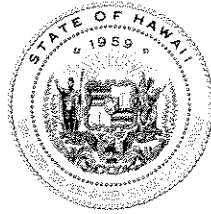
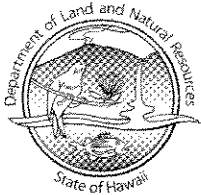


LINDA LINGLE
GOVERNOR OF HAWAII



WAR - 8

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CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
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KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 20, 2009

Katherine Kealoha, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

RECEIVED
09 FEB 24 11:54
HONOLULU, HI

RE: Finding of No Significant Impact (FONSI) for the East Alaka'i Protective Fence Project, Island of Kaua'i

Dear Ms. Kealoha:

The Department of Land and Natural Resources Division of Forestry and Wildlife has reviewed the comments received during the 30-day public comment period which began on October 23, 2008. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the next available OEQC Environmental Notice.

On the enclosed CD please find the OEQC Publication Form and a PDF copy of the Final EA. Attached are two hard copies of the Final EA. Please call Lisa Ferentinos at 586-0917 if you have any questions.

Sincerely,

Paul J. Conry
Paul J. Conry
Administrator

FINAL ENVIRONMENTAL ASSESSMENT
FOR
THE EAST ALAKA‘I PROTECTIVE FENCE
PROJECT

This document prepared pursuant to Chapter 343, HRS

Prepared by
The Nature Conservancy, acting by and through its Hawai‘i Chapter,
Kaua‘i Program, for the benefit of the Kaua‘i Watershed Alliance

February 2009



East Alaka‘i, Kaua‘i Hawai‘i

East Alaka‘i Protective Fence Project Final Environmental Assessment

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FINAL ENVIRONMENTAL ASSESSMENT
FOR
THE EAST ALAKA‘I PROTECTIVE FENCE
PROJECT

I. INTRODUCTION: ENVIRONMENTAL ASSESSMENT

Project Name: East Alaka‘i Protective Fence Project

Proposing Agency: Kaua‘i Watershed Alliance c/o The Nature Conservancy in Hawai‘i,
Kaua‘i Program

Approving Agency: State Department of Land and Natural Resources (DLNR)

Project Location: Alaka‘i Wilderness Preserve

McBryde Sugar Co (A & B Hawai‘i Inc. land owner)
TMK: 4-5-8-001-001 (1,405 acres)

State of Hawai‘i
TMK: 4-1-4-001-003 (595 acres)

Property Owner(s): A & B Hawai‘i Inc. and
State of Hawai‘i

State Land Use Classification: Conservation District Protective Subzone

Anticipated Determination of Environmental Assessment:

A Finding of No Significant Impact (FONSI) is expected for the project.

Agencies and parties consulted during Draft and Final EA Preparation included:

Federal: U.S. Department of Interior
U.S. Fish & Wildlife Service

State: Department of Hawaiian Home Lands
Department of Health
Department of Land and Natural Resources
Division of Forestry and Wildlife
Division of Historic Preservation
Office of Hawaiian Affairs

Kaua'i County: Planning Department
Department of Water

Private: A & B Properties, Inc., Property Manager
McBryde Sugar Company, Ltd.
Gay and Robinson, Inc.
Grove Farm Company, Incorporated
Kamehameha Schools
Kaua'i Ranch, LLC
Lihu'e Land Company
Ben A. Dyre Family LP
National Tropical Botanical Gardens
Princeville Operating Company LLC

(See Exhibit L: Consulted Agencies & Parties Pre-Scoping Distribution List for a complete list and Exhibit O for a complete Draft EA Distribution List and Exhibit P for received comment letters.)

Changes to the Draft EA found in the Final EA

Information was added in response to the letter received from the Office of Environmental Quality Control in regard to the following items: helicopter use during the project, work crew accommodations, weather and detailed description of the radio repeaters. The State Land Use Conservation District reference of Subzone P was changed to Protective Subzone throughout the document as requested by the Office of Conservation and Coastal Lands. All of these changes have been underlined.

FINAL ENVIRONMENTAL ASSESSMENT
FOR
THE EAST ALAKA‘I PROTECTIVE FENCE
PROJECT

II. SUMMARY OF PROPOSED ACTIONS

The Nature Conservancy (TNC), with the approval of the landowner(s), A & B Hawai‘i, Inc. and the State of Hawai‘i, proposes to construct a protective hog wire fence; to assemble weatherports and radio repeaters, monitor invasive species and maintain ungulate control, through the placement of traps, in an effort to safely support watershed management actions within a portion of the eastern Alaka‘i Plateau.

In April 2003, state and private landowners formed the Kaua‘i Watershed Alliance (KWA). The KWA members continue to recognize that cooperation is the key to a timely and successful watershed management program that will protect Kaua‘i’s watershed from invasive alien animals, plants, and other threats.

The objective of this project is to protect and preserve approximately 2,000 acres (ac) of irreplaceable watershed, unique native ecosystem, as well as the rare and endangered species it supports. The project will be located within a portion of the eastern Alaka‘i Plateau between Wainiha Valley and Mt. Wai‘ale‘ale, at the core of Kaua‘i’s watershed.

To obtain approval for such a project on conservation district land, a conservation district use permit application (CDUA) package will be developed which includes a CDUA application, draft environmental assessment, and a management plan. The package shall be submitted to the Board of Land and Natural Resources for determination and a permit approval.

The proposed protective fence will be approximately 7,208 meters (4.48 miles or 23,650 ft) in length and will enclose approximately 595 ac of the Alaka‘i Wilderness Preserve (State of Hawai‘i) and approximately 1,405 ac of McBryde Sugar Co. land, both in the Conservation District. Natural barriers and the steep cliffs will make up the balance of the enclosure (*See Exhibit A: Project Location map*).

The project will involve the clearing of vegetation, several inches above ground level, from up to a 10 ft wide corridor along the length of the proposed fence alignment using small power and hand operated machinery (i.e., handsaw, pick ax, weed eater, chainsaw). A 48 inch (in) high fence will be constructed using hog wire fence mesh supported by galvanized pipes and fence posts. The outside of the fence will be skirted along the base with a hog wire apron. (*See Exhibit(s) B: Fence Construction Examples*)

To improve worker safety and communications during natural resource management activities, 2 solar powered radio repeaters and other monitoring instruments will be strategically placed within and adjacent to the project area. One will be placed near the existing United States Geological Survey (USGS) weather station at the summit of Mt. Wai‘ale‘ale, and another will be placed on La‘au Ridge for the greatest range and coverage. The radio repeaters will be housed in weather protective cases, additional instrumentation may be added to repeater structure. *(See Exhibits A & C: Project Location map & Communication Diagram)*

To provide weather protection and safety for workers during natural resource management activities, 3 weatherports will be assembled. The weatherports will consist of a pre-fabricated weather shelter that is assembled on a pre-fabricated raised platform. The approximate size of the shelter will be 10 ft wide by 20 ft long and 8 ft high. *(See Exhibits A & D: Project Location map & Weatherport Diagram)* In order to prevent the breeding of mosquitoes, a hole 3 to 4 ft deep will be dug and human waste, enclosed in a compostable bag, will be covered in either agricultural lime or bacillus thuringiensis pellets before being filled in with dirt at the end of each field trip.

After construction, the project will consist of natural resource management activities such as feral pig and goat monitoring and removal, invasive weed control, fence maintenance, and monitoring to track the recovery of native plant populations.

The anticipated start date for this project is the first quarter of FY 10 (July – Sept 2009) and once initiated, all phases of the project will be completed within 12 months. Within this time period, radio repeater installation shall take approximately 2 months and weatherport assembly shall take approximately 3 months to complete.

Fundraising for the project will commence upon approval of the Conservation District Use Permit.

A. Project Purpose and Need

The proposed project area falls under the Hawaii Administrative Rules (HAR) Conservation District Protective subzone. This HAR §13-5-11 designation is used “to protect valuable resources in designated areas such as restricted watershed, marine, plant, and wildlife sanctuaries, significant historical, archaeological, geological, and volcanological features and sites, and other designated unique areas.” Protective subzone, as stated in the law, encompasses the protection of watersheds, water sources, and water supplies.

