Honouliuli Nature Preserve

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

Ref.:PB:THE File: OA-2873

MEMORANDUM

To: Gary Gill, Director
Office of Environmental Quality Control

From: Dean Y. Uchida, Administrator
Land Division, Department of Land and Natural Resources

Subject: Negative Declaration Determination and Final Environmental Assessment for Honouliuli Nature Preserve, Honouliuli, Oahu, TMK parcel: (1)9-2-5:13 (portion)

The Department of Land and Natural Resources has reviewed the comments received during the 30-day public comment period that began August 23, 1997 for the subject project. We have determined that this project is not likely to have a significant impact to the environment. Please publish a notice of determination for this negative declaration in the OEQC Bulletin as soon as possible.

We have enclosed a completed OEQC Bulletin Publication Form and four copies of the Final EA for the project. The summary for this project has not changed from that noted in Publication Form for the draft EA. Please contact Tom Eisen of our Land Divisions's Planning and Technical Services Branch, at 587-0386 should you have any questions.

Enclosures

c: Wendy Fulks

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1997-11-23-OA-FEA- Honouliuli Nature Preserve

FINAL ENVIRONMENTAL ASSESSMENT FOR HONOULIULI NATURE PRESERVE

This document prepared pursuant to Chapter 343, HRS

Proposed by:

The Nature Conservancy of Hawai'i

October 1997

Contents

I. Summary

Project Name

Honouliuli Nature Preserve

Proposing Agency / Applicant

The Nature Conservancy of Hawai'i

Approving Agency

State Department of Land and Natural Resources
Division of Land Management

Project Location

3,692 acres in the District of Ewa, County of Honolulu, State of Hawai'i

Tax Map Key	Acres
9-2-5-13 (P)	3,692

Agencies and Individuals Consulted During EA Preparation

(The individuals and agencies listed were provided with copies of the Honouliuli Preserve Long-Range Management Plan, and given 3 weeks to respond. All correspondence received is included in Appendix 1.)

Federal

Environmental Protection Agency
US Army Corps of Engineers
US Army Garrison, Hawai'i/Directorate of Public Works
US Department of Agriculture/Animal Damage Control
US Department of Agriculture/Forest Service
US Department of Interior/Fish & Wildlife Service

State

Department of Agriculture
Senator James Aki
Senator Robert Bunda
Department of Hawaiian Home Lands
DLNR/ Division of Conservation and Resources Enforcement
DLNR/ Division of Forestry & Wildlife, O'ahu District
DLNR/ Division of Land Management, O'ahu District

DLNR/ State Historic Preservation Division
Senator Randall Iwase
Representative Merwyn Jones
Representative Michael Kahikina
Kaho'olawe Island Reserve Commission
Senator Brian Kanno
Representative Mark Moses
Office of Environmental Quality Control
Office of Planning
University of Hawai'i, Department of Botany
University of Hawai'i, Environmental Center
University of Hawai'i, Harold L. Lyon Arboretum
University of Hawai'i, Secretariat for Conservation Biology

City & County of Honolulu

Board of Water Supply
County Councilman John DeSoto
Fire Department
County Councilman Mufi Hanneman

Private

Ahahui Siwila Hawai'i o Kapolei
Steve Brown
Tonnie Casey
Conservation Council for Hawai'i
Del Monte
Estate of James Campbell
Lorin Gill
Michael Hadfield
Hawaii Audubon Society
Steven Montgomery
Native Hawaiian Advisory Council
Native Hawaiian Legal Corporation
Robert Osgood
Outdoor Circle
Benton Keali'i Pang
McDee and Sandy Philpotts
Bart Potter
Norm Schofield
Sierra Club, Hawaii Chapter
Sierra Club Legal Defense Fund
Jesse Sparks
Tim Sutterfield
Richard Towill

II. Project Description

The Nature Conservancy of Hawai'i is an affiliate of The Nature Conservancy, an international, non-profit organization whose mission is to protect the plants and animals that best represent the diversity of life on Earth by protecting the places they need to survive. This environmental assessment was prepared to identify all land uses and activities anticipated at Honouliuli Preserve over the next 10 years. It is being been submitted to the state Land Division as part of a *Conservation District Use Application.*

Location

Honouliuli Preserve, part of the Honouliuli land division, encompasses 3,692 acres on the upper eastern slope of the southern Wai'anae Mountain range. The preserve is located between approximately 1,300 feet in elevation and the summit crest at about 3,100 feet in elevation. The property stretches from Mauna Kapu, north of Makakilo, to the Pu'u Hapapa summit, south of Kolekole Pass (Figure 1). The preserve is entirely within the conservation zone, and includes areas within the protective and resource subzones.

Honouliuli Preserve is bounded on the north by Schofield Barracks Military Reservation, on the east by agricultural lands, on the south by residential development, and on the west by undeveloped state lands and a U.S. Navy communications and storage facility (Lualualei Naval Magazine) (see Figure 1).

Historical Land Use

Large-scale modification within the region encompassing Honouliuli Preserve probably began between 1815 and 1830. During these years, much of Hawai'i's lowland forests, including those in the Wai'anae Mountains, were burned to facilitate the harvest of sandalwood. Following this, livestock such as cattle and goats were introduced and allowed free range, devastating much of the native vegetation. In 1877, when James Campbell purchased the land that now includes Honouliuli Preserve, he reportedly drove 32,347 cattle off the land. Smaller herds of cattle were later ranched in this area. According to historical records, goats were not systematically controlled in this region until 1891[1].

In the 1920's, James Campbell's estate joined the Territory of Hawai'i to establish a Forest Reserve in Honouliuli to protect this valuable watershed. The reserve covered 4,936 acres, including the land now known as Honouliuli Preserve. (The Estate's surrender agreement with the state expired in 1977; at that time the area ceased to be a Forest Reserve.) Through the early 1950's, territorial foresters worked to reforest denuded areas with a variety of native and non-native trees and shrubs (the majority were non-native trees). These plantings, along

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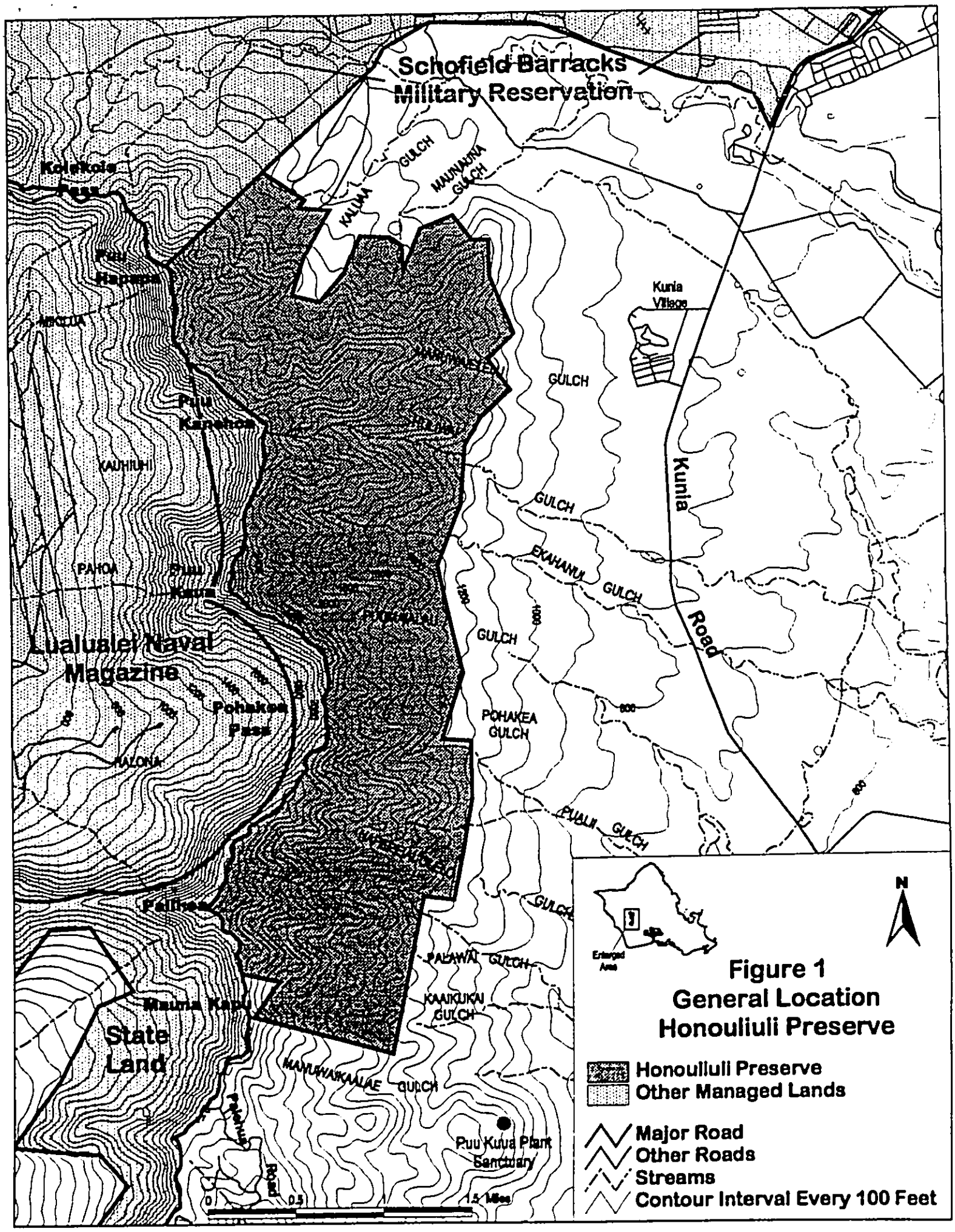
[1] Citations (both from B.B. Frierson, *A Study of Land Use and Vegetation Change: Honouliuli, 1790 - 1925,* Unpublished manuscript): B.F. Dillingham, 1885, *Memos concerning Honouliuli, Kahuku, and Kawailoa ranches,* unpublished; and I.K. von Holt, 1953, *Stories of long ago.* Honolulu, Advertiser Publishing Co.


Schofield Barracks
Military Reservation
Kolekole
Pass
KALUAA GULCH
MAUNAUNA GULCH
Puu
Hapapa
AHICCHA
Puu
Kanehoe
KAUHIUHI
PAHOA
Puu
Kaua
Lualualei Naval
Magazine
Pohakea
Pass
MAILONA
Palikea
Mauna Kapu
State
Land
MANUWAIKAALAE GULCH
Puu Kuua Plant
Sanctuary
Palehua
Road
0
0.5
1
1.5 Miles
Kunia
Village
GULCH
Kunia
Road
EKAHANUI GULCH
POHAKEA
GULCH
PUALII GULCH
PAUWA GULCH
KAAIKUKAI
GULCH
Enlarged
Area
N
Figure 1
General Location
Honouliuli Preserve
Honouliuli Preserve
Other Managed Lands
Major Road
Other Roads
Streams
Contour Interval Every 100 Feet

with the sugar and pineapple industries, resulted in the current diverse patterns of forest and agriculture seen in the Honouliuli land division. In less than 200 years, the diverse native forests of Honouliuli were pushed back to the summit areas and into scattered mid-elevation areas where small remnant stands persist today.

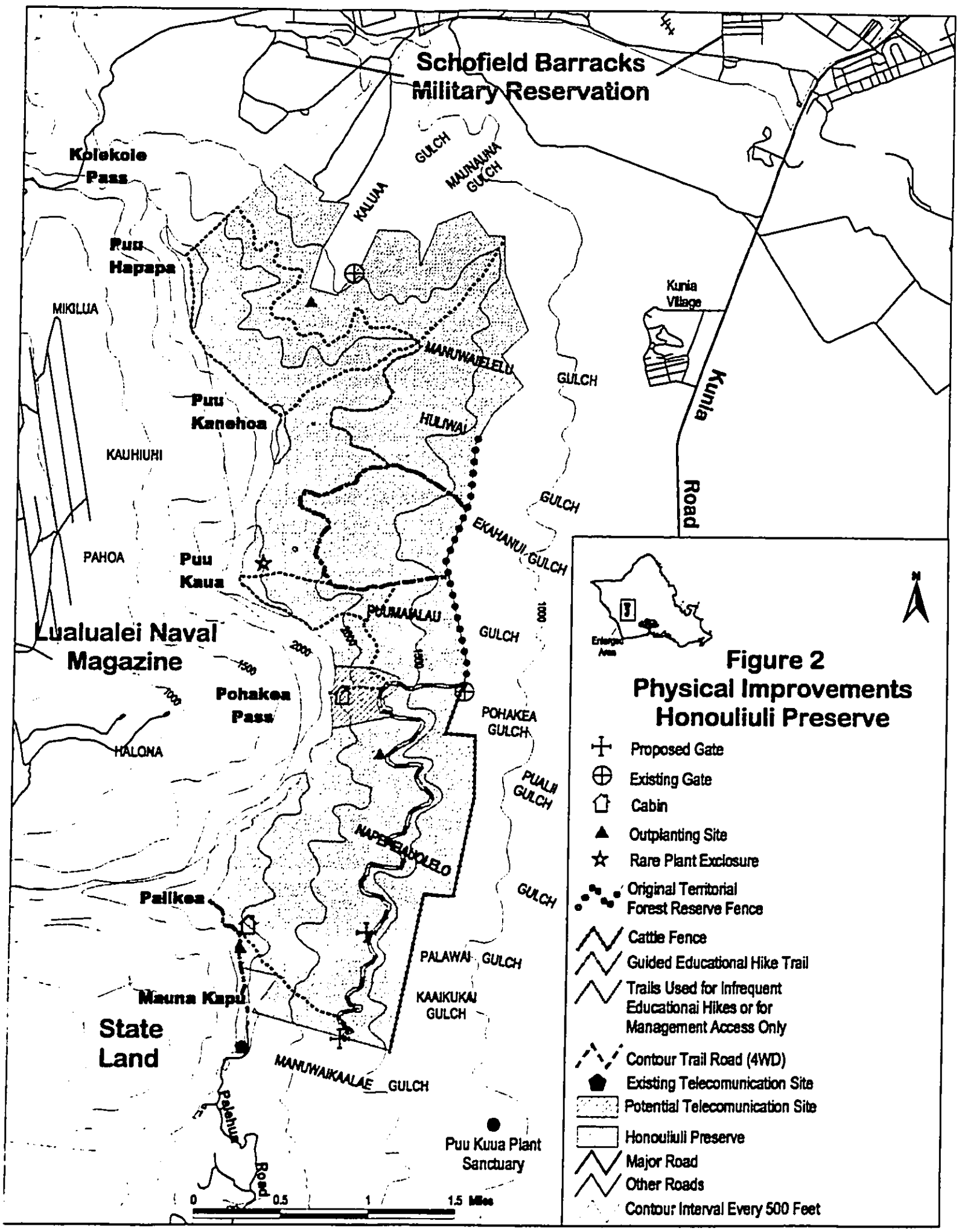
Physical Improvements

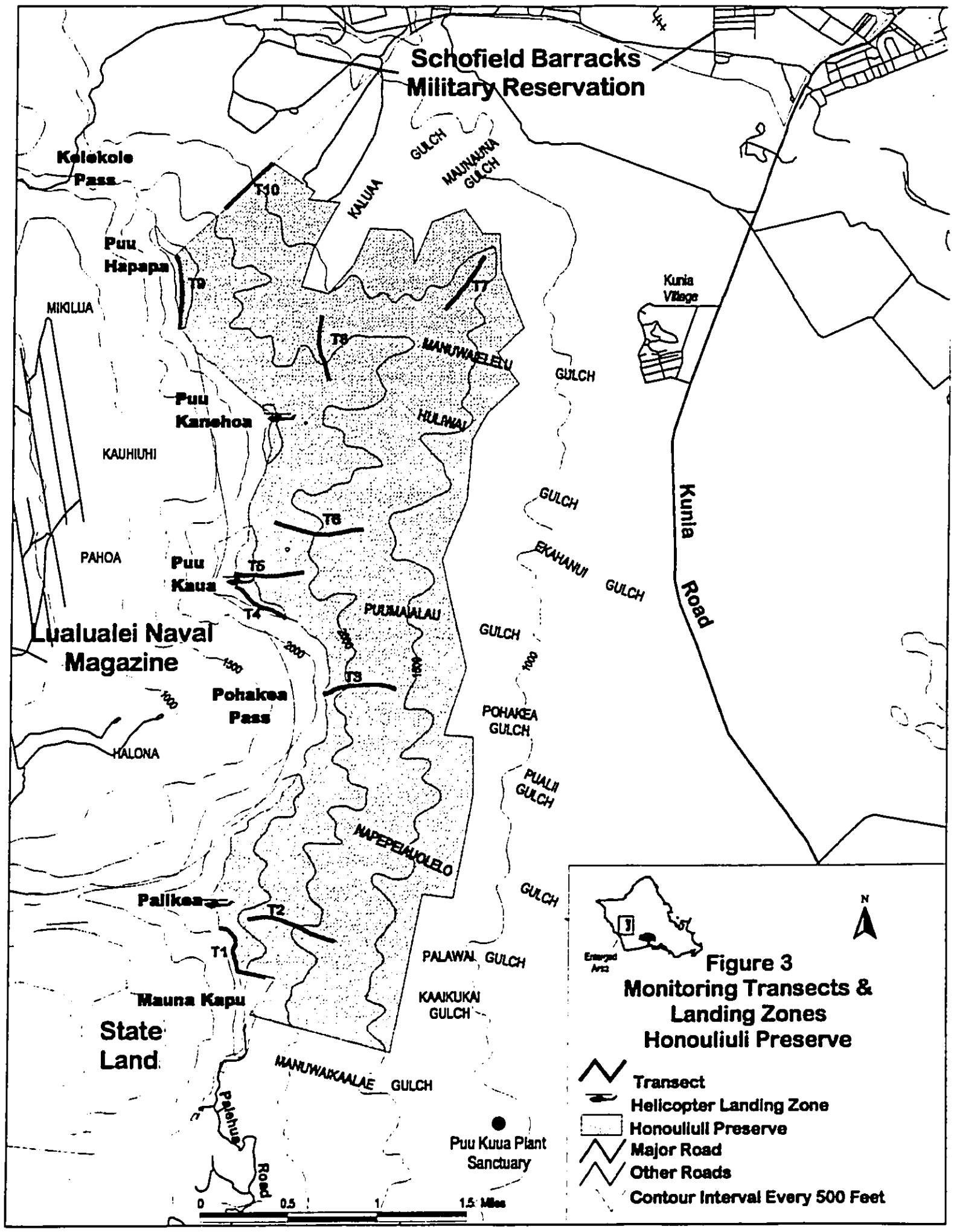
Physical improvements in the preserve include several historic trails, cabins, and a cattle fence; and more recently constructed gates, signs, and small, rare plant exclosures (Figures 2 and 3). There are also telecommunications sites just southwest of the preserve boundary. The Honouliuli Contour Trail, originally built by the Civilian Conservation Corps in the 1930's, has been partially recleared since the Conservancy took on management of the preserve in 1990. Five miles of trail in the preserve's southern section has been reopened to its former jeep width, and can accommodate 4WD vehicles in case of an emergency. Historically, the Contour Trail ran along at 1,800 feet elevation from Kolekole Pass at Schofield Barracks south to the Palehua Road. The trail became overgrown after large trees knocked down by Hurricane Iwa in 1982 discouraged hiking groups from their regular trail maintenance. The recleared portions of the trail serve as emergency and management access, and The Nature Conservancy uses a section for educational hikes to expose people to Hawaiian natural history and conservation.

Several other trails in the preserve follow ridges and access peaks, and are occasionally used for management and infrequent recreational hikes by groups who traditionally used the area before it became a preserve. The most frequently used ridge trail is Palikea Trail, which runs along the ridge from the end of Palehua Road (above Makakilo) at Mauna Kapu, ending just short of the Palikea summit. Other ridge trails include Pu'u Kanehoa and Pu'u Hapapa (entered from Kolekole Pass), and Pu'u Kaua (entered from the Kunia area). Due to the presence of endangered plants and animals adjacent to preserve trails, these may be accessed by the public only with prior permission of The Nature Conservancy. We usually require that groups be accompanied by Conservancy staff or trained hike leaders (docents). It should also be noted that summit and ridge trails contain sections that are steep and narrow, and the trails are not maintained for recreational hiking.

Additional historical improvements include two abandoned, dilapidated cabins. One is on Pohakea ridge; the other is at Palikea. These cabins were utilized by territorial forestry workers. An old cattle fence stretches along the former Forest Reserve boundary (which is also the current preserve boundary) from the preserve's southeast corner to the Pohakea Pass gate. This fence is currently being maintained by cattle ranchers operating on adjacent lands. An unmaintained section of the fence extends from Pohakea Pass to Huliwai (Figure 2).

