

DRAFT ENVIRONMENTAL ASSESSMENT
FOR
THE WAINIHA CONSERVATION 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

2010

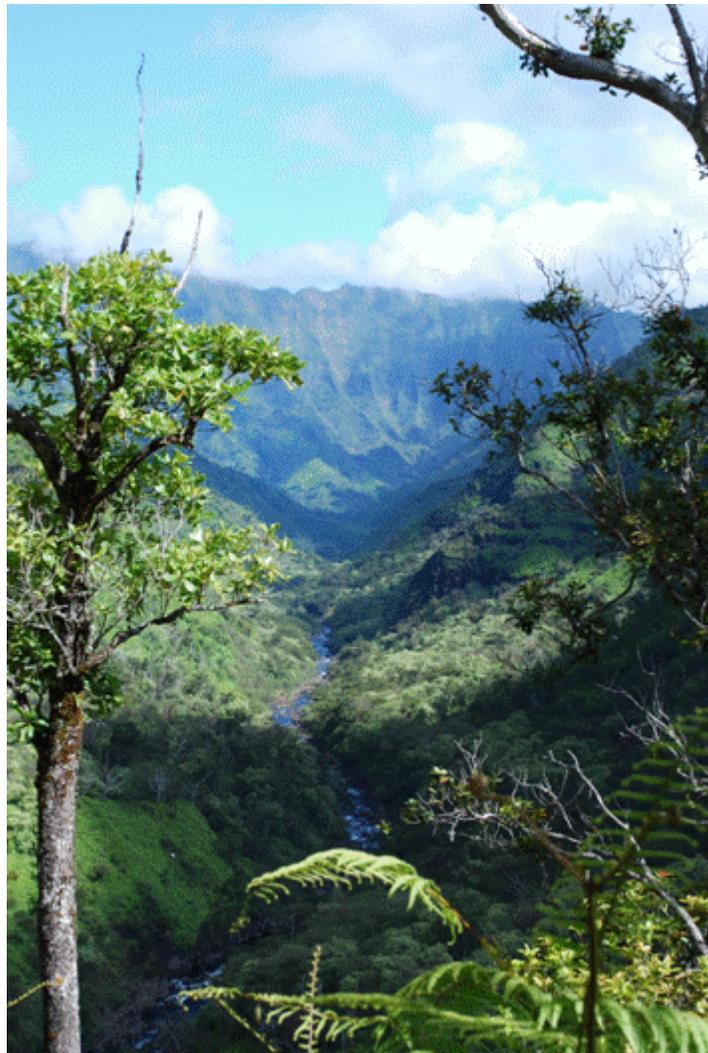


Photo: Ken Wood, 2009

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I. INTRODUCTION: DRAFT ENVIRONMENTAL ASSESSMENT

Project Name: Wainiha Conservation 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: Wainiha

McBryde Sugar Company, Limited
TMK: 4-5-8-001-001

Property Owner(s): McBryde Sugar Company, Limited

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 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 Garden
Princeville Utilities

(See Exhibit I: Consulted Agencies & Parties Pre-Assessment Distribution List for a complete list)

DRAFT ENVIRONMENTAL ASSESSMENT THE WAINIHA CONSERVATION PROJECT

II. SUMMARY OF PROPOSED ACTIONS

The Nature Conservancy (TNC), with the approval of the landowner; McBryde Sugar Company, Limited (McBryde), proposes to construct a protective hog wire fence to prevent ingress of feral ungulates into the Wainiha Preserve. Upon completion of the fence, TNC will conduct ungulate control and monitoring activities to eliminate feral ungulates from within the fenced area. These activities, along with invasive plant survey and control work, will preserve the existing healthy structure and function of the Wainiha watershed and native Hawaiian forest ecosystem.

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 7,050 acres (ac) of irreplaceable watershed and unique native ecosystem, as well as the rare and endangered species it supports. The project will be located in the Wainiha Preserve on the windward side of Kaua'i.

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 permit approval.

The proposed protective fence will be approximately 489 meters (.3 miles or 1,604 ft) in length, and will work in conjunction with vertical cliffs and natural barriers to protect approximately 7,050 ac of McBryde land located in the Conservation District. If needed additional wing fences, along natural barriers, could be added to manage the area effectively, as well as Radio Repeaters to increase crew safety and communications. (*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 wire mesh or standard hog panels supported by T-posts. (*See Exhibit B: Fence Construction example*)

To provide weather protection and safety for workers during natural resource management activities, up to 3 weatherports will be assembled. The weatherports will consist of a pre-

fabricated weather shelter that is assembled on a raised platform. The shelter will be an 8 ft high octagon, with a radius of 20ft. (See Exhibits A & C: Project Location map & Weatherport example) The following human waste disposal protocol will be followed in order to prevent stream contamination or the breeding of mosquitoes: a 3 to 4 ft deep hole will be dug and human waste, enclosed in compostable bags, 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 fence and weatherport 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 second quarter of Fiscal Year 11 (Oct 2010 – Dec 2010) and once initiated, all phases of the project will be completed within 12 months.

