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QUALITY CONTROL

February 25, 2000

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HISTORIC PRESERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT
WATER RESOURCE MANAGEMENT

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
Leoipapa A Kamehameha Building
State Office Tower, Sixth Floor
235 South Beretania Street
Honolulu, Hawai'i, 96813

Dear Ms. Salmonson,

Subject: Final EA for Kamakou Preserve Natural Area Partnership, District of Moloka'i, County of Maui, State of Hawai'i, TMK: 5-4-03:26; Final EA for Mo'omomi Preserve Natural Area Partnership, District of Moloka'i, County of Maui, State of Hawai'i, TMK: 5-1-02:37; Final EA for Waikamoi Preserve Natural Area Partnership, District of Makawao, County of Maui, State of Hawai'i, TMK: 2-3-05-4.

The Department of Land and Natural Resources has reviewed the Final Environmental Assessment for the subject projects and has determined a Finding of No Significant Impact (FONSI) for each of the projects.

Please publish notice of availability for public review of this project in the March 8, 2000 issue of the **Environmental Notice**.

We have enclosed completed publication forms for each project and four hard copies of each of the Final EAs. Since project summaries are not significantly altered from the DEA, they are not being re-submitted. Please contact Betsy Gagne at 587-0063 if you have any questions.

Sincerely,

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

MICHAEL G. BUCK,
Administrator

encl.

31-

MAR 8 2000

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FINAL ENVIRONMENTAL ASSESSMENT
FOR
KAMAKOU PRESERVE
NATURAL AREA PARTNERSHIP

This document prepared pursuant to Chapter 343, HRS

Prepared by
The Nature Conservancy

February 5, 2000

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CONTENTS

I. SUMMARY	3
Project Name	3
Kamakou Preserve Natural Area Partnership.....	3
Proposing Agency / Applicant	3
Approving Agency.....	3
Project Location.....	3
Agencies Consulted During EA Preparation.....	3
Federal	3
State	4
County.....	4
Private.....	4
II. Project Description.....	5
Summary Description of the Affected Environment.....	5
Location	5
Native Natural Communities.....	5
Native Flora	5
Native Terrestrial Fauna	5
Vertebrates.....	5
Invertebrates	6
Historical/Archaeological and Cultural Sites.....	8
Adjacent Natural Resources.....	8
Sensitive Habitats	8
General Description of the Action's Technical, Socio-Economic and Environmental Characteristics.....	9
Technical Characteristics	9
Management Considerations.....	9
Management Areas	13
Management Goals	13
Management Programs	13
Socio-Economic Characteristics	24
Environmental Characteristics	24
III. Summary of Major Impacts	24
Major Impacts - Positive.....	24
Major Impacts - Negative	25
IV. Alternatives Considered.....	25
V. Proposed Mitigation Measures	26
VI. Determination	26
VII. Findings, and Reasons Supporting Determination.....	26
VIII. EA Preparation information.....	28
IX. Appendices	
1. Comments Received During Consultation (and Responses)	
2. Native Natural Communities of Kamakou Preserve	
3. Rare Native Plants of Kamakou Preserve	
4. Rare Native Birds of Kamakou Preserve	
5. Rare Land Snails of Kamakou Preserve	
6. Priority Weed Species of Kamakou Preserve	

Figures

- Figure 1. Kamakou Preserve
- Figure 2. Protected Natural Area
- Figure 3. Kamakou Preserve Management Areas and Fences
- Figure 4. Kamakou Preserve Natural Communities

I. SUMMARY

CHAPTER 343, HAWAII REVISIED STATUTES (HRS) ENVIRONMENTAL ASSESSMENT

Project Name

Kamakou Preserve Natural Area Partnership

Proposing Agency / Applicant

State of Hawai'i
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street
Honolulu, Hawai'i 96813

The Nature Conservancy
923 Nuuanu Avenue
Honolulu, Hawai'i 96817

Approving Agency

State of Hawai'i
Department of Land and Natural Resources
Division of Forestry and Wildlife

Project Location

Kamakou Preserve, 2,774 acres in the District of Molokai, County of Maui,
State of Hawai'i.

<u>Tax Map Key</u>	<u>Acreage</u>
5-4-03-26	2,773.74

Agencies Consulted During EA Preparation

(The individuals and agencies listed were provided with copies of the preserve's Draft Environmental Assessment, and given 3-4 weeks to respond. All written comments received are included in Appendix 1.)

Federal

Environmental Protection Agency, Region 9
US Army Corps of Engineers
US Department of the Interior
US Forest Service
Office of Senator Akaka
Office of Senator Inouye
Office of Representative Abercrombie
Office of Representative Mink

State

Department of Agriculture
Department of Economic Development, Maui County
Department of Hawaiian Homelands
Department of Public Works, Maui County
DLNR, Aquatic Resources Division, Maui
DLNR, Division of Forestry and Wildlife
DLNR, Division of Land Management
DLNR, State Historic Preservation Division
Hawaii State Senate
Hawaii House of Representatives
Native Hawaiian Advisory Council
Office of Hawaiian Affairs
Office of Conservation and Environmental Affairs
Queen Liliu'okalani Children's Center
UH Department of Botany
UH Cooperative Extension Service

County

Maui County Board of Water Supply
Maui County Council
Maui Humane Society
Molokai/Lanai Soil & Water Conservation District
Molokai High School
Soil Conservation Service

Private

Billy Akutagawa
Bobby Alcin
Emmett Aluli
Animal Rights Hawaii
Bruce Anglin
Alu Like, Inc.
Leif Bush
Judy Caparida
Coastal Zone Management Plan
Clayton Ching
Dr. Ames Chow
Conservation Council for Hawaii
Mike Donleavy
Crystal Egusa
Hawaii Audubon Society
Adolph Helm
Karen Holt
Hui Malama O Mo'omomi
Noelani Joy
William Kaholola'a
Kalaupapa National Park
Kamehameha Schools, Bishop Estate
Kapualei Ranch
Kawela Plantation Association
Ke Aupuni Lokahi

Dara Lukonen
Mediation Center
Kim Moses
Mel Paoa
Moanalua Gardens Foundation
Molokai 4-H
Molokai Boy Scouts
Molokai Community Pasture Association
Molokai Earth Preservation Association
Molokai Historical Research & Studies
Molokai Irrigation System
Molokai Ranch
Na Ala Hele Molokai Advisory Council
Walter Naki
Native Hawaiian Legal Corporation
Nēnē O Molokai
Plant Materials Center
Ron Rapanot
Eugene Santiago
Secretariat for Conservation Biology
Sierra Club Maui
Sarah Sykes
Rene Sylva
Lydia Trinidad
The Outdoor Circle

II: PROJECT DESCRIPTION

In 1982 the Conservancy purchased a permanent conservation easement over the area that is now Kamakou Preserve from Molokai Ranch, Limited. The primary goal of this project is to maintain the preserve's native ecosystems and protect the area's rare plants and animals. Previous management work was approved by, and conducted in accordance with, Conservation District Use Permit number SH-2028A.

Summary Description of the Affected Environment

Location

The 2,774-acre preserve is located in the east Molokai mountains and borders three other protected natural areas: state-owned Pu'u Ali'i Natural Area Reserve (NAR), Kalaupapa National Historical Park, and the Conservancy's Pelekunu Preserve (Figure 1). The Conservancy also cooperates with the state to undertake joint management projects in areas adjacent to Kamakou. Together with Olokui NAR, which is east of Pelekunu Preserve, these protected areas form more than 22,000 acres of contiguous, native-dominated ecosystems that range from sea level to 4,970 feet in elevation. Kamakou is one of the primary ground water recharge and surface water source areas feeding the state Department of Agriculture's Molokai Irrigation System.

Native Natural Communities

Kamakou contains five vegetation zones, which contain ten natural community types, ranging from lowland mesic (moist) shrublands to montane wet forests (see Figure 4 and Appendix 2). There are two rare natural communities: the 'Ohi'a Mixed Montane Bog community and the Montane Wet Piping Cave (a subterranean community known only from Molokai).¹

Native Flora

Kamakou is home to 35 rare plant taxa, 18 of which are listed endangered (Appendix 3).

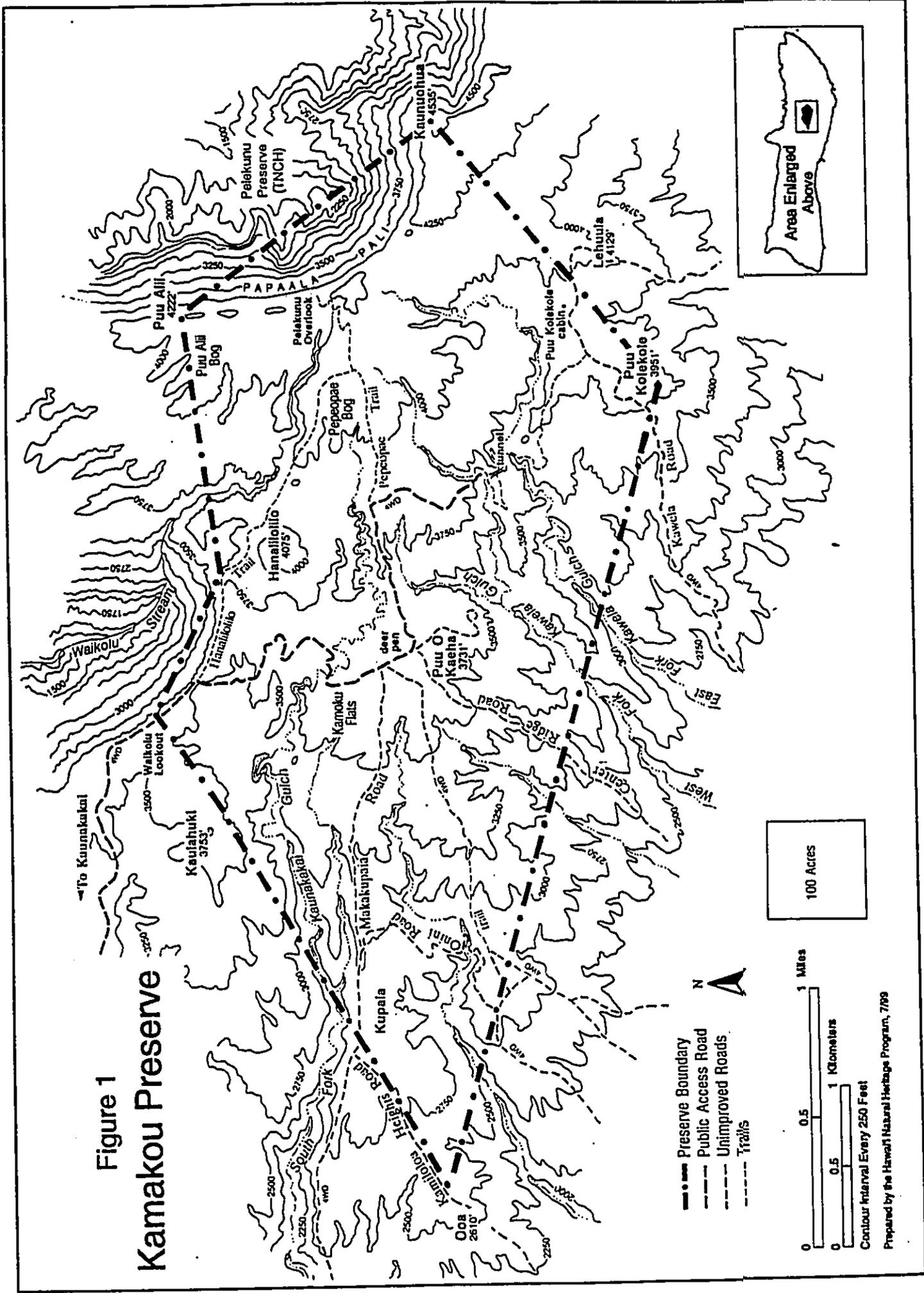
Native Terrestrial Fauna

Vertebrates

Of the five native forest birds historically known from Kamakou, only 'apapane (*Himatione sanguinea sanguinea*) and 'amakihi (*Hemignathus virens wilsoni*) are seen frequently. In FY1996 a solitary juvenile 'i'iwi (*Vestiaria coccinea*) was seen in the preserve. This was the first sighting of this species in Kamakou in five years. The kakawahie (Molokai creeper, *Paroreomyza flammea*) has not been seen on Molokai since 1963, and the oloma'o (Molokai thrush, *Myadestes lanaiensis rutha*) has not been seen on Molokai since 1988 when one was sighted in Kamalo, an area adjacent to the preserve. In May 1995, forest bird survey participants searched the preserve for these three rare birds (Appendix 4) unsuccessfully (but an 'i'iwi was observed on Bishop Estate land east of Kamakou Preserve).

¹The U.S. Fish and Wildlife Service has determined that the eastern portion of Kamakou Preserve contains palustrine systems, a category of wetlands. The Service defines wetlands as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water." Palustrine systems include "all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5‰."

Figure 1
Kamakou Preserve



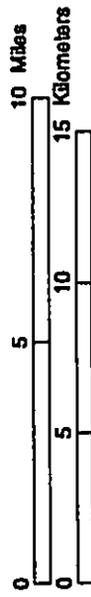
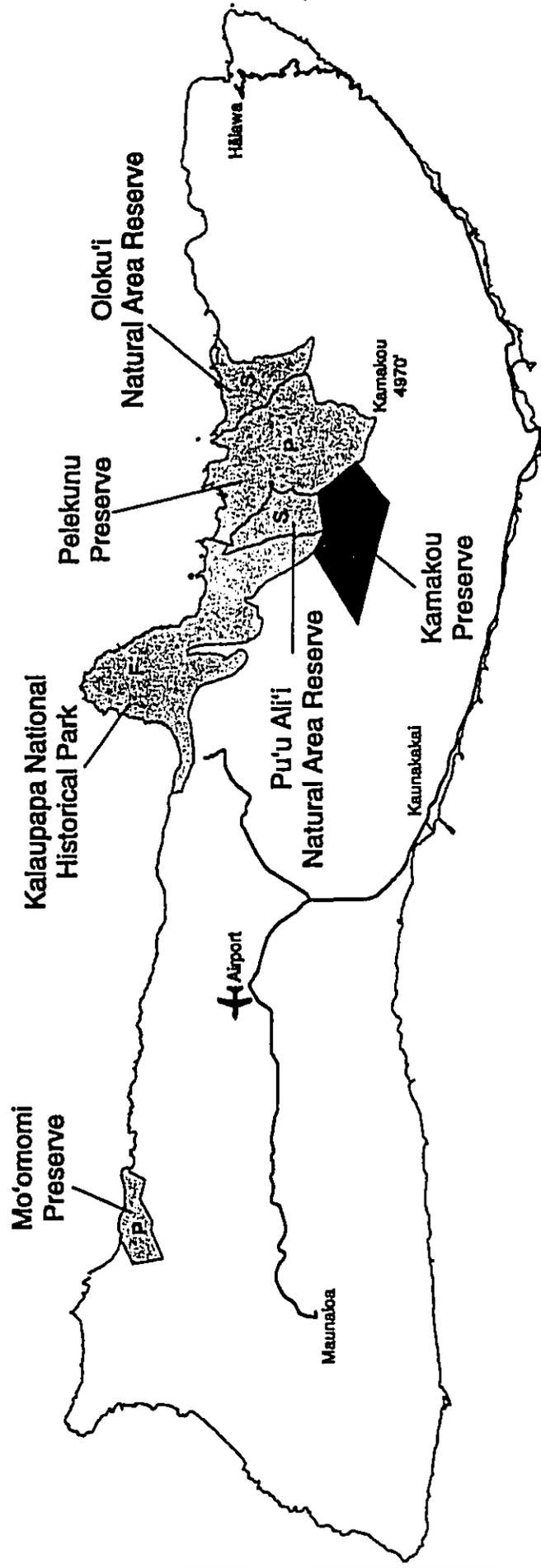
100 Acres

0 0.5 1 Miles
0 0.5 1 Kilometers
Contour Interval Every 250 Feet

Prepared by the Hawaii Natural Heritage Program, 7/89

Moloka'i

Figure 2
Parcel Information
Kamakou Preserve



PARCEL INFORMATION:

- S = State-owned
- F = Federally-owned
- P = Privately-owned
-  = Already Protected

Prepared by the Hawaii Natural Heritage Program, 7/99.