The Alaka‘i Protective Fence Project is a conservation project conceived and planned to protect and preserve the portion of the Alaka‘i which receives the greatest amount of rainfall, and is home to a rich diversity of unique Hawaiian

plants and animals that make up this watershed. Currently, 202 native plant taxa have been documented or observed within the estimated 2,000 ac of the proposed protective fence, which include 66 single island endemic taxa (Wood, 2007).

The forest in this area supports a diverse assemblage of native forest birds and ground-nesting seabirds. Some of these birds are federally listed as endangered species or candidates for listing as endangered species. Common forest bird species include Kaua'i 'Amakihi (*Hemignathus kauaiensis*), 'Anianiau (*Magumma parva*), 'Apapane (*Himatione sanguinea*), 'I'iwi (*Vestiaria coccinea*), and 'Elepaio (*Chasiempis sandwichensis*). The Puaiohi (*Myadestes palmeri*) is suspected to be in the area. (See Exhibit E: Pauline Roberts Personal Communication) The following species have not been detected on recent surveys: Kaua'i Ō'ō, 'Ō'ū, Kama'o, Kaua'i Akialoa and Kaua'i Nukupu'u. Additional surveys are needed to confirm their status. Sea birds include the endangered Hawaiian Petrel (*Pterodroma sandwichensis*) and the threatened Newell Shearwater (*Puffinus newelli*).

Research, within the Hawaiian Islands, has demonstrated that feral pigs, which damage native vegetation and expose soil to erosion, pose a significant threat to the native biodiversity and watershed integrity of Hawaiian forests. Decades of pig control in Hawai'i verify that the only successful method of completely protecting an area from feral pigs is to exclude the animals with wire mesh fence. Once pigs are removed, native vegetation has the ability to recover (Jacobi, 1976). A study looked into the effectiveness of the hunting methods from 1993 – 1998 in natural areas of Molokai. It was shown that in remote or difficult to access areas, community and volunteer hunters were not able to effectively control the populations (Molokai Hunting Test Working Group, 1998). In montane wet forests, it has been shown that there is a direct correlation between the increase of alien plants and pig-induced soil disturbance (Aplet et al, 1991).

Fences have proven that native vegetation is able to recover with time, after the removal of feral pigs from the area. An enclosure was erected in a montane rain forest on the Big Island and monitored for 5 years. The result was that the protected area had a dramatic increase in the native plant understory while there was no noted reestablishment of these plants where pig activity continued outside the enclosure (Katahira, 1980). A 13 year old pig enclosure in Hawaii Volcanoes National Park was monitored to assess the number of plant species inside and outside the fence. Within the fence the native species were able to increase whereas outside the fence the number and density of alien species became better established (Higashino and Stone, 1982).

It has been noted that pigs spread root-rot fungi which has contributed to the destruction of native trees and through their feeding, they have also added to the loss of native plant species. The feeding habits of pigs create muddy areas in which they roll around, thus contributing to the propagation and spread of disease carrying mosquitoes (Baker, 1979). Other authorities note that an analysis of the stomach content of killed pigs showed that

the majority (70-95%) of identifiable food was pieces of the Hawaiian tree fern Hapu‘u (*Cibotium glaucum*) (*Cooray and Mueller-Dombois, 1981*). Pigs can make trenches over a foot deep and 10 to 15 feet long destroying the ground cover and forest understory causing erosion. In this study the pigs were tested and found to carry parasites (fleas, lice, hookworms, tapeworms and trichinae [which is a source of trichinosis in humans]) as well as various diseases such as typhus, leptospirosis and brucellosis which are transmittable to humans (*Warner, 1959 – 1969*). A study on the stomach content analysis of Hawaiian pigs, showed that these pigs carried the following diseases which can easily infect man and dogs; leptospirosis, tuberculosis and possibly typhoid (*Giffin, 1978*).

Pigs are considered to be a bigger threat to watersheds than cattle or goats because of the disruption of the soil which leads to erosion (*McEldowney, 1930*).

B. Project Description and Location

The small headwater streamlets of the Alaka‘i meander and flow on to join larger boulder-strewn drainages. These drainages continue to flow and fall deeper into the eastern windward slopes, descending down to the navigable Wailua and Hanalei Rivers; or falling to the north and creating the great rivers of Wainiha and Lumaha‘i. The Alaka‘i Plateau also drains to the watersheds of western Kaua‘i. The rivers Olokele, Kahana, Mokuone, Mokihana, Nāwaimaka, Wai‘alae, Koai‘e, and Poomau, all have their origins within the Alaka‘i. These rivers eventually conjoin to form the great Makaweli and Waimea Rivers of west Kaua‘i. The Alaka‘i, being the heart of the island, is the greatest and most influential watershed on Kaua‘i, shedding waters throughout the northern, eastern, southern, and western valleys of the island.

The Montane Wet Forest of this area is characterized by an open canopy with gentle to moderately contoured wet slopes dominated by a mixed assemblage of native sedges, grasses, herbs, shrubs and ferns interspersed. Generally, lichens and mosses are prevalent where feral pig disturbance is minimal. The low stature (ca. < 1 m) of these open areas are interspersed with small islands of taller shrubs and trees (ca. 1–5 m) or dissected with headwater streams of riparian vegetation with bordering *Metrosideros* and *Cheirodendron* forest (*See Exhibit F: Critical & Rare Resources map*).

The project area will be located in the east Alaka‘i Plateau up to the Wai‘ale‘ale summit. It totals approximately 2,000 ac and includes approximately 595 ac of state land in the Alaka‘i Wilderness Preserve (TMK 4-1-4-001-003) and approximately 1,405 ac of private land owned by McBryde Sugar Co. (TMK 4-5-8-001-001). It borders private lands of the Gay and Robinson parcel (TMK 4-1-7-001-001) and other State of Hawai‘i parcels (TMK 4-4-2-001-002 and TMK 4-3-9-001-001). Its elevation ranges from 4,400 to 5,148 ft. (*See Exhibit G: Vicinity and Parcel map*)

The project will involve the clearing of vegetation, several inches above ground level, from up to a 10 ft wide corridor along the proposed fence alignment using small power and hand operated machinery (i.e., handsaw, pick ax, weed eater, chainsaw). A 48 in high fence will be constructed using hog wire fence fabric

supported by galvanized pipes and fence posts. As necessary, the outside of the fence will be skirted along the base with a hog wire apron (consisting of 48 inch wide hog wire staked to the ground). (*See Exhibit(s) B: Examples of Fence Construction & Fence Design Details*)

The protective fence shall be approximately 7,208 meters (4.48 miles or 23,650 ft) in length and shall be constructed of 48 in high bezinal coated hog wire fence mesh. The fence mesh will be supported by galvanized coated pipes and fence posts placed no more than 10 ft apart the entire length of the fence line. Shorter galvanized coated pins will be used as anchors within the 10 ft span. The fence will have an apron of hog wire laid horizontally along the ground outside the fence to prevent pigs from digging underneath. The fence alignment will be cleared by hand to a width of no more than 10 ft.

The helicopters used for transportation of materials will land in existing landing sites on the ground or hover as needed. There will be no clearing, damage to vegetation or improvements necessary to accommodate the use of helicopters for the project in this area. The contractor will select a Helicopter Company to work with and this will determine which airport will be utilized to depart from. Staging areas are needed and existing landing zones will be used. The frequency of the trips will be dependent on the weight and amount of materials that need to be flown to the work sight, which will be determined by the weight of the materials selected. An estimate would be: 1 sling load per 200 meters of fence and then possibly a few extra for food and gear for the workers. Therefore, a very rough estimate would necessitate 36 to 40 sling load flights as scheduled by the contractor within the time limits of the contract.

After construction, the project will consist of natural resource management activities such as feral pig and goat removal, invasive weed control, fence maintenance, and monitoring to track the recovery of the plant community.

