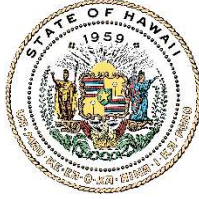
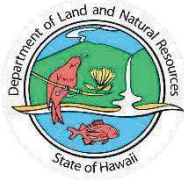


JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII'
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA

P.O. BOX 621
HONOLULU, HAWAII 96809

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
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DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES
ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

November 1, 2024

Mary Alice Evans, Director
Office of Planning and Sustainable Development
State of Hawai'i
P.O. Box 2359, Honolulu, Hawaii
96804-2359

Dear Director:

With this letter, the Department of Land and Natural Resources hereby transmits the final environmental assessment and finding of no significant impact (FEA-FONSI) for the "Upper Waiakea Forest Reserve Fenceline Clearing and Access" project situated at TMK: (3) 2-4:008:001, in the South Hilo District on the island of Hawaii for publication in the next available edition of the Environmental Notice. The Department of Land and Natural Resources did not receive any public comments during the 30-day public comment period on the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI). If there are any questions, please contact Emma Yuen at (808) 366-4788 or Emma.Yuen@hawaii.gov.

Sincerely, *DGS*


DAWN N. S. CHANG
Chairperson

From: webmaster@hawaii.gov
To: [DBEDT OPSD Environmental Review Program](#)
Subject: New online submission for The Environmental Notice
Date: Thursday, October 31, 2024 10:18:24 AM

Action Name

Upper Waiakea Forest Reserve Fenceline Clearing and Access Project

Type of Document/Determination

Final environmental assessment and finding of no significant impact (FEA-FONSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district

Judicial district

South Hilo, Hawai'i

Tax Map Key(s) (TMK(s))

(3) 2-4:008:001

Action type

Agency

Other required permits and approvals

Conservation District Use Permit

Proposing/determining agency

Department of Land and Natural Resources

Agency jurisdiction

State of Hawaii

Agency contact name

EMMA YUEN

Agency contact email (for info about the action)

EMMA.YUEN@HAWAII.GOV

Email address for receiving comments

EMMA.YUEN@HAWAII.GOV

Agency contact phone

(808) 366-4788

Agency address

1151 Punchbowl St
Rm 325
Honolulu, HI 96813
United States

[Map It](#)

Is there a consultant for this action?

No

Action summary

The overall purpose of the road and grubbing project is to facilitate native ecosystem preservation of the Upper Waiakea Forest Reserve in the South Hilo District of Hawaii Island. To gain access and clear for the construction of a hooved-animal-proof fence that will protect approximately 850 acres, the Division proposes creating a road and also clearing a section of the fenceline with a bulldozer. The Division is avoiding impact to sensitive ecosystems by locating the proposed activities on disturbed areas, lava, or areas that have forests that contain lower native biodiversity. The proposed road corridor is approximately 2.52 miles long. The road will be installed in a remote area of the Upper Waiakea Forest Reserve that borders the Puu Makaala Natural Area Reserve.

Reasons supporting determination

HAR Section 11-200.1-13 requires an agency to determine whether an action may have a significant effect on the environment, by considering every phase of a proposed action, the expected impacts, and the proposed mitigation measures, including:

(1) Irrevocably commit a natural, cultural, or historic resource;

This project avoids significant natural, cultural, or historic resources by siting the project primarily on disturbed areas, lava, or areas that have forests that contain lower native biodiversity.

(2) Curtail the range of beneficial uses of the environment;

This project will not curtail beneficial uses such as watershed values or native habitat because it is a relatively small area and is sited in an area with less biodiversity. Instead, this project is meant to improve beneficial uses of the environment by improving access for natural resource management crews.

(3) Conflict with the State's environmental policies or long-term environmental goals established by law;

This project does not conflict with the State's environmental policies or goals, rather it supports the goal to protect and manage watershed forests.

(4) Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State;

This project will not have an adverse effect on the economic welfare, social welfare or cultural practices.

Rather, it seeks to improve welfare and cultural practices by protecting watershed forests which provide many economic services and also contain plants and animals important to the perpetuation of cultural practices.

(5) Have a substantial adverse effect on public health;

This project will benefit public health because it will facilitate a project to remove hooved animals from watershed forests. These hooved animals are known to carry and spread various diseases such as Leptospirosis and nontuberculous mycobacterial lung disease.

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities;

This project is in a remote location and will not impact populations or facilities.

(7) Involve a substantial degradation of environmental quality;

This project will help natural resource managers improve environmental quality by responding to wildfires and removing invasive species.

(8) Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions;

This is a small and independent project that does not affect or commit larger actions.

(9) Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat;

The location of this project seeks to avoid rare, threatened, or endangered species, or their habitat and will include biological surveys to confirm that no rare species will be impacted.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels;

This project does not affect air or water quality or ambient noise levels as it is in a remote location.

(11) Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

This project will not have a substantial adverse effect on or likely to suffer damage by being located in an environmentally sensitive area because it is located in an area the is primarily a low-biodiversity lava flow.

