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STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

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October 10, 2011

Mr. Gary Hooser, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Aloha Director Hooser:

Subject: Draft Environmental Assessment
Āina Mauna Legacy Program, North Hilo, Hawaii

The Department of Hawaiian Home Lands (DHHL) has reviewed the Draft Environmental Assessment for the subject project, and anticipates a Finding of No Significant Impact. DHHL respectfully requests publication of this Notice in the next issue OEQC Environmental Notice (October 23, 2011).

Enclosed please find a completed OEQC Publication Form and one (1) copy of the Draft EA in pdf format on a CD; one (1) hardcopy of the Draft EA; and the distribution list for your review and verification.

Should you have any questions, please contact Linda Chinn, Land Management Division Administrator at 808.620.9451 or email her at linda.l.chinn@hawaii.gov. Your staff may also contact our consultant Peter Young of Hookuleana LLC at 808.254.2223 or email him at PeterYoung@Hookuleana.com.

Me ke aloha,

Albert "Alapaki" Nahale-a, Chairman
Hawaiian Homes Commission

Enc.

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Project Name: 'Āina Mauna Legacy Program Draft Environmental Assessment
Publication Form
The Environmental Notice
Office of Environmental Quality Control

Instructions: Please submit one hardcopy of the document along with a determination letter from the agency. On a compact disk, put an electronic copy of this publication form in MS Word and a PDF of the EA or EIS. Please make sure that your PDF documents are ADA compliant. Mahalo.

Applicable Law: Ch. 343, HRS, EIS Law
Type of Document: Environmental Impact Assessment
Island: Hawai'i
District: North Hilo
TMK: (3) 3-8-001:002; :003; :004; :007; :008 and :009
Permits Required: Historic Sites Review, State Highways Permit, Permit to Construct an Air Pollution Source, National Pollutant Discharge Elimination System, Subdivision Approval, Site Preparation and Stockpiling Permits, Construction Permits, Grading Permits

Applicant or
Proposing Agency: **Department of Hawaiian Home Lands**
Address P.O. Box 1879 Honolulu, HI 96805
Contact & Phone Mike Robinson 808-895-1285
Approving Agency/
Accepting Authority: **Department of Hawaiian Home Lands**
Address P.O. Box 1879 Honolulu, HI 96805
Contact & Phone Albert "Alapaki" Nahale-a, Chairman, Hawaiian Homes Commission
808-620-9501
Consultant: **Ho'okuleana LLC**
Address 25 Kaneohe Bay Drive Suite 212 Kailua, HI 96734
Contact & Phone Peter Young 808-254-2223

Project Summary:

'Āina Mauna Legacy Program, unanimously approved by the Hawaiian Homes Commission, is DHHL's guiding framework for well-coordinated management for long-term protection and perpetuation of the 'Āina Mauna ecosystem. Its mission is to protect approximately 56,000-acres of native Hawaiian forest that is ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries and the community. Beneficiaries and the community will be involved in its implementation.

The Legacy Program proposes multiple actions including Native Forest and Wildlife Habitat Restoration; Feral Ungulate Control; Invasive Species Eradication; Sustainable Commercial Koa Forestry; Outplanting Centers and Field Worker Accommodations; Construction; and Gorse Eradication using shade from Commercial Timber and Harvesting. Infrastructure improvements include Homesteading needs; Water Systems; Pasture and Road improvements. Additional construction includes Administration Base Facility; Remote Accommodations and Adaptive Reuse of the Humu'ula Sheep Station. Revenue generating actions to cover the cost of conservation practices include Eco-tourism Facilities, Services and Activities; Commercial Facilities and Activities; and Commercial Forestry.

The direct, indirect, secondary and cumulative impacts associated with the project would be localized or short-term, occurring during the construction phase. No significant impacts to any resource are anticipated. The issuance of a Finding of No Significant Impact for this project is anticipated.

‘Āina Mauna Legacy Program

DRAFT

Environmental Assessment



Prepared for:

Department of Hawaiian Home Lands

Prepared by:

Ho‘okuleana LLC

... to take responsibility ...

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October 23, 2011

Project Name: 'Āina Mauna Legacy Program

Proposing Agency: State of Hawai'i, Department of Hawaiian Home Lands

Applicant & Property Owners: State of Hawai'i, Department of Hawaiian Home Lands

Approving Agency: State of Hawai'i, Department of Hawaiian Home Lands

Anticipated Determination: Finding of No Significant Impact (FONSI)

Project Location: Northeast slopes of Mauna Kea, North Hilo District, Hawai'i

TMKs: (3) 3-8-001:002, :003, :004, :007, :008, :009

Land Use Classification: General Plan: Conservation and Extensive Agriculture
State Land Use: Conservation and Agriculture
County Zoning: Ag-40a

Land Area: Approximately 56,200-acres

EA Trigger: Use of state land and state funds for the management and implementation of the 'Āina Mauna Legacy Program

Agencies & Organizations who were sent requests for comments on the Scoping and Draft EA:

Required Agencies & Organizations

Federal

U.S. Department of the Interior, Fish & Wildlife Service

State of Hawai'i

Department of Agriculture
Department of Accounting & General Services
Department of Business, Economic Development & Tourism
Department of Business, Economic Development & Tourism – Energy Division
Department of Business, Economic Development & Tourism – Office of Planning
Department of Defense
Department of Education
Department of Health
Department of Health - Environmental
Department of Human Services
Department of Labor & Industrial Services
Department of Land & Natural Resources
Department of Land & Natural Resources – Historic Preservation
Department of Transportation
Hawai'i Housing Finance & Development Corp.
Office of Hawaiian Affairs
University of Hawai'i, Environmental Center

County of Hawai'i

Department of Environmental Management
Department of Parks & Recreation
Department of Public Works
Department of Water Supply
Office of Housing & Community Development
Planning Department

Other Agencies, Organizations & Individuals

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Ross Wilson
Josh Stanbro
John De Fries
David Kaapu
‘Āina Mauna Legacy Program Advisory Group
Hawai'i Audubon Society
Hawai'i Forest Industry Association
The Kamehameha Schools
Queen Lili'uokalani Trust
Queen Emma Land Company
Royal Order of Kamehameha I, Ali'i Chapter
Kahea Hawaiian-Environmental Alliance
Kuakini Hawaiian Civic Club of Kona
Bishop Museum
Hawai'i Island Economic Development Board
Hawai'i Island Chamber of Commerce
The Nature Conservancy
Conservation Council for Hawai'i
The Trust for Public Lands
Big Island Invasive Species Committee
UH-Hilo Coll. of College of Agriculture, Forestry & Natural Resource Management
UH - University of Hawai'i, College of Tropical Agriculture and Human Resources
UH - University of Hawai'i, Department of Natural Resources & Environmental Management
USFWS - Hakalau Forest National Wildlife Refuge
USFWS Conservation Partnerships
‘Ōiwi Lōkahi O Ka Mokupuni O Keawe
Sierra Club
Hui Kako'o 'Āina Ho'opulapula
US Forest Service - Institute of Pacific Islands Forestry
Nēnē for the Army
Hawai'i Forest and Trail
US Army - Pōhakuloa Training Area
 PTA Citizen Advisory Group
 PTA Deputy Commander
 PTA DPW Environmental
DLNR-Division of Forestry and Wildlife
DLNR-Land Division
DLNR-Natural Area Reserves System

DLNR-State Parks
DLNR-Watershed Partnerships Program
Hawai'i Wildfire Management Organization
Institute for Astronomy
Office of Mauna Kea Management
Parker Ranch
Waiki'i Ranch Homeowner's Association
Waiki'i Ranch, Inc
Sunfuels Hawai'i

Contents

Chapter 1 - Introduction	1
1.1 Overview and Background	1
1.2 Purpose and Need	2
1.3 Issues, Concerns and Opportunities - Benefits to DHHL Beneficiaries	3
1.4 Proposed Actions	8
Native Forest Restoration (M1, M2, R1, R2, R3, R4)	8
Sustainable Koa Forestry (K1, K2, K3 K4, K5)	9
Outplanting Centers and Field Worker Accommodations	10
Administration Base Facility	11
Groundwater Water System	12
Surface Water Catchment System	12
Road System	12
Pig Control and Management	13
Gorse Eradication through Commercial Timber Planting and Harvesting (T1, T2)	13
Pasture (Interim and Long Term) (H2, P1, P2)	14
Infrastructure for Initial Homesteading Area (H1, H2, K5)	14
Sheep Station Adaptive Reuse (HSS)	16
Remote Accommodations (K1, K4, R1, R2, R3)	17
Eco-tourism Facilities, Services and Activities	18
Commercial Facilities and Activities (C1/HSS)	18
Research	19
1.5 Responsible Agencies and Funding	19
1.6 Project Development Status and Implementation Schedule	19
1.7 Required Permits and Approvals	20
Chapter 2 - Project Description	21
2.1 Summary of Project Description	21
2.2 Summary of Project Actions	21
2.2.1 Native Forest Restoration (M1, M2, R1, R2, R3, R4)	21
2.2.2 Sustainable Koa Forestry (K1, K2, K3 K4, K5)	23
2.2.3 Outplanting Centers and Field Worker Accommodations	25
2.2.4 Administration Base Facility	27
2.2.5 Groundwater System	29
2.2.6 Surface Water Catchment System	29
2.2.7 Road System	29
2.2.8 Pig Control and Management	31
2.2.9 Gorse Eradication through Commercial Timber Planting and Harvesting (T1, T2)	31
2.2.10 Pasture (Interim and Long Term) (H2, P1, P2)	34
2.2.11 Infrastructure for Initial Homesteading Area (H1, H2, K5)	34
2.2.12 Sheep Station Adaptive Reuse (HSS)	39
2.2.13 Remote Accommodations (K1, K4, R1, R2, R3)	42
2.2.14 Eco-Tourism Facilities, Services and Activities	44
2.2.15 Commercial Facilities and Activities (C1/HSS)	45
2.2.16 Research	46
Chapter 3 - Environmental Assessment Alternatives	48
3.0 Features Common to All Alternatives	48

3.1 Native Forest Restoration (M1, M2, R1, R2, R3, R4).....	52
3.2 Sustainable Koa Forestry (K1, K2, K3, K4, K5)	53
3.3 Outplanting Centers and Field Worker Accommodations	55
3.4 Administration Base Facility.....	56
3.5 Groundwater Water System	58
3.6 Surface Water Catchment System	58
3.7 Road System.....	59
3.8 Pig Control and Management	60
3.9 Gorse Eradication through Commercial Timber Planting and Harvesting (T1, T2).....	61
3.10 Pasture (Interim and Long Term) (H2, P1, P2)	63
3.11 Infrastructure for Initial Homesteading Area (H1, H2, K5)	65
3.12 Sheep Station Adaptive Reuse (HSS).....	66
3.13 Remote Accommodations.....	68
3.14 Eco-tourism Facilities, Services and Activities	70
3.15 Commercial Facilities and Activities (C1/HSS)	72
3.16 Research.....	73
Chapter 4 - Environmental Setting, Impact and Mitigation.....	74
4.1 Introduction	74
4.1.1 Environmental Setting	74
4.1.2 Thresholds Used to Determine Level of Impact.....	75
4.1.3 Potential Project Impacts in Context with Applicable Requirements.....	76
4.1.4 Mitigation Measures	77
4.1.5 Level of Impact after Mitigation	83
4.2 Cultural Resources	84
4.2.1 Environmental Setting	84
4.2.2 Thresholds Uses to Determine Level of Impact	97
4.2.3 Potential Environmental Impacts	97
4.2.4 Mitigation Measures	97
4.2.5 Level of Impact after Mitigation	99
4.2.6 References	99
4.3 Archaeological/Historic Resources	101
4.3.1 Environmental Setting	101
4.3.2 Thresholds Used to Determine Level of Impact.....	107
4.3.3 Potential Environmental Impacts	107
4.3.4 Mitigation Measures	109
4.3.5 Level of Impact after Mitigation	110
4.3.6 References	111
4.4 Biological Resources.....	112
4.4.1 Environmental Setting	112
4.4.2 Thresholds Used to Determine Level of Impact.....	121
4.4.3 Potential Environmental Impacts	121
4.4.4 Mitigation Measures	137
4.4.5 Level of Impact after Mitigation	139
4.4.6 References	139
4.5 Visual and Aesthetic Resources	141
4.5.1 Environmental Setting	141
4.5.2 Thresholds Used to Determine Level of Impact.....	141
4.5.3 Potential Environmental Impact	142

4.5.4 Mitigation Measures	142
4.5.5 Level of Impact after Mitigation	144
4.5.6 References	144
4.6 Geology, Soils, and Slope Stability	145
4.6.1 Environmental Setting	145
4.6.2 Thresholds Used to Determine Level of Impact.....	147
4.6.3 Potential Environmental Impacts	147
4.6.4 Mitigation Measures	147
4.6.5 Level of Impact after Mitigation	148
4.6.6 References	148
4.7 Water Resources and Wastewater	149
4.7.1 Environmental Setting	149
4.7.2 Thresholds Used to Determine Level of Impact.....	158
4.7.3 Potential Environmental Impact	158
4.7.4 Mitigation Measures	160
4.7.5 Level of Impact after Mitigation	160
4.7.6 References	161
4.8 Solid and Hazardous Waste and Material Management	162
4.8.1 Environmental Setting	162
4.8.2 Thresholds Used to Determine Level of Impact.....	162
4.8.3 Potential Environmental Impact	163
4.8.4 Mitigation Measures	165
4.8.5 Level of Impact after Mitigation	165
4.8.6 References	165
4.9 Socioeconomic Conditions and Public Services Facilities	166
4.9.1 Environmental Setting	166
4.9.2 Thresholds Used to Determine Level of Impact.....	168
4.9.3 Potential Environmental Impact	169
4.9.4 Mitigation Measures	172
4.9.5 Level of Impact after Mitigation	173
4.9.6 References	173
4.10 Traffic	175
4.10.1 Environmental Setting	175
4.10.2 Thresholds Used to Determine Level of Impact.....	183
4.10.3 Environmental Impacts	183
4.10.4 Mitigation Measures	184
4.10.5 Level of Impact after Mitigation	187
4.10.6 References	188
4.11 Power and Communications	189
4.11.1 Environmental Setting	189
4.11.2 Thresholds Used to Determine Level of Impact.....	189
4.11.3 Potential Environmental Impacts	189
4.11.4 Mitigation Measures	190
4.11.5 Level of Impact after Mitigation	190
4.11.6 References	191
4.12 Noise	192
4.12.1 Environmental Setting	192
4.12.2 Thresholds Used to Determine Level of Impact.....	193

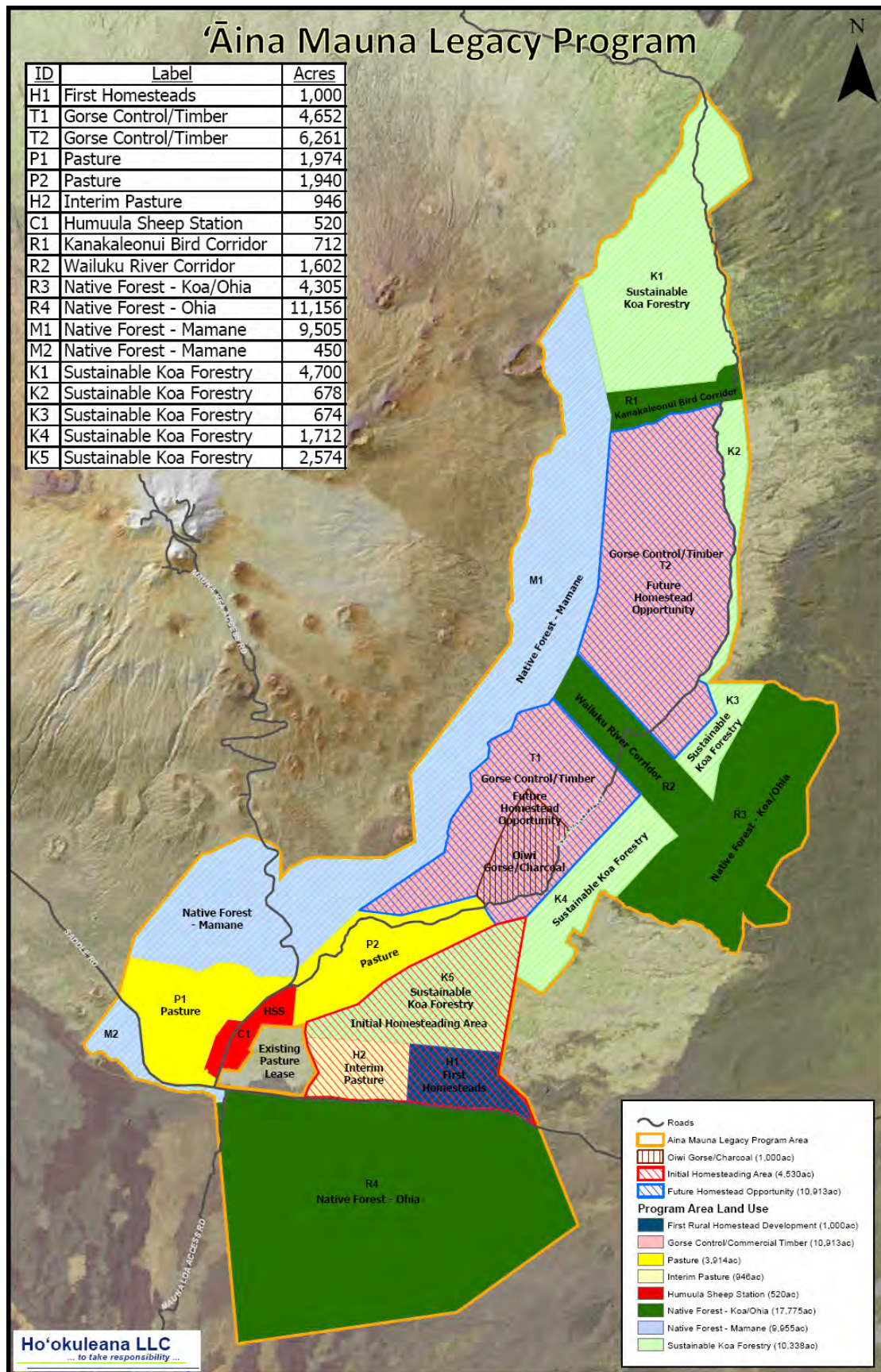
4.12.3 Potential Environmental Impacts	193
4.12.4 Mitigation Measures	194
4.12.5 Level of Impact after Mitigation	195
4.12.6 References	195
4.13 Climate, Air Quality and Lighting	196
4.13.1 Environmental Setting	196
4.13.2 Thresholds Used to Determine Level of Impact.....	197
4.13.3 Potential Environmental Impact	197
4.13.4 Mitigation Measures	198
4.13.5 Level of Impact after Mitigation	199
4.13.6 References	199
4.14 Natural Hazards.....	200
4.14.1 Environmental Setting	200
4.14.2 Thresholds Used to Determine Level of Impact.....	200
4.14.3 Potential Environmental Impact	200
4.14.4 Mitigation Measures	201
4.14.5 Level of Impact after Mitigation	202
4.14.6 References	202
4.15 Fire	203
4.15.1 Environmental Setting	203
4.15.2 Thresholds Used to Determine Level of Impact.....	210
4.15.3 Potential Environmental Impact	210
4.15.4 Mitigation Measures	210
4.15.5 Level of Impact after Mitigation	214
4.15.6 References	214
4.16 Recreation and Tourism	216
4.16.1 Environmental Setting	216
4.16.2 Thresholds Used to Determine Level of Impact.....	222
4.16.3 Potential Environmental Impact	222
4.16.4 Mitigation Measures	223
4.16.5 Level of Impact after Mitigation	225
4.16.6 References	225
4.17 Site Preparation and Construction.....	227
4.17.1 Potential Environmental Impacts	227
4.17.2 Mitigation Measures	229
4.17.3 Level of Impact after Mitigation	232
4.17.4 References	232
Chapter 5 – Laws, Regulations, Land Use Plans and Policies	233
5.1 County of Hawai‘i	234
5.2 State of Hawai‘i	235
5.3 Department of Hawaiian Homes Lands	239
5.4 Federal “Cross-Cutting” Authorities.....	241
5.4.1 Environmental Authorities	241
5.4.2 Economic Authorities	249
5.4.3 Social Authorities	250
5.5 References	253
Chapter 6 - Cumulative Impacts.....	257
6.1 Cumulative Effects Analysis	257

6.1.1 Cumulative Effects Evaluation Methodology.....	257
6.1.2 Past, Present and Reasonably Foreseeable Future Project Activities.....	259
6.1.3 Summary Cumulative Effects	261
6.1.4 Relationship between Short-Term Uses of the Environment and Long-Term Productivity	270
6.1.5 Irreversible and Irretrievable Commitments of Resources.....	270
6.1.6 Conclusion.....	271
6.2 Anticipated Determination, With Findings and Reasons Supporting	272
Chapter 7 - Agency and Public Participation.....	279
7.1 ‘Āina Mauna Legacy Program Outreach Activities.....	279
7.1.1 Hawaiian Homes Commission Informational Workshops (public meetings)	279
7.1.2 Hawaiian Homes Commission Meeting (public meeting).....	279
7.1.3 Beneficiary Consultations (public meetings)	279
7.1.4 Humu‘ula/Pi‘ihonua Legacy Plan Scope of Services Meeting	279
7.1.5 Office of Hawaiian Affairs (Statewide radio program).....	279
7.1.6 Office of Hawaiian Affairs (public meetings)	279
7.1.7 ‘Āina Mauna Legacy Program Advisory Group	280
7.1.8 DHHL Website	280
7.1.9 Mauna Kea Neighbors Meetings.....	280
7.2 ‘Āina Mauna Legacy Program Environmental Assessment Scoping Activities	281
7.2.1 Scoping Letters.....	281
7.2.2 Public Scoping Meetings.....	281
Chapter 8 - List of Preparers	290
Chapter 9 - References.....	291

Appendices:

Pre-Assessment Scoping Comments and Responses

Cultural Impact Assessment



Chapter 1 - Introduction

This Environmental Assessment (EA) represents the Department of Hawaiian Home Lands' (DHHL) analysis in compliance with DHHL policies and State environmental review statutes, including Chapter 343, Hawai'i Revised Statutes (HRS).

In keeping with the purpose of environmental review and to avoid unnecessary repetition, the EA incorporates by reference many of the descriptors and background from the Final 'Āina Mauna Legacy Program (Legacy Program), the 'Āina Mauna Legacy Program Implementation Work Plan (Work Plan) and other documents accompanying the Legacy Program that was unanimously approved by the Hawaiian Homes Commission on December 15, 2009.

While the 'Āina Mauna Legacy Program, Work Plan and the EA are different volumes, the three should be read together to obtain a clear understanding of the environmental consequences of the actions in the Legacy Program.

This environmental assessment (EA) evaluates the activities proposed in the 'Āina Mauna Legacy Program. The Legacy Program is DHHL's overall guiding framework for their mission of well-coordinated management for strong long-term protection and perpetuation of the 'Āina Mauna ecosystem.

The purpose of the EA is to inform the relevant county, state and federal agencies and the public of the likely environmental consequences of the activities contained in the 'Āina Mauna Legacy Program. It focuses on site-specific issues within the boundaries of DHHL's 'Āina Mauna lands and the socioeconomic effects on the State of Hawai'i.

1.1 Overview and Background

DHHL's property in the 'Āina Mauna region is 19-miles long by 6-miles across. This is a vast 56,000-acres. To put the size in perspective, it is equivalent to an area on O'ahu from Hawai'i Kai to Aloha Stadium (19-miles) and Aloha Tower to the Pali Lookout (6-miles).

The 'Āina Mauna Legacy Program (Legacy Program) serves as a guide as DHHL moves forward in managing the Humu'ula/Pi'ihonua area to conserve its legacy for future generations while also serving as an economic resource.

The Legacy Program is an extension of prior planning and activities at the site. It serves as a policy framework related to the overall use and management of the property. Findings, recommendations, background information and other references from many of these prior documents are included and edited into this program.

Mission

The mission of the 'Āina Mauna Legacy Program and its implementation is to protect approximately 56,000-acres of native Hawaiian forest that is ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries and the community.

Goals - Initial goals for the 'Āina Mauna Legacy Program include:

Goal 1: Develop an economically self-sustaining improvement and preservation program for the natural and cultural resources (invasive species eradication and native ecosystem restoration) and implementation strategy. The focus of the 'Āina Mauna Legacy Program shall be on:

- Restoration and enhancement of DHHL trust resources;
- Identify immediate and future opportunities for DHHL beneficiaries;
- Removal of invasive species - gorse, etc;
- Conserve natural and cultural resources and endangered species;
- Address reforestation and restoration of the ecosystem;
- Develop revenue generation, reinvestment in land to sustain activities;
- Provide educational and cultural opportunities;
- Identify and secure partners to sustain activities;
- Identify opportunities for alternative/renewable energy projects; and
- Be a lead and/or model for others to engage in ecosystem restoration in a culturally sensitive manner based on partnerships to develop a self-sustaining model

Goal 2: Develop an outreach program to gain interest, participation and support from the Hawaiian Homes Commission, DHHL Staff, beneficiaries groups, cultural practitioners, natural resource scientists and the broader community for the Legacy Program and its implementation.

The ultimate long-term goal for DHHL is an economically-sustainable, healthy native forest ecosystem, homesteading and other activities at Humu'ula/Pi'ihonua. In achieving this goal, the 'Āina Mauna Legacy Program will serve as a guide for managing existing and future activities and uses, and to ensure ongoing protection of DHHL's trust property in perpetuity by linking traditional cultural knowledge and modern science.

1.2 Purpose and Need

The need for the 'Āina Mauna Legacy Program EA is defined by both legal mandates and priority management needs identified by DHHL. The priority actions address multiple goals and define areas for focused attention, including ecosystem restoration, beneficiary needs, conserving wildlife and habitats, reducing threats to the ecosystem, income generation to be reinvested into the property, coordinating conservation and management efforts and achieving effective management of the 'Āina Mauna. These priority actions and management needs are listed below and summarized in Chapter 2.

The following summarize the purpose of the Hawaiian Homes Commission Act:

§ 101. Purpose. [Subject to Congressional Approval.]

(a) The Congress of the United States and the State of Hawai'i declare that the policy of this Act is to enable native Hawaiians to return to their lands in order to fully support self-sufficiency for native Hawaiians and the self-determination of native Hawaiians in the administration of this Act, and the preservation of the values, traditions, and culture of native Hawaiians.

(b) The principal purposes of this Act include but are not limited to:

- (1) Establishing a permanent land base for the benefit and use of native Hawaiians, upon which they may live, farm, ranch, and otherwise engage in commercial or industrial or any other activities as authorized in this Act;

- (2) Placing native Hawaiians on the lands set aside under this Act in a prompt and efficient manner and assuring long-term tenancy to beneficiaries of this Act and their successors;
- (3) Preventing alienation of the fee title to the lands set aside under this Act so that these lands will always be held in trust for continued use by native Hawaiians in perpetuity;
- (4) Providing adequate amounts of water and supporting infrastructure, so that homestead lands will always be usable and accessible; and
- (5) Providing financial support and technical assistance to native Hawaiian beneficiaries of this Act so that by pursuing strategies to enhance economic self-sufficiency and promote community-based development, the traditions, culture and quality of life of native Hawaiians shall be forever self-sustaining.

1.3 Issues, Concerns and Opportunities - Benefits to DHHL Beneficiaries

Throughout the preparation of the Legacy Program and the scoping meetings for this Environmental Assessment, Hawaiian Homes beneficiaries raised several issues, concerns and opportunities relating to the land and implementation of the program.

The 'Āina Mauna Legacy Program is based on the Hawaiian Homes Commission Mission Statement and the Legacy Program Mission, Goals and Priority Issues. The 'Āina Mauna Legacy Program evaluates and balances conformance of competing uses with these overarching principles. Ultimately, the 'Āina Mauna Legacy Program is about and for the Beneficiaries, Hawaiian Home Lands Trust and the Land. The following are issues, concerns and opportunities raised by beneficiaries.

Homesteading for Beneficiaries

Consistent with the foundation of the Hawaiian Homes Act of putting Native Hawaiian onto the land, the 'Āina Mauna Legacy Program incorporates several opportunities for homesteading across the entire landscape of the Humu'ula/Pi'ihonua lands. One of the preferred alternatives in this EA is the development of infrastructure and opportunities for homesteading. The bulk of the homestead opportunities are anticipated to be phased in once the land has been restored to productive use. This area includes the significant portions of the site that are proposed for sustainable koa restoration.

Humu'ula is a unique environment that historically has been minimally settled, thus, there are questions as to the demand for homesteads in this area. Given that the homesteading areas will be rural developments, temperatures in the region can be cold and the area is relatively isolated from employment, schools, shopping centers and other DHHL communities, it is important that beneficiaries are made aware and understand the advantages and disadvantages of living in this area.

In addition, a commercial area is included in the Legacy Program that will serve the homesteaders in the vicinity, as well as travelers coming to and through this area.

Pasture Use for Beneficiaries

Also consistent with the Hawaiian Homes Act, areas for pasture are included in the Legacy Program and are included in the preferred alternatives in this EA. The preferred alternatives make pasture use available to beneficiaries.

While questions were raised about pasture in other areas of the Legacy Program site, the Legacy Program balances the many competing needs and opportunities, and provides approximately 4,000 acres for pasture use in areas where prior ranch records indicate were adequate for pasture uses.

Throughout the Legacy Program preparation and scoping for the EA a variety of means for dispositions for pasture use were discussed. Some beneficiaries preferred individual leases to beneficiaries, while others suggested a community pasture arrangement. This EA addresses environmental impacts as called for in Chapter 343 and the Environmental Assessment process; actual disposition of leases to beneficiaries will follow standard processes of the Department of Hawaiian Homes Lands.

Feral Animal Eradication and Pig Management

Several issues, concerns and opportunities were raised about beneficiaries participating in feral animal eradication (cattle, sheep, goats) and pig management efforts. It is anticipated that several benefits for beneficiaries are available via these actions: (1) beneficiaries will be able to put meat on their tables, (2) eliminating feral ungulates and managing appropriate populations of pigs in certain areas will reduce the impacts to the forest resources and (3) the trust may generate some income from the sale of feral ungulates or permits to hunt them.

Job Opportunities

Beneficiaries repeatedly emphasized the need for the Legacy Program to provide job opportunities for beneficiaries. Several of the preferred alternatives in this EA call for actions that provide job-generating opportunities. These include long-term jobs related to native forest restoration, harvesting of koa, ecotourism, commercial activities and other jobs noted in the Legacy Program and EA. In addition, there are many short-term jobs associated with various aspects of construction called for in several of the preferred alternatives.

Opportunities for Gathering and Traditional Practices

The restored, healthy native forest provides a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. Since the land is DHHL owned, beneficiaries will have significant benefit for the exercise of cultural traditions.

The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory.

Other obvious benefits to beneficiaries are the opportunities relating to use of the koa wood products. With the restored and expanded forest, practitioners and crafters will have a wide range of (cultural and economic) opportunities for a variety of koa wood product production.

Gorse Eradication

Without question, the eradication of gorse is a priority in order that the Legacy Program is successful. The need for eradicating gorse cannot be overstated.

Until this destructive plant is removed, beneficiaries will not see or experience benefits from the property. To date, gorse has been a nuisance and is expensive to control. Several of the preferred alternatives specifically target the removal of this invasive plant, while also generating revenue to the DHHL for management of the remainder of the land.

The preferred alternative does not preclude other forms of gorse eradication, such as the gasification process suggested by the beneficiary group 'Ōiwi Lōkahi o ka Mokupuni o Keawe. While the use of commercial-scale timber serves to address the long-term control of gorse and its underlying seed bank, the 'Ōiwi gasification process can serve to deal with the initial removal of the gorse vegetation in the site preparation process prior to planting the commercial timber.

Water Issues

Many of the preferred alternatives include the need for water, whether it be for homesteaders' consumption, use by others on the property, stock water, irrigation or fire control. Beneficiaries raised the concern that the water from the property would be available for uses on the property and that the Hawaiian Homes Act states that beneficiaries are to receive free water.

There are a variety of water sources and distribution methods included in the preferred alternatives; however, primarily, water will likely come through some form of catchment. This could be collection off homesteaders' roofs, tank storage and use or refurbishment of the existing ranch collection, storage and distribution system. Ultimately, that water is free.

One of the preferred alternatives addresses the opportunity to develop a groundwater well. While high level water in this area has yet to be demonstrated, the preferred alternative suggests a well, storage and distribution for uses on the property.

Road Systems

Several of the preferred alternatives include the need for vehicular accessibility; in most cases, the alternatives suggest adaptation and use of exiting ranch-style roads. In addition, because of the proposed new uses on the property, new roads will need to be constructed.

Three existing public roads, Saddle Road, Mauna Kea Access Road and Keanakolu-Mana Road, are intended to be used throughout the implementation and management of the Legacy Program. Public roads are expected to be maintained by the public agencies responsible for them, and the DHHL roads are expected to be maintained by the Department.

Preference to Native Hawaiians for Contracts

DHHL is obligated to follow state procurement laws. DHHL has the responsibility to look for the best qualified applicants (background, experience, financial capability, business plan, etc) that can fulfill the Trust's needs at a reasonable price. Consistent with the fundamental purposes of the Hawaiian Homes Commission Act, to the extent permitted by law, it is the goal of the 'Āina Mauna Legacy Program to support economic development, maximize opportunities for beneficiaries and give preference for native Hawaiian beneficiary involvement at all stages of the program's implementation and in the selection process, other items being equal.

Department/Beneficiary Consultation and Collaboration

Partnerships are an important component to any successful plan; the implementation of the Legacy Program is no exception. The implementation process will include the development of an Implementation Advisory Council, as well as beneficiary and community involvement and participation in advising the Department and Commission. There are many partnerships available for DHHL to take advantage of, especially in the areas of invasive species eradication, natural resources restoration, education and funding.

Revenue Opportunities for Implementation

A significant issue and concern that was raised during the preparation of the Legacy Program and this EA was the commitment by the Department for funding the actions called for in the Legacy Program. As noted in the Legacy Program, the Department committed to reinvest revenue generated on the property back into the implementation and management of the Legacy Program.

In addition, as noted in the Legacy Program Mission, the Legacy Program is intended to be self-sustaining. Therefore, several of the preferred alternatives in this EA ultimately generate revenue, so that other actions called for in the Legacy Program can be funded.

Leader and Model

The effort of implementing the 'Āina Mauna Legacy Program can serve as a model to others for appropriate ecosystem restoration and enhancement, involvement of partnerships and self-sustaining approaches to land management.

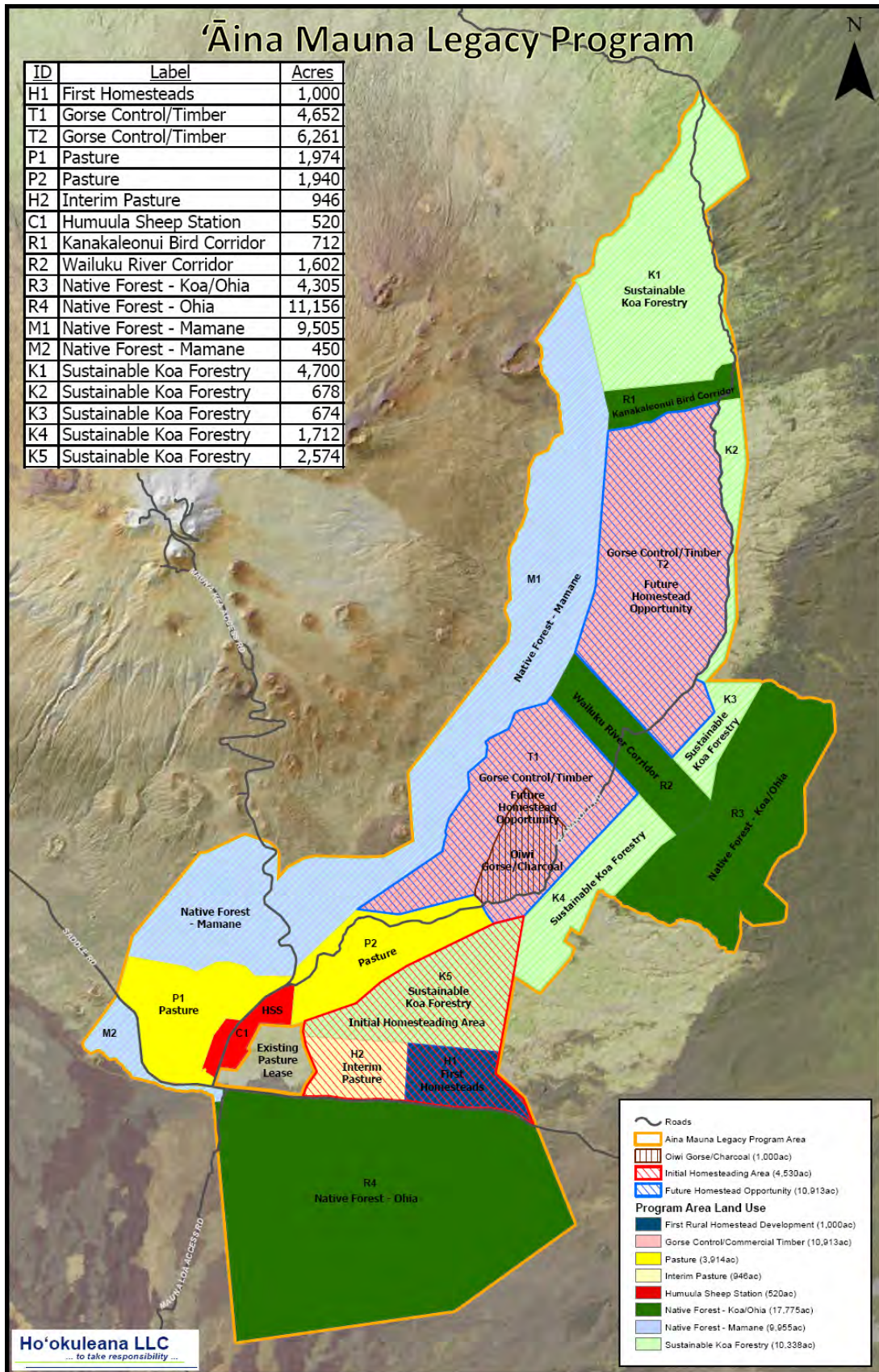
There is a commitment to restore the site to a natural, healthy state; it is a process that will take considerable effort, time and money to complete. Accomplishing this, the Legacy Program and its implementation may serve as a leader and model to others across the State of Hawai'i.

Opportunities for Beneficiaries to Participate and Benefit are Extensive and Diverse

The opportunities for beneficiaries are extensive and diverse; and, there are opportunities for beneficiaries within each of the preferred alternatives, whether it is homesteading, pasture, pig control and management, native forest restoration, commercial timber, koa forestry, ecotourism, cultural practices, etc. Some of the benefits are proposed to be relatively immediate, while others will necessarily take time for the real benefit to come to fruition. Additionally, the implementation process will include opportunities for beneficiary and community involvement and participation at all stages of the process.

'Āina Mauna Legacy Program is All About the Beneficiaries, Trust and the Land

Restoration of the land upon which native Hawaiians have always depended is key to the success of the beneficiaries. Over the past 150-years the land transformed away from a healthy, dense native forest. It will take generations to restore the land back to this healthy condition. Ultimately, and as an overarching principle, the 'Āina Mauna Legacy Program is about and for the Beneficiaries, Hawaiian Home Lands Trust and the Land.



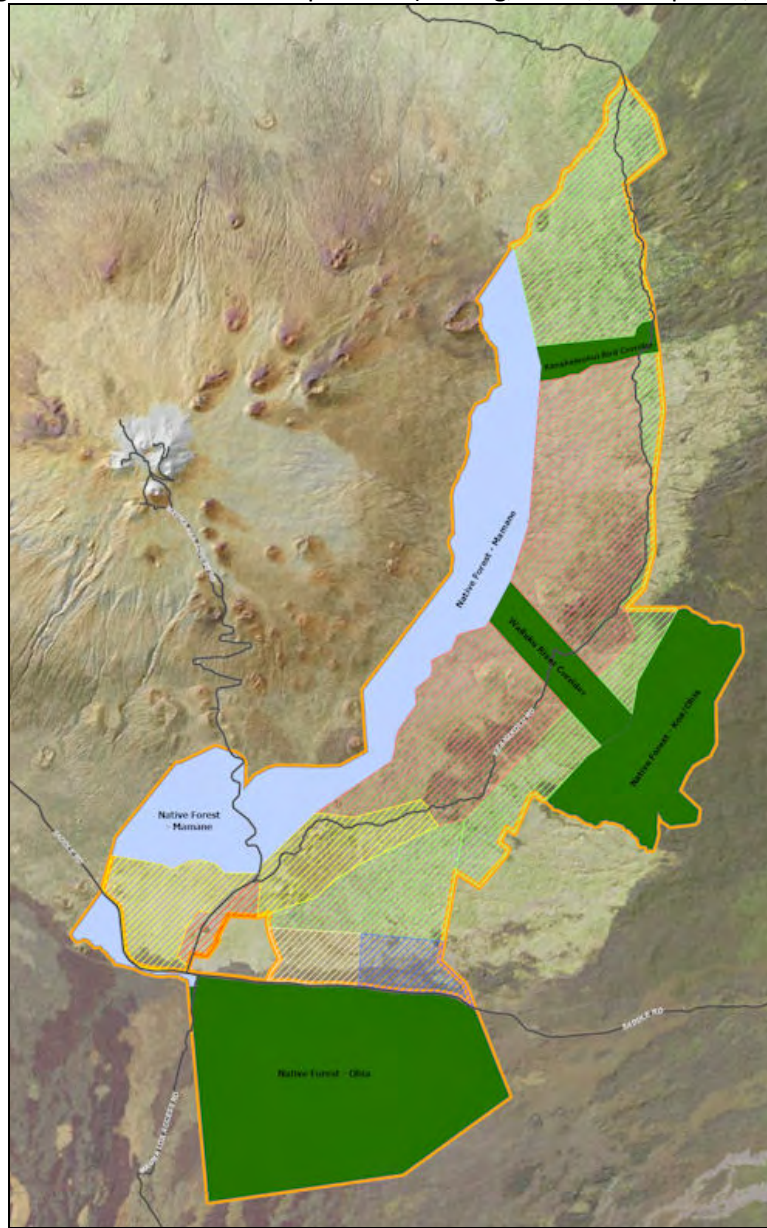
1.4 Proposed Actions

The 'Āina Mauna Legacy Program's proposed actions and some mitigation measures are summarized here and are further described in the 'Āina Mauna Legacy Program. These form the basis for alternative actions evaluated in this EA.

Native Forest Restoration (M1, M2, R1, R2, R3, R4)

Recovery and restoration of the native forest will include seed collection, plant outplanting, site preparation, planting, irrigation water development and project monitoring.

- Initiate Safe Harbor Agreement, Habitat Conservation Plan
- Incorporate Forestry Best Management Practices (BMPs)
- Use existing infrastructure wherever possible (fencing, roads, stock ponds, etc)

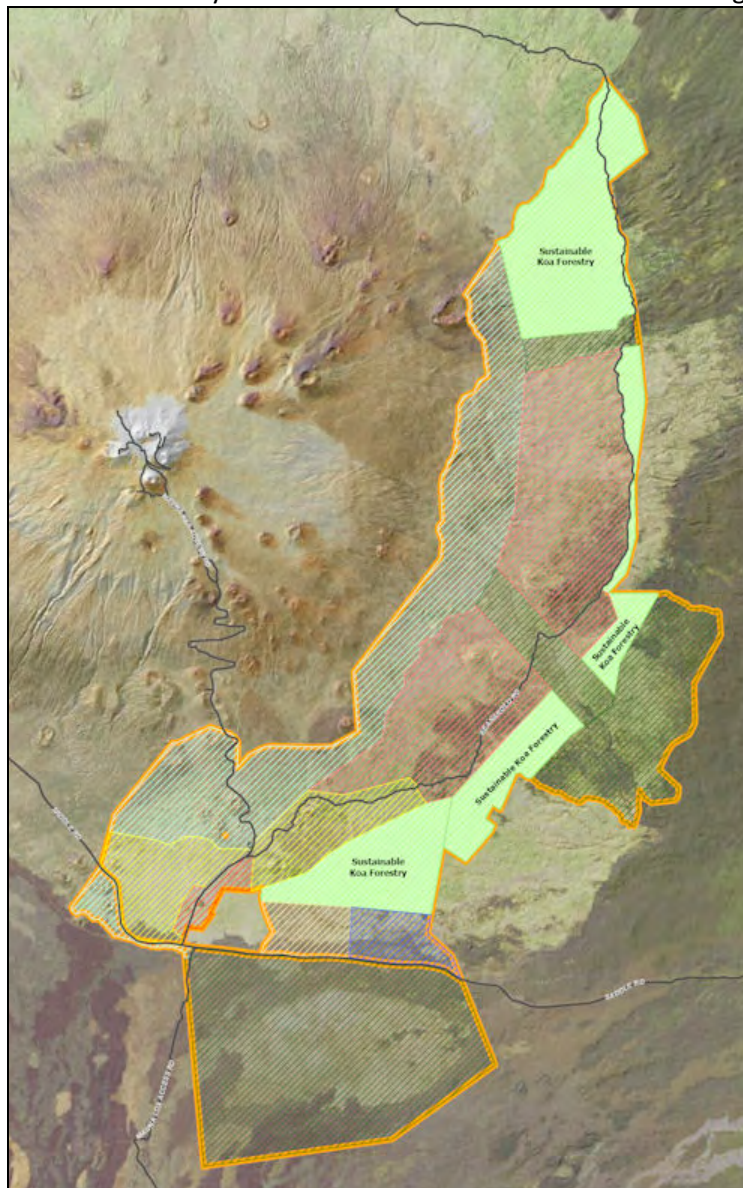


Map Noting Areas for Native Forest Restoration

Sustainable Koa Forestry (K1, K2, K3 K4, K5)

Planting and naturally regenerating sustainable commercial koa forests will include seed orchard development, seed collection, site preparation, outplanting, scarification, diversification plantings, harvesting and project monitoring.