More modern improvements added and maintained by The Nature Conservancy include two gates. One is just outside the preserve boundary at Pohakea Pass; the other, also just outside the preserve, is at Kalua'a. We have also installed preserve use signs at the bottom of Maunauna, Pu'u Kaua, Wiliwili, and at the northern boundary ridge trail. Additionally, the Conservancy constructed three outplanting exclosures in 1994, and another exclosure to protect wild rare plants in 1997. These cover roughly 300, 2,000, 1.2, and 1,600 square meters


Schofield Barracks
Military Reservation
Kolekole
Pass
Puu
Hapapa
MIKILUA
Puu
Kanehoa
KAUHIUHI
PAHOA
Puu
Kaua
Lualualei Naval
Magazine
Pohakea
Pass
HALONA
Palikea
Mauna Kapu
State
Land
Puu Kuua Plant
Sanctuary
Pelehua
Road
KALUAA GULCH
MAUNAUNA GULCH
MANUWAIELELU GULCH
HULIWAI GULCH
EKAHANUI GULCH
POLIMAHLAU GULCH
POHAKEA GULCH
PUALII GULCH
NAPEEHAOULO GULCH
PALAWAI GULCH
KAAIKUKAI GULCH
MANUWAIKAALAE GULCH
Kunia
Village
Kunia
Road
0
0.5
1
1.5 Miles
Figure 2
Physical Improvements
Honouliuli Preserve
Proposed Gate
Existing Gate
Cabin
Outplanting Site
Rare Plant Exclosure
Original Territorial
Forest Reserve Fence
Cattle Fence
Guided Educational Hike Trail
Trails Used for Infrequent
Educational Hikes or for
Management Access Only
Contour Trail Road (4WD)
Existing Telecomunication Site
Potential Telecomunication Site
Honouliuli Preserve
Major Road
Other Roads
Contour Interval Every 500 Feet


Schofield Barracks
Military Reservation
Kolekole
Pass
T10
KALUAA
GULCH
MAUNAUNA
GULCH
Puu
Hapapa
T9
MIKILUA
T7
T8
MANUWAIELELU
GULCH
Puu
Kanehoa
HULIWAI
KAUHIUHI
T6
PAHOA
Puu
Kaua
T5
T4
PUUMAIALAU
GULCH
Lualualei Naval
Magazine
2000
1500
1000
T3
Pohakea
Pass
POHAKEA
GULCH
HALONA
PUALII
GULCH
MAPEPEIAOLELO
GULCH
Palikea
T2
T1
PALAWAI GULCH
Mauna Kapu
KAAIKUKAI
GULCH
State
Land
MANUWAIKAALAE GULCH
Palehua
Road
Puu Kuua Plant
Sanctuary
0
0.5
1
1.5 Miles
Kunia
Village
Kunia
Road
Enlarged
Area
N
Figure 3
Monitoring Transects &
Landing Zones
Honouliuli Preserve
Transect
Helicopter Landing Zone
Honouliuli Preserve
Major Road
Other Roads
Contour Interval Every 500 Feet

and are found at the "Levin site" (inside the preserve at 1,700 feet in elevation near the Contour Trail), Kalua'a, Palikea, and Ekahanui, respectively (see outplanting sites and rare plant exclosures mapped on Figure 2). The Levin, Kalua'a, and Ekahanui fences were constructed using galvanized hog wire, "t" posts, and barbed wire. The small Palikea exclosure was made from rebar and chicken wire. The Levin, Kalua'a, and Palikea barriers were built to exclude pigs from rare plant outplanting sites. The Ekahanui fence was constructed to protect a naturally occurring rare plant population from pigs.

Adjacent to the preserve's southwestern corner at Mauna Kapu, the Estate of James Campbell leases telecommunications sites. The Estate maintains the right to construct additional telecommunications facilities elsewhere on the preserve at sites first approved by The Nature Conservancy (see lease summary on pages 12 and 13).

Native Natural Communities

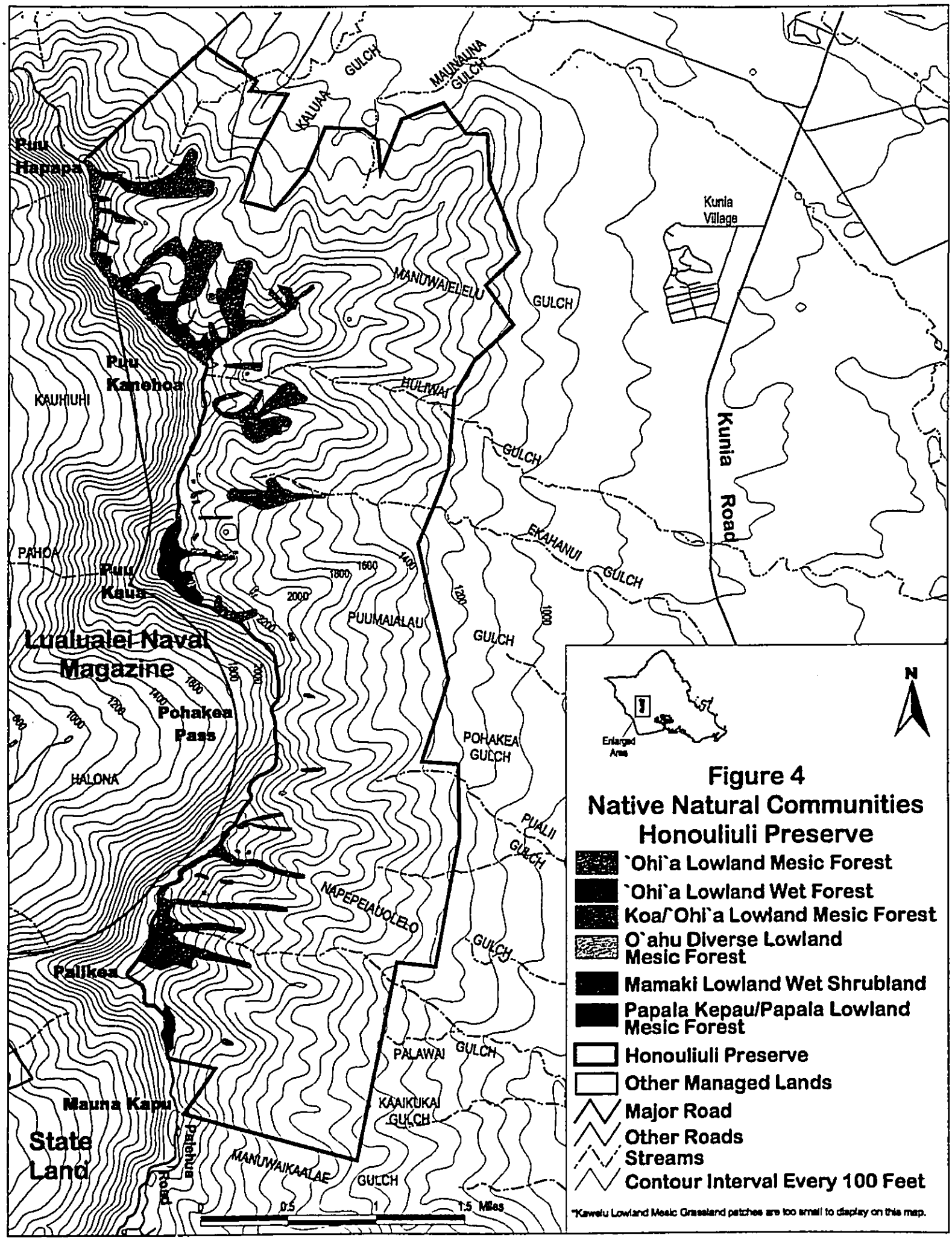
Honouliuli Preserve contains seven native natural community types (Appendix 2). For a community to be considered native, native species must comprise at least 60% of the community. The native communities occupy small pockets of the preserve, mostly in the higher elevations (Figure 4); non-native, or alien-dominated communities, cover most of the preserve. However, native species, and even rare plants, occur in these alien-dominated communities. Of the seven native communities in Honouliuli Preserve, one is considered rare, the O'ahu Diverse Lowland Mesic Forest. In general, rare natural communities occur in fewer than 20 locations worldwide.

Due to the dry nature of this region, there are no perennial streams inside the preserve. There are, however, several intermittent streams that flow during periods of heavy rainfall. At certain times of the year, these streams may provide suitable habitat for native aquatic invertebrates. Historically, ranchers have tapped seeps and springs in the southern portion of the preserve. The current status of these water sources is unknown.

Rare Plants

Hawai'i is known for its large numbers of endangered species, and more listed endangered plants have been reported from Honouliuli Preserve than from any other Nature Conservancy preserve in the state. In all, 66 rare plants have been recorded from Honouliuli Preserve. Twenty of these have not been seen for 15 or more years; these are known as historical taxa (see Appendix 3). We use the Hawai'i Natural Heritage Program's definition of rare: taxa that are known from 20 or fewer locations worldwide.

Forty of the 66 rare plant taxa reported from Honouliuli Preserve have federal status as listed endangered species, and one is listed as threatened. Another six taxa on the list have been recommended by the Pacific Region Office of the U.S. Fish and Wildlife Service (USFWS) to become candidates for listing as endangered or threatened, while 15 taxa are considered by USFWS to be "species of concern." The remaining four species on the list, although not


GULCH
MAUNAUNA GULCH
KALUAA
Puu Hapapa
Kunia Village
MANUWAIELELU
GULCH
Puu Kanehoa
KAUHIUHI
HULIWAI
GULCH
Kunia Road
PAHOA
Puu Kaua
EKAHANUI GULCH
1800
1600
1400
2000
1200
1000
PUUMAIALAU
GULCH
Lualualei Naval Magazine
Pohakea Pass
POHAKEA GULCH
HALONA
PUALII GULCH
NAPEPEIAUOLELO
GULCH
Palikea
PALAWAI GULCH
Mauna Kapu
KAAIKUKAI GULCH
State Land
Palehua Road
MANUWAIKAALAE
GULCH
0
0.5
1
1.5 Miles
Enlarged Area
N
Figure 4
Native Natural Communities
Honouliuli Preserve
`Ohi`a Lowland Mesic Forest
`Ohi`a Lowland Wet Forest
Koa/`Ohi`a Lowland Mesic Forest
O`ahu Diverse Lowland Mesic Forest
Mamaki Lowland Wet Shrubland
Papala Kepau/Papala Lowland Mesic Forest
Honouliuli Preserve
Other Managed Lands
Major Road
Other Roads
Streams
Contour Interval Every 100 Feet
*Kawelu Lowland Mesic Grassland patches are too small to display on this map.

protected by law or otherwise recognized by federal or state officials, are considered rare by the Hawai'i Natural Heritage Program (HINHP).

In addition to the 66 rare plant taxa reported from the preserve, another 10 plants known either currently or historically from Honouliuli are considered by USFWS to be species of concern. However, based on information currently available, these plants are not considered rare by HINHP. These 10 plants are listed in Appendix 3 along with the 66 confirmed rare taxa discussed above.

Rare Animals

Three rare or locally uncommon birds have been reported from Honouliuli Preserve (Appendix 4): the O'ahu 'elepaio (a candidate for federal endangered status), pueo (Hawaiian short-eared owl), and 'i'iwi. The pueo and 'i'iwi are not globally rare, but they are uncommon on O'ahu. In fact, the O'ahu populations of these species are considered endangered by the State of Hawai'i. 'I'iwi have not been seen within the preserve since 1986; however, O'ahu 'elepaio are seen there regularly.

Several species of rare snails and insects have also been reported from the preserve. Two of these are listed endangered tree snails, *Achatinella mustelina* and *Achatinella concavospira*. Other rare snails reported currently or historically from the preserve include species from the following genera: *Amastra*, *Armsia*, *Auriculella*, *Cookeconcha*, *Endodonta*, *Laminella*, *Leptachatina*, *Pleuropoma*, and *Pterodiscus*.

Honouliuli Preserve has not been extensively surveyed for arthropods (insects, spiders, mites, etc.). However, a number of insects believed to be rare or declining have been reported from Honouliuli Preserve. For example, three species of *Drosophila* that are candidates for listing as endangered or threatened were collected from the preserve in 1997 (see Appendix 4). It should be noted that the USFWS has been actively identifying candidate Hawaiian plants and animals for listing as endangered or threatened. Over the course of this 10-year management plan, the list of endangered and threatened plants and animals known from Honouliuli Preserve is expected to grow.

Threats

The primary threats to Honouliuli's biological and aesthetic values stem from the invasion of non-native or "alien" plants and animals, including ungulates (hoofed animals), small mammals (especially mongooses and rats), alien birds, weeds, pest insects and other invertebrates, and disease-causing organisms. The brown tree snake (*Boiga irregularis*) is also a potential, serious threat. This species has been captured in nearby Schofield Barracks, where it was presumably transported in military cargo from Guam. The Nature Conservancy is an active participant in efforts to prevent the establishment of the brown tree snake in Hawai'i.

Some habitat-modifying weeds on this site include white moho (*Heliocarpus popayanensis*), clidemia (*Clidemia hirta*), strawberry guava (*Psidium cattleianum*), and *Passiflora suberosa*.

Honouliuli contains several alien communities dominated by *Eucalyptus* spp., Christmas berry (*Schinus terebinthifolius*), fire tree (*Myrica faya*), Australian red cedar (*Toona ciliata*), and ironwood (*Casuarina equisetifolia*). Feral pigs (*Sus scrofa*) and goats (*Capra hircus*), black twig borer (*Xylosandrus compactus*), two-spotted leafhopper (*Sophonia rufofascia*), and the carnivorous snail *Euglandina rosea* are additional alien threats to the natural resources of Honouliuli Preserve.

Fire is another serious threat, as are illegal visitors (e.g., hikers, hunters, other recreationists, marijuana growers, plant/animal collectors). Rare and endangered plants can be found right along some trails. These plants are particularly susceptible to trampling or other direct damage that can be caused by machetes, mountain bikes, motorbikes, and horses. Unescorted visitors, especially motorbike enthusiasts, are also the most likely source of future destructive fires.

Historical/Archaeological and Cultural Sites

The State Historic Preservation Division (SHP) has limited archaeological information for the Honouliuli area prior to Western contact. According to SHP, there are three likely uses of the area. These uses can help predict the types of sites that may be present in or near the preserve.

- Historical documents refer to a major trail that passes over Pohakea pass down to approximately today's Kunia Road. Although the exact route is not known, some visible rest shelters are likely to be present along the trail.
- There may be scattered shelters, exploitation sites, and access trails associated with general forest gathering activities (e.g., for feathers, timber, and medicinal plants).
- Gulches may contain features such as cultivation sites, associated temporary field shelters, and religious/traditional cultural sites.

SHP has determined that of all the projects proposed in the long-range management plan, only a few (fencing and reforestation) might impact historic sites. According to SHP, "both should easily have 'no effect' on historic sites, if prior checks of the project area are conducted."

Adjacent Natural Resources

There are biologically significant areas on lands adjacent to Honouliuli Preserve. The Lualualei Naval Magazine was surveyed by HINHP biologists in 1994. Twenty-nine rare and endangered plants were identified, in addition to the O'ahu 'elepaio. Most of the rare elements were reported from the slopes on the east side of the installation, near Honouliuli Preserve. Some of the installation's alien species, especially the invasive weed Australian tree fern (*Cyathea cooperi*) and feral goats, threaten Honouliuli Preserve's native plants and animals.

There is a strip of state-owned land on the steep slopes between the Naval Magazine and Honouliuli Preserve. A number of rare plants have been seen here.

The southwestern corner of the preserve abuts the Nanakuli Forest Reserve. This area, surveyed by HINHP in 1987, contains some significant biological resources. There are a

number of rare plants on this state-owned land, and on the shared boundary between the Forest Reserve and Honouliuli Preserve.

According to a report prepared by HINHP in 1994, more than 20 rare plant taxa have been reported from the Pu'u Hapapa region of the Schofield Barracks Military Reservation (SBMR) (immediately north of Honouliuli Preserve). Several of these are listed endangered species that are included in the rare plant list for Honouliuli Preserve. Most of the rare birds and snails listed in Appendix 4 have also been reported from the Pu'u Hapapa region of SBMR. This area was ranked as a Priority 1 Biologically Significant Area in the HINHP report.

Approximately 0.6 mile east of the southeastern corner of Honouliuli Preserve is the state-maintained Pu'u Ku'ua Plant Sanctuary, established in 1935. This is an exclosure containing one mature *Gardenia brighamii* tree. In addition to maintaining the fencing, State Division of Forestry and Wildlife staff have conducted some rat (*Rattus* spp.) control (diphacinone bait boxes) and outplanting.

Sensitive Habitats

The habitats and resources listed above and in the appendices are regarded as sensitive, and are found both within and adjacent to Honouliuli Preserve. The intent of all proposed management activities is to provide long-term protection to these species and habitats. Potential negative effects of management activities such as introduction of new weeds along newly constructed fences, trails, or monitoring transects are recognized, and special precautions will be taken to minimize the risks. Any management activities that may affect adjacent sensitive habitats will be coordinated with appropriate staff from these organizations to avoid potential negative impacts.

General Description of the Action's Technical, Socio-economic and Environmental Characteristics

Action's Technical Characteristics

The mission of management at Honouliuli Preserve is to halt further degradation of native ecosystems, to protect and enhance reproduction of rare native plants and animals wherever possible, and to use the preserve and its programs to promote public and scientific understanding of the importance of native forest resources. TNCH has entered into a number of agreements to facilitate management at Honouliuli Preserve. These are summarized below.

1. In 1990, the Estate of James Campbell granted The Nature Conservancy a conservation lease for the area that is now known as Honouliuli Preserve. The lease was made for the purpose of identifying, preserving, protecting, enhancing, and restoring the ecological, scientific, and aesthetic values of the area. This includes the elimination of threats to the natural ecological values, and the preservation, protection and enhancement of the property as habitat for native Hawaiian natural communities and plant and animal species.

The term of the lease began on April 18, 1990 and will expire on its 30th anniversary. Up to two 10-year extensions may be obtained by The Nature Conservancy, bringing the total lease term to 50 years. The Nature Conservancy maintains the right of first refusal to purchase the upper elevation areas of the preserve should the landowner desire to sell the property. Sections of the lease related to use are summarized here to identify the most visible use rights.

The conservation lease allows The Nature Conservancy to construct fences to limit damage by ungulates; to remove feral pigs and other foreign animals and plants which threaten the preserve; to construct and maintain cabins and shelters for the support of field work; to access the preserve by existing roadways and trails on Estate land adjacent to the preserve; *to construct*, maintain, and improve roads and trails on preserve property; to hike, camp, and hunt and allow others to hike, camp, and hunt under established preserve regulations; to use horses, pack animals, or motorized vehicles on existing roadways and horses or pack animals on existing trails; to conduct scientific research, fund raising, educational activities, and field trips; and to control weeds and wildfire.

The Estate of James Campbell (lessor) maintains the right to construct and maintain telecommunications facilities within the Pohakea Pass Telecommunications Easement area and Mauna Kapu areas as outlined in the lease. Telecommunications facilities may be constructed elsewhere on the property at sites first approved in writing by the Conservancy. Additionally, the lessor maintains the right to inspect the property for fire and safety hazards; to hike and camp along existing trails, and to allow groups to hike in accordance with Conservancy regulations designed to insure that the ecological values of the property are not adversely affected; to use horses, pack animals, and jeeps on existing roads, and horses and pack animals on existing trails in accordance with regulations established by the Conservancy; to hunt ungulates, game birds, and other animals not afforded protection under any governmental law and within regulations developed by the Conservancy; and to maintain existing roads and trails.

The lessor is prohibited from changing, disturbing, altering, or impairing the natural values of the property. In addition, the lessor is restricted from: grazing, constructing roads and trails, dumping or disposing of refuse, applying biocides, using horses or pack animals off established trails or contrary to Conservancy regulations, operating motorized vehicles off established roadways, and using mobile homes, trailers, signs, billboards, or other structures. The lessor may not use the property during times of extreme fire hazard except to fight fires using Conservancy-approved equipment. Smoking or using camp stoves or other fire outside designated areas is prohibited. Lastly, removal or destruction of flora or fauna, as well as introduction of new flora or fauna, are prohibited.

2. An agreement between The Nature Conservancy and the State Division of Forestry and Wildlife supports wildfire suppression. The current agreement, renewed in 1995, will expire in the year 2000.