(12) Have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in county or state plans or studies;

This project is very remote and will not be visible from any important view planes.

(13) Require substantial energy consumption or emit substantial greenhouse gases.

This project will use negligible amounts of energy and will emit negligible greenhouse gases where small amounts of vegetation will be cleared.

Attached documents (signed agency letter & EA/EIS)

- [FEA-Kipuka-Koa.pdf](#)
- [FEA-Publication-Form-Upper-Waiakea-part-1-signed.pdf](#)

Shapefile

- The location map for this Final EA is the same as the location map for the associated Draft EA.

Action location map

- [Fence_Buffer-1.zip](#)

Authorized individual

Emma Yuen

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

FINAL ENVIRONMENTAL ASSESSMENT

UPPER WAIAKEA

FOREST RESERVE

FENCELINE CLEARING AND ACCESS PROJECT

In accordance with

CHAPTER 343, HAWAII REVISED STATUTES

Proposed by:

State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
Forest Reserves System

Project Name Upper Waiakea Forest Reserve
Fenceline Clearing and Access

Project Location Upper Waiakea, South Hilo District, Hawai‘i
TMK: (3) 2-4:008:001

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

Approving Agency State of Hawai‘i
Department of Land and Natural Resources

Parties Consulted Federal: U.S. Department of Interior
Fish and Wildlife Service
National Park Service
USGS, Biological Resources Division

State: Department of Land and Natural Resources
Historic Preservation Division
‘Aha Moku Hawaii Island Councilmember
Office of Hawaiian Affairs
Senator Lorraine Inouye
Representative Jeanne Kapela

County: Planning Department

Private: Bishop Museum
Conservation Council for Hawai‘i
Earthjustice Legal Defense Fund
Hawai‘i Audubon Society
Native Hawaiian Legal Corporation
Sierra Club, Moku Loa Group
The Nature Conservancy of Hawai‘i
Three Mountain Alliance Watershed Partnership

Permits Required Conservation District Use Permit
HRS Section 6E Consultation – No Impact to Historic Properties

Project Description

Summary:

The overall purpose of the road and grubbing project is to facilitate native ecosystem preservation of the Upper Waiakea Forest Reserve in the South Hilo District of Hawaii Island. To gain access and clear for the construction of a hooved-animal-proof fence that will protect approximately 850 acres, the Division proposes creating a road and also clearing a section of the fenceline with a bulldozer. The Division is avoiding impact to sensitive ecosystems by locating the proposed activities on disturbed areas, lava, or areas that have forests that contain lower native biodiversity. The proposed road corridor is approximately 2.52 miles long. The road will be installed in a remote area of the Upper Waiakea Forest Reserve that borders the Puu Makaala Natural Area Reserve. The fenceline proposed to be cleared is approximately 2.84 miles long. Approximately 0.32 miles of this fence will be along an existing old road, and another

1.38 mile section will be along lava flows, with the remainder (1.14 miles) will be through low-diversity native forest. Lengths are approximate and subject to change.

In addition to saving time for conducting natural resource management such as invasive species control and tree planting, this road will reduce the amount of time needed to respond to emergencies like wildfires in this area. Positive social impacts from this project include protection and restoration of a unique Hawaiian forest; a new access into the Reserve for hiking and birdwatching, education and research, and the preservation of a remnant of our rapidly disappearing natural heritage.

The project area is located entirely within the boundaries of the Upper Waiakea Forest Reserve. All project lands are State owned and within the Conservation District, Protected Subzone. On June 26, 2024 the DLNR approved an exemption for ungulate fencing work to be done within the reserve. This fencing project will preserve approximately 850 acres or priority watershed. Ungulate fencing is part of the DLNR's EA exemption list as concurred by the environmental council on November 20, 2020.