- Initiate Safe Harbor Agreement, Habitat Conservation Plan
- Incorporate Forestry BMPs and prescribe silvicultural treatments
- Limit harvest hauling operations to 1 truck per day, from 6 am to 4 pm, weekdays
- Use existing infrastructure wherever possible (fencing, roads, stock ponds, etc)
- Appropriate trees will be retained for wildlife habitat and on-site seed production
- Fire hazards will decrease as fuels are reduced and healthy forests are re-established
- Scarifying the soil will remove non-native grasses and result in desired densities of naturally generated koa seedlings
- Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program

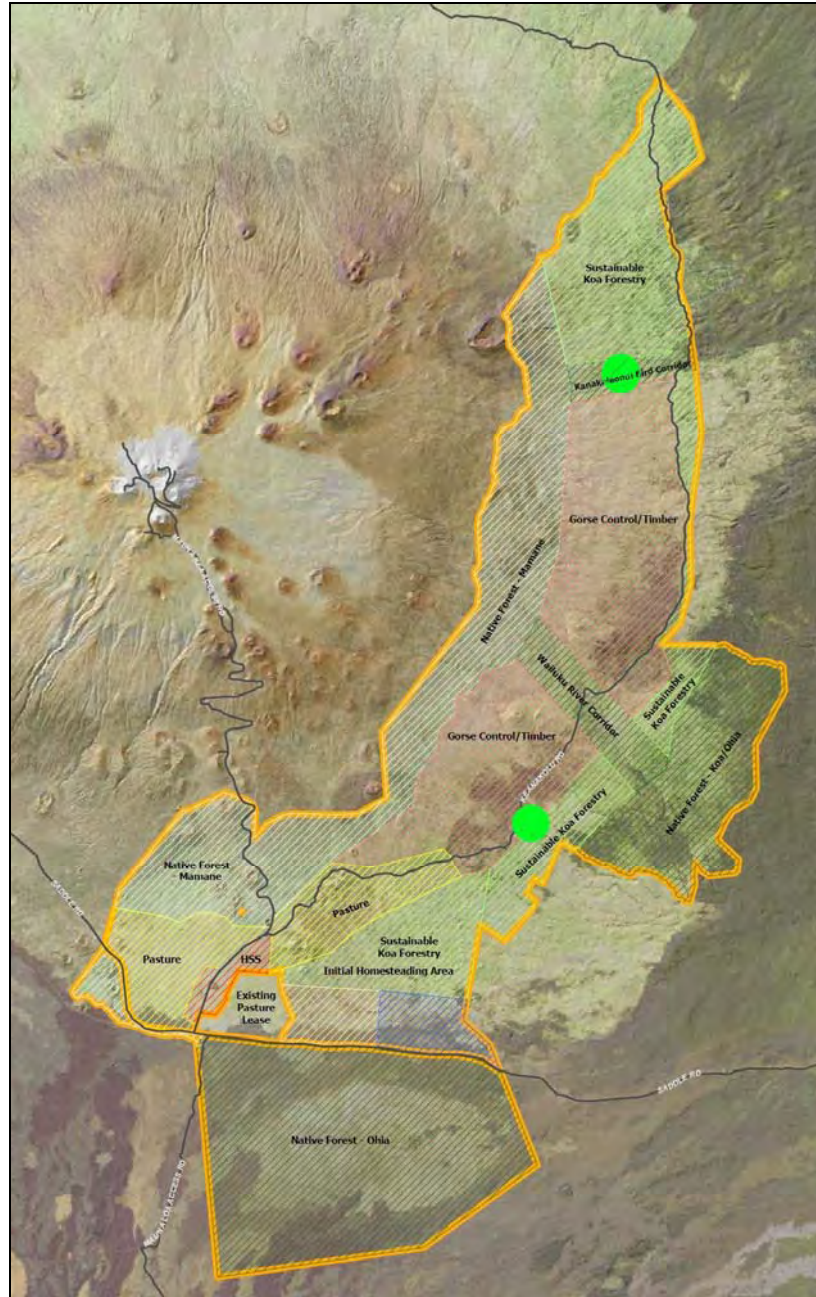


Map Noting Areas for Sustainable Koa Forestry

Outplanting Centers and Field Worker Accommodations

Management support centers are proposed for the Kanakaleonui Bird Corridor and near the former Pu'u 'Ō'ō Ranch headquarters, each with accommodations (for up to 20-person sleeping quarters capacity) with appropriate facilities (restrooms/baths, kitchen/dining), shadehouses and utility storage buildings. A campground area, for periodic need for expanded overnight stays, will be in the vicinity of the permanent facilities.

- Alternative Energy Use (water catchment system, photovoltaic system, low-wind-speed generators, fog drip augmentation system, composting toilets, septic, gray water reuse)
- Rather than workers/volunteers traveling to/from the property, the on-site accommodations will minimize traffic on public and site roads and reduce fuel use and costs

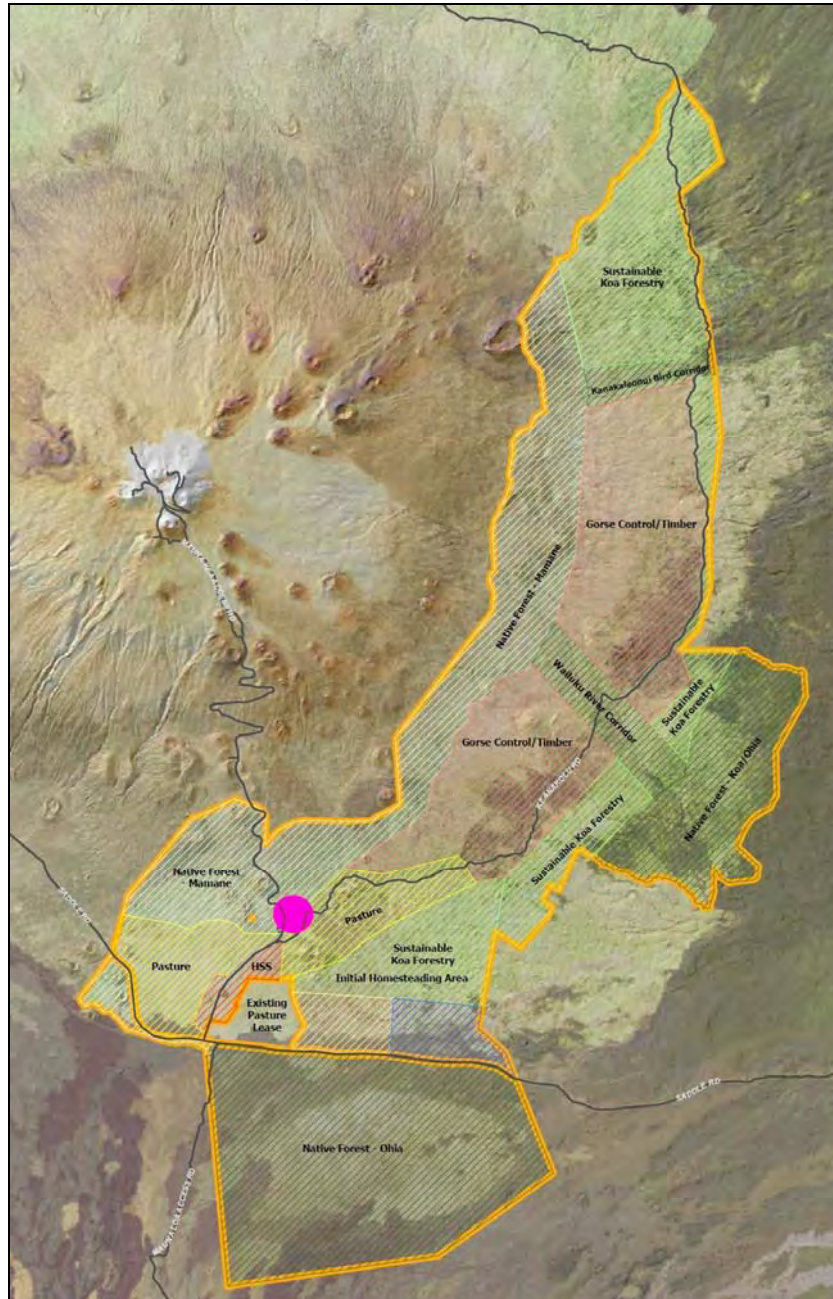


Map Noting Proposed Outplanting Centers (Shown in Green)

Administration Base Facility

The base facility will include office space, laboratory space, storage, meeting rooms, restrooms, showers, accommodations (caretaker's living unit; as well as lodging accommodations for up to 20-person sleeping quarters with appropriate facilities (restrooms/baths, kitchen/dining) for visiting scientists, dignitaries, volunteers and others) and support facilities.

- Alternative Energy Use (water catchment system, photovoltaic system, low-wind-speed generators, fog drip augmentation system, composting toilets, septic, gray water reuse)
- On-site accommodations will minimize traffic getting to and from the property
- Base facility/caretaker house will serve as a 24-hour presence and be a deterrent to inappropriate behavior, vandalism, etc



Map Noting Proposed Base Facility (Shown in Fuchsia)

Groundwater Water System

Development of well, groundwater distribution system and spring restoration for domestic use.

- Alternative Energy Use (photovoltaic system and low-wind-speed generators to power well pump)
- The water may be used for development of the property (human consumption,) as well as for fire management and native forest restoration support

Surface Water Catchment System

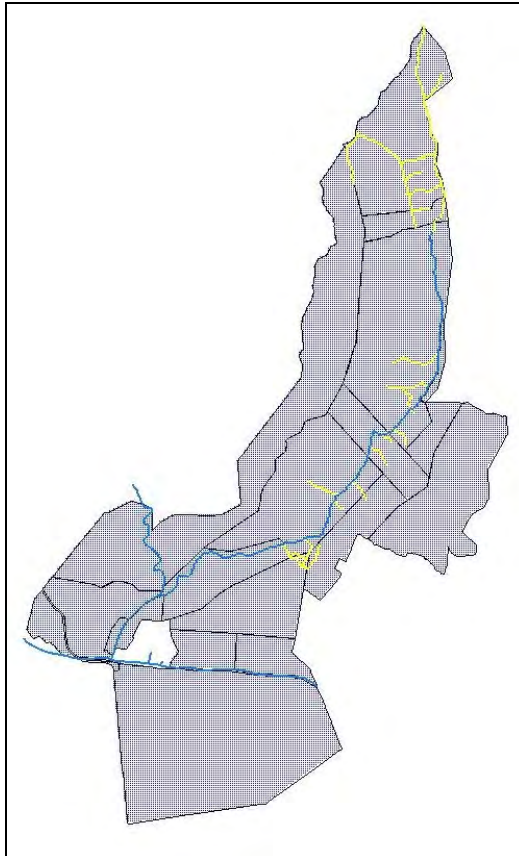
Development and management of surface water catchment system (reservoirs/stock ponds/tanks/catchment systems, (liner, piping, filtering, etc,)) fog drip catchment augmentation systems, water treatment facility(s), waterline distribution systems and site preparation.

- The water may be used for pasture, as well as for development of the property (possible human consumption,) fire management and native forest restoration support
- Use existing infrastructure wherever possible (fencing, roads, reservoirs/distribution, etc)

Road System

Improvement and development of road system across the property; site preparation, cinder/gravel/dirt with the exception of hard surfaces at steep slopes and at water crossings, other paving may occur.

- Efforts will be made to incorporate existing ranch roads into the road system
- Roads provide an added benefit of enhancing management access and serving as firebreaks
- Existing roads will be improved and with additional roads on the property travel will be dispersed and component roads will not have as much traffic, thus not be heavily impacted



Present Management Use of Historic Ranch Roads (Shown in Yellow) and Public Roads (Shown in Blue)

Pig Control and Management

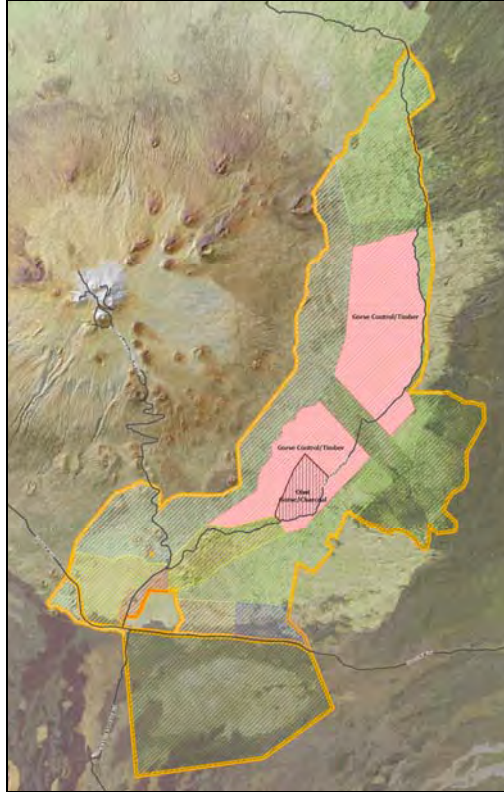
Pig management will involve removing all pigs from some areas (M1, M2, R1, R2, R3) and managing limited populations of pigs in other areas. In areas where pigs will be tolerated, population level awareness and responsive management strategies to maintain acceptable levels will be critical. Modeling techniques in animal control efforts will be used to ensure that population numbers are being reduced and maintained at desired levels. Pig control and management will be accomplished through fencing, trapping, capture, shooting (ground and aerial,) snares and hunting.

- Pig control and management allows for pig populations to be part of the ecosystem, where appropriate, so long as the resources are adequately protected
- Pig removal (in designated areas) will support native forest restoration efforts
- Pig management (in designated areas) will allow beneficiaries the opportunity of sport and food

Gorse Eradication through Commercial Timber Planting and Harvesting (T1, T2)

Approximately 10,000 to 15,000-acres where the gorse infestation is currently the most intense; area will be initially site prepped and planted/harvested with commercial trees to shade out and help eradicate the gorse.

- Tree species to be planted will be evaluated with minimum scores of L or L(Hawai'i) under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Evaluation Group 1 (low risk) in the Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs
- Initiate Safe Harbor Agreement, Habitat Conservation Plan
- Incorporate Forestry BMPs
- Harvest hauling operations limited to up to 10 trucks per day, from 6 am to 4 pm, weekdays
- Fire hazard will decrease as fuels are reduced and altered from brush and grasses to trees
- Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program

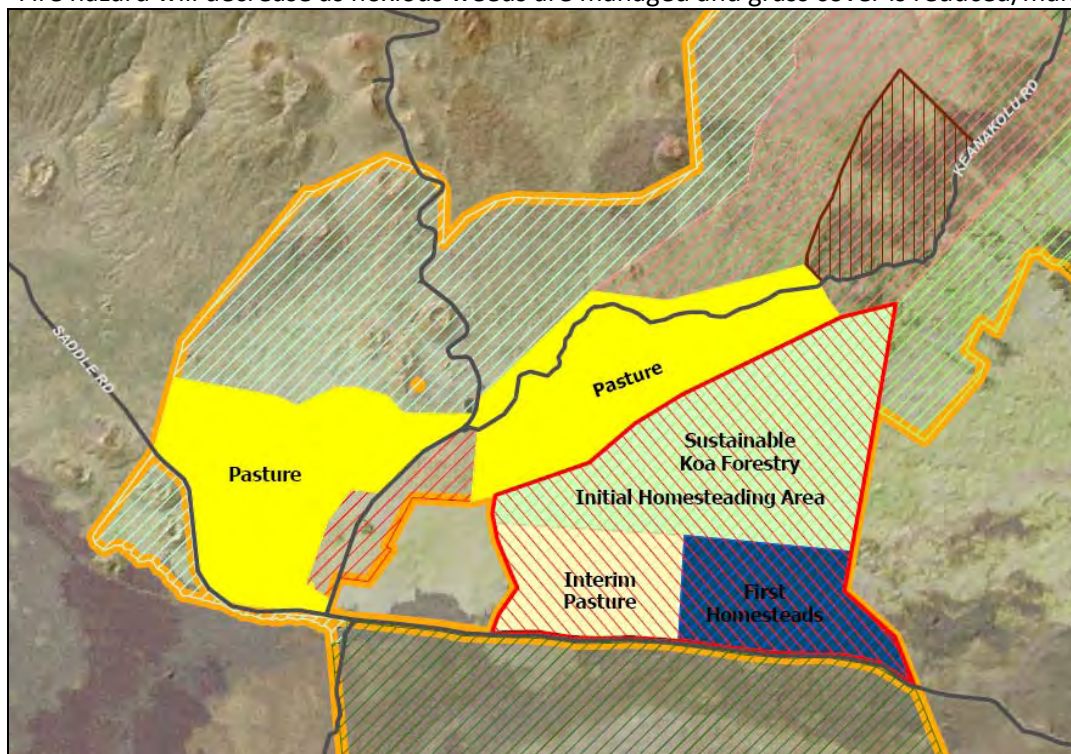


Map Noting Primary Gorse Eradication Area via Commercial Timber

Pasture (Interim and Long Term) (H2, P1, P2)

Fencing, roads and stock water improvements

- Use existing infrastructure wherever possible (fencing, roads, stock ponds, reservoir/distribution, etc)
- Certain trees will be retained and protected for wildlife habitat and on-site seed production
- Fire hazard will decrease as noxious weeds are managed and grass cover is reduced/managed



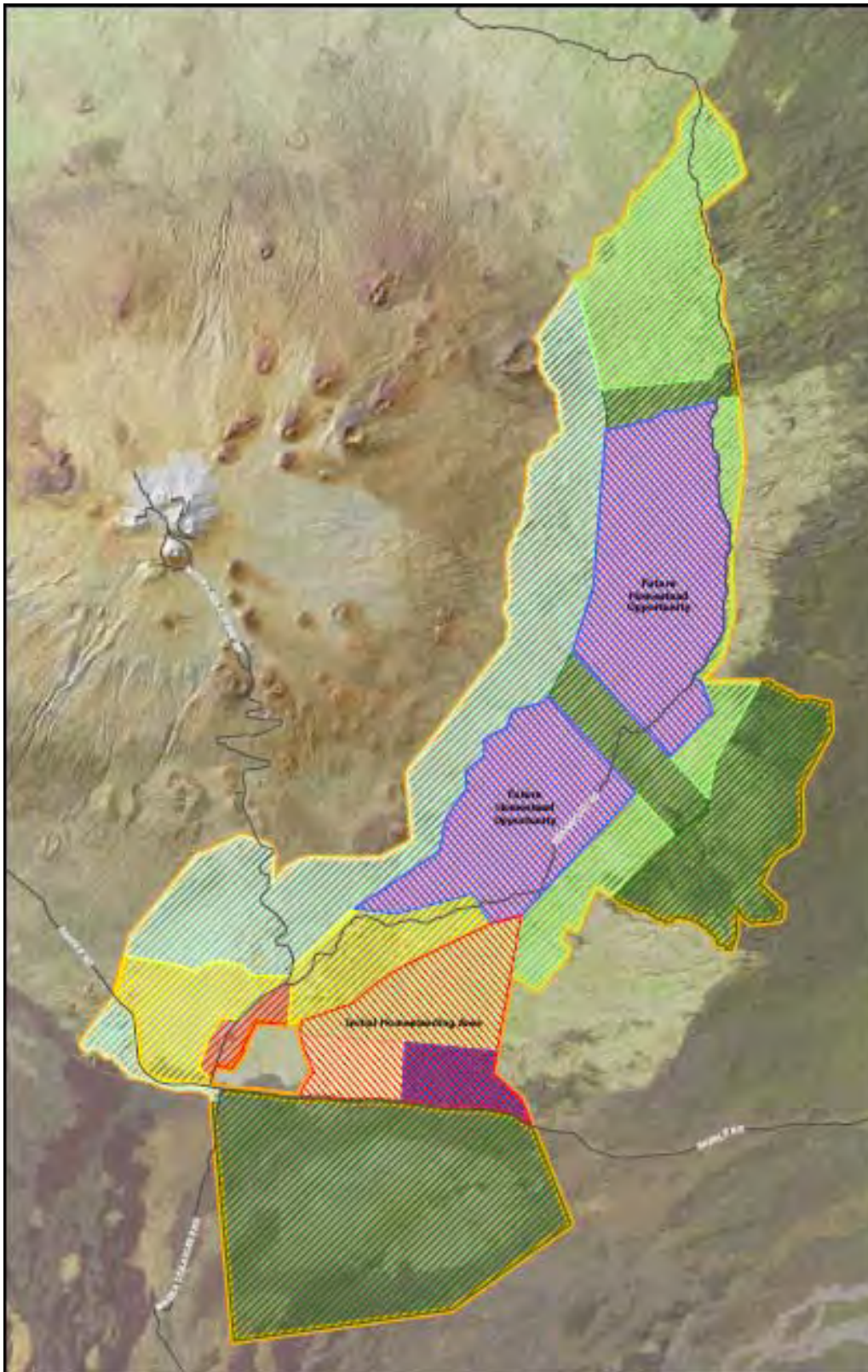
Map Noting Initial Homesteading Area, First Homestead Site and Pasture

Infrastructure for Initial Homesteading Area (H1, H2, K5)

Initially, 100 to 200-homesteads; rurally-developed infrastructure for homesteading projects and sites; home site preparation; unpaved (natural base, gravel/cinder or hard surface) roads to access the area and paving may occur in the future; water source will be by catchment with fog drip catchment augmentation (groundwater system may also be incorporated into the homestead development;) septic tanks, leach fields and/or composting toilets and alternative energy sources.

- Alternative Energy Use (water catchment system, photovoltaic system, low-wind-speed generators, fog drip augmentation system, composting toilets, septic, gray water reuse)
- Use existing infrastructure wherever possible (fencing, roads, etc)
- Adherence to construction BMPs
- Homestead design may incorporate passive solar technologies to assist with winter heating needs

To take advantage of opportunities to further demonstrate the focus on efficient, self-sustainable communities, as well as provide for cost-effective development, the Legacy Program considers a variety of rural-development homestead layouts to address various beneficiary needs: Cluster homestead sites with separate agricultural/pasture lot, Cluster homestead sites with community agricultural/pasture, homestead lot subdivision or a Combination of alternatives.

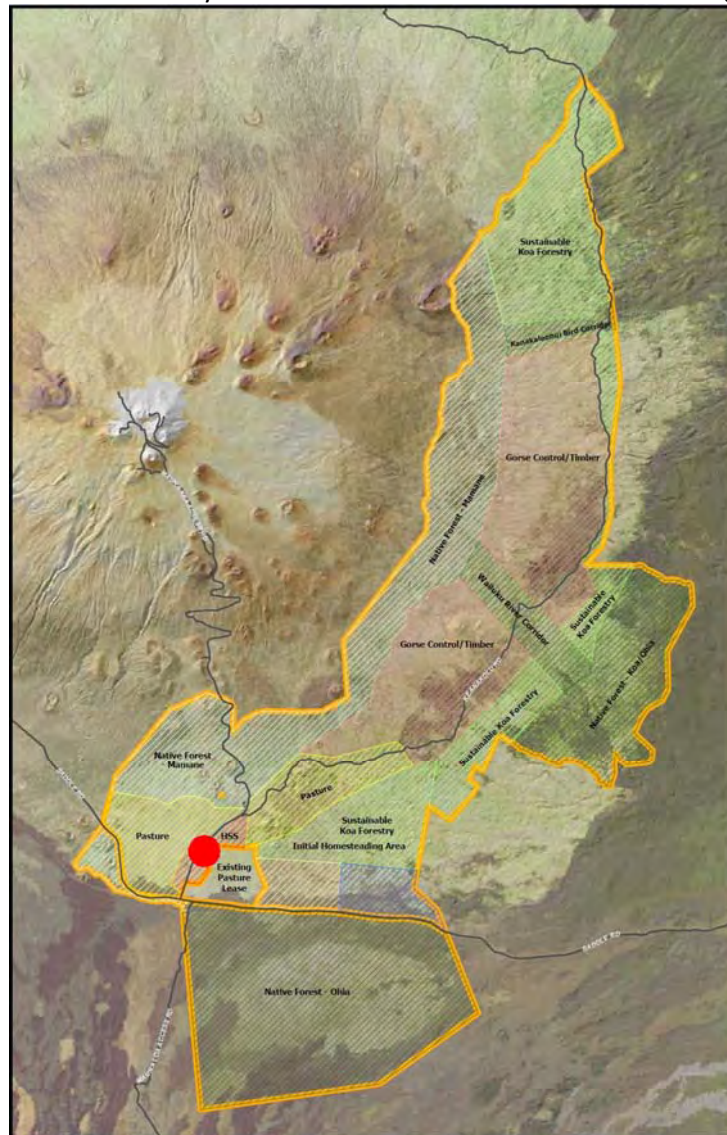


Map Noting Initial and Future Homesteading Opportunities

Sheep Station Adaptive Reuse (HSS)

Restoration of Humu'ula Sheep Station historic facilities, interim use as Administration Base facility and creation of campground and related facilities (up to twenty (20) cabins (120-person capacity) with appropriate facilities (restrooms/baths, kitchen/dining), camp store, eco-tourism staging/community center, campground area, one caretaker's living unit, one administrative unit with office and meeting rooms, utility storage buildings and a parking area.)

- The historic nature of the Humu'ula Sheep Station and related facilities will be retained
- Other structures may be built to enhance the historic nature of the area
- Use existing infrastructure wherever possible (fencing, roads, etc)
- Alternative Energy Use (water catchment system, photovoltaic system, low-wind-speed generators, fog drip augmentation system, composting toilets, septic, gray water reuse)
- Central staging area at Humu'ula Sheep Station for eco-tourism, small footprint for activities, central location for compliance related (i.e. briefings) issues
- Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program



Map Noting Humu'ula Sheep Station (Shown in Red)

Ecotourism overnight facilities proposed at or near (1) Pu'u 'Ō'ō Ranch headquarters, (2) in the vicinity of the former Kahinahina Forest cabin site, (3) in the vicinity of the existing Kanakaleonui cabin, (4) Pi'ihonua mauka and (5) north of the Dr. David Douglas Monument; each site with accommodations (for up to 20-person sleeping quarters capacity) with appropriate facilities (restrooms/baths, kitchen/dining) and utility/ storage buildings. A campground area, for periodic need for expanded overnight stays, will be around the permanent facilities. Improvement of existing and new trails for a variety of means to travel from remote accommodation to remote accommodation, as well as other ecotourism uses with shelters and rest areas.

-
- The map displays the Kona Forest Reserve with several distinct zones and boundaries. Key features include:
- Boundaries:** A thick yellow line outlines the main reserve area, while a thinner black line marks the "1955" boundary.
 - Land Management Zones:**
 - Sustainable Koa Forestry:** Indicated by green diagonal hatching.
 - Gorse Control/Timber:** Indicated by brown diagonal hatching.
 - Native Forest Reserve:** Indicated by green diagonal hatching.
 - Pasture:** Indicated by yellow diagonal hatching.
 - Existing Pasture Lease:** A small orange-outlined area within the pasture zone.
 - Initial Homesteaded Area:** A blue-outlined area within the pasture zone.
 - Native Forest - Other:** A large green area at the bottom of the map.
 - Geographical Features:**
 - Mauna Kea:** Labeled at the top left.
 - Mauna Kilauea:** Labeled at the bottom left.
 - Mauna Loa:** Labeled at the bottom right.
 - Mauna Kea - Kona:** Labeled at the bottom right.
 - Mauna Kea - Kona:** Labeled at the bottom right.
 - Infrastructure:**
 - Highway 11:** Labeled at the top left.
 - Highway 11:** Labeled at the bottom left.
 - Highway 11:** Labeled at the bottom right.
 - Other Labels:**
 - 1955:** A label near the boundary line.
 - Mauna Kea - Kona:** A label near the bottom right.
 - Mauna Kea - Kona:** A label near the bottom right.
 - Mauna Kea - Kona:** A label near the bottom right.

Environmental Assessment - 'Āina Mauna Legacy Program

Eco-tourism Facilities, Services and Activities

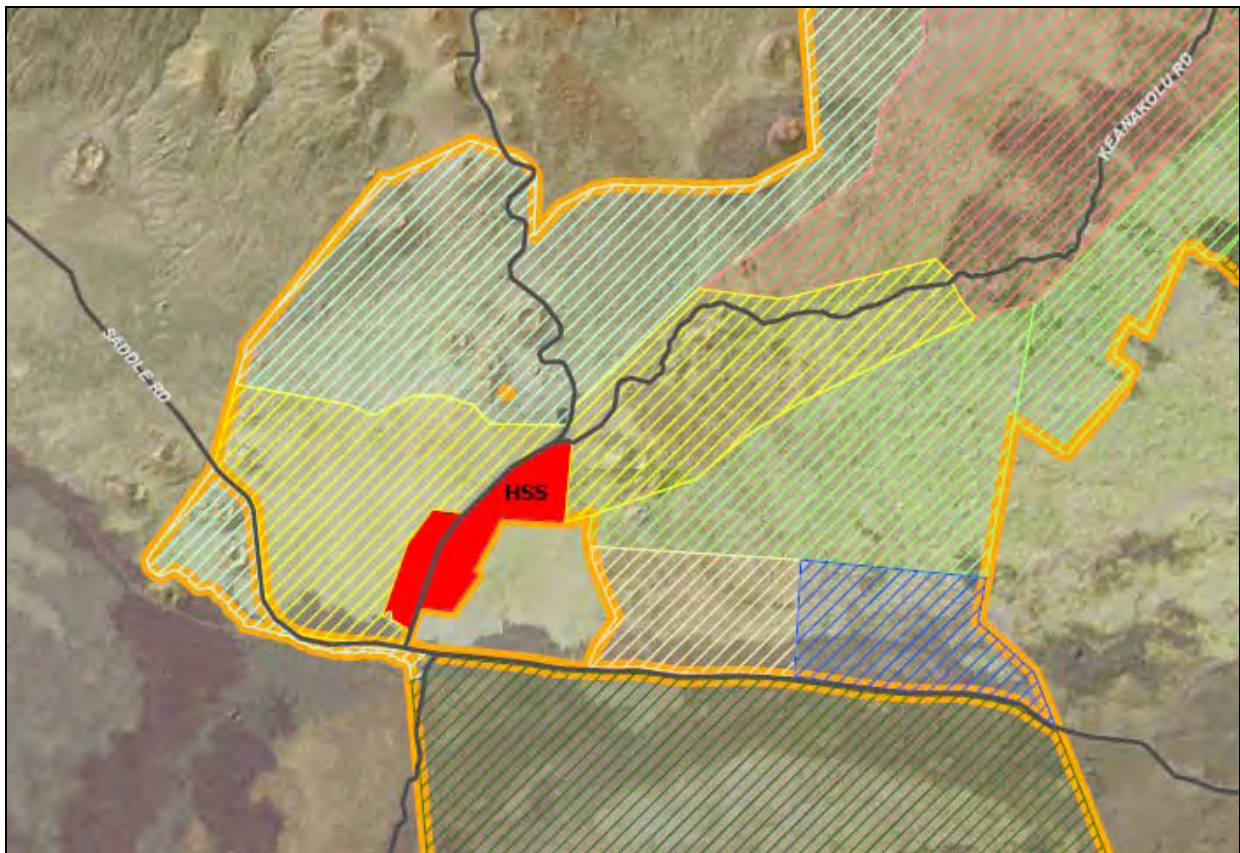
Expand eco-tourism facilities, services and activities with improvement of existing and new trails for a variety of tour opportunities; campgrounds, rest areas, shelters with cooking facilities, parking, lookouts, interpretive signage, board walks, horse corrals, barns, watering areas and storage as needed.

- Use existing infrastructure wherever possible (fencing, roads, reservoirs/distribution, etc)
- Alternative Energy Use (water catchment system, photovoltaic system, low-wind-speed generators, fog drip augmentation system, composting toilets, septic, gray water reuse)
- Guided groups having cultural, natural resources and safety briefings minimize impacts to the landscape and infrastructure
- Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program

Commercial Facilities and Activities (C1/HSS)

Develop commercial facilities and activities on the approximately 500-acres on either side of the Mauna Kea Access Road, surrounding the Humu'ula Sheep Station, including a lodge (up to twenty (20) units,) restaurant, visitor center, retail activities, office, commercial/general/convenience store(s), rest stops, gas station and other facilities that are appropriate to a transient or visitor market.

- Use existing infrastructure wherever possible (fencing, roads, etc)
- Alternative Energy Use (water catchment system, photovoltaic system, low-wind-speed generators, fog drip augmentation system, composting toilets, septic, gray water reuse)
- Re-vegetation with native plants will occur in areas disturbed by construction activities
- Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program



Map Noting Area for Commercial Activities including the Humu'ula Sheep Station Site (Shown in Red)

Research

Conduct research and monitoring to further increase the knowledge base on natural and cultural resources, and habitat and wildlife management. Research projects will address a wide range of natural and cultural resource, as well as management issues such as establishing koa seed orchards, specific weed control strategies, and reforestation and restoration strategies. Collect scientific information (inventories, monitoring, research, assessments, etc) necessary to assist in adaptive management decisions.

- Research activities will contribute to the enhancement, protection, use, preservation and management of wildlife populations and their habitats (on and off 'Āina Mauna lands) and be used to evaluate achievement of resource management and Legacy Program objectives.
- Create partnerships with research entities (e.g. University of Hawai'i, USFS, USFWS, DLNR)
- Research work on site will be governed by a Memorandum of Agreement between the DHHL and its research partners
- Utilize proper cleaning of investigator equipment and clothing, as well as quarantine methods, where necessary, to minimize the potential spread or introduction of invasive species

1.5 Responsible Agencies and Funding

The State of Hawai'i under the Department of Hawaiian Homes Lands (DHHL) is owner of the approximately 56,200-acres that the Legacy Program encompasses. DHHL is the responsible agency for this project. To date there has been an annual budget of approximately \$250,000 from DHHL Trust funds allocated for the implementation of the 'Āina Mauna Legacy Program (besides the development of this Environmental Assessment). As noted in the 'Āina Mauna Legacy Program mission, a fundamental principle is that the program is economically self-sustaining. That means costs are covered by revenue generated from the property.

Therefore, revenue generation for minimal/non-impact activities is necessary in order to fund management and implementation activities. It is the intention of the program, that during the implementation phase, revenue generating items be initiated in order to raise funds for management and implementation of the 'Āina Mauna Legacy Program. Without the funding from activities such as ecotourism, remote accommodations, sheep station adaptive reuse etc, full funding of non-income generating efforts cannot occur.

It should be noted that over the implementation of the Legacy Program, approximately 50% of the 56,000-acre area will be managed as "conservation" areas – primarily māmane forest. Additionally, when koa and 'ōhi'a forests are restored as planned, 88% of the 'Āina Mauna area will consist of native forest.

1.6 Project Development Status and Implementation Schedule

DHHL is looking at its responsibility as a land manager not just to provide homesteads to its beneficiaries, but also to provide for the management and protection of native lands to support both cultural and resource management activities and create sustainable homesteading opportunities for the future. Therefore, the 'Āina Mauna Legacy Program is to be developed to take into consideration not only the immediate needs of the area, but also traditional cultural knowledge and how best to manage the legacy of the area for future generations. By creating a sustainable plan for the area, the lands can be conserved and restored while also providing an economic resource for DHHL and its beneficiaries.

The time commitment for the Legacy Program and restoration of the land is long term, essentially for the next 100-years and beyond. However, it is expected that each of the actions will be implemented immediately and well underway in 5 to 10-years.

When and which parts of the Legacy Program get implemented first will depend on a variety of factors including funding, administrative priorities and regulatory processes. The timeframe of some of these factors are relatively unknown and thus, one can only predict the timeframe the Legacy Program will take. Initial estimates have construction beginning in 2012.

1.7 Required Permits and Approvals

A number of permits or other approvals may be necessary prior to implementation of the Legacy Program. The following list (Table 1.7.1) represents those permits or approvals identified to date. Additional permits might be identified subsequently if warranted by Legacy Program modifications, mitigation measures or refinements in final design.

Table 1.7.1 - Permits and Approvals

Permit / Approval	Applicable Activities	Applicable Areas	Regulatory Agency
Historic Sites Review	Any construction at or near a designated historic place or archaeological site.	Sites listed on or eligible for National or State registers of historic places	State Department of Land and Natural Resources (DLNR), Historic Preservation Division (SHPD)
State Highways Permit	Any work within State highway ROW	Within State highway ROW	State Department of Transportation (DOT)
Permit to Construct an Air Pollution Source	Constructing or installing a new air pollution source or modifying an existing source.	Statewide	State Department of Health (DOH)
National Pollutant Discharge Elimination System (NPDES)	Discharge of any pollutant, altering the quality of any discharge, increasing the quantity of any discharge.	Surface streams and coastal waters of the State	DOH
Subdivision Approval	Dividing or consolidating parcels of land for right-of-way.	Statewide	Per DHHL/County of Hawai'i MOA
Site Preparation and Stockpiling Permits	Any mechanical removal of vegetation from the soil, or the purposeful accumulation and set-aside of loose soil.	Statewide	Per DHHL/County of Hawai'i MOA
Construction Permits	Construction Activities	Statewide	Per DHHL/County of Hawai'i MOA
Grading Permit	Grading	Countywide	Per DHHL/County of Hawai'i MOA

Chapter 2 - Project Description

2.1 Summary of Project Description

Chapter 1 provided brief, bullet-point summaries of the actions called for in this EA; the following are descriptions of the 16 actions that this Environmental Assessment addresses in greater detail. Included is background and other relevant information for the reader to better understand the basis for the 'Āina Mauna Legacy Program and its actions.

2.2 Summary of Project Actions

2.2.1 Native Forest Restoration (M1, M2, R1, R2, R3, R4)

The foundation of the 'Āina Mauna Legacy Program is the protection and restoration of the DHHL lands at Humu'ula/Pi'ihonua. After 150-years of sheep and cattle ranching, the formerly dense forest became significantly altered by these activities and the forest landscape was converted primarily to open pasture land. In order to be consistent with the 'Āina Mauna Legacy Program's Mission, Goals and Priority Issues, certain areas of the site need to be converted out of pasture and returned and restored to native forest.

Forests are critically important to everyone in Hawai'i. Virtually all our fresh water comes from the forest. Also clean air, recreation areas, habitat for native species found only in Hawai'i, plants for cultural practices and woods for fine arts are among the thousands of forest benefits.

Koa and 'ōhi'a forests are found in the lower portions of Pi'ihonua, especially in the lands adjacent to the Hakalau Forest National Wildlife Refuge. Scattered koa and māmane are found over the northern portions of Humu'ula, with scattered māmane found in the upper elevations, especially adjacent to the Mauna Kea Forest Reserve. The māmane forests serve as critical habitat for the palila. Additionally, the koa/'ōhi'a and koa/māmane forests provide habitat for several endangered and threatened native bird species.

The lands of the 'Āina Mauna represent the most important native forest areas remaining in the DHHL trust. Based on soil, elevation and rainfall characteristics, there are an estimated 17,800-acres in Humu'ula and adjacent Pi'ihonua mauka that could be restored back to a healthy, diverse native koa and 'ōhi'a forest ecosystem. Likewise, there are approximately 10,000-acres across the mauka portions of the property that can be restored to māmane forest, a critical Palila bird habitat.

There are strong recommendations to enhance and restore various areas in the overall property because of their importance as habitat, biodiversity and condition (and ability to restore) as native forest. The setting aside, protection and restoration of these areas is critical for the protection, restoration and enhancement of 'Āina Mauna. The native forests can also act as wildlife corridors, which help, provide a contiguous habitat from lower koa forest to higher elevation māmane forest to facilitate the migration of native forest birds between these habitats. As a means to assist in the funding of the restoration and enhancement of these areas, the department may negotiate long term and/or permanent conservation easements and/or leases with various entities.

It is the intent of the Legacy Program that the areas conserved as native forest are not commercially-harvested on a large scale and are instead left as biodiverse habitat, areas for opportunities for ecosystem services: provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and crop pollination; cultural, such as spiritual and recreational benefits; and preserving, which includes guarding against uncertainty through the maintenance of diversity.

Additionally, the restored, healthy native forest provides a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory. The native forest is more than just trees; it includes the various ferns and other levels of understory, mosses, etc making up a biodiverse ecosystem and habitat of various insects, plants and animals. This understory will need to be restored, as well.

In higher elevation areas and conservation corridors designated for native forest restoration, replanting efforts will focus on diversification, using combinations of native plants grouped together (for example, pūkiawe, pilo, ‘a‘ali‘i, pāwale, and āweoweo) that will grow outward until they all connect into one diverse native forest. Additionally, natural processes will be utilized to distribute seed (e.g. wind, birds etc.). Māmane will be planted as an overstory tree to complement these high elevation species. Koa and Ōhi‘a will be planted at lower elevation conservation sites as necessary.

Māmane will be planted as an overstory tree to complement these high elevation species. Koa and Ōhi‘a will be planted at lower elevation conservation sites as necessary. In other restoration areas, koa and Ōhi‘a establishment will rely primarily on natural regeneration, including bird and wind dispersal, and less on out-planting. Soil scarification and retention of organic matter on site should result in koa and Ōhi‘a recruitment. This will be augmented, as needed, by out-planting in large areas where a koa seed source, for example, is not present. Over time, it is expected that an established overstory will allow understory diversification via bird and wind seed dispersal.

Monitoring is an important component of native forest management program. Conducting monitoring and research to determine efficacy of control measures and to identify occurrences and distribution of other new species, will be needed as well.

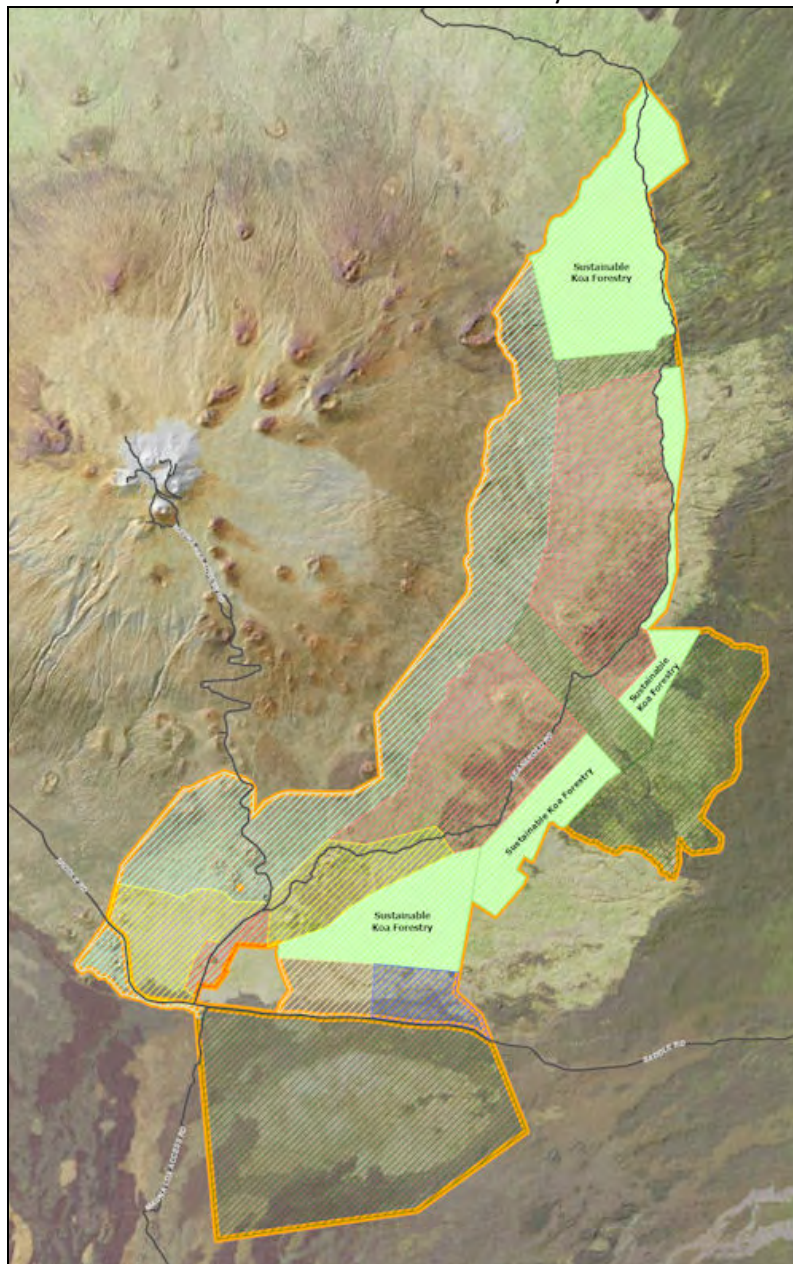
2.2.2 Sustainable Koa Forestry (K1, K2, K3 K4, K5)

Koa is one of the predominant tree species found naturally in the ‘Āina Mauna. It is presently the highest value timber crop in Hawai‘i. It grows easily and well in this area, if introduced ungulates are removed. Restoring portions of the ‘Āina Mauna lands to koa through carefully planned and managed reforestation is its highest and most compatible economic use.

Sustainable koa forestry opportunities can take on two distinct actions. The first is the salvaging of current koa trees (targeted, as well as dead and dying.) The other is the planting and harvesting of koa as a tree crop. A restored sustainable koa forest provides several opportunities and options for future decision-making by DHHL. A sustainable koa forest will provide jobs and generate income to the DHHL trust.

Koa forest restoration, with the focus on sustainable commercial forestry management practices, can be very lucrative. Management of DHHL lands as koa forests combines high quality hardwood returns from the sale of koa wood, eco-tourist opportunities as the forest is restored, and cultural uses such as gathering, crafting and canoe logs. Additionally a sustainable koa reforestation and koa salvage program will:

- Salvage koa trees before they are further reduced in value by weather, rot and age, leaving certain trees for wildlife habitat and on-site seed production;
- Promote forest-based economic opportunities in the community;
- Generate income for DHHL;
- Promote koa regeneration from existing seed present in the soil;
- Provide a source of koa wood for Hawai'i's forest industry



Map Noting Areas for Sustainable Koa Forestry

DHHL has already implemented a koa salvage program at Humu'ula. From 2003 to 2005, approximately 100-acres of koa salvage harvest created five full time jobs, supplied enough koa wood to meet the annual needs of at least 60 woodworkers and generated an average of \$3,500 per acre per year in trust revenues. Additionally, DLNR has conducted a study on its neighboring land and is implementing a like program. Each target dead and/or dying koa and allow contractors to enter the property and harvest.

Likewise, based on soil, elevation and rainfall characteristics, there are an estimated 15,000 to 20,000-acres on the site that could be restored and managed as commercial koa forest. Many of these lands are currently covered in gorse and will require a long term commitment to restoration and conversion through multiple rotations of eucalyptus and/or Sugi pine, prior to conversion to koa.

Actions to restore and manage a sustainable koa forest harvesting regime include developing koa seed stock for koa forest restoration activities, monitoring and partnering with the DLNR Tree Nursery, U.S. Fish & Wildlife Service Hakalau Forest National Wildlife Refuge and other native plant propagation centers.

A restored sustainable koa forest provides several opportunities and options for future decision-making by DHHL. Portions could be restored to biodiverse native forest, large-scale commercial koa harvesting could take place or portions of the property could be divided into homesteads. Portions of the property could be considered for future agricultural (sustainable koa forested) homestead opportunities, affording homesteaders a sustainable koa forest as a part of their homestead. A sustainable commercial koa harvesting regime will provide needed funding for DHHL to undertake the many other activities in the Legacy Program.