Invertebrates

Although much more remains to be learned about the molluscan fauna, five species of rare native land snails have been reported in Kamakou Preserve (Appendix 5). Two of these have been the subject of long-term population dynamics and evolutionary research led by Dr. Michael Hadfield. In FY1996 Dr. Hadfield's project suffered a major setback when the snail population decreased significantly due to rat predation. In response, we acquired funds from the U.S. Fish and Wildlife Service for emergency management of the snails. We are controlling the rat population through an intensive rat-baiting program, which will continue until the tree snail population is considered stable or increasing.

Historical/Archaeological and Cultural Sites

According to records at the State Historic Preservation Division (SHP), no archaeological surveys have been conducted at Kamakou Preserve, so the presence or absence of historical sites has not been determined. Although none have been encountered by those working in the area, there may be undetected agricultural features on the preserve flats, and associated temporary or permanent living sites. Other features such as shrines and rock shelters might also occur in the preserve, though again, none are known.

The Conservancy consulted with SHP staff to ensure that the full scope of proposed activities was known to SHP. SHP concurs that the proposed project appears to involve minimal ground disturbance. However, SHP staff recommended that preserve staff contact them prior to any ground-disturbing management activities. In the long term, the proposed management activities should provide protection for historical resources by reducing disturbance from ungulates (hoofed animals) or vandalism.

Adjacent Natural Resources

Kamakou Preserve is adjacent to three other natural areas that are actively managed: state-owned Pu'u Ali'i Natural Area Reserve (NAR), Kalaupapa National Historical Park, and the Conservancy's Pelekunu Preserve (Figure 1). Together with Olokui NAR, which is west of Pelekunu, these protected areas form more than 22,000 acres of contiguous, native-dominated ecosystems that range from sea level to 4,970 feet in elevation.

To the east and the south, privately owned lands of Kamalo, Makolelau, and Kawela include extensions of the natural habitats occurring in the preserve. Lands to the west are DHHL and state-owned conservation lands with a mixture of native vegetation and planted non-native tree stands and non-native grasslands.

Four of the preserve's more common natural communities are also found in Olokui and/or Pu'u Ali'i NARs (Appendix 2). Twelve of Kamakou's 37 rare plants, and three of its four state or federally endangered bird species have also been reported in Olokui and/or Pu'u Ali'i NARs. Eight of Kamakou's rare plant taxa and two rare bird species have also been reported in Kalaupapa National Historical Park (Appendices 3 and 4).

Sensitive Habitats

The habitats and resources listed above and in the appendices are regarded as sensitive and are found both within and adjacent to Kamakou Preserve. The intent of all proposed management activities is to provide long-term protection to these habitats and resources. 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 these risks. Management activities that affect adjacent sensitive habitats such as Pu'u Ali'i NAR and Kalaupapa National Historical Park will be coordinated with appropriate staff from these organizations to reduce any potential negative impacts.

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

Technical Characteristics

This project is long term, consisting of several different phases. The primary goal is to maintain native ecosystems and protect the habitat of rare plants and animals in the designated area. Management goals for six fiscal years (FY2001-2006) are discussed below. (The Nature Conservancy has adopted a July 1 – June 30 fiscal year.) To facilitate management, two management areas have been designated (see discussion in # 8 below). The Nature Conservancy of Hawai'i will be responsible for the completion of the management work.

The following sections describe specific management strategies that will be undertaken to maintain and enhance the native ecosystems and species of Kamakou Preserve. These management strategies are shaped by the following considerations.

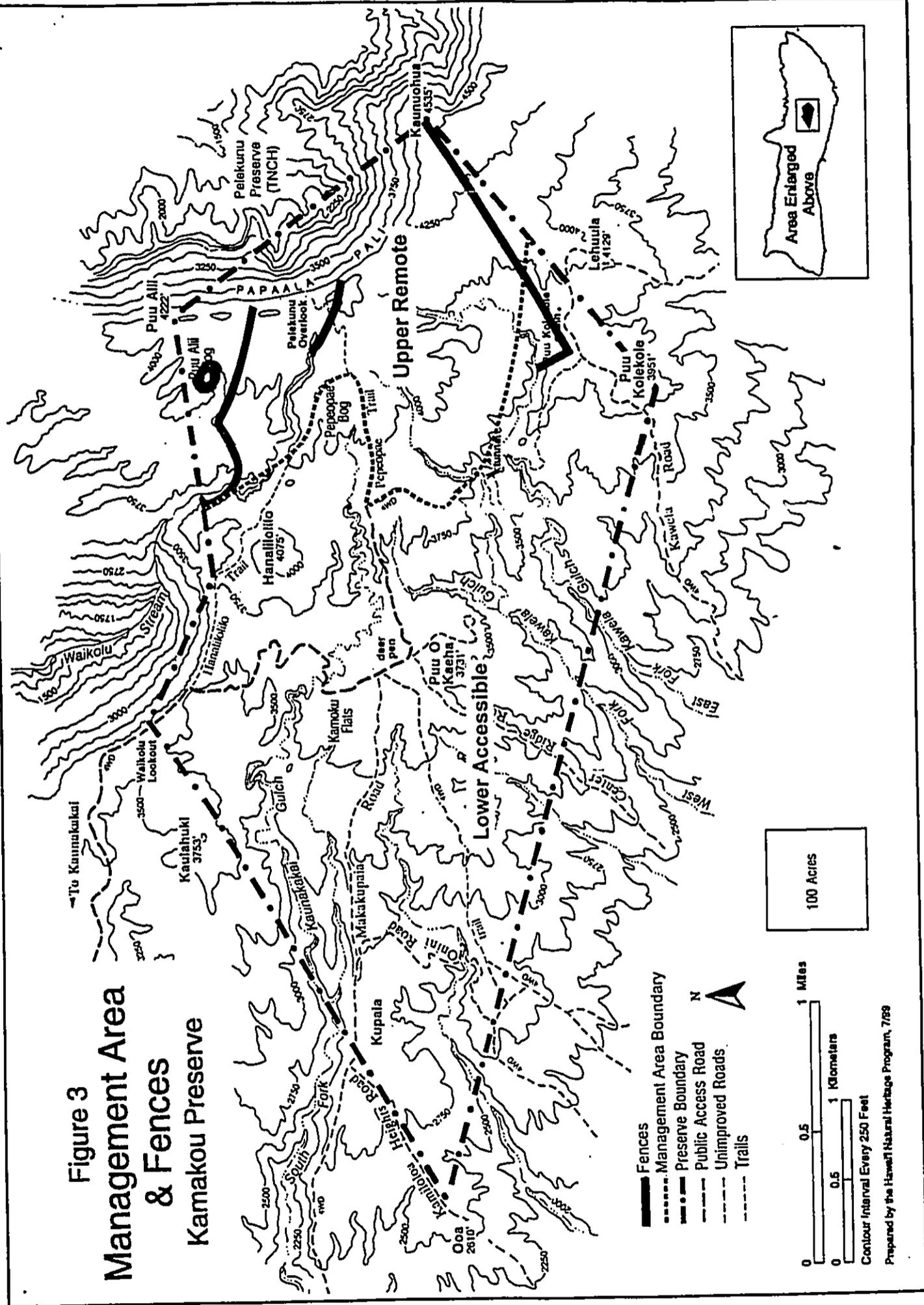
Management Considerations

1. Our primary management activity for protecting the preserve's native plants, animals, and natural communities is to protect the watershed by reducing feral ungulate damage, limiting the spread of non-native, habitat-modifying plants, and preventing wildfire. We are also committed to improving community outreach, and to enhancing access for people who want to use the preserve in ways that will not degrade its natural resources. We will focus on increasing access for educational and cultural activities that preserve traditional knowledge and promote conservation ethics.
2. Kamakou Preserve shares boundaries with the state Pu'u Ali'i NAR, Kalaupapa National Historical Park, Department of Hawaiian Home Lands property, and the Conservancy's Pelekunu Preserve. Bishop Estate, the Anglin property, and Kawela Plantation also share boundaries with the preserve. Some of these landowners will be coming together to form the East Molokai Watershed Partnership (EMWP). Whenever possible we will support EMWP's objectives and sharing of resources.
3. Prior to 1982 the Kamakou Preserve area was part of the State's Molokai Forest Reserve under a surrender agreement with the landowner, Molokai Ranch, Ltd. In 1982, the Conservancy purchased a permanent conservation easement over the property from Molokai Ranch. This easement ensures the Conservancy's rights to manage the preserve for the benefit of native species and ecosystems, and prohibits a wide range of potentially unsuitable activities by the landowner. The document also reserves certain rights for the landowner, including the right to enter and inspect, and to harvest surface water from the established water development systems, which may be expanded within clear limits described in the easement.
4. The previous surrender agreement between the State and Molokai Ranch is still recognized, and Kamakou Preserve is still part of the State Molokai Forest Reserve. However, the

Conservancy's management plans take precedence over other plans for the Kamakou Preserve area. The State Division of Forestry and Wildlife (DOFAW) provides wildfire suppression, road maintenance, use of Pu'u Kolekole cabin, and assistance with other projects in the preserve. Also, a Master Cooperative Agreement and Memorandum of Understanding between DOFAW and the Conservancy encourages sharing of staff, equipment, and expertise. Through a Memorandum of Understanding with DLNR, the preserve's main access road is part of the Na Ala Hele trail and access system.

5. Designated areas of the preserve are open for public hunting (see Status of Public Hunting Opportunities on page 16), hiking, and for educational and cultural activities. During times of extreme fire hazard, unsafe road conditions, or herbicide spraying in accessible areas, portions or all of the preserve may be closed to the public. Notification of closure will be made via a sign posted on the forest access road near the Maunawainui Bridge and by announcements in local newspapers.
6. Members of the Molokai community exercise traditional access, gathering, and other rights within the preserve, as recognized by law. Conservancy management does not alter these rights. However, TNC-sponsored management activities increases access to these sensitive areas. When participants on these TNC-sponsored activities use the opportunity to harvest resources, the levels of collection increase significantly above traditional collection levels that the forest can absorb. These activities can thus harm the native resources; long term impacts, such as reduced reproduction, can result. Therefore, TNC reserves the right to condition the participation on TNC-sponsored activities on the participants' agreement not to harvest native resources during the TNC-sponsored trip. TNC still recognizes the gathering rights of the Molokai community and suggests that if community members wish to gather natural resources under these rights, they may do so on trips to Kamakou that they have made on their own.
7. Access into many parts of the preserve is relatively good via a number of dirt roads and trails. Most were developed in the early 1900s as part of Molokai Ranch's water system and for the state's reforestation programs. Management facilities include the Pu'u Kolekole cabin and the old Civilian Conservation Corps barracks along the Maunahui Road (outside the preserve). The Conservancy leases the barracks from the state on a monthly revocable basis.
8. In the previous long-range plan we broke up the preserve into nine management units. However, in this long-range plan we will basically have two main management areas: upper remote, and lower accessible. The upper remote areas are those areas above the Hanalilolilo/Pepe'opae trail and Pu'u Kolekole road and trail system. The lower accessible areas are those below the Hanalilolilo/Pepe'opae trail and Pu'u Kolekole road and trail system. (See Figure 3 Management Areas of Kamakou Preserve.)

Figure 3
Management Area
& Fences
Kamakou Preserve



Prepared by the Hawaii Natural Heritage Program, 7/89

Management Areas

Kamakou is managed as two management areas (Figure 3) encompassing five vegetation zones (Figure 2). Topographic boundaries and accessibility define the management areas.

Upper Remote Area

The upper remote area is the northeastern section of the preserve above the Hanalilolilo/Pepe'opae trail and Pu'u Kolekole road and trail system. The upper remote area is composed largely of 'Ohi'a (*Metrosideros*)/'Olapa (*Cheirodendron*) Montane Wet forest and also includes a mosaic of native 'Ohi'a and mixed shrub-dominated natural communities along the steep pali walls of Papa'ala Pali. Pig ingress is the primary threat to this area; therefore, three strategic fences have been constructed to help control pig activity. There is also a perimeter fence around the Pu'u Ali'i Bog. A system of flagged trails in this area facilitates staff management and public hunting.

Lower Accessible Area

The lower accessible area is composed largely of 'Ohi'a/Uluhe (*Dicranopteris*) Lowland Wet Forest, 'Ohi'a/Uluhe) Lowland Mesic Forest and native mesic shrublands with patches of non-native molasses grass (*Melinis minutiflora*) and introduced pines (*Pinus* spp.), eucalyptus (*Eucalyptus robusta*), and tropical ash (*Fraxinus uhdei*) plantations. Management of this area focuses on feral pig and weed control and providing interpretive opportunities. Fire is a major threat to this area especially along the southwestern section of the preserve. An old DOFAW cabin provides shelter for research and management activities. A series of roads and flagged trails in this area facilitates staff management and public hunting.

Management Goals

The management programs that follow are listed in order of priority for the next six years of work. Each program goal is followed by a brief description of program strategies, and how we foresee these strategies changing over the next six years. A timetable is provided for each program.

Management Programs

Although the following management programs are described separately, they form an integrated management approach. For each program listed in the following section, we have indicated a major goal and described the management methods chosen. Also included are highlights of past and current achievements and key management issues. Finally, key objectives to achieve the goal are listed by year.

Program 1: Non-Native Species Control

Ungulate Control

Program Goal: To keep ungulate activity below designated thresholds.

In 1984 a series of 8 transects were set up in the preserve to measure ungulate activity². Since then we have expanded to a total of 13 transects. We monitor signs of ungulate activity in contiguous 5m x 10m plots along the transects on a quarterly basis. This monitoring method is used to gauge the effectiveness of our control strategies and techniques.