Kipuka Koa Unit

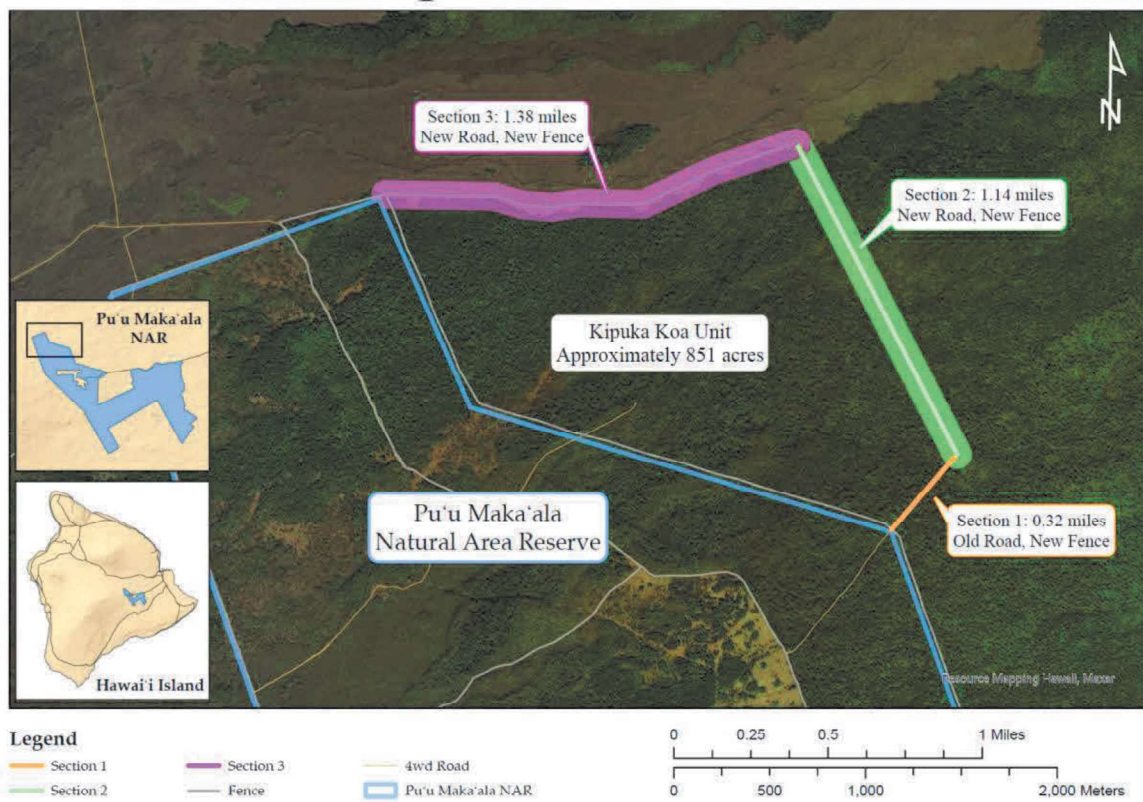


Figure 1. Location of the proposed project in the Upper Waiakea Forest Reserve

The publication of an environmental assessment is triggered by the proposed grubbing activity to bulldoze an area to clear for a fence line. Only grubbing projects that disturb less than an acre are candidates to be exempt from the preparation of an environmental assessment, per the DLNR exemption list reviewed and concurred by the Environmental Council on March 3, 2020. Constructing fences is included in the exemption list, and the August 8, 2024 *The Environmental Notice* published a list of exemption notices, which included this project.

After the drafting of the fence exemption notice, the Division determined that the project would be more efficient if a road was constructed and portions of the fenceline were cleared with a bulldozer, necessitating this environmental assessment. The proposed activities are anticipated to occur in the second half of 2024. Funding needed for this project is minimal and comes from existing State general funds allocated to the salaries of the Division's heavy equipment operators.

Affected Environment

This project is on the eastern slope of Mauna Loa, from approximately 5,200 feet to 5,700 feet elevation. Rainfall averages 100 inches a year. Most of the Reserve is vegetated by a mosaic of different aged stands of 'ōhi'a (*Metrosideros polymorpha*) forest on various substrates. The upper boundary where 1.38 miles of new road is proposed is covered by the historic 1942 flow; these are in the early stages of forest development.

Flora:

There is little vegetation in the northern area proposed for the road because it is sited on a recent lava flow. The vegetation in the eastern area proposed to be cleared via bulldozer is predominantly composed of lower biodiversity native vegetation with uluhe (*Dicranopteris linearis*) understory and sparse 'ōhi'a (*Metrosideros polymorpha*) overstory. While no rare species are known from the project site, Appendix A lists rare species that are extant or recoverable in the entire adjacent Puu Makaala Natural Area Reserve, which will benefit from the facilitated access and protection afforded by this project.

Fauna:

There are likely very few native animals in the area proposed for the road because it is sited on a recent lava flow and in areas of lower biodiversity. The project will avoid damage to native birds by avoiding destruction of large native trees. Native invertebrates may be impacted during the clearing of the bulldozed section. See Appendix B for a list of bird species and invertebrate species recorded from the adjacent Puu Makaala Natural Area Reserve. The adjacent Natural Area Reserve provides habitat for seven honeycreepers (Subfamily Drepanidinae) endemic to the Hawaiian Islands. These include five endangered species: Hawai'i creeper (*Oreomystis mana*), 'i'iwi (*Vestiaria coccinea*), Hawai'i 'ākepa (*Loxops coccineus*), 'akiapōlā'au (*Hemignathus munroi*) and 'ō'ū (*Psittirostra psittacea*), a species which has not been sighted in the area since the mid-1980's and may be extinct. The non-endangered honeycreepers found in the project area include: 'apapane (*Himatione sanguinea*), and Hawai'i 'amakihi (*Hemignathus virens*). Other native forest birds reported from the project area include, 'elepaio (*Chasiempis sandwichensis*), and 'ōma'ō or Hawaiian thrush (*Myadestes obscurus*).

Although little is known about them, the 'opeapea, or Hawaiian bat (*Lasiurus cinereus semotus*), and may use trees within the Reserve as roosting sites. The proposed bulldozing of the fenceline section will occur outside of bat pupping season (April to June) to avoid damaging roosting trees.

Feral pigs are common throughout the NAR, especially in *kipuka* with well-developed soils. Feral, mouflon and hybrid sheep are also present.