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 Hawai‘i 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.” The Protective subzone as stated in the law encompasses the protection of watersheds, water sources, and water supplies.

The Wainiha Conservation Project was conceived and planned to protect and preserve one of the best examples of native lowland wet forest remaining in the state. The valley contains 127 endemic Hawaiian plant species, 41 of which are only found on Kaua‘i. The upper valley contains one of the largest populations of the rare Laua‘e fern which is referred to in many Kaua‘i chants. The native mint, *Phyllostegia helleri*, had once been thought to be extinct, was rediscovered at Hinalele Falls in this valley in 2004 by Ken Wood of the National Tropical Botanical Garden. Other species of interest found in the valley are the endangered *Cyrtandra cyaneoides* and *Plantago princeps* var. *logibracteata*.

In July 2009, the flora of the Wainiha preserve was estimated to be composed of some 281 taxa of vascular plants from 75 families. This includes 222 native taxa, 51 non-native naturalized species, and 8 Polynesian introductions. Of the 222 native plant species naturally occurring within the Wainiha preserve region, it was found that 177 are endemic and 45 are considered indigenous. The Wainiha preserve contains 63 Kaua‘i single island endemic (SIE) taxa which is 28% of the entire 225 SIE taxa unique to

Kaua‘i. This high level of endemism clearly demonstrates the floristic uniqueness, diversity, and importance of the region (Wood, 2009).

The Wainiha preserve also supports a diverse assemblage of native Hawaiian animals, many of which are federally listed as endangered species or are candidates for listing as endangered species. Common forest bird species include Kaua‘i ‘Amakihi (*Hemignathus kauaiensis*), ‘Apapane (*Himatione sanguinea*), and ‘Elepaio (*Chasiempis sandwichensis*). Ground nesting sea birds including the White-tailed Tropicbird (*Phaethon lepturus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell Shearwater (*Puffinus auricularis newelli*) also nest in Wainiha. The Wainiha River itself is home to a number of native Hawaiian species of fish, insects, mollusks and waterfowl, including the endangered Koloa duck (*Anas wyvilliana*).

The natural communities of Wainiha are valuable, not only for the many rare and endangered species that they contain, but also for the ecosystem services which they provide. The KWA recognizes several crucial functions these ecosystems perform related to maintaining a source of high quality water. The forests and riparian areas act as a living sponge, soaking up rainfall, reducing erosion, and increasing infiltration. These buffers then slowly release stored water into streams, mitigating the effects of flood and drought cycles while providing clean, consistent stream flow. Preservation of the structure and function of the Wainiha river watershed is required in order to maintain biodiversity within the river ecosystem, ensure adequate water supply for human uses downstream, and ultimately protect coastal reefs and marine resources from siltation.

As coordinators for the KWA, TNC’s management activities focus on preserving watershed function and overall ecosystem health. The KWA management plan (as well as analyses conducted by numerous other state and federal agencies and academic institutions) has identified the impacts of feral ungulates and invasive weeds as the greatest threats to both biodiversity and watershed function. While most of Wainiha is dominated by native vegetation, many of the major and tributary stream corridors and riparian areas are currently being impacted by feral ungulates and invasive weeds.

Invasive weed species such as Australian tree fern, strawberry guava, and Kahili ginger pose a particularly grave danger to the forest due to their ability to create dense, monotypic populations in previously undisturbed native forest. These monotypic populations increase soil erosion and stream sedimentation due to their inability to absorb surface runoff and retain soil as efficiently as diverse native forest. These weeds not only damage watershed function, but also degrade the quality of wildlife habitat in downstream riparian and reef ecosystems by increasing siltation. (*Hawaii’s Comprehensive Wildlife Conservation Strategy (HCWCS), 2005*).

Feral pigs (*Sus scrofa*) directly threaten native plant diversity by indiscriminately consuming native understory vegetation. One study, analyzing the stomach contents of feral pigs in Hawai‘i, found that the majority (70-95%) of identifiable material was Hapu‘u (*Cibotium glaucum*), the Hawaiian tree fern (*Cooray and Mueller-Dombois, 1981*). Similar studies have found that feral pigs carry parasites such as fleas, lice,

hookworms, tapeworms and trichinae (which is a source of trichinosis in humans) as well as various diseases such as typhus, leptospirosis, tuberculosis, and brucellosis which are transmittable to humans (*Warner, 1959 – 1969*). Feral pigs also damage watersheds by disturbing topsoil with their rooting behavior. This behavior exposes soil to erosion, spreads root-rot fungi to native species, and creates the ideal habitat for invasive alien weed seeds that pigs transport either on their body or within their digestive tract. Studies conducted in similar wet forests in Hawai‘i have shown a direct correlation between the increase of alien plants and pig-induced soil disturbance (*Aplet et al, 1991*). Digging, rooting and wallowing by pigs also fallows the forest floor, creating rainwater receptacles which later serve as prime mosquito breeding areas (*Baker, 1979*). Avian malaria, a mosquito-borne disease, has played a significant role in the extinction of a number of native Hawaiian forest bird species. Any attempt to preserve the health and integrity of this vital watershed must first address the threats posed by feral ungulates.