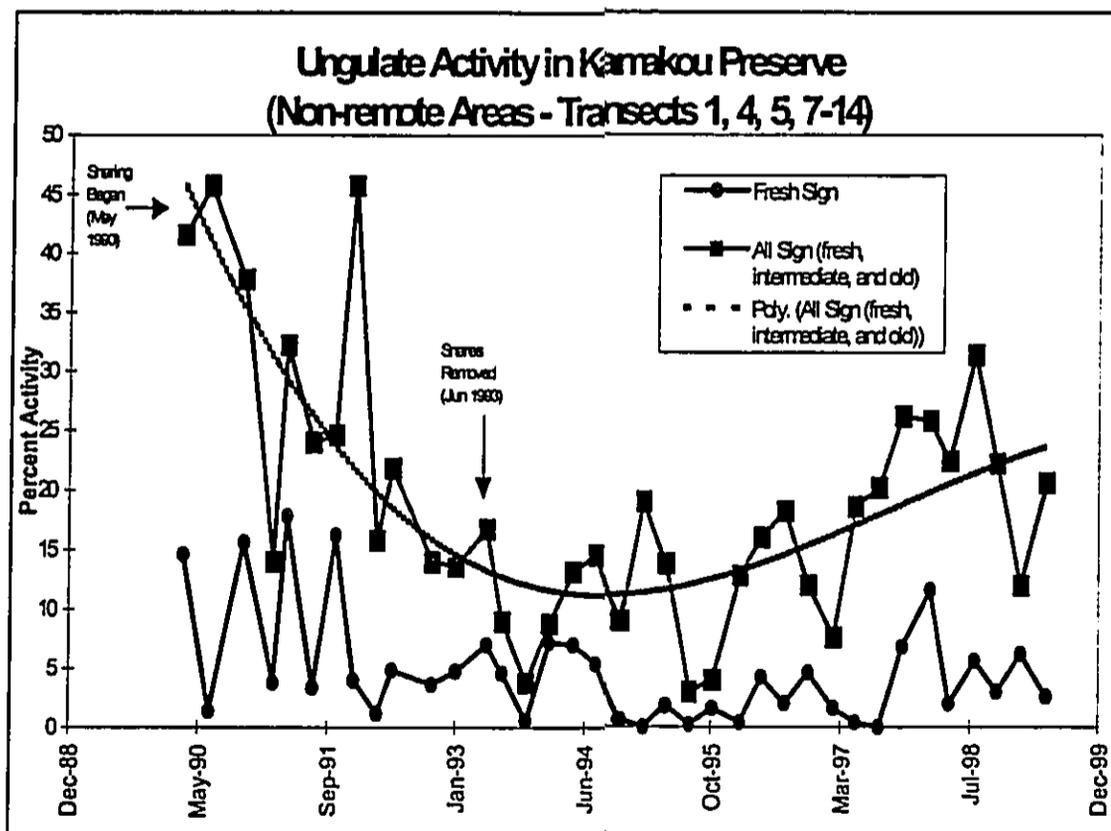
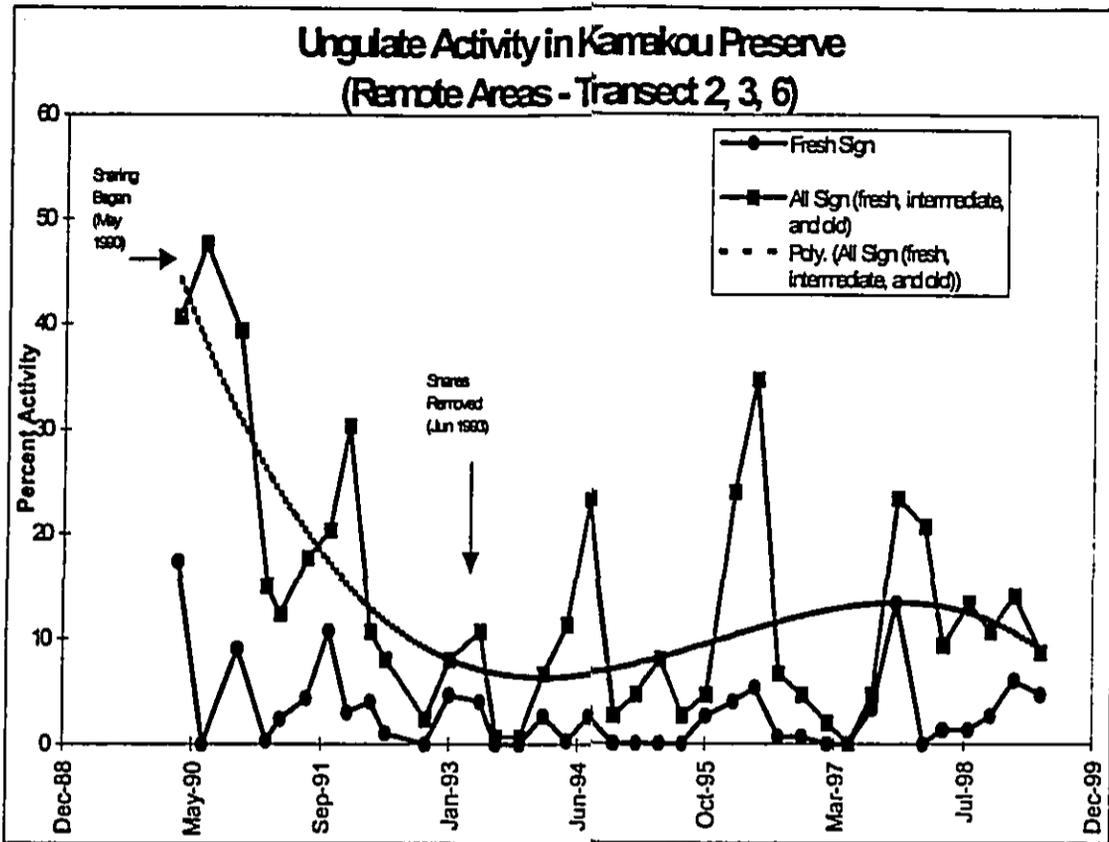
² "Ungulate activity" is determined by monitoring belt transects for ungulate sign (e.g., tracks, scat, wallows, evidence of browsing). For example, if fresh sign is present in 10 out of 100 transect stations, the activity level is said to be 10%.

After several years of open public hunting, we installed snares in the preserve's remote units from 1990 to 1992 to control feral pig populations. Transect data indicate that the snaring program reduced the average frequency of pig activity along transects from 30% to less than 10%. In FY1993, to address the concerns of community hunters, we removed all snares and began, and are maintaining, community hunting as our primary method of ungulate control. The Molokai Hunting Working Group (MHWG) (formed in 1993) continues to provide a forum for allowing community input on issues that affect land managers, hunters, and other Molokai community resource users. The MHWG agreed to use the results from our already established monitoring program to determine the success of community hunting in the preserve. The present agreed upon thresholds are 10% for the upper remote transects (2, 3, 6) and 25% for the lower accessible transects (1, 4, 5, 7-14). Results from the quarterly monitoring sessions are graphed and presented at MHWG meetings (see ungulate activity graphs). If hunters are able to keep pig activity levels at or below the levels achieved with snaring, the hunting program in Kamakou will continue in its present form, or be adjusted as agreed to by the group. Local hunters have been successful in keeping ungulate activity in the lower accessible areas to within the MHWG criteria. However, the overall trend of animal activity is rising, approaching the 25% threshold. The trend in the upper remote areas has remained relatively stable although it has exceeded the 10% level.

If we can increase community hunting pressure, we plan to continue to use community hunting as our primary method of ungulate control at Kamakou. After noting fresh sign in the field, we will notify designated community hunters (recognized by MHWG) of the locations. We will rely on the lead hunters to communicate that information to the rest of the local hunting community. Not all hunts are recorded; therefore, complete data on the number of hunters and captures are lacking for Kamakou Preserve. However, if ungulate activity continues to increase above unacceptable levels we will work with the MHWG to explore and implement alternative control methods.

In addition to hunting, we also use 4-foot-tall hog wire fences to protect fragile areas and to control pig and goat movement. To date, we have constructed four fences (Figure 4). The "Pu'u Ali'i" fence, built by TNCH for the state NAR program under contract, extends from east to west, south of Pu'u Ali'i Bog. Another fence encircles Pu'u Ali'i Bog. A third fence extends from the rim of Pelekunu Valley west toward Pepe'opae Bog and is about 1,000 feet long. The fourth fence is located near, and parallel to the east boundary of the preserve. The east boundary fence (also known as the Pu'u Kolekole fence) was built using EPA non-point source pollution funds. We will explore the idea of fencing the southern boundary of the preserve. If fencing is warranted and supported by the community, we will look for funding to pay for the cost of this southern boundary fence.

A series of 112, 3-meter-long transects were installed along the Pu'u Kolekole fenceline shortly after its completion in 1995 to monitor vegetation changes and ungulate activity. This monitoring program was established in response to some community members' concerns about the effectiveness of the proposed fence, and its effect on the vegetation of the area. The transects were monitored for the third time in January 1998, two years after the installation, completing the monitoring rounds. All but the 1998 data have been entered into our computerized database. Analysis of the data will help determine the effectiveness of the fence. Visual observations indicate vegetation recovery on the inside of the fence with animal activity occurring only on the outside of the fence.



In the past six years, The Nature Conservancy has worked with the State Division of Forestry and Wildlife and the Kalaupapa National Historical Park to leverage efforts over 4 natural areas: Kamakou, Pelekunu, Pu'u Ali'i, and Olokui. Our "partner" effort will be formalized and expanded through the East Molokai Watershed Partnership. The management of ungulates through the leveraging of partner efforts is critical, especially because feral ungulates know no boundaries. We will dedicate time to the control of ungulates outside our boundaries and to help with the overall ungulate problem in the natural areas of East Molokai.

Ungulate Control Timeline

Year 1 - 6 (FY2001 - FY 2006)

- Continue community hunting program with emphasis on increasing hunting pressure to hold activity below agreed upon levels and, based on results of quarterly ungulate monitoring sessions, modify strategies as needed.
- Conduct quarterly ungulate activity surveys and analyze data to determine effectiveness of control programs.
- Repair existing fences as needed.
- Assess need for southern boundary fence. If needed, identify funding source and construct.
- Maintain and develop volunteers (hunters, community members, interested landowners) to assist with the quarterly ungulate monitoring surveys.
- Participate in East Molokai Watershed Partnership to carry out regional resource management projects which will include providing ungulate management and monitoring training opportunities.
- Support research on ungulate control techniques.

Status of Public Hunting Opportunities

The preserve is open for public hunting where and when this is compatible with management programs, and in accordance with the regulations of the adjoining state Pu'u Ali'i NAR. At this time, the NAR and the preserve are open year-round to hunting of pigs, goats and axis deer, without a bag limit. During times of extreme fire hazard, unsafe road conditions, or herbicide spraying in areas accessible to the public, portions or all of the preserve may be closed to the public.

Weed Control

Program Goal: Improve or maintain the integrity of native ecosystems in selected areas of the preserve by reducing the effects of alien plants.

Habitat-modifying weeds are non-native plants that have demonstrated the ability to displace native vegetation. Displacement is accelerated by ungulate disturbance. Ungulates, especially pigs, impact the ground by their foraging activities (rooting and digging) and also carry and spread unwanted weed seeds. Fire also accelerates invasion by certain weed species. Elimination of ungulates and wildfire, therefore, are among the most effective means of controlling the introduction and spread of habitat-modifying weeds in the preserve.

At Kamakou, weeds are controlled manually (by pulling or cutting), chemically (using herbicide), or with a combination of manual and chemical control methods. Volunteers provide at least half of the labor needed for manual weed removal. Herbicides are used only on serious weeds that cannot be controlled by other means, and field staff is trained in their safe application. We consult the

state Department of Agriculture and University of Hawaii (UH) Cooperative Extension Service regarding the types of herbicides used and their proper application. Furthermore, we require all supervisory field staff to be certified in restricted pesticide application through the state Department of Agriculture. A third way to control weeds is by using biological control agents. We are required to obtain approval from the Conservancy's national office to release state-approved biological control agents. If we decide that biocontrol is needed in Kamakou, we will collaborate with state and federal biological control programs to ensure that this technology is appropriately applied.

In addition to active management of established weeds, our weed control program also focuses on prevention. For example, staff and visitors follow strict procedures to prevent the inadvertent introduction of alien pests while working or hiking in the preserve. Our alien species prevention protocol calls for inspecting all clothing and equipment for seeds and invertebrate pests such as ants before they are taken into the preserve.

The Conservancy is committed to educating the Molokai community about the detrimental effects of alien plant invasions. To do so, we cooperate with the State Department of Agriculture to increase the public's awareness of alien species, through local community events (Earth Day Celebration), posters, and our bi-monthly newsletter *Nature's Newsflash*. Our immediate goal is to teach members of the community to identify key weeds that are not yet established on Molokai (e.g., *Miconia calvescens*, *Passiflora mollissima* [banana poka], *Tibouchina*, *Myrica faya* [fire tree], and *Coccinea grandis* [ivy gourd]). In addition, we will work with cooperating agencies and landowners to remove incipient populations of alien plants on Molokai.

The Pepeopae Boardwalk is an invaluable site to show residents and visitors Molokai's native forest in a way that minimizes damage to this resource. The Boardwalk was originally installed in 1985 and completed in 1990. In addition to regular maintenance, it is important for staff to continuously monitor and control weeds along the boardwalk that people transport on their shoes and carry further along the trail. In the next six years, staff will develop a monitoring project to detect the ingress of alien plants along the boardwalk, with the focus on preventing the weeds from becoming established.

In the next six years, our staff will continue to focus on the top priority weeds (Appendix 6), with the goal of eliminating presently known populations of *Corynocarpus laevigata* (karaka nut), *Schinus terebinthifolius* (Christmas berry), *Acacia mearnsii* (black wattle), *Rosa* sp. (wild rose), and *Phormium tenax* (New Zealand flax). New introductions of the species may occur as unmanaged populations outside the preserve spread. We will continue to scout the preserve to identify and remove these new introductions before they become established populations.

Weed Control Timeline

Year 1 - 6 (FY 2001 – FY 2006)

- Visit known populations of clidemia (*Clidemia hirta*) quarterly. Conduct manual removal. Scout for new populations outside of grid. Map any new populations.
- Scout for, map and control populations of karaka nut (*Corynocarpus laevigata*), prickly Florida blackberry (*Rubus argutus*), black wattle (*Acacia mearnsii*), strawberry guava (*Psidium cattleianum*), New Zealand flax (*Phormium tenax*) and rose (*rosa* sp.).
- Annually remove and treat one acre of white ginger (*Hedychium coronarium*).
- Eliminate known populations of Christmas berry (*Schinus terebinthifolius*).
- Scout for and control other priority weeds as needed.
- Maintain alien species prevention protocol.

- Annually check for alien grasses along the preserve road and treat if necessary to prevent their spread by vehicles.
- Conduct Fusilade trials along the boardwalk to control grasses like meadow rice grass (*Ehrharta stipoides*) and *Paspalum urvillei* and develop a strategy for controlling and monitoring other weeds along the Pepeopae Boardwalk; implement as needed.
- Work with cooperating agencies and landowners to remove incipient populations of alien plants on Molokai, including TNC preserves, as needed.
- Recruit and maintain volunteer pool to provide a minimum of 300 person hours of weed control.
- Analyze weed monitoring data collected prior to 1999 and determine proper interval for continued monitoring.
- Continue community education about invasive weeds threats, including those not on Molokai.
- Serve as the Molokai representatives of MISC (Maui Invasive Species Committee) as needed.
- Update weed priority list annually using systematic evaluation of weed distribution, availability of control methods, and the weeds' disruptive potential.

Program 2: Natural Resource Monitoring and Research

Program Goal: To track the biological and physical resources of the preserve, and evaluate changes in these resources to guide management programs.

Natural resource monitoring differs from the monitoring of threats, which is described in the non-native species control program tasks. The purpose of resource monitoring is to help track important biological and physical resources over time to identify trends or changes. We began preserve-wide vegetation monitoring in FY1994 and completed in FY 1995, using permanent plots to collect data on plant species composition, distribution, abundance, and foliar cover. We plan to collect data from these permanent plots every 10 years. This kind of resource monitoring may not have immediate management application but is important for documenting long-term ecological changes.

The Conservancy is committed to learning more about Kamakou's invertebrate fauna. We currently support invertebrate research by various universities and research centers. Our staff has collected native and non-native invertebrates and created a labeled collection. This collection is used for educational purposes such as the training of staff and volunteers. We would like to develop this collection to be of further use in displays to educate the Molokai community about Molokai's native invertebrates.