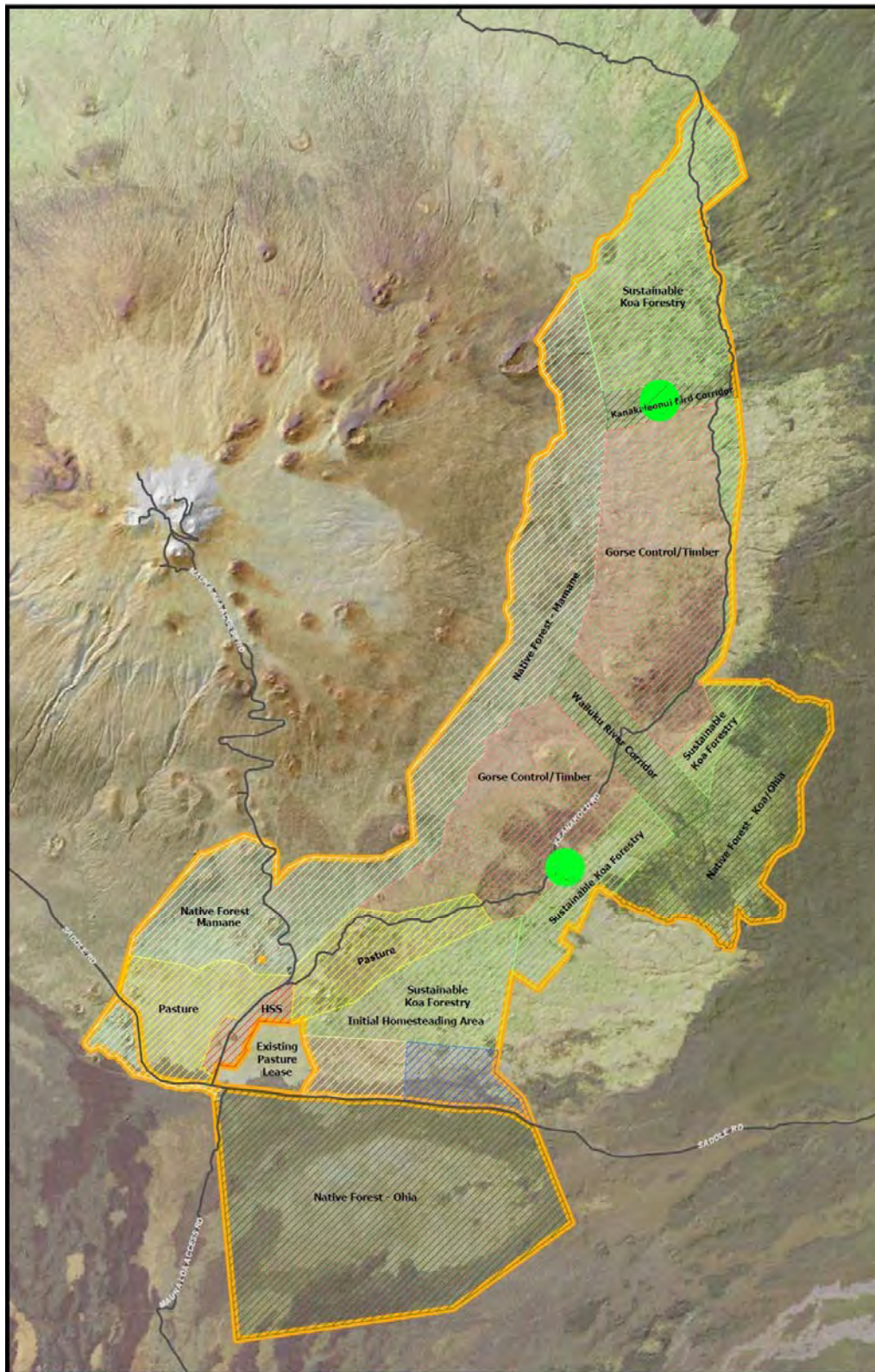
2.2.3 Outplanting Centers and Field Worker Accommodations

The DHHL 'Āina Mauna region is approximately 19-miles long by 6-miles across. This is a vast 56,000-acres. A large majority of this area will be restored to native forest and a significant area will be planted in commercial koa. This restoration effort will require an estimated 10-million new tree and shrub seedlings. This large amount of tree seedlings requires that outplanting facilities be built to provide suitable outplanting sites for seedling to be outplanted and raised.

Foresters agree that propagation of seeds from the reforestation areas will work best with replanting, so it is important that the seedlings be from the area into which they will be planted. This is why the establishment of outplanting centers on site is so critical.

The remoteness of certain areas across the 'Āina Mauna property also dictate that centralized outplanting facilities be placed in Kanakaleonui and north of Pu'u 'Ō'ō. These outplanting centers will be used for both the native forest and sustainable commercial koa reforestation, and include offices, laboratories and storage.

Additionally, the labor involved in propagating and planting over 10-million trees is extensive. A highly skilled, experienced planter can plant approximately 1,000-trees per day (this is planting only, not site preparation, fertilization or other management functions). In order to best utilize the tree planters, having them stay within the planting area, for multiple days, serves a variety of purposes. Thus, outplanting facilities will also include structures for overnight field worker accommodations.



Map Noting Proposed Outplanting Centers (Shown in Green)

Laborers will be able to work longer days, planting more trees at a time, not having to commute to and from the site. Having the workers stay on site will considerably cut down on the amount of traffic coming in and out of the area (limiting their use of roads to Mondays and Fridays), thus cutting down on the usage of the road (wear and tear) and reducing other traffic impacts.

The cost of professional tree planters and the amount of trees needs to be planted presents an opportunity to utilize additional resources in the planting efforts, as well. Volunteers are an excellent supplement to these tree planting activities.

On weekends, holidays and other times, when the field workers are off-site, volunteers can be organized to plant trees, prepare areas for planting, weed, help with outplanting, etc. The field worker accommodations can also be utilized to house the volunteers, providing them more time for activities and cutting down on traffic across the site, and limiting their use of the roadways to weekends.

Additionally, once the trees are planted, the area will still need to be managed and maintained. Research, monitoring and education components will be phased into the area, as well. The field worker accommodations will provide places for scientists, educators, managers, field workers and volunteers to stay while utilizing and experiencing the area; or, the facilities could be used for ecotourism or other overnight uses.

2.2.4 Administration Base Facility

Due to the scope and scale of the Legacy Program, respective DHHL Divisions will implement the Legacy Program under their existing structures, funding and procedures.

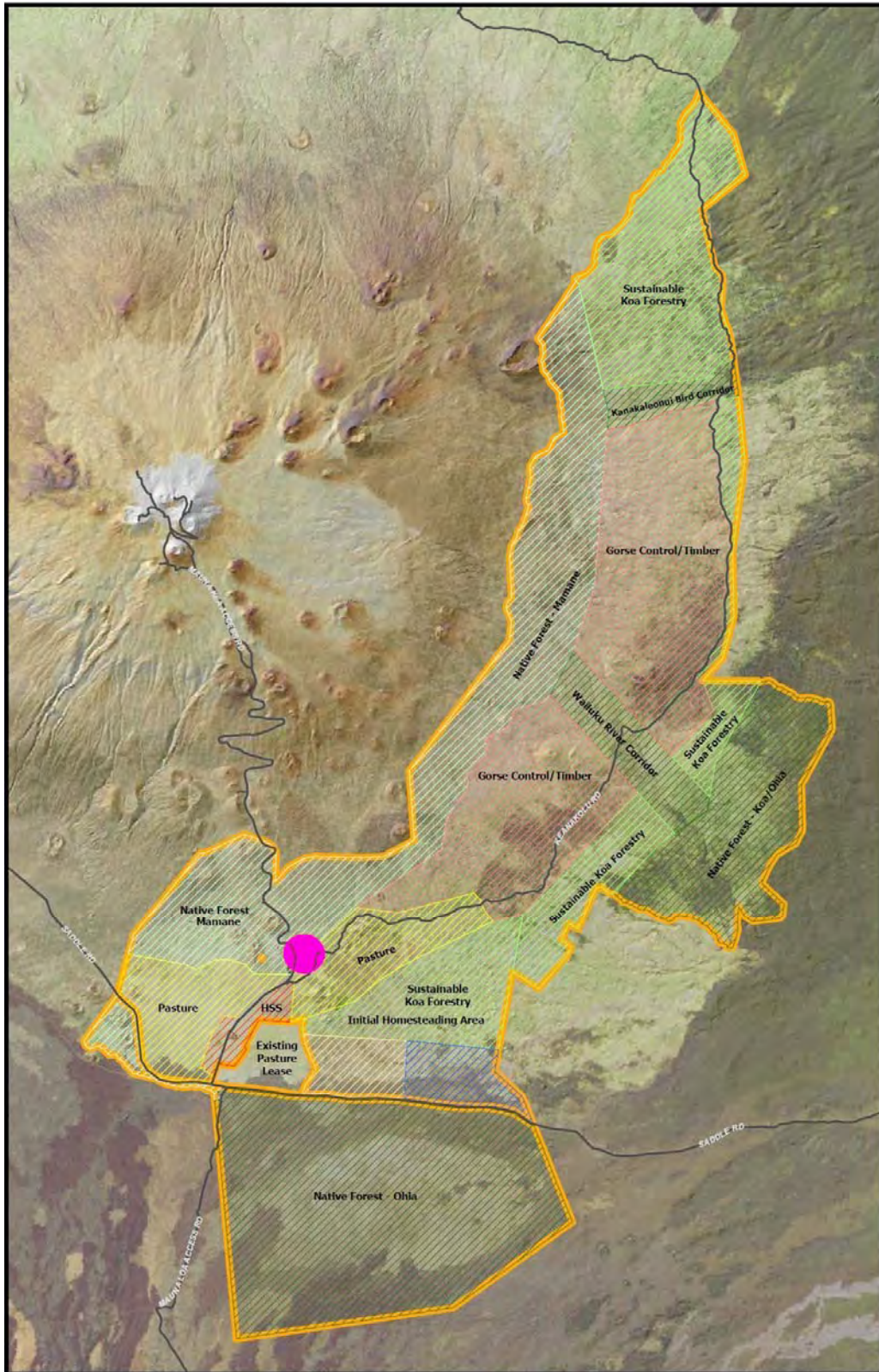
To complement existing DHHL staff working within the 'Āina Mauna, the Legacy Program recommends that at a minimum, three new positions be added and formed within the Land Management Division for implementation and management of the Legacy Program.

The three new positions are proposed to be added and formed within the Land Management Division for implementation and management of the Legacy Program. The positions are Program Coordinator; Contract Management, Compliance and Grant Specialist; and Field Worker.

These positions will be located on-site, thus, an office and complementary facilities are needed to house their operations, in the form of a base facility. The Administration Base Facility will be located in the upper portion of the 500-acre Sheep Station site/commercial site or above the Mauna Kea Access Road and Keanakolu-Mana Road intersection.

Besides offices, the Administration Base facility will consist of accommodations, office space, storage, meeting rooms, restrooms, dormitories, shadehouses, outplanting center and laboratory. Additionally, a staff residence/caretaker house will serve as a 24-hour presence at the Administration Base Facility.

An additional staff residence/caretaker house will be located at the other end of the DHHL property on the Keanakolu/Mana Road, near the DLNR Keanakolu Station, to serve as a presence on the north end of the property.



Map Noting Proposed Base Facility (Shown in Fuchsia)

2.2.5 Groundwater System

Water is a significant and critical limiting factor for use of the site. Many of the proposed activities require expanded water source and distribution improvements. These include pasture uses, homesteading, eco-tourism operations, expanded use of the Humu'ula Sheep Station, forest restoration, commercial timber operations, development of outplanting centers and fieldworker accommodations, use and development of remote accommodations and development of an administration base facility.

Currently, water is hauled from outside supply sources to serve neighboring entities such as Pōhakuloa Military Training Area and Mauna Kea Science Reserve.

There are a few water tanks on the parcel, as well as several water reservoirs and springs. Current groundwater water sources and distribution systems are not adequate to supply the water needed for the Legacy Program development.

The development of a well and groundwater system could provide adequate water to implement the Legacy Program. However, groundwater development (well) is less flexible and more expensive than other water options such as water catchment. Ideally, follow-up work will need to be done to verify the availability of potential well sites, the condition of the springs and ability to rehabilitate existing water infrastructure to possibly provide groundwater to the overall property.

2.2.6 Surface Water Catchment System

As stated above, water is (and will continue to be) a significant and critical limiting factor for use of the site. Many of the proposed activities within the Legacy Program require expanded water source and distribution improvements.

In addition to conventional catchment systems (involving water tanks and reservoirs), which are already in use on site, part of the on-going activity to expand water sources and distribution will be the use of systems that are designed to capture rain clouds and fog drip in and around the storage systems.

This could include the installation of nets and/or other devices that are designed to intercept additional moisture as the clouds/fog roll across the property. Given the location and nature of the proposed homestead areas, it is anticipated that this enhanced water capturing approach will be used and successful in the homestead development, as well.

Alternatives are underway to investigate and test maximum capture of cloud and fog drip into catchment systems. While restoration of the forest can enhance water capture of the cloud and fog drip for the landscape, alternatives need to be explored to enhance water capture for homestead use.

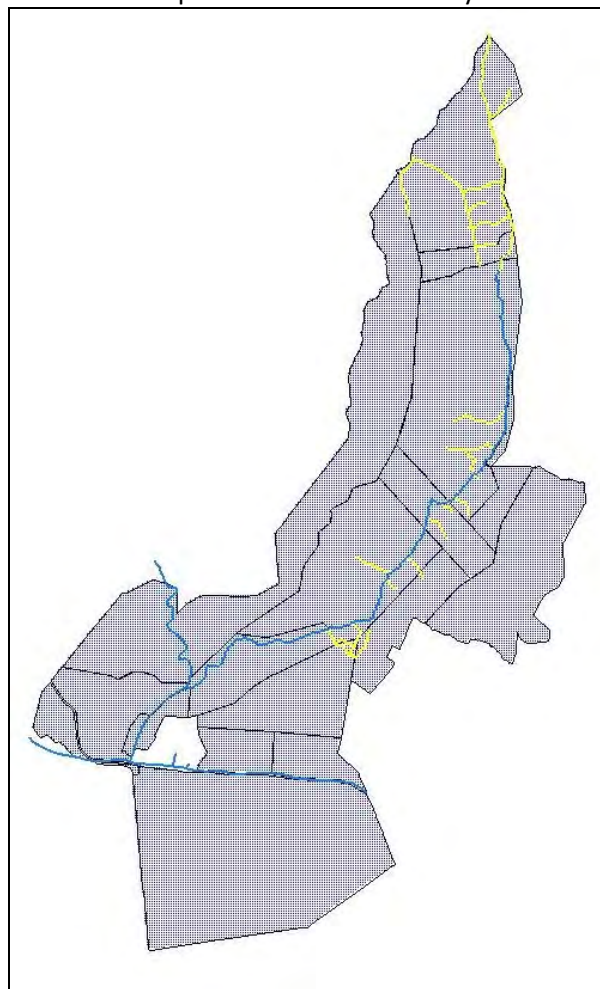
2.2.7 Road System

The primary access to the site is from the Saddle Road, a paved two-lane highway connecting East and West Hawai'i. Additionally, the publically-owned and maintained Mauna Kea Access Road and the Keanakolu-Mana Road traverse the property. Numerous internal 4-wheel drive ranch-style roads lead from the Keanakolu-Mana Road and are primarily used for existing management actions, fire management and gorse eradication operations.

The recent Saddle Road improvement project established several access points fronting the DHHL 'Āina Mauna property. The lowest, near the 23-mile marker provides an improved intersection and access road that cuts through the lowest portion of the area proposed for homesteading. Additionally, there are other designated and improved access points near the 26-mile marker, Kipuka Āinahou and the 27-mile marker. As noted in the traffic impact section of this EA, the Saddle Road improvements address the anticipated demand in the area which includes the preferred alternatives described in this EA.

In order to implement the Legacy Program, internal road infrastructure will need to be expanded and improved. Roads will be built to access a variety of areas within the 'Āina Mauna including pasture areas, homesteading sites, forest restoration areas, commercial timber operation areas, outplanting centers and field worker accommodations, remote accommodations and the administration base facility.

Homestead lot access may be provided at multiple ingress/egress access roadways, to/from Keanakolu-Mana Road and Saddle Road. The proposed internal homestead area road network will be non-dedicable rural roads. This includes a roadbed of packed gravel/cinder, paved where the slope exceeds 8% and unlined drainage swales on each side of the roadway. Because of the rural nature of the area, most roads will be cinder/gravel, with some only being accessible by 4-wheel drive vehicle. Wherever possible, former ranch roads will be incorporated into the road layout.



Present Management Use of Historic Ranch Roads (Shown in Yellow) and Public Roads (Shown in Blue)

2.2.8 Pig Control and Management

Pigs can be vectors for the spread of invasive species (including gorse) and can have a negative influence on native forest restoration. Pigs can impact native plants and ground cover, facilitating sediment run-off. The soil disturbance caused by rooting pigs can facilitate the introduction and expansion of invasive plants and can create breeding grounds for mosquitoes that transmit avian disease to native forest birds.

Pig management will involve removing all pigs from some areas (M1, M2, R1, R2, R3) and managing limited populations of pigs in other areas. Pig control and management allows for pig populations to be part of the ecosystem, where appropriate, so long as the resources are adequately protected. Pig removal (in designated areas) will support native forest restoration efforts. Pig management (in designated areas) will allow beneficiaries the opportunity of sport and food.

In areas where pigs will be tolerated, population level awareness and responsive management strategies to maintain acceptable levels will be critical. Modeling techniques in animal control efforts will be used to ensure that population numbers are being reduced and maintained at desired levels.

Pig control and management will be accomplished through fencing, trapping, capture, shooting (ground and aerial,) snares and hunting.

2.2.9 Gorse Eradication through Commercial Timber Planting and Harvesting (T1, T2)

Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. Gorse has become established in extensive stands on the eastern slope of Mauna Kea and the Humu'ula/Pi'ihonua mauka areas have suffered from heavy infestations of gorse as well. In addition, gorse has a life span of 30 to 40-years while the seed can remain viable in the soil for up to 70-years after that.

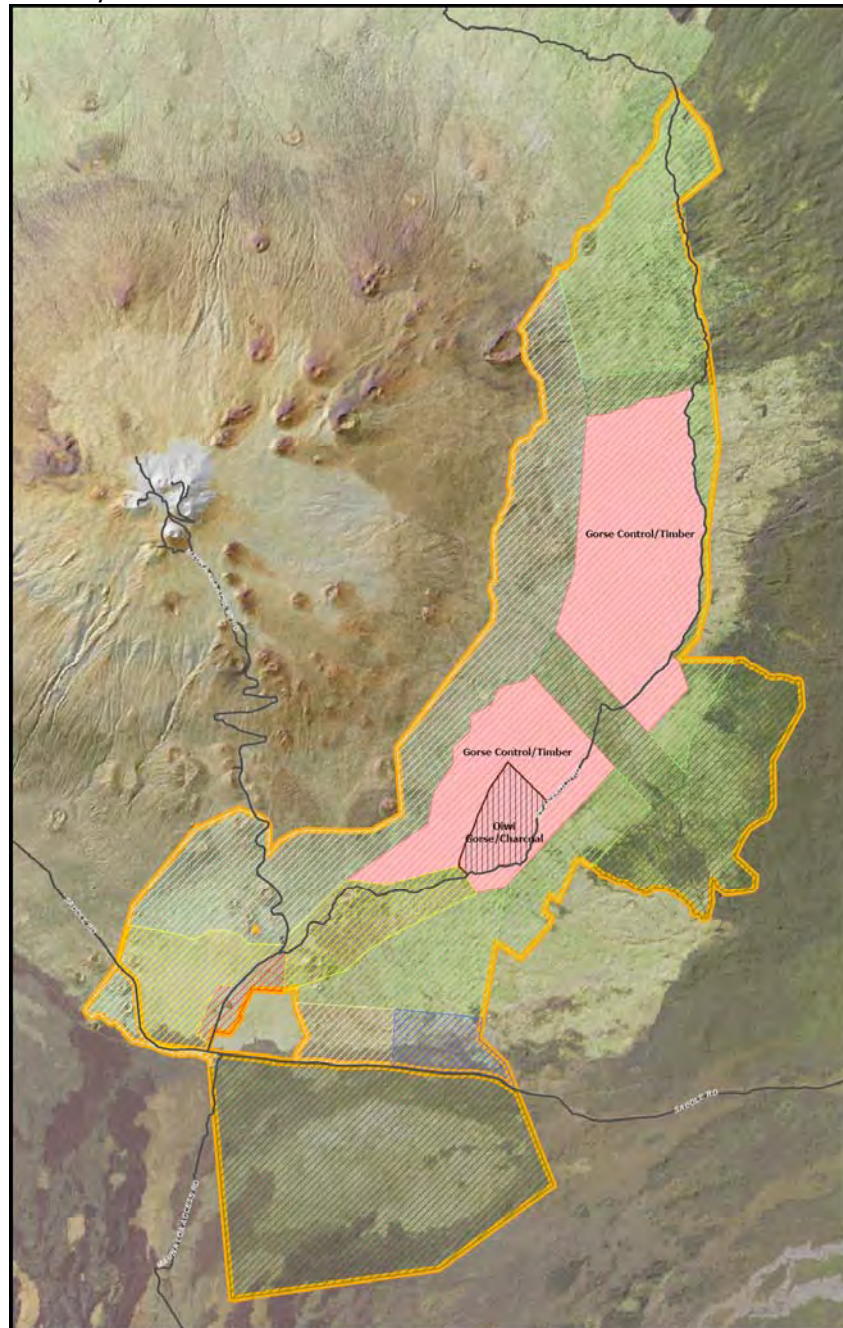
Eradication of this noxious plant, that has already rendered thousands of acres useless, is an essential component in any land use and management plan for these lands. The importance of eliminating this plant cannot be overstated.

The non-profit organization, 'Ōiwi Lōkahi o ka Mokupuni o Keawe currently has a license at Humu'ula from DHHL, for gorse control work within the 'Āina Mauna. They have been working on a process in which harvested gorse goes through a gasification process. Their studies and research are ongoing.

DHHL has begun planting portions of the perimeter of the 'Āina Mauna lands with Sugi pine and koa trees to establish a boundary (gorse containment area) to limit the spread of gorse. DHHL also contracts gorse control efforts (physical, chemical and/or biological) annually.

DHHL field trials and research projects have shown that high levels of shade from trees inhibit the ability for gorse to grow and spread. It is anticipated that commercial-scale timber planting can shade the gorse sufficiently to keep it from producing seeds and perhaps kill it, depending on the tree species planted.

With normal forestry operations, each year some portion of the gorse seed bank will be removed. Interim commercial-scale timber planting can serve both as a gorse eradication mechanism, as well as an income generator. Other viable gorse eradication opportunities can also be considered simultaneously. Eucalyptus and Sugi pine have been proposed as commercial timber operations to control gorse. The initial testing of these tree species at 'Āina Mauna have given rise to increased investment in required infrastructure, including marketing and market development efforts by a number of public and private entities. Field trials have demonstrated the effectiveness of these species, however other trees may also be considered.



Map Noting Primary Gorse Eradication Area via Commercial Timber

Tree species to be planted will be evaluated with minimum scores of L or L(Hawai'i) under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Evaluation Group 1 (low risk) in the Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs.

It is important to understand that all suggested crops (i.e. eucalyptus and Sugi pine) are designed to initially control and eradicate the gorse, then support the eventual reforestation of the land back to native tree species such as koa, 'ōhi'a and māmane. Eucalyptus and Sugi pine should be replaced with native species once it has been determined that gorse seed germination is no longer a threat.

DHHL will solicit proposals for a timber license for the planting and harvesting of commercial non-native tree species that will first serve to fight the gorse, but will also provide valuable wood products for a variety of forest products (e.g. lumber, wood chips, veneer, biomass for alternative energy opportunities, etc.)

In order to plant trees, gorse that is present on site will need to be removed. Almost the entire 10,000-acres is invaded by gorse so this will be a large and significant amount of gorse biomass which will need to be dealt with. This large amount of gorse biomass however, can create an opportunity for the licensee or other entity to process the biomass and use it as an income generator for the project.

A gorse biomass processor who removes the gorse for energy or other commercial purposes would in turn prepare the land for planting in a cost efficient manner. If gorse processing cannot be used as a site preparation tool, then more traditional site prep methods will be employed to remove the gorse prior to planting. These methods would include herbiciding, mechanical and/or prescribed burning.

Commercial timber harvesting to control gorse is expected to be on an industrial scale and large areas are expected to be harvested annually. With approximately 10,000-acres in commercial timber to fight gorse, for example, and a 30-year growing cycle for Sugi pine, approximately 330-acres will be harvested each year.

The lands to be leased/licensed provide an ideal opportunity for commercial forestry operations. In addition to shading and eventual killing off the gorse, timber harvests can generate cash flow, reduce soil erosion by restoring lands laid barren from overgrazing, enhance wildlife habitat and regenerate another round of gorse seed germination for subsequent control. Immediately after a timber harvest, gorse seedlings can be controlled with low volume herbicides; then followed by another planting of timber.

Due to the estimated 70-years gorse seeds remain viable, planting/harvesting/gorse control rotations will be repeated until the majority of dormant gorse seed has germinated. The time estimated for gorse eradication is approximately 100-years. Ultimately, after decades of this interim commercial forestry have effectively cleaned out the gorse and its seed bank, the property will be restored to a native forest.

To fully implement this opportunity, it is important that forestry operations at 'Aina Mauna attempt to capture all possible value from commercially planted trees, such as veneers, lumber, wood chips, biomass for energy and carbon off-set/credits.

This action does not preclude other forms of gorse eradication, such as the gasification process suggested by 'Ōiwi Lōkahi o ka Mokupuni o Keawe.

While the use of commercial-scale timber serves to address the long-term control of gorse and its underlying seed bank, the 'Ōiwi gasification process can serve to deal with the initial removal of the gorse vegetation in the site preparation process prior to the planting of commercial timber.

Carbon Offsets/Credits are a key component of national and international emissions trading efforts that have been implemented to mitigate global warming. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing prices.

2.2.10 Pasture (Interim and Long Term) (H2, P1, P2)

Managed cattle can serve as beneficial tools in controlling fire fuels, particularly in areas where people frequent (primarily fronting and along roads.) Per the DHHL Fire Plan, cattle or other grazers may be utilized as a cost effective way to reduce fuel loadings in high risk areas.

Site evaluation indicates grazing areas south of the gorse infestation and along Keanakolu Road where fuels will be reduced, gorse infestations can be more easily controlled, good animal units per year (AUYs) exist and the natural recovery of adjacent lands could continue.

Wildfire can quickly destroy important, yet fragile, assets of DHHL's lands. The Humu'ula and Pi'ihonua Mauka areas are especially vulnerable because of their remoteness, and the flammable fuel types found there. The prevention of wildfires is of the upmost importance if homesteading is to take place in this area. Thus, one way to help control wildfire fuels is through pasturing in high risk areas where gorse presence is minimal.

Pasture lands will be in the form of additional acreage pasture with the possibility of community pasture. Opportunities will be available in a variety of areas. Approximately three paddocks west of Mauna Kea Access Road and four to five paddocks along Keanakolu Road are available for pasture. Additional acreage pasture use could also be in the form of Community Pasture.

According to the Hawaiian Homes Commission Act, the department (DHHL) is authorized to lease to native Hawaiians the right to the use and occupancy of a tract or tracts of Hawaiian home lands for pastoral lands. Thus pasture use meets the intention of the Hawaiian Homes Commission Act while satisfying beneficiary wants and needs.

The rest of the 'Āina Mauna is less at risk because of its limited access to the general public. In short, most fires are started by humans and limited and/or carefully controlled human presence at 'Āina Mauna greatly reduces the risk.

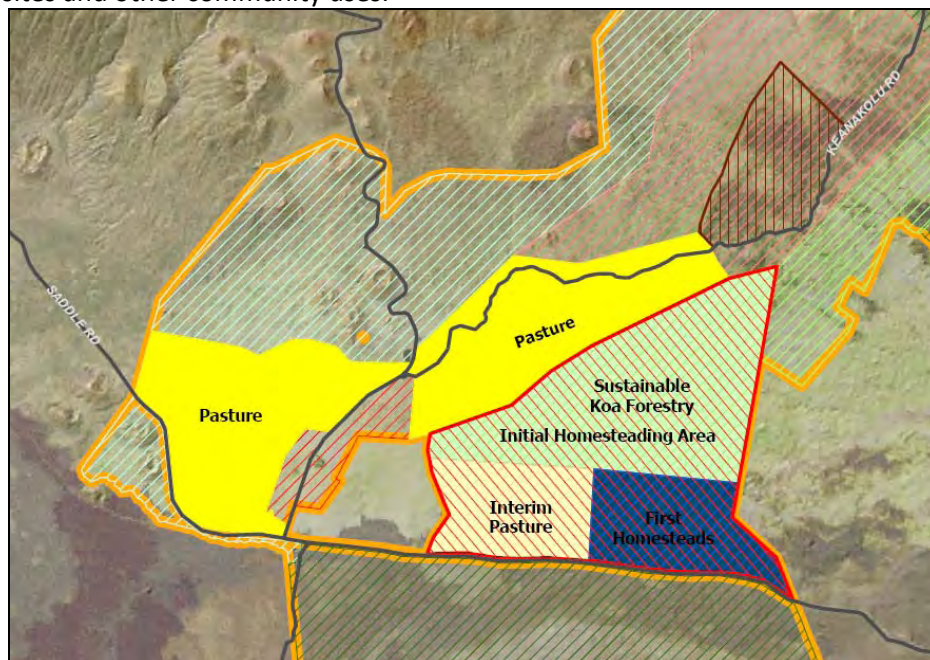
2.2.11 Infrastructure for Initial Homesteading Area (H1, H2, K5)

The Department's initial enabling legislation declares the objective of Congress and the State of Hawai'i, to enable native Hawaiians to return to their lands. Therefore, the role of the Department of Hawaiian Home Lands has been seen as providing land for native Hawaiians. It is therefore appropriate to have homesteading as a component of this 'Āina Mauna Legacy Program.

According to the Hawaiian Homes Commission Act, the department (DHHL) is authorized to lease to native Hawaiians the right to the use and occupancy of a tract or tracts of Hawaiian home lands per each lessee for:

- agriculture lands or lands used for aquaculture purposes; or
- pastoral lands; or
- any class of land to be used as a residence lot

The concept is to develop the first rural-development homestead area for DHHL beneficiaries in the south-eastern portion of the property. Preliminary design concepts call for a subdivision layout encompassing approximately 1,000-acres with a total of approximately 100 to 200 five to ten acre-homesteads sites and other community uses.

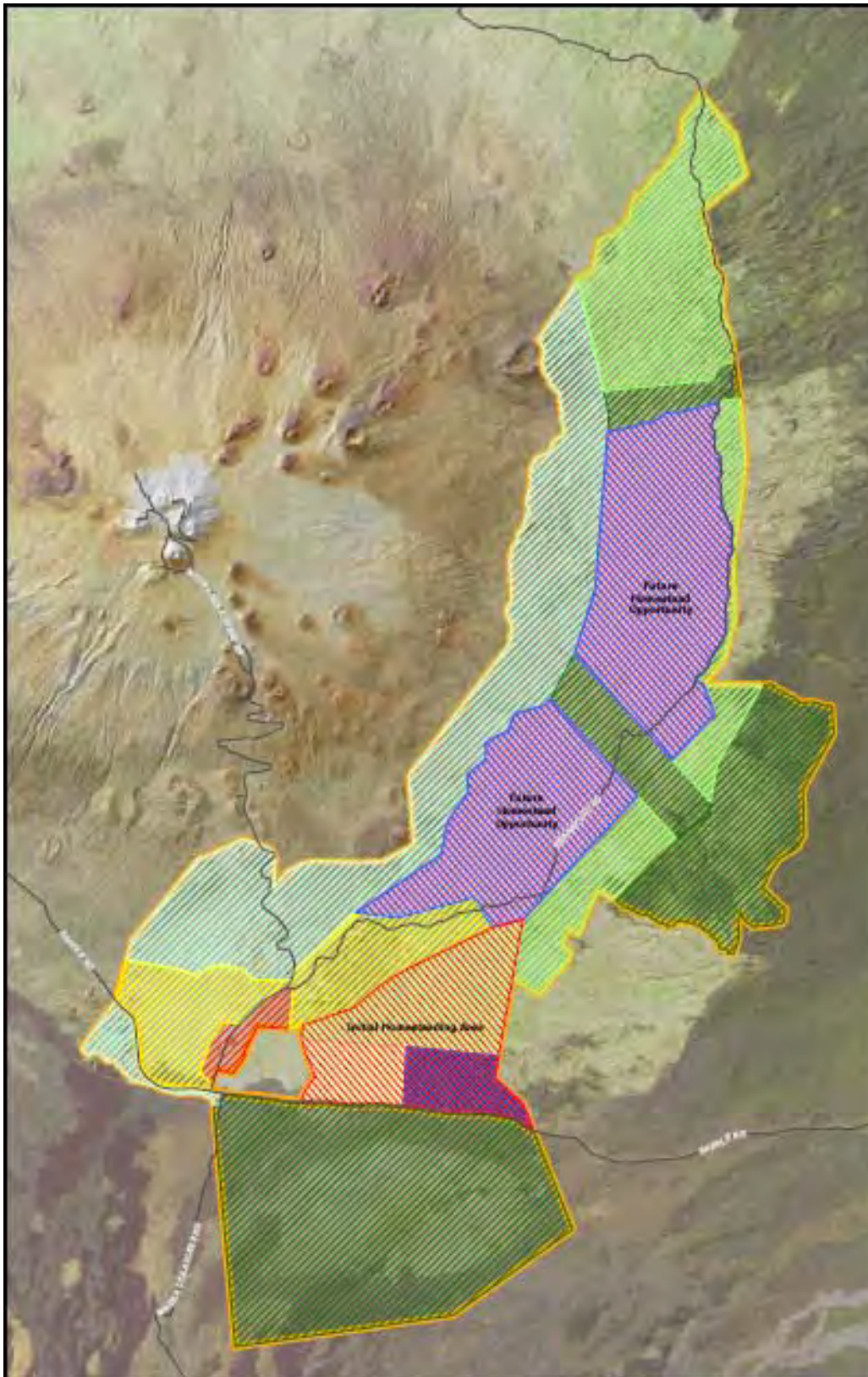


Map Noting Initial Homesteading Area, First Homestead Site and Pasture

To take advantage of opportunities which further demonstrate the focus on efficient, self-sustainable communities, as well as provide for cost-effective development, the Legacy Program considers a variety of homestead development layouts to address various beneficiary needs. Layout options include:

- Cluster homestead sites (lots up to 1-acre) with separate agricultural/pasture lot
- Cluster homestead sites (lots up to 1-acre) with community agricultural/pasture
- Homestead lot subdivision (lots approximately 10-acres)
- Combination of alternatives

It is envisioned that these alternatives will enable DHHL beneficiaries to have sufficient land for self-sustaining homesteading: i.e. land for a home site and related improvements/uses, including land for alternative energy for their use, pasture, agricultural uses and subsistence farming. In addition, the 'Āina Mauna Legacy Program will provide job opportunities for the homesteaders in the immediate vicinity. The bulk of the homestead opportunities are anticipated to be phased in once the land has been restored to productive use. These areas include a significant portion of sites proposed for sustainable koa restoration.



Map Noting Initial and Future Homesteading Opportunities

These forested areas also provide DHHL with an option for future agricultural homesteading. Once the koa restoration is accomplished, DHHL will have the opportunity to consider creation of agricultural homesteads, using forestry, for beneficiaries. Commercial koa forest management operations can continue, with the DHHL and beneficiaries benefiting directly from the commercial sale of koa from community areas, or homesteads could be within the koa forested areas.

Similar to many present-day homesteaders having ranches associated with their homesteads, or areas for agricultural use associated with homesteads, with the restoration and management of forested, areas, future homesteaders may incorporate the management of these forests into their homesteads.

Ultimately, decision-makers decades from now may decide whether this is appropriate or not – once a forest is restored. The Legacy Program expands future options, opportunities and choices for homesteading.

For the disposition of homesteads, it is recommended that DHHL follow its typical internal disposition process, using existing staff, resources and structure to plan, fund and develop the homesteading component of the 'Āina Mauna Legacy Program.

'Āina Mauna is a unique environment that historically has had limited settlement. The homestead sites and area will be rurally-developed with limited infrastructure. The area is relatively isolated from employment, schools, shopping and other DHHL communities; and the temperatures are normally cold. A large scale development proposal may be too ambitious and large at this time. The intent is to start with a single cluster of homesteads, which would include a system of landscape restoration and management projects on adjacent lands.

It is important that beneficiaries are made aware and understand the advantages and disadvantages of living in this area. It is not clear what the demand will be for these types of homesteads. Demand and interest for the first Rural-Development Homestead area and the availability of funds for needed infrastructure need to be taken into consideration.

Subsequent homestead development may occur depending on demand, costs and policy relative to the overall use of the site. Although planning will begin immediately, full build out may not occur for several years.

In order to make the development economically feasible, it is envisioned to be rurally-developed. Roads will initially remain unpaved (natural base, cinder/gravel, rock surface). Water sources will be by catchment with fog drip catchment augmentation. Septic tanks, leach fields and/or, where appropriate, composting toilets will be used for waste disposal.

The homesteads will rely heavily on an alternative energy component (consistent with DHHL's Energy Policy) which will include photovoltaic electrical power (with battery and generator back-up); solar hot water heating; passive solar/insulation; gray-water re-use; water catchment with fog drip catchment augmentation and low-wind-speed generation for electrical power, where appropriate. Homestead design may incorporate passive solar technologies to assist with winter heating needs, as well.

The following is a summary of some of the major homestead infrastructure.

Homestead Roads

For the preferred design option, homestead lot access will be provided to two access roadways. The roadways servicing the homesteading area will provide access connections to each parcel and to the Keanakolu/Mana Road and Saddle Road. Wherever possible, former ranch roads will be incorporated into the road layout.

The proposed road network right-of-way will be non-dedicable rural roads. These standards include a roadbed of packed gravel/cinder, paved where the slope exceeds 8% and unlined drainage swales on each side of the roadway. Roadway geometry shall be designed to meet the minimum county road design standards for horizontal and vertical stopping sight distances for minor streets with a right-of-way width of 50-feet. While the right-of-ways will be sized to county dedicable standards (50-feet,) the roadways themselves will not be constructed to County dedicable standards at this time. In the event the roads are to be conveyed to the County for operation and maintenance in the future, they will be required to be upgraded to dedicable standards.

BMPs and applicable law will be followed to minimize soil movement, erosion and compaction during site preparation, operations, road improvement and maintenance. Soil resources will be protected by the design and location of roads.

Any alteration to the topography will be reviewed under the County of Hawai'i's permit process. This may include obtaining a Grading and Grubbing permit, approval of a Soil Conservation Plan from the Mauna Kea Soil and Water Conservation District and/or a National Pollutant Discharge Elimination System (NPDES) permit.

Implementation actions will include Best Management Practices (BMPs) to ensure that the alterations to the terrain minimize erosion, water quality degradation and other environmental impacts. Required practices will include avoiding disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing dips, water bars, and cross drainage on roads and skid trails to minimize erosion will be followed.

Both short-term construction and long-term maintenance BMPs will be included in the permits conditions. Roadside swales, as required, will direct storm water flow within the road right of way to natural drainage ways. The existing natural drainage ways will continue to convey storm water and drainage from the non-road areas. Roadway fords will be designed for roadway crossing of existing drainage ways.

Domestic Wastewater

Each parcel will manage domestic waste through either or a combination of individual septic systems and/or composting toilets.

Domestic Water

Domestic water to each parcel will be supplied through individual water tanks, filters and pressure pumps. The County has indicated that catchment basins are practical where the annual rainfall exceeds 60 inches. All of the proposed initial homestead sites fall within an area meeting this rainfall criteria.

Supplemental sources of water could come from regular water truck deliveries or a future groundwater well. A variance may be required from the County as part of the subdivision application. The variance would request relief from the requirements for a water system meeting the requirements of the Department of Water Supply.

Water for Pastoral/Farming Needs

Water for pastoral and farming needs will be supplied through use of on-site catchment systems, which will include existing or new ranch ponds on the property and dispersed water storage with water distribution to troughs or farms.

Fire Protection

Each homestead will be responsible for providing fire suppression systems on their property. Catchments, for example, will allow for easy hookup by standard firefighting hoses via standpipes outfitted with Fire Department fittings.

Road and driveway designs will allow for the turning around of fire fighting vehicles. Volunteer fire fighting capacity by 'Āina Mauna homesteaders will be evaluated and created if appropriate. If homes wish to secure fire insurance, they may be required to provide water tanks on-site for fire protection.

Electricity/Communications

Each individual homestead site will be responsible for securing their own electrical and communications needs.

It is anticipated that homesteaders will incorporate solar, photovoltaic and low-wind-speed generators for electrical needs. Communications will be via cellular service or future telephone service.

While the Homestead lots will be rurally-developed because of the area's remote location and lack of traditional infrastructure, the cost of development is significant and beyond the scope and capacity for the remaining revenue-generating opportunities proposed on the property. These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses.

2.2.12 Sheep Station Adaptive Reuse (HSS)

The Humu'ula Sheep Station has and continues to serve as the epicenter of the 'Āina Mauna region. Although abandoned as a sheep station, ranch support activities have continued on site until recently. Existing structures include offices, living facilities, outbuildings, holding pens, work sheds, Quonset huts, water catchment facilities, bunkhouses, shearing sheds and a barn.

In March 2004, Kimura International prepared the report "Humu'ula Sheep Station Adaptive Reuse Plan" (Reuse Plan) for DHHL. The Reuse Plan proposes a mix of land uses, wherein the property is divided into three principal sub-areas: Historic/Community Center (5.5 to 6.0-acres); Open Campground (2.0 to 2.5-acres) and Commercial (7.0 to 8.0-acres), including retail, recreational, lodgings and restaurant activities appropriate to a transient or visitor market.

Additionally, three alternatives were suggested for the site. The alternatives consider different phases (starting with a modest effort and expanding incrementally over time,) as well as different outcomes (i.e. an operator may choose to start with a highly capitalized project, rather than taking a more gradual approach.)

Alternative 1: Low Intensity Development

- The focal activity is a campground where users are largely self-sufficient. “Improvements” consist primarily of demolishing unused structures, removing debris and clearing overgrown landscaping, and erecting fences around the remaining historic buildings).
- Low Intensity Development - Development Components: Campground; Continued use of picnic area by a private eco-tour operator; and Homesteaders association headquarters/community center.

Alternative 2: Medium Intensity Development

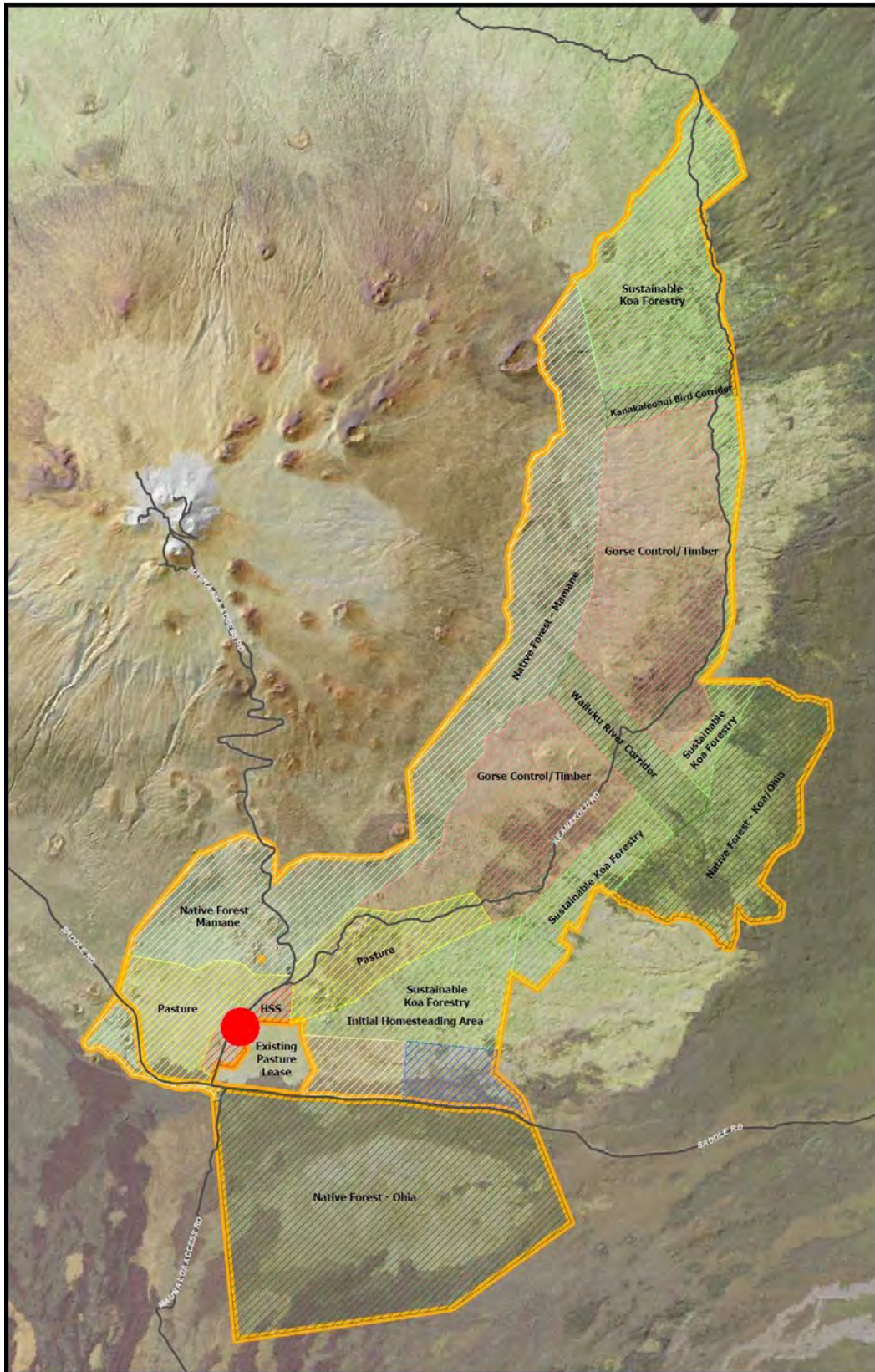
- This alternative involves one or more businesses that have regular hours of operation, thus, requiring permanent, probably full-time, employees. However, capital investment is still relatively limited and development can occur incrementally, whether it is the number of cabins erected, types of eco-tourism activities staged on site, and/or the range of goods and services offered at the rest stop.
- Medium Intensity Development - Development Components: Construction of Cabins; Eco-tourism/adventure tourism staging area; Rest stop with food concession(s) and/or handicraft sales; Campground; Existing cottage converted into the beneficiaries' community center; and Interpretive signs and walkways in the historic zone.

Alternative 3: High Intensity Development

- The high intensity alternative represents a more sophisticated level of development. With a greater outlay of capital, this alternative will need sustained market demand. Alternative 3 offers the greatest variety of visitor amenities and could become a destination of potentially enormous appeal. The addition of a lodge could significantly alter the visitor experience by providing more congenial settings in which to socialize, for example, a dining room/restaurant, seminar rooms for meetings, spa/fitness facilities and/or lounge with the iconic roaring fireplace.
- High Intensity Development - Development Components: Construction of cabins; Lodge with restaurant; Eco-tourism staging center; Wellness center, retreat, seminar rooms; General store (with or without gas pumps); Rest stop; Campground and Stabilization of buildings in the historic zone for long-term conservation.