Decades of research and resource management 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 fences. Once pigs are removed, native Hawaiian ecosystems are capable of recovering on their own (*Jacobi, 1976*). A five year study conducted in montane wet forest on the Big Island recorded a dramatic increase in native understory vegetation within an ungulate exclosure, while there was no reestablishment of these plants where pig activity continued outside the fence (*Katahira, 1980*). Another study compared the vegetation structure inside and outside a 13 year old pig exclosure located in Hawai‘i Volcanoes National Park. The forest inside the fence showed an increase in native species diversity and population size, while outside the fence the number and density of alien species increased over the period of the study (*Higashino and Stone, 1982*).

B. Project Description and Location

The Nature Conservancy’s Wainiha preserve is located miles from the nearest human development, in one the most remote and pristine areas of the state. The extremely rugged topography has isolated it from adjacent watersheds and human development near the mouth of the valley. Due to its’ relative inaccessibility, the native-dominated ecosystems in this area have remained sheltered from deforestation, overgrazing, introduction of numerous invasive weeds and other threats that have degraded ecosystems throughout Hawai‘i. Though damage done to the forests by Hurricanes ‘Iwa and ‘Iniki have given some invasive species a foothold in this area, continued conservation efforts will help safeguard the rich, abundant resources for future generations (*HCWCS, 2005*).

The topography of Wainiha makes it a natural fortress against feral ungulates. Several near-vertical pali two thousand feet tall, surround the valley on three sides, effectively restricting the movement of feral pigs and goats in and out of the management unit. The only route for these animals to enter the back of Wainiha is by following the narrow strip of traversable land along the stream corridor. TNC has conducted extensive topographical analysis, as well as both aerial and on-the-ground surveys, to identify the best location for

a protective fence that will span the stream corridor and connect the two pali on either side of the river to create an impenetrable barrier against feral ungulates. The fence will not continue across the stream but create barriers on either side of the gorge, effectively halting pig traffic through the area.

The upper drainages and forested slopes of Wainiha have been described as being dominated by a native tree canopy of *Metrosideros polymorpha* var. *glaberrima* (‘ōhi‘a), which average around 12 m (40 ft) in height. Occasionally in the less steep regions, *Syzygium sandwicensis* (‘ōhi‘a hā) becomes the dominant along with *Antidesma platyphyllum* (hame). Some open sections along the forested banks of streams can also be dominated by *Aleurites moluccana* (kukui) and interspersed with *Pisonia umbellifera* (pāpala kēpau). Common understory trees include *Psychotria mariniana* & *P. hexandra* (kōpiko), *Scaevola procera* (naupaka kuahiwi), *Kadua affinis* (manono), *Dubautia knudsenii* (na‘ena‘e), *Broussaisia arguta* (kanawao), and several species of *Myrsine* (kōlea). Along streams a predominance of Urticaceae occur, including *Boehmeria grandis* (‘ākōlea), several species of *Pipturus* (māmaki), and the monotypic genus *Touchardia* (olonā). Additional less common associate trees include *Ilex anomala* (kāwa‘u), along with several species of *Cheirodendron* (‘ōlapa), *Cyanea* (hāhā), *Melicope* (alani) and *Labordia* (kāmakahala). Understory riparian herbs and shrubs include many representatives of *Cyrtandra* (ha‘iwale) and *Peperomia* (‘ala‘ala wai nui). Common terrestrial sedges throughout this region include species of *Machaerina* (‘uki or ‘ahaniu) along with several species of vigorous sedges within the genus *Gahnia* (Wood, 2009). (See Exhibit D: Critical & Rare Resources map)

The composition of understory riparian ferns in Wainiha are similar to several of the adjacent north Kaua‘i wet valleys and include the dominant *Diplazium sandwichianum* (hō‘i‘o), along with *Christella cyatheoides* (kikawaiō), and several species of *Asplenium*, *Sadleria* (‘ama‘u), and *Cibotium* (hāpu‘u). In many areas, especially along the steeper drainage walls, the upper stream banks and ridges become dominated by the indigenous matting ferns *Dicranopteris linearis* (uluhe) and *Diplopterygium pinnatum* (uluhe lau nui). Occasionally one can observe the endemic matting fern, *Sticherus owhyhensis* (uluhe or unuhe), along the banks of streams. Epiphytic and lithophytic *Hymenophyllaceae* and *Grammitidaceae* are common in the forest understory and include several species of *Adenophorus* (wahine noho mauna). These delicately beautiful ferns are often matting the trunks of trees and are associated with epiphytic mosses. *Adenophorus*, along with tree-fern species of *Sadleria* represent distinct genera restricted to the Hawaiian Islands (Wood 2006a). It should be noted that the back of Wainiha Valley has a significant population of *Microsorium spectrum* var. *pentadactylum* (pe‘ahi or laua‘i), a maile-scented fern used traditionally for hula (Wood 2007).

Table 1: Checklist of Rare Taxa with Federal Status and Population Estimates
Wainiha Preserve, Kaua`i, Hawai`i

Note: Checklist alphabetical by genus. Symbols: C=Candidate for Listing; E=Endangered; EX=Extinct; H=Historical & no longer present; SOC=Species of Concern; T=Threatened. Flowering plants follow Wagner et al. 1999; pteridophytes follow Palmer 2003.