Management Considerations

The mission of management at Honouliuli Preserve is to halt further degradation of native ecosystems, to protect and enhance reproduction of rare native plants and animals wherever possible, and to use the preserve and its programs to promote public and scientific understanding of the importance of native forest resources. The management programs described in this plan are designed to achieve these goals, and are affected by the following considerations:

1. As a result of access restrictions, and steep terrain on adjacent state and federal lands, the preserve is only accessible by crossing private lands. Honouliuli Preserve is accessed primarily from the south, east, and northeast. Palehua Road passes through locked gates and the Palehua residential community, providing access to the southern portion of the preserve. There are several access points along the eastern and northeastern portions of Honouliuli; these are reached by crossing 4WD roads on private agricultural lands. The Conservancy coordinates all access to help ensure the safety of preserve users. In addition, educational or other activities may be limited to alien-dominated areas, as these activities could damage fragile native habitats.

   Honouliuli Preserve covers a large area, and contains steep and rugged terrain. Some areas that are most important, from a biological standpoint, are also difficult to access due to their remoteness. As a result, extended overnight stays, and helicopter transportation are needed to complete some work.

2. Much of the preserve is dominated by alien plants, due to a long history of site disturbance and reforestation with non-native species. Priority Management Areas (PMA's) are identified within native-dominated forest areas (Figure 4). Management will be focused primarily in these PMA's. Alien-dominated areas that contain concentrations of rare species are also a priority. However, staff also work to control incipient weed species wherever they occur inside the preserve; this will prevent costly future eradication efforts.

3. Eighty percent of the state's 1.1 million residents live on O'ahu and represent a potentially large base of support for the protection of native resources. In addition, students and researchers at the University of Hawai'i at Manoa and other O'ahu institutions could be encouraged to research ways to protect and enhance native species on the preserve. The preserve would be an ideal outdoor classroom for science and other courses. The Conservancy encourages such uses at Honouliuli; however, a balance must be reached between public use, with its potential for volunteer and educational opportunities, and protection of the preserve's rare plants, animals, and natural communities. In all cases, management decisions will be made to prevent damage to sensitive habitats.

4. Honouliuli Preserve is a part of the Wai'anae Mountains, a region of distinctive native species, ecosystems, and threats. The Conservancy works with neighboring landowners, including the U.S. Army, State of Hawai'i, and others, to promote collaborative

management efforts for the Wai'anae region. It is our belief that such partnerships will maximize the effectiveness of conservation projects.

5. Since Honouliuli Preserve's establishment, The Nature Conservancy has conducted minimal management due to limited funding. We can only conduct the work outlined in this plan with the help of dedicated volunteers, along with increased financial assistance from private and corporate donors, foundations, and granting agencies. Without such support, we will not successfully reach the goals outlined herein.

Management Goals

The basic management programs and management techniques to protect the preserve's resources are described on the following pages, and specific goals and objectives are identified. A timetable for implementation and completion of these objectives is not specified, as our rate of accomplishment will rely upon available funding. We consider this an ambitious plan that will take greater levels of funding, staffing, and volunteer assistance than currently available. While we are committed to seeing an increase in these resources, we are unable to accurately predict the rate of increase, and have, therefore, not attempted to document it here. Annually, we will prepare an operational plan based on this long-range plan, which will document each year's specific activities and available resources.

The management programs outlined in this plan are described roughly in order of priority; however, all activities are interrelated, and focusing solely on one program area will not adequately protect the preserve's resources. Decisions to begin specific management tasks must be made based on available resources and the probability of continuing the project until reaching the desired goal. This will mean making some difficult choices, and in some cases, not embarking upon important projects until enough resources are committed to do the job well.

Habitat Protection and Enhancement

If we are to be successful preserving Honouliuli's native plants and animals in the long term, we must ensure that these organisms are components of healthy, functioning ecosystems. In short, we must look beyond the needs of individual rare taxa, focusing instead on the entire system. *Ex situ* ("out of place") propagation successes will be of limited value if there are no suitable areas in which to reintroduce rare and endangered species. Therefore, protecting and improving areas that contain intact, native habitat is our primary management goal at Honouliuli Preserve. There are four components to this program: weed control, ungulate control, small mammal control, and fire control. These are discussed in detail on the following pages.

Weed Control

GOAL: To remove habitat-modifying weeds from high-quality native habitats and prevent the introduction or spread of problem weeds.

Weed control at Honouliuli focuses on 1) controlling habitat-modifying plants in patches of intact native vegetation, 2) eradicating incipient species before they become major pests within native areas, and 3) preventing the introduction of additional alien plants. (Weed control aimed specifically at rare plant recovery is addressed in the Rare Species Recovery section of this plan.)

Weeds (also referred to in this plan as "pest plants") present one of the most pervasive threats to the native ecosystems at Honouliuli. Our highest priority in weed control is to limit habitat-modifying plants within native areas. Habitat-modifying alien plants have the potential to partially or completely displace native vegetation through shading, smothering, or by chemically altering the soil. Most of the major weeds at Honouliuli are fast-growing trees that can quickly reach into the canopy; however, vines and invasive grasses are also of concern. Table 1 is the current list of priority weed species for Honouliuli Preserve. The weeds on this list will be targeted for removal in and around intact native areas and rare plants. Due to the vast scope of the weed control problem at Honouliuli, it will be important to set priorities. Therefore, a Weed Control Plan containing specific, measurable objectives, will be prepared in FY1998. Priority control areas will be identified, along with target control levels for each species.

To date, most of our efforts to prevent the introduction of new species into Honouliuli have focused on preserve visitors. For all visitors, we stress the importance of cleaning boots, and packing out what you pack in. Management staff also follow prevention protocols to reduce the risk of inadvertently introducing new species (especially weeds and alien invertebrates) into the preserve. We also work with neighboring land managers on projects of mutual concern to limit potential new weed sources around the preserve. There are several natural resource agencies working throughout the Wai'anae Mountains. We informally share

Table 1. Priority pest plants of Honouliuli Preserve.

Scientific name	Common name	Growth habit
Clidemia hirta	Koster's curse	Shrub
Fraxinus uhdei	Tropical ash	Tree
Grevillea robusta	Silk oak	Tree
Heliocarpus popayanensis	White moho	Tree
Melinis minutiflora	Molasses grass	Grass
Myrica faya	Fire tree	Tree
Panicum maximum	Guinea grass	Grass
Passiflora suberosa	Corky passion flower	Vine
Psidium cattleianum	Strawberry guava	Tree
Schinus terebinthifolius	Christmas berry	Tree

information about priority weeds with several of these groups; however, we would like to work toward a more formal partnership.

We employ a combination of manual and chemical control methods, using non-restricted use herbicides. Herbicide use will be strictly limited, and in full compliance with the State Department of Agriculture's pesticide branch. Herbicides that are used, or being considered for use, are Garlon 3A, Garlon 4, Round-up, Round-up Pro, EZ Ject glyphosate capsules, and one or more grass-specific herbicides that we have not yet identified. Staff may employ additional herbicides as appropriate, under the direction of the State Department of Agriculture's pesticide branch. Small amounts of herbicides, diluted in water or an oil-based carrier, will generally be applied in solutions that are dripped directly on cut stumps or in frill cuts, or by using an EZ Ject lance (injecting glyphosate capsules). Localized spraying of grasses with a backpack sprayer may be employed in selected areas on non-windy days. Herbicide amounts used inside the preserve will be recorded annually.

If deemed safe and effective, we may also employ biocontrol agents. We would first need to secure permission from The Nature Conservancy's home office, and from state agencies. Prior to the Conservancy's management of this area, one or more biocontrol agents aimed at controlling *Clidemia hirta* were released. We do not have much information about the agent(s) released or the area targeted for control; as a result, we cannot gauge the effectiveness of the released agents. However, *Clidemia* is abundant in much of the lower portion of the preserve, and is present in smaller numbers at higher elevations.

Monitoring is another component of our weed control program. In the past, staff have walked along 500m-long transects noting the presence and abundance of pest plants. The usefulness of this technique is being called into question; as a result, in FY1998 we will re-evaluate our weed monitoring strategy. A brief report will be written documenting the methods to be used to monitor weeds preserve-wide. If transects are used, we will determine the optimal number and placement of the transects, and the recommended monitoring frequency.

1. **Complete and maintain current weed management plan for Honouliuli Preserve.**
   - Prepare plan; update every 3 years, incorporating recent information on control status and distribution for the various targeted pest plants.
   - Update priority pest plant list every 3 years based on the pest plants' distribution, known control methods, and disruptive potential.

2. **Reduce populations of priority weeds, and continue control of specific incipient weeds threatening native forest areas and/or native plants.**
   - In priority intact native areas of Palikea, Palawai, Ekahanui, and Kalua'a, reduce populations of all priority pest plants found.
   - Limit expansion and reduce populations of *Myrica faya* in the Palikea region, and *Heliocarpus popayanensis* in Ekahanui and Huliwai gulches.
   - Work toward complete removal of: all populations of *Cyathea cooperi* in the Palikea – Kaua region (including Lualualei Naval Magazine), both populations of *Chrysophyllum oliviforme* in Ekahanui, and the one known population of *Ardisia elliptica* in Kalua'a.
   - Conduct additional weed control tasks outlined in weed control plan.

3. **Monitor weeds to track their status and the efficacy of control measures, and to locate new weeds of concern.**
   - In FY1998, re-evaluate techniques to be used to monitor incipient and established weeds on a preserve-wide basis. Document results.
   - Monitor weed control technique trials to determine the most effective control methods, and establish trials for additional weed species as needed.
   - Utilize photopoints to document condition of weed-infested sites prior to, and after, control work.
   - Map populations of selected localized and incipient weed species in Honouliuli (including *Ardisia elliptica*, *Chrysophyllum oliviforme*, *Myrica faya*, and *Glycine wightii*); update maps every 3 years.

4. **Prevent the introduction of new weeds.**
   - Train staff and volunteers to follow alien species prevention protocol.
   - Form a partnership of O'ahu agencies and land managers to routinely refine pest plant species lists and control strategies; work together to remove pest species from lands in the Wai'anae region.
   - Educate preserve users about Hawai'i's alien species crisis; stress the importance of prevention.

Ungulate Control

GOAL: Prevent ungulates from degrading native forest patches and damaging rare plant populations.

The majority of Honouliuli Preserve is dominated by introduced vegetation. Native-dominated patches of vegetation remain largely along the summit areas and steep slopes. Our ungulate control program focuses on protecting these native-dominated areas, and on protecting rare and endangered plants and animals.

Historically, cattle, goats, and pigs have all affected the native vegetation of Honouliuli Preserve. Cattle and goats were driven from the preserve area in the late 1800's/early 1900's. Currently, these two ungulates pose a threat along certain portions of the preserve boundary. Two cattle ranches border the preserve along the southeast. We work with these ranchers to identify breaks in the fence caused by cattle, vandals, or other factors; once a break is found, ranchers are generally quick to remove their animals from the preserve and repair the fence. Although there are no goats inside the preserve now, a well-established goat population in the Lualualei Naval Magazine, near the preserve's western boundary, is growing and moving closer to Honouliuli over time. They are especially close to the Pu'u Kaua and Pu'u Hapapa summit areas. The Pu'u Kaua population contains an estimated 20–50 animals. There is little or no hunting pressure on these goats due to restricted access; our strategy to keep goats out of the preserve includes cooperative work with the Navy to reduce the goat population in Lualualei. Goats have also been reported in the Nanakuli Forest Reserve, but we have not observed any evidence of this.

Feral pigs occur in varying densities throughout the preserve, especially in the wetter gulches and upper elevations, and have been historically hunted (though not always with permission of the landowner, the Estate of James Campbell). The Nature Conservancy would like to engage hunters who have utilized the area in the past in an organized volunteer hunting program; to date, we have collected names of hunters we find in the preserve to serve as a base for our volunteer hunter group.

Ungulate control methods will include volunteer, staff, and contract hunting, strategic fencing, exclosure fencing, and trapping. We may experiment with the use of baits and attractants in conjunction with trapping. We expect that hunting combined with fencing will be our primary strategy. Monitoring is another important component of our ungulate control program. Currently, ungulate sign (tracks, digging, browsing, droppings) is noted along ten ungulate/weed monitoring transects annually. These transects are distributed throughout the preserve (Figure 3). In FY1998, as we re-evaluate the usefulness of the weed monitoring transects, we will also determine the best strategy for monitoring ungulates preserve-wide. In smaller areas where our goal is to keep ungulate activity[2] at zero, or below 10%, we plan to install supplemental monitoring transects to help measure success.

The Nature Conservancy has received funding to construct a fence in Palawai gulch in FY1998 to protect several critically endangered plant species from feral pigs. This project is outlined in detail in Appendix 5.

1. **Reduce pig activity in identified areas, and prevent goats and other ungulates from entering the preserve.**
   - Identify areas in which pig activity will be kept below 10%.
   - Identify areas in which pig activity is targeted for zero.
   - Organize a volunteer hunting steering group to oversee volunteer hunting program.
   - Implement volunteer hunting program; educate hunters regarding sensitive areas and sensitive species; coordinate hunters for safety and efficiency of control.
   - Initiate staff and contract hunting as needed to supplement volunteer efforts.
   - Coordinate feral goat control with other natural resource agencies and landowners in the Wai'anae Mountains.
   - Prevent livestock incursion by monitoring the condition of ranch fences and working with ranchers to improve the fences as needed.

2. **Monitor ungulate activity throughout the preserve.**
   - In FY1998, re-evaluate techniques used to monitor ungulates on a preserve-wide basis. Document results.
   - Map ungulate activity using information obtained from routine scouting and incidental sightings by staff and volunteers.
   - Monitor areas where ungulate activity is targeted below 10%, and zero, to gauge success of control program.

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[2] Ungulate "activity" is an index calculated based on the amount of ungulate sign detected. For example, if fresh sign is present in 10 out of 100 transect stations, the activity level is said to be 10%.

- Collect data from volunteer hunters on take: age, size, sex of animals, and location taken. Track volunteer hunter hours.
- Review data annually; determine trends based on control efforts, and revise control program as warranted.

3. **Determine priority areas for fencing, and install fences.**
   - Construct Palawai gulch fence (see Appendix 5); remove any ungulates from within exclosure.
   - Identify additional priority areas for perimeter fences based on multiple rare and endangered plant species, intact native vegetation, and suitable terrain.
   - Reduce ungulate incursion, and improve the effectiveness of removal efforts by blocking key ungulate access and travel routes with strategically located fencing.

Small Mammal Control

GOAL: Prevent small mammals from damaging rare native species, and limit their impact within intact native natural communities.

Rats and mice are known to damage native ecosystems by consuming or damaging flowers, fruits, and other plant tissues, and by reducing native invertebrate populations. Mongooses and rats also prey on native birds, especially nestlings. At Honouliuli Preserve, a number of rare and endangered plants and land snails are threatened by rats. To date, control efforts have been minimal, but in the coming years we plan to increase these efforts, primarily around endangered plants and snails, and in native-dominated areas.

Currently, we plan to effect control using traps and/or poison bait. The anticoagulant diphacinone is registered for use in natural areas in Hawai'i under a Section 24c registration (also known as a special local use registration) All diphacinone use would be in accordance with the special local use registration. Bait would be deployed in tamper-proof boxes. The State Department of Agriculture is tracking diphacinone use in Hawai'i, and requires annual notification of use. Bait is currently limited to 16 ounces per station at any one time. All areas baited would be posted in accordance with requirements. We may also deploy other types of rodenticides, and other means of deploying diphacinone (e.g., aerial drops of loose bait blocks within fenced areas) if they are approved for use in Hawaiian natural areas, and if they are shown to be safe and effective.

1. **Control small mammals around critically rare plants (both outplanted and natural populations) believed to be susceptible to rodent damage.**

2. **Control small mammals around identified *Achatinella mustelina* populations.**

3. **Control small mammals within selected patches of intact, native natural communities to reduce seed and seedling predation.**

Fire Control

GOAL: Prevent all wildfires in the preserve, prepare for wildfire response, and assist lead fire-fighting agencies in aggressively responding to and suppressing wildfires.

In general, fire is not recognized as a natural phenomenon important to the maintenance of native ecosystems in Hawai'i. More aggressive introduced plants are typically the first to colonize areas burned by fire, resulting in conversion of native-dominated areas to non-native communities. For this reason, the Conservancy's Hawai'i fire policy is total suppression. On Conservancy preserves in Hawai'i, our focus is on prevention, building inter-agency support for the objectives outlined in the preserve's fire plan, and assisting the lead fire-fighting agency in any aspect of a fire — from logistics to providing trained Conservancy personnel for the fire line. All fire suppression tactics are carried out under the direction of the lead fire suppression agency, usually, the Honolulu Fire Department (HFD) (City and County of Honolulu), and assisted by the State Division of Forestry and Wildlife (DOFAW). The Nature Conservancy has a Memorandum of Understanding with DOFAW for wildfire suppression activities at Honouliuli Preserve.

Fire management activities fall into three categories: prevention, presuppression, and suppression. Suppression is addressed largely in the O'ahu Preserves Wildfire Management Plan, which documents contact phone numbers and the emergency response system chain of command, including primary wildfire response agencies (HFD and DOFAW). The plan includes maps showing preserve resources such as roads, trails, and helicopter landing sites; and other notable features such as the location of locked gates and nearby water sources. The fire plan notes that the rugged terrain of the preserve precludes use of heavy equipment such as bulldozers for fire line construction within the preserve boundaries (except on the Contour Trail Road), and calls for careful use of fire suppressants, i.e., retardants, wetting agents, and foam, and salt water around native-dominated areas. The Conservancy calls a meeting of these agencies, and neighboring agricultural companies, annually to update the fire plan.

Presuppression activities focus on maintaining access where feasible in the preserve. The Honouliuli Contour Trail is maintained in the southern portion of the preserve (south of Pohakea Pass) as an emergency access road and fuel break, and is mowed two to four times annually as warranted by vegetation growth. Five areas along the Contour Trail are kept clear as emergency helicopter landing sites to facilitate movement of people and equipment into the preserve in case of emergency.

Other presuppression measures include reducing human-related fire sources by a thorough risk-hazard analysis. This conceptual approach is covered under the Public Programs section of this plan.

1. **Maintain presuppression activities.**
   - Annually review and revise Wildfire Management Plan with state, county, and federal fire-fighting officials.
   - Inspect Contour Trail road quarterly to determine if mowing is necessary.
   - Utilizing a contractor with a 4WD mower, mow Contour Trail road section two to four times annually, as warranted by vegetation growth.

- Maintain road bed of the Contour Trail road as needed.
- Work with neighboring landowners and fire-fighting agencies to clear existing, remaining portion of the Contour Trail road south of (outside) the preserve.
- With DOFAW, conduct risk-hazard analysis to identify 1) areas where public access needs to be restricted, and 2) public education needs.

2. **Maintain fire readiness.**
   - Participate in fire training offered by state and federal agencies; all staff will remain current in basic fire-fighting (course number S130/190 or equivalent) and more advanced training as appropriate.
   - Maintain personal fire packs and safety equipment.

3. **Reduce fuel loads through vegetation manipulation.**
   - Experiment with native and Polynesian-introduced tree planting (transplanting and planting seeds and seedlings) along the Contour Trail to shade out grasses.
   - Control alien grasses in selected areas using small amounts of herbicides in addition to planting.

Rare Species Recovery

GOAL: Promote the recovery of critically imperiled species through a combination of threat abatement at key population sites, *ex situ* propagation to increase population levels, and establishment of additional wild populations.

This program consists of rescue efforts for critically rare plants and animals. While habitat protection is the most effective, long-term way to protect native species, some plants and animals are down to such low numbers that *ex situ* propagation is needed to safeguard their survival until the wild habitat can be stabilized. The high number of taxa in need of single species management at Honouliuli requires us to set priorities for the management of these taxa. One of the objectives of this plan is to continue to gather information that will help us set these priorities, especially for rare plants.

Rare plant threat control at Honouliuli includes: ungulate control (covered in the Ungulate Control section of the plan), small mammal control (see previous information related to diphacinone use), slug control using approved baits and barriers, weed control (see methods outlined in Weed Control section), insect control (with approved pesticides), and public education. Where needed, propagation and outplanting work will be done to promote the recovery of critically rare plant taxa.[3]

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[3] The following list of rare plant taxa, some of which may no longer exist at Honouliuli Preserve, includes the most likely outplanting candidates: *Abutilon sandwicense*, *Bonamia menziesii*, *Cyanea grimesiana* ssp. *obatae*, *Cyanea pinnatifida*, *Gardenia brighamii*, *Hibiscus brackenridgei* ssp. *mokuleianus*, *Delissea subcordata*, *Schiedea hookeri*, *Solanum sandwicense*, *Stenogyne kanehoana*, *Tetramolopium lepidotum* ssp. *lepidotum*, *Urera kaalae*, and *Viola chamissoniana*. Additional taxa might also be outplanted, if their status changes or if new information concerning their status becomes available.