The Conservancy encourages research that will help us better understand, and thereby protect the preserve's resources. Conservancy funding for research is limited but, whenever possible, we provide logistical assistance to approved research projects. We will continue to provide this type of support to researchers. We would like Kamakou to become a major research site for studies dealing with conservation and protective land management in Hawaii.

On August 23, 1998, a fire started on the southwest flank of the mountains of East Molokai. It spread rapidly on the dry slopes, eventually reaching the southwest corner of Kamakou Preserve. The fire was mostly extinguished by the middle of September, but isolated flare-ups continued through November. In the preserve, the fire burned in 'Ohi'a (*Metrosideros*) Lowland Mesic Shrubland (ranked G3 by HINHP), in tree plantations comprised of pine (*Pinus* spp.), and in small

plantings of tropical ash (*Fraxinus uhdei*), swamp mahogany (*Eucalyptus robusta*), and Monterey cypress (*Cupressus macrocarpus*). Monitoring of the burned shrubland was initiated one month after the fire and seeks to accomplish three goals. First, we want to document the types of plants and rate at which they recolonize the burned areas. Second, we want to quantify the invasion of burned and unburned shrublands by molasses grass. Third, we want to assess the amount of erosion that is likely to occur in the badly burned areas. Monitoring is on a quarterly basis. After a complete year of monitoring (October 1999), a decision will be made to end or continue this monitoring.

As a result of the fire we lost the location of an ungulate monitoring transect. This has made us more aware of how vulnerable these permanent sites are to acts of nature (fire, hurricane). We've come to recognize the importance of obtaining relocatable GPS reference points for our permanent monitoring sites and propose to do so within the next five years. This will include rare plant locations.

GPS coordinates for other important landmarks will also be collected. For example, coordinates for the burn area will allow comparisons to be made to areas that may be burned in future fires. Coordinates for weed populations can assist with weed control efforts.

As noted in the flora and fauna section, a State forest bird survey was conducted on Molokai in 1995. Although we lack the resources to initiate a survey, it is hoped that the state will conduct another survey during the course of this plan. If this occurs, we will support the survey by providing staff time and logistical support to the state survey team.

Natural Resource Monitoring and Research Timeline

Year 1 and 2 (FY 2001 – FY 2002)

- Provide logistical assistance for approved research.
- Support annual Molokai island-wide Audubon Christmas Bird Count with logistics.
- Remonitor Kamakou shrubland fire plots annually.

Year 3 (FY 2003)

- Provide logistical assistance for approved research.
- Support annual Molokai island-wide Audubon Christmas Bird Count with logistics.
- Remonitor Kamakou shrubland fire plots annually.
- Map 1998 burn area; all weed/ungulate/natural resource monitoring transects; and all rare plant populations with GPS.

Year 4 (FY 2004)

- Provide logistical assistance for approved research.
- Support annual Molokai island-wide Audubon Christmas Bird Count with logistics.
- Remonitor Kamakou shrubland fire plots annually.

Year 5 (FY 2005)

- Provide logistical assistance for approved research.
- Support annual Molokai island-wide Audubon Christmas Bird Count with logistics.
- Remonitor Kamakou shrubland fire plots annually.
- Conduct the second Kamakou natural resources monitoring program's tenth-year resource monitoring.

Year 6 (FY 2006)

- Provide logistical assistance for approved research.
- Support annual Molokai island-wide Audubon Christmas Bird Count with logistics.
- Remonitor Kamakou shrubland fire plots annually.

Program 3: Rare Species Protection

Program Goal: To prevent extinction of rare species in the preserve.

To date, 35 rare plant taxa, three bird species listed by the state and/or federal government as endangered, and five rare snail species have been reported from the preserve (Appendices 3 – 5). The Conservancy uses data compiled by the Hawaii Natural Heritage Program to identify rare taxa, and uses their definition of rare: "species that exist in fewer than 20 populations worldwide." In FY1996 an 'iwi was seen in Kamakou for the first time in 5 years. (The Molokai and Oahu 'iwi populations are considered endangered by the state of Hawaii.)

As part of this program, we have relocated a number of rare plant populations and collected information on their status. Threats to these plants were also assessed. We will continue to monitor these populations on a regular basis (every three years unless specific information is needed or if there is a severe threat that needs to be addressed). Because of these efforts, we have successfully protected three rare species with fences, provided a site for outplanting, and are in the process of identifying sites for additional fencing. In the future and if funding is available, we will focus on building larger fences to encompass entire regions, to protect habitat from pigs.

In FY 1997, we observed a steep population decline of rare *Partulina redfieldii* tree snails in Snail Meadow. In response, we initiated an intensive rat-baiting program that is still in progress. Surveys conducted in FY 1999 showed that the snails are slowly recovering. We will continue the baiting program until it is determined that the population is secure.

Rare species protection continues to be an important, high profile program. However, because TNCH has shifted its focus to protecting large landscapes, this program will be scaled down to allow expansion of off-site partnerships. TNCH staff will then focus on serving as resource people to help other large landowners manage the rare species on their properties as well.

To date, we have monitored 14 rare plant species in Kamakou and plan to continue monitoring each of those 49 populations in three-year intervals. Monitoring includes mapping the plants (by getting GPS coordinates and mapping on standard USGS quads) and collecting information on surrounding terrain and vegetation. Descriptions of each rare plant population, which includes each plant's size, reproductive status, vigor, and any obvious threats are also recorded. The Nature Conservancy cooperates with the Hawaii Rare Plant Restoration Group and the Center for Plant Conservation. These groups developed rare plant monitoring forms and guidelines in 1998. We are using the standardized forms and forwarding monitoring data to the Center for Plant Conservation based at Lyon Arboretum in Honolulu.

Rare Species Protection Timeline

Year 1 - 6 (FY 2001 – FY 2006)

- Maintain baiting program as necessary to control rats within the entire "Snail Meadow" area to protect *Partulina redfieldii* for as long as needed.

- Maintain the *Phyllostegia hispida* outplanting exclosures and the plants within them. Contact Lyon to check on ex-situ propagation of additional plants and plant out when ready.
- Encourage and/or assist State NAR to collect seeds from the *Phyllostegia hispida* in Pu'u Ali'i NAR and put into cultivation at Lyon, with Bill Garnett, or NTBG.
- Coordinate seed and fruit collection of critically endangered plants with Center for Plant Conservation (Hawaii Plant Restoration Group) for ex-situ propagation with various facilities (i.e. Lyon, NTBG, NAR)
- Conduct rare plant monitoring for 49 known populations of rare species on a three-year rotating schedule and compare data with previous session's data.

Program 4: Community Outreach

Program Goal: To build community support and awareness concerning the conservation of native natural resources, and to implement effective conservation practices that are also culturally sensitive.

There is considerable overlap in our community outreach program among the three preserves because outreach activities at each preserve affect the community's overall perception of The Nature Conservancy and the importance of preserving Molokai's natural resources. This overlap is reflected in our report for this section.

We will continue to put a significant amount of effort and resources toward developing a strong volunteer program. We feel that by expanding the volunteer base we will be able to accomplish more of our goals. It is also hoped that as the community becomes more involved with the management of these special areas it will increase their awareness and they will more actively support our efforts to protect these special places. We will continue to actively recruit new groups and individuals to assist with field activities such as weed and ungulate control and monitoring and beach cleanups. We will conduct docent training as needed to maintain a solid core of individuals willing, able, and adequately trained to lead hikes within Kamakou and Mo'omomi Preserves.

For over 15 years we have provided youth employment and educational opportunities by offering internships, participating in summer youth employment programs, doing classroom slide presentations and providing field trip opportunities. We place significant value on these youth employment programs, as an educational opportunity and a labor source, and plan to continue our work with these individuals and organizations. We will also continue to provide field trip opportunities when logistically possible.

Since it was formed in 1993, our Molokai Advisory Council (MAC) has helped us incorporate cultural values into our management practices, supported us on sensitive management issues and provided an important link to the local community. We will continue to meet with this group and recruit new members on an as needed basis. We will also continue our participation as a member of the Molokai Hunting Working Group (a group formed to identify, recommend and implement effective ungulate control methods at Kamakou and Pelekunu) and the Molokai Water Working Group (a group that advises the state Water Commission on water issues that may affect Pelekunu's stream system).

In 1998, a grass roots community group submitted an application to the USDA's Empowerment Zone "EZ" Initiative. On January 13, 1999, The Molokai EZ Application was awarded an Enterprise Community "EC" Designation. This community group, now known as the "*Ke Aupuni*

Lokahi" (EC Governance Board) is working to implement the Board's Strategic Plans. The Conservancy is helping with one of their top priority projects, the Kamalo/Kapualei Watershed Project. Kamalo/Kapualei is adjacent to Kamakou Preserve and this project is the catalyst of the East Molokai Watershed Partnership. We will dedicate staff time to Ke Aupuni Lokahi as this group is providing valuable community based conservation awareness and decision making. The group is made up of a broad representation of the Molokai community.

We will continue to develop the *Nature's Newsflash* (newsletter) and participate in Earth Day. Both of these projects provide us with an opportunity to educate and inspire members of the community about the conservation of Molokai's native natural resources.

Community Outreach Timeline

Year 1 – 6 (FY 2001 – FY 2006)

- Select and fund annual Molokai High School summer intern.
- Train and oversee *Alu Like* and other Summer Youth Program participants in management activities throughout the summer months.
- Conduct monthly and special community group hikes.
- Cultivate active participation of Molokai Earth Preservation Organization (MEPO) in the protection of Molokai's native natural resources (e.g. weed control trips, restoration of native ecosystems). Encourage MEPO to develop goals to become a source of native plant for revegetation.
- Assist Moanalua Gardens Foundation staff with conservation education effort at the school level.
- Continue active participation in the Molokai Hunting Working Group (MHWG), Molokai Water Working Group, and Molokai Advisory Council (MAC).
- Coordinate and organize annual Molokai Earth Day Event.
- Continue distribution of *Newsflash*.
- Maintain and develop docent and volunteer participation and conduct training sessions as needed.
- Write annual progress report and coordinate plans with neighboring landowners and agencies.
- Continue to develop the East Molokai Watershed Partnership through the Molokai Community (Enterprise Community Governance Board) by completing regional watershed management plans and projects.

Program 5: Emergency and Safety

Program Goal: To be trained and equipped to assist primary fire and rescue agencies during an emergency on or adjacent to the preserve.

To provide the safest possible environment for staff, interns, and volunteers, all staff is certified in first aid and CPR. Field staff also participate in training programs offered by state and federal agencies (e.g., fire training, helicopter safety, and hunter safety).

Fire is one of the greatest threats to Kamakou. The dry, southern lowland region of Molokai has a history of brush fires caused by human activities. Since 1983, three fires have threatened the preserve's southern forests and shrublands. A fourth fire occurred in FY 1999 and actually burned approximately 185 acres of the preserve, 40 of which were prime mesic shrubland. TNC staff assisted with fire suppression under the directive of the State's Division of Forestry and Wildlife (DOFAW). Office staff and equipment were used to support communications efforts providing

copying, computer, fax and radio support. Preserve vehicles were used to transport fire crews to the fire sites. In the event of future fires we will again act under the directive of DOFAW. We will support any fire pre-suppression efforts undertaken by DOFAW or the County of Maui. On the preserve we will clear evergreens along the old pipeline road, remove large sections of molasses grass and other fuels along the sides of roads as a fuel break (this may require the use of Fusilade) and, cut back pine trees as needed along fire break roads to prevent canopy fires. In addition we will upgrade our fire equipment to fully outfit entire field-capable staff.

Emergency and Safety Timeline

- Update fire and emergency plans and training.
- Conduct Fusilade trials on molasses grass and if successful, implement regular control.
- Cut pines along fire break roads.
- Remove evergreens along pipeline road.
- Purchase equipment as needed to allow immediate response to fire threats.

Program 6: Personnel, Equipment and Facilities (PE&F)

Program Goal: To provide administrative, logistical, and operational support for all of the Conservancy's field and community activities on Molokai.

The Conservancy has the equivalent of six full-time staff on Molokai consisting of the Program Director, Natural Resource Manager, Administrative Outreach Coordinator, Field Coordinator, Outreach and Volunteer Assistant and Field Technician. About 3 FTE are devoted to implementing the plan at Kamakou Preserve, .5 FTE at Moomomi Preserve, and 2.5 FTE at Pelekunu Preserve. A small portion of each staff member's time will be used to support fundraising efforts, build partnership capacity and conduct island wide community outreach activities. These activities are necessary to meet the NAPP 1/3 private match and to build overall support for the Preserve. The annual intern mentioned in the Community Outreach section is also part of the personnel budget.

Office/baseyard, equipment, and travel costs on Molokai are also split among the three preserves, with 60% charged to the Kamakou budget. Management in Kamakou requires four-wheel drive vehicles, and 80% of our vehicle costs are paid out of the Kamakou budget.

The Honolulu office of The Nature Conservancy provides technical and annual planning support. In particular, the Stewardship Ecologist, Director of Science and Stewardship Operations, Director of Science, Director of Communications and other island resource staff will help prepare annual plans and reports, develop and implement monitoring and research programs, and establish interpretive and intern programs at the preserve. In addition, biologists from the Hawaii Heritage Program will occasionally help Molokai staff with rare species monitoring and other stewardship projects. In FY 2006 we will update this long-range management plan.

Dirt roads provide the main access to Kamakou Preserve. Roads and trails are maintained to provide safe access to and within the preserve. Two preserve facilities are associated with Kamakou Preserve. The Kamakou barracks is a state-owned building in the Molokai Forest Reserve that is leased by the Conservancy to house volunteers and researchers. The Pu'u Kolekole cabin, inside the eastern boundary of the preserve, is also state-owned. The Conservancy uses this cabin for management and research activities in the eastern portion of the preserve.

Funding

The above programs comprise a six-year management plan for Kamakou Preserve. Through the NAP program, the state pays two-thirds of the management costs for an anticipated total funded amount of \$162,680.

Socio-Economic Characteristics

Three general types of socio-economic benefits will result from the proposed project: 1) watershed protection, 2) maintenance of biodiversity, and 3) public education and recreation. This project will also create conservation jobs on Molokai.

The forests of east Molokai serve as a stable domestic and agricultural water source for the island. 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.

Preservation of biodiversity has been recognized as a legitimate and necessary goal for society. This project provides multiple opportunities to protect and preserve natural ecosystems and endemic species.

Kamakou Preserve staff routinely give presentations to community and school groups on the importance of protecting natural areas in Hawaii, and Kamakou's important biota. Conservancy staff will also provide some hiking opportunities to the general public. In addition, volunteers are routinely used in many management projects. Community volunteers have gained hands-on conservation experience while learning about Hawaii's unique plants and animals.

Environmental Characteristics

This project has benefited, and will continue to benefit the environment by maintaining and enhancing native ecosystems, preserving biological diversity, and promoting improved water quality.

A least 37 rare plants, four state or federally endangered birds, five rare snail species, and two rare natural communities reported from Kamakou Preserve are better protected as a result of this project. By reducing the potential for rapid runoff from ungulate-damaged areas, a stable water regime will be promoted. In addition, the maintenance of a natural "viewshed" enhances the aesthetics of the area.

III. SUMMARY OF MAJOR IMPACTS**Major Impacts - Positive**

- Reduction of ungulate activity to a level that will promote and sustain measurable recovery of native vegetation in the preserve.
- Reduction of the range of habitat-modifying weeds and prevention of introduction of new problem weeds.