<i>GENUS</i>	<i>SPECIES</i>	<i>COMMON NAME</i>	<i>FEDST</i>	<i># OF PLANTS</i>
Adenophorus	periens L.E.Bishop	palai lā'au	end, E	ca. 32
Anoectochilus	sandvicensis Lindl.	jewel orchid	end, SOC	ca. 100+
Bidens	campylothecha Sch.Bip.	ko'oko'olau, ko'olau	end, SOC	ca. 500
Bidens	valida Sherff subsp. nov.	ko'oko'olau, ko'olau	end, SOC	ca. 100
Chamaesyce	remyi (A.Gray ex Boiss.) Croizat & O.Deg. var. kauaiensis (O.Deg. & Sherff) O.Deg. & I.Deg.	'akoko, koko, 'ekoko, kōkōmālei	end, C	ca. 500
Christella	wailele (Flynn) D.D.Palmer		end, SOC	ca. 30
Cyanea	recta (Wawra) Hillebr.	Hāhā	end, T	ca. 1000-1200
Cyrtandra	cyaneoides Rock	māpele, ha'iwale, kanawao ke'oke'o	end, E	ca. 500
Cyrtandra	kamoolaensis H. St. John	ha'iwale	end, SOC	ca. 500
Cyrtandra	kealiae Wawra	ha'iwale, kanawao ke'oke'o	end, T	ca. 500
Cyrtandra	limahuliensis	ha'iwale, kanawao ke'oke'o	end, SOC	ca. 100
Cyrtandra	oenobarba H.Mann	ha'iwale, kanawao ke'oke'o	end, C	ca. 50
Cyrtandra	pickeringii A.Gray	ha'iwale, kanawao ke'oke'o	end, SOC	ca. 100
Dubautia	knudsenii Hillebr. subsp. filiformis G.D.Carr	na'ena'e, kūpaoa	end, SOC	ca. 100
Hillebrandia	sandwicensis Oliv.	pua maka nui, aka'aka'awa (Kaua'i)	end, SOC	ca. 10
Isodendron	longifolium A.Gray	Aupaka	end, T	ca. 50
Kadua	elatior (H.Mann) W. L. Wagner & Lorence	'uiwi (Moloka'i), 'āwiwi	end, SOC	ca. 300+
Kadua	tryblium (D.R.Herbst & W.L.Wagner) W. L. Wagner & Lorence		end, SOC	ca. 2000+
Labordia	tinifolia A.Gray var. wahiawaensis H.St.John	Kāmakahala	end, E	ca. 4
Melicope	degeneri (B.C.Stone) T.G.Hartley & B.C.Stone	alani, alani kuahiwi	end, C	ca. 9
Melicope	paniculata (H.St.John) T.G.Hartley & B.C.Stone	alani, alani kuahiwi	end, C	ca. 5
Melicope	puberula (H.St.John) T.G.Hartley & B.C.Stone	alani, alani kuahiwi	end, C	ca. 10
Panicum	lineale H.St.John		end, SOC	ca. 1000+

<i>GENUS</i>	<i>SPECIES</i>	<i>COMMON NAME</i>	<i>FEDST</i>	<i># OF PLANTS</i>
Phyllostegia	helleri Sherff		end, SOC	ca.10
Phyllostegia	renovans W.L.Wagner		end, SOC	ca. 20
Plantago	princeps Cham. & Schltld. var. longibracteata H.Mann	laukahi kuahiwi, ale	end, E	ca. 200
Pritchardia	limahuliensis H. St. John	Loulu	end, SOC	ca. 50
Pritchardia	perlmanii Gemmill	Loulu	end, SOC	ca. 20
Schiedea	membranacea H.St.John		end, E	ca. 35
Stenogyne	kealiae Wawra		end, C	ca. 10
Tetraplasandra	kavaiensis (H.Mann) Sherff	‘ohe‘ohe	end, SOC	ca. 300
Zanthoxylum	dipetalum H.Mann	kāwa‘u, kāwa‘u kua kuku kapa	end, SOC	ca. 100

(Ken Wood, Wainiha Biological Survey, 2009)

A botanical survey along the proposed fence line, which is designed to protect the upper Wainiha Stream and forest region above ca. 365 m [1200 ft] elevation from the destructive presence of non-native feral ungulates, particularly pigs, was carried out in April 2009. There were no rare plant taxa observed on this proposed fence line (Wood, 2009). Seabird surveys conducted by the Kaua‘i Endangered Seabird Recovery Project during the 2009 nesting season documented the absence of any colonies along the fence alignment. The project supports the goals and objectives from Seabird Recovery plans outlined in the 2005 Newell Shearwater Five Year Plan (NESH Working Group, 2005), the 2005 USFWS Seabird Conservation Plan (USFWS, 2005) and the Department of Land and Natural Resources, Hawai‘is Comprehensive Wildlife Conservation Strategy (HCWCS, 2005).