Baiting and trapping using silo traps will be strategically deployed throughout the fenced preserve. The traps are circular and about 4.5 meters in diameter with approximately 1.5 meter high walls constructed of welded mesh. The door into the trap is a push through design. An internal mesh skirt attached at the base of the trap will prevent pigs from tunneling out of the trap. The open top and natural ground floor employed in this design will minimize stress on the animals. (*See Exhibits H & I: Pig Control map & Silo Trap and Feeder diagrams*)

Automated bait stations will be installed inside each of the traps, either suspended from a tree above the trap or mounted on a tripod inside. The feeders will be baited with a two week's supply of cracked corn, macadamia nuts or other baits as needed.

For the first 3 to 5 weeks of the project the traps will be kept open, in order to allow the resident pigs to grow accustomed to entering the traps and feeding. The traps will then be set and checked the following day to remove the captured pigs.

Due to the remote locations involved in the project, the traps will be positioned and baited by helicopter. Trap placement will take advantage of existing openings in the forest canopy and shrub layer. We do not anticipate altering vegetation for either helicopter access or trap placement. Wherever possible, areas previously disturbed by pigs will be used for trap placement. In previous uses this trap design has caused only minimal ground disturbance. At project end all trapping and baiting materials will be removed. *(See Exhibit I: Silo Trap and Feeder diagrams)*

To improve worker safety and communications during natural resource management activities, 2 solar powered radio repeaters and other monitoring instruments will be strategically placed within or adjacent to the project area. One will be placed near the existing United States Geological Survey (USGS) weather station at the summit of Mt. Wai‘ale‘ale and another will be placed on La‘au Ridge. The radio repeaters will be housed in weather protective cases, additional instrumentation may be added to repeater structure. The height of the antennae (tallest component) will be approximately 10 to 15 feet above grade. The locations have been selected for the installation of the radio repeaters, the exact foot print of the repeaters should not exceed 36 square feet. They will be erected where they least impact the Montane Wet Forest and will avoid any rare or endangered plants. *(See Exhibits A & C: Project Location map & Communications Diagram)*

To provide weather protection and safety for workers during natural resource management activities, 3 weatherports will be assembled. The weatherports will consist of a pre-fabricated weather shelter that is assembled on a pre-fabricated raised platform. The approximate size of the shelter will be 10 ft wide by 20 ft long and 8 ft high. *(See Exhibits A & D: Project Location map & Weatherport Diagram)*

C. Schedule

A project goal would be to secure all necessary permits, including a conservation district use permit by the fourth quarter of FY 09 (April – June 2009). The anticipated construction start date for this project would then be the first quarter of FY 10 (July – Sept 2009) and all phases of the project will be completed within 12 months. Within this time period, the radio repeater installation shall take approximately 2 months and the weatherport(s) assembly shall take approximately 3 months to complete.

i. Fence Corridor Clearing

Clearing of vegetation along the fence corridor will be completed within a 12 month time period.

ii. Fence Installation

The fence installation process will occur simultaneously with corridor clearing. The entire process will be completed within 12 months. Fencing material will be transported to the site by helicopter and all construction (post installation, fence stretching, clipping, etc.) will be done by hand. Due to the remote location, the construction crew will camp at the work site at intervals. The duration of their stay will be determined by the contractor hired and the weather conditions encountered. Camping will be a necessity and occur in existing clearings. Although the construction of the fence will take less than 12 months, due to unpredictable weather conditions that exist at high elevations, we have scheduled 1 year for the project in order for the contractor to take advantage of the best weather conditions. The predominant weather patterns are trade winds based upon high pressure systems north of the state. During the winter months, Kona low pressure systems can also significantly affect the weather conditions at this elevation. Wind and cloud conditions at this elevation create fewer opportunities for access than most every where else on the island of Kaua'i. The work will be weather dependent and activity may not be continuous within the 12 month period.

iii. Radio Repeater Installation

One repeater will be placed near the existing United States Geological Survey (USGS) weather station at the summit of Mt. Wai'ale'ale, and another will be placed on La'au Ridge for the greatest range and coverage. The radio repeaters will be erected and housed in weather protective cases and powered by solar panels.

iv. Weatherport Installation

The weatherport assembly will consist of a pre-fabricated weatherproof tent that is erected on a raised pre-fabricated platform. The approximate size of the shelter will be 10 ft wide by 20 ft long and 8 ft in height.

v. Inspections and Maintenance

The fence, radio repeaters, and weatherports will be inspected and maintained. The maintenance will be a part of the natural resource management actions carried out within the project area on a quarterly schedule. Biologists with expertise in the field of non-native vertebrates and invertebrates, as well as biologists with proficiency in the conduction

of auditory seabird surveys, are supported and encouraged to monitor the area.

vi. Ungulate Control

Once fence construction has been completed it will be necessary to visually monitor the area until ungulate activity is no longer present.

vii. Weed Control

Monitoring of invasive weeds will occur along the fence line during routine maintenance inspections to assess plant regeneration. Invasive weeds such as *Kāhili ginger (Hedychium gardnerianum)*, *Strawberry guava (Psidium cattleianum)* and *Australian tree fern (Sphaeropteris cooperi)* will be a top priority for management in the project area. Weed removal will be carried out using approved mechanical and chemical methods shown to be highly effective in other areas.

D. Funding Sources

Fundraising for this project will commence upon approval of the Conservation District Use Permit.

III. SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT

A. General

The state-owned portion of the project area is designated as a wilderness preserve. DOFAW's Draft Management Guidelines (DMG) classify this area as "V-1: Highest Quality Native Ecosystems" containing greater than 90% native vegetation.

The project will take place within the eastern Alaka'i Plateau and is directed at protecting this unique ecosystem and the rare and endangered species within it. The forest is comprised of mostly montane closed to open *Metrosideros* ('Ōhi'a) and *Cheirodendron* ('Ōlapa) wet forest mixed with a rich diversity of understory trees, shrubs and ferns, many of which are restricted to only Kaua'i. Currently, 202 native plant taxa have been documented or observed within the 1,405 ac Alaka'i portion of the Preserve, which includes 66 single island endemic plant taxa (Wood, 2007).

Nearly the entire western half of the area contains soil described as "mucky peat" with 0 to 30 percent slope. The eastern half contains a more diverse array of soils, with those closer to the summit described as poorly drained "silty clay" with 8 to 30 percent slopes. The rugged terrain to the north of the summit area is classified in 2 major descriptions: "mucky silty clay loam" with 30 to 70 percent slope which then merges with the more

rugged terrain described as “rough mountainous land” characterized by steep valley walls, narrow ridges, and thin soil 1 to 10 in deep (Foote, *et al.* 1972). The proposed protective fence will cross one stream, the Koai‘e Stream, which flows to the west. (*See Exhibit J: Topography map*)

Helicopters are the primary means of access, but strong winds and cloud cover over the Alaka‘i Plateau are major impediments to the predictability and consistency of this mode of travel. The closest road is the 4X4 dirt road leading to the Camp-10 picnic area nearly seven and a half miles to the northwest of the summit. No Na Ala Hele trails or any other official trails reach the area. The Waialae Trail comes to within a little under a mile of the fence alignment, with no discernable access route to the project area. (*See Exhibit K: Access map*)

B. Flora and Fauna

Many *threatened*, *endangered* and even *critically endangered* species have been documented either within the proposed fence area or in close proximity. Most surveys occur along established bird-transect lines. The eastern portion of the Alaka‘i might be considered relatively un-surveyed by botanists and ornithologists as compared to other more accessible regions.

- i. **Flora:** Contained within the project area are several vegetative classifications including Bog Vegetation, Native Wet Cliff Vegetation, Closed ‘Ōhi‘a Forest, Native Wet Forest and Shrubland, ‘Ōhi‘a-‘Ōlapa Forest, and Open ‘Ōhi‘a Forest according to the Hawai‘i GAP Landcover Analysis. Critical Habitat for 2 taxa of endangered plants also exists within the project area (USFWS, 2004) and two other endangered species have been documented within the project area during botanical surveys (See Table-1).