With funding from the Department of Defense's Legacy Resource Management Program, seven rare plant taxa were outplanted at three sites in Honouliuli Preserve in 1994: *Delissea subcordata, Gardenia brighamii, Hibiscus brackenridgei* ssp. *mokuleianus, Nototrichium humile, Schiedea hookeri, Tetramolopium lepidotum* ssp. *lepidotum*, and *Urera kaalae*. Plants were protected from ungulates by exclosure fencing. Weeds, slugs, and rodents were also controlled. Although all outplanted individuals survived their first year, approximately half died during the ensuing years. Most of the surviving plants are healthy; these are monitored annually.

Future rare plant research and outplanting efforts at Honouliuli are likely to include the following activities: monitoring, propagule collection and transfer to suitable nursery facilities, outplanting site preparation (small-scale clearing, installation of temporary irrigation systems, exclosure construction), and threat control. All necessary state and federal endangered species permits will be acquired and maintained.

For the past several years, a population of *Achatinella mustelina* has been the focus of field research and reintroduction experiments at Honouliuli. Results of the reintroduction experiment were mixed, and there are no immediate plans to continue this work. However, the Conservancy would cooperate with qualified researchers wanting to pursue this type of work in the future. Management and research-related actions to promote the recovery of *Achatinella* at Honouliuli Preserve could include: small mammal control, *Euglandina rosea* control, collection of *Achatinella* for propagation in the laboratory, reintroduction of offspring to suitable sites within the preserve, and monitoring (marking, measuring, and recapturing individual snails over time). Small mammal control would consist of trapping for rats and mongooses, and might include the use of toxicants to control rats (see Small Mammal Control section). Dr. Michael Hadfield has been developing a bait to control the cannibal snail *Euglandina rosea*; barriers are also somewhat effective and could be used at Honouliuli Preserve. All necessary state and federal endangered species permits would be acquired and maintained.

Honouliuli also contains O'ahu 'elepaio, a candidate for endangered or threatened status. As with *Achatinella*, the Conservancy is willing cooperate with others to promote this subspecies' recovery. Potential management or research-related activities include rodent control, mist netting, banding, and drawing blood from individual birds to detect avian malaria or other diseases. Again, the necessary permits would be acquired and maintained.

1. **Maintain and monitor wild colonies of critically rare plants.**
   - Monitor rare plants annually, collecting data on threats, habitat, plant health, and reproductive status.
   - Annually summarize results of monitoring.
   - Construct exclosure fences around critically rare plants, as appropriate.
   - Judiciously control habitat-modifying plants in the vicinity of critically rare plants as needed.
   - Identify, then control, additional threats (e.g., rats, slugs, insects, fire, humans) around critically rare plants.

2. **Outplant additional rare taxa.**
   - With cooperating nurseries, collect and propagate seeds and cuttings.

- Acclimate nursery-raised plants to field conditions.
- Prepare planting sites: e.g., remove competing alien plants, erect fences, install watering systems, and supply water using helicopter transportation.
- Plant rare plants during wet season.

3. **Maintain and monitor outplanted populations.**
   - Control threats (e.g., rats, slugs, insects, weeds, ungulates, fire, humans) around rare outplanted plants.
   - Monitor growth, flowering/fruiting cycles, and threats to planted populations.
   - Summarize results of monitoring.

4. **Improve our understanding of the preserve's critically rare plants.**
   - Work with experts to refine list of priority rare plant taxa, and to determine recovery actions.
   - Visit areas where critically rare plants have been reported historically, and other suitable habitat, in order to locate additional plants or populations.

5. **Where feasible, cooperate with qualified researchers to promote the recovery of *Achatinella*.**

6. **Where feasible, cooperate with qualified workers to promote the recovery of O'ahu 'elepaio.**

Native Habitat Restoration

GOAL: Revegetate degraded areas and re-establish native canopies, focusing on opportunities to reduce fuel loads, expand native forests, and reduce opportunities for weed establishment.

The native forests within Honouliuli Preserve were dramatically degraded around the turn of the century. Currently, stands of invasive weeds such as strawberry guava (*Psidium cattleianum*) inhibit understory growth and accelerate erosion. Other species of introduced trees, such as the forestry plantation species silk oak (*Grevillea robusta*) are dying, leaving large areas without a canopy. These areas are susceptible to invasion by non-native grasses, which add to the potential fuel load of standing dead trees. These immediate threats, and the longer-term threat of the urban zone expanding ever closer to the preserve require a buffer area in the lower elevations, and make restoration a high priority in Honouliuli Preserve. Unfortunately, management funding for the preserve to date has been inadequate to launch a full-scale restoration effort.

In the past 3 years, restoration work within Honouliuli has been done on a very small-scale, experimental basis. With initial moneys from a memorial restoration fund, and the hard work of volunteers and high school students, we have established two dry forest plantings (Wiliwili Grove and the Legacy Grove) in an area near the center of the preserve known as Wiliwili ridge. We will expand these areas and increase our stock of planting materials. For the future, we will develop a restoration plan to guide our restoration work. Forest composition prior to degradation is unclear; the restoration plan will identify the suite of species we will use for

restoration of various areas. Restoration will also be done in conjunction with any wide-scale alien plant removal.

1. **Expand revegetation efforts at Wiliwili ridge.**
   - Continue to maintain and expand Wiliwili Grove using monthly high school work trips.
   - Maintain and expand Legacy Grove with assistance from volunteer groups.
   - Encourage participation from Legacy Club members at least annually.

2. **Identify restoration priorities (e.g., sites, natural community types, species) and implement planned work.**
   - Identify sites appropriate for restoration.
   - Write restoration plan; update every 5 years.
   - Implement programs as outlined in the restoration plan.

3. **Work with U.S. Forest Service, DOFAW, and University of Hawai'i researchers to improve understanding of the impacts of past reforestation activities on native forest restoration.**
   - Encourage DOFAW to include Honouliuli in timber inventory work.

Monitoring and Research

GOAL: To track biological and physical resources of the preserve and evaluate changes in these resources over time; to identify new threats before they become established; and to promote research that guides management programs.

Resource monitoring differs from ungulate and weed monitoring in that its purpose is to document and quantify natural resources (e.g., native vegetation, native birds) and track them over time, identifying trends. (Rare plant and snail monitoring are covered in the Rare Species Recovery section.) Accurately quantifying changes in natural resources provides land managers with the information needed to determine the efficacy of past management programs, and to plan future research and management in Honouliuli. Also included here is the monitoring of physical parameters that affect biological resources (e.g., weather).

We will use a network of monitoring plots to quantify and better understand Honouliuli's vegetation. The initial round of vegetation monitoring is scheduled for FY1998 or FY1999; plots will be monitored every 10 years thereafter. We will also begin to collect data on weather (temperature, relative humidity, and light intensity) at six sites within the preserve, with rainfall and wind speed data collected at two of those six sites (see Appendix 6 for more details).

Weather is an important factor affecting the distribution, survivorship, and reproduction of plants and animals. Data collected from the weather stations will be correlated with other types of information (qualitative and quantitative) to help us interpret changes in the condition and distribution of the preserve's plants and animals.

A number of scientists have taken advantage of Honouliuli Preserve's unique setting and accessibility to collect or observe native plants and animals. As was mentioned earlier, research has also been conducted in recent years on the endangered snail *Achatinella mustelina*. In addition to this work, U.S. Forest Service staff are investigating the fate of some of Honouliuli's old forestry plantations. Work currently proposed includes activities such as leaf litter collection, collection of leaves from living trees, small-scale planting/trenching, and digging to collect soil core samples and root samples. In 1994, the Department of Defense also sponsored research projects (conducted by Conservancy staff) on rare plant management and weed control.

We recognize the need for additional research to assist us with the management of the preserve's rare plants and animals, and to guide restoration efforts. Therefore, we maintain a research needs list that details questions we need answered in order to better manage the preserve. This list is promoted through the University of Hawai'i's Secretariat for Conservation Biology. Where feasible, we will also provide logistical assistance to researchers.

1. Monitor preserve resources.
   - Install and maintain permanent weather monitoring stations at key sites in preserve.
   - Install plots, and initiate vegetation monitoring in priority areas on a 10-year cycle.
   - Analyze monitoring data and adjust management as warranted by the data.
   - Encourage DOFAW to include Honouliuli Preserve in its regular, statewide forest bird monitoring program (each main island is currently monitored every 5–6 years); assist with surveys.
   - Facilitate Audubon Society's collection of data from Honouliuli during its annual Christmas Bird Count.

2. Promote research to help guide management programs.
   - Publicize preserve research needs list through the Secretariat for Conservation Biology.
   - Provide logistical assistance to researchers.

Public Programs

GOAL: Build public support for preserve protection and biodiversity conservation through education and public outreach activities.

At the foothills of Honouliuli Preserve is Kapolei, O'ahu's "Second City," where agricultural fields are being converted to housing. The city of Kapolei is expected to experience the most growth of all O'ahu areas over the next 20 years, with the addition of 53,000 residential units, an 800-acre business park, 4,000 new hotel rooms in a recently completed resort area, and 26,000 new jobs, both professional and industrial. The population of the region is projected to increase to 126,400 by 2010, from a 1993 population of less than 45,000. The community is represented by a variety of ethnic groups, including Hawaiians, Caucasians, Filipinos, and various Asian groups; there is also a large transient military population. This increased urbanization makes Honouliuli an even greater natural asset, providing opportunities to the community for recreation, a connection to the natural world and native habitats, and a link to Hawai'i's cultural heritage.

This incredible influx of new residents and the expansion of housing developments poses an increased human threat to the preserve as people look to the mountains for recreation and subsistence. However, this increase also provides an opportunity to engage a greater segment of O'ahu's population in conservation issues. Our outreach program is aimed at increasing support for natural resource protection statewide, by using Honouliuli Preserve as a place where people can learn about the importance of this protection, and to become vested in the conservation effort by contributing to the protection of native species and forests.

1. **Increase community outreach to promote awareness of important preserve resources.**
   - Share information about the preserve through a variety of non-preserve forums, including media, community group meetings, and civic clubs.
   - Using volunteer docents, continue guided hikes at least three times per month, and actively pursue participation from leeward community groups.
   - Develop an island-wide community outreach strategy that identifies and builds new allies for natural resource conservation issues.
   - Improve portions of the Palikea and Contour Trails as needed to ensure hiker safety.
   - Monitor and report on public use of the preserve.

2. **Develop Public Use/Recreational Use Plan.**
   - Delineate use areas and sensitive habitats; identify upper limits of public use for various areas to protect preserve resources.
   - Work with recreational clubs to identify desired uses, and consider if these are consistent with preserve protection goals.

3. **Use volunteers to accomplish preserve management goals.**
   - Develop a volunteer corps with varying levels of commitment and skills required. Conduct twice-monthly work trips to achieve preserve biological goals, and maintain trails; use individual volunteers on a weekly basis to supplement field crew.
   - Market volunteer trips to high schools; fill a minimum of one work trip per month (during the school term) with high school groups.

4. **Improve notification and enforcement of access restrictions to reduce trespass.**
   - Continue to work with Del Monte Security and preserve neighbors to install gates along controllable routes.
   - Post signs at key access points to improve our ability to enforce no trespassing rules and laws.
   - Post fire danger awareness signs.
   - Initiate area patrols, using volunteers, to educate trespassers about fire danger.
   - Explore enforcement options.

Administration

GOAL: Support operations of the preserve with adequate staffing, equipment, and planning.

Honouliuli staff includes a Program Director, Field Coordinator, and periodic Field Technician staff (depending on available funding). The Program Director and Field

Coordinator split their time between O'ahu and Lana'i preserves. This is a very small staff for the ambitious tasks outlined in this plan, especially considering the necessary administrative and planning time that reduces hours available for field work. For all of the tasks outlined in this plan, we need to see a steady increase in funding, staff, and volunteer effort over the course of this plan. (Our Volunteer Program is addressed in the previous section.)

The O'ahu Program rents space from the Hawai'i Agriculture Research Center in their Kunia Substation. The substation is ideally located to access the preserve, and provides both office and equipment storage and maintenance space for O'ahu staff. Two vehicles are used for field management work, with a third vehicle (an all-wheel drive van) available for volunteer and hike activities. Regularly utilized field equipment include, power tools such as chain saws and weed whackers, hand tools such as folding saws and loppers, specialized equipment such as herbicide applicator bottles and cargo nets for remote area helicopter flights, and communication equipment including cellular telephones.

1. **Increase permanent staffing through new grants, contracts, partnerships, and fundraising opportunities.**

2. **Maintain effective working conditions for staff.**
   - Continue to provide training opportunities for staff to improve field safety and knowledge of current management techniques.
   - Purchase and maintain tools and equipment to support management programs.
   - Maintain baseyard and office facility for optimal organization and safety.

3. **Continue cooperative projects with adjacent landowners and state and federal agencies.**
   - Actively pursue regional projects under general cooperative agreements with the State Department of Land and Natural Resources and USFWS.
   - Continue informal cooperative field projects with neighboring land management staff.

4. **Prepare plans to guide annual and long-term work by Conservancy staff on O'ahu.**
   - Prepare annual plan and report on previous year's progress by August 1 of each year.
   - Update long-range plan by August 1, 2006.

Action's Socio-economic Characteristics

Two primary socio-economic benefits will result from the proposed project: watershed protection, and public education. This project will also create conservation jobs on O'ahu.

The Wai'anae Mountains, while not as wet as the Ko'olau range, are an important watershed. Native vegetation is an essential component of this watershed system. Forest cover protects fragile mountain soils from erosion, and acts like an immense sponge that absorbs heavy rains. Water is gradually released into streams and groundwater aquifers, rather than running off the surface in torrents to the sea. Management activities will promote a more stable water regime

both within and below the project area by reducing the potential for rapid runoff from disturbed or degraded areas within the watershed area.

Staff routinely give presentations to community groups on the importance of protecting natural areas in Hawai'i. Utilizing trained docents, the Conservancy also provides educational hiking opportunities to the general public. In addition, volunteers and student interns are routinely used in management projects.

Action's Environmental Characteristics

This project will benefit the environment by maintaining and restoring native ecosystems and preserving biological diversity. A host of rare plants, animals, and natural communities known from Honouliuli Preserve will be better protected as a result of this project. These benefits far outweigh the expected and potential impacts described below.

III. Summary of Major Impacts

Major Impacts – Positive

- Control of ungulates, rats, and other animal pests.
- Reduction of the range of habitat-modifying weeds and prevention of introduction of new problem weeds.
- Tracking of biological resources in the preserve and evaluation of changes in these resources over time.
- Prevention of extinction of rare species in the preserve.
- Watershed management.

Major Impacts – Negative

Below we discuss a number of expected or potential negative impacts of the proposed project. Impacts related to general management are discussed, as are impacts related to fence and weather station construction. Any significant negative effects would be short-term, and far outweighed by related positive effects.

Management-related Impacts

One potential impact of our management is the accidental introduction or spread of new weed species by managers or visitors on equipment, supplies, or transport vehicles. Also, because herbicides will sometimes be used to control habitat-modifying weeds in the preserve, there is a remote possibility of localized soil contamination. Because we are planning to use diphacinone bait blocks to control rats, there is a small chance that non-target animals will be poisoned. It is also possible that there will be some visitor impacts (e.g., trampling) along trails.

Construction-related Impacts

We have immediate plans to build a fence in Palawai gulch to protect critically endangered plants (see Appendix 5). It is also likely that future fences will need to be constructed. For projects such as this, the clearing of the fenceline and initial construction will cause disturbance to plants along a 4-foot wide corridor, around field camps, and on temporary trails used by the crews. Based on past experience, we can predict with some certainty that this damage will be temporary and will heal naturally within a period of months. One or more temporary field camps will be set up in the forest, and small helicopter landing zones will be cleared.

In FY1998 we plan to construct six weather stations (see Appendix 6). Construction-related impacts will be minimal; the main impact will be digging holes (one hole for each station, 2 feet deep and 1 foot in diameter) for the partial weather stations, and pounding in the posts for the guy wires holding the complete weather stations. A second impact will be aesthetic; it's possible that the tops of the weather stations will be seen by hikers and other area users.

For both fence and weather station construction, periodic increases in the noise level (due to helicopters and the use of small power tools) could disturb forest birds in the immediate vicinity of fences. The O'ahu 'elepaio, a candidate for listing as endangered or threatened, is known from Palawai gulch and other parts of the preserve. Nevertheless, we do not anticipate any *significant* adverse effects on birds, insects, snails, or other native fauna. Soil disturbance is expected to be temporary and confined to the fencelines, campsites, and temporary trails. No changes in normal rainwater runoff or percolation are expected, and special care will be taken to avoid such problems as they would threaten fence integrity.

Construction of fences might interrupt any existing travel routes used by pigs.

IV. Proposed Mitigation Measures

Management-related Mitigation Measures

To prevent the accidental introduction or spread of weeds or alien invertebrates, staff and volunteers entering the preserve are required to clean their clothing, boots, equipment, and camping gear of soil, plant material, and insects. Wherever possible, helicopter flights into the

preserve will originate from areas free of invasive pest plants, and all materials hauled in will be inspected and cleaned to remove soil, plant material, and insects. Helicopter landing sites and areas frequented by staff will be inspected for weeds. To prevent contamination of soil or water with pesticides, all field staff have been trained in the safe application of chemicals. Weed control staff are licensed by the state Department of Agriculture's pesticide branch, and herbicides are used selectively, and according to label instructions. Similarly, the rodenticide diphacinone will be used in accordance with the label information, which includes notifying the Department of Agriculture before planned use of this pesticide. We will utilize tamper-proof or tamper-resistant bait boxes designed to minimize the chances of non-target animal poisoning. The Nature Conservancy will continue to work with the informal Toxicant Registration Working Group to employ the safest, most effective rodent control techniques.

With a few exceptions, visitors are escorted by staff or trained volunteer hike leaders. This minimizes the chances that hikers will damage sensitive resources, and ensures that visitors will stay on established trails. Staff informally monitor damage along frequently used trails, and adjust the number of organized hikes to prevent such problems.

Construction-related Mitigation Measures

In all of the sites disturbed by fence and weather station construction and maintenance, strict protocols will be used to 1) clean all gear carried into the forest to prevent the introduction of new weeds or other pests, 2) monitor for and remove as necessary any weeds that become established or expand as a result of the disturbance, 3) maintain a clean work site, and 4) minimize the impacts of camping. Fencelines will be surveyed by botanists (and, where needed, other experts) to ensure that no rare or endangered species are harmed.

Fence construction could affect cultural or archaeological sites, if present. Prior to construction, the State Historic Preservation Division will be consulted to determine if any sites are known from the area. Moreover, if any evidence indicating the existence of archaeological sites is found, work on the project will halt immediately until proper authorities can be notified and mitigation actions can be planned.

Because the fences could interrupt ungulate travel routes, it is critical that pig control work get underway in coordination with fence construction to be sure that pigs do not cause severe forest damage as they attempt to cross the new fencelines. Hunting will be our primary ungulate removal method.

We will establish photo points along fencelines to track changes in vegetation. Additionally, in Palawai gulch, we will initiate monitoring of the *Silene perlmanii* and *Phyllostegia parviflora* var. 1, as well the former location of *Solanum sandwicense.* We will continue this monitoring after the fence project is complete, and monitor additional rare plant populations within the fence as funds allow.

V. Alternatives Considered

Although we considered a variety of alternatives involving lower levels of management, we decided that the actions outlined in this assessment are all necessary for the immediate protection of rare plants, animals, and natural communities. Slowing the pace of management could jeopardize progress made in controlling habitat-modifying weeds and other threats. Similarly, a no-action alternative would promote the loss of native species.

This is the preferred alternative.

VI. Determination

No significant negative impacts to the environment are expected to result from the implementation of the proposed activities.

VII. Findings, and Reasons Supporting Determination

In summary, all activities are expected to be beneficial, or to have no long-term negative effects. Thirteen specific significance criteria are addressed below.