Feral dogs and cats, rats, mice, and mongoose are also found in the Reserve.

Significant & Sensitive Habitats:

The areas proposed for road building and grubbing are carefully designed to avoid significant or sensitive habitats.

Many other locations within the Reserve that this project will benefit can be considered a sensitive habitat, particularly for native forest birds and rare plants.

Archaeological Sites:

No archaeological sites have been observed in the areas where the proposed activity would take place. The road construction proposed will take place on recent lava flows and very remote sections of forest minimizing the likelihood that historic sites will be affected. A review of historical literature does not indicate the area proposed for bulldozing contains any historic features as it is a remote wilderness area. This project proposal has been sent to the State Historical Preservation Division to concur with the Division's recommendation that no historic properties will be impacted.

Impacts Resulting from Project

Short Term Impacts:

The primary short-term environmental impacts from this project will be those associated with improvement of roads and grubbing. This project requires the construction of approximately 2.52 miles (13,306 feet) of road. The project will also include the grubbing of 7.3 acres of vegetation to clear a path no more than 24 feet wide. This will include the use of a bulldozer, with a blade of 16 feet wide, to assist with the grubbing. This clearing will cause soil disturbance and include vegetative clearing, digging, noise disturbance from machines and power tools. The crew will be required to follow the contract sanitation protocol which requires dedicated gear to prevent the spread of alien plant species and rapid 'ōhi'a death *Ceratosystis* fungus. Increased human activity in the area, such as from work crews camping on site, will be necessary. This increase in activity may disturb native birds and/or bats in the immediate vicinity.

The area proposed to be grubbed contains sparsely situated 'ōhi'a trees. This project may increase the spread of rapid 'ōhi'a death if trees are wounded or their roots are crushed by heavy machinery. The project will minimize this damage by avoidance of trees and sanitizing machinery to reduce spread of the fungus. Additionally, the overall project will protect a much larger area from feral pigs and other hooved animals, which have been known to dramatically increase 'ōhi'a mortality by wounding trees and creating openings for infection. In fact, fencing and hooved animal removal is the top recommended landscape-scale action to prevent rapid 'ōhi'a death.

Long Term Impacts:

Proceeding with the activities proposed in this plan will likely lead to an increase in human traffic in this remote area. This, and the unavoidable disturbance associated with fence and road construction create the potential for negative effects. Most significant are greater potential for inadvertent introduction of new weed species, and further spread of non-native plants already present in the Reserve.

Constructing new roads and cleared areas may affect the "wilderness" character of this remote area. However, a new road may be beneficial by increasing the ability to manage this area for native ecosystem protection. In addition to saving time for routing natural resource management such as invasive species control and tree planting, this road will reduce the amount of time needed to respond to emergencies like wildfires in this area.

Long-term benefits of this project include improved access to manage the fenced area. The fenced area is anticipated to have high levels of regeneration. Hooved animals within this area have resulted in the destruction of much of the natural forest understory. Native tree seedlings, herbaceous ground cover and ferns have been damaged. The result has been an increase in sunlight reaching the forest floor. These conditions have favored the establishment of non-native grasses, which compete with and prevent the establishment of native plant seedlings. Long term studies of similar areas (particularly in Hawaii Volcanoes National Park) show that native plants can often reestablish themselves and shade out non-native competitors if animal disturbance is removed.

Additionally, the fenced, animal free areas will be available as outplanting sites for rare and endangered species. At present, efforts to reintroduce and enhance populations of species appropriate to this area have been hampered by the presence of hooved animals.

Excluding pigs will also remove the primary vector by which seeds of the most invasive weeds are being spread. Some of the most invasive weed threats are species which are readily distributed in the droppings of pigs that have eaten the fallen fruit.

Climate change impacts:

The main climate change impact will be the removal of approximately 7.3 acres of vegetation through bulldozing to clear a fenceline corridor. The overall project is anticipated to reduce the loss of the native forest across 850 acres, potentially offsetting the loss of carbon being stored by cleared vegetation.

The project will result in minimal emissions from the operation of heavy machinery during the course of approximately two-five weeks. However, it is anticipated that the project will overall reduce emissions because it will create a more direct access to the Reserve, and there will be a reduced reliance on helicopters to ferry staff and materials to the region since more of the Reserve will be easily accessed with a vehicle.

Since ancient times, native Hawaiian culture observed that “hahai no ka ua i ka ulu la’au” - “the rain follows the forest”. Protecting forest watersheds is the most cost effective and efficient way to absorb rainwater and replenish ground water. Robust watersheds also reduce climate change impacts by absorbing greenhouse gases and reducing flooding, erosion, and siltation of reefs and fisheries. The forests and their ability to capture water depend on the protection provided by protecting watersheds. Building this road and clearing a fenceline will enable more efficient management of this reserve. It will also help DLNR reach its 30 by 30 watershed target of protecting 30% of Hawaii’s priority watershed forests by 2030. Additionally this project could greatly reduce greenhouse gas emissions if a wildfire breaks out in the region, and crews are able to respond to it faster because there is road access.