Table-1: Rare Plants Documented Within The Project Area & Vicinity.

Scientific Name	Common Name	Federal Status	Island Wide Pop. Estimate	Survey Info
<i>Acaena exigua</i>	liliwai	E	unknown	
<i>Alsinidendron lychnoides</i> (*)	kuawawaenohu	E	n/a	
<i>Astelia waialeale</i>	pa'iniu	PE	n/a	
<i>Cheirodendron dominii</i>	lapalapa	E	>2500	
<i>Dubautia waialealeae</i>	na'ena'e	PE	500 - 700	
<i>Eurya sandwicensis</i>	anini	SOC	n/a	
<i>Geranium kauaiense</i>		C	3	
<i>Lagenifera helenae</i> (**)		PE	300	2000, Wood
<i>Lysimachia daphnoides</i>	Lehua makanoe	PE	200 - 300	1995, Perlman
<i>Lysimachia venosa</i>		PE	Unknown	
<i>Melicope cruciata</i>	cross-bearing pelea	SOC	20 - 30	2000, Wood
<i>Melicope puberula</i>	Alani	PE	900	2000, Wood
<i>Melicope waialealae</i>	Alaniawai		n/a	
<i>Myrsine petiolata</i>			unknown	
<i>Phyllostegia helleri</i>		C	Previously considered extinct. About 100.	Rediscovered 2004, Wood
<i>Platanthera holochila</i>		E	>40	
<i>Sanicula kauaiensis</i>	Kaua'i Sanicle	SOC	One 1911 collection. Very rare or extinct	

(*) *Alsinidendron lychnoides* synonymous for *Schiedea lychnoides*.

(**) *Lagenifera helenae* synonymous for *Keysseria helenae*.

Bold font indicates federally listed endangered species.

PE = Proposed Endangered listed Oct 2008

C = Candidate for Listing

SOC = Species of Concern

- ii. **Fauna:** Common forest bird species include Kaua'i 'Amakihi (*Hemignathus kauaiensis*), 'Anianiau (*Magumma parva*), 'Apapane (*Himatione sanguinea*), 'I'iwi (*Vestiaria coccinea*), and 'Elepaio (*Chasiempis sandwichensis*). The Puaiohi (*Myadestes palmeri*) is suspected to be in the area. The following species have not been detected on recent surveys: Kaua'i Ō'ō, Ō'ū, Kama'o, Kaua'i Akialoa and Kaua'i Nukupu'u. Koloa ducks inhabit the area's streams and the Hawaiian Owl (*Asio flammeus sandwichensis*) hunt open areas such as grasslands, stream banks, and bogs.

A colony of Hawaiian Petrel (*Pterodroma sandwichensis*) was documented in 1990 in close proximity to the proposed fenceline at the edge of a Sincok Bog. At that

site, 12 separate individuals (*P. sandwichensis*) were heard over the course of 2 days (Hawai'i Biodiversity and Mapping Program, 2007). Refer to Table-2 for species.

Table-2: Native Flying Vertebrates Found Within The Alaka'i Protective Fence Vicinity.

Scientific Name	Common Name	Federal Status	Island-wide Pop. Est. (Survey Date)
<i>Lasiurus cinereus semotus</i>	'Ōpe'ape'a (Hawaiian Hoary Bat)	E	?
<i>Loxops caeruleirostris</i>	'Akeke'e (Kaua'i 'Akepa)	PE	30,000 (2000)
<i>Magumma parva</i>	'Anianiau		35,000 (2000)
<i>Himatione sanguinea</i>	'Apapane		64,972 ± 2,014 (2000)
<i>Vestiaria coccinea</i>	'I'iwi		5,400 ± 500 (1976-1981)
<i>Psittirostra psittacea</i>	'Ō'ū	E	0 (2000)
<i>Oreomystis bairdi</i>	'Akikiki (Kauai Creeper)	PE	2,448 ± 1,200 (2000)
<i>Myadestes myadestinus</i>	Kama'o (Large Kaua'i Thrush)	E	0 (2000)
<i>Hemignathus kauaiensis</i>	Kaua'i 'Amakihi		>40,000 (2000)
<i>Chasiempis sandwichensis sclateri</i>	Kaua'i 'Elepaio		25,000 (2000)
<i>Moho braccatus</i>	Kaua'i 'Ō'ō ('Ō'ō 'ā'ā)	E	0 (1989-2000)
<i>Hemignathus procerus</i>	Kaua'i Akialoa	E	0 (1989-2000)
<i>Hemignathus lucidus hanapepe</i>	Kaua'i nukupu'u	E	Unknown (1989-2000)
<i>Myadestes palmeri</i>	Puaiohi (Small Kaua'i Thrush)	E	300 - 500
<i>Anas wyvilliana</i>	Koloa (Hawaiian Duck)	E	2000
<i>Pterodroma sandwichensis</i>	Hawaiian Petrel ('Ua'u)	E	NA
<i>Puffinus newelli</i>	Newell Shearwater ('A'ō)	T	N/A
<i>Asio flammeus sandwichensis</i>	Hawaiian Owl (Pueo)		N/A

Sources Include: Kauai Forest Bird Survey, CWCS (Mitchell, et al, 2005) and Revised Recovery Plan for Hawaii (USFWS 2006)

Bold font indicates federally listed endangered species.

PE = Proposed Endangered listed Oct 2008

T = Threatened

C = Candidate for Listing

SOC = Species of Concern

No surveys could be located for native terrestrial invertebrates or native aquatic invertebrates within the area; however anecdotal evidence suggests that the area contains diverse communities of native invertebrates, evidence of a healthy, functioning ecosystem.

C. Cultural Resources

The following steps have been taken to determine the cultural and historical significance of the project area:

i. Cultural Impact Assessment

A cultural impact assessment has been completed for the project. A complete copy is included with this document and also available at: www.hawp.org .

Selected excerpt from Cultural Impact Assessment for the Alaka'i Protective Fence Project; Waimea and Wainiha Ahupua'a, Waimea and Hanalei Districts, Island of Kaua'i, March 2008, pg 68, section 7.7.

According to researchers, Charles Burrows, President of 'Ahahui Mālama I Ka Lōkahi, Charles Isaacs Jr., Treasurer of 'Ahahui Mālama I Ka Lōkahi, and Kepā Maly, Cultural Historian & Resource Specialist, President of Kumu Pono Associates (2007), it is well documented that feral pigs ranging through Hawai'i's upland forests today bear little physical or cultural resemblance to the smaller, domesticated pigs brought to the islands by voyaging Polynesians. It remains a popular misconception that pigs are native to Hawaiian forests and that pig hunting was a common practice in ancient Hawai'i. The article completed by the researchers mentioned above titled, Pua'a (pigs) in Hawai'i, from Traditional to Modern compares the traditional role of pigs in Hawaiian culture.

Pigs are not native to Hawai'i. The first pigs were brought to the Hawaiian Islands by Polynesians as early as the fourth century A.D. Skeletal remains of pigs and recorded traditional knowledge sources indicate that pua'a (the Polynesian pig) was a much smaller animal than the feral pigs of today [ii].

Originally, pua'a enjoyed a close relationship with their human families and rarely strayed far from the kauhale (family compound) [iv].

Well developed taro and sweet potato agriculture in ancient Hawai'i was incompatible with uncontrolled pigs, and there is every indication that pigs were both highly valued and carefully managed sources of protein. Pua'a were an integrated part of Hawaiian households, and the common presence of pa pua'a (pig pens) reflects the controlled, physically compartmentalized nature of pig management in traditional Hawai'i [v].

In contrast, today's feral pigs are largely derived from animals introduced after western contact. Cook, for example, brought European pigs during his first voyage to Hawai'i, and many other introductions of European and Asian swine followed [vii].

Clearly, domesticated pua'a carried strong cultural value in traditional Hawai'i. Aside from being an important possession and source of food, oral tradition describes the adventures of Kamapua'a (the pig child), a powerful demi-god who ranged over the islands and into the sea [xiii].