The Reuse Plan is intended to allow for entrepreneurial flexibility; however, some uses are distinctly incompatible, including: Warehousing; Baseyard for transportation or construction operations or for utility companies; Manufacturing or repair services; Residential, except in a bed-breakfast or caretaker type of situation; Commercial agriculture; and Large-scale institutional or eleemosynary use or campus.

The redevelopment of the Sheep Station will include facilities open to the public, as well as the restoration of three historic buildings (office and dwelling building, barn and shearing shed) referred to in the Reuse Plan as the “historic zone.” Initially, depending on their structural condition, the Quonset huts and other buildings on site may serve a useful purpose as office space, storage and potentially other interim uses. They are not considered for long-term restoration as part of the restoration effort.



Map Noting Humu'ula Sheep Station (Shown in Red)

All improvements to the site will require close work with the State Historic Preservation Division as the site is over 50-year old and identified as historic property.

Infrastructure at the site is very limited. Water at present is by catchment only. Alternative water sources could come from drilling a well, hauling water to the site or connecting to an existing water system. Depending on the use of the site, the project may require additional electrical power.

An existing eco-tourism operator (a DHHL licensee) uses portions of the property as a staging and picnic area. This use will likely continue. Likewise, additional separate RFQ/RFP solicitations may be issued for other eco-tourism activities, remote accommodations and other uses.

The redevelopment of the property will also include the set-aside of a staging area for eco-tourism activities that occur over the remainder of 'Āina Mauna.

The Reuse Plan also suggests that the redevelopment of the property include a Lodge. The lodge (restaurant and visitor center) may also be developed in the area immediately above the 500-acre commercial area on either side of the Mauna Kea Access Road generally at the elevation of the Monterey Pine tree stand above the Mauna Kea Access Road/Keanakolu-Mana Road intersection.

Additionally, an initial base facility for staff including accommodations, office, storage and possible field worker facilities and related improvements/infrastructure may also be included depending upon administrative needs. Likewise, the facility could be considered for a variety of uses and serve as a base/focal point for ecotourism, events, education, staging, retreats, gatherings, meetings, etc.

2.2.13 Remote Accommodations (K1, K4, R1, R2, R3)

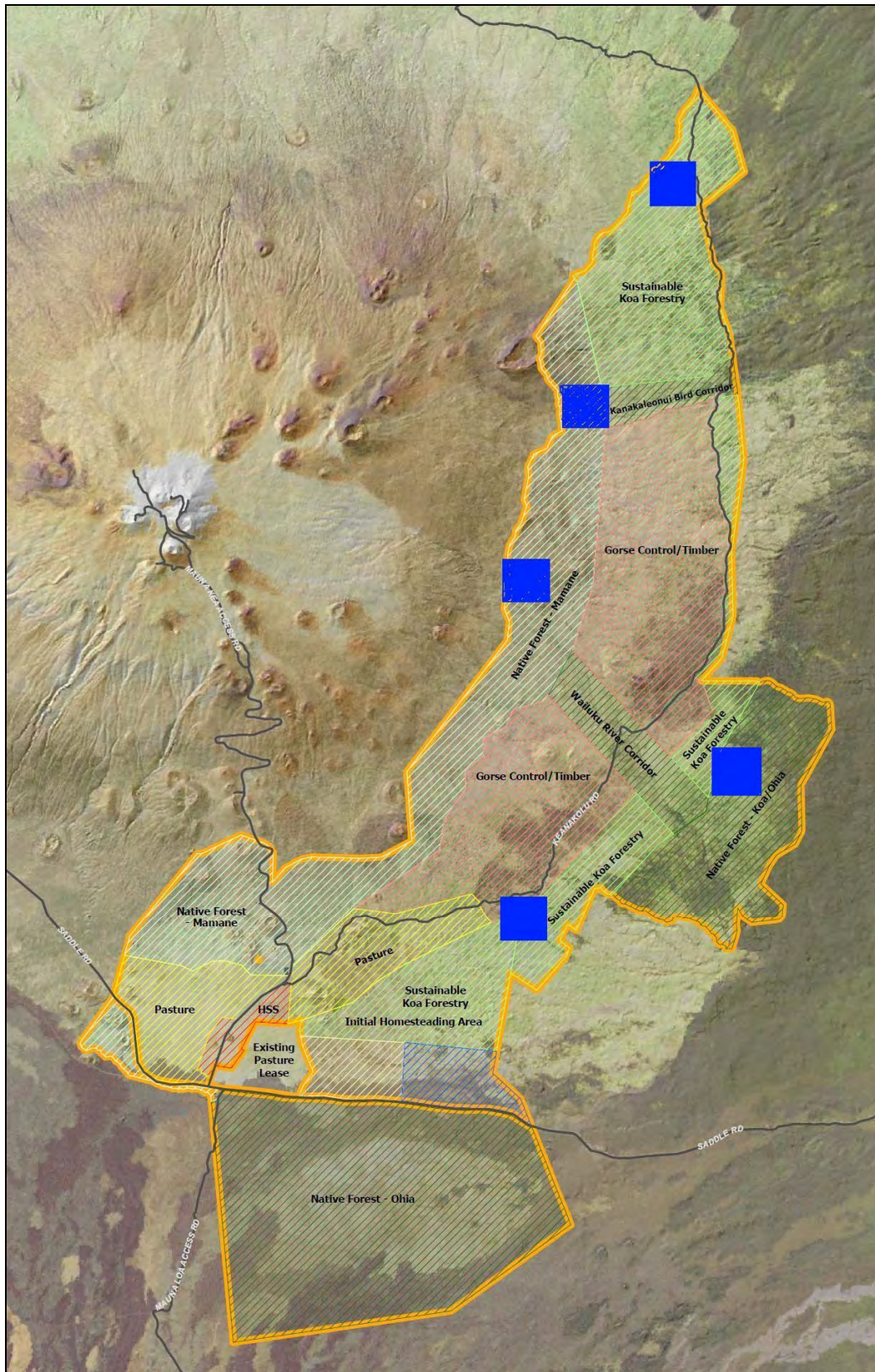
One of the components to fulfilling the Legacy Program's mission's mandate of economic self-sufficiency is expanding the use of remote accommodations across the property.

Remote accommodations cover a small footprint on the overall landscape and have limited impact on the natural resources, but provide necessary funds for the self-sufficient operations of the Legacy Program. Operations that are non-income generating, such as the restoration of māmane and 'ōhi'a forest, will especially benefit from this funding source.

The property has existing (and can accommodate additional) ranch houses, cabins, camping and other remote accommodations. The former Pu'u 'Ō'ō ranch headquarters and the Kanakaleonui cabin (or others that could be constructed), are examples of locations for overnight accommodations, retreats, ecotourism uses, etc.

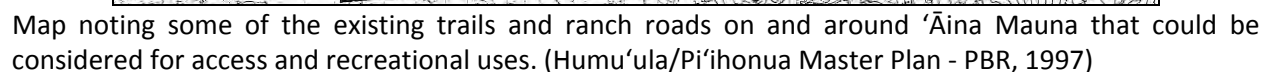
One option is to solicit operators to lease a package that includes a staging area at the Humu'ula Sheep Station with one or more remote sites. These sites will be especially attractive if developed in conjunction with existing and new trails for a variety of means of travel from remote site to site.

Ecotourism continues to be a growing segment of the Hawai'i visitor industry. The unique natural resources of these and the surrounding lands provide an ideal setting for ecotourism related activities, as well as opportunities for remote lodge facilities and campgrounds located in relation to the surrounding environmental resources.



Map Noting Sites Proposed for Remote Accommodations (Shown in Blue)

Ecotourism and recreation related activities, a growing sector of the island's visitor industry, have great potential within the 'Āina Mauna due to the natural resources of the area. Other than providing a staging area, such as the Sheep Station, to service and manage these activities, these uses and activities could be integrated and managed across the remainder of the landscape and within other proposed uses.



Eco-tourism uses typically have a small footprint and limited impact. Ecotourism can provide a valuable economic use for an area, which, until now, has not been utilized to its full potential and which does not require permanent structures or impact.

Eco-Tourism uses and activities will include: Biking Tours, Bird Watching Tours, Camping, Lodge, Hiking Tours, Horseback Tours, Horse Drawn Wagon Tours, Wilderness Resort, Guest Ranch, Historical Tours, Nature Tours, Hunting, Volunteer “Service” Trips, etc, as well as their related infrastructure.

Applicants entering into a license agreement with DHHL will be required to adhere to numerous equipment and procedural requirements for the health and safety of visitors, as well as protection of the area’s natural and cultural resources. In order to help assure that the activities are respectful, careful and safe, operators will have to:

- Adhere to required procedures/equipment protocols
- Include volunteer “service” trip components to augment the reforestation and invasive species control activities
- Incorporate cultural, natural resources and safety briefing to guests
- Incorporate cultural, natural resources and safety employee/volunteer training program

A relatively new segment of ecotourism, dubbed by some as “VolunTourism” integrates volunteering activities into tourism activities. These volunteer “service” trips, allow participants the opportunity to volunteer at the site they are visiting and thus give back to the community.

Ecotourism activities within ‘Āina Mauna can also draw on the unique history and cultural connection that the area has. Its proximity to Mauna Kea provides a unique look into the history and culture of the islands. Likewise, the historic nature of the cattle and ranching activities of the area provide options for historical related activities.

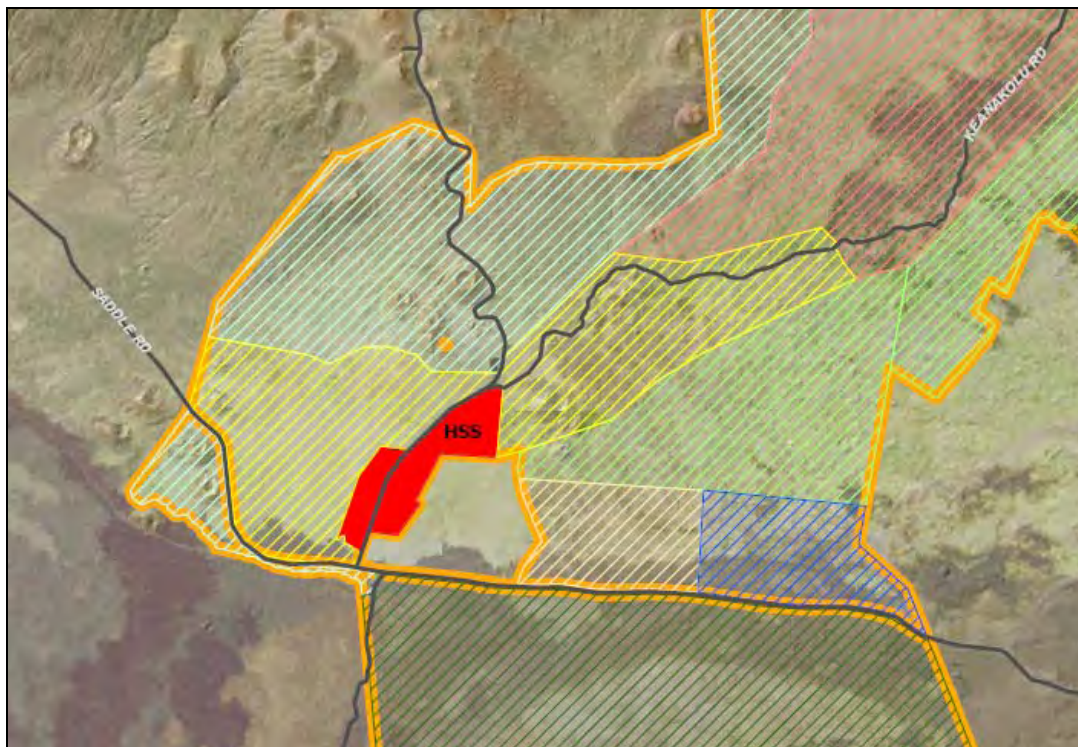
2.2.15 Commercial Facilities and Activities (C1/HSS)

The ‘Āina Mauna Legacy Program delineates approximately 500-acres on the lower portion of the property, on either side of the Mauna Kea Access Road, surrounding the Humu‘ula Sheep Station, for “commercial use”. This area was designated “commercial” due to its proximity to the Saddle Road and Mauna Kea Access Road, as well as its placement as an entry point to the property. Additionally, past planning studies and reports have listed the area as the ideal commercial center for the property.

The commercial area is located at a transportation crossroad and in a region that abounds with recreational, environmental, cultural and educational resources. There are opportunities to provide service oriented businesses to serve Saddle Road traffic, as well as the ‘Āina Mauna region.

Recognizing the potentially significant increase in cross island traffic that will result from the ongoing improvements to the Saddle Road, the nearby Pōhakuloa Training Area and the growing interest in the astronomical activities on Mauna Kea, there is the opportunity and potential need for commercial service facilities to be located near the Saddle Road/Mauna Kea Access Road intersection. The designated commercial area provides an ideal location.

Commercial uses will provide both periodic (ecotourism) and long-term (commercial, lodge, etc.) opportunities for revenue generation. Commercial uses could take on a variety of uses including a lodge, restaurant, visitor center, retail activities, office, commercial/general/convenience store(s), rest stops, gas station and other facilities that are appropriate to a transient or visitor market.



Map Noting Area for Commercial Activities including the Humu'ula Sheep Station Site (Shown in Red)

2.2.16 Research

The uniqueness of the 'Āina Mauna region presents an unparalleled opportunity for scientists and researchers to learn about the area, its biological history and plethora of flora and fauna. Historians, as well as cultural practitioners, can also benefit from the area's rich history and past use.

The 'Āina Mauna region should be viewed as a place where people can come to learn about Hawai'i, it's flora and fauna (both endemic and introduced), history and its unique native forest ecosystem.

The implementation of the 'Āina Mauna Legacy Program offers the opportunity for others to visit and experience the natural and cultural resources of the 'Āina Mauna region and provide formal and informal educational opportunities for children and adults to:

- Connect people with the world around them
- Have hand's on experiences in a healthy Hawai'i native forest
- Foster awareness, appreciation and understanding of Hawai'i and its natural and cultural environment
- Encourage wise stewardship of precious Island ecosystems
- Provide a unique and educational experience for visitors to the Islands
- Document the successes and failures of land management activities via formal research

Ongoing monitoring and research in support of the proposed forestry restoration programs and invasive species control is necessary to effectively evaluate the various experimental methods of out planting and invasive species management.

Entities such as USFWS, USFS, DLNR, Hawai'i Agricultural Research Center, the University of Hawai'i, Hilo, College of Agriculture, Forestry and Natural Resource Management, the University of Hawai'i, College of Tropical Agriculture and Human Resources and others have researchers with the expertise to conduct this type of monitoring and research.

Chapter 3 - Environmental Assessment Alternatives

This Chapter lists and describes the various alternatives, including the preferred alternatives for the various actions called for in the Legacy Program.

3.0 Features Common to All Alternatives

All of the various alternatives for the respective actions contain common features. To reduce the length and redundancy of the individual alternative descriptions, common features are presented below.

Implementation Subject to Funding Availability

Under each alternative, actions will be implemented over a period of years following EA approval, as funding becomes available. It is the intent of DHHL that annual priorities will follow the EA guidelines, although funding initiatives, unforeseeable management challenges and varying budgets may impact feasibility of actions from year to year.

A goal of the 'Āina Mauna Legacy Program is to be economically self-sustaining. Therefore some proposed actions include revenue generating activities; this revenue will be used to fund the implementation of the 'Āina Mauna Legacy Program actions.

Boundary Fencing and Sequence of Management Actions

For all alternatives, portions of DHHL's 'Āina Mauna Lands will be enclosed by fencing, as needed to successfully implement a particular alternative. The only difference with additional fencing in the various alternatives correlate to internal fencing needed to divide areas into management units. Establishing appropriate perimeter boundary fencing is a critical first step in habitat protection and restoration to deter major threats to the ecosystem and their impacts to wildlife population and species recovery.

For areas where complete feral animal and pig eradication is proposed (R1, R2, R3, M1 & M2), once perimeter boundary fences are established, the standard management strategy sequence will be to remove feral ungulates and pigs, then concentrate on invasive species control (e.g., invasive plants, predators such as rats, mongooses, cats, and dogs) while simultaneously restoring habitat through native plant out-plantings. Out-plantings will occur once habitats are stabilized and threats managed.

Access and Maintenance Roads and Trails

In order to appropriately fence and access areas, four-wheel drive installation and maintenance roads will be needed. These roads will serve an added benefit of serving as additional access to the overall property and as firebreaks in the event of fire. Limited road improvements, such as grading for driveways and to smooth out rough areas and resurfacing in some areas, will occur. Additionally, trails will be developed to access areas for management purposes.

Use and Maintenance of Existing Facilities and Fences

For all alternatives efforts will be made to use existing infrastructure wherever and whenever possible (fencing, ranch roads, stock ponds, etc.) Periodic maintenance and upgrading of buildings, fences and facilities will be necessary regardless of the alternative selected for safety and accessibility and to support management and visitor needs.

Periodic maintenance and upgrading of fences is necessary to manage and/or exclude ungulates from management units. The use of a helicopter may be required in remote areas to deliver fencing and other materials.

Feral Animal Eradication

Feral animals (hoofed mammals such as cattle, sheep, goats, as well as dogs and cats etc) can be vectors for the spread of invasive species (including gorse) and can have a negative influence on native forest restoration. (Feral animal eradication does not cover pigs, as they are covered under a separate action 2.2.9.)

Control and/or removal of these animals will be done across the entire property. Implementing feral animal eradication (primarily sheep, cattle, goats, dogs, cats etc) and allowing management of pigs (so long as the resources are adequately protected) will provide food for beneficiaries, reduce the impacts to the forest resources and may generate revenue for the Trust from the sale of feral ungulates or permits to hunt them.

Feral animals introduced to Hawai'i can be detrimental to Hawai'i's native ecosystems via the damage they inflict on both vegetation structure and composition. Feral animals can impact native plants and ground cover, facilitating sediment run-off. The soil disturbance caused by feral animals facilitates the introduction and expansion of invasive plants and creates breeding grounds for mosquitoes that transmit avian disease to native forest birds.

There are four main components in successful feral animal eradication programs, including:

- 1) Removal of populations from designated areas;
- 2) Establishment of barriers to continue isolation of populations from designated sites;
- 3) Barrier inspection and maintenance; and
- 4) Vigilance in monitoring feral animal populations

A feral animal eradication program could be initiated with designated animals being eradicated by either beneficiaries or professional contractors. The feral animal eradication program does not prohibit the opportunity for future homesteaders to raise their own livestock.

Feral animals, including ungulates (cattle, sheep, goats, etc,) and non-native birds and predators (dogs, cats, etc) will be controlled and eradicated through fencing, trapping, capture, shooting (ground and aerial,) snares and hunting. Periodically, hunters (archery and rifle) will be allowed on the property and shoot feral animals. The intention is not to develop a game management program, but, rather an eradication of feral animals.

Aerial shooting has been used effectively by DLNR to control/eradicate feral animal populations. Hawai'i Administrative Rule §13-123-22 (d) (2) Conditions and restrictions (Hawai'i hunting rules,) states:

“No person shall use any aircraft to herd or drive game mammals, or land any aircraft for the purpose of hunting, or discharge any weapon from any aircraft into a public hunting area except as provided by the department”

‘Āina Mauna is not a public hunting area and feral animal eradication is not “hunting”. DHHL will consult and work closely with DLNR-DOFAW, if aerial shooting is used for feral animal control.

Invasive Plant Control and Remnant Invasive Species Eradication

A feature common to all alternatives will be invasive plant control and remnant invasive species eradication. This invasive plant control and remnant invasive species eradication focuses on isolated areas of invasive species, not the gorse control areas (T1 & T2).

Hawai'i is in the midst of a growing invasive species crisis affecting the islands' endangered plants and animals, overall environmental and human health, the viability of its tourism and agriculture based economy and, our way of life. Fighting invasive species is a critically important priority because it is the single most-effective way to protect Hawai'i's natural resources and is critical to maintaining the value of forest resources.

The Legacy Program envisions eradicating gorse utilizing commercial timber or other viable gorse eradication opportunities by means of an RFQ/RFP process. However, gorse eradication through the RFQ/RFP process will only be for the approximately 10,000-acres which are part of the commercial timber gorse control area.

Gorse is also present across much of the remaining 46,000-acres, so the eradication of all gorse is important. DHHL has been combating gorse for many years and its eradication techniques will be continued and other alternative methods explored.

Besides the highly invasive gorse, the 'Āina Mauna lands also have banana poka, fireweed, various invasive grasses, etc. Each species may need to be managed individually, using a variety of techniques. Management approaches will consider the species' distribution, mode of spread, and other factors. The Legacy Program includes a wide range of techniques and tools available that can be applied.

Invasive plants will be managed via an organized program that includes physical (hand clearing, mulching, controlled burns, etc,) chemical (manual, hand and aerial spraying) and biological controls. These will be used for all invasive plant species as appropriate. A combination of alternatives is most effective (i.e. Invasive Species/Pest Management and Control Program)

Monitoring is an important component of any invasive plant control management program. Conducting monitoring and research to determine efficacy of control measures and to identify occurrences and distribution of other new species will be needed, as well.

Invasive plant control will be for remnant gorse and other invasive plant species throughout the property (Gorse within the main infestation area will be eradicated as described further in this EA). This invasive plant control is dealing with the remnant gorse and other invasive plant species, which are outside of the main infestation area.

Invasive plant control will incorporate Forestry BMPs. Fire hazards will decrease as fuels are reduced and/or altered. Invasive plant management will support native forest restoration efforts. Additionally, the spread of invasive species across the property as well as outside of the 'Āina Mauna boundaries will be minimized.

DHHL will continue to work with neighboring property owners on invasive species eradication techniques and monitoring.

Sustainable Resources

The use of sustainable resources is an important aspect of the 'Āina Mauna Legacy Program. The 'Āina Mauna is isolated from major infrastructure development and thus, the use of sustainable energy and water systems will be used. Sustainable energy and water use will be throughout the property depending on energy and water needs for specific sites.

Renewable energy use will include installation of photovoltaic systems, low-wind-speed generators, solar hot water heating and passive solar/insulation.

Solar panels/photovoltaic panels (with battery storage and generator backup) will be located either on rooftops of facilities and/or on free-standing posts nearby.

Low-wind-speed generators will also provide energy for facilities. Small-scale rooftop low-wind-speed generators will be installed and will be located in areas that maximize wind-power generation.

Building design may incorporate passive solar technologies to assist with winter heating needs, as well. Sustainable energy systems (photovoltaic system and low-wind-speed generators) will also be used to power well pumps.

Installations of alternative energy sources will comply with all county building codes.

Sustainable water sources will be by individual water storage and catchment with fog drip catchment augmentation systems. Related infrastructure will include water tanks and filtering and pressure pumps.

Septic tanks, leach fields and/or, where appropriate, composting toilets will be used for waste disposal. Gray water reuse may also be implemented, where appropriate.

Mauna Kea Watershed Alliance (MKWA) Coordination

DHHL and 'Āina Mauna staff will continue to maintain regular discussions with members of the MKWA, including the State of Hawai'i Department of Land and Natural Resources, Division of Forestry of Wildlife (DLNR-DOFAW) and the U.S. Fish & Wildlife Service (USFWS), a key neighbor at the nearby Hakalau Forest National Wildlife Refuge.

Key topics for discussion with MKWA members will be wildlife monitoring, forest bird monitoring and management, threatened and endangered species management, wildlife mortality and disease monitoring, predator management, public use opportunities, as well as protection of wildlife and habitat.

Volunteer Opportunities and Partnerships

Volunteer opportunities and partnerships occur in all alternatives. These are recognized as key components of the successful management of public lands and vital to implementation of the 'Āina Mauna Legacy's programs, plans and projects, especially in times of declining budgets.

Monitoring

Monitoring of outcomes of various actions/inactions will allow management to make better management decisions. In addition to targeted research, monitoring of all actions taken will give important information for future decision-making.

3.1 Native Forest Restoration (M1, M2, R1, R2, R3, R4)

The following are alternatives for native forest restoration.

3.1.1 Alternative 1a - No Action

Under alternative 1a, no action will be taken and the land will be left in its current state. The native forest will be reestablished via natural regeneration. This will allow alien species to continue their invasion of the existing native forest and thus minimal native species reestablishment will occur. Large areas are expected to be devoid of native plants for long periods of time as no native seed bank is currently present throughout the entire area.

Without restoration of koa and native tree corridors, the bridges between the lower elevation's mixed koa/'ōhi'a forest and higher elevation māmane forests, which create crucial migration corridors between seasonal food sources for native forest birds, will not occur. Food resources for the endangered palila, suitable palila habitat and improved year-round palila foraging opportunities along an elevational gradient will not be realized.

Since one of the goals of the Legacy Program is to improve habitat for native species, leaving the land as is will not fulfill the fundamental goal of native forest restoration.

Other native forest benefits will be minimal (include improved soil quality, improved water quality, improved habitat for native species, gathering opportunities and cultural benefits for native Hawaiians, and various economic benefits which a healthy native forest will provide) because native recruitment will be minimal and invasive species will thrive.

3.1.2 Alternative 1b - Native Forests Restoration - Preferred Alternative

Under this preferred alternative, 1b, recovery and restoration of the native forest will include seed collection, plant propagation, site preparation and planting.

Management areas will be created and will vary in sizes range from a few hundred acres to 10,000-acres. Creating management areas will allow for flexibility in the size of the units based on anticipated activity, terrain and available funding. This will also give management more flexibility in determining priority areas and the ability to utilize funds where they are most needed.

Steps in the native forest restoration process will include site preparation, ripping for planting, planting, irrigation and fertilization. There may be limited harvest of selected dead and dying trees. Forest Best Management Practices (BMPs) will be incorporated. Feral ungulates and invasive/alien species will be removed from the project area, native forest is re-established, soil and water quality are improved, habitat for native species is created and/or improved, and economic and cultural benefits are accrued.

Forest management activities will follow applicable laws regarding activities such as road improvement and maintenance, soil erosion control practices, fire management, and use of fuels and chemicals. Temporary irrigation water development for seedling establishment will also occur.

Koa and native tree corridors that bridge between the lower elevation's mixed koa/'ōhi'a forest and higher elevation māmane forests are crucial migration corridors between seasonal food sources for native forest birds.

Māmane plantings will provide food resources for the endangered palila, increase suitable palila habitat and improve year round palila foraging opportunities along an elevational gradient.

With the restoration of the forest it is anticipated that more wildlife will inhabit this area, including existing and/or potential endangered birds and bats, thus, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated. The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the native forest restoration attracts endangered or threatened species or result in increased numbers or distributions of listed species already present.

With native forest restoration, the planting component will ensure a diversification of plants within the native forest. Additionally, the planting component will ensure plant regeneration, and natural regeneration should occur at an accelerated rate.

3.2 Sustainable Koa Forestry (K1, K2, K3, K4, K5)

The following are alternatives for sustainable koa forestry.

3.2.1 Alternative 2a - No Action

Alternative 2a, the no action alternative, will have no deviation from the current land use. Site impacts from past ranching will continue and non-native grasses will continue to flourish. Existing tree cover will be reduced over several decades as old age and rot take their toll on mature trees. Organic material on the ground will build up substantially as trees fall or are blown over. Understory trees will regenerate naturally, but will be inhibited by the presence of dense, introduced pasture grasses such as kikuyu grass. Some understory plants will continue to die or be damaged as a result of the overstory falling on them. Damage will likely perpetuate various rots invading the younger trees and reduce the future value of them as mature trees for wood products.

Fire hazard will increase slightly with the increase in fuels from fallen trees and branches, and will be further increased with unmanaged invasive species and pasture grass growth. Over a lengthy period of time, perhaps fifty years, the current stock of viable tree seeds found in the soil will disappear from iterative sprouting. With no overstory to replenish tree seeds, a transition will occur.

The proposed project site will change from a dead and dying overstory of trees with a viable seed bank in the soil, to a pure grass pasture with little or no presence of tree seeds. The latter scenario will necessitate artificial planting if a forest was desired at some future date. As tree cover disappeared, the site will be prone to greater variations in temperature and moisture extremes, such as frost or drought.

It is anticipated that site productivity will gradually decline as a result. The loss of trees will also mean the loss of certain wildlife habitat, particularly forest bird habitat. The risk of colonizing invasive species, such as gorse, occupying the site will increase.

The forest will restore itself naturally, albeit with more invasive species, more slowly, with greater risk from fire and with decreased diversity. This alternative will not allow for minimal recruitment of native species and will ultimately result in the further demise of the native ecosystem.

Organic material on the ground will build up substantially as trees fell or were blown over, then decline gradually once the entire overstory was gone. Understory trees will continue to die, both from old age and from damage as a result of the overstory falling on them.

Sites for other native plant regeneration will increase with the increase in organic material. Fire hazard will increase substantially, however, with the increase in fuels from grass and fallen trees. With the presence of an existing seed bank, koa will reestablish itself throughout the parcel.

Gorse is a concern to future management efforts. Gorse is shade intolerant and can die out in denser shade. Under this alternative, the risk of a gorse invasion and subsequent control costs are highest as overstory establishment is slowed by grass competition.

Without commercial harvesting, DHHL will not raise necessary funds for the implementation of the Legacy Program.

3.2.2 Alternative 2b - Koa Planting and Harvest - Preferred Alternative

Under this preferred alternative, 2b, planting and naturally regenerating sustainable commercial koa forests will include seed orchard development, seed collection, site preparation, outplanting, diversification plantings, salvaging dead and dying trees and harvesting. The intent in this Alternative is to focus primarily on the growth of koa trees for commercial harvest and not on an intact, diverse native forest. It is expected that the resulting forest will be composed of a diversity of native species to maximize inter-harvest benefits, but most diversity will occur from natural process, e.g. seed dispersal via birds.

Managing and commercial harvesting of koa will provide DHHL with an opportunity to generate income to fund and support the 'Āina Mauna Legacy Program and provide an opportunity to institute sustainable koa forestry while certain trees are left for wildlife habitat and on-site seed production.

Harvesting will target dead and dying or selected koa trees to improve forest health and productivity; there will be no clear cutting of the koa forest. This proposed alternative will promote economic opportunity in the community by providing immediate and long-term jobs and provide a base source of koa wood for various cultural and craft activities.

Since the development of sustainable koa forestry may attract wildlife, including possible endangered birds and bats, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated. The Safe Harbor program provides regulatory assurances that future property use restrictions will not be imposed if the sustainable koa restoration attracts endangered or threatened species or results in increased numbers or distribution of listed species already present.

If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to forest birds, the area and trees scheduled for harvest will first be reviewed by a qualified land manager, biologist, or forester prior to timber harvest.

Viable and present seed sources, will result in the natural regeneration of several native species within a few years.

Fire hazard will decrease as fuels are reduced and healthy forests are reestablished. Scarifying the soil will temporarily reduce non-native grasses and result in desired densities of naturally generated koa seedlings.

Steps in the koa planting and harvesting process will include site preparation, planting and fertilization. Forest Best Management Practices (BMPs) and prescribed silviculture treatments will be incorporated. Project monitoring and evaluation will also occur.

3.3 Outplanting Centers and Field Worker Accommodations

The following are alternatives for outplanting centers and field worker accommodations.

3.3.1 Alternative 3a - No action

Under alternative 3a, no outplanting facilities or field worker accommodations will be built therefore, no ground disturbing activities, or facility construction will occur. Reforestation activities will continue to occur, requiring staff, contractors and volunteers to travel to the remote planting sites on a more frequent basis. No centers will be established for the outplanting of plants.

With no place to stay overnight, staff, contractors and volunteers will have to travel from Hilo or other places of residence on a daily basis. Travel time will cut back on the number of hours spent planting. Without shade house facilities for plants to acclimate to the site prior to planting, seedlings survival will be greatly reduced.

3.3.2 Alternative 3b - Outplanting Centers and Field Worker Accommodations at two sites - Preferred Alternative

Under this preferred alternative, 3b, outplanting centers will be constructed within the Kanakaleonui Bird Corridor and near the former Pu'u 'Ō'ō Ranch headquarters to support forest restoration efforts. These sites were chosen for their centralized locations, elevations and road access to the areas in need of reforestation. These outplanting centers will be used for both the native forest restoration and sustainable koa forest plantings.

The distance and remoteness of certain areas across the 'Āina Mauna dictate that outplanting centers be centralized in Kanakaleonui and near Pu'u 'Ō'ō. Due to the scale of the reforestation effort (including the number of seedlings needed and remoteness of the site,) it is recommended that overnight accommodations be constructed to temporarily house field workers.

Overnight accommodations will be in the form of bunkhouse type facilities with accommodations (for up to 20-person sleeping quarters capacity) with appropriate facilities (restrooms/baths, kitchen/dining) and utility storage buildings. A campground area, for periodic need for expanded overnight stays, will be in the vicinity of the permanent facilities. Rather than workers/volunteers traveling to/from the property, the on-site accommodations will minimize traffic on public and site roads (to Mondays and Fridays for workers and Weekends for volunteers).

Basic/minimal infrastructure to accommodate overnight or longer stays, including water, shelter and improved access will assist in the overall efficiency of the restoration efforts. All efforts in facility design will minimize impact to existing native trees. Re-vegetation with native plants will occur in areas disturbed by construction activities as necessary.

The outplanting centers will consist of shadehouses, utility storage buildings and a parking area. The parking area may serve as a helipad site. Typical shadehouse-like structures will be needed to outplant and store seedlings and supplies, and will have adjoining structures for office, laboratory and storage facilities. These improvements will lead to more efficient and cost effective restoration efforts including outplanting and weed control.

3.3.3 Alternative 3c - Outplanting Center and Field Worker Accommodations at one site

Alternative 3c will be similar to Alternative 3b above; however, only one outplanting center and fieldworker accommodation site will be chosen.

Having only one outplanting center will increase the time and distance it will take to get seedlings from the outplanting center to the replanting areas across the 56,000-acres – a site that is 19-miles long and up to 6-miles wide. Travel time will cut back on the number of hours spent planting, since workers would have farther to travel from planting area to planting area.

With only one outplanting center, either a larger facility will be built or less plants will be able to be site conditioned compared to having more than one facility. With less seedlings being conditioned, native reforestation will be slower as there will be an added delay. Elevation requirements (māmane vs ‘ōhi’a) may be compromised, resulting in poorer survival and increased costs via transport and personnel time.

3.3.4 Alternative 3d - Outplanting Centers with no Field Worker Accommodations

For alternative 3d, outplanting centers as described in alternative 3b will be built at both sites; however, field worker accommodations will not be built at either site. Travel time and traffic will increase since field workers, staff and volunteers will need to drive to the site daily. The length of time to plant seedlings will be increased and thus reforestation will take longer.

With no place to stay overnight, staff, contractors and volunteers will have to travel from Hilo or other places of residence on the island on a daily basis to maintain plants. Travel time will cut back on the number of hours spent planting.

3.4 Administration Base Facility

The following are alternatives for the development of an administration base facility.

3.4.1 Alternative 4a - No Action

Under alternative 4a, no base facility will be built, therefore, no ground disturbing activities, or facility construction will occur.

Without an administration base facility, staff offices will be housed offsite in Hilo. The only onsite presence by staff would be when they drive up to the property or stay overnight at one of the other accommodations, e.g. remote or outplanting facilities. Managing and monitoring the property would be difficult without a continual onsite presence. Staff traveling from Hilo will have minimal time onsite due to the lengthy drive time. Additionally, there will be additional vehicles on the roads.

Without an onsite presence the site will be vulnerable to trespassing and other illegal activities.

3.4.2 Alternative 4b - Administration Base Facility with Offices, Storage, Caretakers Quarters and Accommodations - Preferred Alternative

Under this preferred alternative, 4b, the base facility will provide office space, laboratory space, meeting rooms, restrooms, showers, administrative unit with teaching, office and meeting rooms, utility, vehicle, equipment and supply storage buildings, accommodations and support facilities.

The base facility is proposed in the vicinity of the Mauna Kea Access Road and Keanakolu/Mana Road intersection. The base facility will also serve as a presence and be a deterrent to inappropriate behavior (vandalism, etc) by others coming to this remote region.

The Administration Base Facility accommodations will consist of a caretaker's living unit, as well as accommodations for up to 20-person sleeping quarters capacity with appropriate facilities (restrooms/baths, kitchen/dining), support facilities and a parking area. The parking area may serve as a helipad site. The accommodations will be used for staff, as well as visiting scientists, dignitaries, volunteers and others utilizing the area. On-site accommodations will minimize traffic getting to and from the property.

Additionally, a staff residence/caretaker house will serve as a 24-hour presence at the base facility site; the idea being that a staff member will be able to live on-site to provide such a presence. An additional staff residence/caretaker house will be located at the other end of the DHHL property on the Keanakolu/Mana Road, near the DLNR Keanakolu Station.

All efforts in facility design will minimize impact to existing native trees. Re-vegetation with native plants, as appropriate, will occur in areas disturbed by construction activities.

3.4.3 Alternative 4c - Administration Base Facility with Office, Storage and Caretaker Residence Only

Alternative 4c will be similar to alternative 5b in that a base facility will be built to provide office space, storage, meeting rooms, caretaker's residence and restrooms. However, no dorm accommodations will be built.

The base facility is proposed in the vicinity of the Mauna Kea Access Road and Keanakolu/Mana Road intersection. The base facility will also serve as a presence and be a deterrent to inappropriate behavior (vandalism, etc) by others coming to this remote region. All efforts in facility design will minimize impact to existing native trees. Re-vegetation with native plants will occur in areas disturbed by construction activities.

The Administration Base Facility accommodations will consist of a caretaker's living unit, as well as support facilities, rooftop water collection systems and a parking area. The parking area may serve as a helipad site. A staff residence/caretaker house will serve as a 24-hour presence at the site; the idea being that a staff member will be able to live on-site to provide such a presence. An additional staff residence/caretaker house will be located at the other end of the DHHL property on the Keanakolu/Mana Road, near the DLNR Keanakolu Station.

Without accommodations, visitors and staff will need to stay in Hilo or stay at the field worker accommodations proposed within the Kanakaleonui Bird Corridor and north of Pu'u 'Ō'ō. Both of these sites will add extensive amounts of travel time to those visits. It will also lead to more cars on the roads within the 'Āina Mauna and more wear and tear on the road system.

3.5 Groundwater Water System

The following are alternatives for the development of groundwater water system.

3.5.1 Alternative 5a - No Action

Under alternative 5a, no action will be taken and an exploratory well will not be developed. Water for the area will continue to come from catchment or be hauled to the property. Water will continue to be a constraint on restoration, development and use of the property. Under this no action alternative DHHL will not know if groundwater development is possible since no exploratory well will be developed. Water will need to be captured through a surface water catchment system or hauled onto the property. Under this alternative DHHL will need able to investigate other water source opportunities

3.5.2 Alternative 5b - Development of Well, Groundwater Distribution System and Spring Restoration - Preferred Alternative

Under this preferred alternative, 5b, an exploratory well would first be drilled; if successful, a production well will be developed with associated storage and distribution. Under this alternative, the well will either produce water and a groundwater distribution system will be developed or no water will be found and the well will need to be capped.

If water is found after development of a well, the groundwater system will include the completion to production well, reservoir tank storage, a waterline distribution system, a photovoltaic system and low-wind-speed generators to power well pumps (with power, generator backup and battery storage) and site grading.

Additional ground water resources may also come from springs located on the property. Historic records indicate that various springs may be located on the property. These springs will be rehabilitated/restored to provide additional water to the overall property for domestic use. The water may be used for development of the property (human consumption,) as well as for fire management and irrigation.

However, if, under this alternative, an exploratory well is developed and water is not found or development of a full groundwater system is not be feasible based on data from the exploratory well development, the well will need to be capped and closed.

Although drilling an exploratory well is expensive and DHHL will only know after drilling an exploratory well whether ground water will be available to the property, if water is discovered, water needs would be met for all actions, more efficiently and ultimately economically than through catchment alone.

3.6 Surface Water Catchment System

The following are alternatives for the development of a surface water catchment system.

3.6.1 Alternative 6a - No Action

Under alternative 6a, no action will be taken and a surface water catchment system will not be developed. Water for the area will need to be hauled to the property. Water will continue to be a constraint on restoration and development of the property. The hauling of water to the property will be uneconomical due to the amount needed and the cost of hauling it to the remote property.

3.6.2 Alternative 6b - Development of Surface Water Catchment System - Preferred Alternative

Under this preferred alternative, 6b, a surface water catchment system will be developed and managed for the property (or portions of the property,) where needed. The surface water catchment system will include reservoir/stock ponds/tanks/catchment systems, (liner, piping, filtering, etc,) fog drip catchment augmentation systems, water treatment facility(s), waterline distribution systems and site preparation.

Catchment provides a lower cost alternative for water, as well as flexibility of providing catchment and storage at the various places of need. The water may be used for pasture, as well as for development of the property (possible human consumption,) fire management and irrigation.

Because there is no potable water system or perennial stream in feasible proximity, the Hawai'i County Water Use and Development Plan (*DHHL Special Report #2*) recommended that individual roof catchment and storage systems be installed for each unit as developed. So, individual catchment, storage, filtering systems may be placed at each of the structures on the property, i.e. homestead sites, attached to each building in the Sheep Station Adaptive Reuse Plan, headquarters, outplanting centers, etc.

3.6.3 Alternative 6c - Development of Surface Water Catchment System (non-potable)

Under this alternative a limited surface water catchment system will be developed for the property (or portions of the property, where needed). The surface water catchment system will include a reservoir/catchment system (grading, liner piping), a limited waterline distribution system and site grading.

The water from the development of a surface water catchment system will be used for non-consumption i.e. pasture, fire management, and reforestation support only. Thus, the water will not need to be treated and the water treatment facility will be eliminated from the process. Additionally, water will be through rain catchment only via tanks or reservoirs. Fog drip augmentation will be used.

3.7 Road System

The following are alternatives for the development of a road system.

3.7.1 Alternative 7a - No Action

Under alternative 7a, no action will be taken. Currently access to the property consists of a three main roads (Saddle Road, Mana/Keanakolu Road and Mauna Kea Access Road) which traverse the entire property with ranch-style roads splitting from each allowing access to other areas of the property.

No new roads will be built and thus, there will be no disturbance to the property. Existing roads will be used. Because of the poor condition of many of these ranch-style roads, the ranch-style roads will be left to continue to decline and deteriorate.

Access across the property will be limited to currently accessible areas. Because of the large size of the property, some areas will not be accessible. Additionally, many of the other actions considered in this EA would be limited due to the inaccessibility of many areas. For example, ecotourism operations would be limited to only a few roads thus, limiting the area of the 'Āina Mauna they are able to take visitors to.

3.7.2 Alternative 7b - Develop Road System Across Property - Preferred Alternative

Under this preferred alternative, 7b, ranch-style roads will be improved and developed to access the property and serve as firebreaks. Saddle Road, Mana/Keanakolu Road and Mauna Kea Access Road will continue to be used, as well.

The ranch-style roads will be cinder/gravel/dirt (4-wheel drive) with the exception of hard surfaces at steep slopes and at water crossings. Site preparation and other paving may also occur. Efforts will be made to incorporate existing ranch roads into the road system.

Other actions within this EA which rely on accessible travel across the property will be able to proceed. With additional roads on the property, travel will be dispersed and component roads will not have as much traffic, thus not be heavily impacted.

The development of new roads will provide an added benefit of enhancing management access. Since the property is so large, new roads will enable management to access areas of the property which they are unable to access currently. Additionally, new roads (and existing roads) will serve as fire breaks. Firebreaks are an important part of the areas wildfire management and thus serve a dual purpose for access as well as fire management.

3.7.3 Alternative 7c - Improve Existing Roads

Under alternative 7c, no new roads will be built however the existing Saddle Road, Mana/Keanakolu Road and Mauna Kea Access Road, as well as existing ranch-style roads will be improved. The improvements will consist of hardening in some areas and adding gravel/cinder to other depending on the terrain.

Although this alternative will improve some access across the property, it will not allow for development outside of the current roads immediate vicinity. Because of the large size of the property, some areas will not be accessible. Additionally, many of the other actions considered in this EA would be limited due to the inaccessibility of many areas. All development will need to be centered on current roads thus, making some development cost prohibitive

3.8 Pig Control and Management

The following are alternatives for pig control and management.

3.8.1 Alternative 8a - No Action

Under the alternative 8a, no management of pigs will be undertaken. No fencing will be constructed or maintained and pigs will be allowed to continue to roam the landscape unimpeded. Pigs would not be eradicated and thus, populations would continue to multiply. This alternative will perpetuate the current state that has led to the serious demise of the areas landscape, native plant populations, forests and ecosystems. Alternative 8a will diminish the recruitment of native species (particularly in native forest restoration and koa forest restoration areas) and will ultimately result in the further demise of the native ecosystem.

Managers can mitigate threats posed by fire and try to prevent the destruction posed by insects and other invasive pests but the regeneration of the native and koa forests will not occur without fencing to keep pigs out and complete eradication in these areas.

3.8.2 Alternative 8b - Pig Control and Management - Preferred Alternative

Under this preferred alternative, 8b, pigs will be controlled and managed across the property through a variety of means. Pig management will involve removing all pigs from some areas and managing limited populations of pigs in other areas.

All pigs will be removed from sensitive forestry areas (M1, M2, R1, R2, R3). Removal will be done through a variety of techniques including through trapping, capture, shooting (ground and aerial,) snares and hunting. Their main components in successful feral animal eradication programs, described in “feral animal eradication” (in actions common to all alternatives) may be used.

Once pigs are removed from the designated areas, fencing for pig exclusion and inclusion will be installed. Management unit perimeter fences will be built, and may include one-way gates and traps. Fence monitoring and maintenance will be an important aspect of pig control and management.

In areas where pigs will be tolerated, population level awareness and responsive management strategies to maintain acceptable levels will be critical. Modeling techniques in animal control efforts will be used to ensure that population numbers are being reduced and maintained at desired levels. Periodically, beneficiaries and others will be allowed on the property to remove pigs (in areas of the property where pigs are not eradicated) through shooting, trapping, etc. This form of management will provide opportunities to beneficiaries and others for sport and food. The intention is not to develop a game management program, but, rather management of limited populations of pigs while providing benefits to beneficiaries.

This preferred alternative allows for limited pig populations to be part of the ecosystem, where appropriate, so long as the resources are adequately protected.

3.8.3 Alternative 8c – Pig Eradication over entire property

Under alternative 8c, pigs would not be managed and instead eradicated over the entire property. Eradication techniques would be the same as described in alternative 9b above.

Pig eradication will provide opportunities to beneficiaries and others for sport and food, but only for a limited time, as pig populations decline and eradication of the species is realized. Diligence in fence monitoring and repair will be a vital part of this alternative, as the entry of a few pigs may cause the population to multiply quickly in a previously eradicated area.

3.9 Gorse Eradication through Commercial Timber Planting and Harvesting (T1, T2)

The following are alternatives for gorse eradication through commercial timber planting and harvesting.

3.9.1 Alternative 9a - No Action

Under alternative 9a, no action will be taken in the 10,000-acre gorse eradication area. The gorse will continue to spread and will not be contained or eradicated.