Socio-economic impacts:

Minimal costs are associated with this project. They include paying bulldozer operators and vehicle operating expenses. These monies will come from normal operating funds, which have already been obligated.

Cultural impact assessment:

Pre-contact Hawaiian use of upland forests such as those in Upper Waiakea and Puu Makaala was likely limited to activities such as gathering plant materials, and bird-catching. A cultural study has been prepared and is included in this Environmental Assessment as Appendix C. Based on the study, this project is not anticipated to have any negative effects on cultural activities. This determination was made by analyzing the ethnographic and oral history interviews, as well as historical cultural source materials listed in the cultural study. The project is anticipated to benefit the native Hawaiian plants and birds traditionally gathered in this region. It also is anticipated to create public access to this area.

Mitigation Measures

As stated earlier, the major impacts from this project are vegetation related. Damage to living native plants will be restricted to within the road/clearing corridors, and no living trees greater than 12 inches diameter will be cut. No legally protected plant species have been observed near the proposed road or clearing corridor, but an additional reconnaissance of all corridors will be made before work begins. Significant plants will be marked with flagging, and/or alignments will be shifted to avoid damage.

Weed and rapid ‘ōhi‘a death introduction will be minimized by ensuring that all heavy equipment, tools, boots, etc. have been cleaned before entering the project area. The long-term management plan for the Reserve includes regular monitoring and control of newly introduced species of non-native plants along fence lines and access roads.

No archaeological sites have been seen within the area to be disturbed by this project. Road and clearing alignments are chosen to utilize previously disturbed or barren areas where ever possible. Should any sites be discovered during construction, work will be halted and the proper authorities notified.

Alternatives to Project

Alternative #1:

Proceed with the project. This would have multiple benefits for natural resource management of the Reserve. In addition to saving time for routine natural resource management such as invasive species control, this road will reduce the amount of time needed to respond to emergencies like wildfires in this area. This road would significantly decrease staff time and cost to access this area, therefore increasing capacity for natural resource management crews to dedicate to protecting this area.

Clearing a section of the fenceline with a bulldozer will also reduce the difficulty and cost of fence construction, as well as aid the ongoing maintenance of these fences.

This is the preferred alternative, as it the most feasible.

Alternative #2:

Construct the road, but do not bulldoze the area proposed for the fenceline. Without the option of clearing a section of fenceline via bulldozer, the Division would route the fenceline alongside an existing road that follows the southern end of the lava flow (See figure 1). Since the existing road does not follow a straight line, that would result in a longer fenceline, increasing the project costs. This option would also reduce the amount of area protected from hooved animals by approximately 130 acres.

Alternative #3:

No action. Without the road, there would be significantly higher costs to the management of the Reserve. Staff and contractors may need to rely more heavily on helicopters, increasing use of fuel and greenhouse gas emissions, noise disturbance, and further exposing staff to safety risks of aviation. Staff would not be able to quickly access this area to respond to wildfires.

The impacts of not using a bulldozer to clear the fenceline are discussed in Alternative #2.

Significance Criteria

HAR Section 11-200.1-13 requires an agency to determine whether an action may have a significant effect on the environment, by considering every phase of a proposed action, the expected impacts, and the proposed mitigation measures, including:

(1) Irrevocably commit a natural, cultural, or historic resource;

This project avoids significant natural, cultural, or historic resources by siting the project primarily on disturbed areas, lava, or areas that have forests that contain lower native biodiversity.

(2) Curtail the range of beneficial uses of the environment;

This project will not curtail beneficial uses such as watershed values or native habitat because it is a relatively small area and is sited in an area with less biodiversity. Instead, this project is meant to improve beneficial uses of the environment by improving access for natural resource management crews.

(3) Conflict with the State's environmental policies or long-term environmental goals established by law;

This project does not conflict with the State's environmental policies or goals, rather it supports the goal to protect and manage watershed forests.

(4) Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State;

This project will not have an adverse effect on the economic welfare, social welfare or cultural practices. Rather, it seeks to improve welfare and cultural practices by protecting watershed forests which provide many economic services and also contain plants and animals important to the perpetuation of cultural practices.

(5) Have a substantial adverse effect on public health;

This project will benefit public health because it will facilitate a project to remove hooved animals from watershed forests. These hooved animals are known to carry and spread various diseases such as *Leptospirosis* and nontuberculous mycobacterial lung disease.

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities;

This project is in a remote location and will not impact populations or facilities.

(7) Involve a substantial degradation of environmental quality;

This project will help natural resource managers improve environmental quality by responding to wildfires and removing invasive species.

(8) Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions;

This is a small and independent project that does not affect or commit larger actions.

(9) Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat;

The location of this project seeks to avoid rare, threatened, or endangered species, or their habitat and will include biological surveys to confirm that no rare species will be impacted.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels;

This project does not affect air or water quality or ambient noise levels as it is in a remote location.

(11) Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

This project will not have a substantial adverse effect on or likely to suffer damage by being located in an environmentally sensitive area because it is located in an area that is primarily a low-biodiversity lava flow.