The fence line passes through a 30–50% cover of *Metrosideros polymorpha* lowland wet forest. Riparian sections of stream bank where the fence line passes can be somewhat level to moderately steep and dominated by non-native understory trees of *Psidium guajava* and *Aleurites moluccana* and interspersed with common native tree components such as *Pisonia umbellifera*, *Antidesma platyphyllum* var. *hillebrandii*, *Ilex anomala*, *Psychotria mariniana*, and *Kadua affinis*. Moving further from the stream toward the valley walls, the proposed fence line rises up through very steep open slopes dominated by matting native ferns of *Dicranopteris linearis* & *Diplopterygium pinnatum* with occasional *Metrosideros* forest patches dominated by understory ferns of *Microlepia strigosa* & *Sphenomeris chinensis* (Wood, 2009). This area is wet, with an average annual rainfall of 160–200 inches. The soil on the banks of the Wainiha Stream are classified as Kolokolo extremely stony clay loam, which is found on stream bottoms with soils that are classified as rough mountainous land and described as “very steep land broken by numerous intermittent drainages” (Foote, et al, 1972).

The project area will be located in the Wainiha Preserve and will enclose approximately 7,050 ac of McBryde land, located in the Conservation District (TMK 4-5-8-001-001). Adjacent parcels are Kamehameha Schools (TMK 4-5-7-001-001) and State of Hawai'i (TMK 4-1-4-001-003), Robinson Family Partners (TMK 4-5-8-002-002 & 4-1-7-001-001). (See *Exhibit E: Vicinity & 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). The length of the fence shall be approximately 489 meters (.3 miles or 1,604 ft) in length. It will be 48 inches high and be constructed using hog wire fence fabric or standard hog panels 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 laid horizontally along the ground to prevent pigs from digging underneath. The skirting will be 48 inches wide and be made out of Bezial coated hog wire. (See *Exhibit B: Example of Fence Construction*)

A landing zone, used for the transportation of materials, will be located along the fence line requiring minimal additional clearing. The contractor will select a helicopter company to work with which will determine which airport will be utilized. The number of the trips required to construct the fence will be dependent upon the weight and amount of equipment and supplies which need to be flown to the work sight. It is estimated that 10 sling loads will be required to transport fence materials to the project site. (See *Exhibit F: Pig Control Map*)

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 will be the primary method of ungulate control employed throughout the fenced preserve. Circular silo traps will be constructed in areas showing high ungulate activity. These traps will be constructed of 1.5 meter high welded mesh walls, with an interior diameter of, about 4.5 meters. The door of the traps will be 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 F & G: 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 wherever possible. *(See Exhibit F: Pig Control)* In some cases, altering native vegetation may be necessary for either helicopter access or trap placement. Areas previously disturbed by pigs will be used for trap placement wherever possible. In previous uses this trap design has caused only minimal ground disturbance. *(See Exhibit G: Silo Trap and Feeder diagrams)*

To provide weather protection and safety for workers during natural resource management activities, up to 3 weatherports will be assembled. The weatherports will consist of a pre-fabricated weather shelter that is assembled on a raised wooden platform. The approximate size of the shelter will be 20 ft wide by 20 ft long and 8 ft high. The locations of these shelters will be carefully selected to minimize disturbance to native plants. Areas already converted to non-native grass and weeds by feral ungulates will be considered first. *(See Exhibits A & C: Project Location map & Weatherport example)*

Should radio communications prove difficult using the existing radio repeaters located near the United States Geological Survey (USGS) weather station at the summit of Mt. Wai‘ale‘ale and on La‘au Ridge, it might be necessary to place additional repeaters in the area. The radio repeaters would be solar powered and 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 and the exact foot print of the repeaters should not exceed 36 square feet. The locations will be selected for the installation of the radio repeaters, where they least impact the Native Forest and will avoid any rare or endangered plants.

C. Schedule

The project goal is to secure all necessary permits, including a conservation district use permit by the first quarter of Fiscal Year 11 (July 2010 – Sept 2010). The anticipated construction start date for this project would then be the second quarter of Fiscal Year 11 (Oct 2010 – Dec 2010) and all phases of the project will be completed within 12 months.

i. Fence Corridor Clearing

Clearing of vegetation along the fence corridor will be completed as the first action by the contractor. A 3 month time period has been allocated for this task.

ii. Fence Installation

Fence installation will immediately follow the corridor clearing. The entire process will be completed within 12 months. Fencing material will be transported to the site by helicopter and all construction 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 will occur in existing

clearings. Although the construction of the fence should take less than 12 months, due to unpredictable weather conditions that exist, 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 location create fewer opportunities for access than most other areas on the island of Kaua‘i. The work will be weather dependent and activity may not be continuous within the project time period.

iii. Weatherport Installation

The weatherport assembly will consist of a pre-fabricated weatherproof tent that is erected on a raised wooden platform. The approximate size of the shelter will be 20 ft wide by 20 ft long and 8 ft in height. Their location will be carefully selected to minimize disturbance to native plants. Areas converted to non-native grass and weeds by feral ungulates will be considered first. (*See Exhibit F: Pig Control map*)

iv. Inspections and Maintenance

The fence 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 semi-annual schedule. Biologists with expertise in the field of non-native vertebrates and invertebrates, as well as biologists with expertise in conducting auditory seabird surveys, will also be allowed to monitor the area.