1. The proposed action *does not* involve an irrevocable commitment to loss or destruction of any natural or cultural resource. In fact, the proposed activities are expressly intended to benefit natural resources, including native species and native ecosystems.
2. The proposed action *will not* curtail the range of beneficial uses of the environment.
3. The action *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.
4. The proposed action *will not* substantially affect the economic or social welfare of the community or State. No effects of this nature are expected.
5. The proposed action *does not* substantially affect public health. No effects of this nature are expected.
6. The proposed action *does not* involve substantial secondary impacts, such as population changes or effects on public facilities.
7. The proposed action *does not* involve a substantial degradation of environmental quality; in fact, the opposite will be true.
8. The proposed action *will not* have considerable cumulative negative environmental effects (effects will be positive), and *will not* involve a commitment for larger actions.
9. The proposed action *does not* substantially negatively affect rare, threatened, or endangered species, or their habitat. By contrast, rare species and their habitat will benefit from the proposed action.
10. The proposed action *will not* significantly detrimentally affect air or water quality or ambient noise levels. Periodic increases in the noise level due to helicopters and the use of small power tools will be brief and largely restricted to unpopulated areas.
11. The proposed action *will not* affect or be likely to suffer damage by being located in an

environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

12. The proposed action *will not* substantially affect scenic vistas and viewplans identified in county or state plans or studies. No large-scale construction or clearing are planned.
13. The proposed action *will not* require substantial energy consumption.

VIII. EA Preparation Information

This Environmental Assessment was prepared by:

Wendy Fulks, Project Manager
The Nature Conservancy of Hawai'i
1116 Smith Street, Suite 201
Honolulu, Hawai'i 96817
(808) 537-4508

IX. Appendices

APPENDIX 1
COMMENTS RECEIVED DURING CONSULTATION
(AND RESPONSES)

Del Monte

[illegible] 1997

[illegible]

June 9, 1997

Ms. Wendy Fulks
Nature Conservancy of Hawaii
1116 Smith Street
Honolulu, Hawaii 96817

Dear Wendy:

I apologize for this late reply. The draft of the Long-range Management Plan for the Honouliuli Preserve is a good document. I do have a few comments to make, first under the Management Programs for Weed Control section it states that, "the introduction of new species into Honouliuli have assumed that people are the primary vectors of alien plants within the preserve." I don't understand what this statement is trying to convey? Are you implying that people purposely introduce alien plants in the preserve? I agree that people may track alien plant seeds into the preserve with contaminated personal equpment. People do bring to our islands illegal alien plant seeds that could become a problem in our environment. I feel there are additional vectors for the possible introduction of alien plants into the preserve such as birds, mammals, possibly insects, and the wind from sources surrounding the preserve, and they should be considered.

Under the section Threats, there is no mention of the Brown Tree Snake from Guam. What is the Nature Conservancy's position on the possible introduction of this reptile into the preserve? Are you working proactively with the state or military to prevent its introduction? This threat could be a very serious one for the rare plants and animals in the preserve.

Lastly I would like to comment on your need to control weeds and ungulates in the preserve. I agree with this task. I do feel the future restoration plan you will develop should be comprehensive and have time allocation and contraints to guide your restoration work. My main concern would be the possibility of potential soil and water erosion in the preserve and the resulting impact on the lands we farm below , expecially if the chemical and mechanical control of weeds and ungulates isn't balanced with an aggressive revegetation effort.

In closing I would like to express my support and my company's support in your efforts to improve and upgrade the areas you manage in the Honouliuli Preserve for the benefit of the citizens of our state and for the future generations in Hawaii.

Sincerely yours,

Robert W.T. Pang
Agribus. Mgr

The Nature
Conservancy
of Hawai'i
1116 Smith Street
Honolulu, Hawai'i 96817
Phone (808) 537-4508
Facsimile (808) 545-2019

The Nature Conservancy
International
Headquarters
1815 North Lynn Street
Arlington, Virginia 22209
http://www.tnc.org

The Nature Conservancy of Hawai'i

July 15, 1997

Mr. Robert W.T. Pang
Agribusiness Manager
Del Monte Fresh Produce (Hawaii) Inc.
P.O. Box 200
Kunia, Hawaii 96759

Dear Mr Bob Pang:

Thank you for taking the time to review the Honouliuli Preserve Long-Range Management Plan, and for your statements of support. In your letter dated June 9, 1997, you raised some important issues. Several reviewers questioned our statement about humans being the primary vectors of alien plants in Honouliuli. As a result, we have modified the plan to better convey our intended meaning. That is to say, we realize that birds and other animals, and wind can be important alien plant vectors. However, to date we have focused on visitors because they are the one important vector we can effectively control at this time.

We have added a few sentences to the management plan about the threat posed by the brown tree snake. You will be interested to know that The Nature Conservancy is a member of the Brown Tree Snake Technical Committee. Along with a number of other agencies (e.g., the state Department of Agriculture, state Department of Land and Natural Resources, Department of Defense, and the U.S. Fish and Wildlife Service) The Nature Conservancy is actively working to prevent the establishment of brown tree snakes in Hawaii.

Finally, I agree that it is important to address the potential impacts of weed control, especially erosion. Therefore, we will couple any large-scale weed control projects with revegetation/restoration efforts. I have modified the management plan to make this intention explicit.

Once again, thank you for your comments. I hope I have adequately addressed your concerns. Please contact me if you have additional questions.

Sincerely,

Barrie

Barrie Fox Morgan
Director, Oahu/Lanai Programs

United States Department of the Interior

FISH AND WILDLIFE SERVICE

PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

JUN 11 1997

In Reply Refer To: CMC

Wendy Fulks
The Nature Conservancy of Hawaii
1116 Smith St.
Honolulu, Hawaii 96817

Dear Ms. Fulks:

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to review and provide comments on the Honouliuli Preserve Long- Range Management Plan. The Service applauds the Nature Conservancy of Hawaii for the preparation of a long term plan that addresses management on both an ecosystem and species level. We would like to offer the following comments and suggestions for your consideration.

Physical improvements

Paragraph 4: Four rare plant exclosures are discussed and referenced to figure 3 (Monitoring Transects and Landing Zones), yet this figure does not depict any exclosures. One rare plant exclosure is represented in figure 2 (Physical improvements) near Puu Kaua. It would be helpful to include all four rare plant exclosures in Figure 2 as it illustrates physical improvements.

Weed Control

Paragraph 6: The plan addresses securing permission from The Nature Conservancy's main office to release biocontrol agents. Given Hawaii's unique and extensive weed problem, the Service recognizes the need to consider biocontrol as part of a weed management strategy. However, as biocontrol agents may adversely affect native as well as threatened and endangered species, we recommend caution when considering their use. The Service emphasizes the need for extensive research and host specificity testing in order to avoid adverse impacts to Hawaii's native resources. The Service supports the Nature Conservancy in researching biocontrol and suggests exploring opportunities to cooperatively fund such research with neighboring land owners.

Action #3, bullet 2: The practicality of weed and ungulate monitoring transects as a tool for guiding management was recently addressed at the Alien Plant Control and Monitoring Workshop held at Hawaii Volcanoes National Park on Feb. 26 - 28. Brian Stevens of NARS found that transects were not useful in detecting small changes in vegetation (740 fifty meter belt transects per 10,000 acres of land are needed to detect a 3.5% change in vegetation). He suggested that by the time weed monitoring transects showed significant ingress, non-native plants would be well established. Furthermore, NARS advised that non-permanent transects monitored only once every 5 years would yield ample information and help to reduce disturbance. The Service believes the effectiveness of weed/ungulate transects in guiding management for TNC may be worth further consideration.

The Service appreciates the opportunity to provide comments on the Honouliuli management plan. We look forward to our continued working relationship. If you have any questions, please contact Fish and Wildlife Biologist Christina Crooker at (808) 541-3441.

Sincerely,

Karen J Rosa

for/ Brooks Harper
Field Supervisor
Ecological Services

The Nature
Conservancy
of Hawai'i
1116 Smith Street
Honolulu, Hawai'i 96817
Phone (808) 537-4508
Facsimile (808) 545-2019

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The Nature Conservancy of Hawai'i

July 15, 1997

Mr. Brooks Harper, Field Supervisor
Ecological Services
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3108
Box 50088
Honolulu, HI 96850

Dear Mr. Harper:

Thank you for taking the time to review the Honouliuli Preserve Long-Range Management Plan, and for your statements of support. As you pointed out, we mistakenly stated that Figure 3 depicted the preserve's rare plant exclosures/outplanting sites. The plan should have referred to Figure 2. I have corrected this mistake in the final long-range plan, and in the Environmental Assessment.

I agree with your cautionary statements regarding biocontrol agents. The Nature Conservancy typically requires extensive documentation, including monitoring results, before it approves the release of biocontrol agents in its preserves. I would like to discuss any ideas you have for cooperatively seeking funds for biocontrol research in the Waianae region.

We received several comments like yours questioning the usefulness of weed monitoring transects; as a result, we plan to revisit our threat monitoring protocol next fiscal year. We will abandon the 500m-long transects if they are not providing useful data.

Once again, thank you for your comments. I hope I have adequately addressed your concerns. Please contact me if you have additional questions.

Sincerely,

Barrie Fox Morgan

Barrie Fox Morgan
Director, Oahu/Lanai Programs

JUN - 4 1997

NA ALA HELE
Hawaii Trail & Access System

MEMORANDUM

2 June 1997

TO Barrie Morgan, Director, TNC Oahu/Lanai Programs
FR Curt Cottrell, NAH Program
RE Honouliuli Preserve Long Range Draft Management Plan

Mahalo for the opportunity to review the TNC Honouliuli Preserve (HP) Long Range Draft Management Plan. Since the HP is not managed for public recreation, NAH comments are very limited. In the plan, there is reference to the projected increase over the next 20 years in the population of the Ewa area as a result of the development of Kapolei. I agree that the value of HP as a natural asset will most assuredly increase over time, and that pressure for public access will increase. Since "official" unrestricted and unsupervised public access to the HP is not part of the TNC plan, it is very likely you will have a growing supply of volunteers to kokua your management of the HP!

My only substantive comment relates to the relationship between maintained trails and fire suppression. Maintained trails are very useful for 1) providing quick and safe access for fire crews to combat fire, and 2) depending on the degree of maintenance, also act as fire breaks. I have seen a three foot wide trail that had been recently been maintained by a crew with weedeaters stop a fire. Even though the HP plan states the the trails are not maintained for recreational hiking, as you proceed with trail maintenance activity, consider the value of scheduled trail maintenance for fire suppression. Your potential increase in volunteers may provide a means to do this. Sacrificing certain species along a trail to accomodate a maintenance standard may ultimately protect acres of the same species from the threat of fire.

xc Mike Buck
Aaron Lowe

MAY 19 1997

UNIVERSITY OF HAWAI'I

Pacific Biomedical Research Center

May 16, 1997

Ms. Wendy Fulks
The Nature Conservancy of Hawai'i
1116 Smith Street
Honolulu, HI 96817

Dear Ms. Fulks:

I have read the draft "Long-Range Management Plan for the Honouliuli Preserve," and have found it to be an excellent summary of the history and current conditions in the Reserve. The plans for future management are sound, and I sincerely hope that most of them can be realized. I have only two concerns about the plan. The first is simply an oversight, and the second is a worry about the Palawai Fencing Project that may be easily resolved.

On page 9, under "Threats" both rats and mongooses are missing. While rats are cited later as a problem, they should appropriately be listed here because they constitute one of the two major threats to the persistence of *Achatinella mustelina* and other native snails in the Preserve. The full problems associated with mongooses aren't known, but they are certainly a threat to nesting birds and their eggs.

The Palawai Fencing Project is admirable in its goal to fence pigs out of an area with many rare plant species. However, the plan to cut a four-foot wide swath down the summit in this region is potentially very damaging to tree snails. We have noted *Achatinella mustelina* in this area (in fact, it includes the site where we released captive-born snails in 1994), and a major destruction of vegetation for the fence line could have adverse effects. I am not as familiar with the terrain down slope from the summit, but it also may contain important snail populations. Perhaps the best plan is to include malacologists with the botanists (under "Construction Details" on p. A12) who will survey the fence corridor to locate rare species.

These minor "complaints" can be easily addressed, I'm sure. Thank you very much for giving me the opportunity to review the management plan. If there are ways that I can assist TNC in carrying out the plan, please let me know.

Sincerely,

Mike Hadfield

Michael G. Hadfield, Director
and Professor of Zoology

The Nature
Conservancy
of Hawai'i
1116 Smith Street
Honolulu, Hawai'i 96817
Phone (808) 537-4508
Facsimile (808) 545-2019

The Nature Conservancy

International Headquarters
1815 North Lynn Street
Arlington, Virginia 22209
http://www.tnc.org

July 15, 1997

Dr. Michael Hadfield, Director
and Professor of Zoology
Kewalo Marine Laboratory
41 Ahui Street
Honolulu, HI 96813

Dear Dr ~~Hadfield~~ Mike:

Thank you for taking the time to review the Honouliuli Preserve Long-Range Management Plan, and for your statements of support. We have addressed your concerns as follows:

Although the management plan did list "small mammals" as an important threat, it did not mention rats and mongooses. In response to your comment, mongooses and rats are now mentioned explicitly in the *Threats* section of the management plan. Also, to help ensure that the Palawai fence does not damage *Achatinella*, we will include a malacologist in the team that surveys the fenceline.

Once again, thank you for your comments. Please contact me if you have additional questions.

Sincerely,

Barrie

Barrie Fox Morgan
Director, Oahu/Lanai Programs

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO ATTENTION OF

JUL 11 1997

Directorate of Public Works

Ms Wendy Fulks
The Nature Conservancy of Hawaii
1116 Smith Street
Honolulu, Hawaii 96817

Dear Ms Fulks:

Thank you for the opportunity to review your Draft Long-range Management Plan for Honouliuli Preserve. We have the following comments to offer:

a. The plan can be improved with specific, time-lined, measurable, prioritized objectives arranged chronologically. For example, on pages 14 and 15 for weed control there is a goal but the objectives or sub-goals on page 15 could be more specific. A completion date for the weed plan would help. Statements such as "reduce populations of all priority pest plants found" and "work toward complete removal of" are vague and not measurable. Are populations going to be reduced by 1%, 10%, etc? Does "work toward" mean eliminate 2, 3, or 5 populations? The Army had difficulty in establishing good measurable objectives in its plans also. These specifics could be incorporated in the weed plan. Perhaps the TNCH plan should state that a Weed Plan will address these objectives.

b. Since TNCH is managing T & E species, recommend that the plan clarify if they as a lessee are assuming all the liability for the species, or if the land owner, Campbell Estate still has liability?

c. Page 16, lines 1 and 2 - The value of having only ten weed transects for the entire preserve is questionable. At the Alien Plant Control Conference this year, the State Division of Forestry and Wildlife (DOFAW) presented a paper stating that unless there is a saturation of transects, the data obtained is not very useful.

d. Page 19 - Pre-suppression activities should address a TNCH protocol for fire control during times of control burns / harvesting of sugar cane and pineapple fields below Honouliuli.

e. Page 26 - Under Administration the plan states that "for all of the tasks outlined need to see a steady increase in funding, staff, and volunteer effort over the course of this plan." Recommend that the plan quantify this by year on a table. In that way it will be a plan that can be something to strive for. Unless there are reasonable measurable objectives one does not know what to work toward or what to judge success on. The plan can always be revised each year depending on funding

f. Recommend including Oahu Elepaio in management. Encourage TNCH to monitor the birds by banding and obtaining disease information.

If you have any questions about our comments, please contact Mr. Steve Kim, Environmental Division, Directorate of Public Works, 656-2878, extension 1050.

Sincerely,

for Dennis J. Fontana
Colonel, U.S. Army
Director of Public Works

The Nature Conservancy of Hawai'i

July 15, 1997

Dennis J. Fontana, Colonel, U.S. Army
Director of Public Works
Directorate of Public Works
U.S. Army Garrison, Hawaii
Schofield Barracks, Hawaii 96857-5000

Dear Colonel Fontana:

Thank you for your well-considered comments to the Honouliuli Preserve Long-Range Management Plan. I agree with many of the statements you made, especially with regard to the need for more specific objectives and tasks. We have modified the plan to state that a Weed Control Plan will be drafted in fiscal year 1998. The plan will contain details about the species to be controlled, target levels of control, and priority control sites. With regard to funding and staffing levels, in this situation, it would not be a useful exercise to create detailed budgets for a 10-year management plan. Instead, operating budgets will be outlined, and objectives will be made more specific, in annual plans.

You asked if the Conservancy or the landowner (The Estate of James Campbell) assumes liability for threatened and endangered species. According to the U.S. Fish and Wildlife Service, from a federal standpoint, liability for threatened and endangered *plants* is not an issue on privately owned land. That is, there are no federal laws against "taking" or harming threatened or endangered plants on private property. Taking or harming threatened or endangered *animals* on private land is against federal law; in that case the party directly responsible for the damage is liable.

We received several comments like yours questioning the usefulness of weed monitoring transects; as a result, we plan to revisit our threat monitoring protocol next fiscal year. We will abandon the 500m-long transects if they are not providing useful data.

In response to your comment about the need to address fire control during controlled burns on adjacent agricultural lands, we have changed the plan to reflect the fact that we consult with agricultural neighbors annually to discuss fire issues. Please note that the agricultural companies are responsible for controlling fires started on their land.

Finally, as you suggested, we have expanded our tasks to include Oahu elepaio management work. I hope I have adequately addressed your concerns. Please contact me if you have additional questions.

Sincerely,

Barrie Fox Morgan

Barrie Fox Morgan
Director, Oahu/Lanai Programs

BENJAMIN J. CAYETANO

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
[illegible]

June 5, 1997

Mr. Barrie Morgan
Director, Oahu/Lanai Programs
The Nature Conservancy of Hawaii
1116 Smith Street
Honolulu, Hawaii 96817

Attention: Ms. Wendy Fulks

Dear Mr. Morgan:

Re: Response to Draft Long-range Management Plan for Honouliuli Preserve

Thank you for allowing us to review and comment on your draft plan. We have the following preliminary comments.

1. **Funding Methods and Priorities**

The draft plan makes no specific reference to funding amounts or sources. Any use of Government lands or funds is a trigger for environmental review. Given the limited funds from both government and private sources, it would be helpful to have dollar estimates for the implementation of the various goals and action items in your plan. Establishing a timeline or priority list for each of these various goals would help the reader realistically assess the likelihood of implementing each goal.

2. **Population Pressures**

The draft plan makes reference to the growing population in the Ewa region and notes the dangers and opportunities inherent with human contact. It would be useful to have a better idea of the carrying capacity of the reserve in light of its anticipated increase in intensity of use. Will the number of people allowed entry to the reserve need to be limited? Will the reserve be closed to hikers during a time of year to allow its recovery? Do any of the lessons learned in the management of places like Hanauma Bay apply to the Honouliuli Reserve?

JUN - 9 1997

3. **Telecom Sites**

The placement of telecommunication antennae throughout the island has become a persistent concern for policy makers and land managers. Co-location of competing service providers' antennae on a single tower is preferable to multiple towers. The increase in demand for these services, the increase in competing telecom companies and the increase in population in the area all point to a potential management problem for the reserve. The visual impacts of these antennae will be more acute as more residential development takes place in the area. The Conservancy should review and assess this issue in greater detail.

4. **Coordination with Military**

The draft plan references a cooperative relationship with the military in managing the resources in the Waianae Mountains. In recent years, the military has increased its sensitivity and commitment to protecting environmental resources in Hawaii. Since the military is a major player in both controlling land on Oahu and impacting it through its training exercises, a more detailed review of military activities and how they relate to Honouliuli would be helpful.

5. **Geographical Information System**

State government, private planners, and the public are beginning to apply GIS technology to help protect the environment. It would be helpful to know in what way the Conservancy will use a GIS system to help manage the reserve and if any of the data will be made available to government and/or the public.

6. **Environmental Indicators**

Each year, OEQC publishes an annual report including a listing of environmental indicators that reflect the current health of Hawaii's environment. One indicator that is missing is data that would accurately reflect the condition or "intactness" of the native forest. In previous discussions between our offices, the possibility was raised that perhaps the status of native plants in the Waianae Range could be used as an indicator of our success in re-establishing native ecosystems on disturbed land. Would the

work of the Conservancy under this Management Plan make the creation of such an environmental indicator possible? OEQC would like to work with you in this regard.

7. **Environmental Assessment**

Your letter indicates that you will be using the information in the Draft Management Plan to prepare an Environmental Assessment (EA) for the project. As the agency in charge of implementing the environmental review law for the State of Hawaii, we offer our assistance and consultation during the preparation of the EA.

Thank you for the opportunity to comment on the Draft Honouliuli Management Plan. I hope these remarks are helpful to you. Should you have any questions, please do not hesitate to call on me.