(12) Have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in county or state plans or studies;

This project is very remote and will not be visible from any important view planes.

(13) Require substantial energy consumption or emit substantial greenhouse gases.

This project will use negligible amounts of energy and will emit negligible greenhouse gases where small amounts of vegetation will be cleared.

Expected Determination

The Department proposes a Finding of No Significant Impact for this project.

Findings and Reasons Supporting Expected Determination

The intent of this project is to benefit native species in the project area. Staff will carefully survey the road and areas proposed to be cleared to prevent destruction of rare species. Additionally, the area proposed to be cleared is already primarily non-native forest and will be routed to prevent damage to the remaining native trees present in that section.

The short term damage to vegetation as a result of clearing will be offset by the improved management access for natural resource crews. These actions will enable the crews to benefit the native ecosystems.

Environmental Assessment Prepared By:

Emma Yuen
Native Ecosystems Program Manager
Division of Forestry and Wildlife
1151 Punchbowl St. Honolulu, HI 96813
E-mail: Emma.Yuen@hawaii.gov
Phone: (808) 587-4170

Sources of Information:

Puu Makaala Management Plan and Environmental Assessment, 2013

He Moolelo Aina: A Cultural Study of the Puu Makaala Natural Area Reserve, Districts of Hilo and Puna, Island of Hawai'i – prepared for the Division of Forestry and Wildlife by Kumu Pono Associates, 2004.

Appendix A

Table 1. Endangered and rare plant species historically and/or currently found in or near Pu'u Maka'ala NAR.

Taxon	Common name	Status*	NAR Critical Habitat
<i>Adenophorus periens</i>	palai la'au	E	
<i>Anoectochilus sandvicensis</i>	jewel orchid	SOC	
<i>Argyroxiphum kauense</i>	Mauna Loa silversword	E	Yes
<i>Asplenium schizophyllum</i>		SOC	
<i>Asplenium peruvianum</i> var. <i>insulare</i>		E	
<i>Clermontia lindseyana</i>	'oha wai	E	Yes
<i>Clermontia peleana</i>	'oha wai	E	
<i>Cyanea coplandii</i>	hāhā	E (X)	
<i>Cyanea giffardii</i>	hāhā	SOC(X)	
<i>Cyanea platyphylla</i>	'akū'akū	E	
<i>Cyanea shipmanii</i>	hāhā	E	Yes
<i>Cyanea stictophylla</i>	hāhā	E	Yes
<i>Cyanea tritomantha</i>	'akū	C	
<i>Cyrtandra giffardii</i>	ha'iwale	E	Yes
<i>Cyrtandra tintinnabula</i>	ha'iwale	E	
<i>Eurya sandwicensis</i>	ānini	SOC	
<i>Fragaria chiloensis</i> ssp. <i>sandwicensis</i>	'ōhelo papa	SOC	
<i>Gardenia remyi</i>	nānū	C	
<i>Joinvillea ascendens</i> ssp. <i>ascendens</i>	'ohe	C	
<i>Liparis hawaiiensis</i>	'awapuhiakanaloa	SOC	
<i>Pittosporum hawaiiense</i>	hō 'awa	SOC	
<i>Phyllostegia ambigua</i>		SOC	
<i>Phyllostegia floribunda</i>		C	
<i>Phyllostegia macrophylla</i>		SOC	
<i>Phyllostegia racemosa</i>	kīponapona	E	
<i>Phyllostegia velutina</i>		E	Yes
<i>Pritchardia beccariana</i>	loulu	SOC	
<i>Rubus macraei</i>	'ākala	SOC	
<i>Schieda diffusa</i>		SOC	
<i>Sicyos alba</i>	'ānunu	E	Yes
<i>Sisyrinchium acre</i>	mau'u lā'ili	SOC	
<i>Stenogyne macrantha</i>	mā'ohi'ohi	SOC	
<i>Trematolobelia grandifolia</i>	koli'i	SOC	
<i>Vicia menziesii</i>	Hawaiian vetch	E	

<i>Zanthoxylum kauaense</i>	a'e, mānele, hea'e	SOC	
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* E = endangered; T = threatened; C = candidate for listing; SOC = species of concern; (X) = possibly extinct
 ** Species with populations historically/currently known from Pu‘u Maka‘ala NAR or nearby locations are noted.

Appendix B

Native birds historically and/or currently found in or near Pu‘u Maka‘ala NAR.