Use of physical (hand clearing, mulching, controlled burns etc,) chemical (manual, hand and aerial spraying) and biological controls could be used to manage the gorse and attempt to keep it from spreading. No monetary gain will be realized and instead money will need to be spent on gorse eradication and management.

3.9.2 Alternative 9b - Commercial Timber for Gorse Eradication and Commercial Timber Harvest - Preferred Alternative

Under this preferred alternative, 9b, approximately 10,000 where the gorse infestation is currently the most intense will be initially site prepped and planted/harvested with commercial trees to shade out and help eradicate the gorse. This Alternative would allow DHHL to license or otherwise permit use of the site to an operator who would pay a fee to DHHL to use the land for timber.

First, site preparation will remove the gorse plants growing on the property. This gorse could then be processed, used for a carbon transfer or disposed of through other means on site. No unprocessed gorse plants will be allowed to be removed from the area, (i.e. trucked off the mountain), to ensure the weed is not spread. This alternative does not preclude other forms of gorse removal, such as the gasification process suggested by the beneficiary group 'Ōiwi Lōkahi o ka Mokupuni o Keawe.

Commercial scale timber will be planted when the existing gorse plants have been removed and the seed bank has been sufficiently reduced to minimize gorse regeneration. These commercial scale timber trees will serve to shade out any new growth of gorse plants whose seed bank remains in the soil.

Tree species to be planted will be evaluated with minimum scores of L or L(Hawai'i) under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Evaluation Group 1 (low risk) in the Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs.

As the trees grow the shade from their leaves are expected to inhibit the gorse growth and regeneration; thus, eventually killing off the gorse. Steps in the commercial timber planting process will include physical, chemical and/or biological invasive plant control, site preparation and fertilization.

Once the trees reach maturity they may be harvested and new stock replanted. The project proposes to begin harvesting the trees after approximately 10-years after planting, in continuing cycles for at least 50-years. Trees will be felled under current BMPs. Replanting and any needed gorse control will occur as soon as possible after each harvest. Current forestry BMPs will be the guiding measurement for all harvest-related activities on the property. All County and State permits necessary at the time of harvest will be obtained prior to harvesting.

For commercial timber operations, there will be a limit on the number of trucks accessing the Saddle Road per day. Harvest hauling operations on the Saddle Road will be limited to up to 10 trucks per day, from 6 am to 4 pm, on weekdays only. These mitigation measures are twofold.

First, commercial timber traffic will be limited to weekdays, thus allowing the general public to utilize the road without harvest hauling operation traffic on the weekends when the general public will be more prone to accessing the area and utilizing the Saddle Road. This will also help minimize interactions between commercial vehicles and the public. There will be an average of less than one truck per hour.

Second, the mandated day light operation hours will allow motorists to better see the harvest hauling operations and limit road use to times when fog is less prevalent.

With the planting of trees, it is anticipated that wildlife and possibly endangered species will inhabit this area; therefore, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated.

The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the commercial timber plantings attract endangered or threatened species or result in increased numbers or distributions of listed species already present.

Besides the eradication of gorse, this alternative will lead to a decrease in fire hazards as flashy fuels are reduced and altered from brush and grasses to trees. Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program.

Gorse in outlying areas will also continue to be controlled through an Integrated Pest Management Control Program including physical (hand clearing, mulching, controlled burn, etc), chemical (manual, hand and aerial spraying) and biological controls. This form of gorse control will be for remnant gorse throughout the property.

3.9.3 Alternative 9c – Burn and Spray Herbicide for Gorse Eradication

The burn and spray herbicide alternative would consist of continued burning of gorse plants and ground and aerial spraying of herbicide.

Gorse would continue its expansion into the remaining areas of the 'Āina Mauna. It could increase its density into the Hakalau Forest National Wildlife Refuge and adjacent State' forest reserves, and expand its range into the Pōhakuloa Training Area and down the Wailuku River toward Hilo.

The use of fire for burning gorse has many potential impacts including escaped fire causing non-gorse areas to be burned, dangers in management of fire on personnel and the ability to control fire on isolated populations. Although useful in smaller, controlled populations, the use of fire is impractical for an area as large and invasive as the current gorse invasion is.

Although herbicide application is an inexpensive alternative, in combination with burning does not facilitate it as an alternative. Herbicide application would remain the same or increase as needed. This Alternative would not bring in any revenue to DHHL and would have the added expense for the herbicide and burning functions.

3.10 Pasture (Interim and Long Term) (H2, P1, P2)

The following are alternatives for pasture use (interim and long term).

3.10.1 Alternative 10a - No Action

Under alternative 10a, no action will be taken to create, develop or improve pasture lands. Lands set aside for pasture activities/use will not be utilized for pasture uses.

Pursuant to the Hawaiian Homes Commission Act this “no action” alternative does not represent an option toward addressing the entitlements and pasture needs of Native Hawaiians. Additionally, both in the preparation of the 'Āina Mauna Legacy Program and in the scoping of this EA, beneficiaries were in favor of expanding pasture uses within the 'Āina Mauna. Thus, this alternative would not serve the desires of the beneficiary community.

3.10.2 Alternative 10b - Interim and Long Term Pasture Infrastructure (Fencing and Stock Water Improvements) - Preferred Alternative

Under this preferred alternative, 10b, interim and long-term pasture improvements will include fencing, roads, stock water systems and reservoir infrastructure improvements.

Fencing is an essential part of any cattle operation. Without adequate fencing cattle can escape and become wild. Additionally, wild cattle pose a threat to native vegetation, especially seedlings. Fencing will involve repairing and replacing fencing which is already in place. In some cases, new fencing may be needed if the paddocks are reconfigured from past configurations.

To ensure exclusion of wild ungulates, hog wire and barbed wire fence (the top wire of the fence will be smooth to reduce any chances of injury to birds or bats) may be used and fencing mesh size may be more tightly woven closer to the ground and buried to exclude nonnative predators.

Certain trees will be retained and protected for wildlife habitat and on-site seed production. Fire hazard will decrease as noxious weeds are managed and grass cover is reduced/managed.

Water is also an essential part of pasturing. There are already a few reservoirs/stock ponds from prior ranching activities still in place, which were used historically for cattle operations. Some of these reservoirs/stock ponds are still in use by the ranchers that are on adjacent properties. Many existing reservoirs are in need of infrastructure repair, including new lining and piping. Additional reservoirs and water distribution systems may be added and built to ensure an adequate water supply for cattle operations.

This preferred alternative is pursuant to the Hawaiian Homes Commission Act as it addresses the pasture needs of Native Hawaiians. In both in the preparation of the 'Āina Mauna Legacy Program and in the scoping of this EA, beneficiaries were in favor of expanding pasture uses within the 'Āina Mauna. Many stated the need for more pasture land and were in favor of a variety of options for pasture layouts. This preferred alternative would serve the desires of the beneficiary community by opening more pasture to beneficiaries and improving pasture infrastructure. Pasture uses could be in the form of individual leases or community pastures.

3.10.3 Alternative 10c – Koa Planting and Harvest

Under this alternative existing pasture lands will be used for koa planting and harvesting, rather than for cattle pasture. As described in Alternative 2b above, planting and naturally regenerating sustainable commercial koa forests will include seed orchard development, seed collection, site preparation, outplanting, diversification plantings, salvaging dead and dying trees and harvesting.

While this Alternative has the many benefits of providing koa trees in a sustainable process, this alternative would not serve the desires of the beneficiary community to continue pasturing most appropriate areas of the 'Āina Mauna.

Both in the preparation of the 'Āina Mauna Legacy Program and in the scoping of this EA, beneficiaries were in favor of expanding pasture uses within appropriate areas of the 'Āina Mauna. The 'Āina Mauna Legacy Program seeks to provide a balance and this alternative removes one appropriate action, i.e. cattle ranching, from the landscape.

3.11 Infrastructure for Initial Homesteading Area (H1, H2, K5)

The following are alternatives for infrastructure for initial homesteading area.

3.11.1 Alternative 11a - No Action

Under alternative 11a, no infrastructure will be developed for homesteading. Without basic infrastructure, homesteading will not be possible. The area will naturally evolve into a forest consisting of both native and non-native plants and animals. Fire and invasive species will continue to be a concern for the area.

There are hundreds of Native Hawaiians on the waiting list for homestead lands on Hawai'i Island. Pursuant to the Hawaiian Homes Commission Act this "no action" alternative does not provide an opportunity for addressing the entitlements and housing needs of Native Hawaiians.

3.11.2 Alternative 11b - Rurally-Developed Infrastructure for Initial Homesteading Area - Preferred Alternative

Under this preferred alternative, 11b, rurally-developed infrastructure for homesteading projects and sites will be developed. Approximately 4,500-acres are identified for the initial homesteading area. Initially, there will be approximately 100 to 200-homesteads with a variety of possible development layouts per approximately 1,000-acres.

To take advantage of opportunities to further demonstrate the focus on efficient, self-sustainable communities, as well as provide for cost-effective development, the Legacy Program considers a variety of homestead development layouts to address various beneficiary needs. Layout options include:

- Cluster homestead sites (lots up to 1-acre) with separate agricultural/pasture lot
- Cluster homestead sites (lots up to 1-acre) with community agricultural/pasture
- Homestead lot subdivision (lots approximately 10-acres)
- Combination of alternatives

The layouts and details of the individual home sites will be determined by a community process similar to how other DHHL homesteads are developed. Eventually, homesteaders will build their homes and accessory buildings and structures will be built on their own properties.

Rurally-developed infrastructure for homesteading projects and sites will be developed first. This will include home site preparation and the addition of unpaved (natural base, gravel/cinder or hard surface) roads to access the area and paving may occur in the future.

Water source will be by catchment with fog drip catchment augmentation (groundwater systems may also be incorporated into the homestead development.) Septic tanks, leach fields, gray-water re-use and/or, where appropriate, composting toilets for waste disposal will be used.

Because there is no potable water system or perennial stream in feasible proximity, the Hawai'i County Water Use and Development Plan (*DHHL Special Report #2*) recommended that individual roof catchment and storage systems be installed for each unit as developed.

Consistent with DHHL's Energy Policy, alternative energy components will be employed wherever possible and may include:

- Photovoltaic electrical power (with battery and generator back-up)
- Solar hot water heating
- Passive solar/insulation
- Low-wind-speed generators for electrical power, where appropriate

Installation of photovoltaic systems (power, battery storage and generator backup) and low-wind-speed generators will provide green energy for the homes. Small-scale rooftop low-wind-speed generators will be installed and will be located in areas that maximize wind-power generation. Solar panels/Photovoltaic panels will be located either on rooftops of homes or on free-standing posts nearby. Installations of alternative energy sources will comply with all county building codes.

Best Management Practices (BMPs) will be followed to ensure infrastructure construction is implemented properly.

Access to this area would be off of the Saddle Road, at the designated and improved intersection near the 23-mile marker, identified as Pu'u 'Ō'ō Ranch, or other existing Saddle Road intersections, as well as to the Keanakolu-Mana Road. Internal roadways would be constructed to serve homesteader lots.

Individual homesteads will be cleared and constructed on an individual basis with construction anticipated to be staggered throughout the years. Homesteads will comply with applicable County codes and seismic safety regulations and standards in the design of structures to meet applicable codes to ensure the safety of homesteaders and visitors. In addition, the design of the structures will incorporate techniques to minimize the seismic risk of potential damage.

Positive impacts from this alternative include the creation of additional homesteads and pastoral sites and the potential generation of jobs. The potential generation of jobs near homesteads will increase the quality of life for native Hawaiians through decreasing commuting as well as traffic on the Saddle Road.

This preferred alternative is consistent with the foundation of the Hawaiian Homes Act of putting Native Hawaiians onto the land. During the development of the 'Āina Mauna Legacy Program as well as during the scoping process for this EA, no objections to the description of homesteading layout, infrastructure and/or development were made. Thus, this is the preferred alternative.

3.12 Sheep Station Adaptive Reuse (HSS)

The following are alternatives for the sheep station adaptive reuse.

3.12.1 Alternative 12a - No Action

Under alternative 12a, no action will be taken. The existing structures will continue to degrade without stabilization or restoration. Building will continue to be a liability due to condition and the area will need to be gated to allow no access. No economic benefit will be gained since the site will not be used. Additionally, the historic nature of the area will be lost due to the deterioration of the historic sheep station structures.

Without redevelopment the site would continue into disarray. Historic structures would continue their decline. The 'Āina Mauna will lose an important part of its ranching history and the Sheep Station's ability to tell the story and history of the area will be lost.

3.12.2 Alternative 12b - Restoration of Sheep Station Facilities and Creation of Demonstration Areas – Preferred Alternative

Under this preferred alternative, 12b, reuse of the Humu'ula Sheep Station as proposed in the Humu'ula Sheep Station Adaptive Reuse Plan (Reuse Plan) will be implemented. This preferred alternative recognizes that there are three scales of development within the Reuse Plan. This preferred alternative addresses the full build out; however, it may be phased in over time. Just as the Reuse Plan allows for flexibility, phase-in of the Plan will be flexible.

Historic buildings (e.g. office and dwelling building, barn and shearing shed) will be restored and additional site improvement made. These historic buildings may be used for offices, ecotourism base facilities, museums and/or gift shop operations, as appropriate. The historic nature of the Sheep Station and related facilities will be retained.

The restoration of the historic buildings may be costly but return will be the highest of the proposed alternatives due to the commercial appeal of the renovations and new structures. Additionally, other commercial uses and structures may be built to enhance the historic nature of the area such as sheep pens and other animal enclosures.

Existing structures at the Sheep Station may also serve as an interim Administration Base facility for program operations while a permanent administration base facility is built. Thus, the habitable buildings on site can be used for office space, accommodations and storage.

It is anticipated that permanent overnight accommodations and related facilities will consist of up to twenty (20) cabins (120-person capacity) with appropriate facilities (restrooms/baths, kitchen/dining), camp store, eco-tourism staging/community center, campground area, one caretaker's living unit, one administrative unit with office and meeting rooms, utility storage buildings and a parking area. The parking area may also serve as an emergency helipad site.

In addition, a lodge, restaurant and visitor center may also be developed near the Sheep Station or in the area immediately above the 500-acre commercial area on either side of the Mauna Kea Access Road.

The Sheep Station will serve as a central staging for ecotourism activities across the entire property. Operations will use the site to orientate visitors and stage training and other prepping activities. The area covers a small footprint for activities and serves as a central location for compliance related (i.e. briefings) issues. Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program.

This preferred alternative takes into account the Sheep Station's historical, architectural and cultural importance by implementing appropriate portions of the Reuse Plan. The redevelopment of the Sheep Station, through this preferred alternative, will improve services to the area and create a revenue source for the Department.

3.12.3 Alternative 12c – Stabilization and Improvement to Historic Structures Only

Under alternative 12c, no new permanent structures will be built. Instead improvements will be made to the historic buildings on site as described in the Reuse Plan as the “Historic Center.” The Historic Center (5.5 to 6.0 acres) consists of three core buildings: the office/dwelling building, barn and shearing shed.

Improvements will consist primarily of stabilize buildings in the historic center for long-term preservation, removing debris and clearing overgrown landscaping.

Paths linking these buildings will be constructed to define safe walking and observation areas for visitors. The area will be further improved with interpretive signs and displays of artifacts. Corrals and open fields on the south and west sides of the site will be retained so that the roadway approaches from Saddle Road and Mauna Kea Access Road convey an ambiance of wide open spaces and pastureland.

Other existing structures (outside of the Historic Center) will serve as an interim Administration Base Facility for program operations while a permanent Administration Base Facility is built. The habitable buildings on site will be used for office space, accommodations and storage and fences will be erected fences the remaining buildings to keep people from entering hazardous structures.

From a potential financial standpoint, this alternative is essentially a non-revenue generating and purely expense component of the property. The stabilization and ultimate restoration of the historic structures will provide minimal economic opportunity. Without uses called for in the Reuse Plan, visitor amenities, such as accommodations, visitor revenue will be limited. Additionally, over the long term, the buildings will need to completely renovated which, without a revenue source, may be cost prohibitive.

3.13 Remote Accommodations

The following are alternatives for the development of remote accommodations.

3.13.1 Alternative 13a - No Action

Under alternative 13a, no structures will be built and no ground disturbing actions will take place. The ability for visitors to stay within the ‘Āina Mauna area and experience its restoration will be limited to facilities at the Sheep Station and possibly at field worker accommodation facilities. This would limit access to the property for visitors. Because of the ‘Āina Mauna’s size, accommodations are desirable so that those accessing the area are able to spend more time on site rather than spend the entire day accessing part of the area.

Without the development of remote accommodations, no revenue will be regenerated to fund other actions of the ‘Āina Mauna Legacy Program.

3.13.2 Alternative 13b - Construct Remote Accommodations/Shelters/Rest-Areas/Campgrounds - Preferred Alternative

Under this preferred alternative, 13b, additional remote accommodations, shelters, rest areas and/or campgrounds will be built over several areas on the 56,000-acre property. Accommodations could include bunkhouses or cabins and baths/showers, single residences, cabins and/or shelters, and campgrounds with shelters and tent camping.

As referenced in the Humu'ula Sheep Station Adaptive Reuse Plan, Humu'ula/Pi'ihonua Master Plan and the Legacy Program, areas for remote accommodations have already been established and follow many old established ranch roads. The property's existing ranch houses/cabins/sites or others that could be constructed can provide a series of locations for overnight accommodations, retreat and ecotourism uses.

Ecotourism overnight facilities are proposed at/near five locations 1) Pu'u 'Ō'ō Ranch headquarters (K4), 2) in the vicinity of the former Kahinahina Forest cabin site (R2), 3) in the vicinity of the existing Kanakaleonui cabin (R1), 4) Pi'ihonua mauka (R3) and 5) north of the Dr. David Douglas Monument (K1). The sites are purposely selected across the landscape, generally in areas where improvements have existed in the past.

Each site may consist of accommodations (for up to 20-person sleeping quarters capacity) with appropriate facilities (restrooms/baths, kitchen/dining) and utility/storage buildings. A campground area, for periodic need for expanded overnight stays, will be around the permanent facilities.

Improvement of existing and new trails for hikers, mountain-bicyclists, ATV*, horseback riders, horse drawn wagons and/or others who could then travel from remote accommodation to remote accommodation, as well as other ecotourism uses with shelters and rest areas, will be made.

*As discussed and generally agreed in the EA scoping meetings, no unsupervised, independent recreational use of ATVs on the 'Āina Mauna property will be permitted (however, 'Āina Mauna management personnel may use ATVs in fulfilling management functions.) ATV use in the ecotourism activities action will only be permitted when supervised by the ecotourism operator and the ATV throttle will be modified so that its maximum speed is reduced to that of a typical walk or jog.

One option is to offer a lease package that includes a staging area at the Sheep Station with one or more remote sites. These sites will be especially attractive if developed in conjunction with existing and new trails. The facilities could be operated as independent units or assembled into groups for management as a series of overnight accommodations.

All efforts in facility design will minimize impact to existing native trees. Re-vegetation with native plants will occur in areas disturbed by construction activities.

The uses of these individual and collective "remote accommodations" cover a small footprint and are dispersed across the landscape. Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program. During the development of the 'Āina Mauna Legacy Program as well as during the scoping process for this EA, no objections to the description, locations and/or number of remote accommodations were made. Thus, this is the preferred alternative.

3.13.3 Alternative 13c - Construct Remote Accommodations/Shelters/Rest-Areas/Campgrounds at Three Existing Sites

Under this alternative, 13c, remote accommodations, shelters, rest areas and campgrounds will be built over several areas on the 56,000-acre property. Accommodations could include bunkhouses or cabins and baths/showers, single residences, cabins and/or shelters, and campgrounds with shelters and tent camping.

As referenced in the Humu'ula Sheep Station Adaptive Reuse Plan and Humu'ula/Pi'ihonua Master Plan, many areas for remote accommodations have already been established and follow many old established ranch roads. The property's existing ranch houses/cabins/sites can provide a series of locations for overnight accommodations, retreat, ecotourism uses, etc.

For this alternative, ecotourism overnight facilities are proposed at 1) Pu'u 'Ō'ō Ranch headquarters (K4), 2) former Kahinahina Forest cabin site (R2) and at the 3) Kanakaleonui cabin (R1).

As with alternative 13b, each site may consist of accommodations (for up to 20-person sleeping quarters capacity) with appropriate facilities (restrooms/baths, kitchen/dining) and utility/storage buildings. A campground area, for periodic need for expanded overnight stays, will be around the permanent facilities.

Improvement of existing and new trails for hikers, mountain-bicyclists, ATV*, horseback riders, horse drawn wagons and/or others who could then travel from remote accommodation to remote accommodation, as well as other ecotourism uses with shelters and rest areas, will be made.

One option is to offer a lease package that includes a staging area at the Sheep Station with one or more remote sites. These sites will be especially attractive if developed in conjunction with existing and new trails. The facilities could be operated as independent units or assembled into groups for management as a series of overnight accommodations.

However with this alternative, only three sites will be developed thus limiting the options for travel from site to site. With no remote accommodation sites in the northern part of the property, much of the 'Āina Mauna would be inaccessible. Visitors will be unable to see all of the management activities and efforts underway within the 'Āina Mauna. Excluded will be commercial koa areas and lower elevation native forest management areas where 'ōhi'a is expected to be the dominant overstory species and koa will achieve its largest size.

All efforts in facility design will minimize impact to existing native trees. Re-vegetation with native plants will occur in areas disturbed by construction activities. The uses of these individual and collective "remote accommodations" cover a small footprint. Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program.

With this alternative, revenue generated from the development of remote accommodations would be less than if more facilities were built, thus the full revenue potential for the development of remote accommodations would not be realized.

3.14 Eco-tourism Facilities, Services and Activities

The following are alternatives for eco-tourism facilities, services and activities.

3.14.1 Alternative 14a - No Action

Under alternative 14a, eco-tourism activities will be limited to those already occurring on site (Hawai'i Forest and Trail). No new eco-tourism activities, service or facilities would be developed. Activities for visitors would be severely limited.

Visitors would be unable to draw on the unique history and cultural connection that the area has. The absence of ecotourism activities would have a negative impact on other visitor facilities onsite, since ecotourism activities complement many of the other 'Āina Mauna legacy Program actions.

Volunteer "service" trips, which allow participants the opportunity to volunteer at the site they are visiting, thus give back to the community, would also not occur. This would limit local residents from experience the 'Āina Mauna region, through "service" trips, as well.

In addition, revenue opportunities will be limited to already existing uses. No new revenue would be realized and thus other actions of the 'Āina Mauna Legacy Program may not be realized.

3.14.2 Alternative 14b - Expand Eco-Tourism Facilities, Services and Activities - Preferred Alternative

Under this preferred alternative, 14b, eco-tourism facilities, services and activities on site will be expanded. Expanded infrastructure will include improvement of existing and new trails for hikers, mountain-bicyclists, ATV*, horseback riders, horse drawn wagons and/or others; campgrounds, rest areas, shelters with cooking facilities, parking, lookouts, interpretive signage, board walks, horse corrals, barns, watering areas and storage as needed.

Eco-Tourism uses and activities will include: Biking Tours, Bird Watching Tours, Camping, Hiking Tours, Horseback Tours, ATV* tours, Horse Drawn Wagon Tours, Historical Tours, Nature Tours, Hunting, Volunteer "Service" Trips, etc.

With an increase in eco-tourism activities and services, infrastructure will be developed and improved. Infrastructure improvement and development will include improvements to existing trails and development of new campgrounds, rest areas, shelters with cooking facilities, parking, lookouts, interpretive signage, board walks, horse corrals, barns, watering areas and storage.

*As discussed and generally agreed in the EA scoping meetings, no unsupervised, independent recreational use of ATVs on the 'Āina Mauna property will be permitted (however, 'Āina Mauna management personnel may use ATVs in fulfilling management functions.) ATV use in the ecotourism activities action will only be permitted when supervised by the ecotourism operator and the ATV throttle will be modified so that its maximum speed is reduced to that of a typical walk or jog.

Guided groups will have cultural, natural resources and safety briefings which will minimize impacts to the landscape and infrastructure. All horseback, ATV* and related users will also be given an additional safety and operational briefing on appropriate use of the equipment.

Additionally, money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program.

3.14.3 Alternative 14c - Expand Eco-Tourism Services and Activities, No New Facilities

Under alternative 14c, eco-tourism services and activities will be expanded but facilities and infrastructure will remain in its present state. Without expanded infrastructure the types of activities will be limited.

Eco-Tourism uses and activities such Biking Tours, Bird Watching Tours, Hiking Tours, Historical Tours and Nature Tours would be limited to already existing trails. Many of these existing trails are in disrepair and may not be compatible with ecotourism activities without upgrades.

Some activities could be conducted at the Humu'ula Sheep Station such as camping and horseback riding but these activities will need to be coordinated with activities taking place at the Sheep Station. Without the development of new roads and trails, the use of the remote "back-county" of the property will be limited.

Under this alternative volunteer "Service" Trips would be limited to day use as there would be limited overnight accommodations to house volunteers.

Guided groups will have cultural, natural resources and safety briefings which will minimize impacts to the landscape and infrastructure. All ATV users will also be given an additional safety and operational briefing on ATV use.

Money raised from ecotourism activities will be reinvested into the 'Āina Mauna Legacy Program. Without infrastructure and facility costs, in the short term revenue may increase, however in the long term without new infrastructure ecotourism activities and their expansion will be limited, thus limiting long term revenue.

3.15 Commercial Facilities and Activities (C1/HSS)

The following are alternatives for commercial facilities and activities.

3.15.1 Alternative 15a - No Action

Under alternative 15a, no structures will be built and no commercial activities will take place in the commercially designated area. The area will remain vacant.

Commercial facilities and activities will be limited to eco-tourism activities, facilities and activities at the Humu'ula Sheep Station and development and use of remote accommodations. The ability for visitors to experience the 'Āina Mauna and services offered to them will be limited.

In addition, revenue to support native forest restoration and other activities of the 'Āina Mauna Legacy Program will be limited.

3.15.2 Alternative 15b - Develop Commercial Facilities and Activities - Preferred Alternative

Under the preferred alternative, 15b, commercial facilities will be developed on portions of the approximately 500-acres on either side of the Mauna Kea Access Road, surrounding the Humu'ula Sheep Station. Facilities will include a lodge (up to twenty (20) units,) restaurant, visitor center, retail activities, office, commercial/general/convenience store(s), rest stops, gas station and other facilities that are appropriate to a homesteading, transient and/or visitor market.

The lodge, restaurant and visitor center may also be developed in the area immediately above the 500-acre commercial area on either side of the Mauna Kea Access Road generally at the elevation of the tree stand above the Mauna Kea Access Road/Keanakolu-Mana Road intersection.

As a mixed-use facility, there will be a variety of commercial uses, catering to residents, those traveling the Saddle Road and the astronomy industry at Mauna Kea, as well as the other uses within the 'Āina Mauna. Commercial uses will provide both periodic (ecotourism) and long-term (commercial, lodge, etc) opportunities for revenue generation.

Specific uses will be dictated by the need and demand for such services from both the 'Āina Mauna community and sounding uses. Money raised from this activity will be reinvested into the 'Āina Mauna Legacy Program.

Roads will need to be built to access the area and accommodate traffic off the Saddle Road. Re-vegetation with native plants will occur in areas disturbed by construction activities.

3.16 Research

The following are alternatives for research.

3.16.1 Alternative 16a - No Action

Under alternative 16a, no additional research will occur on 'Āina Mauna Lands. Management will be unable to gauge how various management actions are working and will be forced to rely primarily on visual inspections for various project outcomes. Collaboration between DHHL and other agencies and entities on research will not occur and DHHL will not attempt to receive grants for research funding.

3.16.2 Alternative 16b - Research Activities - Preferred Alternative

Under the preferred alternative, 16b, research and monitoring of the various activities will be conducted to further increase the knowledge base on natural and cultural resources, and habitat and wildlife management. Research projects will address a wide range of natural and cultural resources, as well as management techniques and efficacies such as establishing koa seed orchards, specific weed control strategies, and reforestation and restoration strategies.

Research will include the collection of scientific information (inventories, monitoring, research, assessments, etc) necessary to assist in adaptive management decisions. Research activities will contribute to the enhancement, protection, use, conservation and management of wildlife populations and their habitats (on and off 'Āina Mauna lands) and be used to evaluate achievement of resource management and Legacy Program objectives.

Partnerships with research entities or interests (e.g. University of Hawai'i, USFS, USFWS, DLNR, HARC) will be expanded and/or created. Research work on site will be governed by a Memorandum of Agreement between the DHHL and its research partners. Participation in the Mauna Kea Watershed Alliance may be the most suitable vehicle for achieving said collaboration. Utilization of proper cleaning of investigator equipment and clothing, as well as quarantine methods, where necessary, will minimize the potential spread or introduction of invasive species.

Chapter 4 - Environmental Setting, Impact and Mitigation

This chapter presents the current understanding of the environmental setting in the region and within the 'Āina Mauna. Mitigation measures identified in this EA have been developed to avoid, minimize, rectify, or reduce the Legacy Program's potential adverse environmental impacts and be good stewards of the land. Mitigation measures have been considered throughout the Legacy Program planning process and incorporated into the Legacy Program's design and construction plans.

4.1 Introduction

Each section in this Chapter discusses (a) current conditions and/or management practices in the region and in the Legacy Program area related to the specific environmental subject, (b) the threshold used to determine the Legacy Program's level of impact, (c) the Legacy Program's potential long-term operation phase impacts related to the specific environmental subject, (d) the potential mitigation measures that could be implemented by the Legacy Program to avoid, minimize, rectify, or reduce potential substantial adverse environmental impacts, and (e) the Legacy Program's relative potential impact that will remain after the potential mitigation measures are implemented.

The information about existing conditions, potential Legacy Program impacts and potential mitigation measures presented in this Chapter has been developed through (a) the review and use of existing information related to the 'Āina Mauna area, specifically information related to DHHL lands; and (b) new studies conducted for the Legacy Program. Existing information related to 'Āina Mauna is extensive, and includes the following principal sources:

- 'Āina Mauna Legacy Program - Ho'okuleana LLC - December 15, 2009
- Humu'ula Sheep Station Adaptive Reuse Plan - Kimura International - March 2004
- Final Environmental Assessment, Piha Mauka Forest Management Plan and Environmental Assessment, Humu'ula, Island of Hawai'i - Department of Hawaiian Home Lands - February, 2004
- Final Environmental Assessment, Koa Salvage-Reforestation and Gorse Containment, Humu'ula, Island of Hawai'i - Department of Hawaiian Home Lands - August 9, 2001
- Humu'ula/Pi'ihonua Master Plan - PBR, Hawai'i - December, 1997

Each section also includes a list of references with additional sources of information used in the evaluation of the specific environmental subject.

Each environmental subject is discussed in this EA as outlined in the following sections.

4.1.1 Environmental Setting

"Environmental Setting" describes the existing environmental conditions in the Legacy Program area and the region as it currently exists, before the commencement of the Legacy Program. This provides a baseline for comparing "before the Legacy Program" and "after the Legacy Program" environmental conditions.

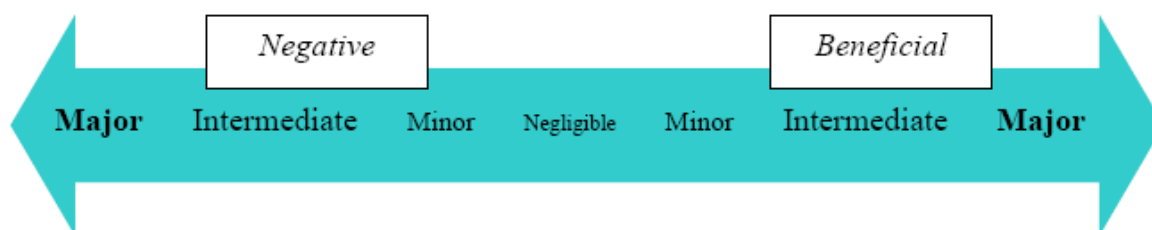
4.1.2 Thresholds Used to Determine Level of Impact

“Thresholds Used to Determine Level of Impact” defines and lists specific criteria used to determine whether an impact is considered to be potentially significant.

Hawai‘i Administrative Rules (HAR) Section 11-200-12 provides 13 “significance criteria” against which an action is to evaluate its potential impact. These criteria are:

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.
2. Curtails the range of beneficial uses of the environment.
3. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.
4. Substantially affects the economic welfare, social welfare and cultural practices of the community or State.
5. Substantially affects public health.
6. Involves substantial secondary impacts, such as population changes or effects on public facilities.
7. Involves a substantial degradation of environmental quality.
8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.
9. Substantially affects a rare, threatened or endangered species, or its habitat.
10. Detrimentally affects air or water quality or ambient noise levels.
11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal waters.
12. Substantially affects scenic vistas and view planes identified in County or State plans or studies.
13. Requires substantial energy consumption.

Effects were assessed for scope, scale and intensity of impacts to resources. Effects may be identified further as beneficial or negative, as well as short-term and long-term. Scope, scale and intensity can be defined on a range from negligible to major.



(Graphic: Pacific Southwest Research Station-Institute of Pacific Islands Forestry, 2009)

- **Negligible:** Resources will not be affected, or the effects will be at or near the lowest level of detection. Resource conditions will not change or will be so slight there will not be any measurable or perceptible consequence to a population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource;

- **Minor:** Effects will be detectable but localized, small, and of little consequence to a population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource. Mitigation, if needed to offset negative effects, will be easily implemented and likely to be successful;
- **Intermediate:** Effects will be readily detectable and localized with consequences to a population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource. Mitigation measures will be needed to offset negative effects and will be extensive, moderately complicated to implement, and probably successful;
- **Major:** Effects will be obvious and will result in substantial consequences to a local area or regional population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource. Extensive mitigating measures may be needed to offset negative effects and will be large-scale, very complicated to implement, and may not have any guarantee of success. In some instances, major effects will include the irretrievable loss of the resource.

Time scales are defined as either short-term or long-term.

- **Short-term or Temporary:** An effect that generally will last less than a year or season;
- **Long-term:** A change in a resource or its condition that will last longer than a single year or season.

The thresholds established correspond to the above criteria and other environmental laws. Each section of this EA presents a significance threshold for its specific environmental subject; should the Legacy Program potentially cause an impact greater than the identified threshold then the potential impact will be considered to be significant.

4.1.3 Potential Project Impacts in Context with Applicable Requirements

The potential impacts are evaluated within the framework of the Legacy Program's compliance with all applicable rules, regulations and requirements for its action type and location. The existing rules, regulations, requirements and procedures applicable to the Legacy Program are considered a part of the existing regulatory environment.

Rules, regulations and requirements which may be applicable include:

- Hawai'i Administrative Rules (HAR), including (but not limited to):
 - o Title 4, Subtitle 6, Chapter 68, Noxious Weed Rules
 - o Title 11, Chapter 23, Underground Injection Control
 - o Title 11, Chapter 45, Community Noise Control
 - o Title 11, Chapter 54, Water Quality Standards
 - o Title 11, Chapter 55, Water Pollution Control
 - o Title 11, Chapter 60, Air Pollution Control
 - o Title 11, Chapter 62, Wastewater Systems
 - o Title 11, Chapter 68, Litter Control
 - o Title 11, Chapter 200, Environmental Impact Statement Rules
 - o Title 11, Chapter 260, Hazardous Waste Management General Provisions
 - o Title 11, Chapter 262, Standards Applicable to Generators of Hazardous Waste

- o Title 13, Subtitle 1, Chapter 5, Conservation District
- o Title 13, Subtitle 5, Chapter 107, Threatened and Endangered Plants
- o Title 13, Subtitle 5, Chapter 124, Indigenous Wildlife, Endangered and Threatened Wildlife and Introduced Wild Birds
- o Title 13, Subtitle 13, Chapter 275-284, Historic Preservation Review Process
- o Title 13, Subtitle 13, Chapter 300, Burial Sites and Human Remains
- Hawai'i Revised Statutes (HRS), including (but not limited to):
 - o Chapter 6E, Historic Preservation
 - o Chapter 183C, Conservation District
 - o Chapter 195D, Conservation of Aquatic Life, Wildlife and Land Plants
 - o Chapter 205, State Land Use Law
 - o Chapter 226, Hawai'i State Planning Act
 - o Chapter 342D, Water Pollution Law
 - o Chapter 342J, Hawai'i Hazardous Waste Law
 - o Chapter 343, Environmental Impact Statements
 - o Chapter 344, Hawai'i State Environmental Policy
- County of Hawai'i ordinances, rules and requirements, including (but not limited to):
 - o County of Hawai'i General Plan
 - o County of Hawai'i Building and Planning Codes

To ensure compliance, the Project will:

- a) Design its facilities to comply and/or facilitate compliance and
- b) Develop and implement a range of plans and programs outlined in this EA.

These plans and programs will include policies and procedures to be employed during long-term operation, as well as construction of the Legacy Program. Each plan/program will be developed using ideas from similar types of existing plans. Among these plans and programs are the following, which are detailed in the noted sections of Chapter 4:

- Cultural, Natural Resources and Safety Training Program for Legacy Program personnel and contractors. This program is outlined in Sections 4.2.4.
- Invasive Species/Pest Management and Control Program. This program is outlined in Section 4.4.3.
- Waste Minimization Plan (WMP). This plan will include annual audits to reduce hazardous materials use and energy consumption. This plan is outlined in Sections 4.8.3.
- Materials Storage/Waste Management Plan will be prepared and implemented to comply with hazardous materials rules and regulations and is outlined in Section 4.8.3.
- Spill Prevention and Response Plan (SPRP). This plan will be prepared and implemented will protect against the release of chemicals or fuel to the environment and is outlined in Section 4.8.3.

4.1.4 Mitigation Measures

“Mitigation Measures” identifies Legacy Program-specific measures that may be needed that go beyond compliance with applicable existing rules, regulations and requirements, to reduce a potentially significant impact, as applicable. The compliance with existing applicable rules, regulations and requirements is considered a part of the existing regulatory environment, and is described above.

The mitigation measures identified in this EA have been developed to avoid, minimize, rectify or reduce the Legacy Program's potential adverse environmental impacts. Mitigation measures have been considered throughout the Project planning process and will be incorporated into the Project design and construction plans. Project mitigation measures are identified and detailed in subsection 4 of Sections 4.2 through 4.18.

Mitigation Measures which Apply to all Activities

- Focus and priority is to restore the native ecosystem, which by definition includes the presence and participation of Trust beneficiaries
- Conform to all appropriate laws, codes, rules and regulations
- Carefully monitor 3rd party activities for compliance with contracts/agreements
- Use existing infrastructure wherever possible (fencing, roads, reservoirs, stock ponds, etc)
- Facility design will minimize impact to existing native trees; appropriate re-vegetation with native plants in areas disturbed by construction activities
- 'Āina Mauna Cultural, Natural Resources and Safety Briefings (for all workers, contractors and visitors) noting the area's sensitive natural resources, as well as its cultural and historic significance. Likewise, the educational program will discuss appropriate behavior that people on the property are expected to follow - increasing understanding, care and respect for the area
- Monitor for and exclude the presence of invasive species
- Incorporate on-the-ground implementation strategies to avoid, minimize or mitigate impacts through relevant BMPs
- Income generated from 'Āina Mauna lands will be reinvested into the 'Āina Mauna Legacy Program

Table 4.1.4.1 - Mitigation Measures for 'Āina Mauna Legacy Program

Mitigation Measures	Target Species/Habitat/Resource
Educational Program Given to Workers/Visitors	
The 'Āina Mauna Legacy Program Cultural, Natural Resources and Safety Briefings will apprise workers and visitors of the area's sensitive resources, as well as its cultural and historic significance. Likewise, the briefings will discuss appropriate behavior that people are expected to follow.	Protection of Native Plants and Animals and their Habitats, and the Protection of Cultural and Historic Resources
Native Vegetation	
Removal of native tree species will be minimized within the construction areas and, where appropriate, disturbed areas will be restored with native plant species.	Protection of Native Plants and Wildlife
The total amount of land disturbance will be minimized. Construction contractors will be limited to delineated construction work areas.	Protection of Native Plants and Wildlife
Wildlife	
To reduce potential impacts to foraging bats, smooth wire will be used on the top of any fences constructed.	Ōpe'ape'a - Hawaiian hoary bat (<i>Lasiurus cinereus semotus</i>)

Mitigation Measures	Target Species/Habitat/Resource
Cultural and Historic Resources	
Although not a mitigation measure, restoration of the native forest will enhance gathering and other traditional practices.	Cultural Practices
The Hawai'i State Historic Preservation Statute (Chapter 6E) affords protection to historic sites. The criteria, standards and guidelines currently utilized by the DLNR-SHPD for the evaluation and documentation of cultural sites will be followed. DLNR-SHPD will be notified of any findings, when made.	Cultural and Historic Resources
If evidence of any archaeological or culturally significant site is encountered during construction or vegetation clearing, work within 25-feet of the findings will be suspended and DLNR-SHPD will be notified.	Unanticipated Discoveries
If any burial remains are discovered, they will be treated in concurrence with Chapter 6E-43.	Burials
Use of appropriate General Design Guidelines for the reuse and development of the Sheep Station site as stated in the Humu'ula Sheep Station Adaptive Reuse Report (which may be updated over time) including location guidelines, design guidelines and architectural style and materials guidelines.	Sheep Station Historic Restoration
Invasive Species Control	
Prior to ground-disturbing activities, all contractor equipment will arrive at the work site clean and free of invasive species. Prior to leaving the work site, contractor equipment will be re-cleaned to avoid transporting invasive species from 'Āina Mauna.	Protection of Native Plants and Habitats
Building materials including sand, gravel, cinder, rock and/or mulch for use at the site will be inspected for invasive species.	Protection of Native Plants and Habitats
Tree species to be planted under the commercial timber action to control gorse must first be evaluated under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs. Transport of products from commercial areas infested with noxious weeds will be conducted in ways which preclude the spread of such noxious weeds.	Protection of Native Plants and Habitats
Implement an Invasive Species/Pest Management and Control Program that outlines steps to avoid the potential impacts associated with invasive species.	Protection of Native Plants and Habitats
Solid and Hazardous Waste and Material Management	
Development of proper protocol for disposal and management of solid and hazardous waste.	Proper Solid & Hazardous Waste Handling and Disposal
Develop and implement resource efficiency programs to reduce, reuse and recycle resources.	Solid and Hazardous Waste and Material Management
Recycling solid and non-hazardous waste material and reusing them to the extent possible.	Solid and Hazardous Waste and Material Management

Mitigation Measures	Target Species/Habitat/Resource
Noise	
Whenever construction noise is expected to exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction.	Reduce Noise Impacts
The number of vehicles accessing the area will be reduced through onsite worker housing and ride-sharing programs.	Reduce Noise Impacts
Generators will be used only when needed.	Reduce Noise Impacts
Visual and Aesthetic Resources	
Use of the Humu'ula Sheep Station Adaptive Reuse guidelines for creating structures which are both visually appealing and blend in with the scenery around them, including Location Guidelines, Height, Bulk, and Density Guidelines, and Architectural Styles and Materials Guidelines.	Preserve Visual and Aesthetic Resources
The location and design of the proposed Legacy Program actions will incorporate measures that mitigate the potential visual impacts.	Preserve Visual and Aesthetic Resources
Geology, Soil and Slope Stability	
Applicable laws will be followed to minimize soil movement, erosion and compaction during site preparation, operations, road improvement and maintenance.	Reduce Geology, Soil and Slope Stability Impacts
Site preparation will be conducted in such a manner as to minimize the amount of exposed soil at any one time.	Reduce Geology, Soil and Slope Stability Impacts
The Legacy Program will comply with applicable seismic safety regulations and standards in the design of structures to meet applicable codes to ensure the safety of personnel and visitors.	Reduce Geology, Soil and Slope Stability Impacts
Water Resources & Wastewater	
Catchment, water re-use and water conservation measures will be implemented.	Water Conservation
Required practices include avoiding disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing dips, water bars and cross drainage on roads and skid trails to minimize erosion will be followed.	Water Resource and Run-off Protection
Applicable laws will be followed regarding the selection, use and storage of chemicals for forest management activities.	Water Resource and Run-off Protection
When necessary DHHL will report violations to OSHA regarding the improper use of chemicals in the Legacy Program area.	Water Resource and Run-off Protection
Efficient and safe application of chemicals according to manufacturer's labels	Water Resource and Run-off Protection
Development of proper protocol for disposal and management of wastewater (composting toilets, gray water reuse.)	Proper Management and Disposal of Wastewater

Mitigation Measures	Target Species/Habitat/Resource
Traffic	
Outplanting Centers will allow field workers to stay on-site and not have to drive back and forth, up/down the mountain, thereby minimizing traffic on the roadways.	Traffic Reduction
Development of ride-sharing programs; group travel for ecotourism	Traffic Reduction
Construction traffic will be limited as much as possible, particularly traffic related to hauling heavy equipment, to minimize interaction with vehicular traffic on the existing roads.	Traffic
Power & Communications	
Use of renewable energy throughout project area	Alternative Energy
Use of energy-conserving techniques	Energy Conservation
Building design will maximum use of natural ventilation and lighting.	Energy Conservation
Climate, Air Quality & Lighting	
Lighting mitigation measures	Protection of Wildlife
Compliance with Hawai'i County Code § 14 – 50 et seq., which requires the shielding of exterior lights so as to lower the ambient glare to the astronomical observatories located on Mauna Kea.	Astronomical Observatories located on Mauna Kea
Standard dust control and construction equipment emission control measures will be implemented as necessary to reduce temporary impacts to air quality during construction activities.	Air Quality
Construction equipment will be required to meet all applicable emission standards.	Air Quality
Fire Hazards	
Existing roads will be improved and additional roads on the property will enhance management access and serve as firebreaks.	Protection of Plants, Animals and Habitats
Grazing in selected areas will help reduce grass fuel types and may assist in the control of undesirable shrubs.	Protection of Plants, Animals and Habitats
DHHL will install mile markers and fire risk signs along Keanakolu Road. Risk sign information will be based upon the National Fire Danger Rating System.	Fire Hazard Awareness
Construction personnel will be required to have cell phones or other communication equipment that provides coverage at the work site that can be used to contact the fire department immediately in the event of a fire.	Protection of Plants, Animals and Habitats
Access to the Legacy Program site may be limited during salvage and reforestation activities, if fire risk is heightened.	Protection of Plants, Animals and Habitats
Fire breaks between tree species and gorse will be used to minimize fire loss.	Protection of Plants, Animals and Habitats
To minimize the risk of wildfire during construction, requirements will mandate that all construction activity shall be restricted within clearly delineated areas.	Protection of Plants, Animals and Habitats

Mitigation Measures	Target Species/Habitat/Resource
Fire Hazards	
Construction projects will be required to employ a Fire Prevention and Response Plan. The Fire Prevention and Response Plan will outline steps to be taken during construction activities to decrease the chance of fire.	Protection of Plants, Animals and Habitats
Motorized equipment will have fire extinguishers.	Protection of Plants, Animals and Habitats
Operations within commercial forestry project areas will follow applicable laws to ensure the control and prevention of possible fire hazards, including herbicide application and site preparation in the gorse control project areas.	Protection of Plants, Animals and Habitats
DHHL will conduct regular reviews and reauthorizations of the Humu'ula/Pi'ihonua Mauka Wildland Fire Management Plan and the Humu'ula/Pi'ihonua Mauka Community Wildfire Protection Plan. Implementation of said plans will continue.	Protection of Plants, Animals and Habitats
Fencing	
Existing ranch paddock and pasture systems will be used and restored/refined as appropriate.	Protection of Plants, Animals and Habitats
Roads	
Existing ranch roads that are properly located and necessary for access will be improved and maintained. Flash fuels within said roadbeds will be minimized via cutting or replacement with gravel or pavement as needed.	Protection of Plants, Animals and Habitats
Remote Accommodations	
Facilities that are properly located and needed will be sited at or near previously built/used ranch cabins/facilities.	Protection of Plants, Animals and Habitats
Trails	
Existing ranch roads/trails that are properly located and necessary to implement the Legacy Program will be used.	Protection of Plants, Animals and Habitats
Recreation and Tourism	
Applicants entering into a license agreement with DHHL for ecotourism activities will be required to adhere to all equipment and procedural requirements for the health and safety of visitors, as well as protection of the area's natural and cultural resources.	Protection of Plants, Animals and Habitats
No unsupervised, independent recreational use of ATVs on the 'Āina Mauna property will be permitted (however, 'Āina Mauna management personnel may use ATVs in fulfilling management functions.) ATV use in the ecotourism activities action will be permitted when supervised by the ecotourism operator and the ATV throttle will be modified so that its maximum speed is reduced to that of a typical walk or jog.	Protection of Plants, Animals and Habitats

Mitigation Measures	Target Species/Habitat/Resource
Research	
Utilize proper cleaning of investigator equipment and clothing, as well as quarantine methods, where necessary, to minimize the potential spread or introduction of invasive species.	Protection of Plants, Animals and Habitats
Research work on site will be governed by a Memorandum of Agreement between the parties.	Protection of Plants, Animals and Habitats

In addition to the above, action-specific mitigation measures will be implemented.

