>	forest spleenwort
	<i>Asplenium lobulatum</i>	piipiilau manamana
	<i>Asplenium monanthes</i>	
	<i>Asplenium rhipidoneuron</i>	
<i>Athyriaceae</i>	<i>Athyrium microphyllum</i>	
<i>Woodsiaceae</i>	<i>Diplazium sandwichianum</i>	
<i>Blechnaceae</i>	<i>Sedleria pallida</i>	
<i>Campanulaceae</i>	<i>Clermontia cf. hawaiiensis</i>	oha kepau
<i>Cyperaceae</i>	<i>Carex alligata</i>	hawaiian sedge
	<i>Uncinia uncinata</i>	
<i>Dennstaedtiaceae</i>	<i>Microlepia strigosa</i>	palapalai
<i>Dicksoniaceae</i>	<i>Cibotium chamissoi</i>	hapu`u pulu
	<i>Cibotium glaucum</i>	hapu`u
<i>Elaphoglossaceae</i>	<i>Elaphoglossum hirtum</i>	ekaha
<i>Epacridaceae</i>	<i>Styphelia tameiameia</i>	pukiawe
<i>Ericaceae</i>	<i>Vaccinium calycinum</i>	ohelo

**NATIVE PLANTS FOUND IN OR NEARBY PROJECT AREA:**

<b><u>Family:</u></b>	<b><u>Species Name:</u></b>	<b><u>Common Name:</u></b>
<i>Fabaceae</i>	<i>Acacia koa</i>	koa
	<i>Sophora chrysophylla</i>	mamane
<i>Fabaceae</i>	<i>Vicia menziesii</i>	hawaiian vetch (endangered spp.)
<i>Gleicheniaceae</i>	<i>Dicranopteris linearis</i>	
	<i>Sticherus owbyhensis</i>	
<i>Grammitaceae</i>	<i>Adenophorus tamariscinus</i>	
<i>Hydrangaceae</i>	<i>Broussaisia arguta</i>	kanawao
<i>Lamiaceae</i>	<i>Stenogyne calaminthoides</i>	
	<i>Stenogyne cf. macrantha</i>	
<i>Liliaceae</i>	<i>Astelia menziesiana</i>	
<i>Lindsaeaceae</i>	<i>Sphenomeris chinensis</i>	
<i>Marattiaceae</i>	<i>Marattia douglasii</i>	
<i>Myoporaceae</i>	<i>Myoporum sandwicense</i>	naio
<i>Myrsinaceae</i>	<i>Embelia pacifica</i>	kilioe
	<i>Myrsine lessertiana</i>	kolea lau nui
<i>Myrataceae</i>	<i>Metrosideros polymorpha</i>	ohia lehua
<i>Phytolaccaceae</i>	<i>Phytolacca sandwicensis</i>	pokeberry
<i>Piperaceae</i>	<i>Peperomia cf. cookiana</i>	
	<i>Peperomia cf. hypoleuca</i>	
<i>Polygonaceae</i>	<i>Rumex gigantea</i>	pawale
<i>Polypodiaceae</i>	<i>Pleopeltis thunbergiana</i>	



**APPENDIX C: FAUNA IN STUDY AREA**

**LIST OF FAUNA FOUND IN OR NEARBY PROJECT SITE:**

**Native Vertebrates:**

<u>Species Name:</u>	<u>Common Name:</u>
<i>Hemignathus munroi</i>	'Akiapola'au (Endangered spp.)
<i>Oreomystis mana</i>	Hawaii Creeper (Endangered spp.)
<i>Buteo solitarius</i>	'Io (Endangered spp.)
<i>Himatione sanguinea sanguinea</i>	'Apapane
<i>Hemignathus virens virens</i>	'Amakihi
<i>Chasiempis sandwichensis sandwichensis</i>	'Elepaio
<i>Vestiaria coccinea</i>	'I'iwi
<i>Myadestes obscurus</i>	'Oma'o

**Non-Native Vertebrates:**

<u>Species Name:</u>	<u>Common Name:</u>
<i>Carpodacus mexicanus</i>	house finch
<i>Tyto alba</i>	barn owl
<i>Cardinalis cardinalis</i>	northern cardinal
<i>Zosterops japonicus</i>	Japanese white eye
<i>Lophura leucomelana</i>	kalij pheasant
<i>Meleagris gallopavo</i>	turkey
<i>Leiothrix lutea</i>	red billed leiothrix
<i>Lonchura punctulata</i>	nutmeg manakin
<i>Sus scrofa</i>	feral pig
<i>Vobis taurus</i>	cattle
<i>Rattus spp.</i>	rats
<i>Herpestes auropuntatus</i>	mongoose

**APPENDIX D: DRAFT CONSULTATION**

BENJAMIN J. CAYETANO  
GOVERNOR

*CRS*



RECEIVED

GENEVIEVE SALMONSON  
DIRECTOR

STATE OF HAWAII

01 MAR 23 AM: 43

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

236 SOUTH BERETANIA STREET  
SUITE 702  
HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4185  
FACSIMILE (808) 586-4188

DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

March 20, 2001

Mr. Gilbert Agaran, Director  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

Dear Mr. Agaran:


Subject: Draft Environmental Assessment for the Keauhou Koa Timber Stand Improvement at  
1978 Koa Reforested Parcel, Hawaii

Thank you for the opportunity to review and comment on the subject document. We have the following comments.