Taxon	Common Name	Status
<i>Corvus hawaiiensis</i>	‘alalā, Hawaiian crow	endemic - endangered
<i>Asio flammeus sandwichensis</i>	pueo, Hawaiian owl	endemic
<i>Branta sandvicensis</i>	nēnē, Hawaiian goose	endemic - endangered
<i>Buteo solitarius</i>	‘io, Hawaiian hawk	endemic - endangered
<i>Chasiempis sandwichensis</i>	‘elepaio	endemic
<i>Hemignathus munroi</i>	‘akiapōlā‘au	endemic - endangered
<i>Hemignathus virens</i>	‘amakihī	endemic
<i>Himatione sanguinea</i>	‘apapane	endemic
<i>Loxops coccineus</i>	Hawai‘i ‘ākepa	endemic - endangered
<i>Oceanodroma castro</i>	‘akē‘akē, band-rumped storm petrel	indigenous - candidate
<i>Oreomystis mana</i>	Hawai‘i creeper	endemic - endangered
<i>Myadestes obscurus</i>	‘ōma‘o	endemic
<i>Pluvialis fulva</i>	kōlea, Pacific golden plover	indigenous
<i>Psittirostra psittacea</i>	‘ō‘ū	endemic – endangered
<i>Pterodroma sandwichensis</i>	‘ua‘u or Hawaiian petrel	endemic - endangered
<i>Vestiaria coccinea</i>	‘i‘iwi	endemic - endangered

Notable Native Insects in Pu‘u Maka‘ala NAR (summarized from Preston 1995).

TAXA	DESCRIPTION
<p>COLEOPTERA Aglycyderidae (Proterinid Weevils)</p>	<p>These tiny (less than 3 mm long) primitive weevils are remarkably diverse in Hawai‘i. About 175 species are known only from Hawai‘i; these constitute more than 90% of the world's fauna in the family. The larvae are wood borers, mostly in twigs and stems of native plants, and most species are host specific. Unidentified species were collected in the NAR</p>
<p>DIPTERA Drosophilidae (Pomace Flies) <i>Drosophila</i> spp. (picture wing group)</p>	<p>Hawaiian Drosophilidae are one of the best studied examples of adaptive radiation. Over 600 species have been described, and another 200 species are known but not yet named. The existence of such a diverse fauna in Hawai‘i provides an ideal natural laboratory for comparative studies in evolutionary biology. At least 3 species belonging to the large "picture wing" group were collected. The NAR is critical habitat for the listed endangered species <i>Drosophila mulli</i> (not detected in the 1995 surveys by Preston).</p>
<p>Muscidae (House Flies and relatives) <i>Lisopocephala confluens</i> (Malloch, 1928) <i>Lisopocephala dextioides</i> (Grimshaw, 1901) <i>Lisopocephala ingens</i> (Grimshaw, 1901)</p>	<p>The endemic genus <i>Lisopocephala</i> contains over 100 known species, which are all predatory on other insects. Thirty species are known from the Big Island, and of these only 3 species were collected: <i>Lisopocephala confluens</i> previously only known from Moloka‘i and Maui, <i>L. dextioides</i>, known only from Maui and the Big Island, and <i>L. ingens</i>, known from Oahu, Moloka‘i, Maui and the Big Island.</p>
<p>HETEROPTERA Miridae (Plant Bugs) <i>Hyalopeplus pellucidus</i> (Stål, 1859) <i>Orthothotylus</i> spp. <i>Sarona</i> sp.</p>	<p>Hawaiian plant bugs remain poorly known (about 50 species have been named, but at least another 100 species are in collections). Most species are plant feeders, but many are predaceous or omnivorous. Many species are found only in a small geographical area and feed on a single species of plant. Three native species were identified: <i>Hyalopeplus pellucidus</i> is a common species with a wide host range, including guava and other alien plant species; <i>Orthothylus</i>, a widespread genus; and the endemic genus <i>Sarona</i>.</p>
<p>Nabidae (Damsel Bugs) <i>Nabis oscillans</i> Blackburn, 1888</p>	<p>The damsel bugs are all predatory on other insects. There are 30 Hawaiian species, but new species continue to be discovered. <i>Nabis oscillans</i> Blackburn, 1888 was collected.</p>