Sincerely,

Gary Gill, Director
Office of Environmental Quality Control

The Nature
Conservancy
of Hawai'i
[illegible]
Phone [illegible]
Fax [illegible]

The Nature Conservancy of Hawai'i

July 15, 1997

Mr. Gary Gill
Office of Environmental Quality Control
235 South Beretania St., Suite 702
Honolulu, HI 96813

Dear Mr. Gill:

Thank you for your well-considered comments on the draft Honouliuli Preserve Long-Range Management Plan. You have raised some important issues, which I will address below.

With regard to funding amounts and sources, the plan does state that we will require "increased financial assistance from private and corporate donors, foundations, and granting agencies." The Palawai gulch fence project is the only government-funded project included in the plan. We have modified the appendix that describes this project to indicate that $75,000 in federal funds is earmarked for this work. As for the need to include dollar estimates for the other work, I agree that this would be valuable; unfortunately, it is not possible in this case. Please note, however, that yearly operating budgets will be included in annual plans, as annual funding becomes clear.

Your comment about population pressures and the need to establish a "carrying capacity" for visitors is well taken. I have modified the plan to include this task. To answer your question, yes, the number of visitors will be limited as needed to prevent damage to the resources.

You urged us to review and assess the impacts of telecommunications antennae. I do not believe this issue is relevant to the Honouliuli EA because the Conservancy is not seeking approvals related to antenna construction. The landowner maintains rights to construct antennae within the Pohakea Pass Telecommunications Easement Area and at Mauna Kapu. It would be the landowner's responsibility to assess the impacts of such projects.

I agree with your assessment of the military's increased commitment to protecting its environmental resources. Indeed, I regard the Army as an important conservation partner. However, the Conservancy has several such partners on Oahu, including the State, and I do not believe it would be particularly useful, in this plan, to expand on the military's role. Training activities at Schofield Barracks are having little or no direct impact on Honouliuli Preserve. If you would like more information, we would be happy to provide your office with a list of recent cooperative and contractual projects we have done with the Army.

It is difficult to predict exactly how we will implement GIS technology at Honouliuli. Information on rare plants, animals, and natural communities is maintained by the Conservancy's Hawaii Natural Heritage Program, which has a GIS. So, in that sense, the Conservancy is using GIS to store spatial information on rare taxa and natural communities at Honouliuli. Such data are not typically shared with the general public.

Regarding your office's need for environmental indicators that reflect the health of the environment on Oahu, such a project is beyond the scope of the current management plan. Nevertheless, I would be very interested in continuing discussions that our offices have begun on this topic. Implementation could include Honouliuli Preserve, as well as other sites on Oahu.

Once again, thank you for your comments. I hope I have adequately addressed your concerns. Please contact me if you have additional questions.

Sincerely,

Barrie Fox Morgan

Barrie Fox Morgan
Director, Oahu/Lanai Programs

JUN 30 1997

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

June 23, 1997

Ms. Wendy Fulks
The Nature Conservancy of Hawaii
1116 Smith Street
Honolulu, HI 96817

Thanks for sending the honouli doc via E-mail. I was partially successful in getting it transposed into Wordperfect format but there were some major conversion glitches which prevent me from making electronic changes, i.e. strikeout/redline. Instead, I've opted to do it the traditional way but leave open the option for discussion with you for clarification of some items you may not understand.

Overall, I thought that the draft was pretty comprehensive. It provided historical background which is appropriate to put my review effort in the proper perspective. The inventory of physical improvements and natural attributes were concise and essential for development and implementation of the management plan. In effect, you performed a thorough area analysis which lends itself perfectly in developing your management strategy for the Honouliuli Preserve.

The following comments/recommendations are made:

Page 6, 2nd ¶--Figure 3 does not depict the three rare plant enclosures. Suggest that you depict it, otherwise remove reference to (Figure 3).

Page 7, Figure 4, Native Natural Communities--Where's the seventh native natural community that is described in the narrative?

Page 19, Goal--Change to read, "Prevent all wildfires in the preserve, prepare for wildfire response, and aggressively respond to and suppress wildfires."

Page 19, first ¶, last two sentences--Change to read, "All fire suppression tactics. . . (City and County of Honolulu), and assisted by the State Division of forestry and wildlife (DOFAW). The Nature Conservancy. . . wildfire management activities at Honouliuli Preserve."

Page 19, second ¶, first sentence--Change to read, "Fire management activities fall into three categories: prevention, presuppression, and suppression."

Page 19, second ¶, second to last sentence--Change to read, "The fire plan notes. . . and calls for careful use of fire suppressants, i.e. retardants, wetting agents, and foam, and salt water around native-dominated areas."

Page 19, third ¶, add last sentence the following--"Other presuppression measures include training of Conservancy staff and volunteers in the basic elements of firefighting to include fireline safety guidelines. Training in advanced fire control techniques and acquisition of basic fire tools and personal protective equipment are vital components in preparing for fire control in and adjacent to the nature preserve.

Page 19, fourth ¶, first sentence--Change first sentence to read, "A prevention priority is to reduce human-related fire sources by a thorough risk-hazard-analysis of the Honouliuli Preserve.

Page 19, fourth ¶, subsequent sentences--"This conceptual approach can help to prioritize prevention measures. By determining where risk-hazard-value(s) are high, appropriate prevention actions can be emplaced. For instance, if the risk factor is high, e.g. lots of trespass; hazard is high because of predominance of high volume fuels of every type; and value is high because of the occurrence of SEA--prevention of unauthorized access should be a very high priority and is addressed under the Public Programs section of the plan."

In that you had similar mailing of your draft to some of the Oahu Branch (DOFAW) key staff, you should be receiving other comments from their respective disciplines. Identification of the seven native natural communities is a wonderful start for implementation of the Preserve's priority goals. They provide the core working areas from which management projects can proceed safely and efficiently.

Relationships with partner agency and organization should be nurtured and extend beyond management boundaries. With limited assets and other resources to accomplish respective missions, it only makes sense to kokua as much as we can. . .

If you have questions regarding my comments, please call me at 973-9787. Aloha!

Sincerely,

Patrick G. Costales
Oahu Branch Manager

cc M. Buck

The Nature
Conservancy
of Hawai'i
1116 Smith Street
Honolulu, Hawai'i 96817
Phone (808) 537-4508
Facsimile (808) 545-2019

The Nature Conservancy
International
Headquarters
1815 North Lynn Street
Arlington, Virginia 22209
http://www.tnc.org

The Nature Conservancy of Hawai'i

July 15, 1997

Mr. Patrick G. Costales
Oahu Branch Manager
Division of Forestry and Wildlife
1151 Punchbowl St.
Honolulu, HI 96813

Dear Mr. Pat Costales:

Thank you for taking the time to review the Honouliuli Preserve Long-Range Management Plan, and for your detailed comments. As you pointed out, we mistakenly stated that Figure 3 depicted the preserve's rare plant exclosures/outplanting sites. The plan should have referred to Figure 2. I have corrected this mistake in the final long-range plan, and in the Environmental Assessment.

Figure 4 has been changed; the current version states that the Kawelu (*Eragrostis*) Lowland Mesic Grassland occurrences are too small to be included on that map.

We have incorporated most of your suggested changes to the Fire Control section in the revised Long-Range Management Plan and in the Draft Environmental Assessment. I agree that a risk-hazard analysis would be useful, and I could use your expertise to assist with this analysis. Therefore, I have added the following task to the Public Programs section: "With DOFAW, conduct risk-hazard analysis to identify 1) areas where public access needs to be restricted, and 2) public education needs."

Once again, thank you for your comments, especially your thoughtful analysis of the Fire Control section. I hope we can continue to work together to safeguard areas such as Honouliuli Preserve from fire and other threats. Please contact me if you have additional questions.

Sincerely,

Barrie Fox Morgan
Director, Oahu/Lanai Programs

JUN - 6 1997

May 28, 1997

Ms. Barrie Morgan
The Nature Conservancy of Hawaii
Director, Oahu/Lanai Programs
1116 Smith Street, Suite 201
Honolulu, Hawaii 96817

Dear Ms. Morgan,

I've just finished reading your Long-Range Management Plan for Fiscal years 1998-2008 and just can't think how I can contribute to such a well written plan. I am extremely impressed with your very progressive goal oriented plan. The only comment I can make is that I hope these efforts will become a reality and that you will succeed. The future holds some tough times ahead. You will definitely get the support you need to do the kind of things you need to do however we are living in some very depressed times. The bottom line is to get some financial support and that money may not be there. Your long-range management plan need to take that possibility seriously. Your failure to plan for this possibility may result in your failure to attain your goals.

The answer lies in expanding your volunteer program. Getting not only people or individuals involved in your efforts but organizations as well. There are a lot of people out there who are as concerned about what is happening with our native wildlife and habitat. We need to get them better organized. We need to develop a better structured volunteer program. There needs to be a way of informing volunteers on immediate plans and projects. In these tough economic times President Clinton has also come to realize how important it is to tap into this resource by even creating a committee to structure this move. I hope that The Nature Conservancy of Hawaii's vision of the future includes this important resource of volunteerism.

Our Ahahui Siwila Hawaii O Kapolei would like to thank you for allowing us to comment on your Long-Range Management Plan. Please call on us should you need our assistance.

Sincerely,

Shad Kane
1st Vice-President
Ahahui Siwila Hawaii O Kapolei

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING
235 South Beretania Street, [illegible] Honolulu, Hawaii 96813
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Ref. No. P-6711

June 2, 1997

Ms. Barrie Morgan
Director
Oahu/Lanai Programs
The Nature Conservancy
1116 Smith Street
Honolulu, Hawaii 96817

Dear Ms. Morgan:

Subject: Honouliuli Preserve, Oahu, Hawaii, Long-Range Management Plan
Fiscal Years 1998-2008

We have the following comments on the draft management plan.

The land area encompassing 3,692 acres is within the Conservation District. The proposed plan will implement plans that include but not limited to fire prevention activities and methods to control and eliminate, where possible, damage from weeds, ungulates, small mammals, slugs and insects.

We note that the 1992 Five-Year Boundary Review identified an area which borders the eastern boundary of Honouliuli Preserve and extends from the Urban land use district boundary for Makakilo to the south, to the approximate western end of Manuwaiahu Gulch to the north as containing conservation resources. The area includes lands with steep slopes, scenic and open space resources, and a buffer for the adjacent resource rich conservation area to the west.

Non-point source pollution is a major priority for our Coastal Zone Management Program. Fencing to prevent ground damage caused by feral pigs, cattle and goats will help to minimize non-point source pollution in the area.

If you have any questions, please contact Christina Meller of our Coastal Zone Management Program at 587-2845.

Sincerely,

Rick Egged
Director
Office of Planning

BOARD OF WATER SUPPLY

June 6, 1997

Ms. Barrie Morgan, Director
Oahu/Lanai Programs
The Nature Conservancy of Hawaii
1116 Smith Street
Honolulu, Hawaii 96817

Attention: Ms. Wendy Fulks

Dear Ms. Morgan:

Subject: Your Letter of May 9, 1997 on the Draft Long-Range Management Plan for the Honouliuli Preserve, Honouliuli, Oahu, Hawaii

Thank you for the opportunity to review and comment on the subject document.

We support the Nature Conservancy's conservation efforts at the Honouliuli Preserve and have no objections to the proposed management goals and short term objectives. There are no existing or proposed Board of Water Supply facilities in the project area.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

THE ESTATE OF JAMES CAMPBELL

June 9, 1997

Ms. Wendy Fulks
The Nature Conservancy of Hawaii
1116 Smith Street
Honolulu, HI 96817

Dear Ms. Fulks:

Draft Long Range Management Plan for Honouliuli Preserve, May 1997

We have reviewed your Long Range Management Plan and believe that it represents a solid 10-year blueprint for continued activity in the Honouliuli Preserve.

We appreciate the opportunity to keep current with your goals, objectives and activities.

Very truly yours,

Henry Eng, AICP
Manager, Land Planning

db:01002900\K11001

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

JUN 27 1997

June 26, 1997

Wendy Fulks
Oahu/Lanai Programs
The Nature Conservancy of Hawai'i
1116 Smith Street
Honolulu, Hawai'i 96817

LOG NO: 19473 ✓
DOC NO: 9706RC51

Dear Ms. Fulks:

SUBJECT: Draft Long-Range Management Plan for Honouliuli Preserve
Honouliuli, 'Ewa, O'ahu

This review responds to your letter of May 9, 1997, which we received on May 12th.

We support your long-range management goals. Only a few of your proposed projects might impact historic sites -- fencing and dense plots of native reforestation. Both should easily have "no effect" on historic sites, if prior checks of the project area are conducted. The checks should be in the planning stages of the projects, however, not when they are underway.

You might wish to add some information on human use of your preserve area prior to 1815. With your preserve at higher elevations (1,200 feet to the summit ridge crest) in Honouliuli ahupua'a in 'Ewa, land use was clearly quite different than nearer the shore. Currently, we have very limited archaeological information for this area for precontact or early 1800s times, but we are able to predict three likely uses of the area.

1. Historical information notes the presence of a major trail which passed over the mountains connecting the Wai'anae area to 'Ewa. This trail passed up through Lualualei and over Pohakea pass and down to approximately today's Kunia Road (which roughly follows an old trail route linking West Loch to the North Shore)('I'i 1959:23, 27, 97. Fragments of Hawaiian History. Bishop Museum.). We have no documents at this time on this trail's exact route. It is likely that rest shelters were present along this trail, and some may be visible archaeologically. Although archaeological and historical information is currently limited, research (both archival work and archaeological fieldwork) can be done to find more information.

2. General use of forest areas in the islands had ahupua'a residents going periodically into the forest to gather feathers from birds, and to obtain timber, medicinal plants, and other forest resources. Scattered shelters and exploitation sites and access trails were associated with these

uses -- found across the forest lands (usually more dense at lower elevations in the forest). But, unless caves were used, these sites are very difficult to find archaeologically because they had very little stonework and are essentially small, subsurface deposits.

3. There are recent archaeological studies to the north in the Schofield Barracks area -- around and below Kolekole Pass (another old traditional trail route) which have found archaeological ruins of irrigated taro cultivation and dryland farms, some associated temporary field shelters, and a few religious/traditional cultural places extending up some stream gulches to well above the 1,200 foot elevation. Permanent housing and main heiau seem to be present lower down the gulches (at the ca. 1,000 foot elevation) along with agricultural fields. We do have similar information (very brief) for sites along Ekahanui Gulch from 1,200-1,400 feet in your project area, and some small heiau exist on the fringes of your project area, just downslope. These sites are highly visible archaeologically. Thus, many of the gulches descending down from your forest reserve could have this pattern of sites in the 1,200-1,400 feet elevations.

At some point, it might be useful to have some archaeological and historical work done to better determine the patterning of sites in your forest reserve. It would better help with your long-range planning. Dr. Ross Cordy, our Branch Chief for Archaeology (587-0012), has a student at UH West O'ahu who is interested in doing his senior paper on such a topic and was interested in your area. We will put that student in contact with you, and perhaps a small project can be worked out that can start to help you identify your historic sites.

If you have any questions, please contact Ross. Also, could we possibly get a copy of the B.B. Frierson unpublished ms "A Study of Land Use and Vegetation Change. Honouliuli, 1790-1925." for our library? This would help us in our statewide planning efforts for the 'Ewa area.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

RC:jk

APPENDIX 2
NATIVE NATURAL COMMUNITIES OF HONOULIULI PRESERVE

NATURAL COMMUNITY	GLOBAL RANK[1]
Kawelu (*Eragrostis*) Lowland Mesic Grassland	G3
Koa/ʻOhiʻa (*Acacia koa/Metrosideros polymorpha*) Lowland Mesic Forest	G3
Mamaki (*Pipturus albidus*) Lowland Wet Shrubland	G3
Oʻahu Diverse Lowland Mesic Forest	G1*
ʻOhiʻa (*Metrosideros polymorpha*) Lowland Mesic Forest	G3
ʻOhiʻa (*Metrosideros polymorpha*) Lowland Wet Forest	G3
Papala Kepau/Papala (*Pisonia/Charpentiera*) Lowland Mesic Forest	G3

1
Global Rank:
G1 = Critically imperiled globally (typically 1-5 occurrences)
G3 = Restricted range (typically 20-100 occurrences)

*Rare natural community

APPENDIX 3
RARE PLANTS AND OTHER PLANT TAXA OF CONCERN REPORTED FROM HONOULIULI PRESERVE

SCIENTIFIC NAME	COMMON NAME	KNOWN ONLY HISTORICALLY FROM PRESERVE[1]	FEDERAL STATUS[2]	GLOBAL RANK[3]
Abutilon sandwicense			LE	G1
Alectryon macrococcus var. *macrococcus*	ʻAlaʻalahua, mahoe		LE	G2T2
Alsinidendron obovatum		X	LE	G1
Bobea sandwicensis	ʻAhakea	X	None	G1
Cenchrus agrimonioides var. *agrimonioides*	Kamanomano		LE	G1T1
Chamaesyce herbstii	ʻAkoko, koko, kokomalei		LE	G1
Clermontia persicifolia	ʻOha, ʻohawai		SOC	+
Colubrina oppositifolia	Kauila	X	LE	G1
Cyanea grimesiana ssp. *grimesiana*	ʻOha, haha, ʻohawai		LE	G2T1
Cyanea grimesiana ssp. *obatae*	ʻOha, haha, ʻohawai		LE	G2T1
Cyanea lanceolata ssp. *calycina*	ʻOha, haha, ʻohawai		RC	G3T1
Cyanea membranacea	ʻOha, haha, ʻohawai		SOC	G1
Cyanea pinnatifida	ʻOha, haha, ʻohawai		LE	G1
Cyrtandra dentata	Haʻiwale, kanawao keʻokeʻo	X	LE	G1
Cystopteris douglasii			SOC	G2
Delissea subcordata	ʻOha, haha, ʻohawai		LE	G1
Diellia falcata			LE	G1

SCIENTIFIC NAME	COMMON NAME	KNOWN ONLY HISTORICALLY FROM PRESERVE[1]	FEDERAL STATUS[2]	GLOBAL RANK[3]
Diellia unisora			LE	G1
Dissochondrus biflorus			SOC	G2
Dubautia sherffiana	Na'ena'e		SOC	G1
Embelia pacifica	Kilioe		SOC	+
Exocarpos gaudichaudii	Heau		SOC	G1
Flueggea neowawraea	Mehamehame		LE	G1
Gardenia mannii	Nanu, na'u		LE	G1
Gouania meyenii		X	LE	G1
Hedyotis coriacea		X	LE	G1
Hedyotis parvula		X	LE	G1
Hesperomannia arbuscula			LE	G1
Joinvillea ascendens ssp. *ascendens*	'Ohe		RC	G3G5T1
Labordia kaalae	Kamakahala		SOC	G1
Lepidium arbuscula	'Anaunau, naunau, kunana	X	LE	G1
Lindsaea repens var. macraeana		X	SOC	G?T1
Lipochaeta lobata var. leptophylla	Nehe		LE	G2T1
Lipochaeta tenuis	Nehe	X	SOC	G2
Lobelia yuccoides	Panaunau		SOC	G2
Melicope christophersenii	Alani	X	RC	G1
Melicope cinerea	Alani	X	None	G1

SCIENTIFIC NAME	COMMON NAME	KNOWN ONLY HISTORICALLY FROM PRESERVE[1]	FEDERAL STATUS[2]	GLOBAL RANK[3]
Melicope pallida	Alani	X	LE	G1
Melicope saint-johnii	Alani		LE	G1
Melicope sandwicensis	Alani		None	G1
Melicope sp. 1 aff. *ovata*	Alani		None	G1
Microsorium spectrum	Pe'ahi		SOC	+
Morinda trimera	Noni kuahiwi		SOC	+
Neraudia angulata var. *angulata*	Ma'aloa, ma'oloa, 'oloa		LE	G1T1
Neraudia angulata var. *dentata*	Ma'aloa, ma'oloa, 'oloa	X	LE	G1T1
Neraudia melastomifolia	Ma'aloa, ma'oloa, 'oloa		SOC	G2
Nesoluma polynesicum	Keahi	X	SOC	G2
Nothocestrum latifolium	'Aiea	X	SOC	G1
Peucedanum sandwicense	Makou	X	LT	G2
Phyllostegia hirsuta			LE	G1
Phyllostegia kaalaensis			LE	G1
Phyllostegia mollis			LE	G1
Phyllostegia parviflora var. 1			LE	G1T1
Phytolacca sandwicensis	Popolo ku mai	X	SOC	+
Plantago princeps var. *princeps*	Ale		LE	G2T1
Platydesma cornuta var. *decurrens*	Pilo kea		RC	G2T2

SCIENTIFIC NAME	COMMON NAME	KNOWN ONLY HISTORICALLY FROM PRESERVE[1]	FEDERAL STATUS[2]	GLOBAL RANK[3]
Pleomele forbesii	Halapepe		RC	G1
Pteralyxia macrocarpa	Kaulu		RC	G2
Schiedea hookeri			LE	G1
Schiedea kaalae			LE	G1
Schiedea ligustrina			SOC	G2
Schiedea nuttallii		X	LE	G1T1
Schiedea pubescens var. *purpurascens*			SOC	G2T2
Sicyos sp. 1 (*Sicyos* sp. A)	ʻAnunu, kupala		SOC	G1
Silene perlmanii			LE	G1
Solanum sandwicense	Popolo-ʻai-a-ke-akua		LE	G1
Stenogyne kanehoana			LE	G1
Streblus pendulinus	Aʻiaʻi		SOC	+
Strongylodon ruber	Nuku ʻiʻiwi, ka ʻiʻiwi		SOC	+
Tetramolopium lepidotum ssp. *lepidotum*			LE	G1T1
Tetraplasandra gymnocarpa		X	LE	G1
Tetraplasandra kavaiensis	ʻOheʻohe		SOC	+
Tetraplasandra oahuensis	ʻOhe mauka		SOC	+
Urera kaalae	Opuhe		LE	G1
Viola chamissoniana ssp. *chamissoniana*	Pamakani	X	LE	G3T1
Zanthoxylum dipetalum var. *dipetalum*	Kawaʻu		SOC	+

1
Taxa that have not been reported from Honouliuli Preserve in the last 15 years.

2
Federal Status:
LE = Listed endangered by the U.S. Fish and Wildlife Service.
RC = Recommended by the Pacific Region Office of the U.S. Fish and Wildlife Service to become a candidate for listing as endangered or threatened.
SOC = Considered a species of concern by the Pacific Region Office of the U.S. Fish and Wildlife Service.