- Tracking of biological and physical resources in the preserve and evaluation of changes in these resources over time to identify new threats.
- Logistical and financial support to approved research projects will improve management understanding and protection of the preserve's resources as well as other natural areas in the state.
- Prevention of the extinction of rare species.
- Promotion of a more stable water regime both in and below the project area by reducing the potential for rapid runoff from disturbed or degraded areas within Kamakou through removal of feral animals and habitat-modifying weeds and prevention of fire.
- Improved water quality (within and below the preserve) due to:
 1. Decreased erosion and its subsequent siltation of streams and nearshore waters.
 2. Ungulate control, which lowers the potential for bacterial coliform and leptospirosis in the water.
- Preservation of a living component of Hawaiian culture.

Major Impacts - Negative

No major negative impacts are expected to result from the proposed activities. However, there are several *potential* negative impacts. One of these is the accidental introduction or spread of new weed species by managers or visitors on equipment, supplies, or transport vehicles. Because herbicides are sometimes used to control habitat-modifying weeds in the preserve, there is a remote possibility of localized soil contamination. Another potential impact is related to the restoration of large areas currently dominated by alien plants (such as pine plantations). Our goal is to eventually remove these stands and replace them with native plants. In the course of such work, there is the potential for increased erosion and establishment of new alien plant pests after vegetation removal. Occasionally there will be an increase in noise levels when helicopters are used to access remote areas. The "prop wash" of low-flying helicopters also might disturb animals such as tree snails and birds.

There is also the potential for visitors to harm Kamakou's natural resources. As mentioned earlier in this assessment, the preserve is open to the public for hunting, hiking, and limited gathering of culturally important forest materials. With such an open access policy comes risks. Visitors might harm Kamakou's resources in several ways. Potential detrimental activities include dumping trash, introducing weeds or alien invertebrates, starting fires, overcollecting, trampling rare plants, and planting marijuana or other illegal plants.

IV. ALTERNATIVES CONSIDERED

Although we (the Conservancy) considered a variety of alternatives involving lower levels of management, we decided that the actions outlined in this assessment are all necessary to assure the continued protection of rare species and valuable habitat. Slowing the pace of management could jeopardize progress made in controlling feral pigs and goats, weeds, and other serious threats. A no-action alternative would promote the loss of rare Hawaiian ecosystems, plants, and animals. Furthermore, erosion of fragile forest topsoils would continue at an accelerated rate, degrading an important watershed area and nearshore reefs and fisheries.

V. PROPOSED 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 and plant material and insects. Wherever possible, helicopter flights into the preserve will originate from weed-free areas such as wooden platforms or pavement, 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 herbicides, all field staff has 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. With regard to the potential for increased erosion and establishment of new weeds during weed control/restoration work, our plans will be focused on preventing these effects. We will begin with small-scale removal trials. Helicopter use is limited to essential conservation-related projects, and landings are restricted to very limited designated landing zones. Furthermore, to reduce noise and prop wash, we ask local helicopter pilots to fly higher than 1,000 feet above the forest canopy when travelling over the preserve. The Conservancy reports illegal helicopter landings and low-level overflights to the state Division of Conservation and Resources Enforcement.

With respect to the potential for visitors to harm Kamakou by overcollecting, trampling rare plants, starting fires, etc., we have taken several steps to minimize or prevent such damage. For example, to prevent the damage that can result from hikers using muddy trails, the Conservancy erected boardwalks in wet areas that are used frequently. Staff and trained docents guide hikes and advise visitors how to minimize their impact on the preserve, and staff monitor areas that receive the most public use (trails and roads) for new infestations of weeds. We also require groups of eight or more people to notify the preserve manager before visiting the preserve, and all visitors are asked to register at the Visitor Check Station at the preserve entrance where they can obtain copies of the preserve rules. Fire and public overnight camping within the preserve boundaries are prohibited. We also ask that visitors drive only on roads, and that they not litter. Staff is regularly present in the preserve to answer questions and enforce non-criminal violations of preserve rules. Enforcement of criminal activity such as poaching is the responsibility of the state Division of Conservation and Resources Enforcement. We also work with the public to foster a strong sense of community and, to date, the Molokai community has used Kamakou responsibly.

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 negative effect. The proposed activities are expected to benefit native species (including rare plants and animals) and native natural communities, both in the project area and on adjacent lands. For example, ungulate control will protect rare plants and rare natural communities from browsing and other types of ungulate damage (including the spread of certain weeds). Active weed control in the project area will also help protect rare plants and natural communities, and will indirectly help rare and other native animals. Active management of Kamakou Preserve will also promote a more stable water regime both in and below the project area by reducing the potential for rapid runoff from disturbed or degraded areas.

The risk of significant negative impact is low. Through a rigorous cleaning and monitoring program, the introduction or spread of new weed species by humans is expected to be minimal. Management-related impacts on any historical resources in the area are expected to be negligible. Furthermore, the risk of herbicidal contamination is low because: 1) only small volumes of approved herbicides are used, 2) staff is well-trained in herbicidal application, and 3) all chemical use is in compliance with the state Department of Agriculture's pesticide branch.

Significance Criteria

The Hanalilolilo and Pu'u Kolekole trail system are the only known historical structures discovered at Kamakou. Historically, very few people were allowed into the upper elevations of the Hawaiian forest so it is unlikely that there are any historical structures within the preserve. However staff has been instructed to report anything that could be of cultural or historic importance. Everyday management does not pose a threat to any structures that may exist within the preserve. (Please refer to Historical/Archaeological and Cultural Sites in this document.)

The Kamakou Preserve has continued to allow the public open access via the Molokai Forest Reserve Road. Through our various community outreach programs, we encourage the community to visit the preserve. We estimate that up to 500 people a year visit the preserve through our monthly hikes, volunteer trips and educational field trips. (Please refer to Program 4: Community Outreach in this document.)

The Nature Conservancy is in full compliance with the letter and spirit of the law as stated in Chapter 344 of the state environmental policy. The effort to establish the Kamakou Preserve in order to protect Hawaii's unique plants and birds is at the forefront of the purpose of Chapter 344. The Nature Conservancy will continue to improve the environmental quality of Hawaii through its efforts in Kamakou Preserve for many years to come.

The 2974-acre Kamakou Preserve is said to contribute about 60% of the water entering the State's Molokai Irrigation System, which is dedicated to supply agriculture water to Molokai's farming industry. Active management is essential in keeping the native forest from being degraded, and thus reducing the flow of water to the MIS system. Additionally, the legal landowner, Molokai Ranch, also draws surface water from several intakes in the Preserve which serve operations on their agricultural and business lands in Kualapu'u and Maunaloa. Molokai Ranch is one of the biggest employers on Molokai.

Public health is improved through the management of Kamakou Preserve. By removing feral ungulates, known carriers of water borne pathogens, a source of contamination is removed from the public water supply. Furthermore, an intact forest increases the filtration of water flowing into Molokai aquifers, and thus provides cleaner water.

As the majority of Kamakou Preserve is accessible via a muddy four-wheel drive road, there is no affect on population changes nor effect on public facilities. Kamakou Preserve is located in a conservation district and therefore any development of infrastructure is strictly prohibited.

Our primary strategy for protection of Kamakou Preserve is to reduce damage to native vegetation and soils by removing all feral ungulates. Ecoregion-wide protection significantly reduces environmental degradation by preserving Hawaii's native flora and fauna.

State Historical Preservation Division and TNCH have agreed that management activities would involve little to no ground disturbance in the preserve. The cumulative impact of feral ungulate browsing and invasive pest weeds by far exceeds the minimal impact of our management activities.

Feral ungulates damage native forests by eating the roots and disturbing native plants which are vital to the survival of the many rare, threatened and endangered birds and plants located in Kamakou Preserve. The positive impact of The Nature Conservancy's strategy of fencing and feral ungulate removal has been evidenced in Kamakou where damaged areas have recovered making better habitat for rare and endangered species. As noted in the Program 3, Rare Species Protection, outplantings for rare species have been undertaken.

Water quality is improved by removal of disease-bearing hooved animals from the watershed. There are no management activities which effect ambient noise levels, although localized increases in noise do occur when helicopter travel to remote parts of the preserve is required. Management of Kamakou Preserve will not affect air quality, as an intact forest helps the environment by absorbing carbon dioxide and, at the same time, by providing the oxygen we need.

Kamakou Preserve is a natural area and will be treated as such. It will be prone to any natural event that may happen in the area, but these events will only add to the natural state of Kamakou.

In fact, due to our management of Kamakou Preserve, we have enhanced the community's ability to access one of the most spectacular scenic vistas in the state—Pelekunu overlook. The only structures that can be seen in the preserve are fences and boardwalks (that protect the Pepeopae trail from impact). The vast majority of these fences and boardwalk are well below the canopy of the forest.

As there are no structures in the project area, management of Kamakou Preserve requires only a modest amount of energy in vehicular and helicopter transportation to complete management projects.

Approvals

As outlined by the Rules Regulating Application, Approval and Administration of the Natural Area Partnership Program, the final EA, a partnership agreement (contract) and a long range plan are submitted to the Board of Land and Natural Resources for approval prior to project commencement.

VIII. EA PREPARATION INFORMATION

This document was prepared by staff of The Nature Conservancy, in consultation with Randy Kennedy and Betsy Gagné, staff members in the Department of Land and Natural Resources, Division of Forestry and Wildlife, Natural Area Reserves System program. The primary EA preparer is:

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This environmental assessment incorporates many sections and figures from the Kamakou Preserve Long Range Management Plan (e.g., all maps, descriptions of resources, and proposed activities). Please refer to the management plan for details pertaining to the project budget.

IX. APPENDICES

APPENDIX 1
COMMENTS RECEIVED DURING CONSULTATION
(AND RESPONSES)

MOLOKAI - LANAI SOIL AND WATER CONSERVATION DISTRICT

Dan Roudy K.



P.O. Box 398
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Phone (808) 567-6869
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December 15, 1999

Mr. Michael G. Buck, Administrator
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 224
Honolulu, Hawaii 96813

Subject: Comments on Draft Environmental Assessments for Kamakou Preserve, Moloka'i and Mo'omomi Preserve, Moloka'i, for Mo'omomi Preserve Natural Area Partnership

Dear Mr. Buck:

The Moloka'i - Lana'i Soil and Water Conservation District would like to thank you for the opportunity to review the Draft Environmental Assessments for the Kamakou and Mo'omomi Preserves here on Moloka'i. These assessments seem to be adequate and the District has no comments at this time. However, we would like to take this opportunity to commend The Nature Conservancy of Hawaii and your agency for your continuing hard work and dedication to the protection and preservation of our precious natural resources here on Moloka'i.

Sincerely,

Paul K. Ella
Paul K. Ella
MLSWCD Chairman

PE:zp

DANIEL K. AKAKA
Member
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WASHINGTON, DC 20518
Telephone: (202) 225-4281
HONOLULU OFFICE
3108 PUNCHBOWL STREET
HONOLULU, HI 96806
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Dan Roudy K.
United States Senate
WASHINGTON, DC 20510-1103

Member
COMMITTEE ON ENERGY AND
NATURAL RESOURCES
COMMITTEE ON GOVERNMENTAL AFFAIRS
COMMITTEE ON INDIAN AFFAIRS
COMMITTEE ON VETERANS AFFAIRS

December 9, 1999

Mr. Michael G. Buck
Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street, Room 224
Honolulu, HI 96813

Dear Mike:

Thank you for your recent letter soliciting comments on the Draft Environmental Assessments (DEAs) for reauthorization of various wildlife preserves as participants in the Natural Area Partnership Program. I will review the DEAs and, if necessary, provide comments for the record.

Thank you for continuing to keep my office apprised of your agency's activities. I look forward to renewing our partnership on various issues in the coming session of Congress.

Aloha pumehana,

Danny
DANIEL K. AKAKA
U.S. Senator

TRCH DEA, NAPP

From: Dave.Hopper@fws.gov
To: kenned@hgea.org
Date: Wed, Dec 1, 1999, 11:25 AM
Subject: TRCH DEA, NAPP

Tue, Dec 7, 1999 9:56 AM

To Randy Kennedy, NARS, DLNR; 1 Dec. 1999

Randy,

We reviewed the recent (23 Nov. 1999) DEAs for TRCH's preserves on Maui and Molokai (Kamakou, Waikamoi, and Mo'omomi). TRCH adequately addressed FWS comments that were provided by our office on 22 October 1999, and we will make no further comments.

Dave Hopper

Rec'd 12-2-99

JAMES "IMO" APALIA
Mayor

CHARLES JENCKS
Director

DAVID C. GOODE
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

Randy



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
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WAILUKU, MAUI, HAWAII 96793

RON R. RISKA, P.E.
Wastewater Reclamation Division
LLOYD P. C. W. LEE, P.E.
Engineering Division
BRIAN H. SHIRO, P.E.
Highways Division
ANDREW M. HIROSE
Solid Waste Division

November 30, 1999

Mr. Michael G. Buck, Administrator
State Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 224
Honolulu, Hawaii 96813

Dear Mr. Buck:

SUBJECT: DRAFT EA FOR KAMAKOU, MO'OMOMI, AND WAIKAMOI
PRESERVES FOR REAUTHORIZATION AS PARTICIPANTS IN
THE NATURAL AREA PARTNERSHIP PROGRAM

Thank you for the opportunity to comment on the subject environmental assessments.

You may wish to include as a positive impact to this program that ungulate control also reduces downstream flooding concerns. As the County maintains some drainage facilities makai of these preserves, this program benefits downstream facilities and properties.

If you have any questions, please contact me at (808) 270-7845.

Sincerely,

DAVID GOODE
Deputy Director of Public Works
and Waste Management

DG:mt

JAMES "KIMO" APANA
MAYOR



OFFICE OF THE MAYOR

Ke'ena O Ka Mea
COUNTY OF MAUI
Kalana O Maui

December 21, 1999

Mr. Michael Buck, Administrator
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Buck:

RE: Draft Environmental Assessments for Waikamoi Preserve (Maui),
Kamakou Preserve (Molokai) and Moomomi Preserve (Molokai) for
Reauthorization as Participants in the Natural Area Partnership
Program

Thank you for the opportunity to provide you with comments on the
above-referenced Draft Environmental Assessments (DEA).

As a partner in this program, we support the reauthorization of the Natural Area
Partnership Program. We recognize the importance of these preserves and their need
for long-term management. This particular approach has shown itself to be an
effective tool in preserving our resources for the generations to come.

We believe the public participation aspects of the management plans are
especially important as it fosters a sense of community and adds to the effectiveness
of the program.

If you have any questions, please contact Mr. William Spence, Staff Planner, of
the Maui Planning Department at 270-7735.

Sincerely yours,

JAMES "KIMO" APANA
Mayor, County of Maui

Mr. Michael Buck, Administrator
December 21, 1999
Page 2

JA:WRS:cmb

c: John E. Min, Planning Director
Brian Miskae, Executive Assistant to the Mayor
William Spence, Staff Planner
Mark White, Maui TNC
Project File
General File
S:\ALL\WILLUAC\RES\BUCK3.WPD

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JAMES J. CAYetano
Governor



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

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FACSIMILE (808) 586-4188

December 21, 1999

Mr. Tim Johns, Chair
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Johns:

Subject: Draft Environmental Assessment for the Kamakou, Mo'omomi, and Waikamoi Preserves Natural Area Partnership, Molokai and Maui

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

1. Please include a list of all approvals (State, Federal, County) required for the project in the final environmental assessment.

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

Sincerely,

Genevieve Salmonson
Genevieve Salmonson
Director

c: Nature Conservancy

The Nature Conservancy of Hawaii
1116 South Street
Honolulu, Hawaii 96813
Phone: (808) 537-1500
Facsimile: (808) 545-3049

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http://www.tnc.org

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February 22, 2000

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

Dear Ms. Salmonson:

Subject: Draft Environmental Assessment for Waikamoi, Kamakou and Moomomi Preserves Natural Area Partnership

Your 12/21/99 memorandum to the Department of Land and Natural Resources was forwarded to The Nature Conservancy for response. In the Final Environmental Assessment we have added a statement under the section "Findings, and Reasons Supporting Determination" that clarifies the needed approval for this project to proceed.