<p>Pentatomidae (Stink Bugs and Shield Bugs)</p>	<p><i>Coleoichus blackburniae</i>, the koa bug, is the largest and most conspicuous native true bug (nearly an inch long and iridescent blue, green, maroon, and yellow). Once common on koa and a'ali throughout Hawai'i, it is now rare due to the introduction of several parasites for biological control of the pestiferous southern green stink bug in the 1960's. Historically known from the NAR, but none were seen during this survey.</p>
<p>HOMOPTERA Cicadellidae <i>Nesophrosyne</i> spp.</p>	<p>Seven endemic genera of leaf hoppers, plant hoppers, and psyllids were collected. Several species in the native genus <i>Nesophrosyne</i> (Cicadellidae) were abundant.</p>
<p>Cixiidae <i>Iolania perkinsi</i> Kirkaldy, 1902 <i>Oliarus</i> (2 species)</p>	<p><i>Iolania perkinsi</i> Kirkaldy, 1902 a native cixiid restricted to Hawai'i island and associated with native ferns, was common. Specimens of two species in the other native genus <i>Oliarus</i> were also collected.</p>
<p>Delphacidae <i>Letaloha</i> sp. <i>Nesosydne</i> (2 species) <i>Nesothoe</i> sp.</p>	<p>Three endemic genera of leaf hoppers were common in Pu'u Maka'ala: <i>Letaloha</i>, <i>Nesosydne</i>, and <i>Nesothoe</i>.</p>
<p>HYMENOPTERA Ichneumonidae (Ichneumon wasps) <i>Enicospilus nigrolineatus</i> Ashmead, 1901 <i>Enicospilus</i> (2 species) <i>Spolas</i> nr. <i>hawaitensis</i> (Ashmead, 1901) <i>Spolas</i> (2 species)</p>	<p>These wasps are parasites of other insects; the adult female searches for, and lays eggs in, suitable hosts. Individuals of several species were collected sporadically as expected. In addition, on one occasion, dozens of individuals of the native genus, <i>Enicospilus</i>, were collected. <i>Enicospilus nigrolineatus</i> (Ashmead, 1901), a very large and showy species was collected in every Malaise trap sample. Two undetermined <i>Enicospilus</i> spp. were also present in the trap in larger numbers. Three species in the native genus <i>Spolas</i> were also found as well as the ever abundant and purposely introduced parasite, <i>Ichneumon purpuripennis</i> Cresson, 1877. Other native species of wasps were collected in and around the trap sites, but identification will have to wait for specialists.</p>
<p>LEPIDOPTERA Crambidae (Crambid Moths) <i>Eudonia</i> (5 species) <i>Mestolobes minuscula</i> (Butler, 1881) <i>Mestolobes</i> sp.</p>	<p>The crambids are a diverse group of mostly small moths, which are exceptionally well-represented in Hawai'i (206 named species). The genus <i>Mestolobes</i> with 33 species is endemic to Hawai'i. <i>Mestolobes minuscula</i> (Butler, 1881) is a common moth in the lowlands yet nothing is known of its biology. Adults of many <i>Eudonia</i> species resemble the lichens upon which they rest, and the larvae are probably associated with lichens. There are over 100 species in the genus, but many remain undescribed.</p>
<p>Geometridae (Inchworms) <i>Eupithecia monticolens</i> Butler, 1881 <i>Scotorythra artemidora</i> Meyrick, 1899 <i>Scotorythra brunnea</i> (Warren, 1896) <i>Scotorythra euryphaea</i> Meyrick,</p>	<p>The genus <i>Scotorythra</i> contains 38 species, all endemic to the Hawaiian Islands. Two species, <i>S. dicerania</i> Meyrick, 1928 and <i>S. euryphaea</i> Meyrick, 1899 are new records for the island of Hawai'i. Specimens of the predatory inchworm <i>Paggithécia</i></p>

<p>1899 <i>Scotorythra pachyaspila</i> Meyrick, 1899</p>	<p><i>monticolans</i> Butler, 1881 were also trapped.</p>
<p>Lycaenidae and Nymphalidae (Blue and Brush-footed Butterflies) <i>Vanessa tameamea</i> Eschscholtz, 1821</p>	<p>Only two species of butterflies are native to Hawai'i, a blue (Blackburn's butterfly, or <i>Udara blackburnii</i> (Tuely, 1878), which feeds on koa, a'ali'i and other legumes) and an admiral or brush-footed butterfly (Kamehameha butterfly or <i>Vanessa tameamea</i> Eschscholtz, 1821, which feeds on mamaki and other Urticaceae). Both species are locally common where their hosts are found. Only the Kamehameha butterfly was observed flying near both trapping sites.</p>
<p>ODONATA Coenagrionidae (Damselflies) <i>Megalagrion hawaiiense</i> (McLachlan, 1883)</p>	<p>There are 29 species in the endemic genus <i>Megalagrion</i>. <i>M. hawaiiense</i> (McLachlan, 1883) was frequently encountered in rain puddles throughout the Reserve. The historic record yielded 5 other species of damselflies known to inhabit the Reserve. <i>M. callipha microdemas</i> (Perkins, 1899), <i>M. peles</i> (Perkins, 1899) and two alien species: <i>Enallagma civile</i> (Hagen, 1862) and <i>Ischnura ramburii</i> (Selys-Longchamps).</p>
<p>ORTHOPTERA Gryllidae (Crickets) <i>Laupala</i> spp. <i>Paratrigonidium</i> sp.</p>	<p>There are 243 native species of crickets known from Hawaii (Otte 1994), which is more than twice as many as the total number known from the rest of the United States. Most native species have restricted ranges; some are known from only small areas within single islands. Their great diversity makes them ideal for evolutionary studies (Otte, 1994). Hawaiian crickets live mostly in trees and shrubs, but some forage in the leaf litter. Most are omnivores, feeding on both plant and animal material. Two native genera of swordtail crickets (<i>Trigonidium</i> and <i>Laupala</i>) were collected in Pu'u Maka'ala.</p>

Appendix C

He Moolelo Aina: A Cultural Study of the Puu Makaala Natural Area Reserve, Districts of Hilo and Puna, Island of Hawai'i – prepared for the Division of Forestry and Wildlife by Kumu Pono Associates, 2004.

Available at: [Microsoft Word - HiNars80-Puu Makaala_b.doc \(hawaii.gov\)](#)

Appendix D

Environmental Assessment Comments Received and Agency Responses

No comments were received.

Signature: 

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