However, pigs were never hunted game for ancient Hawaiians. The Polynesian interaction with these animals was one of near-complete domestication. Despite reference to hunting rats with bow and arrow, no historic or traditional knowledge sources describe ancient Hawaiians hunting pigs for either food or recreation [xvi]. [Burrows, Isacc, Maly 2007: 1-3]"

ii. Archaeological Assessment

An archaeological assessment has been completed for the project. A complete copy is included with this document and also available at: www.hawp.org .

Selected excerpts from Archaeological Assessment for the Alaka'i Protective Fence Project; Waimea and Wainiha Ahupua'a, Waimea and Hanalei Districts, Island of Kaua'i, March 2008, pg 27, section 7.1.

The Alaka'i, Kaua'i's watershed core, is an ecologically rich area containing over 95% native Hawaiian-dominated forests and a variety of native biodiversity. The Alaka'i serves as a primary source of the island's freshwater – the high elevation forests filtering rainwater into subterranean aquifers and dispensing surface waters into Kauai's seven main rivers. The presence of habitat-modifying weeds and feral ungulates such as pigs and goats threaten the health and integrity of this vital watershed forest habitat.

The entire length of the proposed fence line was traversed from the Wainiha Pali in the northwest to the summit bog fence and the Wailua Pali in the southeast. No archaeological sites were observed.

The proposed fence line lies in the exceedingly inaccessible east end of the Alaka'i Plateau. No maintained trails run anywhere nearby. While the Kilohana Overlook end of the maintained Alaka'i Swamp trail is only about 5 miles "as the crow flies" northwest of the northwest end of the proposed fence line this would be close to a day's journey of very rugged endeavor for most people. The isolation suggests that the level of use of the entire east end of the Alaka'i Plateau has always been exceedingly limited. Indeed it seems probable that in traditional Hawaiian times the vicinity was only frequented by the most hardy bird hunters and by people going to and from the Ka'awakō Shrine. Informant testimony and the earliest historic accounts of visits to the shrine suggest these trips were

typically via the steep ascent from the Wailua side which may not have brought pilgrims into the project area at all. The annual summit rainfall, estimated at 11,000 mm (433 inches), would not have encouraged many to linger for long.

A notable feature of the Alaka'i Plateau is the general absence of rocks for construction material. Perhaps 99% of the proposed fence line route is stone free with no raw material for construction that would endure.

Site density is anticipated to be very, very low away from the Alaka'i Plateau rim. (Hammatt and Shideler, 2008)

The pre-consultation and any continued correspondence include the following organizations: State Historic Preservation (SHP) Division; Department of Hawaiian Home Lands; and Office of Hawaiian Affairs (OHA). (*See Exhibit L: Consulted Agencies & Parties Distribution List for a complete list.*)

Note: Should any iwi or Native Hawaiian cultural or traditional deposits be found during fence construction, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

D. Sensitive Habitat

Many *threatened, endangered* and even *critically endangered* plant and animal species have been documented either within the proposed fence area or in close proximity. The project area also contains montane bog habitat, which is listed as rare by the Hawai'i Biodiversity and Mapping Program.

The forest and cliffs in and around this area support a diverse assemblage of native forest birds and 2 species of ground-nesting seabirds. No colonies of ground nesting seabirds have been located along the fence alignment. Some of these birds are federally listed as endangered species or candidates for listing as endangered species.

Land in the western half of the project area is designated critical habitat (CH) for *Platanthera holochila* and *Exocarpos luteolus* while lands in the northern portion contain designated CH for *Cyrtandra cyanoides*. CH for *Cyrtandra limahuliensis*, *Pteralyxia kauaiensis*, and *Plantago princeps* borders the eastern edge of the project area (USFWS, 2004, See Table-3). This implies that these endangered species are or were found in the project area or that the area provides suitable habitat which is essential for species recovery. Included on Table-1 are 4 federally listed endangered species of flora, 6 proposed endangered, 2 candidates for the endangered species list, and 3 more flora listed as species of concern. With the exception of *E. luteolus*, *C. cyanoides*, and *C. Limahuliensis*, all listed species of flora have been recorded in close proximity or within the project area. (*See Exhibit F: Critical & Rare Resources map*) Most surveys occur along established bird-transect lines. The eastern portion of the Alaka'i might be

considered relatively un-surveyed by botanists and ornithologists as compared to other more accessible regions.

Table- 3 Critical Habitat within the Alaka‘i Protective Fence Project Area

Scientific Name	Common Name
<i>Plantago princeps</i>	Laukahi kuahiwi
<i>Pteralyxia kauaiensis</i>	Kaulu
<i>Exocarpus luteolis</i>	Heae, au
<i>Platanthera holochila</i>	Fringed orchid
<i>Cyrtandra cyanooides</i>	
<i>Cyrtandra limahuliensis</i>	

Source: U.S. Fish and Wildlife Service. 2004. *Endangered and Threatened Wildlife and Plants; Final Designation or Non-designation of Critical Habitat for 95 Plant Species from the Islands of Kaua‘i and Niihau, HI.*

E. Other Uses

The state-owned portion of the project area is designated as a wilderness preserve. Hiking, hunting, camping, photography, and trout fishing activities occur within the overall Alaka‘i Wilderness Preserve, but are seldom conducted within this portion due to its extreme remoteness. (See Exhibit G: Vicinity & Parcel map)

Because of the high quality and fragile nature of the native ecosystems located within the project area, the area has been designated as “A-4: Game Control (supervised)” by DOFAW’s Draft Management Guidelines (DMG). The area is not utilized for timber production or for any other forestry products. DOFAW’s DMG prohibits the harvest/collection of forest products within the area unless there is “compelling public benefit”. HAR §13-3-2 places the following restrictions on the Alaka‘i wilderness preserve area, “the following restrictions shall also apply...the introduction of lantana (*Lantana camara*), black wattle (*Acacia decurrens*), firetree (*Myrica faya*), blackberry (*rubus penctrans*), or any plants or animals deemed objectionable by the board is prohibited...”.

Current hunting regulations (governing the state land portion) allow hunters to take 1 pig per licensed hunter per day, year round on Saturdays, Sundays, and state holidays with rifles, handguns, bow & arrows, or dogs and knives. Seasonal goat hunting occurs during eight consecutive weekends from mid-July through mid-September, on Saturdays and Sundays, with rifles, muzzleloaders, and bow and arrows; a bag limit of one goat per rifle/muzzleloader tag issued. Hunters must sign-in at a checking station prior to the hunt and sign-out at the end of the day. Hunters with a valid camping permit can access the Alaka‘i Wilderness Preserve via the Mokihana Ridge Game Management Area by means of the Waimea Valley Checking Station on Fridays only after 3:00 p.m. in preparation for Saturday’s hunt.

Natural water collection and storage is the most important resource attribute within the project area. The project area, being a part of the greater summit area, defines the upper

most boundaries for many of Kaua‘i’s major watersheds. Which, in turn, supply the island with abundant water resources. The McBryde Sugar, Co. portion of the project area provides water for a hydroelectric power plant in Wainiha Valley.

IV. SUMMARY OF MAJOR IMPACTS

A. Major Positive Impacts

The most positive impact of this project will be the long term protection of forested watershed and native Hawaiian bio-diversity in approximately 2,000 ac of the east Alaka‘i Plateau. Natural water collection is an essential function of the Alaka‘i and can be considered the most important resource of this ecosystem. The native forests in this region not only collect moisture from moisture laden clouds, but also act as a living sponge during times of heavy rain. All of this water is sequestered in diverse, dense layers of living and decaying organic material and drains gradually off the plateau. In this manner, the Alaka‘i mitigates the impacts of natural drought and flood cycles.