4.1.5 Level of Impact after Mitigation

“Level of Impact after Mitigation” indicates what effect remains after application of mitigation measures, and whether the remaining effect will be considered to be significant, or not.

4.2 Cultural Resources

This section discusses the cultural resources in the region and specific Legacy Program areas, the potential impact of the Legacy Program on those resources and mitigation measures the Legacy Program will employ to minimize those potential impacts.

“Resource” is defined as the natural environment or human practices, values, and traditions and their physical manifestations. Some examples of what are regarded as “cultural resources” are archaeological sites, historic properties, spiritual places, cultural and religious practices and historic objects. As this indicates, cultural resources include, but are not restricted to historic properties.

Historic properties, including archaeological sites, are discussed in Section 4.3. This section focuses on other cultural resources, such as Native Hawaiian cultural practices and Mauna Kea’s spiritual and sacred quality.

4.2.1 Environmental Setting

The cultural and historical research conducted by Kumu Pono Associates documents descriptions of Ka’ohe, Humu’ula, and Pi’ihonua. The study provides readers with documentation pertaining to the traditional, cultural and historical setting of the ‘āina mauna on the Island of Hawai’i. It is concluded that the Hawaiian way of life was the product of strict land use management.

The historical record coupled with oral history interviews provide clues as to the types of sites, hence past land uses, that may be found at Humu’ula/Pi’ihonua: native trails (some overlaid by current access routes), stone mounds/land markers, altars and types of ceremonial sites, shelters and habitation caves, resource collection sites, ilina (burial features), later dated features (1800s) such as pens, walls, fence lines, stone and wooden houses, water collection and storage, bird hunting blinds, former garden plots, and support features.

‘Āina Mauna, or mountain lands, reflects a term used affectionately by elder Hawaiians to describe the upper regions of all mountain lands surrounding and including Mauna Kea.

Genealogical Accounts and Traditional Features

In Hawaiian culture, the natural and cultural resources are one and the same. Native traditions describe the birth of the islands and the life that exists on them in terms of genealogical accounts.

All natural forms of the environment are believed to be embodiments of gods and deities. From godly forces the Hawaiian Islands are born of Wākea (the expanse of the sky-father) and Papahānaumoku (Pāpā who gave birth to the islands). Wākea and Pāpā are credited for being the parents of the first man, Hāloa, the ancestor of all people. It is from this genealogical thread that Hawaiians address their environment and it forms the basis of the Hawaiian system of land use.

The generations that followed developed a refined system of land use and management. ‘Umi a Līloa, the ruler of Hawai’i, created land divisions according to a chiefly management system.

The island, or mokupuni, was divided into moku o loke, or districts. Hilo district contained Humu'ula, an ahupua'a. Subdivisions within a moku are 'okana and kalana, both of these will contain several ahupua'a.

Manageable parcels of land will typically run mauka to makai and will be marked with stone wall alignments. These parcels are known as: 'ili, kō'ele, mahina 'ai, māla and kīhāpai. Tenants cultivated smaller crops for family consumption, to supply the needs of chiefs, and provide tributes. Kapu were observed as a matter of resource and land management among other things. Access to resources was tied to residency and earned as a result of taking responsibility to steward the environment and supply the needs of ali'i. The social structure reinforced land management.

Native Hawaiian tradition and historical accounts portray the lands of Humu'ula, Pi'ihonua and Ka'ohe as having been dense forests where native practitioners gathered forest resources, birds and food. Humu'ula is named for a type of stone (red jasper) used to make ko'i or adze.

The 'āina mauna was also used by travelers making their way through the area. The area was frequented by native practitioners and contained a native and cultural landscape that provided among other things:

- Places to worship
- Places to gather stones
- Kanu iwi (places to bury human remains)
- Kanu piko (places to bury umbilical cords)
- Places to traverse, i.e. for those who were crossing from one region to another
- Places to gather food and catch birds
- Sacred and safe areas

Mauna Kea may be literally interpreted as "white mountain" because during the winters, the summit is covered in snow. Mauna Kea may also be translated as "Wākea's Mountain." Wākea, also written and pronounced as Ākea and Kea, was the god-father of the Island of Hawai'i. The island child was born by Papa or Haumea, the goddess who gave birth to islands.

The proposed Legacy Program area was once heavily forested. Native Hawaiians viewed the mountain areas as the heavily forested zone (waoakua, forest of gods). Other traditional uses by pre-contact native Hawaiians were gathering medicinal plants and bird feathers.

'Āina Mauna

A number of research papers, studies and assessments have been prepared in recent times concerning cultural resources within the 'Āina Mauna area. These include:

- Keanakolu: An Archaeological Perspective of Hawaiian Ranching and the Pacific Hide and Tallow Trade TMK 3-8-01:9, Draft - Peter R. Mills - Spring 2007
- "Mauna Kea - Ka Piko Kaulana O Ka 'Āina" (Mauna Kea-The Famous Summit of the Lands), A Collection of Native Traditions, Historical Accounts, and Oral History Interviews for: Mauna Kea, the Lands of Ka'ohe, Humu'ula and the 'Āina Mauna on the Island of Hawai'i - Kumu Pono Associates LLC - March 30, 2005

- “He Moolelo ‘Āina” A Cultural-Historical Study of the Upper Waiākea-Humu‘ula Mountain Lands: The Proposed Kīpuka ‘Āina Mauna Natural Area Reserve District of Hilo, Island of Hawai‘i - Kumu Pono Associates LLC - March 23, 2005
- Humu‘ula Rural Villages and Landscape Restoration Plan (Final Report) - Townscape, Inc. - March 2005
- “Humu‘ula A Me Pi‘ihonua: He Mau ‘Āina Lei Ali‘i Ma Ka ‘Āina Mauna O Hawai‘i” (Humu‘ula and Pi‘ihonua: Lands that Adorn the Chiefs on the Mountain Lands of Hawai‘i, A Collection of Native Traditions, Historical Accounts, and Oral History Interviews - Kumu Pono Associates LLC - March 15, 2004
- Humu‘ula Sheep Station Adaptive Reuse Plan - Kimura International - March 2004
- Overview: Excerpts From - “He Wahi Mo‘olelo No Ka ‘Āina A Me Na ‘Ohana O Waiki‘i Ma Waikōloa (Kalana O Waimea, Kohala), A Me Ka ‘Āina Mauna” (A Collection of Traditions and Historical Accounts of the Lands and Families of Waiki‘i and Waikōloa (Waimea Region, South Kohala), and the Mountain lands, Island of Hawai‘i) - Kumu Pono Associates LLC - November 12, 2002
- Department of Hawaiian Home Lands Hawai‘i Island Plan - PBR, Hawai‘i - May 2002
- Malama Pono I Ka ‘Āina-An Overview of the Hawaiian Cultural Landscape - Kumu Pono Associates LLC - 2001
- Humu‘ula/Pi‘ihonua Master Plan - PBR, Hawai‘i - December, 1997
- Hawai‘i Register of Historic Places, Historic Sites Information and Review Form, Humu‘ula Sheep Station - Department of Land and Natural Resources, Division of State Parks - June, 1973

Historical Overview of Settlement, Land Uses and Travel in the ‘Āina Mauna

The following historical overview is taken from “Mauna Kea - Ka Piko Kaulana O Ka ‘Āina” (Mauna Kea-The Famous Summit of the Lands), A Collection of Native Traditions, Historical Accounts, and Oral History Interviews for: Mauna Kea, the Lands of Ka‘ohe, Humu‘ula and the ‘Āina Mauna on the Island of Hawai‘i” by Kumu Pono Associates LLC, March 30, 2005.

Sequence of Hawaiian Settlement

Archaeologists and historians describe the inhabiting of these Islands in the context of settlement which resulted from voyages taken across the open ocean. For many years archaeologists have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai‘i were underway by AD 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population, the Hawaiian Kahiki, were the Marquesas and Society Islands (Emory in Tatar 1982:16-18).

For generations following initial settlement, communities were clustered along the windward (koʻolau) shores of the Hawaiian Islands. Along the koʻolau shores, streams flowed, rainfall was abundant and agricultural production became established. The koʻolau region also offered sheltered bays from which deep sea fisheries could be easily accessed. Also, near-shore fisheries, enriched by nutrients carried in the fresh water running from the mountain streams, could be maintained in fishponds and coastal fisheries. It was around these bays such as at Hilo, that clusters of houses where families lived could be found (see McEldowney 1979). In these early times, the residents generally engaged in subsistence practices in the forms of agriculture and fishing (Handy, Handy and Pukui, 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by ca. 900 to 1100 AD, the population began expanding to the Kona (leeward side) and more remote regions of the island (Cordy 2000:130). Kirch (1979) reported that by ca. AD 1200, there were small coastal settlements at various areas along the western shore line of Hawaiʻi (Kirch 1979: 198). In this system of settlement and residency, the near-shore communities shared extended familial relations with those of the uplands.

By the 1400s, upland regions to around the 3,000-foot elevation were being developed into areas of residence and a system of agricultural fields. By the 1500s to 1600s, residency in the uplands was becoming permanent, and there was an increasing separation of royal class from commoners. During the latter part of this period, the population stabilized and a system of land management was established as a political and socio-economic factor (see Kamakau 1961; Ellis 1963: Handy. Handy & Pukui 1972: Tomonari-Tuggle 1985: and Cordy 2000).

The lowlands of Kaʻohe, Humuʻula and the other neighboring ahupuaʻa, extending from the shore to around the 3,000-foot elevation, supported residential, agricultural and subsistence activities, spanning the centuries of Hawaiian residency. The upper mountain lands of the Kaʻohe-Humuʻula region were frequented by travelers, collectors of natural resources, and for a wide range of cultural practices (see Kamakau, 1961; and Boundary Commission Testimonies, 1865 to 1891).

Traditions and historical records tell us that the deification and personification of the land and natural resources, and the practices of district subdividing and land use as described above, were integral to Hawaiian life, and were the product of strictly adhered to resource management planning. In this system, the people learned to live within the wealth and limitations of their natural environment, and were able to sustain themselves on the land and ocean. It is in this cultural system that we can understand the significance of the lands of Kaʻohe, Humuʻula and the neighboring ʻāina mauna.

This traditional cultural knowledge will be an important part of the ʻĀina Mauna Legacy Program implementation process. In order to restore the ʻĀina Mauna to what ancient Native Hawaiians viewed the mountain lands as a heavily forested area, we recommend utilization of both traditional cultural knowledge and modern science in management efforts.

Land Use Practices

The land of Humuʻula, extending from sea level to the 9,000-foot elevation on Mauna Kea, and above the 13,000-foot elevation on Mauna Loa, is apparently named for a type of stone (Red jasper stone) that was used in making koʻi (adze).

The place name of Ka'ōhe, a land area extending from sea level to the summits of Mauna Kea and Mauna Loa, may be literally translated as "the bamboo" or named for a type of kalo (taro) that may have been common in the region (ct. Pukui. et al. 1974).

Native Hawaiian traditions and historical accounts describe the lands of Humu'ula and Ka'ōhe, those areas extending from shore to around the 6,000-foot elevation as having once been covered with dense forests, and frequented by native practitioners who gathered forest-plant resources, birds, and food. The larger 'āina mauna were frequented by individuals who were traveling to the upper regions of Mauna Kea to worship, gather stone, bury family members, or deposit the piko (umbilical cords of newborn children) in sacred and safe areas; and by those who were crossing from one region of the island to another.

As early as the 1820s, introduced cattle, sheep, goats and wild dogs had made their way up to the mountain lands and were bothersome to those who traveled the 'āina mauna. In 1834, Scottish naturalist, David Douglas was gored and killed by a wild bullock near the boundary of Humu'ula and Laupāhoehoe. By 1850, the natural-cultural landscape of the 'āina mauna was being significantly altered by the roving herds of wild bullocks, sheep and other ungulates, and ranching Interests were being formalized in the region.

By 1857, the Crown and Government mountain lands, including Humu'ula and Ka'ōhe, were leased to Francis Spencer and the Waimea Grazing and Agricultural Company, which established ranching stations and operations around the mountain lands. As a result, the 'āina mauna have been intensively ranched for more than 150 years.

Humu'ula

Because hunting, and subsequently ranching of bullocks, cattle and sheep, was the primary activity on the mountain lands of Humu'ula, areas once forested, soon became open pasture land. While the first formal lease of Humu'ula was issued in 1857 (Keoni Ana to F. Spencer), it was Interests of the Parker Ranch that held the longest lease on the Humu'ula mountain lands. The lease, from the early 1900s to 2002, covered the area extending around Mauna Kea to the 'Āina Hou-Pu'uhuluhulu vicinity.

The Parker Ranch interests initially focused on sheep ranching in the Humu'ula-Kalai'eha section, but in 1964 the ranch terminated its sheep program. Cattle operations were maintained until the end of the Parker lease in August, 2002.

Today, limited ranching of cattle is continued on Humu'ula via several DHHL pasture homesteads along Saddle Road. Also, some 10,000 to 13,000-acres have succumbed to an infestation of the introduced gorse (first recorded on the land in 1892).

Historic Features

By 1850, the cultural and natural landscape had been significantly altered by roving herds of wild ungulates. Ranching interest, having become formalized, began to establish ranching stations and operations on the mountain lands. Thus, areas once forested soon became open pasture lands.

Parker Ranch held the longest ranching lease to the property, from the early 1900s to 2002, and their lease extended around Mauna Kea to the Pu‘uhuluhulu vicinity. Initially, Parker Ranch invested in sheep ranching and then focused on cattle operations until the end of their lease with DHHL in 2002. As well, portions of Pi‘ihonua were leased to various native hunters during the middle 1860s.

Historic features include:

- Walls, pens, fence lines
- Stone and wooden houses
- Water collection and storage facilities
- Bird hunting blinds
- Former garden plots
- Kulaka “cattle pen”, 1850, oldest-named wall feature in Humu‘ula
- Stone wall extending from Pu‘uhuluhulu, enclosing ‘Ōma‘okoili paddocks marking the boundary between Humu‘ula and Ka‘ohe

Cattle

The following history of cattle in Hawai‘i was taken from Kumu Pono Associates LLC documents and the website HawaiiHistory.org.

Ancient Hawai‘i boasted no large land mammals, but with the arrival of Western ships, new plants and animals soon found their way to the Islands. The simple-seeming gift of a few cattle given to Kamehameha I by Captain George Vancouver in 1793 made a major impact on the Hawai‘i’s economy and ecosystem. It also spawned a rich tradition of cowboy and ranch culture that is still visible today.

Spaniards introduced the first cattle to Veracruz, Mexico in 1521. Vancouver picked up descendants of these animals from the Spanish mission in Monterey, California when he set off across the Pacific, intending to use them as food and gifts. The first cows and bulls given the Hawaiians fared poorly, either falling ill and dying or quickly killed and eaten.

Cattle were not the only animals introduced to Hawai‘i during this period. In 1778, Captain Cook had left both goats and pigs with natives. In 1803, American Richard Cleveland presented horses, a stallion and a mare to Kamehameha.

British introduced sheep in the 1790s and they soon damaged the native forests of Mauna Kea and Hualālai at the same time failing as an economic crop. When Vancouver landed additional cattle at Kealakekua in 1794, he strongly encouraged Kamehameha to place a 10-year kapu on them to allow the herd to grow. Grow they did, into a huge problem. In the following decades, the kapu was not lifted until 1830, cattle flourished and turned into a dangerous nuisance.

By 1846, 25,000-wild cattle roamed at will and an additional 10,000-semi-domesticated cattle lived alongside humans. A wild bull or cow could weigh 1,200 to 1,500-pounds and had a six-foot horn spread. Vast herds destroyed natives’ crops, ate the thatching on houses, and hurt, attacked and sometimes killed people.

In addition to causing erosion damage to the land, these animals also affected what foreign plants were brought to the Islands. While native koa, 'ōhi'a, uhiuhi, ēlama, kauila, halapepe, 'aiea, māmane and 'iliahi began to disappear, other non-native species were planted as cattle feed. Ranchers introduced fountain grass, native to North Africa, and mullein. After 1905, they introduced kiawe as another cattle feed, a shallow-rooted, thorny tree that is now ubiquitous.

By the time of Kamehameha III's reign (1824-1854), something had to be done. After the kapu was lifted in 1830, the hunting of wild cattle was encouraged. The king hired bullock hunters from overseas to help in the effort. Many of these were former convicts from Botany Bay in Australia.

As early as the 1820s, introduced cattle, sheep, goats and wild dogs had made their way up to the mountain lands, and were bothersome to those who traveled the 'āina mauna. Hawai'i's wild cattle population needed to be controlled for safety reasons, but the arrival of bullock hunters and Mexican vaquero also happened to coincide with an economic opportunity.

In the early 1830s, trade in sandalwood slowed down as island forests became depleted. At about the same time, whaling ships hunting in the north Pacific began wintering in Hawaiian waters. Ships provisioning in Hawai'i ports provided a market for salt beef in addition to hides and tallow. With the economic nudge of the whaling industry, ranching became a commercial enterprise worth pursuing.

By 1850, the natural-cultural landscape of the 'āina mauna was being significantly altered by the roving herds of wild bullocks, sheep and other ungulates, and ranching interests were being formalized in the region.

In 1857, the Crown and Government mountain lands of Humu'ula and Ka'ohe, including the summit of Mauna Kea, were leased to Francis Spencer and the Waimea Grazing and Agricultural Company, which established ranching stations and operations around the mountain lands. Portions of the land of Pi'ihonua were leased to native bird hunters in the middle 1860s, and subsequently to native and foreign bullock hunters. As a result, Humu'ula and the larger 'āina mauna have been intensively ranched for more than 150 years.

Because hunting, and subsequently ranching of bullocks, cattle and sheep became the primary historic activities on the mountain lands, areas once forested soon became open pasture land. While the first formal lease of Humu'ula and Ka'ohe was issued in 1857 (Keoni Ana to F. Spencer), it was Samuel Parker and Parker Ranch that held the longest lease on the Humu'ula and Ka'ohe mountain lands.

Between 1900 and 2002, their leases extended around Mauna Kea to the Pu'uhuluhulu vicinity, and for a period, the leases also included portions of the 'Āinahou lands. The Parker Ranch interests initially focused on sheep ranching in the Humu'ula-Kalai'eha section, but in 1964, the ranch terminated its sheep program. Cattle operations were maintained till the end of the Parker lease in August, 2002.

Since cattle leases expired on these lands in 2002, some areas have little or no cattle present and important natural resources within the 'Āina Mauna have begun to show significant recovery. This recovery is most evident in the mauka and certain makai areas of Humu'ula where water and/or feed is limited and feral cattle have been excluded. Giving this land "a rest" after more than 150 years of grazing is beneficial to the landscape by minimizing soil loss and allowing natural processes to recover the area's productivity.

Mauka areas (7,600 - 8,000 ft. elevation) are exhibiting a re-growth of the historic native Hawaiian ecosystem, including māmane, pūkiawe, and other species. Makai and gulch areas up to about the 7,000-foot elevation are seeing a resurgence of koa natural regeneration.

Na ‘Āina e pili ‘ana iā Mauna Kea

All other lands lying on the slopes of Mauna Kea, those belonging to the districts of Hilo, Hāmākua and Kohala, generally extended through the forests, where they are cut off by the traditional boundaries of Ka’ohe and Humu’ula. From the middle 1800s, those lands such as Waiākea, Pi’ihonua, Pāpa’ikou, Laupāhoehoe, ‘Ō’ōkala, Ka’ala, Kūka’iau, Pā’auhau, and Waikōloa, were either held in fee simple interest or leased out by the Crown and Government, for development of lumber collection, bullock hunting, cattle and sheep grazing, and in the elevations below approximately the 2,000-foot level, to development of sugar plantations.

In the early 1900s, forest lands below Humu’ula and Ka’ohe, and the Mauna Kea mountain lands from approximately the 9,000-foot elevation to the summit, were turned over to conservation in the form of forest reserves. The primary interest in the development of the reserves was the protection of watersheds to ensure that plantations would have access to water, necessary for the cultivation, harvesting and processing of sugar. Interest in, and the value of Hawaiian forests and watersheds has since evolved as a greater awareness of the unique and fragile ecosystems of the Hawaiian mountain lands has been developed.

Travel - Na Ala Hele o ka ‘Āina Mauna

Travel across the ‘āina mauna is documented in native traditions, which describe ala hele (trails) passing from the coastal lowlands through the forest lands; along the edge of the forests; across the plateau lands of the Pōhakuloa-Ka’ohe region, and to the summit of Mauna Kea. These ala hele approached Mauna Kea from Hilo, Hāmākua, Kohala, Kona and Ka’ū, five of the major districts on the Island. Only Puna, which is cut off from direct access to the mountain lands, apparently did not have a direct trail to the ‘āina mauna. Thus, people traveling to Mauna Kea from Puna traveled through the lands of Waiākea, Hilo or Keauhou, Ka’ū to reach Humu’ula and the slopes of Mauna Kea.

By the early 1820s, foreign visitors, in the company of native guides, began making trips across the ‘āina mauna and to the summit of Mauna Kea. Based on their accounts, travel in the region through the middle 1800s basically followed the old trails, or cut across new areas, a result of dense forest growth, and new lava flows covering older routes.

By the 1850s, the Kingdom of Hawai’i entered into a program of improving ancient trails and identifying new routes, by which to improve travel between various locations and facilitate commerce. The earliest recorded improvements (describing government activity on a trail around Mauna Kea) document work on the Waimea-Kula’imano trail (cutting across the lands of Ka’ohe, Hāmākua and Hilo), running above the forest line and to the coast of Hilo, date from 1854, when the Waimea-Kula’imano route was improved to accommodate wagon travel.

In the later 1850s, as leases were given out for the lands of Humu’ula and Ka’ohe, and the sheep and bullock hunting interests grew, the 1854 route was maintained, and the upper trail between Kula’imano-Makahalanaloa, was improved to the Kalai’eha vicinity.

In 1862, the Kingdom again initiated a program to improve the government roads across the 'āina mauna. Two routes were proposed, one between Hilo and Waimea via Kalai'eha, and the second to improve on the trail from Kalai'eha towards Kula'imano-Makahalanaloa, and around through Hanaipoe-Mānā and Waimea. These trails, termed Alanui Aupuni, were appropriated and work completed by the late 1860s. The routes appear on island maps through 1901, with subsequent designations as trails on later maps.

Several ancient trails approached the summit of Mauna Kea, and were used by maka'āinana through the 1920s. Most of these trails were accessed via the improved government roads around the mountain. Primary approaches included, but were not limited to the Kalai'eha-Waiau Trail, the 'Umikoa-Ka'ula Trail, and the Kemole-Pu'u Nanahu Trail. Historical accounts and oral history interviews record that these trails provided travelers with access to various sites, including areas where rituals and practices were observed, and that the trails converged at Waiau. At Waiau, travelers found a sheltered area and water for their use while on the mountain. Those who were traveling to the summit of Mauna Kea or to other locations in the summit region then followed smaller trails that provided them with the access necessary for their purposes.

By the early 1870s, the ancient trail between Kalai'eha and the summit of Mauna Kea was improved into a horse trail by the Spencers, lessees of the Mauna Kea mountain lands. Other routes, accessing outlying ranching stations, such as at Pu'u 'Ō'ō and Puakala (Pua'ākala), Lahohinu, and Hanaipoe had also been improved by lessees, with routes running around the mountain, and down to Hilo or out to Waimea. In the leases of the Crown Lands and Government Lands, it was specified that improvements, including trails, reverted to the Crown or Government upon termination of the leases.

Until the late 1940s, early 1950s, these trails and government roads were primarily used by lessees for transportation of goods-and cared for by the lessees. There are also numerous accounts by visitors to the 'āina mauna document travel in the region. By the late 1890s, the Kohala road supervisor reported that while the mountain roads belonged to the government, they were all but private by the nature of their use.

Between the 1930s to 1940s, improvements were made to the Kalai'eha-Waipunalei section of the road to Waimea as a part of the Civilian Conservation Corps (CCC) and Territorial Forestry programs, with work also being done by the Parker Ranch. Likewise, the Kalai'eha-Waiki'i route was maintained by the ranch, and improved by the United States Army-U.S.ED., in 1942.

Apparently little work was done on the Kalai'eha-Hilo section of the road (trail), after the 1870s. The trail was accessed by ranchers, with routes diverging to Kalai'eha and Pu'u 'Ō'ō, as described in survey records, journals and kama'āina testimonies. It was also periodically used by visitors to the mountain lands, usually those who were traveling to view Mauna Loa lava flows, or to make the ascent of Mauna Kea.

It was not until 1942, that the route was modified as a vehicular road in what became the Saddle Road, following in areas, the native trail and historic route, while also cutting across new lands in other locations. The "Saddle Road" was formally turned over to the Territory in 1947, following which time the general public was then given an opportunity to travel to the mountain lands unhindered.

In 1963, interest in Mauna Kea as a site for a telescope, manifested itself. Hawai'i based scientists. Walter Steiger (with the University of Hawai'i) and Howard Ellis (with the National Weather Service's Mauna Loa Weather Station) facilitated trips by Dr. Gerard Kuiper and Alike Herring (both associated with the University of Arizona and NASA) to the summits of Mauna Loa and Mauna Kea.

The Mauna Kea route basically followed the old foot trail from Kalai'eha, past Kalepeamo, Keonehe'ehe'e and up to the summit. Over the years, the old trail was modified for horses and pack animals, and after World War II, for the occasional four-wheel drive vehicles that ascended the mountain.

In 1964, Pu'u Poli'ahu on Mauna Kea had been chosen as the site for the first telescope, and state funds were released for grading a road to Pu'u Poli'ahu, to facilitate construction and access by the scientists. Since 1964, the primary route of access up the mountain slopes has remained generally the same, though as additional development in the summit region has occurred, new accesses and realignments of the earlier route have occurred.

Territorial Forestry and the Civilian Conservation Corps

The following history of Territorial Forestry and the Civilian Conservation Corps is taken from "Keanakolu: An Archaeological Perspective of Hawaiian Ranching and the Pacific Hide and Tallow Trade TMK 3-8-01:9" by Peter R. Mills.

In 1876, the legislature of Kamehameha III passed a law declaring all "forest lands" to be government property in an effort to conserve the forests from further encroachment on the seaward side by the plantations' need for fuel and on the mountain side from grazing animals. In 1901, approximately 30,000 acres of the upland forest were lost to a series of fires in Hāmākua. As a consequence, the Hilo Forest Reserve was formerly established by the Territory of Hawai'i in 1905 (Tomonari-Tuggle 1996:19, 33-35). Johnny Ah San, who worked as a territorial forester, claims that in the years from 1924 to 1926 forest rangers expanded the log cabin at Keanakolu for use as a field station.

Hundreds of thousands of pigs, sheep, cattle and goats were reportedly removed from Hawai'i's Territorial forests in those years (Tomich 1986:113). It was during this period that additional fruit trees were planted in an orchard below the log cabin, as well as hardwood and softwood trees in the surrounding vicinity. A group of six men periodically stayed in the cabin for maintenance purposes (e.g. orchards, trails). These men were responsible for the construction of many miles of fence to contain cattle that freely roamed the area during this time.

The Forest Reserves were established as a cooperative arrangement between the Hawai'i Sugar Planters Association and the territorial government. Plantations needed wood for fuel, but they also needed to keep the forests intact to draw mist precipitation from the trade winds, which in turn fed the irrigation systems in the cane fields below. Their own consumption of fuel had clearly been contributing to the decline of the forest at lower elevations, where flume systems transported large quantities of wood, as well as cane.

The first Territorial forester, Ralph S. Hosmer, suggested that the forest had been declining in the uplands as a result of fire, grazing and insects (Hosmer 1904:317, in Tomonari-Tuggle 1996:16).

In order to preserve the forest, it was necessary to keep the cattle and sheep out, but the planters were also worried about hunters in the woods starting fires from their camps. The commercial ranchers were also wary of individual hunters who could also shoot cattle from the ranch, a problem that was apparently at its worst near the World War II era (Langlas et al. 1999:40). Consequently, the burden of maintaining fences and keeping cattle out of the upper forest were duties mainly shared by territorial foresters and the ranchers.

In 1934, the territorial foresters' camp at Keanakolu was expanded into a Civilian Conservation Corps (CCC) field camp. This was one of several such camps established throughout the mid-slopes of Mauna Kea in the early 1930s (Ah San 1992).

The camp consisted of a bunkhouse that housed as many as 40 teenage boys, a mess hall, foreman's quarters and other service buildings. Another foreman's quarters was added next to the koa cabin during this same year. All of these buildings are still standing today. In addition, the lower mess hall still contains the original kerosene stove and bunk beds. The corpsmen did not reside at Keanakolu Camp year-round due to water shortages. In an effort to conserve water, "the 'straw-boss' sat on the hill above the toilet and made sure the men were in and out of the showers quickly (Ah San 1992)."

Major duties of the corpsmen included maintenance of trails that came up from the low lands, developing the Mana/Keanakolu wagon road into an auto road, construction of fences to keep cattle and sheep out of the forest, and the planting of a variety of forest and fruit trees. In all, over 20 varieties of pear, 25 varieties of plum, and 60 varieties of apple were planted. Ah San (1992) suggests that the orchard directly surrounding the log cabin complex was planted by the CCC, but a separate nearby orchard was planted earlier.

Also in 1934, a monument to David Douglas was erected on a parcel of territorial forest land close to the location of Gurney's bullock pit. It appears that the actual pit was on ceded land, but because territorial forester L. W. Bryan was also a member of the club who sponsored the construction of the monument, its location is most likely due to it being on the parcel of territorial forest that is closest to the pit. The Club also planted about 200 Douglas fir seedlings around the monument, many of which have now grown to mature trees.

In 1935, the CCC began the monumental task of building a 60-mile long fence around the 85,000-acre Mauna Kea Forest Reserve to help keep an estimated herd of 40,000 wild sheep out of the reserve. Seven cabins were built around the forest reserve boundaries for shelter as the project proceeded (Langlas et al. 1999:55).

The CCC camps were disbanded in the 1940s, after which Keanakolu was once again used as a field station for the forest rangers. Rangers stayed alone in the mountains for long periods and continued to maintain the local natural resources.

Names of some of these rangers were Ignacio, Pimental, Kahele and Ah San (Ah San 1992). Their duties included acting as hunting guides to ensure that hunters will abide hunting regulations on leased ranchlands. Rangers who patrolled the massive jurisdictional land area rode horses that were pastured at the ranger station.

Many times a year, forestry crews from Hilo will come up to work with the rangers on large fencing, trail construction, and tree planting projects (Ah San 1992). From 1945-1953 a major movement took place to control the sheep population. According to Ah San (1992), “the pasture above the fence was so overgrazed that at one time the ground was bare of vegetation and only dirt and large trees were visible.”

As part of their efforts, the CCC also improved the wagon road into an auto route using rock-laid masonry:

The cobble roadbed built by the CCC in 1935 is exposed in many places along Keanakolu Road. The cobble bed is made of basalt cobbles and small boulders set to form a relatively level surface, and it is evenly bordered with cobbles. Where both edges are preserved, the cobbled bed is 9 ft (2.8 m) wide. The stones for the roadbed were quarried from various places along the road; drilled holes are visible in rock faces at several places along the road, indicating that blasting powder was used to quarry rock (Williams and O’Hare 2001:16).

By the 1940s, the CCC camp at Keanakolu was converted into a field station for territorial rangers. Johnny Ah San stated “these rugged men stayed in the mountains by themselves for long periods and continued to maintain the management of natural resources. Names of some of these hardy rangers were Ignacio, Pimental, Kahele and Ah San” (Ah San 1992). Forestry crews from Hilo will work with the rangers on occasion to work in fences, trails and reforestation.

Parker Ranch lease-lands along Keanakolu Road were also used for some military training going as late as the 1980s and early 1990s (Williams and O’Hare 2001:12-14).

Historic and Cultural Resources

Based on archaeological surveys conducted in the area, known archaeological features within the parcel are limited to predominately historical sites. These include paths, trails, roads and the Humu’ula sheep station. Additionally a variety of historic and prehistoric sites may be present in the parcel including burial sites, temporary habitation sites, markers or historical sites, communication routes (trails and roads), ritual sites, and camps and processing sites (relating to bird hunting and/or adze production).

Overall, it is predicted that a relatively low concentration of surface sites will be found throughout the parcel. Those areas where site densities are likely to be highest include: ahupua’a borders, cinder cones (pu’u) caves or lave tubes, traditional bird feeding habitats, the paleo-forest scrub transition area, traditional resource convergence area (water, fuel and shelter locations), and along communication routes (roads and trails). The gulches and pu’us, in addition to serving as possible refuge areas endangered plant species, will be among the likely areas where archaeological sites, if present, will be found.

Historically commercial uses of the ‘Āina Mauna lands were limited to managed sheep and cattle grazing. The majority of the subject lands had previously been occupied by, Parker Ranch, since at least 1909 when sheep grazing started. However, by 1963 the sheep operation was phased out due to a decline of wool prices caused by the depression and competition from foreign countries and Parker Ranch converted the land to a cattle operation.

Throughout the property there are several ponds, trails, fences and rock walls which are in various states of repair, which were put in place for ranching infrastructure. Additionally there are two cabins located on the property, the Kanakaleonui cabin and the Pu'u 'Ō'ō cabin/ranch headquarters.

The known historic and cultural resources on the land parcel are as follows:

Keanakolu/Mana Road - This road is located in Humu'ula and was built in 1870 to connect Hilo and Waimea. It is of historical interest because it developed a more efficient route for transportation between Hilo and Waimea and opened up land for grazing and sugar cane. The road was surveyed by Mr. D. H. Hitchcock in 1870. Between the 1930s to 1940s, improvements were made to the Kalai'eha-Waipunalei section of the road to Waimea as a part of the Civilian Conservation Corps (CCC) and Territorial Forestry programs, with work also being done by the Parker Ranch. Likewise, the Kalai'eha-Waiki'i route was maintained by the ranch, and improved by the United States Army-U.S.E.D., in 1942.

Humu'ula Sheep Station - The Humu'ula Sheep Station Company chartered by the Hawaiian Government in 1883, was an operation of H. Hackfeld and Company. By 1894 the company had erected large and extensive paddocks at Kalai'eha and also had a station at Keanakolu. Ownership of the station came under Parker Ranch and operations continued for years, often little known by Hawai'i residents due to its comparatively isolated location.

It has historical and architectural interest because sheep raising was one of the oldest introduced agricultural pursuits in Hawai'i and while never a major industry it was carried on until the last large flock in the Islands located at Humu'ula was phased out in 1963. Humu'ula's relationship to Parker Ranch and to the general agricultural history of Hawai'i is significant.

The Mauna Kea-Humu'ula Trail - This trail was first plotted by Alexander in 1892, and is shown on two later maps, the U.S. Coast and Geodetic Survey 1925-1926 and U.S. Geological Survey 1956. In 1936 the Civilian Conservation Corps made improvements to what is believed to have been a section of the old Mauna Kea-Humu'ula Trail from near the Humu'ula Sheep Station at Kalai'eha to the summit.

Summary of Cultural Practices

Cultural practices within the 'Āina Mauna area are currently limited. Use of the area by cultural practitioners and others is not well documented. In meetings with the community no cultural uses have been specifically identified.

A restored, healthy native forest can provide a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory. Since the land is DHHL managed, beneficiaries will have significant benefit for the exercise of cultural traditions.

With the restoration of the native forest within the area, it is believed that cultural practices will be re-established due to the rehabilitation of the land and natural resources of the area.

The numerous forestry projects will have a positive effect on native Hawaiian gathering and/or other traditional uses as the forest and understory grows back. Wood may be made available by DHHL for cultural practices on a case by case basis. Hunting opportunities will not be reduced under this proposal.

4.2.2 Thresholds Uses to Determine Level of Impact

An impact to cultural resources will be considered negative if an action affected a resource listed or eligible for listing on the National Register of Historic Places (NRHP). In general, a negative effect may occur if a cultural resource were to be physically damaged or altered, isolated from the context considered significant, or affected by project elements that will be out of character with the significant property or its setting.

4.2.3 Potential Environmental Impacts

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the Legacy Program type and location. This includes requirements HRS Chapter 6E, the State Historic Preservation law. Chapter 6E requires that no historic properties, such as historic shrines, be altered or destroyed.

Potential construction-phase impacts, including the inadvertent discovery of human remains, are discussed in Section 4.3. Potential impacts to archaeological/historic resources, such as burials, are discussed in Section 4.3. This section focuses on the potential impacts to spiritual places and cultural and religious practices.

Cultural Practices

Current cultural practices in the area are very limited. It is not believed that any of the Legacy Program components will have a negative impact on current cultural practices. When parts of the Legacy Program are completed, such as the native forest restoration, it is believed that there will be many positive effects on gathering and other traditional cultural practices. Activities such as gathering, will be enhanced, currently the population of the vegetation most used for gathering practices are very rare. With the native forest restoration these plants will be more abundant and thus gathering activities may become more common in the area.

Cultural Resources

When parts of the Legacy Program are completed, such as the restoration of the Humu'ula Sheep Station, it is believed that there will be many positive effects cultural resources. Currently the historic facilities of the Sheep Station are in disrepair. The restoration of these facilities will add to the cultural resources of the area.

4.2.4 Mitigation Measures

To avoid negative effects to cultural resources, a cultural impact assessment has been conducted (Appendix A). If cultural resources are found, appropriate procedures and protocols will be followed to protect the cultural resources.

Whenever possible, resources will be avoided or mitigated. Mitigation options, in addition to site avoidance by relocating or redesigning facilities, will include data recovery, using either collection techniques, or in-situ site stabilization protection.

In order to mitigate any impacts to cultural and natural resources, everyone who visits/enters the area, including contractors and staff, will be required to participate in a mandatory 'Āina Mauna cultural, natural resources and safety briefing. The Briefing will be used to raise awareness and appreciation of the area being experienced.

The 'Āina Mauna Cultural, Natural Resources and Safety Briefing will include three important components.

- Cultural Briefing
- Natural Resources Briefing
- Safety Briefing

At a minimum, the briefing will include the following components:

Cultural Briefing

- History of the area
- Concerns regarding sensitivity of cultural resources
- Specific guidelines for culturally appropriate behavior
- Provide guidance and information as to what constitutes respectful and sensitive behavior

Natural Resources Briefing

- Concerns regarding sensitivity of natural resources
- Describe the status, condition and diversity of natural resources present, including biotic and physical elements
- Outline the potential and existing threats to the natural resources
- Litter and debris control
- Summarize the protection afforded the natural resources on various rules and regulations
- Provide expectations and requirements to avoid habitat damage
 - A prohibition on off-road vehicle use (except for emergency, management and security purposes)
 - The requirements of the Invasive Species/Pest Management and Control Program
 - Watch for and avoid impact with nēnē along the roads
 - Restrictions on smoking and other potential sources of fire

Safety Briefing

- Health and safety issues
- Rules and regulations
- Prohibitions
- Emergency procedures
- Steps to take and consider regarding personal safety and potential hazards
- Activity specific operational and safety procedures (i.e. horses, ATVs, bicycles, etc)

The 'Āina Mauna cultural, natural resources and safety briefing will be required for all who enter the property including visitors, tour operators and staff, DHHL staff, contractors, researchers and volunteers on an annual basis. Commercial tour operators and existing and potential future staff and contractors are required to incorporate the 'Āina Mauna cultural, natural resources and safety briefing into their programs. This requirement will be included in the various permit conditions and in all other contracts. The training program will be updated regularly to incorporate changing conditions within the region.

A separate training program for employees and volunteers will also be developed and approved by DHHL, in addition to the 'Āina Mauna cultural, natural resources and safety briefing. The training will address field-personnel training, volunteer training and general staff training. General training requirements include review of applicable laws and regulations, and basic cultural and natural resources training.

Training for all personnel involved in field-based management activities may include general safety training, 4-wheel drive vehicle operation, briefing to working at high elevations, emergency response, CPR and first aid, and recognition of culturally significant areas and items and protected flora and fauna. All staff who access the area will receive safety briefing and basic cultural and natural resources training including basic emergency response training annually.

4.2.5 Level of Impact after Mitigation

The Legacy Program will follow all applicable rules and regulations and adhere to the mitigation measures described above. The Legacy Program will not have an impact on current cultural practices and in fact cultural practices will be enhanced after the Legacy Program is completed with the restoration of native habitat and opportunities provided for gathering of forest products.

4.2.6 References

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Appendix B, Archaeological Field Inspection Report. Todd Tulchin & Hallett H. Hammatt Ph. D, Cultural Surveys Hawai'i, Inc.

Appendix C, Humu'ula and Pi'ihonua Native Traditions, Historical Accounts and Oral Interviews Report. Kepā Maly & Onaona Maly, Kumu Pono Associates, LLC.

Appendix D, Personal Interview Final Report.

4.3 Archaeological/Historic Resources

This section discusses the archaeological and historic resources in the region and specific Legacy Program areas, the potential impact of the Legacy Program on those resources, and mitigation measures the Legacy Program will employ to mitigate those potential impacts.

4.3.1 Environmental Setting

Numerous studies have been conducted on the subject property, as well as adjoining parcels.

Archaeological Research

Three archaeological studies have recently been completed on lands within the Legacy Program area.

Williams and O'Hare (2001) completed a cultural resources inventory of the Keanakolu Road corridor. Four sites were located within the project area. The entire cobble roadbed of Keanakolu Road was designated Site 50-10-32-22939. In addition, two remnant portions of the wagon roadbed (Sites 22942 and 22943), which predates the present Keanakolu Rd., were also identified. Site 22940 consists of a complex of nine features, including enclosures, walls, quarried areas, and a small lava tube. It was indicated that the lava tube feature may contain pre-contact cultural deposits. All remaining features were interpreted to be associated with road construction or military training activities. Recommendations for the identified sites included data recovery for Sites 22939 and 22940, and preservation in place for Sites 22942 and 22943.

Rechtman (2002) conducted an archaeological reconnaissance survey of a 32-acre parcel located near the northeastern boundary of the Legacy Program area. The project was conducted in association with the DHHL Humu'ula Gorse Removal Project. No sites were located.

Latinis (1997) conducted an archaeological study of upland Humu'ula and Pi'ihonua Ahupua'a, including the Legacy Program area, in association with the DHHL Pi'ihonua/Humu'ula Master Plan. The study focused on the review of pertinent previous archaeological studies within and in the vicinity of the project area, in order to develop a predictive model of site types that may be encountered in the project area.

In summary, Latinis (1997) predicted overall site density in upland Humu'ula to be low. Sites were predicted to be predominantly composed of historic sites, though traditional Hawaiian sites may include temporary habitation sites, specialized processing and camp sites, markers, trails, religious sites, and burials. Areas deemed sensitive, where site densities are likely to be greatest, included: ahupua'a and other boundary areas, in the vicinity of pu'u, caves, along trails, resource convergence areas, traditional bird feeding habitats, and at the paleo-forest/scrub transition area.

Following the predictive modeling, Latinis (1997) also conducted a one-day field inspection within the project area. The limited nature of the fieldwork focused on areas designated sensitive. Findings were generally limited to modest C-shaped structures located near the base of a pu'u, attributable to military training activities in the area.

Numerous archaeological studies have been conducted at the neighboring Pōhakuloa Training Area (PTA). The PTA consists of approximately 471 sq. km (116,000 acres) of military training grounds located both north and south of Saddle Road, near the Legacy Program area.

In general, due to the large size of designated project areas within the PTA, much of the archaeological surveys were limited to aerial and vehicular reconnaissance, with more intensive study in areas to be directly impacted by development of military infrastructure.

In summary, the site types located throughout the PTA were generally limited to temporary habitation sites within large and small lava tubes and overhangs, trails, ahu (cairns), and quarries. Historic ranching-era walls were also located.

Hammatt and Shideler (1991) developed an archaeological sensitivity map for the PTA, based on a compilation of historical documentation and previous archaeological research, as well as geological, botanical and faunal studies.

It was determined that the western portion of the PTA was likely to contain the highest density of archaeological sites. The eastern portion of the PTA, near the Legacy Program area, was determined to likely have a low to moderate site density.

In addition to the studies conducted at the PTA, the slopes and summit area of Mauna Kea have also undergone relatively intensive archaeological research. The Mauna Kea Adze Quarry, Hopukani and Liloe Springs, and Pu'u Kalepeamoia areas are located on the southern slopes of Mauna Kea, roughly between 8,600-13,000 ft. Site types included quarry areas, stone tool artifacts, evidence of tool manufacture, rock shelters, workshops, and shrines (Cleghorn 1982; McCoy 1986).

Studies at the Mauna Kea summit area have been conducted in association with development of astronomical telescopes in the area. Sites in the summit area are generally limited to shrines (McCoy 1982; McCoy 1984).

Archaeological Investigation

Based on a field inspection conducted in June 2004 by Cultural Surveys Hawai'i, it is predicted that there is a relatively low concentration of surface sites in the project area. Areas where site densities are likely to be significant include ahupua'a borders, pu'u (cinder cones), caves or lava tubes, traditional bird feeding habitats, the paleo-forest scrub transition area, traditional resource convergence areas (water, fuel, and shelter locations), and along trails and roads.

The archaeological field reconnaissance indicated that historic and prehistoric sites may be present in the parcel, including: burial sites, temporary habitation sites, markers or historic sites, trails and roads, ritual sites, and camps and processing sites (relating to bird hunting and/or adze production).