3
Heritage Program Global Ranks:
G1 = Species critically imperiled globally (typically 1 to 5 current occurrences).
G2 = Species imperiled globally (typically 6 to 20 current occurrences).
G3 = Species has restricted range (typically 21 to 100 current occurrences).
G3G5 = Specific global rank not yet assigned for this species.
G5 = Species secure.
T1 = Subspecies or variety critically imperiled globally.
T2 = Subspecies or variety imperiled globally.
+ = Taxon not currently tracked by HINHP; these plants might not meet HINHP criteria for rarity.

APPENDIX 4
RARE ANIMALS REPORTED FROM HONOULIULI PRESERVE

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS[1]	GLOBAL RANK[2]
Birds			
Asio flammeus sandwichensis	Pueo, Hawaiian short-eared owl	None*	G5T3
Chasiempis sandwichensis gayi	O'ahu 'elepaio	C	G4T3
Vestiaria coccinea	'I'iwi	None*	G4
Land Snails			
Achatinella concavospira	O'ahu tree snail, pupu kuahiwi, pupu kanioe, kahuli	LE	G1
Achatinella mustelina	O'ahu tree snail, pupu kuahiwi, pupu kanioe, kahuli	LE	G1
Amastra crassilabrum		None	GH
Amastra cylindrica		None	G1
Amastra micans		None	G1
Amastra spirizona		None	G1
Armsia petasus		None	G1
Auriculella aff. *castanea* n. sp. 1		None	G1
Auriculella aff. *perpusilla* n. sp. 1		None	G1
Auriculella ambusta		None	G1
Auriculella tenella		None	G1
Cookeconcha sp. 1		None	G1

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS[1]	GLOBAL RANK[2]
Endodonta sp. 1		None	G1
Laminella sanguinea		None	G1
Leptachatina sp. 2		None	G1
Leptachatina sp. 8		None	G1
Pleuropoma sandwichiensis		None	G1
Pterodiscus heliciformis		None	G1
Insects			
Drosophila aglaia	Pomace fly	C	Not yet ranked
Drosophila flexipes	Pomace fly	None	Not yet ranked
Drosophila hemipeza	Pomace fly	C	Not yet ranked
Drosophila montgomeryi	Pomace fly	C	Not yet ranked
Hedylepta monogramma	(Moth)	None	G1
Nesopeplus serratus	Souring beetle	None	GH
Nesoprosopis unica	Unique yellow-faced bee	None	GH
Pentarthrum obscurum	Obscure pentarthrum weevil	None	G1

1
Federal Status:
LE = Listed endangered by the U.S. Fish and Wildlife Service.
C = Taxa for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species. Proposed rules have not yet been issued because this action is precluded at present by other listing activity. Development and publication of proposed rules for these taxa are anticipated. The U.S. Fish and Wildlife Service encourages State and other Federal agencies as well as other affected parties to give consideration to these taxa in environmental planning.
* No federal status, but the O'ahu population is considered endangered by the State of Hawai'i.

2

Heritage Program Global Ranks:

G1 = Species critically imperiled globally (typically 1 to 5 current occurrences).
G4 = Species apparently secure globally, but may be rare locally (typically >100 current occurrences).
G5 = Species secure.
GH = Species known only from historical occurrences (no observations in the past 15 years).
T1 = Subspecies or variety critically imperiled globally.
T2 = Subspecies or variety imperiled globally (typically 6 to 20 current occurrences).
T3 = Subspecies or variety has restricted range (typically 21 to 100 current occurrences).

Note: Global rank assignments for the insects, and for many of the snails (other than *Achatinella*) listed in this table are tentative. While the Hawai'i Natural Heritage Program has some information in its database about these taxa, the taxa are not actively tracked.

APPENDIX 5
PALAWAI FENCING PROJECT DESCRIPTION

Project Justification

Feral pigs (and possibly goats, if they become established) pose a serious threat to rare plants and their habitat within Honouliuli Preserve. Fences, coupled with animal removal, are one of the most effective ways of managing these animals, and are absolutely necessary in sites where the management goal is eradication. To date, fencing in the preserve has been limited to small exclosures around isolated outplanting sites. The exclosure approach is labor-intensive and of limited value. The plants are protected, but most of the plants' habitat is not. It can also be more cost-effective to protect several species or colonies with one large fence, rather than constructing a number of smaller exclosures. Additionally, many "at-risk" taxa are in gulch bottoms or precipitous locations, making species-specific fences infeasible, and potentially harmful to the remaining wild plants.

For these reasons, the Conservancy has proposed, and secured $75,000 in federal funds for, the construction of several miles of pig-proof fencing in Palawai gulch. The fence will encircle approximately 90 acres of rare plants and rare plant habitat. There is a high density of rare plants in this area, and this moderately sized fence will protect several rare taxa. Specifically, this fencing project is intended to help safeguard populations of three listed endangered plant taxa: *Silene perlmanii*, *Solanum sandwicense*, and *Phyllostegia parviflora* var. 1 (also known as *Phyllostegia parviflora* var. *lydgatei*, although this name has not been published). Additional rare species reported from this area are listed below.

Setting

The fence will be constructed along the summit and secondary ridges around North Palawai gulch, extending from the Palikea Trail on the Wai'anae Summit down to approximately 2,000 feet in elevation. The proposed fence will encompass approximately 90 acres of north-facing slopes in the upper North Palawai drainage (Figure 5).

The vegetation in this area is primarily Koa (*Acacia koa*)/'Ohi'a (*Metrosideros polymorpha*) Lowland Mesic Forest. In addition to the three endangered plant species listed above that are our immediate concern, a number of other rare plant taxa (either listed endangered, recommended candidates for endangered or threatened status, or considered species of concern by the U.S. Fish and Wildlife Service) have been reported from this gulch. Some of these plants currently exist in the area, while some are reported historically and their current status is unknown. The additional taxa include:

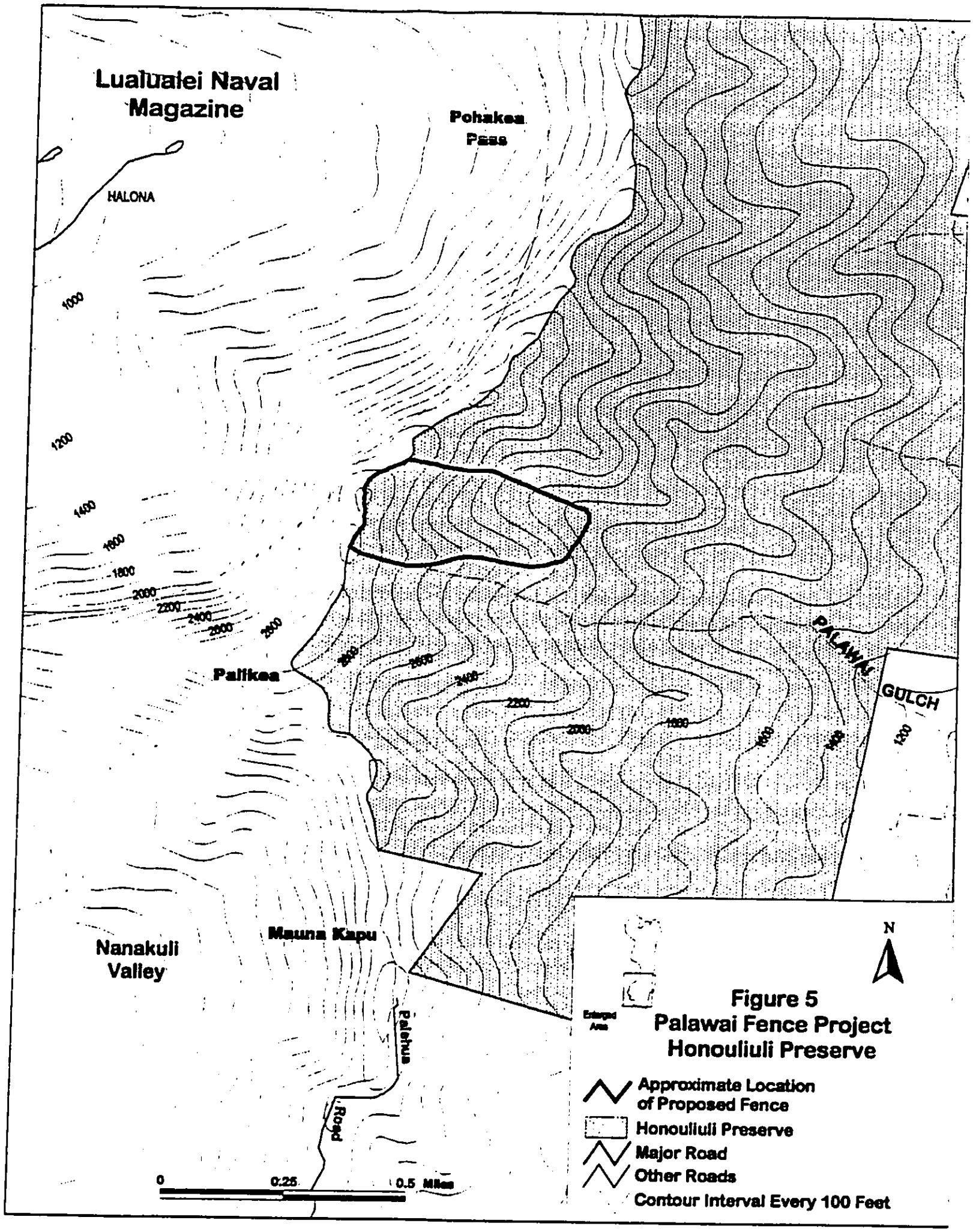


Figure 5
Palawai Fence Project
Honouliuli Preserve

Urera kaalae, *Pritchardia kaalae*, *Phyllostegia mollis*, *Plantago princeps*, *Melicope saint-johnii*, *Exocarpos gaudichaudii*, *Pteralyxia macrocarpa*, *Cyanea membranacea*, *Neraudia melastomifolia*, *Cystopteris douglasii*, *Lobelia yuccoides*, *Sicyos* sp. 1, *Labordia kaalae*, *Strongylodon ruber*, and *Diellia falcata*. (Refer to Appendix 3 for these species' federal status and global ranks.)

Construction Details

Construction of the fence is expected to proceed as follows: First the fence corridor will be surveyed by botanists and malacologists to locate any rare species or other special vegetation that should be protected. Then the exact fence route will be determined and cleared with hand tools and small power tools. This clearing will be done in a strip no more than 4 feet wide. Felling of large trees will be avoided wherever possible. Non-native trees that are cut will be treated with herbicide as needed to prevent their regrowth. The second phase is actual installation of the fence. Materials and workers will be flown in by helicopter, and all construction work will be done with hand and small power tools. This construction involves driving galvanized steel t-posts into the ground 10 feet apart, attaching one strand of galvanized barbed wire to the posts at ground level, and stretching 47-inch hog wire with Class 3 galvanizing along the posts (see Figure 6). The fence posts will be installed using a manual pole pounder, or a rock drill where necessary. Where needed, reinforced corner posts will be used to add strength at critical points, and additional hog wire sections will be anchored along the bottom of the fence to prevent pigs from digging under it. Metal anchor stakes will be added to ensure that the fence fits closely to the ground.

Fencing materials and supplies will be flown in by helicopter. Fence construction will be carried out by trained crews of two to six people. In some areas, temporary field camps will be set up along the fenceline. Crews will access the area on foot, or be ferried to and from the work site by helicopter.

For the first year following construction, Conservancy staff will inspect and maintain the fence quarterly to check for and repair damage. The inspection frequency for the following years has not been determined, but visits will be made at least annually.

Impacts/Mitigation

The clearing of the fenceline and initial construction will cause disturbance to plants along a 4-foot wide corridor, around the field camp, and on temporary trails used by the crew. Based on past experience, we can predict with some certainty that this damage will be temporary and will heal naturally within a period of months. A temporary field camp will be set up in the forest, and a small helicopter landing zone will be cleared. The fenceline will be surveyed by a botanist and a malacologist to ensure that no rare or endangered plants or snails are harmed.

Construction materials:

-47-inch tall hog wire
-single-strand barbed wire
-6-foot tall "t" posts (galvanized steel)
-12-gauge galvanized wire

Construction technique:

1. Manual post-pounder or gas-powered rock drill is used to install post 2 feet into ground.
2. Wire is stretched with a manual "come-along."
3. Wire is manually clipped to "t" posts using stainless steel clips.

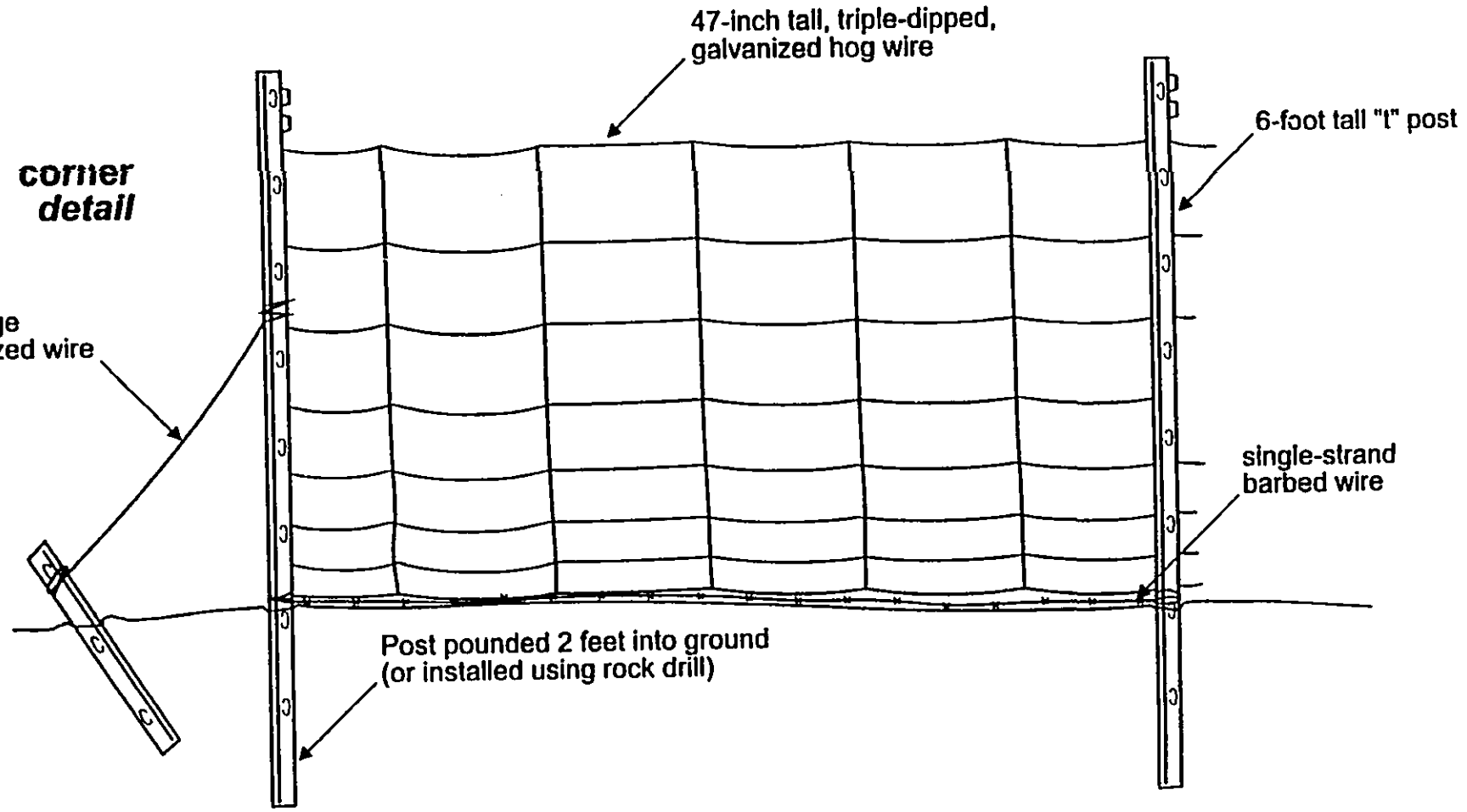


Figure 6. Palawai Fence Construction Detail.

Periodic increases in the noise level (due to helicopters and the use of small power tools) could disturb forest birds in the immediate vicinity of the fence. The O'ahu 'elepaio, a candidate for listing as endangered or threatened, is known from this gulch. Nevertheless, we do not anticipate any *significant* adverse effects on birds, insects, snails, or other native fauna. Soil disturbance is expected to be temporary and confined to the fenceline, campsite, and temporary trails. No changes in normal rainwater runoff or percolation are expected, and special care will be taken to avoid such problems as they would threaten the integrity of the fence.

Construction of the fence might interrupt any existing travel routes used by pigs. It is critical, therefore, that pig control work (hunting) get underway in coordination with fence construction to be sure that pigs do not cause severe forest damage as they attempt to cross the new fencelines. Hunters (probably volunteers) will be used to eradicate pigs within the fenced area. The area outside the fence will also be monitored and hunted as needed to prevent serious damage around the fenceline.

In all of the sites disturbed by the fence construction and maintenance, strict protocols will be used to 1) clean all gear carried into the forest to prevent the introduction of new weeds or other pests, 2) monitor for and remove as necessary any weeds that become established or expand as a result of the disturbance, 3) maintain a clean work site, and 4) minimize the impacts of camping.

Fence construction could affect cultural or archaeological sites, if present. Prior to construction, the State Historic Preservation Division will be consulted to determine if any sites are known from the proposed fenceline area. Moreover, if any evidence indicating the existence of archaeological sites is found, work on the project will halt immediately until proper authorities can be notified and mitigation actions can be planned.

We will establish photo points along the fenceline to track changes in vegetation. Additionally, we will initiate monitoring of the *Silene perlmanii* and *Phyllostegia parviflora* var. 1, as well the former location of *Solanum sandwicense*. We will continue this monitoring after the fence project is complete, and monitor additional rare plant populations within the fence as funds allow.

APPENDIX 6
WEATHER STATION INSTALLATION

Project Justification

Weather monitoring is important to the long-term goal of restoring the native forests of Honouliuli Preserve. Weather affects the distribution, survivorship, and reproduction of plants and animals. Data collected from the weather stations will be correlated with other types of information (qualitative and quantitative) to help us interpret changes in the condition and distribution of the preserve's plants and animals.

Installation of the weather stations will allow long-term characterization and tracking of basic parameters including temperature, solar radiation (light intensity), and relative humidity. Multiple weather stations need to be established to monitor conditions in different areas of the preserve. Therefore, we will install stations at both upper and lower elevations, and in the northern, southern, and central parts of the preserve.