Under the "Rules Regulating Application, Approval and Administration of the Natural Area Partnership Program," the partnership agreement (contract and long-range plan) is submitted to the Board of Land and Natural Resources for final approval prior to project commencement.

TNC also holds a current Wildlife Control Permit for night-time hunting of deer on Maui. This permit is valid for one year and is renewed annually.

Thank you for your comments. Please contact me at 537-4508 if I have not adequately addressed your concerns.

Sincerely,

Alenka Remeč

Alenka Remeč
Director Science and Stewardship Operations

cc: Mike Buck, DLNR
Randy Kennedy, DLNR
Betsy Gagne, DLNR
Mark White, TNCH Maui
Anders Lyons, TNCH Maui



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*Randy K
Betty J*

23 December, 1999

Department of Land and Natural Resources
State of Hawaii
Division of Forestry and Wildlife
1151 Punchbowl Street
Honolulu, Hawaii 96813
Via FAX: 587.0160

The Nature Conservancy of Hawaii
1116 Smith Street Suite 201
Honolulu, Hawaii 96817
Via FAX: 545.2019

Re: Draft Environmental Assessment
Mo'omomi Preserve (Molokai)
Natural Area Partnership
And

Draft Environmental Assessment
Kama'ou Preserve (Molokai)
Natural Area Partnership
And

Draft Environmental Assessment
Waikamoi Preserve (Maui)
Natural Areas Partnership

Animal Rights Hawaii (ARH) is responding to the above mentioned draft environmental assessments for the continued contractual relationship between the State of Hawaii and the Nature Conservancy of Hawaii (NCH)

ARH has grave reservations regarding the proposed contract's empowerment of NCH as well as other various government agencies to utilize animal control methods which are universally considered inhumane, cruel and useless in the long range plan to remove introduced species from the above mentioned properties.

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We have, in the past, explored TNCH to use its vast private resources, as well as those tax payer funded monies awarded by the State of Hawaii, to find and implement humane, effective, long-range programs (such as already available immunization) towards re-establishing a friendly environment for native species.

We have also stated that the invasion of large portions of lands in Hawaii by herds of cattle and the devastation of native forests in the clearing of lands for these cattle, as well as the resulting pollution of lands by cattle dung and runoff and pollution resulting from slaughter and processing, have created massive environmental degradation far worse than that produced by introduced animals. The State of Hawaii continues to ignore the environmental dangers of the livestock industry in Hawaii and chooses to concentrate on its own program of ethnic cleansing against animals who have no lobbying power nor wealthy donors to speak for them.

Although the goals of the proposed EAs (to protect native species) are worthy, the methods, including maximum kills of cats, pigs, deer, goats and rodents and mongooses, are cruel and unacceptable.

ARH hereby states our intention to participate in the planning and evaluation process for any and all programs involving animal control in activities by the State of Hawaii and its partners in land management. Please include us in your consultation list.

Truly,

Cathy Coe
Cathy Coe
Director, Research and Investigations

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February 22, 2000

Cathy Goeggel
Director, Research and Investigations
Animal Rights Hawaii
P.O. Box 10845
Honolulu, HI 96816

RE: Response to the Draft Environmental Assessment for Waikamoi Preserve

Dear Ms. Goeggel,

Your letter to the Department of Land and Natural Resources was forwarded to The Nature Conservancy of Hawaii (TNC-H) for response. Thank you for responding to our request for comments on the Draft Environmental Assessment for Waikamoi Preserve.

While feral cattle are causing damage to Hawaii's native ecosystems in some areas, they have been excluded from Waikamoi Preserve for a long time through our use of fences. Cattle therefore are not considered a threat to the preserve. There are, however, introduced animals such as pigs, goats, and deer which continue to destroy our native ecosystems, and these are the targets of our control efforts. Because of the heavy damage these animals inflict on our native forests, their presence in our preserve is cause for great concern.

Feral animals continually eat away and otherwise disturb the understory that provides for new forest growth. Over time, the regeneration of new trees ceases, while existing trees grow old and die. Without native trees and plants, the birds begin to disappear, slowly at first and then more rapidly. For the forest, and the native plants and animals that live there, what is occurring is a cruel and lengthy death sentence.

Statewide we have seen over half of our native habitat destroyed in just 1500 years, and historic accounts of the native bird population show their range diminishing at incredible rates. In Waikamoi Preserve alone we have seven species of native birds that are endangered or rare. In light of these facts, our effort to protect the remaining native habitat is essential.

We employ several tools in managing our preserves. Fencing off an area to be protected is integral to our management efforts. Fencing keeps pigs out and reduces the number of pigs that need to be removed from our preserve. We also employ a variety of one-way gates, which provide the pigs inside the preserve access to the outside. Second, we encourage public hunters to hunt in the more accessible areas of the preserve. While hunting has its own opponents, this method has been accepted as appropriate by the Humane Society of Maui. In addition to public hunters we use contract hunters -- paid professionals who do intensive hunting and harvest all meat. As an initial tool in removing pigs from an area we have also flown public hunters into remote areas. While this strategy is effective with high populations, it becomes less effective as populations diminish. Snaring is only used as a last resort in the most fragile and remote areas where no other method has proven effective.

The Hawaii Department of Land and Natural Resources, the National Park Service, The Nature Conservancy, and others have worked for many years developing effective control programs to reduce the devastating effects of pigs and other alien species invading our forests. The National Park Service, especially, has conducted major research in Hawaii on hunting, trapping, baiting, snaring and other feral animal control methods. We have collaborated with experts elsewhere in the United States and abroad, taking advantage of this collective knowledge to develop our current program. We have learned that, both for the protection of the forest and to minimize the number of feral animals that must be killed, control programs must be very aggressive. An effective control program must use a variety of methods to first reduce the feral animal population in an area to very low levels as quickly as possible, and then to keep it low.

We are dedicating staff and funding to search for additional control methods that can replace snaring. There are several possibilities, but it will be some time before they are practical for Hawaii.

Commonly proposed alternatives to snaring such as poison and birth control are opposed by many and are not feasible. No poison of any kind is currently legal for pigs or goats in the United States. While birth control is theoretically possible and has been applied to many mammal species in controlled settings, it is not yet practical for use in remote, wild populations. We recently supported a project to develop a vaccine for immunosterilization of pigs. The findings show that a contraceptive (not sterilization) effect was achieved in 50% of the animals. However, the vaccine must be delivered by injection and needs to be re-administered by two specifically timed boosters. Thus, such a method, while technically possible in a controlled environment, is not practical in a dense rain forest setting with free-roaming, wild populations. Also, there are serious concerns about the impacts these animals would continue to have on the environment while they remained alive. Nevertheless, we continue to stay abreast of contraceptive research and other developments as possible future alternatives.

Again, thank you for responding to our request for comments on the Draft Environmental Assessment for Waikamoi Preserve.

Aloha,

Alenka Remec
Director, Science and Stewardship Operations

Cc: Mike Buck, DLNR
Randy Kennedy, DLNR
Betsy Gagne, DLNR
Mark White, TNC-H Maui
Anders Lyons, TNC-H Maui

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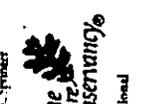
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December 21, 1999

Steven J. Araujo
PO Box 637
(808) 966-7215
Kurtistown, HI 96760

Michael Buck
Administrator
Division of Forestry and Wildlife
DLNR
1151 Punchbowl St.
Honolulu, HI 96813

Dear Mike,

Thank you for the opportunity to provide testimony on the Re-assessment for the reauthorization of TNCH's application for the Natural Area Partnership Program.

These plans are not well written management plans. There are many discrepancies and repetitions as mentioned in some detail. (See attached sheets.) All of these plans should be rewritten and detailed. There should be accounts for actual problem areas-size, etc., amount of man-hours, amount of herbicides used, type(s) of herbicides used, and approximate total cost of projects etc. It is suggested that until this is done and again sent out for public review, all renewals for this Partnership should not be reauthorize.

I do believe that public comment on matters such as these should be made more public friendly. Meaning that, the vast majority of the public has no idea of this sort of happenings. Perhaps public advertisements such as newspapers, etc., might be the method of delivery. Public comments need to come from the general public and not only certain interest groups. What happens in Hawaii affects all of the people and all of their generations. These programs are publicly funded and information regarding these programs and the use of funds should be made more available to the public. Therefore, DLNR should do its utmost to provide the general public with full information on the happenings that are occurring and will possibly occur in the State of Hawaii.

Please provide me with answers to all of my questions and concerns that I have given to you on the attached sheets. I would also like to know as stated in HRS 195-6.5 Natural Area Partnership Program (b) if their was a transfer of fee title or conservation easement granted to the State by TNCH? Please reply as soon as possible. Thank you.

Sincerely,

Steven J. Araujo

Steven J. Araujo
cc: Tim Johns (BLNR Chairman)
Betsy Gagne (Secretary of NARS Commission)
Randy Kennedy (Native Resources Program Manager)
Other interested parties

Waikamoi

Page 6: Natural Communities-Of these 14 communities, who is it that considers 2 communities rare?

Page 10: Sensitive Habitats- This section talks about Sensitive Habitat in Haleakala National Park and adjoining lands. What does this have to do with Waikamoi? It has also been mentioned at a program called after dark in the park on July 11, 1999 that the term Sensitive Areas were conjured by National Park Administration to receive more funds for their programs. These minutes are on video file at Volcano National Park. Is TNCH and BLNR and DLNR aware of this? If not, the suggestion is to become aware and not get caught up in something you don't want to be caught in.

Page 11-19: As stated through out these pages, for ten years, snaring and contract hunting has been the strategy used to reduce game mammal populations except in unit 1a where it states that game mammal populations have not been reduced. Under heading Status of Public Hunting it states that ranch employees have the hunting priority and that TNC Reserves the right to close all areas to hunting. - I will remind you of HRS 195-6.5 where it states (2)(A)(B):

...The management plan shall include provisions to allow public hunting wherever feasible; provided that:

- (A) Hunting activities shall be in compliance with applicable laws; and
- (B) Game animals shall not be introduced to any partnership area and hunting shall be conducted as a conservation purpose of this program.

I would also like to mention that 195-6.5 mentions nothing about total eradication or use of snares and contract hunting. This might be in violation of the law. The rest of this writing is not a management plan for a specific area. It talks about other partners and corporation with other agencies and for education, and areas outside the reserve.

Kamakou

Page 5: Native Flora- States Kamakou is home to 35 rare plant taxa. But only 18 are federally listed as endangered. Then why are the remaining 17 plant taxa considered rare and by whose determination creates them to be rare?

Page 9: Management Considerations- Please explain to me how prior to 1982 the Kamakou Preserve area was part of the States Molokai Forest Reserve and how TNCH has gained the right to manage this area under the natural area partnership program and apply for funding under this program?

Page 10: #5 states- part of the area if not all of the area are closed during herbicide spraying. Is this a wise management decision reason being pg. 5 states this area is a ground water recharge and surface water source area. Have any water samples been taken and been tested for contamination? Also as written this sounds like broadcast spraying. Are these areas checked for native invertebrates that may be in the spray zone before herbicide is applied?

Page 8-10: Sensitive Areas- What are these sensitive areas? What types of plants incorporate the areas and where are they? What are traditional collection levels? Who determines the levels of the specific items collected?

Page 13: Lower Accessible Areas- Why are these tree plantations included within the preserve? Weren't these trees planted for future harvest and income for the State? This area should be removed from this preserve.

Page 14: Last Paragraph- Here it states that a fence line was completed in 1995 to monitor vegetation changes. Data was compiled from 1995-1997 and states that visual observations indicate that the fence is working, activities most prevalent outside the fence. Was this fence constructed to monitor vegetation changes or mammal activity? As stated, vegetation changes. So does this mean that the activity of vegetation changes, growing, seeding, etc., is most prevalent outside the fence?

Page 16: Status of Public Hunting- What is the status of public hunting? All this short paragraph states is that these areas are open to public hunting 7 days a week with no bag limit and closed during certain hazardous times.

Page 17-28: The rest of these pages repeats what was previously written with the addition of monitoring programs incorporated into different paragraphs.

In conclusion this plan should be rewritten and more detailed descriptions management actions outlined in the plan. Furthermore it is TNCH that has and is advocating at meetings, in their newsletters, and other publications that most native species are found nowhere else on earth. If these species are found nowhere else on earth, then how can TNCH give these species a global ranking(G-1,G-2,G-3)?

Mo'omoi

Page 5: Native Flora- If 8 of 25 taxa are rare and actually only 5 are federally listed on the federal endangered species list. How and who considers the rest rare? The species *Marsilea villosa* hasn't been found on the preserve since the 1970's and was "rediscovered" west of the preserve. Then how can one say that this plant is one of the 25 native plant taxa that occurs in this preserve?

Page 8: Where is the fire plan?

Page 10: What is the traditional collection levels? Who determines the level of specific species collected and the traditional collection level?

Page 11: Ungulate Control Timeline- Under this heading it states TNCH will assist Molokai Ranch with maintenance of barbed wire cattle fence. On page 9 under Management Considerations it states that TNCH and Molokai Ranch have a fencing agreement that states the ranch is responsible for repairing fence breaks.

To access the need for future fencing for deer and to complete studies on the effects of deer on the native vegetation without allowing public hunting is ridiculous. By having game mammals in a fenced off area without an adequate public hunting program to keep the mammals under control these animals will have a heavy impact on the vegetation. Or is this study intended to prove that these animals need to be eradicated as stated in all the other studies done on game mammals and native vegetation?

Page 11: Weed Control- If *Reichardia* has become a problem in the past 3 years. What was the size of the area then and the size of it now? Why does it state that by removing *kiawe* clumps that other weeds may invade these areas and that cattle can facilitate weed invasion by disturbing the ground? If cattle hoof depressions and grazing facilitate weed invasion the isn't it a sure fact that the *kiawe* clump removal will have the same or even worse results? So what's the need for monitoring?

Page 12: Weed Control Timeline- TNCH for many years has been emphasizing the degradation of native vegetation by non native species. Since this is known by TNCH there should be no need for monitoring. A comprehensive, realistic management plan should be written and realistic management carried out.

Program 2: If data was collected from 1992 and compiled in 1998 then what is the result? In the second paragraph, it is stated that aerial photographic monitoring might be incorporated then goes on to say this type of monitoring would determine when control should begin. Isn't control supposed to be an ongoing activity?

The third paragraph mentions specific research with permits were done on preserve. What are the research projects and their findings and why aren't they stated?

Pages 14-16: As stated TNC is working with Molokai community groups on management of this preserve, then what have these groups come up with and why isn't it in this project plan renewal?

Page 18: VII findings- Here it states that weed control will help protect rare dune ecosystems but on page 17 under Major Impacts-Neg. it states that by removing weeds it could be destabilizing to the sand. Which is it? Here it also states that TNC's management of this preserve helps prevent over harvesting of coastal resources, but states above that the coastal management laws are not under their jurisdiction. They also state on page 11 that there is limited resources for enforcement, so on that case, how can TNC state that their management prevents over harvesting? Also, bag limits are only set for certain coastal resources, not all.

Page 19: Significance Criteria- Here it states that approximately 500 people visit this preserve every year. Then it goes on to say that there are no facilities or plans to create facilities on the preserve. It also states that preventing cattle from entering the preserve would cause less cattle fecal waste on the ground. The major question here is, which fecal waste is more environmentally and humanly harmful? Where does the human fecal waste go?