Based on archaeological surveys conducted in the area, those known archaeological features within the parcel are predominately historical sites, and a relatively low concentration of archaeological sites are expected to be found. The gulches and pu'u, in addition to serving as possible refuge areas endangered plant species, will be among the likely areas where archaeological sites, if present, will be found.

Historic features include:

- Walls, pens, fence lines
- Stone and wooden houses
- Water collection and storage facilities
- Bird hunting blinds
- Former garden plots
- Kulaka “cattle pen”, 1850, oldest-named wall feature in Humu’ula
- Stone wall extending from Pu’uhuluhulu, enclosing ‘Ōma’okoili paddocks marking the boundary between Humu’ula and Ka’ohe

Historical uses of the ‘Āina Mauna were limited to managed sheep and cattle grazing. The majority of the subject lands had previously been occupied by, Parker Ranch, since at least 1909 when sheep grazing started.

However, by 1963 the sheep operation was phased out due to a decline of wool prices caused by the depression, competition from foreign countries, and heavy losses from wild dogs and feral pigs. Parker Ranch then converted the land to a cattle operation. Conversion from sheep to cattle gave way to the initial significant outbreak of gorse.

Results of Field Inspection

Field inspection of portions of the project area was conducted on May 4-6, 2004 by two CSH archaeologists, David Shideler, M.A. and Todd Tulchin, B.S., under the overall supervision of Hallett H. Hammatt, Ph.D. In general, the project area consisted of open pastures, including both steep and rocky areas in the mauka (northern) portion of the project area, as well as relatively stone free, rolling grassland to the south.

Aerial reconnaissance was successful in locating both single and clusters of multiple relatively small stacked stone structures and long stone walls. Following the aerial reconnaissance, ground reconnaissance was able to successfully relocate all features observed during the aerial reconnaissance. An attempt was also made to traverse all 4 x 4 roads within the project area. However, access to some areas was limited by impassable locked gates and fences. The field inspection also focused on two areas during ground reconnaissance: the vicinity of Kalai’eha pu’u including the Humu’ula Sheep Station, and the area in the southeastern portion of the project area.

Ranching infrastructure was generally limited to a network of 4 x 4 roads, water tanks, hog wire/barbed wire fences, and stone walls. Numerous reservoirs were also observed to be constructed within normally dry drainage channels. The reservoirs functioned in providing catchment water for ranch livestock.

A total of 13 sites were located during the field inspection. In general, the archaeological sites identified in the study (excluding ranch walls) were clustered in distinct localities (i.e. near the boundary of the PTA, the vicinity of the Humu’ula Sheep Station, and the southeastern corner of the project area), with large land areas appearing to lack historic properties. Descriptions of historic properties identified during the field inspection of the project area follow:

Table 4.3.1.1 - Summary and Recommendations for All Identified Archaeological Sites Located within the Project Area

Field Site #	Site Type	Posited Function	Work Accomplished	Recommendation
CSH 1	Wall	Ranch Related	L, P, D	Preservation Through Avoidance
CSH 2	Enclosure & Mounds	Temporary Habitation (Ranching); Pasture Improvement	L, P, D	Inventory Survey, Preservation Through Avoidance
CSH 3	C-Shape Complex	Temporary Shelter (Military Training)	L, P, D	No Further Work
CSH 4	C-Shapes & Terrace	Temporary Shelter (Military Training); agricultural	L, P, D	No Further Work
CSH 5	C-Shape / Enclosure Complex	Temporary Shelter (Military Training)	L, P, D	No Further Work
CSH 6	Modified Cave	Temporary Habitation	L, P, D	Inventory Survey, Preservation and/or Data Recovery
CSH 7	Modified Cave	Temporary Habitation	L, P, D	Inventory Survey, Preservation and/or Data Recovery
CSH 8	Wall	Ranch Related	L, P, D	Preservation Through Avoidance
CSH 9	Modified Cave	Temporary Habitation	L, P, D	Inventory Survey, Preservation and/or Data Recovery
CSH 11	U-Shape	Temporary Habitation (Ranching)	L, P, D	Inventory Survey, Preservation Through Avoidance
CSH 12	Wall	Ranch Related	L, P, D	Preservation Through Avoidance
50-10-32-7119	Historic Structures	Humu'ula Sheep Station (Ranching)	L, M, P, D	Preservation, Stabilization, Historic Architecture Study
50-10-32-22942	Road Remnant	Historic Transportation	L, P, D	Preservation Through Avoidance

L=Located with GPS, M=Mapped, P=Photographed, D=Described

Historic Sites

The known historic and cultural resources on the land parcel are as follows:

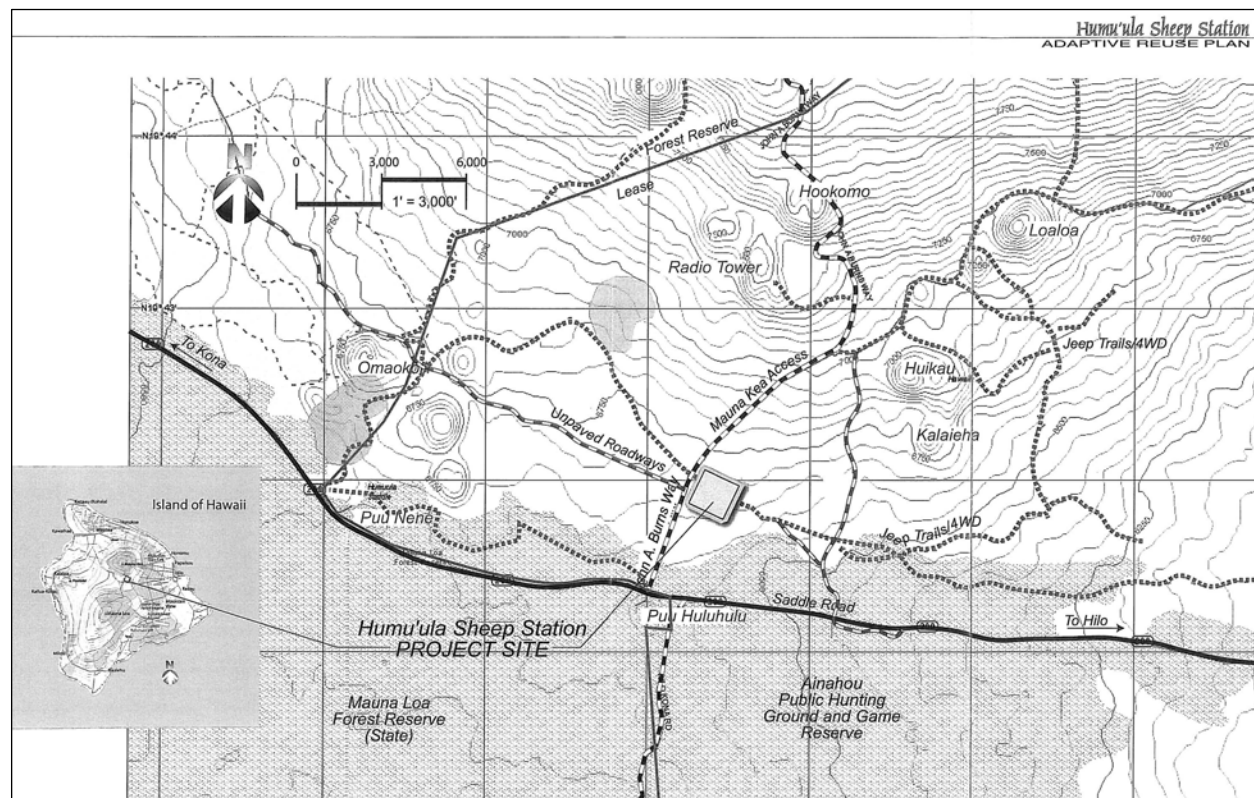
Ranching Infrastructure - Throughout the property there are several ponds, trails, fences, and rock walls which are in various states of repair, which were put in place for ranching infrastructure.

Cabins - There are two cabins located on the property, the Pu'u 'Ō'ō cabin/ranch headquarters and Kanakaleonui cabin.

Keanakolu/Mana Road - This road is located in Humu'ula and was built in 1870 to connect Hilo and Waimea. It is of historical interest because it developed a more efficient route for transportation between Hilo and Waimea and opened up land for grazing and sugar cane.

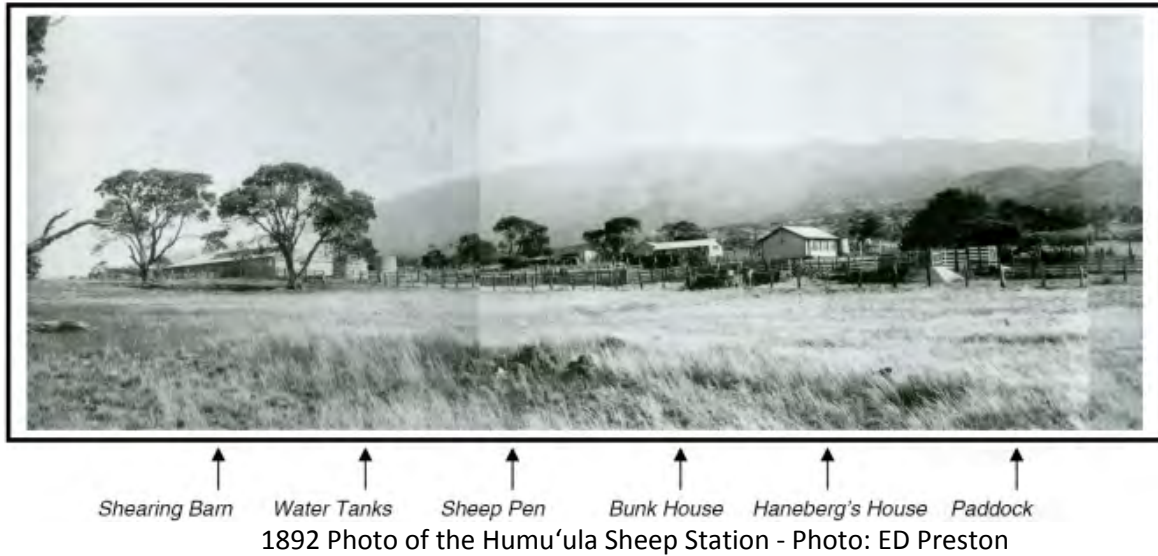
The Mauna Kea-Humu'ula Trail - This trail was first plotted by Alexander in 1892, and is shown on two later maps, the U.S. Coast and Geodetic Survey 1925-1926 and U.S. Geological Survey 1956. In 1936 the Civilian Conservation Corps made improvements to what is believed to have been a section of the old Mauna Kea-Humu'ula Trail from near the Humu'ula Sheep Station at Kalai'eha to the summit.

Humu'ula Sheep Station - The Humu'ula Sheep Station Company chartered by the Hawaiian Government in 1883, was an operation of H. Hackfeld and Company. By 1894 the company had erected large and extensive paddocks at Kalai'eha and also had a station at Keanakolu. Ownership of the station came under Parker Ranch and operations continued for years, often little known by Hawai'i residents due to its comparatively isolated location.



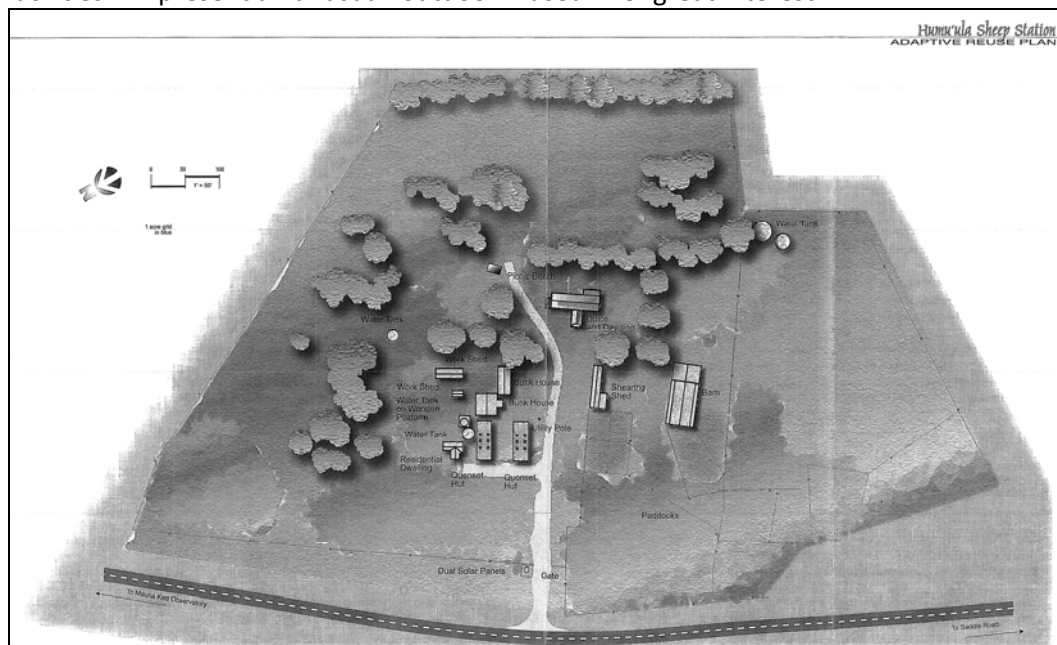
Map of Humu'ula Sheep Station Site (Kimura International, 2004)

Sheep were originally introduced to the Big Island by Capt. George Vancouver in 1793 when he left two ewes and a ram at Kealahakua. Sheep were being raised for export by 1809 and flourished through the early part of the 20 century. Most meat was consumed locally and wool was supplied to mainland United States buyers. Wool production reached its peak in 1875 when 565,000 pounds were sent overseas.



Although abandoned as a sheep station, ranch support activities have continued until recently. Therefore, the site contains a mix of structures and artifacts with varying degrees of historic, architectural and aesthetic significance. Existing structures include offices, living facilities, outbuildings, work sheds, shearing sheds, holding pens and water catchment facilities.

The site was assessed by the State Historic Preservation Division for placement on the Hawai'i Register of Historic Places. The historian determined that the site's architectural interest and merit lie in "structures (c. 1900) [that] are typical ranch house style but are particularly interesting for their 'homemade' contrived plans and arrangements, both functional and picturesque." The assessment concluded with a recommended "Valuable" status based primarily on its historical interest and secondarily on its architectural interest. "If possible, a restoration into an operating complex including visitors facilities will present an unusual 'outdoor museum' of great interest."



Map of the Humu'ula Sheep Station's Existing Structures (Kimura International, 2004)

The office/dwelling is the main historic building, part of a cluster that represents the property's rustic character. It was originally built as a men's living cottage and, over time, converted to office and residential use. The structure was built in stages and consists of two distinct wings, both with gable roofs. The 1973 SHPD assessment refers to the elaborate decoration of the living room with skylight, wainscoting and carved scrollwork. Unfortunately, in the nearly 40 years since, the building has deteriorated from neglect and lack of maintenance. A preliminary architectural inspection indicates that the building will require extensive structural rehabilitation to meet current health and safety standards for occupancy.

4.3.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it involves an irrevocable commitment to loss or destruction of any natural or cultural resource. Therefore, a significant impact will occur if the Legacy Program resulted in the loss or destruction of any archaeological/historic resource.

4.3.3 Potential Environmental Impacts

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the Legacy Program type and location.

While very little cultural or historical artifacts have been found within the project boundaries that does not mean they do not exist. The rough terrain in some areas makes detecting sites very difficult. Removing feral ungulates will mean the less likelihood of disturbance of possible surface features.

Construction

Construction areas will be prepped before construction commences so the chance that a cultural or historical artifact will be adversely impacted will be negated. While there are no archaeological or cultural sites anticipated to be adversely affected by the proposed actions, should any such site be encountered during construction or reforestation operations, all activities will immediately cease and the appropriate agencies, including the State Division of Historic Preservation, will be consulted.

Humu'ula Sheep Station Adaptive Reuse

The Humu'ula Sheep Station is proposed for reuse. The structures contained within the Sheep Station's "historic zone" are historic, thus special care will be taken in dealing with these historic structures. The Humu'ula Sheep Station Adaptive Reuse Plan calls for stabilizing buildings in the historic zone for long-term preservation.



Quonset Hut Dormitories - Photo: Ho'okuleana LLC



Holding Pens and Sheering Sheds - Photo: Ho'okuleana LLC

The redevelopment of the Subject Property is in line with the Reuse Plan and includes facilities open to the public.

The redevelopment of the site includes the restoration of three historic buildings (office and dwelling building, barn and shearing shed) referred to in the Reuse Plan as the "historic zone." Other buildings may be renovated, as well.

All improvements to the site will require close work with the State Historic Preservation Division as the site is over 50-year old and regulated as historic property. The re-development of the Sheep Station will also include a staging area for eco-tourism activities across the entire property. Operators will use the site to orientate visitors, stage training and other prepping activities.

Historic buildings (office and dwelling building, barn and shearing shed) will be restored and additions to the site improvement made. These historic buildings will be used for offices, ecotourism base facilities, museums and gift shop operations. The historic nature of the Sheep Station and related facilities will be retained. The restoration of the historic buildings will be costly but return will be the highest of the proposed alternatives due to the commercial appeal of the renovations and new structures. Additionally, other commercial uses and structures may be built to enhance the historic nature of the area such as sheep pens and other animal enclosures.

Existing structures at the Sheep Station will also serve as an interim Administration-Base facility for program operations while a permanent administration base facility is built.

Thus, the habitable buildings on site will be used for office space, accommodations and storage. Port-a-potties already on site will be used and a composting toilet and a wastewater system (which may include septic) will be developed.



Office Buildings - Photo: Ho'okuleana LLC

Initial, permanent overnight accommodations will consist of up to twenty (20) cabins with appropriate facilities (rest-rooms/baths, kitchen/ dining), camp store, eco-tourism staging/community center, open campground, one caretaker's living unit, one administrative unit with office and meeting rooms, utility storage buildings, rooftop water collection systems and a parking area. The parking area may serve as a helipad site.

4.3.4 Mitigation Measures

Implementation of the management procedures, such as the Cultural and Natural Resources Training Program, and compliance with existing regulations and requirements will ensure that Legacy Program impact will not have a significant impact on historic resources. DHHL will comply with all State and County laws and rules regarding the preservation of archaeological and historic sites.

The Hawai'i State Historic Preservation Statute (Chapter 6E) affords protection to historic sites. The criteria, standards and guidelines currently utilized by the DLNR-SHPD for the evaluation and documentation of cultural sites will be followed. DLNR-SHPD will be notified of any findings, when made. If any burial remains are discovered, they will be treated in concurrence with Chapter 6E-43.

If evidence of any archaeological or culturally significant sites is encountered during construction or vegetation clearing, work within 25-feet of the findings will be terminated and DLNR-SHPD will be notified. The Legacy Program will consult with SHPD and the 'Āina Mauna Advisory Council to establish appropriate protocols if historic items are found.

Sheep Station

The "reuse" of the Sheep Station is a positive mitigative step that the 'Āina Mauna Legacy Program is proposing. Unfortunately, the buildings have deteriorated from neglect and lack of maintenance. The reuse of these facilities and the development of buildings in the same "style" will bring back the historic nature of the area.

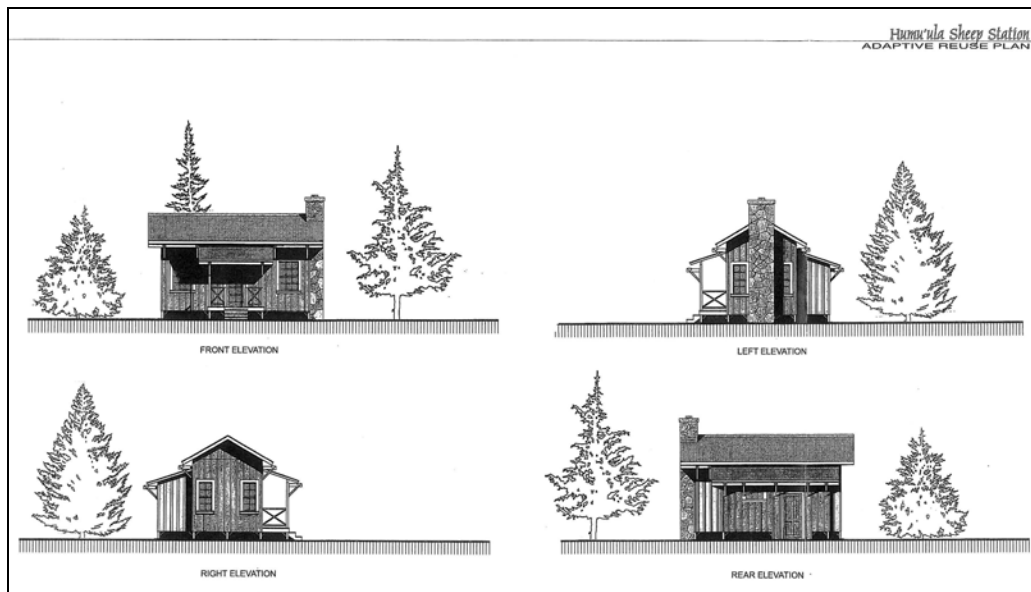
The Humu'ula Sheep Station Adaptive Reuse Plan details "General Design Guidelines" for the reuse and development of the Sheep Station site. The following design guidelines are recommended based on development outcomes envisioned in the Adaptive Reuse Plan.

Location Guidelines

- Retain corrals and open fields on the south and west sides of the site so that the roadway approaches from Saddle Road and Mauna Kea Access Road convey an ambiance of wide open spaces and pastureland.
- Establish an historic zone consisting of at least three core buildings: the Office and Dwelling Building, Barn, and Shearing Shed. Paths linking these buildings should be constructed to define safe walking and observation areas for visitors. The area can be further improved with interpretive signs and displays of artifacts. Over the long term, the buildings will need to be stabilized against further deterioration and collapse.

Design Guidelines and Architectural Style and Materials

The buildings shown in the concept design drawings below were inspired by the simple, rustic structures built during the heyday of livestock production that still remain on-site. By incorporating similar design elements in modern buildings, the site as a whole will convey a unified aesthetic that highlights its historical roots.



Concept Design of Typical Cottage/Cabin (Kimura International, 2004)

Roofing	Pre-finished or field painted corrugated metal: overhanging eaves; Roof angle similar to the existing office building
Foundation	Post construction with an elevated ground floor
Exterior siding	Wood cement board and composite battens; lava-like rock for chimneys, exterior posts and accents
Entrance doors	Wood stile Wood stile and rail, panel or true divided light (glass) doors
Windows	Aluminum or vinyl clad wood, double hung or awning windows
Coatings	Earth and vegetation tones and colors
Other	Provide porches and verandas; incorporate lean-to type extensions (for example, to accommodate the lavatory).

4.3.5 Level of Impact after Mitigation

Because the Legacy Program will not affect any known or yet to be discovered historic property within the area it has been determined that the Legacy Program will not result in the loss or destruction of any archaeological/historic resource. The mitigation measures outlined above will reduce the Legacy Program's impact on historic resources, if new resources are uncovered and impacted.

4.3.6 References

Faucette, David T. 2009. Draft Environmental Assessment for Construction of a 275-acre Fence Enclosure South of Waikoloa Village.

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PB Americas. 2009. Draft Environmental Impact Statement for the Proposed TMT Observatory.

PBR Hawai'i. 1997. Humu'ula/Pi'ihonua Master Plan.

Technical Reference Document I, Archaeological Review and Predictive Model. D. Kyle Latinis, M.A., Scientific Consultant Services Inc.

State of Hawai'i, Department of Hawaiian Home Lands. 2001. Final Environmental Assessment, Koa Salvage-Reforestation and Gorse Containment, Humu'ula, Island of Hawai'i.

State of Hawai'i, Department of Land and Natural Resources, Division of State Parks. 1973. Hawai'i Register of Historic Places, Historic Sites Information and Review Form, Humu'ula Sheep Station.

Townscape, Inc. 2005. Humu'ula Rural Villages and Landscape Restoration Plan (Final Report).

Appendix B, Archaeological Field Inspection Report. Todd Tulchin & Hallett H. Hammatt Ph. D, Cultural Surveys Hawai'i, Inc.

Appendix C, Humu'ula and Pi'ihonua Native Traditions, Historical Accounts and Oral Interviews Report. Kepā Maly & Onaona Maly, Kumu Pono Associates, LLC.

Appendix D, Personal Interview Final Report.

4.4 Biological Resources

This section discusses the biological resources (flora and fauna, including rare, threatened and endangered species) in the region and in the Legacy Program area, the potential impacts of the Legacy Program on those resources and mitigation measures the Legacy Program will take to mitigate those potential impacts.

4.4.1 Environmental Setting

Flora

The vegetation is dominated by an understory of exotic pasture grasses over much of the lands with koa/‘ōhi‘a forest found in the lower portions of Pi‘ihonua, especially in the lands adjacent to the Hakalau Forest National Wildlife Refuge.

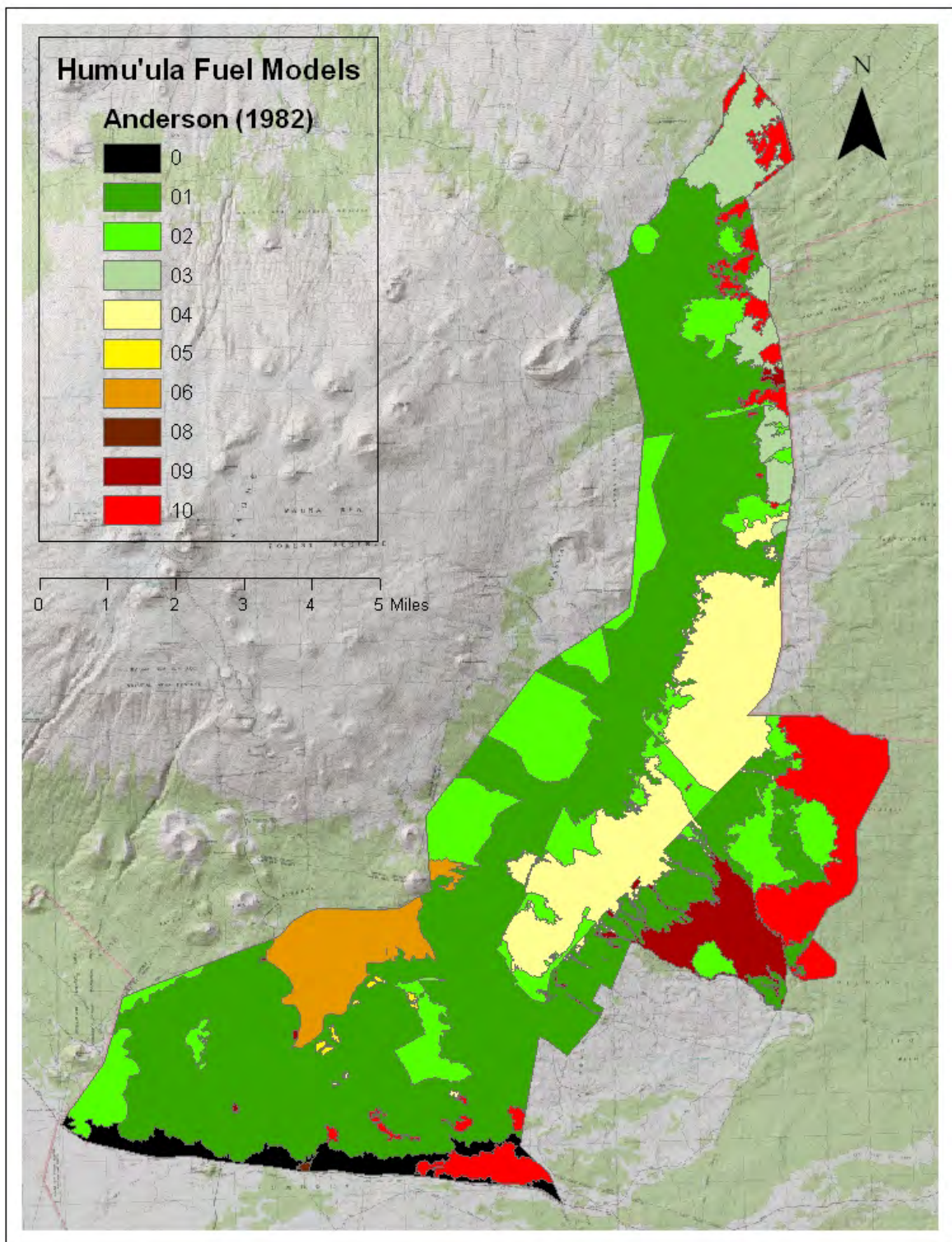
Scattered koa and māmane are found over the northern portions of Humu‘ula with scattered māmane found in the upper elevations, especially adjacent to the Mauna Kea Forest Reserve. The vegetation on the ‘Āinahou lands generally consists of scattered scrub vegetation of ‘ōhi‘a and native shrubs.

‘Āinahou contains primarily two vegetative types. The types consist of very scattered ‘ōhi‘a and native trees of moderate height, in a dry habitat with native shrubs and areas of bare ground.

Fuel management units (FMU) and identified fuel models at Humu‘ula were used to develop management recommendations by DHHL and are shown in the table below. The following surface fuel types were mapped in Humu‘ula and identified for fire management purposes utilizing Andersons (1982) Fuel Models For Estimating Fire Behavior. They are also useful in describing the flora of the landscape in more detail.

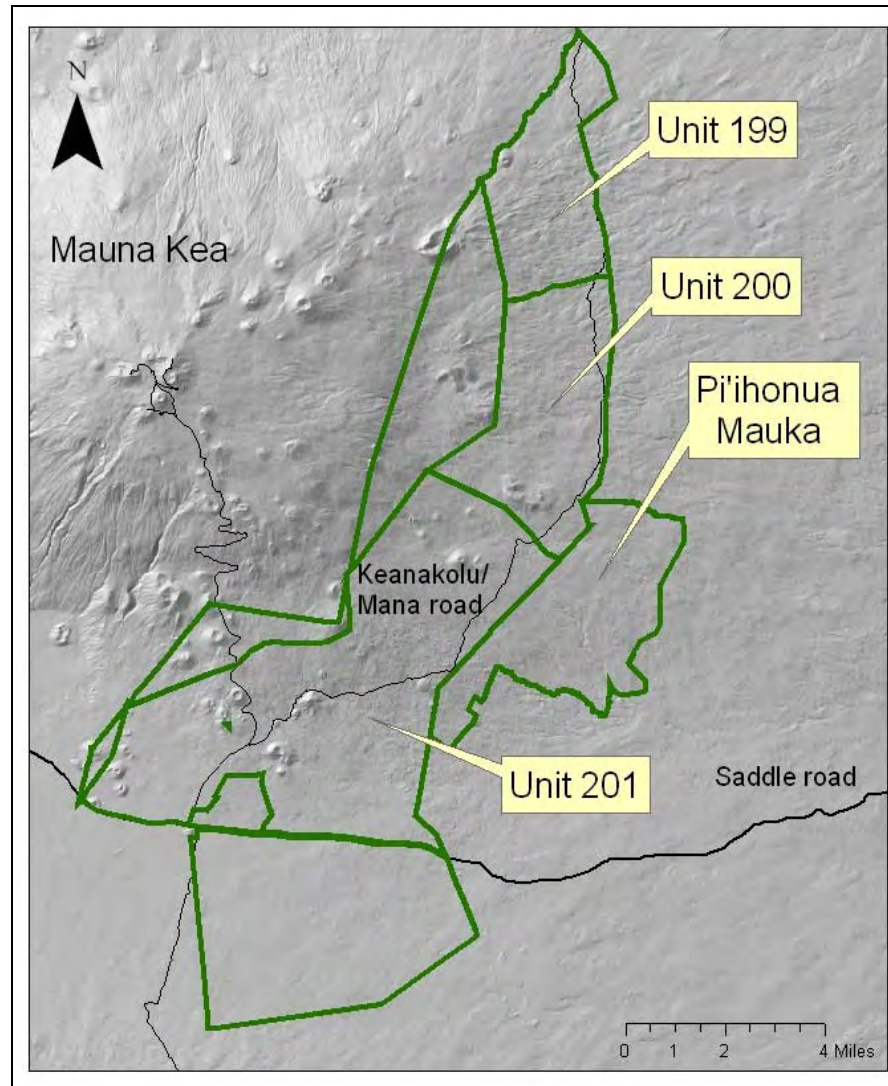
Table 4.4.1.1 – Fuel Models Found at Humu‘ula

FUEL MODELS FOUND AT HUMU‘ULA		
Fuel Model by Acres at Humu‘ula (DHHL)		
Fuel Model	Description	Acres
Model 0	lava, open areas	978
Model 1	annual grasslands	21,031
Model 2	annual grasslands and shrubs and/or timber trees	6,239
Model 3	grasslands that are coarse structured, above knee level (most intense burning grass)	1,467
Model 4	large shrubs with significant dead component (most intense burning shrub)	4,811
Model 5	short green shrubs	60
Model 6	medium green/dead shrubs	1,722
Model 8	timber with little to no under story, light fuel loading	11
Model 9	timber with some under story, moderate fuel loading	1,293
Model 10	timber with heavy under story and/or midstory, greatest total fuel load (most intense burning timber)	3,236
	Total Acres	40,848



Map of Humu'ula Fuel Models - DHHL

The flora is analyzed below using four data collection units: 199, 200, 201, and Pi'ihonua Mauka, that correspond to former pastoral leases, shown on the map below.



Humu'ula/Pi'ihonua Data Collection Units - DHHL

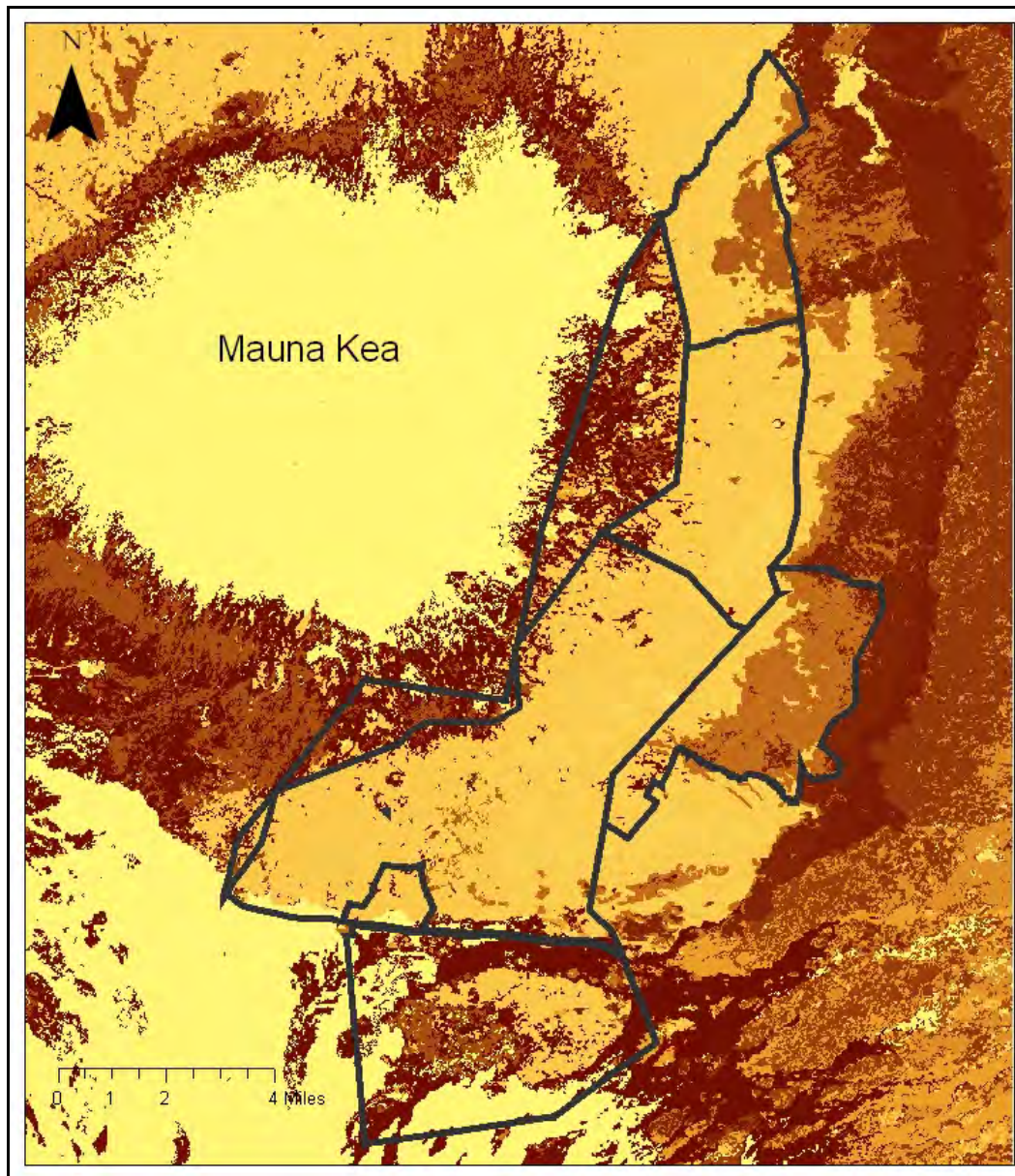
Vegetation variations are patterned by elevation, temperature, and rainfall, with some exceptions due to general topography, soils and underlying geologic substrate, and microclimate (Tomonari-Tuggle 1996).

There are several remnant patches of high elevation native forests scattered amongst primarily introduced grasses and shrubs at Humu'ula. The introduced species in the area are the product of a long history of grazing and subsequent land conversion from high elevation native forest ecosystems to pastoral lands (Scowcroft & Jeffrey 1999; Leary et al. 2004).

Remnant native forests that can still be found in the project area are koa/'ōhi'a (*Acacia koa*/*Metrosideros polymorpha*), pūkiawe (*Leptecophylla tameiameia*) shrub complex, and high elevation māmane/naio (*Sophora chrysophylla*-*Myoporum sandwicense*).

The dominant introduced species are non-native grasses, primarily composed of kikuyu grass (*Pennisetum clandestinum*), sweet vernal grass (*Anoxanthum odoratum*) and narrow-leaved carpet grass (*Axonopus affinis*), the invasive shrub gorse (*Ulex europaeus*) and timber trees that have been planted for research and as windbreaks near areas of former habitation.

The areas vegetation zones are mostly light colored open/pasture areas with smaller patches of darker colored forested areas. Each data collection unit is slightly different and defined by its physical and biological characteristics.



Humu'ula/Pi'ihonua Vegetation Zones - DHHL



Data collection unit 199 is most representative of native forests prior to the introduction of cattle with native koa/‘ōhi‘a forests at lower elevations and māmane at higher elevations.

This unit has a heavy kikuyu grass component at lower elevations eventually thinning out to less dense open pasture grasses with increase in elevation. There are few introduced plants in this area besides pasture grasses.

Unit 199, Koa forests mauka of Keanakolu road (lower right) - Photo: Mike Robinson, DHHL

Introduced trees and saplings can be found along state boundaries and banana poka (*Passiflora mollissima*) has been found within DHHL bounds. Only a few individual gorse plants have been found in this area and are treated and monitored annually.

Data collection unit 200 is dominated by the main gorse infestation which is located along Keanakolu/Mana Road. The main gorse infestation begins near Pu‘u O‘o in Unit 201 and ends just north of the gated entrance to Hakalau Forest National Wildlife Refuge in unit 200. Lands mauka (towards the mountains) of the gorse infestation are dominated by introduced grasses with pockets of small māmane forests.

North of Hakalau Forest National Wildlife Refuges’ entrance there are small groups of remnant old growth koa forest and introduced grasses. There are pockets of native species communities that thrive in the ravines here and consist of koa, ‘ōhi‘a and diverse native shrub and tree understory. Remnant koa can be found interspersed within the gorse infestation.



Unit 200/201, Main gorse infestation makai of Pu‘u Loa facing east - Photo: Mike Robinson, DHHL

The nuisance shrub, gorse, covers about 20% of the entire site (11,000-acres). Patches or individual plants can be found across another 10,000-acres. Gorse (*Ulex europaeus*) is a member of the legume family, native to Europe and introduced to Hawai‘i as a hedge plant. The shrub grows thickly to heights of 6 to 10-feet and produces sharp, three inch thorns covered with a thick, waxy substance.

The seeds of the gorse plant can lie dormant for 50 to 70-years. Heat tends to trigger seed germination, and each plant propagates thousands of seeds. Gorse interferes with reforestation and is suspected of causing ecological upsets by acidifying certain types of soil. The dense wax covered thorns are flammable and even in moist conditions can support intense brush fires.

The continued dominance of gorse could potentially eliminate any productive use in areas covered by the plant and render the land unsuitable as habitat of any kind, including native birds and forests, cattle pasture, or other agricultural use.



Data collection unit 201 is composed of scattered māmane and introduced pasture grasses west of Mauna Kea access road.

There are pūkiawe native mix shrub complexes south of Keanakolu/Mana road with occasional remnant koa/‘ōhi‘a forests interspersed throughout the area.

These remnant koa/‘ōhi‘a forests are very diverse with many native understory species. The dominant vegetation is introduced grasses and large incipient populations of gorse.

Unit 201, Incipient gorse populations (center) and pūkiawe shrub complex (top) - Photo: Mike Robinson, DHHL

The main gorse infestation begins along the northeastern boundary of this unit near Pu‘u O‘o. There is a large band of high elevation native māmane/naio forests mauka of Keanakolu/Mana road upon entry from the Mauna Kea access road. These native populations are relatively intact and should be considered a valuable natural and cultural resource in the event of wildland fire.

Pi‘ihonua Mauka was most recently leased as Pu‘u O‘o Ranch until the early 1990’s and there are still quite a few feral cows in this area. This unit is made up mostly of introduced grasses with a significant ‘ōhi‘a overstory. Access, especially during wet periods, is very difficult.

There are sporadic patches of gorse in the mauka grasslands and gorse populations established along stream courses and gullies. The makai (towards the ocean) portion of the unit is mostly ‘ōhi‘a forests with occasional large koa trees and a few stumps indicating past logging.



Pi‘ihonua Mauka, Heavily grazed grasslands & invading gorse populations - Photo: Mike Robinson, DHHL

Fauna

Humu'ula is home to many introduced and some native birds. Introduced bird species include kalij pheasant (*Lophura leucomelana*), ring necked pheasant (*Phasianus colchicus*), green pheasant (*Phasianus colchicus versicolor*), California quail (*Callipepla californica*), gray francolin (*Francolinus pondicerianus*) and wild turkey (*Meleagris gallopavo*).

The endemic endangered birds that may be found at Humu'ula include the Hawaiian nēnē (*Branta sandvicensis*) goose, Hawaiian hawk 'io (*Buteo solitarius*), and rarely the Hawaiian duck koloa (*Anas wyvilliana*).

Endemic birds include the short-eared owl pueo (*Asio flammeus sandwichensis*) and transient birds include the Pacific golden plover kolea (*Pluvialis fulva*).

There are numerous small to medium sized introduced birds that frequent the area such as the Japanese white eye (*Zosterops japonica*).



Nēnē Goose at Humu'ula - Photo: Mike Robinson, DHHL

There are several mammals that are in the project area, including ungulates such as the domestic cow *pipi* (*Bos Taurus*), mouflon (*Ovis musimon*), feral pig (*Sus scrofa*), and rarely the feral sheep (*Ovis aries*). The only indigenous native mammal in the area is the Hawaiian Hoary bat or *ope'ape'a* (*Lasiurus cinereus semotus*).



Bull under koa tree near gorse population - Photo: Mike Robinson, DHHL

There is also the feral dog *ilio* (*Canis familiaris*) and cat *popoki* (*Felis catus*). Additionally, the black rat (*Rattus rattus*), Polynesian rat *i'ole* (*Rattus exulans*) and Indian mongoose (*Herpestes auropunctatus*) are present in the area.

Other introduced ungulates like the domestic goat or *kao* (*Capra hircus*) have been eradicated or pushed out of the vicinity. There is a no hunting policy on DHHL lands. Except for smaller, specific project areas, there has never been an intensive survey of endangered, threatened or sensitive species throughout Humu'ula.

Any wildland fire located mauka of Hakalau could represent a significant threat to native bird habitat and, if present, endangered plant species.

Endangered and Threatened Species

Analysis conducted in 1996 discusses the probable occurrence of protected plant species. Although none of these lands are designated as critical habitat, data base analysis has shown that legally protected plants were found within the project area in the past and may be found there now.

Exact locations of endangered plant species cannot effectively be shown on a base map. The 1996 Analysis lists four species of listed endangered plants and two species of concern reported to grow within the project area. Four of these species are reported from more than one location.

Table 4.4.1.2 - Listed Endangered Plant Species & Species of Concern Reported within the Project Area

Common Name	Scientific Name	Status	Area	Year of observation
fern	<i>Asplenium fragile var insulare</i>	Listed Endangered	Keanakolu	1957
			Pu'u 'Ō'ō	1935
'ōhā, 'ōhā wai	<i>Clermontia lindseyana</i>	Listed Endangered	Pu'u 'Ō'ō	1957
'ōhā, 'ōhā wai	<i>Clermontia pyralaria</i>	Listed Endangered	Keanakolu	1978
			Pu'u Ākala	1992
laukahi kuahiwi	<i>Plantago hawaiiensis</i>	Listed Endangered	Pu'u 'Ō'ō	1979
na'ena'e	<i>Dubautia arborea</i>	Species of Concern	Pu'u 'Ō'ō	1935
			Keanakolu	1935
makou	<i>Ranunculus hawaiiensis</i>	Species of Concern	Mauna Kea	1990
			Pu'u 'Ō'ō	1979

Additionally, there are records of five other such species outside, but near the boundaries of the project area. Silverswords are known to grow slightly above the elevation of project area in the vicinity of the Wailuku River and Waipāhoehoe Gulch. Data base records show that in the past the silverswords grew as low as 8,000 feet elevation, well within the project area.

Table 4.4.1.3 - Listed Endangered Plant Species & Species of Concern Reported to Grow Outside, but Near the Boundaries of the Project Area

Common Name	Scientific Name	Status	Area	Year of observation
'āhinahina, silversword	<i>Argyroxiphium sandwicense</i>	Listed Endangered	Mauna Kea	1991
pōpolo kū mai	<i>Solanum incompletum</i>	Listed Endangered	Pu'u 'Ō'ō	1949
fescue	<i>Festuca hawaiiensis</i>	Species of Concern	Pu'u 'Ō'ō	1916
'ākala, 'ākalakala	<i>Rubus macraei</i>	Species of Concern	Upper Pi'ihonua	1991
'ānunu	<i>Sicyos macrophyllus</i>	Species of Concern	Pu'u 'Ō'ō	1985

Flora and fauna on the land parcel had been mapped from information documented by the Federal Status and Heritage Global Ranks of the official U.S. Fish & Wildlife Service Endangered Species Act. All flora and fauna identified on these lands and described below are either endangered or threatened.

The Pi'ihonua parcel may contain several endangered or threatened vertebrate species: the koa-ōhi'a forest below the 6,000 foot level is significant from both an avian and botanical perspective. It is typically good habitat for at least four endangered avian species: Hawai'i 'Ākepa, Hawai'i Creeper, 'Akiapōlā'au, and Hawaiian Hawk ('Io,) as well as breeding habitat for at least five other endemic species.