The proposed fence will protect a portion the existing native forest, therefore maintaining the ability of this section of the Alaka‘i Plateau to collect and retain rainfall as well as provide a consistent and stable water source to Kaua‘i’s lowlands. The exclusion of feral pigs from the plateau will allow native vegetation to regenerate in degraded areas. The protective fence will first stop the continued damage being caused by feral pigs. Damage such as: spreading of invasive species i.e. strawberry guava and aggressive grasses, harm done to Hawaiian forests and streams impairing the function of watersheds, contamination of the fresh water supply with disease-causing organisms, destruction of native species and their habitat, prevention of the recovery of rare and endangered species, increased rock falls, mudslides, and reef siltation by accelerated erosion. This will then facilitate a decrease in the amount of soil exposed to possible erosion in the future, thereby improving watershed function of this area.

Protecting, sustaining, and even improving water production is critical to Kaua‘i’s future. Abundant clean water is needed for a growing population, the agricultural and commercial activities that support it and hydro-electric power plants which are important in providing alternative energy sources. The project area provides runoff to 4 of the 6 largest watersheds on Kaua‘i. Historically, this reliable source of water has been crucial for agricultural endeavors such as taro production in valleys such as Hanalei, Hanapepe, and Waimea since the beginning of recorded history and more recently sugar plantations such as on the west side of the island.

This project will protect and allow for the recovery of natural communities and their constituent native species within the enclosure. The biological diversity and cultural integrity of this area, as it exists today, will be preserved within the fenced area. Contained within the project area are several montane vegetative classifications including Bog Vegetation, Native Wet Cliff Vegetation, Closed ‘Ōhi‘a Forest, Native Wet Forest and Shrubland, ‘Ōhi‘a-‘Ōlapa Forest, and Open ‘Ōhi‘a Forest according to the Hawai‘i

GAP Landcover Analysis. Critical Habitat for 6 taxa of endangered plants also exists within the project area (Critical Habitat, 2004) and two other endangered species have been documented within the project area during botanical surveys (See Table-1). The proposed fence area contains 202 native plant taxa, 66 of which are found only on Kauai (Wood, 2007). In addition the forest in this area supports a diverse assemblage of native forest birds and ground-nesting seabirds. Some of these birds are federally listed as endangered species or candidates for listing as endangered species. Common forest bird species include Kaua'i 'Amakihi (*Hemignathus kauaiensis*), 'Anianiau (*Magumma parva*), 'Apapane (*Himatione sanguinea*), 'I'iwi (*Vestiaria coccinea*), and 'Elepaio (*Chasiempis sandwichensis*). Seabirds include the endangered Hawaiian Petrel (*Pterodroma sandwichensis*) and the threatened Newell Shearwater (*Puffinus newelli*).

B. Major Negative Impacts

No specific major negative impacts have been identified. Discussed below are potential impacts of limited scope to the project area.

There will be some short-term negative impact on the environment associated with the fence construction. Disturbance of vegetation and soil will occur in the immediate vicinity of the planned fence line because the work entails clearing the corridor of vegetation. Plants will be pruned to several inches above ground or if necessary removed along the entire corridor up to a width of 10 ft. This will involve the removal of common native plants, but no rare or sensitive species (the fence alignment will avoid rare plant occurrences). The 3 weatherport and 2 radio repeater foot prints are very small and will not likely have a lasting impact. There will be some trampling of the vegetation during installation. Solar panels will be used to power the repeater stations (small wind turbines have been eliminated due to possible lasting negative impacts to birds and bats).

There will be a temporarily increased potential for accidental introduction of non-native plants along the fence corridor due to the possibility of seed transport on shoes, clothes, packs, and/or fencing material and equipment from off site. Disturbance of the ground surface along the fence line will also lead to conditions which might favor colonizing weed species that already exist within the project area. It should be noted that the impacts observed from the existing bog fences for over 10 years has been negligible. Incidental weed introductions along the fence corridor will be controlled during routine fence maintenance.

The proposed protective fence will enclose approximately 2,000 ac of the highest quality watershed and endemic forests on the island. Of this 2,000 ac, 595 ac lie within the Alaka'i Wilderness Preserve. The proposed feral pig and goat removal is consistent with the stated purpose of the Wilderness Preserve designation. This portion of the fenced area is also designated as Hunting Unit E and will remain as such. Therefore, there will be no reduction in public hunting area and gates will be provided for pig and goat hunters to access the fenced area. Although pig and goat populations will be intensively reduced from within the fenced area the impact on available public hunting area will be negligible. Furthermore, the project will have a negligible impact on existing pig

populations outside of the fenced area. Given the amount of existing pig habitat on the island, which likely includes a substantial portion of native and non-native forests, shrublands, and grasslands on both public and private lands (283,044 ac; source HIGAP land cover data), the removal of 2,000 ac of pig habitat would be insignificant.

The biological surveys found no nesting colonies for ground nesting sea birds along either side of the proposed protective fence alignment. Although no known flight ways intersect the fence alignment and the fence profile is only 48 inches in height there is still a possibility that the fence may in some way impact the sea birds and the Hawaiian hoary bat. (See Biological Survey [included with this document and also available at www.hawp.org.](#))

The fence will cross Koai'e Stream. This fence section is designed to prevent feral pig ingress while allowing stream flow and aquatic species to move freely in either direction. (*See Exhibit B: Fence Construction Samples, Stream Crossing Section*)

Although the project area is very remote there are significant cultural sites which will be enclosed within the fence in addition to culturally significant native plants and animals. These sites are Lake Wai'ale'ale and Ka'awakō Shrine. The construction of the protective fence will not significantly influence access to the area for cultural purposes. Within the surveyed fence alignment, several access gates will be located to accommodate access to the enclosed area. The protective fence will protect the site from degradation. Potential damage to the shrine and lake from hoofed animals such as goats and pigs will be reduced or eliminated. (*See Exhibits B & K: Examples of Fence Construction & Access map*)

V. PROPOSED MITIGATION MEASURES

A. Vegetation and Soil Disturbance

The fence and placement of weatherports and radio repeaters have been aligned and located to reduce the amount of native vegetation to be cut and to avoid harm to rare or endangered species. The weatherport and radio repeater designs have a small footprint, therefore keeping ground disturbance to a minimum.

Soil disturbance may be unavoidable, particularly during vegetation clearing, although clearing will not occur down to the soil level. Clearing at no wider than 10 ft would impact a maximum of 10 ac of the total 2,000 ac of the project area. After clearing, the fence material will be dropped by helicopter approximately every 300 ft along the corridor, and the fence mesh unrolled to lay flat on the ground. Workers will walk on the mesh as they install the fence, and then walk on the outside apron portion of the fence after it is erected. This will greatly reduce soil disturbance caused by the activity of fence construction. Water bars will be installed in areas with steep slopes. These bars will divert water from flowing directly down the fence line thus reducing erosion. Erosion

due to the installation of the fence line will be monitored and if present, addressed during routine maintenance checks.

B. Weed Introductions

There will be a temporarily increased potential for accidental introduction of non-native plants along the fence corridor due to the possibility of seed transport on shoes, clothes, packs, and/or fencing material and equipment from off site.

Throughout the project and subsequent access, strict protocols will be used to: 1) clean and inspect all gear and supplies, pressure washing as needed, (fencing material, radio repeaters, weatherports, camp materials, and personnel gear) to prevent the introduction of alien species (seeds, plants, and insects). Fumigation protocols will not be needed as wood posts will not be used in the fence construction. These protocols will be included in contracts with any contractors. 2) Monitor the fence and remove any weeds that become established or spread as a result of the disturbance during construction or maintenance of fence line. A schedule to monitor the fence and control incidental weed introduction will occur at regular intervals after construction and will be included in the management plan and implemented. Funding has been allocated for this action. 3) At the completion of construction and installation all rubbish and waste will be removed from work sites.