v. Ungulate Control

Once fence construction has been completed intensive ungulate control activities will be undertaken. Monitoring protocols will be put into place to track the decline of the resident pig population, and detect the presence or absence of ungulates throughout the valley. Pigs will be dispatched on site and placed away from the stream corridor.

vi. Weed Control

Monitoring of invasive weeds will occur along the fence line and surrounding areas during routine maintenance inspections to assess plant regeneration. Other weed control activities will occur throughout the preserve to maintain the integrity of the ecosystem. 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 and in accordance with state and federal laws

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

McBryde has been a dedicated steward of Wainiha for well over a century, and in 2007 entered into a 10 year conservation agreement with The Nature Conservancy creating the state's third largest nature preserve. This preserve includes one of Kauai's largest river systems and is therefore vastly important to the mission of the Kaua'i Watershed Alliance in their preservation of watershed resources.

The fence line passes through a 30–50% cover of *Metrosideros polymorpha* lowland wet forest. Riparian sections of stream bank where the fence line passes can be somewhat level to moderately steep and dominated by non-native understory trees of *Psidium guajava* and *Aleurites moluccana* and interspersed with common native tree components such as *Pisonia umbellifera*, *Antidesma platyphyllum* var. *hillebrandii*, *Ilex anomala*, *Psychotria mariniana*, and *Kadua affinis*. Moving further from the stream toward the valley walls, the proposed fence line rises up through very steep open slopes dominated by matting native ferns of *Dicranopteris linearis* & *Diplopterygium pinnatum* with occasional *Metrosideros* forest patches dominated by understory ferns of *Microlepia strigosa* & *Sphenomeris chinensis* (Wood, 2009).

The fence alignment is located in the upper portion of Wainiha Valley, approximately 9.0–9.5 km from the coast where the area is wet, with an average annual rainfall of 160–200 inches. Here, the soils at and near the banks of the Wainiha Stream, are classified as Kolokolo extremely stony clay loam, which is found on stream bottoms subject to damaging flow. Away from the stream, as the elevation increases, the soils are classified as rough mountainous land, which is accurately described as “very steep land broken by numerous intermittent drainages” (Foote, et al, 1972). (See Exhibit H: Topography map)

Helicopters will be the primary means of access to the remote project area. There is no public access to the location. The McBryde parcel is landlocked by the Robinson parcel to the North and ground access is via permission from the Robinson Family Partners. Step over gates will allow access across the fenceline should it be needed. (See Exhibit A: Project Location and Exhibit B: Fence Examples) The closest paved government road is Wainiha Powerhouse Road, which ends at the McBryde Hydroelectric power generation plant, which is over 2 miles downstream from the project area. Neither public, Na Ala Hele nor any

other official trails are located near the project site. (See Exhibit E: Vicinity & Parcel map)

B. Flora and Fauna

The fence line passes through a 30–50% cover of *Metrosideros polymorpha* lowland wet forest. Riparian sections of stream bank where the fence line passes can be somewhat level to moderately steep and dominated by non-native understory trees of *Psidium guajava* and *Aleurites moluccana* and interspersed with common native tree components such as *Pisonia umbellifera*, *Antidesma platyphyllum* var. *hillebrandii*, *Ilex anomala*, *Psychotria mariniana*, and *Kadua affinis*. Moving further from the stream toward the valley walls, the proposed fence line rises up through very steep open slopes dominated by matting native ferns of *Dicranopteris linearis* & *Diplopterygium pinnatum* with occasional *Metrosideros* forest patches dominated by understory ferns of *Microlepia strigosa* & *Sphenomeris chinensis* (Wood, 2009). While native fauna are present in the project area, surveys have indicated that the scope and scale of fence construction activities will have no detrimental impact on their populations.

Forest bird species noted in the project area include Kaua‘i ‘Amakihi (*Hemignathus kauaiensis*), ‘Apapane (*Himatione sanguinea*), and ‘Elepaio (*Chasiempis sandwichensis*). No nest sites were detected during surveys of the fenceline. Ground nesting sea birds including the White-tailed Tropicbird (*Phaethon lepturus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell Shearwater (*Puffinus newelli*) also nest in Wainiha, however no nests sites were detected along the fenceline during the 2009 nesting season. The location and topography of the proposed fenceline insures that Native Hawaiian fish, insect, mollusk, and waterfowl species living in the Wainiha stream corridor will not be impacted by the fence construction. The fence will not continue across the stream but create barriers on either side of the gorge, effectively halting pig traffic through the area but not altering the stream in any way. (See Exhibit B: Fence Examples)

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 in October 2009, by Samuel M. Gon III, Ph.D., the Senior Scientist and Cultural Advisor with The Nature Conservancy Hawai‘i. A copy of his survey is included as part of the supporting documents for the Environmental Assessment. The Executive Summary is as follows:

“A review of pertinent literature and records, extracts from recently conducted interviews with regional cultural

practitioners and elders, and previous investigations by the State Historic Preservation Division (SHPD), and contracted archeologists on sites, features and practices of cultural significance at the proposed fence route in the Wainiha Preserve, Wainiha Ahupua‘a, Hanalei District, Island of Kaua‘i, reveals that there are no archeological sites within the proposed area, and that only lands several kilometers *ma kai* (seaward) of the site include significant sites. This corroborates the described geography of historical activities in the region, concentrated in arable valley bottoms and lower elevations near the coast, and minimal above Lā‘au Ridge. The lands of the proposed fence area bear significance as the *wao nahele* (forested zone) containing native plants and animals of great cultural value, and as *wahi pana* (storied places) tied to the *Mū-‘ai-mai‘a* (the banana-eating Mū people) and the *menehune*. Persistence of *mai‘a* (banana) growing in the remotest parts of upper Wainiha is traditionally pointed to as evidence of past habitation of the *Mū*. Otherwise, the upper valley retains very strong native vegetation, but with the start of significant invasion by alien plants and animals. The proposed conservation actions (fencing and ungulate control), designed to protect the native forest and the native species that reside within it, will enhance the cultural value of the lands and will exercise care to retain traditional access, such as to gather native plant material for hula and other Hawaiian arts.”

ii. Archaeological Assessment

An archaeological assessment has been completed for the project in October 2009 by T.S. Dye & Colleagues, Archeologists, Inc. A copy of this survey is included in the supporting documents with the following summation of their findings:

“This document presents the results of an archaeological survey of proposed fence lines and other facilities associated with an animal control fencing project in upper Wainiha Valley. No historic sites were found in the proposed fence area and no historic properties will be affected by the animal control fence project.”

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 forests and cliffs in and around this area support a diverse assemblage of native forest birds, waterfowl, and ground-nesting seabirds. Some of these birds are federally listed as endangered species or candidates for listing as endangered species.

Over 1,500 acres of the Wainiha preserve have been classified as critical habitat for *Cyrtandra cyanooides*. This implies that this endangered species is found in the project area and that the area provides suitable habitat which is essential for species recovery. The valley also contains existing populations and suitable habitat for several other endangered species. Included on Table-2 are 3 federally listed *endangered* species, 2 species listed as *threatened*, 5 *candidates* for the endangered species list, and 4 more listed as *species of concern*. (See Exhibit D: *Critical & Rare Resources map*)

Table- 2 Critical Habitat within the Wainiha Valley Protective Fence Project Area

Scientific Name	Common Name
<i>Phyllostegia helleri</i>	
<i>Melicope puberula</i>	Alani
<i>Cyrtandra limahuliensis</i>	Ha`iwale, Kanawao, Ke`oke`o
<i>Stenogyne kealiae</i>	
<i>Adenophorus periens</i>	
<i>Chamaesyce remyi</i> var <i>kauaiensis</i>	`Akoko, Koko, Kokomalei
<i>Cyrtandra oenobarba</i>	Ha`iwale, Kanawao, Ke`oke`o
<i>Lentipes concolor</i>	`O`opu Alamo`o
<i>Awaous guamensis</i>	`O`opu Nakea
<i>Sicyopterus stimpsoni</i>	`O`opu Nopili
<i>Anas wyvilliana</i>	Hawaiian Duck, Koloa
<i>Pterodroma sandwichensis</i>	Hawaiian Dark-Rumped Petrel, `Ua`u
<i>Atyoida bisulcata</i>	`Opaekala`ole

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

Natural water collection and storage is the most important resource attribute within the project area. This area provides water for a hydroelectric power plant in Wainiha valley, owned by McBryde Sugar Company, Limited. The river also provides water for small independent diversified agriculture, including Kalo production in the lowest portion of the 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 7,050 ac of the Wainiha. Natural water collection is an essential function 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 receive water from the eastern Alaka‘i.

The proposed fence will protect the existing native lowland wet forest, therefore maintaining the ability of Wainiha to collect and retain rainfall as well as provide consistent, perennial stream flow to the lower valley. The exclusion of feral pigs from the remote upper valley will allow native vegetation to regenerate in degraded areas. The protective fence will stop the continued damage being caused by feral pigs such as: spreading of invasive species i.e. strawberry guava and aggressive grasses, harm to Hawaiian forests and streams by 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 preserve the project area’s ability to soak up rainfall and mitigate the effects of flood and drought cycles while providing clean, consistent stream flow. Preservation of the structure and function of the Wainiha river watershed is required in order to maintain biodiversity within the river ecosystem, ensure adequate water supply for human uses downstream, and ultimately protect coastal reefs and marine resources from siltation.

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.