Setting

Two types of weather stations will be utilized; one type is more complete, measuring temperature, relative humidity, solar radiation, rainfall, and wind speed. These stations include and an independent data logger and battery power source. The second type of station does not include the rain gauge and anemometer, and uses instruments with internal battery power and data loggers (see Construction Details). The more complete weather stations will be installed at two locations: the Pu'u Kaua summit peak (elevation 3,127 feet), and along the Contour Trail (approximately 1,600 feet in elevation). Four partial weather stations will be installed; three along the Contour Trail, and the fourth at the Palikea summit peak (3,098 feet elevation) (see Figure 7).

At the Pu'u Kaua and Palikea summits, the vegetation is dominated by 'Ohi'a (*Metrosideros polymorpha*) Lowland Wet Forest and 'Ohi'a Lowland Mesic Forest, respectively. Weather station sites along the Contour Trail will be within non-native dominated areas. Some native plants may be present near these sites (e.g., wiliwili [*Erythrina sandwicensis*], lonomea [*Sapindus oahuensis*], and 'a'ali'i [*Dodonaea viscosa*]). The weather stations will not be installed in the immediate vicinity of rare or endangered plants.

Construction Details

Weather station sites will be located off trails, in areas where native plants will not need to be removed. Materials for the installation will be flown in by helicopter to the various sites. All parts of the weather station will be pre-fitted prior to delivery into the field. For each partial

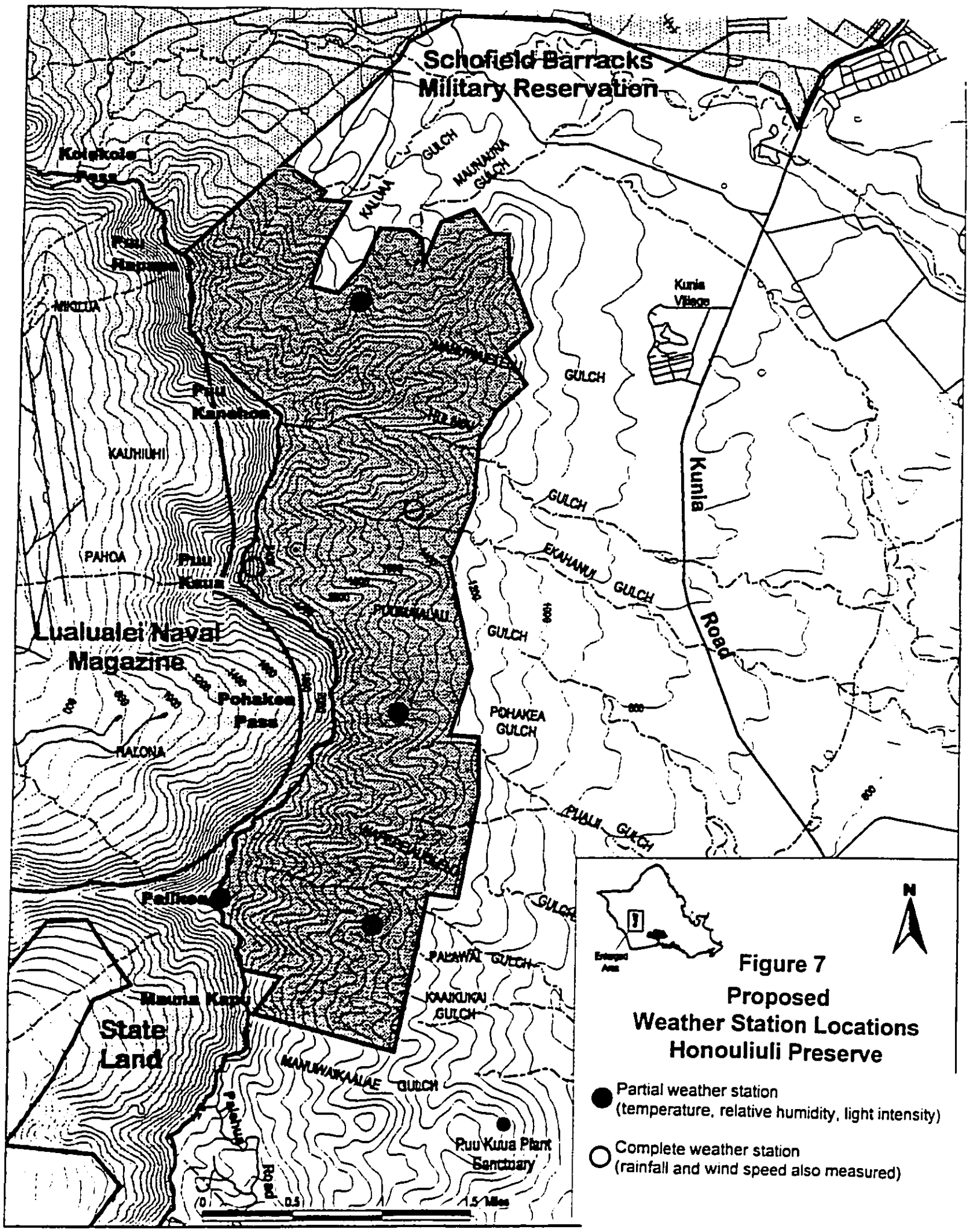


Figure 7
Proposed
Weather Station Locations
Honouliuli Preserve

● Partial weather station
(temperature, relative humidity, light intensity)

○ Complete weather station
(rainfall and wind speed also measured)

weather station, a single hole, 2 feet deep and 1 foot in diameter, will be dug and filled with concrete. For each complete weather station, nine "t" posts (approximately 2 inches in diameter) will be pounded into the ground; guy wires supporting the ladder to which the instruments are attached will be used to hold the ladder upright and rigid enough for a person to climb. This design creates a moveable, low-impact weather station (see Figure 8).

Maintenance

Each weather station will be visited every 3 – 4 months by trained personnel traveling on foot. Data will be downloaded from the various data storage modules, and any needed repairs or adjustments will be made. These visits will be done in conjunction with other work in the area, and will not significantly increase foot traffic to the weather station sites.

Impacts/Mitigation

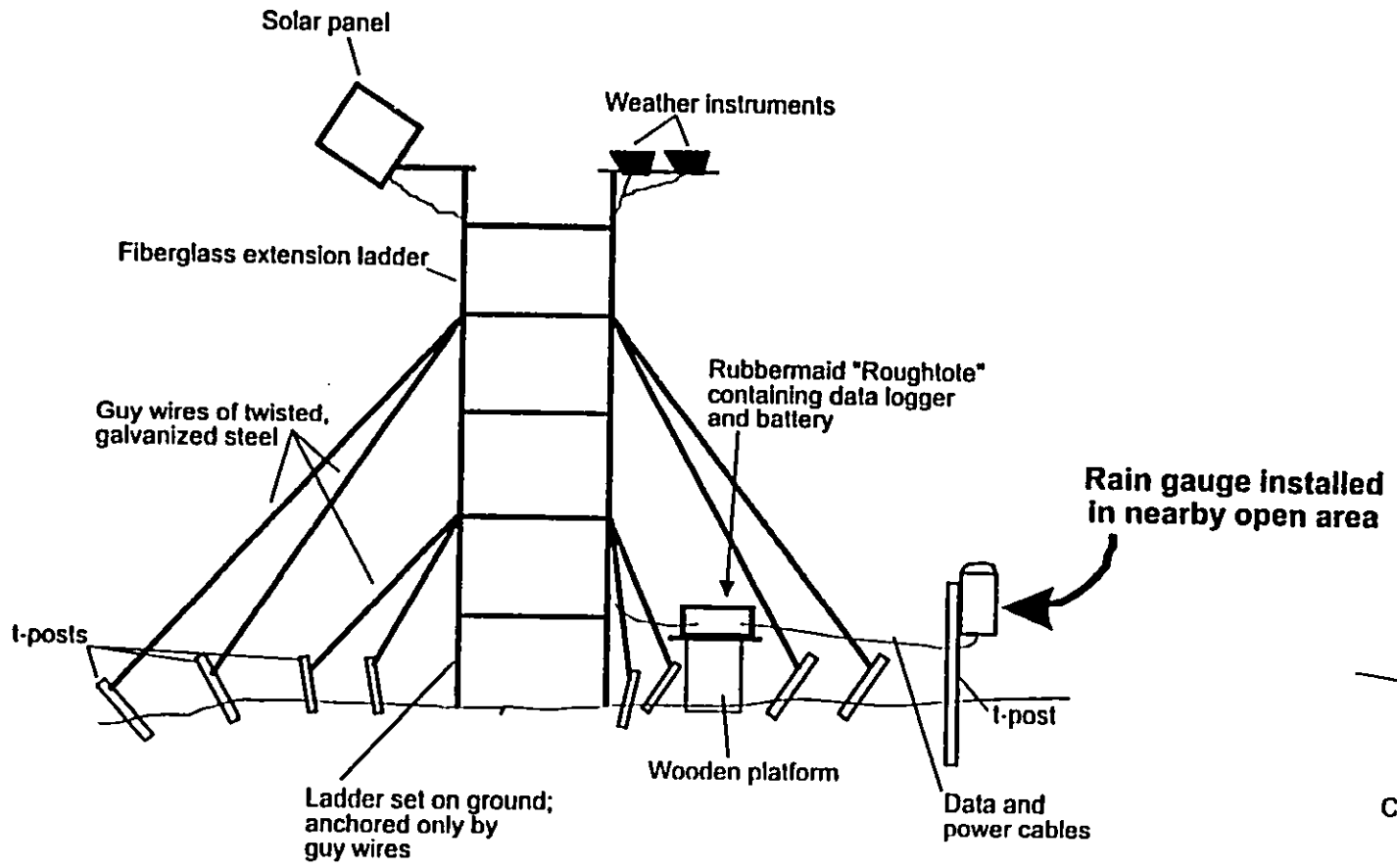
The main impact will be digging the single hole for each partial weather station, and pounding in the posts for the guy wires holding the complete weather stations. These are both highly localized impacts where conditions can be assessed, and impact to native natural resources can be completely avoided. A second impact will be aesthetic; it's possible that the tops of the weather stations will be seen by hikers and other area users.

No power tools will be used during installation, so the only noise will be associated with the helicopter dropping off materials, and the manual post pounder (which sounds like a hammer on an anvil). These temporary noise increases could disturb forest birds in the immediate vicinity of the fence. The O'ahu 'elepaio, a candidate for listing as endangered or threatened, is known from the Contour Trail and other areas within the preserve. Nevertheless, we do not anticipate any *significant* adverse effects on birds or other native fauna.

In all of the sites disturbed by the fence construction and maintenance, strict protocols will be used to 1) clean all gear carried into the forest to prevent the introduction of new weeds or other pests, 2) monitor for and remove as necessary any weeds that become established or expand as a result of the disturbance, and 3) maintain a clean work site.

Additional Specifications:
Solar panel 12" x 13"
Weather instruments approx. 6" diameter
Ladder 20' tall
Rubbermaid "roughtote" 12" tall, 25" wide
Wooden platform 30" tall, 27" wide
Rain gauge 6.25" diameter, 6.5" tall, mounted on 1.5' tall t-post
T-posts of galvanized steel, manually driven into ground 1.5 - 2' deep

Complete Weather Station



Partial Weather Station

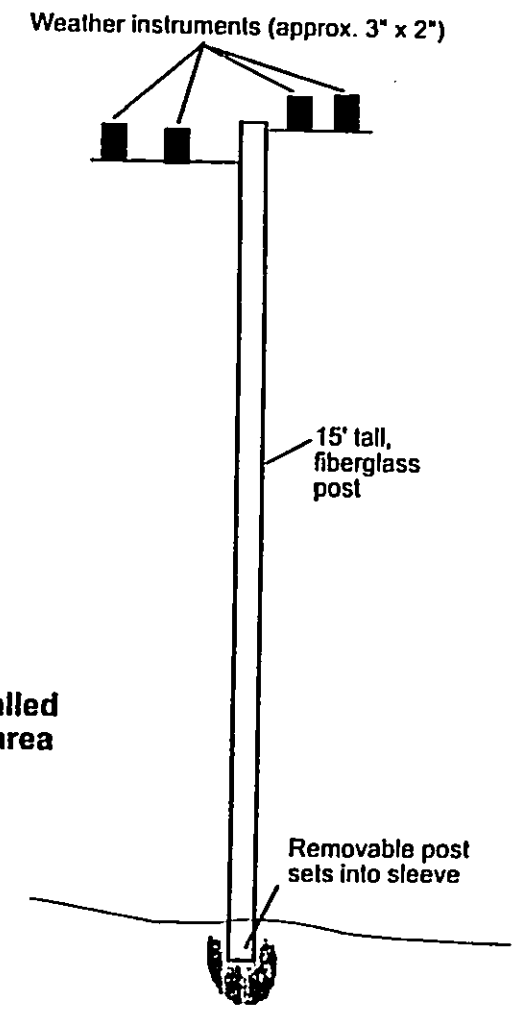


Figure 8. Weather station construction detail (not drawn to scale).

APPENDIX 7
COMMENTS RECEIVED ON DRAFT ENVIRONMENTAL ASSESSMENT
(AND RESPONSES)

OCT 7 1997

SEP 23 9 01 AM '97

RECEIVED
DIVISION OF
LAND MANAGEMENT, H.I.

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813-5249
PHONE (808) 594-1888
FAX (808) 594-1865

September 18, 1997

Mr. Dean Y. Uchida
Administrator, Land Division
Department of Land and Natural Resources
P.O. Box 621
Wailuku, Maui HI 96809

Subject: Conservation District Use Application and Draft Environmental Assessment (DEA) for Honouliuli Nature Preserve, Island of Oahu.

Dear Mr. Uchida:

Thank you for the opportunity to review the Conservation District Use Application and Draft Environmental Assessment (DEA) for Honouliuli Nature Preserve, Island of Oahu. The preserve comprises 3,692 acres of land located on the upper eastern slope of the southern Waianae Range. The mission of the preserve is to halt further degradation of local ecosystems and wildlife habitats.

The Office of Hawaiian Affairs (OHA) has no objections at this time to the proposed land use plan described in the DEA. OHA concurs with the management strategies outlined in the plan: (i) control of feral ungulates, (ii) eradication of weeds and other noxious species (iii) monitoring of flora and fauna resources, (iv) restoration and preservation of extinct rare species, and (v) overall watershed management. But OHA disagrees with the semantics of labeling these strategies as "major positive impacts" (see page 29 of the DEA). Instead, OHA believes that positive impacts from the plan will include (i) a healthy and well protected preserve, (ii) an enhanced population of endangered species, and (iii) an unique natural laboratory for biological research and ecosystem characterization.

Please contact Lynn Lee, Acting Officer of the Land and Natural Resources Division, or Luis A. Manrique, should you have any questions on this matter.

Sincerely yours,

Randall Ogata
Administrator

Lynn Lee
Acting Officer,
Land and Natural
Resources Division

LM:lm
cc Trustee Clayton Hee, Board Chair
Trustee Abraham Aiona, Board Vice-Chair
Trustee Rowena Akana, Land & Sovereignty Chair
Trustee Haunani Apoliona
Trustee Billie Beamer
Trustee Frenchy DeSoto
Trustee Moses Keale
Trustee Colette Machado
Trustee Hannah Springer

OCT 7 1997

United States Department of the Interior

FISH AND WILDLIFE SERVICE

PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

SEP 4 1997

RECEIVED
'97 SEP 8 AM 9 45
DIVISION OF
LAND MANAGEMENT

In Reply Refer To: CMC

Dean Uchida
State of Hawaii
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Re: Conservation District use Application (Board Permit) for Honouliuli Nature Preserve

Dear Mr. Uchida:

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to review the Conservation District Use Application (CDUA) for Honouliuli Nature Preserve. The Nature Conservancy of Hawaii (TNCH) is seeking approval to manage the Honouliuli Nature Preserve in a manner that will provide for long term ecosystem and species level conservation. According to the Honouliuli Long-Range Management Plan, the strategy adopted by TNCH includes fencing, ungulate control, weed control, small mammal control, fire control, revegetation, and outplanting and monitoring of rare and federally listed species.

It is the belief of the Service that the activities detailed in the Honouliuli Long-Range Management Plan are consistent with the purpose of the Conservation District. The Service anticipates no adverse impacts to threatened or endangered species to result from the implementation of management at Honouliuli Nature Preserve and fully supports the granting of a Board permit to the Nature Conservancy of Hawaii to carry out such management. If you have any questions, please contact Fish and Wildlife Biologist Christina Crooker at (808) 541-3441.

Sincerely,

Karen W Rosa

for/ Brooks Harper
Field Supervisor
Ecological Services

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING
235 South Beretania Street, 6th Flr., Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

BENJAMIN J. CAYETANO
GOVERNOR
SEIJI F. NAYA
DIRECTOR
BRADLEY J. MOSSMAN
DEPUTY DIRECTOR
RICK EGGED
DIRECTOR, OFFICE OF PLANNING

Tel.: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-6927

September 4, 1997

MEMORANDUM

TO: Mr. Michael D. Wilson, Chairperson
Department of Land and Natural Resources

ATTN: Mr. Dean Y. Uchida, Administrator
Land Division

FROM: Rick Egged
Director, Office of Planning

SUBJECT: Conservation District Use Application (CDUA), File No. OA-2871, Honouliuli Nature Preserve, Ewa, Oahu

We support the Nature Conservancy's management plan for the Honouliuli Preserve. Its implementation should help prevent or minimize nonpoint source pollution, a major coastal zone management (CZM) issue.

If there are any questions, please contact Charles Carole of our CZM Program at 587-2804.

OCT 7 1997

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

REF LD JGD

AUG 27 1997

To: Dean Y. Uchida, Administrator
Land Division

From: John Dooling, Land Agent
Oahu District Land Office

Subject: Request For Comments, Conservation District Use Application for the Nature Conservancy of Hawaii OA-2871 Located on the Estate of James Campbell, at Honouliuli, Ewa, Oahu TMK: 1st/ 9-2-05:13

The Oahu District Office of the Land Division is in favor of the subject CDUA as its goal is to protect and preserve the endangered and threatened species in the Honouliuli area. As the largest A'hupuaha on the island of Oahu, Honouliuli has abundant lands in the Conservation District which serves as habitat for the endangered and threatened species. We note that the subject land is privately owned by the Estate of James Campbell.

We do require that the applicant obtain all required Federal, State and County permits for the CDUA.

Should you have any questions, please contact me at 7-0410.

cc: Ms. Inouye
Mr. Matsumoto

LD

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

OCT 7 1997

LAWRENCE MIIKE
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to

August 27, 1997

97-182/epo

TO: The Honorable Michael Wilson, Chairperson
Department of Land and Natural Resources

FROM: Lawrence Miike
Director of Health

SUBJECT: CONSERVATION DISTRICT USE PERMIT APPLICATION
(Board Permit)

Applicant: The Nature Conservancy of Hawaii
File No: OA-2871
Request: Honouliuli Nature Preserve
Location: Honouliuli, Ewa, Oahu
TMK: (1) 9-2-05: 13

RECEIVED
DIVISION OF
LAND MANAGEMENT
AUG 29 9 52 AM '97

Thank you for allowing us to review and comment on the subject application. At this time, we do not have any comments to offer.

RECEIVED
97 AUG 28 P 3: 55
DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4414 • FAX: (808) 527-6743

OCT 7 1997

JEREMY HARRIS
MAYOR

JAN NAOE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

97-05986(ST)

September 5, 1997

RECEIVED
SEP 9 9 13 AM '97
DIVISION OF
LAND MANAGEMENT

The Honorable Michael D. Wilson, Director
Department of Land and
Natural Resources
State of Hawaii
Kalanimoku Building
1151 Punchbowl Street, Room 130
Honolulu, Hawaii 96813

Dear Mr. Wilson:

Conservation District Use Application (CDUA) No. OA-2871
Honouliuli Nature Preserve
Waianae Mountains, Oahu
Tax Map Key: 9-2-05: por. 13

We have reviewed the CDUA information transmitted by your letter dated August 18, 1997, and have no comments to offer at this time other than to note that the preserve is not located within the Special Management Area (SMA) and consequently is not subject to the regulations of Chapter 25, Revised Ordinances of Honolulu (ROH).

Thank you for the opportunity to comment on this matter. Should you have any questions, please contact Steve Tagawa of our staff at 523-4817.

Very truly yours,

JAN NAOE SULLIVAN
Director of Land Utilization

JNS:am

g:ppd\9705986.sht