C. Reduction of Game Habitat

Because of the high quality and fragile nature of the native ecosystems located within the project area, the area has been designated as “A-4: Game Control (supervised)” by DOFAW’s DMG. Nearly 2,000 ac will be protected from feral pigs; approximately 595 ac lies on state land, representing just 2.75% of public hunting of unit-E and just 0.56% of total public hunting area on Kaua’i. The remaining 1,405 ac is located on A & B Hawai’i, Inc. private lands. The fenced area is not conducive to newborn piglets and therefore should not pose a threat to the reproduction cycle of the feral pigs. Farrowing nests are generally situated in open places and are therefore susceptible to flooding. Should a piglet be forced out of the nest early, direct exposure to the cold and rain would contribute to piglet mortality (Foley et al, 1971 cited from Diong, 1982). Piglets less than a month old are not able to thermoregulate and once in the open, would perish due to the cold, entrapment in mud and/or accidental abandonment (Myrcha & Jezierski, 1972 from Diong, 1982).

Gates are to be constructed along the protective fence to accommodate access to the area by hunters. As outlined and regulated by the State of Hawai’i as a Conservation District land area and Wilderness Preserve.

D. Ground Nesting Seabirds and Bats

The biological surveys found no nesting colonies for ground nesting sea birds along either side of the proposed protective fence alignment. Although no known flight ways intersect the fence alignment and the fence profile is only 48 inches in height there is still a possibility that the fence may in some way impact the sea birds and the Hawaiian hoary bat. There will be no barbed wire on any portion of the fence, thereby reducing any possible impalement on the fence. In addition, we will use the most appropriate proven method to warn birds of the fence.

As recommended by Menard (2001), we are timing the fence clearing (i.e. removal of woody vegetation) to occur when bats are not likely to be present in the project area to minimize the risk of disturbing or killing roosting bats. In this case, because the site is at a relatively high altitude where temperatures during the breeding season are cool (i.e. minimum July temperatures are 11C or less), it is likely that bats are avoiding the area during the breeding season and are roosting in the warm lowlands of Kaua'i. Menard's thesis discusses the reasons why roosting bats would derive advantages from roosting in the warm lowlands during the April to August period.

Should any seabirds or Hawaiian hoary bats be found at anytime during natural resource management of the area the appropriate agencies will be notified and consulted as to the best way to handle the situation.

E. Streams

Mitigation measures are inherent to the stream crossing fence design. The mesh size of the fence will only restrict the movement of feral pigs and goats. Aquatic organisms may freely migrate in either direction within the stream.

F. Cultural Access

The project area is extremely remote. The construction of the protective fence will not impact access to the area for cultural purposes. Within the surveyed fence alignment, several access gates will be located to accommodate access to the enclosed area. These gates will be located to promote a more direct route to the project area and the cultural site, Lake Wa'iale'ale and Ka'awakō Shrine at Wai'ale'ale. Portions are regulated by the State of Hawai'i as a Conservation District land area and Wilderness Preserve. Most of the fenced area belongs to a private land owner, and is regulated by their right of entry protocols. Contractors will be made aware of historical and cultural sites in the area and will be included in discussions during the contracting process.

VI. ALTERNATIVES CONSIDERED

A. Alternative: No Action

This action effectively accepts the continued degradation of the Alaka'i from existing threats of invasive weeds and feral pigs. This alternative is neither consistent with the landowners' aim nor the objectives of the Kaua'i Watershed Alliance members. No action is inconsistent with the sense of responsible stewardship for Kaua'i's natural resources. Conservation District Protective subzone designation, as outlined in HAR §13-5-11 states, "The objective of this subzone is to protect valuable resources in designated areas", therefore, the East Alaka'i Protective Fence Project provides a means to carry out this directive. As intended in the purpose statement for the Alaka'i Wilderness Preserve, HAR §13-3-1, "For the purposes of preserving, protecting, and conserving all manner of flora and fauna", the no action alternative will result in far greater and more damaging (potentially irreversible) environmental impacts in this area. Therefore, this alternative of no action has not been selected.

VII. ANTICIPATED DETERMINATION

Note: The Department of Land and Natural Resources issued a Finding of No Significant Impact on October 10, 2008 (See Exhibit N)

We conclude that the Alaka'i Protective Fence Project, will not have any significant adverse impacts on the environment. Therefore, we anticipate a Finding of No Significant Impact (FONSI).

VIII. FINDINGS AND REASONS SUPPORTING THE DETERMINATION

The environmental impacts of the Alaka'i Protective Fence Project have been evaluated in relation to the thirteen significance criteria listed in the Guidebook for the State Environmental Review Process. The criteria and the effects this project will have are listed:

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.

The purpose of this project is to protect a portion of the Alaka'i Plateau from damage by feral pigs. Rather than allowing potential destruction of natural and cultural resources, this project will enhance the protection of the project area.

2. Curtails the range of beneficial uses of the environment.

The East Alaka'i Plateau contains intact montane wet forests, a diverse collection of endemic plants, and important habitat for native forest birds and ground nesting seabirds such as the Newell Shearwater and Hawaiian Petrel. The area functions as the primary

watershed catchment and storage area for the island, supplying the headwaters to Wainiha, Lumaha‘i, Hanalei, Wailua, and Waimea Rivers. This project will strengthen rather than curtail these functions. Possible educational, cultural, and scientific uses will be enhanced by the completion of the project.

3. Conflicts with the state’s long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revision thereof and amendments thereto, court decisions, or executive orders.

This project is consistent with Chapter 344 in that the aim is to preserve the natural resources “by safeguarding the State’s unique natural environmental characteristics”. Therefore, the protection of the watershed will, in effect, reduce the drain on nonrenewable resources as stated in the HRS and is in line with the state’s long-term environmental policies.

4. Substantially affects the economic, social welfare, and cultural practices of the community or state.

The project will not impact either the economic or social welfare, or the cultural practices of the community or state due to the remoteness and rugged terrain of the project area.

5. Substantially affects public health.

The project will not affect public health. It is located in a remote portion of the Alaka‘i Plateau. Any impacts to public health would likely be positive i.e., improved water quality, consistent supply of water quantity, reduced potential for destructive flooding during heavy rain events, reduced harmful bacteria levels, etc.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.

The remoteness and rugged terrain of the project area precludes any impact on population or public facilities.

7. Involves a substantial degradation of environmental quality.

The purpose of this project is to improve the quality of a unique Hawaiian ecosystem over time and protect its’ inherent, high quality watershed. This project requires very limited cutting back of common native plants along the fence alignment and some short-term soil disturbance. However, this activity is necessary to protect the integrity of the ecosystem (approximately 2,000 acres) resulting in a net long-term benefit.

8. Is individually limited but has considerable effect upon environment or involves a commitment for larger actions.

The project supports ongoing and future management to benefit the project area but does not involve a commitment for larger actions. The protective fence project has a very

small physical foot print of approximately 10 ac relative to the larger area of approximately 2,000 ac it is designed to protect. It will protect the watershed from degradation by invasive feral pigs which numerous scientific studies have demonstrated to be destructive to native forests and watersheds. The exclusion of feral pigs from the project area will allow native vegetation to regenerate in degraded areas. This project, over time, may prevent a greater need for more expansive restorative actions in the future.

9. Substantially affects a rare, threatened, or endangered species or its habitat.

The project will have a beneficial effect on the rare, threatened and endangered species and the ecosystem that exist within the project area. A survey of the fence alignment by Ken Wood (biologist for the National Tropical Botanical Gardens) has determined the project will not adversely impact any rare, threatened or endangered species along the proposed fence. In addition, this project is consistent with the tasks outlined in the U.S. Fish and Wildlife Service's 2006 Revised Recovery Plan for Hawaiian Forest Birds; action number 2.2.101 (Reduce or eliminate the detrimental effects of feral pigs and goats on vegetation within Halehaha, Halepa'akai, and Koai'e drainages, Alaka'i Wilderness Preserve, Portions of TMK 4-1-4-001-003). It is consistent with the State of Hawai'i's Comprehensive Wildlife Conservation Strategy (CWCS). The intent of a CWCS is to create a dynamic vision for the future of wildlife conservation.

This project will also benefit the designated critical habitat for 6 listed plant species by enclosing them within the fence project area and managing threats to their habitat.