This project will protect and allow for the recovery of natural communities and their constituent native species within the Wainiha preserve. The biological diversity and cultural integrity of this area, as it exists today, will be preserved. Contained within the project area are several vegetative classifications including Native Wet Cliff Vegetation, Closed ‘Ōhi‘a Forest, Native Wet Forest and Shrubland, and Open ‘Ōhi‘a Forest (*Hawai‘i GAP Landcover Analysis, 2000*). Critical Habitat for 1 endangered plant species also exists within the project area (*Critical Habitat, 2004*) and two other endangered species have been documented within the project area (See Table-2). Of the 222 native plant species naturally occurring within the Wainiha Preserve region, 177 are endemic and 45 are considered indigenous. The Wainiha Preserve is prime habitat for 63 Kaua‘i single island endemic (SIE) taxa which is 28% of the entire 225 SIE taxa unique to Kaua‘i. (*Wood, 2009*). Common forest bird species include Kaua‘i ‘Amakihi (*Hemignathus kauaiensis*), ‘Apapane (*Himatione sanguinea*), and ‘Elepaio (*Chasiempis sandwichensis*). Ground nesting sea birds including the White-tailed Tropicbird (*Phaethon lepturus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell Shearwater (*Puffinus newelli*) also nest in Wainiha. The Wainiha

River itself is home to a number of native Hawaiian species of fish, insects, mollusks and waterfowl, including the endangered Koloa duck (*Anas wyvilliana*).

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 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 weatherport foot prints are very small; they will be carefully sited and will not have a lasting impact. There will be some trampling of the vegetation during installation.

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 fences for over 10 years has been negligible. Any incidental weed introductions along the fence corridor will be controlled during routine fence maintenance which will be done on a semi-annual basis.

The biological surveys found no nesting colonies for ground nesting sea birds along either section 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 used. The top of the fence will be flagged to prevent birds from flying into it. (*See supporting documents for Biological Survey*)

Although the project area is very remote, located completely on private land, with no access, there are culturally significant native flora and fauna. The construction of the fence will not significantly influence access to the area for cultural purposes and a step over access will be provided along the fence line. (*See Exhibit F: Pig Control map*)

V. PROPOSED MITIGATION MEASURES

A. Vegetation and Soil Disturbance

The fence and placement of weatherports 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 weatherports have small footprints, therefore keeping ground disturbance to a

minimum. There were no rare plant taxa observed on this proposed fence line (*Wood, 2009*).

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 have an impact of no more than one half an acre of the total 3,700 acres of the project area. After clearing, the fence material will be dropped by helicopter at intervals 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 subject to erosion. 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 on a semi-annual basis.

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, 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 on a semi-annual basis. Funding will be allocated for this action. 3) At the completion of construction and installation, all rubbish and waste will be removed from work sites.

C. 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 and the top of the fence will be flagged, 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. 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 either the Division of Forestry and Wildlife Kaua‘i Branch, Biologist or Kauai Seabird HCP Office, as appropriate, will be notified and consulted.

D. Streams

The proposed fence alignment will not cross any streams. The fence will tie into a steep, cliff section on both sides of Wainiha River. Mitigation measures inherent to stream crossing fence design are not applicable. *(See Exhibit B: Fence Examples*

E. Cultural Access

The project area is very remote and construction of the fence will not impact access to the area for cultural purposes. 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 relevance of the area which will be specified in any contracts related to the project. Step overs will be included in the fence construction. *(See Exhibit B: Fence Examples)*

VIII. FINDINGS AND REASONS SUPPORTING THE DETERMINATION

The environmental impacts of the Wainiha Valley 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 the Wainiha Preserve from damage by feral pigs and invasive plants. This project will enhance the protection of the project area with minimal loss of common plants along the fence lines and initiate more intensive monitoring of resources.

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

The upper Wainiha Valley contains intact lowland wet forests, a diverse collection of endemic plants, and important habitat for ground nesting seabirds such as the Newell Shearwater and Hawaiian Petrel. The area functions as an important watershed catchment and storage area for the entire Wainiha watershed. 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 native lowland wet forest as well as watershed will, in effect, reduce the destruction of nonrenewable resources 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. There will be step overs along the fence line for access.

5. Substantially affects public health.

The project will not affect public health. Potential positive impacts to public health are: improved water quality, more consistent water quantity, reduced potential for destructive flooding during heavy rain events and reduced harmful bacteria levels.

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

The remoteness and rugged terrain of the project area in addition to the fact that the project is being done on private land, rules out 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 watershed function. This project requires the clearing of common native plants from along the fence alignment, and some short-term soil disturbance over an area of less than half an acre. However, this activity is necessary to protect the integrity of the ecosystem (approximately 7,050 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 one-half acre relative to the larger area of approximately 7,050 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. 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 10 species that are either currently listed, or are candidates for listing, as threatened or endangered by enclosing their habitat within the management area and addressing their primary threats.

10. Detrimentially 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. The distance to the nearest residence is approximately 6 to 8 miles.

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 Wainiha Preserve, in an environmentally sensitive area that includes freshwater streams, native lowland wet forest; however, the intent of the project is environmental protection of this habitat. The foot print of the protective fence is very minimal, at less than one-half acre. The fence will not continue across the stream but create barriers on either side of the gorge, effectively halting pig traffic through the area but not altering the stream in any way. 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 Wainiha Preserve, the geography of which would only allow the proposed fence to be visible from the air.

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).

X. EA PREPARATION

This draft Environmental Assessment is being prepared in consultation with the land owner, McBryde Sugar Company, Limited. This document, and all supporting documents are available on the Hawai'i Association of Watershed Partnerships at www.hawp.org.

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