In conclusion, TNC should rewrite this proposal and write a comprehensive detailed management plan for this preserve. This plan is not even a management plan. How can anyone say that this is a 6 year management plan. Noting from fig. 2 map, this preserve is more than 75% non-native, which means that only a very small portion of this area should be considered a natural area. Where is the plan? If the partnership should continue, then the non-native areas should not be included in the 2 for 1 State funding. Although this area contains paleontological and archaeological sites, I believe that this does not fall under the chapter providing the partnership funds. TNC should inquire with other agencies to seek funding to manage this portion of their preserve, including road maintenance. Also, it is TNCH that has been advocating at meetings, in newsletters and other publications that most of these native Hawaiian species are found nowhere else on earth. If these species are found nowhere else on earth, then how can TNCH give these species a global ranking (G-1, G-2, G-3)?

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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1151 PUNCHBOWL STREET
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Timothy E. Johns
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY

Janet E. Kawelo

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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT
WATER RESOURCE MANAGEMENT

February 8, 2000

Steven J. Araujo
P.O. Box 637
Kurtistown, HI. 96760

RE: Waikamoi, Kamakou and Moomomi Draft Environmental Assessment

Dear Mr. Araujo,

Thank you for responding to our request for comments on the Waikamoi, Kamakou and Moomomi Draft Environmental Assessment. Your letter has been forwarded to The Nature Conservancy of Hawaii (TNCH) who have responded in detail to your inquiries.

In the letter, you indicated that:

1. "The management plans are not well written and should include more specific details about the day to day operation of the Preserves". These plans were written for the initial application of the Preserves into the Natural Area Partnership Program (NAPP) six years ago and meet public review at that time. They have been updated to reflect current management goals and objectives, which are very similar today as then -- to protect and preserve Hawaii's unique native resources on private lands. The format and level of detail for the management plans are that used by TNC both in Hawaii and nationally and in fact have been used extensively in Hawaii by other managers of conservation lands.
2. "Public comments on the re-authorizations of NAPPs should be made more public friendly". In the case of the re-authorizations of these contracts, the public has opportunities to comment at the NARS Commission meeting, the Environmental Assessment process which is advertised through the OEQC Bulletin, and the BLNR meeting.

Your other comments have been addressed in TNCH's response letter.

Thank you again for your response to our request for comments.

Aloha,

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

Michael G. Buck
DOFAW Administrator



February 5, 2000

Steven J. Araujo
P.O. Box 637
Kurtistown, HI. 96760

RE: Draft Environmental Assessments for Waikamoi, Kamakou
and Mo'omomi Natural Area Partnerships

Dear Mr. Araujo,

Your letter dated December 21, 1999, to the Department of Land and Natural Resources was forwarded to The Nature Conservancy of Hawaii (TNCH) for response relative to TNCH activities. Thank you for taking the time to review the Waikamoi, Kamakou and Mo'omomi Preserves Draft Environmental Assessments (EAs) and for providing comments for us to consider in preparation of final EAs for these projects. We would like to respond to the concerns detailed in your letter:

WAIKAMOI:

First, "... (Was) there a transfer of fee title or conservation easement granted to the State by THE CONSERVANCY?" The Waikamoi Preserve, as shown on page 6 of the draft EA, was established when Haleakala Ranch granted The Nature Conservancy a permanent conservation easement. Haleakala Ranch maintains the fee title to that tax map key (TMK). Under HRS 195-6.5 (b) (1), to qualify under this program an applicant shall be a landowner or a cooperating entity of private land of natural area reserve quality and shall agree to "dedicate the private land in perpetuity through a transfer of fee title or a conservation easement to the state or a cooperating entity." In the case of Waikamoi, the Conservancy is the cooperating entity that was granted a conservation easement from the landowner.

Second, Natural Communities:

Fourteen terrestrial native natural communities are represented in Waikamoi Preserve, two of which are considered rare: Deschampsia Subalpine Mesic Grassland and Māmane (*Sophora chrysophylla*) Subalpine Dry Forest. The Heritage Program and biologists familiar to Waikamoi have recorded these two natural communities as being rare because they occur only in the Waikamoi area and no where else in the world. Both rare native shrublands have less than five existing locations worldwide. Please

refer to the definitions of the Heritage Global Rankings and the Federal Status on the enclosed Hawai'i Heritage Program document.

Third, *What do sensitive habitats in adjoining lands, like Haleakala National Park, have to do with Waikamoi?*

The entire native habitat found on Haleakala's north slope is considered sensitive because it represents native resources that have been reduced by more than half during the past 1,500 years. This dramatic reduction has been brought about by human as well as feral animal presence, and by invasive non-native plant species, which have greatly expanded their range. Once this native forest is lost, no amount of effort will bring it back. The proposed management activities contained within the draft EA are aimed at ensuring the long-term protection of the native habitat and its resources. The potential negative effects of management activities, such as the introduction of non-native plants along newly constructed fences, trails, and monitoring transects, are reduced by following strict cleaning protocols for all items transported into the preserve. Furthermore, any management activity that might impact neighboring sensitive habitats in Hanawi NAR, Haleakala National Park, or other private lands will be discussed and examined with the appropriate staff from these organizations.

Fourth, Hawaii Revised Statutes 195-6.5:

The portion of HRS 195-6.5, that you have quoted, reads in its entirety: [In order to qualify under this program, an applicant shall...] "Have the land managed by the cooperating entity or qualified landowner according to a management plan prepared by the cooperating entity or landowner and approved by the board that meets the standards established by the department for the system. The management plan shall include provisions to allow public hunting wherever feasible; provided that:

- (A) Hunting activities shall be in compliance with applicable laws; and
- (B) Game animals shall not be introduced to any partnership area and hunting shall be conducted as a conservation purpose of this program."

The central goal of the Natural Area Partnership Program is the protection of Hawai'i's native ecosystems, and all management activities undertaken should directly contribute to that goal. In Waikamoi Preserve, the conservation easement between the Conservancy and Haleakala Ranch allows ranch employees hunting privileges as long as there is game to hunt. This is a private contractual condition to the Conservancy's right to protect the property under the conservation easement and is not in any way connected to the NAP program. Public hunters willing to follow guidelines, sign a liability waiver, and complete a volunteer form will be allowed to hunt in Unit 1A of the preserve on a limited basis (when hunting will not interfere with ongoing management activities, planned guided hikes, and hunting by ranch employees). Under these circumstances, limited volunteer hunting opportunities are available at Waikamoi Preserve. However, it should be understood that our goal is to remove all ungulates in the preserve, and no area within Waikamoi Preserve will be considered a sustained yield hunting area. At

times, hunting in other areas of the preserve has also been possible when it could be combined with our management activities.

Finally, the items you mention -- partnerships, working in cooperation with other agencies for education, and areas outside the reserve -- are all aspects of a management plan as specified by the "Rules Regulating Application, Approval and Administration of the Natural Area Partnership Program," Chapter 210 of title 13, Hawaii Administrative Rules. These rules were enacted by the DLNR pursuant to HRS 195-5 "Rules and Regulations." The NAPP rules also mention that a management plan should describe programs, including non-native species control among others. It should also be noted that, as stated by law, all NAPP plans are subject to final approval by the Board of Land and Natural Resources (BLNR) prior to implementation.

KAMAKOU

Native Flora:

Page 5: The Hawai'i Natural Heritage Program and biologists familiar to the Kamakou area have identified the 35 plant taxa as being rare due to the number of populations in the world. The 35 plant taxa are all considered rare with or without federal endangered species designation. The Heritage Program states the facts of the species and does not manipulate or judge whether a species is rare or not. The number of population locations, number of individuals, and immediate threats determine the rarity of each species. The remaining 17 plant taxa are considered rare due to the above criteria. Even though they are not considered federally endangered today, they may be designated endangered in the near future. Many of these 17 species have a federal designation as "Species of Concern" (SOC). The SOC designation is the first step in identifying species that may be considered endangered. (Please refer to the enclosed Hawai'i Heritage Program document for a definition of the Heritage Global Ranking System and Federal Status.)

Management Consideration:

Page 9: In 1982, Molokai Ranch, Limited, transferred a conservation easement to The Nature Conservancy to manage the Kamakou Preserve area as a nature preserve. Molokai Ranch was and still is the landowner of the Kamakou Preserve area. The Ranch has a previous forest reserve surrender agreement with the State of Hawai'i. However, the conservation easement amends the surrender agreement that allows the Conservancy to manage the area for the purpose of a nature preserve. The Kamakou Preserve qualifies for the Natural Area Partnership Program (NAPP) because it is of natural area reserve quality, is owned privately, and the landowner, Molokai Ranch, has an easement with a "cooperating" conservation entity (the Conservancy). The Kamakou Preserve became a part of the NAPP program in 1995, thirteen years after it was established in 1982.

Herbicide Use:

Page 10: The Nature Conservancy requires all use of herbicides to be in compliance with approved herbicide labels and State of Hawai'i Department of Agriculture regulations. In addition, targeted species are treated by spot treatment, not broadcast spraying. The rates of application are a fraction of the listed rates on the product labels, and application methods are designed to minimize any non-target impact.

Sensitive areas:

Page 8-10: As stated in Management Consideration #6, "TNCH-sponsored management activities increase access to these sensitive areas." A sensitive area would be any area that is relatively intact (primarily native plants and a few alien species) or an area with rare and endangered species. Because the native vegetation communities at our Kamakou Preserve are highly regarded by the scientific and conservation communities, the entire preserve's native plant communities would be considered sensitive to over-collecting.

Lower accessible areas:

Page 13: One of the main reasons the pine plantations were established was to stop erosion and increase watershed potential. These plantations are within the boundaries of the preserve for several reasons: 1) there are extensive native plant communities that surround the plantations; 2) some of the rarest native hardwood tree species are found in pockets of the lower pine plantations; and 3) the property's boundaries happen to include some of the lower pine plantation and the cost of subdividing these areas out would be cost prohibitive.

Fence/line:

Page 14: The fence was constructed to control the movement of feral animals from the outside to the inside of the preserve. Monitoring (both animal activity/damage and vegetation changes/introduction) plays a key role in detecting changes that occur on both sides of the fence. We have noticed vegetation recovery on the inside of the fence with animal activity occurring only on the outside of the fence. We will adjust the wording in the final I/A and the long-range plan to make this point clear.

Status of public hunting:

Page 16: At Kamakou, hunting is open all year round, which means you can hunt there anytime, and there is no bag limit, which means you can capture as much game as you want. Closure of the preserve during hazardous periods means hunting may be closed due to circumstances such as fires, unsafe road conditions, and herbicide application periods.

Management Programs:

Page 17-28: These pages contain more detailed descriptions of key management programs including weed control, natural resource monitoring and research, rare species protection, community outreach, emergency and safety and logistical and

operational support. The NAPP rules mentioned in our responses under Waikamoi require that these aspects of management be described in the plan.

Re: Global ranking:

The Global Rank is an international ranking system developed by the Natural Heritage network. It determines the rarity of a species worldwide, and guides agencies to set priorities for protection. The ranking system is based on an element's number of occurrences and individuals, health, threats, etc. While the Heritage Global Ranking is independent from the U.S. Fish and Wildlife Federal List of Endangered Species, the USFWS often cites the Heritage Ranking to help convey the rare and imperiled status of a particular species. (Please refer to the enclosed Hawai'i Natural Heritage Program document for a definition of the Heritage Global Ranking System and Federal Status.)

In conclusion, the global ranking of Hawai'i's native species is an indication of the uniqueness of Hawai'i's endemic biota -- found nowhere else on the globe -- and a further reason why it needs to be preserved and protected, before it is too late.

MO'OMOMI

Native Flora:

Page 5: The Hawai'i Natural Heritage Program and biologists familiar to the Mo'omomi area have identified the 25 plant taxa as being rare due to the number of populations in the world. The 25 plant taxa are all considered rare with or without federal endangered species designation. The Heritage Program states the facts of the species and does not manipulate or judge whether a species should be rare or not. The number of known population locations, the number of individuals, and the immediate threats determine the rarity of each species. The remaining five plant taxa are considered rare due to the above criteria. Even though they are not considered federally endangered today, they may be designated endangered in the near future. Some of these five species have a federal designation as "Species of Concern" (SOC). The SOC designation is the first step in identifying species that may be considered endangered. (Please refer to the enclosed Hawai'i Natural Heritage Program document for a definition of the Heritage Global Ranking System and Federal Status.)

As for the *Marsilea villosa*: While species such as this may not have been recorded for a few years, they are still considered extant due to the likelihood of "rediscovering" the population or an individual species. In many areas, species with older observation dates are still considered possibly existing, either due to environmental factors, or because biological surveys have not been done, or because the area is extremely remote and access is difficult. For the *Marsilea*, environmental conditions must be adequate for the species to appear again. The *Marsilea* may lay dormant for many years, and requires heavy rains for the aquatic fern to multiply.

Fireplan:

Page 8: As mentioned under Emergency and Safety programs, the Mo'omomi wildfire management plan is reviewed annually with the lead emergency agency (Molokai Fire Department) and the State Division of Forestry and Wildlife for the purpose of best coordinating activities in the case of wildfire. Copies are distributed to these agencies and Molokai Ranch, the adjacent landowner.

Collection of native materials:

Page 10: We advocate working with local native Hawaiian groups to develop practices that will sustain and conserve the natural resources while also allowing native Hawaiians to exercise their traditional rights. Conservancy-sponsored activities have greatly increased human access to the preserve and therefore we have an obligation to see to it that the Conservancy's own activities do not lead to over-collecting and negatively damage the resources.

Ungrate Control Timeline

Page 11: You have stated correctly that Molokai Ranch is responsible for the fence. However, because grazing cattle represents one of the most destructive forces to the dune ecosystem, we have taken a proactive approach to help the ranch monitor the condition of the fence. When we decide to help with the repairs, the Ranch provides all the fencing materials. Because of our proactive approach, Ranch personnel have become very responsive when we notify them that there is a breach in the fence and their cattle are encroaching on our preserve. The only feral animals within the preserve are axis deer. Presently, the cattle fence does not restrict the movement of deer in and out of the preserve. The studies are to find out how we should manage for deer in the preserve.

W'eed control:

Page 11: *Reichardia tingitana* is a recent weed that has invaded a large part of the preserve. However, because *reichardia* is an annual plant and is only present for part of the year, we are not sure of the full extent of the invasion and are still learning how to manage it. Kiawe, on the other hand, is a weed with which we have extensive trial experience. Our biggest concern, as you have pointed out, is the potential invasion of other noxious weeds into the areas where we are removing kiawe. However, our studies show that the removal of kiawe fosters the growth of the native 'aki 'aki grass (*Sporobolus virginicus*). This has given us the evidence and confidence to end the trials and begin implementation of kiawe removal. Note that we are only removing clumps of kiawe that occur in native-dominated areas. In essence, we are removing an alien plant and adding increasing areas that will be native dominated. As for cattle grazing and trampling, they impact the native areas directly and introduce alien weeds (such as *reichardia*) through their manure.

W'eed Control Timeline:

Page 12: I believe you are misunderstanding a section here. Natural Resource Monitoring is the beginning of a new section and is not part of the Weed Control

Timeline. Natural Resource Monitoring, or monitoring, is the way we measure changes of all resources over time. These changes act as a barometer and help us identify why the changes are occurring. We then apply this knowledge to our ongoing management efforts. As for the data that has been collected, we are in the process of analyzing it this year. We do not yet have the final results.