1. According to page 1 of the draft environmental assessment, the project site encompasses 22 acres. On page 6, the draft environmental assessment states that "no archaeological or historic site resources have been observed in or near the 18 acres of the proposed project site." Has the remaining 4 acres been surveyed for archaeological or historic site resources?

Should you have any question, please call Jeyan Thirugnanam at 586-4185.

Sincerely,

  
Genevieve Salmonson  
Director

c: Kamehameha Schools

BENJAMIN J. CAVETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF FORESTRY AND WILDLIFE  
1151 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813

GILBERT S. COLOMA-AGARAN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

JANET E. KAWELO  
DEPUTY

AQUACULTURE DEVELOPMENT  
PROGRAM  
AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
CONSERVATION AND  
ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT  
WATER RESOURCES MANAGEMENT

April 3, 2001

Ms. Genevieve Salmonson, Director  
Office of Environmental Quality Control  
235 South Beretania St., Room 702  
Honolulu, HI 96813-2437

Dear Ms. Salmonson,

Subject: Draft Environmental Assessment for the Keauhou Koa Timber Stand Improvement at the 1978 Koa Reforested Parcel, Hawaii, TMK: (3) 9-9-01:004, Keauhou Ranch, Hawaii.

Thank you for reviewing and commenting on the subject Draft Environmental Assessment (DEA). You have brought to our attention a discrepancy in the DEA. The project site encompasses 22 acres. The 18 acres referred to on page 6 was a typing error and will be immediately changed to 22 acres. No archaeological or historic site resources have been observed in or near the 22 acres of the proposed project site.

Once again, thank you for your thorough review and comments on the subject document. If you have any further questions or concerns, please contact me at (808) 587-4177.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael Buck".

Michael Buck, Administrator  
Division of Forestry & Wildlife



SIERRA  
CLUB  
FOUNDED 1892

March 21, 2001

Lance K. De Silva  
19 East Kawili Street  
Hilo, HI 96720

Dear Mr. De Silva,

Thank you for including the Sierra Club in the loop for your proposed project. I have read your draft EA with interest. My father was a forester and we spent lengthy walks in the woods examining timber stands and how they can be improved.

As the area to be studied contains very few native species and has been grazed in historic times till the Kamehameha Schools started a reforestation project in the 1970's, we can see no grounds for opposition to this project on environmental grounds. I was happy to see that your draft EA covered the points that my predecessor, Roberta Brashear, brought up in her response to you in October of 2000.

I was particularly interested in your proposal to leave some standing dead wood to attract insects that serve as a food source for endangered native birds like the akiapola'au and the Hawaiian Creeper that are found in forest areas adjoining your test site.

We are interested in being informed of the results of your test and possibly visiting the site at some point if that would be possible.

Sincerely,

Dr. Phil Barnes  
Moku Loa Chair  
Sierra Club

RR 2 Box 4756  
Kehena Beach, HI 96778  
(808) 965-9695  
greenhi@interpac.net

*For Our Families - For Our Future*



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
DIVISION OF FORESTRY AND WILDLIFE  
P.O. BOX 4849  
HILO, HAWAII 96720  
(808) 974-4221  
FAX (808) 974-4226

March 28, 2001

Dr. Phil Barnes  
Moku Loa Chair  
Sierra Club  
RR 2 Box 4756  
Kehena Beach, HI 96778

Dear Dr. Barnes,

Thank you for your thoughtful and thorough review and comments on the subject Draft Environmental Assessment. We are pleased that you are in favor of this project.

The agencies involved with this project are trying their best to improve koa silviculture and at the same time remain environmentally sensitive to the surroundings.

Once again, thank you for your time and cooperation and look forward to informing you of the test results when it is completed. If you have any questions or concerns, please contact me at (808) 974-4221 or fax (808) 974-4226.

Aloha,

A handwritten signature in black ink, appearing to read "Lance K. De Silva".

Lance K. De Silva  
Forest Survey Supervisor



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Hawai'i Forest Industry Association  
P. O. Box 10216 • Hilo, Hawai'i 96721 hawaii-forest.org  
(808) 933-9411 • FAX (808) 933-9140

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21 March 2001

Mr. Peter Simmons  
The Kamehameha Schools  
P.O. Box 495  
Pa'auilo, HI 96776

RE: Draft Environmental Assessment, Keauhou Koa Thinning Demonstration Project

Dear Mr. Simmons:

The Hawai'i Forest Industry Association is pleased to comment upon the subject DEA. We support the koa timber stand improvement project in Keauhou Ranch.

Knowledge of koa silviculture is incomplete, despite *Acacia koa* being one of the most common, commercially valuable and ecologically important trees in Hawaiian forests. Efforts to reforest with koa are hampered by a lack of understanding of the best stand management methods. Put simply, we don't know how best to grow koa.

This project will provide valuable data regarding appropriate timber stand improvement measures. The number of public and private forestry organizations involved in the study, including both federal and state agencies as well as the University of Hawai'i and the private sector, is evidence of the importance of this work.

Growing koa in an effective and sustainable manner is critical to forest health as well as to commercial forestry. The low-impact methodology proposed for this study should, as stated, have minimal negative effects on the existing flora, fauna, and soils in the area.

Thank you for the opportunity to comment.

Aloha,

Andrea T. Gill  
Executive Director

cc: ✓ Carl Masaki, DLNR/DOFAW  
Genevieve Salmonson, OEQC