10. Detrimentally affect air or water quality or ambient noise levels.

Air or water quality will not be affected. Helicopters will transport construction materials to the project site. These flights will occur during normal work hours, in areas that already have sightseeing helicopter activity, and will not fly over residences. Thus, noise levels will be slightly elevated during the installation flights, but this impact will be minor and will occur only for a short time.

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, and estuary, freshwater, or coastal waters.

The project will not negatively affect an environmentally sensitive area nor suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, or geologically hazardous land. This project is located in the eastern Alaka'i Plateau in an environmentally sensitive area that includes freshwater streams, native montane wet forest, and rare bog ecosystems; however, the intent of the project is environmental protection of this habitat. The foot print of the protective fence, weatherports, and radio repeaters are very minimal, less than 10 acres. The best management practices are in place to prevent and minimize any anticipated short-term impacts and are not anticipated to result in long-term damage to any of the habitat.

12. Substantially affect scenic vistas and view planes in county or state plans or studies.

The project will not have any substantial effect on any scenic vistas or view planes. The project area is located in a remote portion of the eastern Alaka'i Plateau, the geography of which is only visible at great distances from a small number of lookouts in the Koke'e and Alaka'i region, weather permitting. From those vistas, a fence standing no more than 48 inches in height will not be seen.

13. Requires substantial energy consumption.

Energy consumption for this project will be of a short duration and not substantial. Direct energy requirements/consumption will be restricted to the fuel required for helicopter flights and fence construction.

IX. PERMITS REQUIRED

The project falls in a Conservation District Protective subzone. Therefore the project requires a board permit from the Board of Land and Natural Resources, Department of Land and Natural Resources (Section 13-Conservation District).

Please see Exhibit Q for a brief summary of the Conservation District Use Application public hearing that was held in Lihu'e, Kaua'i at Chiefess Kamakahelei Middle School on February 4th, 2009.

X. EA PREPARATION

This draft Environmental Assessment is being prepared in consultation with the land owner(s) A & B Hawai'i, Inc. (McBryde Sugar Co.) and the State of Hawai'i. This document, and all supporting documents are available on the Hawai'i Association of Watershed Partnerships at www.hawp.org.

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XI. REFERENCES CITED

- Aplet, G. H., Anderson, Stephen J., Stone, Charles P., 1991. Association between feral pig disturbance and the composition of some alien plant assemblages in Hawaii Volcanoes National Park. *Vegetation* 95: 55-62.
- Burney, D.A., 2002, Late Quaternary Chronology and Stratigraphy of Twelve Sites on Kaua'i, *Radiocarbon*, 44, Nr 1, p 13-44.
- Baker, J. K., 1979. The feral pig in Hawaii Volcanoes National Park, *Proceedings: First Conference on Scientific research in the National Parks*, pp. 365-367.
- Cooray, R. G. and Mueller-Dombois, D., 1981. *Island Ecosystems: Biological Organization in Selected Hawaiian Communities*, Hutchinson Ross Publishing Co., Stroudsburg, PA, pp. 309-317.
- Foley, C.W., Seerley, R. W., Hansen, W. J., and Curtis, S. E., 1971. Thermoregulatory responses to cold environment by neonatal wild and domestic piglets. *J. Anim. Sci.* 32(5): 926-929.
- Foote, D. E., Hill, E. L., Nakamura, S. and Stephens, F., 1972. *Soil Survey of the Islands of Kaua'i, Oahu, Maui, Moloka'i, and Lana'i, State of Hawai'i*, USDA, SCS and the University of Hawai'i A.E.S. U.S. Government Printing Office, Washington, D.C., <http://www.ctahr.hawaii.edu/soilsurvey/5is/Htm/howmade.htm> .
- Giffin, Jon, 1978. Ecology of the feral pig on the island of Hawaii. *Elepaio* 37 (12): 140-142.
- Hammatt, H. H., 2008. *Cultural Impact Assessment for the Alaka'i Protective Fence Project Area; Waimea and Wainiha Ahupua'a, Waimea and Hanalei Districts, Island of Kaua'i*, Prepared for The Nature Conservancy.
- Hammatt, H. H. and Shideler, M.A., 2008. *Archaeological Assessment for the Alaka'i Protective Fence Project; Waimea and Wainiha Ahupua'a, Waimea and Hanalei Districts, Island of Kaua'i*, prepared for The Nature Conservancy.
- Hawai'i Biodiversity and Mapping Program, 2007. University of Hawai'i, Center for Conservation Research and Training, Honolulu, Hawai'i.
- Higashino, Paul K., and Stone, Charles P., 1982. The fern jungle enclosure in Hawaii Volcanoes National Park: 13 years without feral pigs in a rain forest. *Proceedings: Fourth Conference in Natural Sciences. Hawaii Volcanoes National Park*, p. 86. Cooperative National Park Resources Studies Unit, University of Hawaii at Manoa.
- Jacobi, James D., 1976. The influence of feral pigs on a native alpine grassland in Haleakala National Park. *Proceedings: Hawaii Volcanoes National Park Natural Resources Conference* 1: 107 – 112.

Katahira, L., 1980. The effects of feral pigs on montane rain forest in Hawaii Volcanoes National Park. Proceedings, 2nd Conference in Natural Sciences, Hawaii Volcanoes National Park, Cooperative National Park Resources Studies Unit, University of Hawaii, Manoa, Honolulu, HI, pp. 173-178.

McEldowney, G.A., 1930. Forestry of Oahu. *Hawaiian Planters' Record*, 34 (3): 267-287.

Menard, Theresa C., 2001. *Activity Patterns of the Hawaiian Hoary Bat (Lasiurus cinereus semotus) in Relation to Reproductive Time Periods*. Master's Thesis. University of Hawaii, Manoa. Honolulu, HI. 153 pp.

Mitchell, C, Ogura, C, Meadows, D. W., Kane, A., Strommer, L., Fretz, S., Leonard, D. and McClung, A., 2005. *Hawai'i's Comprehensive Wildlife Conservation Strategy*. Department of Land and Natural Resources, http://www.state.hi.us/dlnr/dofaw/cwcs/process_strategy.htm (September 26, 2005).

Molokai Hunting Test Working Group, 1998. Findings and Recommendations in Response to S.R. # 68/S.C.R. # 83 of the Seventeenth State Legislature, State of Hawaii, 1993. December 1998.

The Nature Conservancy 2005. Kaua'i Watershed Management Plan: Overall Management Strategy. Prepared by the Kaua'i Watershed Alliance, http://www.kauaiwatershed.org/KWA_management_plan.pdf (April 2005).

U.S. Fish and Wildlife Service, 2006. *Revised Recovery Plan for Hawaiian Forest Birds*, Region 1, Portland, OR, <http://www.fws.gov/policy/library/E6-15956.pdf> .

U.S. Fish and Wildlife Service, 2004. Critical Habitat Designation. Endangered and Threatened Wildlife and Plants; Final Designation or Non-Designation of Critical Habitat for 95 Plant Species from the Islands of Kaua'i and Ni'ihau, HI USFS Pacific Islands Office.

Department of Forestry and Wildlife, 2007, DOFAW's management guidelines to Vegetation Classifications, *DOFAW Management Guidelines*. Department of Land and Natural Resources, Division of Forestry and Wildlife Hawaii, http://www.state.hi.us/dlnr/dofaw/guidelines/mg_jw03/page2.html (November 27, 2007).

Warner, Richard E., 1956 – 1969. *Ecological investigation on the Hawaiian pig* (1959); *Ecology of the Wild Pig* (1963, 1963); and *Feral Game Mammal Survey* (1969). State of Hawaii, Division of Fish and Game, Project # W-r-R10; Project # W-5-R13; Project # W-5-R14; and Project # W-5-R-20.

Wood, K. R., 2007. *Notes on the Flora of Wainiha and Alaka'i, Kaua'i, Hawai'i*, National Tropical Botanical Gardens, Kalaheo, HI, p 8, pp. 29-57. <http://hawp.org/file-list.php?SubSite=03> .