Research Summary:

Regarding research conducted in the preserve, please refer to the enclosed copy listing research activities on all Molokai preserves.

Community Groups:

Pages 14-16: As stated, we support the efforts of community groups that seek to manage natural resources. In the case of Mo'omomi, the focus of Hui Malama o Mo'omomi is on marine resources. The focus of the Conservancy's work at our Mo'omomi Preserve is on terrestrial sand dune ecosystems. We complement one another and are willing to work together for the betterment of the land and sea. A copy of the Mo'omomi Hui management document can be obtained through a request to the Hui.

Findings:

Page 18: The Kiawe example mentioned previously under weed control is the best example as to why weed removal is beneficial to the preserve. We will not be removing any weeds in a "clear-cut" manner that will expose vast amounts of bare dunes. Anything that directly destroys the native flora, like cattle, will have direct impact and result in bare, unstable dunes.

We are subject to State fishing/harvesting laws. The way the Conservancy contributes is by not allowing commercial harvest on the preserve, and by regulating access.

Significance criteria:

Page 19: Trips to Mo'omomi are predominantly day trips. Local fishermen are the main overnight visitors and we encourage them to bury their fecal waste. There are no plans to construct amenities. Mo'omomi is still a wild land and the Molokai community would like it to remain that way. We do try to exercise the utmost care of the area when taking visitors to our preserve.

The funds we request are for the management of the native areas within the preserve. We will restate in the Executive Summary of the final Long-Range Plan that we are looking for "other sources" of funding and expertise to manage the archaeological and paleontological resources. The global ranking as described previously under Kamakou is a further indication of the uniqueness of Hawaii's endemic biota -- found nowhere else on the globe -- and a further reason why it needs to be preserved and protected, before it is too late.

Finally, you have repeatedly included a blanket statement that calls for the rewriting of the Waikamoi, Kamakou, and Mo'omomi management plans because they are not detailed enough. These management plans are written as is dictated by the NAPP rules that govern this entire process. Land management is not a static activity; it requires frequent revision and development based on lessons learned from experience. That is why the process also calls for progress reports throughout the year to develop and adjust management practices. By providing a long-range plan and fulfilling the reporting requirements set out by the NAPP rules, The Nature Conservancy is in full compliance with the program.

Again, thank you for your response to our request for comments.

Aloha,



Alenka Remec
Director, Science and Stewardship Operations

Enclosures (2):
Hawaii's Natural Heritage Program (with List of Federal Status and Heritage Global Ranks)
Molokai Preserves Research

cc: Mike Buck, DLNR
Randy Kennedy, DLNR
Betsy Gagné, DLNR
Mark White, TNCH Maui
Anders Lyons, TNCH Maui
Ed Misaki, TNCH Molokai

WILLIAM A. EASTMAN
GOVERNOR OF HAWAII

: Alan ca
Larty



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
Culinary Building, Room 155
501 Kalia Boulevard
Honolulu, Hawaii 96807

December 17, 1999

→ Randy K

FRANCIS E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
DEPUTY
JANET T. LAMBLE
MAUI, HAWAII

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
MANAGEMENT
CONSERVATION
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

MEMORANDUM

LOG NO: 24599 ✓
DOC NO: 9912SC13

TO: Michael Buck, Administrator
Division of Forestry and Wildlife

FROM: Don Hibbard, Administrator
State Historic Preservation Division *DH*

SUBJECT: Chapter 6E-8 Historic Preservation Comment on the Draft Environmental Assessment (DEA) for the Kamakou and Mo'omomi Preserves, Moloka'i, and Waikamoi Preserve, Maui for Reauthorization as Participants in the Natural Area Partnership Program
Mo'omomi, Kaluako'i, Moloka'i (TMK:5-1-002: 001)
Kaga'akea & Kawela, Moloka'i (TMK: 5-4-003)

We believe that reauthorization of the Natural Area Partnership Program at Mo'omomi and Kamakou Preserves on Moloka'i, if carried out as described in the DEAs, will have "no effect" on the significant historic sites present in each locality. We would only request that copies of all reports documenting historic sites at either preserve, particularly Mo'omomi Preserve, be made available to our office.

Should you have any questions, please feel free to call Sara Collins at 692-8026.

SC:jen

c: Cultural Resources Commission, Maui Png Dept, 250 S. High Street, Wailuku, HI 96793
Ms. Barbara Haliniak, Chair, Molokai Png Comm, P.O. Box 976, Kaunakakai, HI 96748

APPENDIX 2

NATIVE NATURAL COMMUNITIES OF KAMAKOU PRESERVE

NATURAL COMMUNITY	GLOBAL RANK(a)
Lowland	
'Ohi'a/Uluhe (<i>Metrosideros/Dicranopteris</i>) Lowland Wet Forest#*	G3
Uluhe (<i>Dicranopteris</i>) Lowland Wet Shrubland#*	G4
'Ohi'a (<i>Metrosideros</i>) Lowland Mesic Shrubland	G3
Montane	
'Ohi'a/Olapa (<i>Metrosideros/Cheirodendron</i>) Montane Wet Forest#*	G3
'Ohi'a (<i>Metrosideros</i>) Mixed Montane Bog	G2
'Ohi'a (<i>Metrosideros</i>) Mixed Shrub Montane Wet Forest#*	G3
'Ohi'a (<i>Metrosideros</i>) Montane Wet Shrubland	G3
Mixed Shrub Montane Wet Cliffs	G3
Aquatic Community	
Hawaiian Intermittent Stream#*	G4
Subterranean Community	
Small-eyed Rock Centipede/Ground Beetle (<i>Lithobius/Carabid</i>) Montane Wet Piping Cave	G1

=Known also from Puu Alii NAR

* =Known also from Olokui NAR

(a) Key to Global Ranks as defined by Heritage Program:

G1 = Critically imperiled globally (typically 1 to 5 current occurrences).

G2 = Imperiled globally (typically 6 to 20 current occurrences).

G3 = Restricted range (typically 21 to 100 current occurrences).

G4 = Apparently secure globally (> 100 occurrences).

APPENDIX 3

RARE NATIVE PLANTS OF KAMAKOU PRESERVE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK (a)	FEDERAL STATUS (b)
<i>Alectryon macrococcus</i> var. <i>macrococcus</i> †	'ala'alahua, mahoe	G2T2	LE
<i>Canavalia molokaiensis</i> †	'awikiwiki, puakauhi	G1	LE
<i>Clermontia oblongifolia</i> ssp. <i>brevipes</i> #	'oha, 'oha wai	G1T1	LE
<i>Cyanea mannii</i>	'oha, haha, 'oha wai	G1	LE
<i>Cyanea procera</i> #	'oha, haha, 'oha wai	G1	LE
<i>Cyanea solanacea</i> *#	'oha, haha, 'oha wai	G1	
<i>Cyanea solenocalyx</i> *#	'oha, haha, 'oha wai	G2	
<i>Cyrtandra halawensis</i> *	ha'iwale, kanawao ke'oke'o	G1	
<i>Cyrtandra hematos</i> *	ha'iwale, kanawao ke'oke'o	G1	
<i>Dissochondrus biflorus</i>	-	G2	
<i>Eurya sandwicensis</i> #*	anini, wanini	G2	
<i>Exocarpos gaudichaudii</i> †	heau	G1	
<i>Hedyotis mannii</i> †	-	G1	LE
<i>Joinvillea ascendens</i> ssp. <i>ascendens</i> *	'ohe	G3G5T1	
<i>Lobelia dunbarii</i> ssp. <i>paniculata</i>	'oha, haha, 'oha wai	G1T1	
<i>Mariscus fauriei</i>	-	G1	LE
<i>Melicope hawaiiensis</i>	alani	G2	
<i>Melicope mucronulata</i>	alani	G1	LE
<i>Melicope reflexa</i>	alani	G1	LE
<i>Nothocestrum latifolium</i>	'aiea	G1	
<i>Oligadenus periens</i> [<i>Adenophorus periens</i>]		G1	LE
<i>Phyllostegia hispida</i> #‡		G1	
<i>Phyllostegia mannii</i> #‡	-	G1	LE
<i>Phyllostegia mollis</i>	-	G1	LE
<i>Phyllostegia stachyoides</i>	-	G1	
<i>Plantago princeps</i> var. <i>laxiflora</i> *†	ale	G2T1	LE
<i>Platanthera holochila</i>	-	G1	LE
<i>Ranunculus mauianensis</i> #†	makou	G2	
<i>Schiedea diffusa</i>	-	G2	
<i>Schiedea nuttallii</i>	-	G1	LE
<i>Schiedea sarmentosa</i>	-	G1	
<i>Sicyos cucumerinus</i>	'anunu, kupala	G1	
<i>Stenogyne bifida</i> #	-	G1	LE
<i>Vigna o-wahuensis</i>	-	G1	LE
<i>Zanthoxylum hawaiiense</i> †	hea'e, a'e	G1	LE

Number of Rare Plants in Kamakou: 35

#=Also known (currently or historically) from Puu Alii NAR

*= Also known (currently or historically) from Olokui NAR

‡=Botanists now believe that two plant populations in Kamakou previously thought to be *Phyllostegia mannii* are actually *P. hispida* (and that *P. mannii* may be extinct). Until this question is resolved, we will include both taxa on the preserve rare plant list.

†= Also known (currently or historically) from Kalaupapa National Historical Park

(a) Key to Global Ranks as defined by Heritage Program:

- G1 = Species critically imperiled globally (typically 1 to 5 current occurrences).
- G2 = Species imperiled globally (typically 6 to 20 current occurrences).
- G3G5 = Global rank uncertain, more information is needed to accurately rank this species.
- T1 = Subspecies or variety critically imperiled globally.
- T2 = Subspecies or variety imperiled globally.
- (b) Federal Status:
- LE = Taxa formally listed as endangered.

APPENDIX 4

RARE NATIVE BIRDS OF KAMAKOU PRESERVE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK (a)	FEDERAL STATUS (b)
<i>Myadestes lanaiensis rutha</i>	Oloma'o, Molokai thrush	G1T1	LE
<i>Paroreomyza flammea</i>	Kakawahie, Molokai creeper	GH	LE
<i>Vestiaria coccinea*</i>	'I'iwi	G4	E,-

- (a) Key to Global Ranks as defined by Heritage Program:
- G1 = Species critically imperiled globally (typically 1-5 current occurrences).
 - G4 = Species apparently secure globally but may be rare locally.
 - GH = Species known only from historical occurrences (no observations in the past 15 years).
 - T1 = Subspecies or variety critically imperiled globally.

- (b) Federal Status:
- LE = Taxa formally listed as endangered.
 - E = Molokai population considered endangered by the state only.
 - = No federal status.

*This species is not considered rare by HINHP. It is included in this list because it is considered by the state of Hawaii to be endangered on Molokai and Oahu.

APPENDIX 5

RARE LAND SNAILS OF KAMAKOU PRESERVE

SCIENTIFIC NAME	COMMON NAME	HERITAGE RANK (a)
<i>Partulina mighelsiana</i> #*	Achatinellid Land Snail	G1
<i>Partulina proxima</i> #	Achatinellid Land Snail	G1
<i>Partulina redfieldii</i> #	Achatinellid Land Snail	G1
<i>Partulina tessellata</i> #*	Achatinellid Land Snail	G1
<i>Perdicella helena</i>	Achatinellid Land Snail	G1

#= Also known (currently or historically) from Puu Alii NAR

*= Also known (currently or historically) from Olokui NAR

(a) Key to Global Ranks as defined by Heritage Program:

G1 = Species critically imperiled globally (typically 1-5 current occurrences).

APPENDIX 6

PRIORITY WEED SPECIES OF KAMAKOU PRESERVE
(in order of priority)

Scientific Name	Common Name	DP	MA	DIS	EXP	Rank *
<i>Clidemia hirta</i>	Koster's curse	1	1	1	1	4
<i>Corynocarpus laevigata</i>	karakā nut	2	1	1	1	5
<i>Rubus argutus</i>	prickly Florida blackberry	1	1	2	1	5
<i>Schinus terebinthifolius</i>	Christmas berry	1	2	1	1	5
<i>Acacia mearnsii</i>	black wattle	2	1	1	2	6
<i>Passiflora</i> sp.	passion fruit, passion flower	3	1	1	1	6
<i>Psidium cattleianum</i>	strawberry guava, waiawi	1	2	3	1	7
<i>Hedychium coronarium</i>	white ginger	1	1	3	2	8
<i>Phormium tenax</i>	New Zealand flax	2	2	3	1	8
<i>Rosa</i> sp.	rose	3	1	2	2	8
<i>Syzygium jambos</i>	rose apple	2	4	1	1	8
<i>Eucalyptus robusta</i> (satellite pop'n)	swamp mahogany, eucalyptus	3	3	2	1	9
<i>Melaleuca quinquenervia</i>	paperbark	3	1	2	3	9
<i>Acacia melanoxydon</i>	blackwood acacia	3	1	3	3	10
<i>Fraxinus uhdei</i>	tropical ash	1	3	4	2	10
<i>Grevillea robusta</i>	silk oak	2	3	3	2	10
<i>Pinus</i> spp. (satellite pop'n)	loblolly, slash, Monterey pines	3	1	4	2	10
<i>Casuarina equisetifolia</i>	ironwood	2	3	3	3	11
<i>Opuntia ficus-indica</i>	panini, prickly pear cactus	4	1	1	5	11
<i>Paspalum conjugatum</i>	Hilo grass	2	2	3	4	11
<i>Syncarpia glomeratus</i>	turpentine tree	3	3	2	3	11
<i>Toona ciliata</i>	Australian red cedar	2	5	2	2	11
<i>Alnus nepalensis</i>	Nepal alder	3	3	3	3	12
<i>Grevillea banksii</i>	kahili flower	3	3	2	4	12
<i>Psidium guajava</i>	common guava	3	3	2	4	12
<i>Traepoleus majus</i>	nasturtium	3	3	2	4	12
<i>Tristania confertus</i>	brush box	3	3	3	3	12
<i>Andropogon virginicus</i>	broomsedge	2	3	5	4	14
<i>Lantana camara</i>	lantana	3	4	3	4	14
<i>Cupressus macrocarpus</i>	Monterey cypress	3	4	3	4	14
<i>Melinis minutiflora</i>	molasses grass	1	5	5	3	14
<i>Ageratina riparia</i>	Maui pamakani	3	2	5	5	15
<i>Cryptomeria japonica</i>	tsugi, Japanese cedar	4	5	1	5	15
<i>Eucalyptus robusta</i> (plantings)	swamp mahogany, eucalyptus	3	3	5	4	15
<i>Ricinus communis</i>	castor bean	3	4	3	5	15
<i>Thuja plicata</i>	Western red cedar	4	5	2	4	15
<i>Ageratina adenophora</i>	Hamakua pamakani	3	3	5	5	16
<i>Cunninghamia lanceolata</i>	China fir	5	5	1	5	16
<i>Hibiscus elatus</i>	Cuba blast	5	5	1	5	16
<i>Pinus</i> spp. (plantings)	loblolly, slash, Monterey pines	2	4	5	5	16
<i>Rubus rosifolius</i>	thimbleberry	3	3	5	5	16
<i>Cirsium vulgare</i>	bull thistle	4	4	4	5	17

Scientific Name	Common Name	DP	MA	DIS	EXP	Rank *
<i>Buddleia asiatica</i>	dog tail	3	5	5	5	18
<i>Juncus effusus</i>	Japanese mat rush	3	5	5	5	18
<i>Sequoia sempervirens</i>	coast redwood	5	5	3	5	18

* disruptive potential (DP)+methods available (MA)+distribution (DIS)+experience (EXP) = RANK