The north Humu'ula subsection may have the following vertebrates: Hawaiian Creeper, 'Io, Hawaiian Hoary Bat, Palila, 'Akiapōlā'au and Hawaiian Duck (Koloa). The na'ena'e and 'ōhā wai plant species may be found in the natural communities of māmane subalpine dry forest and koa/māmane montane dry forest. The māmane forest is an important resource for the Palila.

The middle Humu'ula subsection also may have the following vertebrates: 'Io, Koloa, Hawaiian Creeper, Hawaiian 'Ākepa, Hawaiian Goose (Nēnē), Hawaiian Hoary Bat and Palila. Also found in this subsection is the natural communities of koa/māmane montane dry forest and māmane subalpine dry forest at the upper elevations, adjacent to the Mauna Kea Forest Reserve.

The south Humu'ula subsection may have the following vertebrates: Nēnē, 'Akiapōlā'au, 'Io, Palila and Hawaiian Dark Rumped Petrel. Also found in this subsection may be na'ena'e and 'ōhā wai plants and the natural communities of koa/māmane montane dry forest and the māmane subalpine dry forest.

The Māmane forest at the western boundary of the south Humu'ula subsection represents a potential resource for the endangered Palila. From recent research it appears that one of the most important resources for supporting Palila is a māmane forest with a large latitudinal range similar to that found in this area. This allows the birds to move up and down slope following the bloom and pod set of the forest which occurs over a latitudinal cline. The south Humu'ula subsection is also the only location of the land parcel that may have an invertebrate species, the Amastrid Land Snail. Both Amastrid Land Snail and Dark Rumped Petrel have been documented near Saddle Road.

'Āinahou may have the following vertebrates: Hawaiian Creeper, 'Io, 'Akiapōlā'au, Nēnē, and Palila. Also found in the 'Āinahou section may be the Makou plant and the natural communities of Deschampsia nubigena, subalpine mesic, and grassland. The 'Āinahou subsection is unique from both a biological and botanical perspective in that it consists of shrub land community that is strongly native in character with a few small kīpuka of closed 'ōhi'a forests in the eastern portion. It may support several endangered avian species, including the Nēnē. Additionally, many endangered plants and animal species are found in the adjacent west Pōhakuloa Training Area.

From a biological perspective the māmane forests are important in that they serve as critical habitat for palila, an endangered native bird. Several endangered or threaten native bird species also are associated with the koa/'ōhi'a and koa/māmane forest areas. The 'Āinahou lands, which serve as a public hunting and game reserve area, also serve as a refuge area for the nēnē.

Unlike topographic features, plants and plant populations may disappear locally or expand existing populations, or even sprout in completely new areas. This analysis can only list locations of endangered plants known at the time the data were collected. These species could spread to new locations at any time, or disappear completely for no obvious reason. Furthermore, the Humu'ula/Pi'ihonua project area is vast and will require an inordinate amount of time to actually search in entirety for endangered plants.

These difficulties make the use of vegetation analysis and maps invaluable. These tools can show where it is most probable that endangered plants may grow. Use of these Vegetation Maps used to delineate the master planning efforts of the 'Āina Mauna Legacy Program, subject to the following considerations:

1. In general, endangered species are more likely to occur in native plant communities that have received less disturbance rather than in the more heavily grazed parts of the project area.
2. Secondly, topographic features that make grazing difficult, such as steep pu'u, a'a flows, gullies, or lava tube entrances, may be plant refuges harboring remnants of native vegetation not shown on maps. Endangered species may persist in these kinds of sites.

4.4.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant effect to the existing biological resources if it (1) caused/involved an action that irrevocably commits a natural resource, (2) curtails the range of beneficial uses of the environment, or (3) or substantially affects a rare, threatened, or endangered species, or its habitat.

Therefore, a significant adverse impact will occur if the Legacy Program caused long-term loss or impairment of a substantial portion of local habitat of indigenous Hawaiian species; caused a substantial reduction in the population of a protected species, as designated by Federal and State agencies, or a species with regional and local significance; introduced or increased the prevalence of undesirable non-native species; curtailed the range of a native Hawaiian species; or otherwise reduced the range of beneficial uses of the environment. This can occur with a reduction in numbers; by alteration in behavior, reproduction, or survival, or by loss or disturbance of habitat.

4.4.3 Potential Environmental Impacts

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the Legacy Program type and location. This includes requirements of the 'Āina Mauna Legacy Program, 'Āina Mauna Implementation Work Plan, the Endangered Species Act and the State of Hawai'i Environmental Policy (HRS 344).

Impacts on native biological resources were evaluated by assessing the sensitivity, significance or rarity of each resource that could be adversely affected by the Legacy Program. The significance may be different for each habitat or species and is based on the resource's rarity or sensitivity and the level of impact that will result from the proposed Legacy Program.

Potential long-term impacts associated with the Legacy Program include; (a) the replacement of existing habitat with Infrastructure for Homesteading, Groundwater Water System and Surface Water Catchment System, Outplanting Centers and Field Worker Accommodations, Invasive Plant Control and Remnant Invasive Species Eradication, Feral Animal Eradication, Pig Management and Control, Sheep Station Restoration Adaptive Reuse, Administration Base Facility, Road System, Gores Eradication through Commercial Timber Planting and Harvesting, Remote Accommodations, Eco-Tourism Facilities, Services and Activities, Commercial Facilities and Activities, Native Forest Restoration and Sustainable Koa Forestry; and (b) dust generated by vehicles traveling along the unpaved access roads, Keanakolu/Mana Road and Mauna Kea Access Road.

Each of these potential impacts is discussed below.

Species or Habitat Replacement

Species and habitat replacement will be minimal. Most areas slated for construction of structures are on marginal pasturelands and include:

- Infrastructure for Homesteading: Preliminary design concepts call for a subdivision layout encompassing approximately 1,000-acres of former pasturelands, with a total of approximately 100 to 200-homesteads sites and other community uses, sited on former pasturelands that do not currently harbor any species of concern.
- Groundwater Water System and Surface Water Catchment System: Development of groundwater and surface water systems across property, at various sites to be determined by level of development, sited on former pasturelands that do not currently harbor any species of concern.
- Outplanting Centers and Field Worker Accommodations (Kanakaleonui and Pu'u 'Ō'ō): Sited on former pasturelands that do not currently harbor any species of concern.
- Invasive Plant Control and Remnant Invasive Species Eradication: Invasive Plant Control and Remnant Invasive Species Eradication on former pasturelands across the overall site that do not currently harbor any species of concern.
- Feral Animal Eradication: Feral Animal Eradication Control on former pasturelands across the overall site that do not currently harbor any species of concern.
- Sheep Station Adaptive Reuse: Approximately twenty-acres of former pasturelands that do not currently harbor any species of concern will be displaced with the adaptive reuse of the Sheep Station.
- Administration Base Facility: Five to ten-acres of former pasturelands that does not currently harbor any species of concern will be displaced with the development of an Administration Base Facility.
- Road System: Former pasturelands that do not currently harbor any species of concern will be displaced which the development of the areas road system.
- Gorse Eradication through Commercial Timber Planting and Harvesting: Approximately 10,000-acres of marginal pasturelands infested with gorse will be displaced. The area has previously been disturbed by ranching and gorse control efforts. The area will be returned to native forest after the gorse eradication is complete.
- Remote Accommodations: 50 to 100-acres total, in 5 to 20-acre units of former pasturelands that does not currently harbor any species of concern will be displaced with the development of remote accommodations.

- **Eco-Tourism Facilities, Services and Activities:** Areas of former pasturelands that do not currently harbor any species of concern will be displaced with the development of eco-tourism facilities and activities.
- **Commercial Facilities and Activities:** Approximately 500-acres of former pasturelands that do not currently harbor any species of concern will be displaced with the development of commercial facilities.
- **Native Forest Restoration and Sustainable Koa Forestry:** Approximately 38,000-acres of forest area – by species the break down is approximately Māmane - 10,000-acres, Sustainable Koa - 10,000- acres, 'Ōhi'a - 11,000-acres and 'Ōhi'a/Koa mix - 7,000-acres, will be planted and reforested.

In higher elevation areas and conservation corridors designated for native forest restoration, replanting efforts will focus on diversification, using combinations of native plants grouped together (for example, pūkiawe, pilo, 'a'ali'i, pāwale, and āweoweo) that will grow outward until they all connect into one diverse native forest. Additionally, natural processes will be utilized to distribute seed (e.g. wind, birds etc.). Māmane will be planted as an overstory tree to complement these high elevation species. Koa and Ōhi'a will be planted at lower elevation conservation sites as necessary.

In other restoration areas Koa and 'ōhi'a establishment will rely primarily on natural regeneration, including bird and wind dispersal, and less on outplanting. Soil scarification and retainment of organic matter on site should result in koa and ōhi'a recruitment. This will be augmented as needed by outplanting in large areas where a koa seed source, for example, is not present. Over time it is expected that an established overstory will allow understory diversification via bird and wind seed dispersal.

All parts of the Legacy Program will occur on former pasture land, thus no current habitat will be affected and thus there will be no significant impact on biological resources. The following sections discuss some of these areas individually.

Commercial Timber Activities

Approximately 10,000-acres of marginal pasture lands infested with gorse will be planted with eucalyptus/Sugi pine or another approved species to eradicate gorse. Much of the area is currently dense with gorse.

Prescribed fire may be used in the commercial planting areas to assist with site preparation prior to planting of overstory trees. Herbicide use will be as minimal as possible to control expected gorse seed re-germination.

Planting gorse shading trees is expected to have minimal impact on the native bird population. While the native bird population may not nest in the selected species, neither do they nest in gorse. No nesting sites will be displaced.

Planting gorse shading trees is expected to have a beneficial impact on the native 'ōpe'ape'a. The 'ōpe'ape'a, or Hawaiian hoary bat (Family: *Vespertilionidae*), is Hawai'i's only native terrestrial mammal.



'Ōpe'ape'a - Photo: USFWS

'Ōpe'ape'a have been found roosting in 'ōhi'a (*Metrosideros polymorpha*), puhala (*Pandanus tectorius*), coconut palms (*Cocos nucifera*), kukui (*Aleurites moluccana*), kiawe (*Proscopis pallida*), avocado (*Persea americana*), shower trees (*Cassia javanica*), pūkiawe (*Styphelia tameiameia*), and fern clumps; they are also known to roost in Eucalyptus (*Eucalyptus* spp.) and Sugi pine (*Cryptomeria japonica*) stands.

Evidence of breeding populations is limited to Kaua'i and the island of Hawai'i. On the island of Hawai'i, bats are found primarily from sea level to 7,500-foot elevation, although they have been observed near the island's summits (above 13,000-feet).

Recent work on the island of Hawai'i found that bat activity varied with season and altitude, and the greatest level of activity occurred at low elevations (below 4,200-feet) from April to December. Because warm temperatures are strongly associated with reproductive success in this and other bat species, it has been suggested that key breeding habitat is likely to occur at sites where the average July minimum temperature is above 52° F. If true, key breeding habitat on the island of Hawai'i will occur below 4,200-foot elevation. Because bats use both native and non-native habitat for foraging and roosting, the importance of non-native timber stands, particularly those at low elevations, should be determined. Breeding sites are known for Mānuka Natural Area Reserve and scattered areas along the Hāmākua Coast.

Planting of Eucalyptus and Sugi pine has been suggested for gorse eradication because the initial development of these crops in the general area have given rise to increased investment in required infrastructure including marketing and market development efforts by a number of public and private entities and field trials have demonstrated their effectiveness. However, other trees may also be considered. Tree species to be planted will be evaluated with minimum scores of L or L(Hawai'i) under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Evaluation Group 1 (low risk) in the Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs.

Comments received during the scoping process suggested limiting harvest of trees to times when endangered species, such as the 'ōpe'ape'a, are not breeding; this essentially limits the harvesting activity to 3-4 months per year. While still protecting the species, the proposal here calls for inspections of areas prior to harvesting and buffers in areas where endangered species are found.

If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to bats and forest birds, the areas and trees scheduled for harvest will first be reviewed by a qualified land manager, biologist, forester, etc prior to timber harvest. The DLNR and the USFWS, will be notified if the 'ōpe'ape'a is found to be in trees planted for commercial timber purposes and scheduled for harvest.

Once the trees reach maturity they will be harvested and new stock replanted. Depending on the species planted and the commercial product produced, the project proposes to begin harvesting the trees after approximately 10-35 years after planting, in continuing cycles for at least 70 years to effectively control the gorse and eliminate the majority of gorse seed bank that is on site. Trees will be felled under standard BMPs of the time. Replanting will occur after each harvest, to continue the gorse eradication process.

Harvesting is expected to be on an industrial scale. For example, with approximately 10,000-acres in commercial timber to fight gorse and a 10-year growing cycle, approximately 1,000-acres will be harvested each year. Harvest hauling operations will be limited to up to 10 trucks per day, from 6 am to 4 pm, weekdays only.

Since the commercial timber may attract native wildlife, including possible endangered birds and bats, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated. The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the commercial timber attracts endangered or threatened species or results in increased numbers or distributions of listed species already present.

Native Forest Restoration and Sustainable Koa Forestry

Approximately 38,000-acres of native forest will be planted and/or retained in native forest or included in sustainable forestry uses. By species the break down is approximately Māmane - 10,000-acres, Sustainable Koa - 10,000-acres, 'Ōhi'a - 11,000-acres and 'Ōhi'a/Koa mix - 7,000-acres.

The 'Āina Mauna Legacy Program proposes that 50% of the landscape be restored and conserved as diversified native forest. With the addition of sustainable koa, 88% of the area will be in native forest species. However, the means of getting to this 88% native forest species is through raising funds that will have significant positive impacts in the long term.

Native Hawaiian tradition and historical accounts portray the lands of Humu'ula, Pi'ihonua, and Ka'ohe as having been dense forests where native practitioners gathered forest resources, birds and food. Our quality of life, cultural, spiritual and economic survival depends on the environment.

Through active management, the Department of Hawaiian Home Lands (DHHL) intends to restore its koa, 'ōhi'a and māmane forests and ecosystems, create jobs in the community, provide Hawai'i's wood products market with a source of high quality hardwood, and endow the DHHL trust fund with a long term revenue stream to support the mission to "manage the Hawaiian Home Lands trust effectively and to develop and deliver lands to native Hawaiians." This, too, will increase forest bird and other forest-related habitat.

Some of the area to be restored is considered critical palila habitat by the USFWS. However, the impacts are expected to be beneficial, with the restoration of the native forest, including māmane, within the mauka boundary of the project. Māmane plantings will provide food resources for the endangered palila, increase suitable palila habitat and improve year-round palila foraging opportunities along an elevational gradient.

Restoration of primarily former pasture land to a diverse native forest will be an ongoing process. Research in Hawai'i has shown that the control of ungulates in native forest areas, in combination with viable and present seed sources, can result in the natural regeneration of native species within a few years. Koa regeneration responds well when grass covered soils are disturbed and grazing animals are removed.

Harvesting of koa is expected to be limited to salvage and selected harvest, not clear-cutting of areas. If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to forest birds, the area and trees scheduled for harvest will first be reviewed by a qualified land manager, biologist, forester, etc prior to timber harvest. It is expected that the koa forests over time will have a naturally occurring diversity of native plant species in the understory. Harvest activities will avoid existing native plant species and retain them for diversity as much as possible.

Implementation of the Legacy Program will be conducted in a manner that complies with applicable law for activities such as site preparation and regeneration, soil erosion control, and use of fuels and chemicals.

Extensive research at Keauhou Ranch by Mueller-Dombois, et al. provides insight as to how reforestation might occur. Mueller-Dombois describes koa as a species ready to take advantages of local disturbances in the forest. Overstory components (living, dying and dead) will be retained to provide forest bird habitat and foraging opportunities for native species and to continue the process of koa seed production on site.

The program may involve the construction and maintenance of fences to remove pigs, cattle and other feral ungulates as necessary. Removing pigs and feral ungulates will allow existing trees to reproduce and maintain root shoots and basal sprouts, thereby increasing foliage and subsequent tree processes. The remaining mature trees will most likely continue their current decline, but at a decelerated rate. Compaction of soil on and around surface roots from cattle will cease, allowing additional root growth and reversing current trends of root dieback.

Reforestation will be conducted through soil scarification and planting of seedlings. It is expected that a viable stand of koa saplings could become established within a few years of the Legacy Program's implementation. Natural regeneration will be monitored.

If forest regeneration is inadequate following overstory removal, planting from local seed sources at appropriate stocking levels may occur to assist forest recovery efforts. Herbicide treatments on invasive species and competing grasses may be used as appropriate to ensure native forest recovery.

Sustainable forest practices can bring economic diversity and employment for DHHL beneficiaries; enhance the environment, while retaining the rural character of the islands. DHHL's forested lands on the island of Hawai'i are well placed to contribute to and support the forest industry with a range of value-added opportunities.

Facility Construction

Construction of proposed facilities will result in a small loss of predominately non-native vegetation/habitat. Protection of native trees in combination with restoration of native vegetation will improve habitat conditions on portions of the site, and overall, there will be little change in habitat due to the proposed activities.

Effects on wildlife include short-term disturbance and avoidance by mobile species on the affected area, and possible mortality to less mobile species that occupy the understory (grasses and shrubs) on the areas actually disturbed. Effects to these species will consist largely of short-term avoidance. Therefore, any direct and indirect effects are of limited extent and insignificant.

Removal of native tree species will be minimized within the construction areas and, where possible, disturbed areas will be restored with native plant species. The total amount of land disturbance will be minimized. Construction contractors will be limited to delineated construction work areas.

Fencing

Fencing at 'Āina Mauna will be kept to a minimum and used only when necessary. It is expected that fences will be retained or built as necessary. Examples include excluding all ungulates from native forest restoration areas (e.g. R1, R2), protecting inhabited sites such as homesteads and remote accommodations, and maintaining special areas such as koa seed orchards or pastures.

All fences will be constructed as needed, using current state-of-the-art methods to accomplish the goals of having a fence while simultaneously protecting native wildlife. For example, the top wire of all fences will use smooth wire to reduce the chance of injury to bats and birds.

Like facility construction, effects to wildlife include short-term disturbance of mobile species and/or possible mortality to less mobile species affected by clearing the fence line. The fence itself can be a hazard to wildlife striking or becoming entangled in it. To ensure that this mitigation measure is effective, the fence line will be monitored for a period of 3 years following construction to identify and document any losses of wildlife, and appropriate, additional mitigation measures will be implemented if necessary.

In summary, although some adverse effects associated with fence construction are possible, fencing out nonnative ungulates is recognized as a key wildlife restoration effort, and this, in combination with the educational component associated with the site, will be expected to provide long-term benefits to wildlife.

Alternative Energy

Photovoltaic Systems - There will be little if any additional disturbance associated with the installation of photovoltaic systems other than what was described under facility construction. Installation of photovoltaic systems (power, battery storage and generator backup) will provide green energy for facilities. While Solar panels/Photovoltaic panels will be located either on rooftops of facilities or on free-standing posts nearby, they will be readily visible. Also, due to their close proximity to other structures, it is unlikely that they will affect wildlife.

Installations of alternative energy sources will comply with all county building codes. Installation of Solar panels/Photovoltaic panels will pose little if any direct impacts to wildlife and effects will be considered discountable. Therefore there are no indirect effects from Solar panels/Photovoltaic panels installation anticipated.

Wind Energy - Low-wind-speed generators will also provide green energy for facilities. Small-scale rooftop low-wind-speed generators will be installed and will be located in areas that maximize wind-power generation. Installation of low-wind-speed generators will comply with all county building codes. Installation of low-wind-speed generators have a low profile on the structures (less than a typical chimney above the roof line) and will pose little, if any, direct impacts to wildlife and effects are considered not significant.

Impacts Associated with Potential Accidents

In addition to the long-term Legacy Program impacts, as discussed above, there will be a potential for impacts that may occur if there were to be an accident associated with the Legacy Program. These potential impacts are discussed below.

Accidental Introduction of Invasive Species/Pests

Hawai'i is in the midst of a growing invasive species crisis affecting the islands' endangered plants and animals, overall environmental and human health, and the viability of its tourism and agriculture based economy ... and, our way of life. Fighting Invasive Species is a critically important priority because it is the single most-effective way to protect Hawai'i's natural resources.

The control of alien species within these lands is critical to maintaining the value of forest resources and needs to be included as part of an overall management plan.

Besides the highly invasive gorse, the 'Āina Mauna lands also have banana poka, fireweed, various non-native invasive grasses and feral ungulates. With increased activity on the property, there is further risk of introduction of other plants, animals, insects, etc.

Movement of vehicles, personnel and equipment to the Legacy Program areas may accidentally introduce invasive, non-indigenous species to the 'Āina Mauna region. Invasive species can displace indigenous species and thereby reduce their populations.

Gorse

Gorse is classified as a noxious weed under Hawai'i Administrative Rules Chapter 68. It forces out competing plants, shades out grasses, is inedible to cattle, can be spread easily and is a fire hazard. The nuisance shrub is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. Gorse infestations have become established in extensive stands on agriculture and conservation lands on the southeastern slope of Mauna Kea and Humu'ula area continues to suffer from heavy infestations of gorse.



Gorse (Koa Tree “Skeletons” Indicate Area was Once Forested) - Photo: Mike Robinson, DHHL

The shrub grows thickly to heights of 6 to 10 feet and produces sharp, three-inch spines covered with a thick waxy cuticle. Gorse has a life span of 30 -40 years. Each plant can produce thousands of seeds annually, which can lie dormant for 70 or more years and remain viable in the soil. Heat can trigger gorse seed germination.

A most promising tool to eradicate gorse is through dense shading. Gorse is shade intolerant. Therefore, reforestation with a dense shade producing tree species can limit seed production and gorse regeneration and possibly induce mortality to gorse. A pine tree planting on Maui has shown promising results in its ability to limit gorse growth and expansion.

Additionally, DHHL field and research trials have shown that heavy shade from trees inhibits the ability for gorse to grow and spread. Heaviest shade under a dense tree canopy such as Sugi pine (*Cryptomeria japonica*) appears to have the ability to kill mature gorse.

Thus, timber planting can serve both as an income generator and as a gorse eradication mechanism. Other viable gorse eradication opportunities can also be considered.

DHHL has begun planting a gorse containment perimeter within the Humu’ula/Pi’ihonua lands with trees to establish a boundary to limit the spread of the weed. However, adjacent lands outside the containment area will also require intensive efforts to control the further spread of gorse.

It is likely that the long-term eradication of gorse will require significant financial resources that may need to be subsidized by other economic uses. This makes timber planting as a gorse eradication mechanism so attractive. It can serve as both a gorse eradicator and income generator.



Aerial Image of Planting of Portion of Gorse Containment Area - Photo: Mike Robinson, DHHL

Feral Animal Eradication and Pig Control and Management

Feral ungulates (hoofed mammals sheep, goats, cattle, etc.) introduced to Hawai'i are detrimental to Hawai'i's native ecosystems via the damage they inflict on both vegetation structure and composition. Feral ungulates impact native plants and ground cover, facilitating sediment run-off and the smothering of coral reefs.

The soil disturbance caused by rooting ungulates also facilitates the introduction and expansion of invasive plants, and creates breeding grounds for mosquitoes that transmit avian disease to native forest birds.

Feral ungulates have high population growth rates, are elusive and can often jump or circumvent existing ungulate fences. Control and/or removal of these animals should be a high priority on all lands designated for protection of native biodiversity in Hawai'i.

There are several areas in Hawai'i where goat, sheep and cattle populations are successfully kept at zero population levels over large areas. In these cases successful control of ungulate populations involved: 1) Establishment of barriers to isolate populations, 2) Removal of sufficient numbers of animals to prevent unacceptable damage to the land and its resources, 3) Inspecting and maintaining barriers, and 4) Vigilance in monitoring animal population increase and ingress.

Four main components in successful feral ungulate population control

- 1) **Ungulate barriers** to isolate populations usually consist of fences, sometimes abutting against barren, inaccessible habitat to form management units. Currently 4-foot high hog wire with no gaps at the ground is used to deal with goats, cattle and domestic sheep. Since sheep are excellent jumpers, 6-foot high hog wire is used (with the realization that some animals will still be able to penetrate the barrier). The size of the units in some instances are as large as 10,000 acres, but must be smaller if managers are not able to reliably remove an acceptable percent of the population each year.
- 2) **Remove sufficient numbers of animals to prevent unacceptable damage to the land and its resources.** This requires taking more than a third of the remaining goat (or sheep) population each year. Before 1970, management staff at Hawai'i Volcanoes National Park were removing 2,000 goats per year without any effect on the remaining goat population. With a goat population numbering about 15,000 and an annual increment capable of reaching 5,000 per year, taking just 2,000 a year from this population was meaningless. As populations are squeezed, the remaining animals become extremely wary. One hypothesis is that it requires an equal cost or energy input to cut a population from 100 down to 50 as it did to cut the 1,000 population down to 500. Careful records of number, sex, age and reproductive status of removed animals form the basis for reviewing control progress and refining strategy through adaptive management.
- 3) **Inspecting and maintaining barriers** such as fencing never ends. Failure to mend fences and to remove the annual increment of animals or those that leaked through will result in the negation of all previous labor, costs and ecosystem recovery gains. Monitoring both barrier fences and animal populations are integral to controlling ungulate populations.
- 4) **Vigilance in monitoring** and removing any animal population increase and ingress, like fencing, never ends if an area is to be kept ungulate free. Monitoring animal populations is integral to controlling ungulate populations. To achieve a sizable area free of ungulates where they were previously numerous is difficult and rarely accomplished, thus, monitoring will not be neglected. A tiny goat population, left undetected, can recover to 90% of its former levels in only four years. Years of ecosystem recovery can be reversed in a few short months of renewed feral ungulate depredation. Most monitoring involves regular helicopter transect inspections, and ground transect analyses to detect 'sign' or browsing. Judas goat searches are very effective in monitoring goat-free areas.

In a non-native wildlife eradication program, capture blocks may be delineated within the project area and each block will be rendered animal free before the next block may be entered if adequate fencing or other means of controlling animal movement are in place or constructed. On-going periodic monitoring of animal free blocks will be required to prevent "restocking" as the project continues.

All animals are expected to be captured regardless of age, sex or condition, with the exception of animals that are sick, diseased or too dangerous to handle safely. These animals will be disposed of on-site in a humane and sanitary manner. Care will be employed to ensure that no captured animals escape from the traps. Escaped animals will learn to avoid traps and may teach others to avoid them, making subsequent captures more difficult.

Present/Contemplated Control Strategies (in sequence) by Species

Goats ('Āina Mauna is currently goat free at this time)

- Fence management unit (4' hogwire with no gaps at ground; can be as much as 10,000-acres.)
- If not remote, public/volunteer shooters may make initial population reduction.
- Specially recruited, trained and supervised volunteers remove initial numbers of animals.
- Release Judas goats.
- Professional shooters kill most remaining population, aided by Judas goats.
- Professional shooters from helicopter mop up remnant individuals along cliffs.
- Fences are routinely mended; Judas goats are left to help professional hunters monitor and shoot any strays or new entries.

Pigs

- Allow for retention, management and taking of appropriate feral pig populations, in areas such as K1 or T2 if other resources are adequately maintained.
- In other areas such as R1 and M1, management units will be fenced (4' hogwire with no gaps at ground; can be as much as 2,000-acres), sometimes including one-way gates and traps.
- If not remote, public/volunteer shooters may make initial population reduction.
- Professional shooters with dogs will take most of remaining population.
- Baiting helps concentrate pigs for shooting and/or snaring.
- Professional technicians may set snares (ratcheted Kelly snare) to mop up pig populations where eradication is necessary.
- Snares are used to take any strays and to monitor for new entries.
- Keep fences mended.

Cattle

- Fence management units.
- Install one-way gates into pasture areas.
- Provide adequate water and feed to keep cattle inside pasture areas.
- Maintain appropriate mature bull cow ratios.
- Keep fences mended.

Sheep

- Fence management unit (6' hogwire; can be as much as 5,000-acres)
- If not remote, public/volunteer shooters may make initial population reduction.
- Professional shooters with dogs will take most remaining population. (Combining professional shooters with dogs, and helicopter search and shooting is effective).
- Experiment with Judas mouflon as aid to monitoring strays or new entries. (Mouflon sheep socialize in small groups and, if lucky, collared animals may help occasionally.)
- Run helicopter King Index surveys to monitor strays and new entries.
- Keep fences mended.

Rats, Mice and Mongooses

Rats and mice can interfere with important nesting areas for native birds or habitats known to harbor rare native plants. They can also carry and spread disease and be a nuisance to humans.

Establishing perimeter boundary fencing is a critical first step in habitat protection and restoration to deter major threats to the ecosystem and their impacts to wildlife population and species recovery. Once perimeter boundary fences are established, the standard management strategy sequence will be to remove feral ungulates, and then concentrate on invasive species control such as rats, mice and mongooses, while simultaneously restoring habitat through native plant out-plantings.

Proper storage, disposal and removal of trash will help to eliminate food sources which rats, mice and mongooses may be drawn to. The USFWS has offered its services in identifying appropriate rodent abatement and control methods to be used. Their experience at Hakalau Forest NWR is an invaluable resource for 'Āina Mauna managers in dealing with these types of threats.

Banana Poka

Banana poka (*Passiflora mollissima*) is an alien vine that infests some forests in and near Humu'ula, especially near Keanakolu. This vine forms a dense canopy that shades the trees and other native vegetation, greatly degrading the forest. Cooperation with other state agencies in controlling this pest may help maintain the value of forest resources.

Herbicide treatments are the most widely used treatments to manage on banana poka. Banana poka may invade areas as feral cattle are withdrawn. Periodic control of banana poka may be required and appropriate control strategies employed. Banana poka can easily invade a formerly grazed area within 5-years and will jeopardize any restoration efforts. Saplings and young trees, while still requiring protection from banana poka to survive, will require less periodic maintenance. Banana poka monitoring and treatments will be required annually.

Ants

Ants can be found virtually everywhere. A total of 44 ant species have been recorded in the Hawaiian Islands. None of these ants are native. They were all accidentally introduced by people. Ants have a devastating impact on the native fauna and flora. The establishment of ants over wide areas could result in the reduction and possible elimination of many native plant pollinators, threatening reproductive success. Certain ant species are also efficient seed predators.

Ant control methods could have equal or more severe deleterious effects on the native fauna in the area. Therefore, the use of a control method that is ant species specific is preferred. Proper storage, disposal and removal of trash is the first defense against ants and other pests. The use of insecticide-laden baits is also ideal in these situations. Baits can be formulated to be attractive to ants, yet unattractive to the majority of native arthropod species. Under specific situations, baits can be offered in bait stations to minimize the impact on the native fauna. This is in contrast to other ant control techniques, such as insecticidal sprays, which are not host specific. Although sprays work well for ant control in some urban situations, they are not practical for naturalized areas because of non-target effects.

The main difficulty with baits is that ant colonies often have a plentiful and varied diet available to them in natural areas, and the ants may not be interested in or attracted to the bait offered. Food preferences will change depending on which foods are naturally available in the environment. Naturally occurring food will change seasonally.

Food preferences of ant colonies will also change due to ant developmental changes in the colony. Increases in the production of eggs and worker ants will increase the protein requirements of the colony. During this time, baits with protein attractants are much preferred by this ant over carbohydrate or oil based baits. Later, the colonies shift to a preference for carbohydrate-based foods in the late fall.

A number of baits are being developed which contain various attractants, but the majority of baits are directed towards the urban ant pests and a few agricultural pest species. In general, insecticide-laden baits are the preferred method for management of pest ants in natural areas. They have the advantages of being easily applied over large, inaccessible areas and being relatively host specific to the target ants.

Different baits have different attractants so that they are attractive to specific ant species. For example, the bait Amdro contains soybean oil as an attractant and is readily fed upon by the bigheaded ant (*Pheidole megacephala*). The granular baits Maxforce and Combat contain insect proteins as an attractant. These baits are attractive to Argentine ants (*Linepithema humile*).

Another opportunity to address ant concerns is through existing outreach and education programs. AntWatch Hawai'i is an educational, long-term effort to monitor the Hawaiian Islands for resident alien ant species and provide an early-warning network for newly introduced species. AntWatch relies on participating schools, teachers and students to collect geographic information on these introduced ant species. This information is transmitted to and analyzed by specialists in research management agencies.

Non-Native Grasses/Weeds

Non-native grasses, including kikuyu grass (*Pennisetum clandestinum*), velvet grass (*Holcus lanatus*), orchard grass (*Dactylis glomerata*), and sweet vernal (*Anthoxanthum odoratum*) are abundant in the 'Āina Mauna region. Fountain grass (*Pennisetum setaceum*), a fire-promoting grass, is one of the most aggressive and potentially damaging introduced plants in Hawai'i. It has already become the dominant ground cover in large areas of Kona and the area between Mauna Kea, Mauna Loa and Hualālai; colonies have also become established on the southern and western slopes of Mauna Kea.

The continuing presence of non-native grasses slows the natural restoration process of the area. Research in the late 1970s at Keauhou, for example, showed that after 3 years of excluding cattle, an average of only 4 seedlings per acre could be found in and among the dense kikuyu grass. This is in contrast to scarified sites at the same location with koa stocking densities averaging 8,000 seedlings per acre at 6 months.

Implementation of an Invasive Species/Pest Management and Control Program will help monitor and control the further spread of non-native grasses and weeds across the property.

Fireweed

While gorse infestation remains a problem, there is a growing concern for fireweed. Although not an issue on reforested lands, roughly 85% of the area, it is a growing problem in areas proposed for ranching. Fireweed is infesting large portions of acreage directly above the Kaniho lease area.

Fireweed (*Senecio madagascariensis*), also known as the Madagascar ragwort is considered very invasive and is on the Hawai'i State Noxious Weed List. The daisy-like herb grows upright and branched, and can get up to 20 inches high. Its yellow flowers each have 13 petals and look like small daisies which mature into white thistle balls.

Native to Madagascar, its introduction history in Hawai'i unknown. It was discovered in the early 1980s in pastures in Kohala on the Big Island, and new populations have been introduced to Kaua'i and O'ahu. Each plant can produce 30,000 seeds per year that spread by wind, hiking boots, vehicles or by animals when moved from infested to non-infested areas.

Chemical suppression is the most common control. There are promising, potential bio-control agents of fireweed however, none have been widely used.

Invasive Species/Pest Management and Control Program

The three roads which currently access the property (Saddle Road, Mauna Kea Access Road and Keanakolu Road) are public roads. Thus, DHHL cannot currently control access of everyone that enters the property.

DHHL can, however, impose conditions on a portion of those accessing the area, including staff, contract workers and visitors to sites under DHHL control. Therefore, the Legacy Program will reduce the probability for invasive species being introduced to the environment by implementing an Invasive Species/Pest Management and Control Program. DHHL will review and use ideas in already prepared plans when developing their plan for 'Āina Mauna. The Program DHHL will include, as conditions on contracts, permits etc, the following:

- Education regarding the status, condition, diversity and protection afforded the natural resources present on the mountain and the harm invasive species/pests can inflict on these natural resource.
- Requirements that everyone who enters 'Āina Mauna Property brush down their clothes and shoes to remove invasive plant seeds and invertebrates. This will be done at the Humu'ula Sheep Station, Administration Base Facility, Offices, or other lower elevation locations prior to boarding vehicles bound for the upper areas of the 'Āina Mauna.
- Regular inspections and washing, at lower elevation facilities such as the Humu'ula Sheep Station, Administration Base Facility, Offices of DHHL vehicles and other items that are regularly transported between the upper and lower elevations of the area.
- Regular monitoring of the habitat along Keanakolu/Mana Road, Mauna Kea Access Road and internal roadways for invasive species, and eradication of such species when found using methods that will not impact indigenous resident species.
- Inspection and monitoring of major shipments of new equipment bound for the upper 'Āina Mauna regions prior to transportation beyond Administration Base Facility.
- Controlling and monitoring established species.
- Reporting any observation of intentional and/or accidental introductions to appropriate DHHL management staff.
- All contractor equipment will arrive at the work site clean and free of invasive species/pests. Prior to leaving the work site, contractor equipment will be re-cleaned to avoid transporting invasive species/pests from 'Āina Mauna.

- Where appropriate, onsite materials will be used. When off-site materials are used, including sand, gravel, cinder, rock and/or mulch, they will be inspected for invasive species/pests.
- Research activities will utilize proper cleaning of equipment and clothing, as well as quarantine methods where necessary to minimize the potential spread or introduction of invasive species/pests.
- Research work on site will be governed by a Memorandum of Agreement between parties which will incorporate protocols for combating the spread of invasive species/pests in research activities.
- Tree species to be planted under the commercial timber to fight gorse must first be evaluated under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs. Transport of products from commercial areas infested with noxious weeds will be conducted in ways which preclude the spread of such noxious weeds.
- Proper disposal and removal of trash to discourage ants and pests.

Thus, the potential impacts due to new invasive non-indigenous species are likely to be less than significant.

Accidental Vehicle Impacts

There are reports of nēnē killed by vehicles on the Mauna Kea Access Road. Nēnē may utilize the lower portions of this road, especially during breeding season, and inattentive drivers may strike these birds. Nēnē are also frequently seen along Keanakolu Road, but are not often seen on the Mauna Kea Access Road. Nor do they occur elsewhere on the island in great abundance, however the taking of endangered species is serious.

While the overall impact of Legacy Program traffic on the Mauna Kea Access Road and Keanakolu Road will be less than significant to the Nēnē population of Hawai'i, to avoid the potential for such an accident, all 'Āina Mauna personnel will be informed of the potential impact to Nēnē during the required cultural/natural resources training and required to take precautions at all times while traveling on this segment of the road.

Additionally, due to possible impacts due to vehicles using Keanakolu Road, if stock ponds and reservoirs within 50-yards of Keanakolu Road are found to be used by nēnē, they will be closed, drained and not used. The existing reservoir near Mauna Kea Access Road will be fenced. This will help to keep nēnē away from road areas where they can be hit by passing vehicles.

Commercial Activities

Commercial tour operators and existing and potential contractors are required to incorporate the 'Āina Mauna cultural, natural resources and safety briefing into their programs. This requirement will be included in the various permit conditions and in all other contracts. The training program will be updated regularly to incorporate changing conditions within the region.

One of the special conditions attached to each permit will state that activities may not be conducted in a manner that modifies the natural behavior of birds being viewed. Activities will cease immediately if the subject shows signs of disturbance and/or stress, and the permittee must vacate the vicinity.

The handling or harassment of birds or their nests is strictly prohibited. Special conditions to protect the habitat will also be incorporated. These include taking precautions to prevent the introduction of alien plants and insects to the area. Vehicles, boots, clothing and equipment must be cleaned and inspected for seeds, eggs and larvae at the staging area, before proceeding further into the 'Āina Mauna property.

Cutting or clearing vegetation is not permitted. Other conditions prohibit fires and require the disposal of all trash off site.

Because each special use permit will contain specific permit conditions for minimizing adverse effects to the areas resources while the commercial activity is being conducted, it is anticipated that wildlife populations will find sufficient food resources and resting places such that their abundance and use of the area will not be measurably lessened from these activities.

The relatively limited number of individuals expected to be adversely affected from these activities will not cause wildlife populations to materially decline, the physiological condition and production of native wildlife species will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall welfare will not be negatively impacted.

In light of the benefits the use is expected to have in expanding public appreciation for and understanding of 'Āina Mauna's unique wildlife, diverse native habitats and management programs, allowing commercial tours and noncommercial conservation and education group visits to occur with stipulations will contribute to the purposes for which the 'Āina Mauna was established.

4.4.4 Mitigation Measures

One method to ensure that all visitors, including contractors and their staff, receive the information they need in order to better protect 'Āina Mauna's cultural and natural resources is to require everyone who visits/enters the area to participate in a mandatory 'Āina Mauna cultural, natural resources and safety briefing. The Briefing will be used to raise awareness and appreciation of the area being experienced.

The Briefing will include information relative to establishment and management of 'Āina Mauna, endangered forest birds and protection and management of endemic plants and animals.

The 'Āina Mauna Cultural, Natural Resources and Safety Briefing will include three important components:

- Cultural Briefing
- Natural Resources Briefing
- Safety Briefing

At a minimum, the briefing will include the following components:

Cultural Briefing

- History of the area
- Concerns regarding sensitivity of cultural resources
- Specific guidelines for culturally appropriate behavior
- Provide guidance and information as to what constitutes respectful and sensitive behavior

Natural Resources Briefing

- Concerns regarding sensitivity of natural resources
- Describe the status, condition and diversity of natural resources present, including biotic and physical elements
- Outline the requirements of the Invasive Species/Pest Management and Control Program
- Outline the potential and existing threats to the natural resources
- Litter and debris control
- Summarize the protection afforded the natural resources on various rules and regulations
- Provide expectations and requirements to avoid habitat damage
 - A prohibition on off-road vehicle use off of roads/trails except under emergency situation such as wildfire or rescue operations
 - Watch for and avoid impact with nēnē along the roads
 - Restrictions on smoking and other potential sources of wildfire

Safety Briefing

- Health and safety issues
- Rules and regulations
- Prohibitions
- Emergency procedures
- Steps to take and consider regarding personal safety and potential hazards
- Activity specific operational and safety procedures (i.e. horses, ATVs, bicycles, etc)

The 'Āina Mauna cultural, natural resources and safety briefing will be required for all who enter the property including visitors, tour operators and their staff, DHHL staff, contractors, researchers and volunteers.

Commercial tour operators and existing and potential future staff and contractors are required to incorporate the 'Āina Mauna cultural, natural resources and safety briefing into their programs. This requirement will be included in the various permit conditions and in all other contracts. The training program will be updated regularly to incorporate changing conditions within the region.

A separate training program for employees and volunteers will also be developed and approved by DHHL, in addition to the 'Āina Mauna cultural, natural resources and safety briefing. The training will address field-personnel training, volunteer training and general staff training. General training requirements include review of applicable laws and regulations, and basic cultural and natural resources training.

Training requirements for all personnel involved in field-based management activities include general safety training, 4-wheel drive vehicle operation, briefing to working at high elevations, emergency response and recognition of culturally significant areas and items and protected flora and fauna. All staff who access the area will receive safety briefing and basic cultural and natural resources training including basic emergency response training annually.

The Legacy Program will comply with existing regulations and requirements, which will mitigate many of the potential impacts, as discussed above.

The Legacy Program's policies to comply with applicable rules and regulations and will include the following actions, further detailed above:

- Implementation of a 'Āina Mauna cultural, natural resources and safety briefing. This program, detailed above, will require that everyone entering the 'Āina Mauna receive an orientation regarding natural and cultural resources and safety.
- Implement an Invasive Species/Pest Management and Control Program. This program will outline steps to be taken to avoid the potential impacts associated with invasive species/pests.
- DHHL may elect to use paving and/or soil-binding stabilizers to control dust along the unpaved portion of the internal road system. Several dust-suppressing soil stabilizers are considered "environmentally friendly." This will only be used if dust presents a problem. Soil stabilizers will not be used indiscriminately. Application of soil stabilizers will only be performed at intervals recommended by the manufacturer and then applied under light wind conditions to prevent drift into adjacent habitat.
- The total amount of land disturbance will be minimized. The construction contractor will be limited to the delineated construction work areas within the Legacy Program area or clearly marked staging areas.
- For the Ōpeʻapeʻa, the USFWS will be consulted if the Ōpeʻapeʻa is found to be in trees planted for commercial timber purposes.

4.4.5 Level of Impact after Mitigation

Legacy Program impact on biological resources will be less than significant with implementation of the 'Āina Mauna cultural, natural resources and safety briefing and Invasive Species/Pest Management and Control Program and other mitigation measures.

Implementation of the additional mitigation measures, including Invasive Species/Pest Management and Control Program and potential future use of soil-binding stabilizers and various management actions to minimize disturbances to birds and bats will further reduce the potential impact of the Legacy Program.

4.4.6 References

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4.5 Visual and Aesthetic Resources

This section describes the existing visual conditions on the Island of Hawai'i and 'Āina Mauna, discusses the visual impacts the Legacy Program may have, and identifies how the Legacy Program mitigates its potential visual impacts.

4.5.1 Environmental Setting

The Island of Hawai'i's landscape and visual resources are varied. On the northern tip, the coast is rugged, covered in dense vegetation and dotted with waterfalls and rivers. Inland, around the town of Waimea, at an elevation of 4,000 feet, the landscape is comprised of rolling pastures used for cattle ranching. The western side of the island consists of popular resorts and beaches, but lacks vegetation. The southern and southeastern portions of the island experience high rainfall and are covered with lush vegetation; Volcanoes National Park is located in this area. The eastern portion of the island consists of steep terrain with dramatic views of the rainforest and cliffs along the coast.

The Hawai'i County General Plan (County of Hawai'i, 2005) includes a chapter on Natural Beauty that recognizes the importance of preserving the island's natural and scenic beauty. The chapter includes goals, policies and standards to identify and protect scenic vistas and view-planes. One goal is to "Protect scenic vistas and view planes from becoming obstructed." The General Plan also provides guidelines for designating sites and vistas of extraordinary natural beauty to be protected, and includes the standard "Distinctive and identifiable landforms distinguished as landmarks, e.g. Mauna Kea, Waipi'o Valley."

The lands of Humu'ula are characterized by their isolation, high elevation, cool temperatures and lack of infrastructure. The vegetation is dominated by an understory of exotic pasture grasses over much of the lands with koa/'ōhi'a forest found in the lower portions of Pi'ihonua, especially in the lands adjacent to the Hakalau Forest National Wildlife Refuge. Scattered koa and māmane are found over the northern portions of Humu'ula with scattered māmane found in the upper elevations, especially adjacent to the Mauna Kea Forest Reserve. The vegetation on the 'Āinahou lands generally consists of scattered scrub vegetation of 'ōhi'a and native shrubs.

Viewsheds throughout 'Āina Mauna are quite varied. In many places views of the distant coastline and Mauna Loa are easily viewed on cloudless days, presenting beautiful vistas, sunrises and sunsets to the observer. On severely foggy days, however, viewsheds can be reduced to less than 30-yards.

4.5.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it substantially affects scenic vistas and view-planes identified in County or State plans or studies. Therefore, the Legacy Program will have a significant impact if it will block or substantially obstruct a vista by placing a structure in the foreground so as to prevent a view of an identified resource from an identified area or create a structure that will be incongruous with existing structures currently in the vista or view-plane.

4.5.3 Potential Environmental Impact

The land area covered by the 'Āina Mauna Legacy Program is a vast 56,000 acres. To put the size in perspective, it is equivalent to an area on O'ahu from Hawai'i Kai to Aloha Stadium (19-miles) and Aloha Tower to the Pali Lookout (6-miles).

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the Legacy Program type and location. This analysis primarily focuses on the potential visual impacts that will occur from locating the proposed facilities within the 'Āina Mauna. Due to the topography of the area, most of the proposed Legacy Program actions will not be visible if sites are properly selected. Therefore, those facilities will not result in an adverse visual impact.

The constructed buildings and infrastructure around the Legacy Program site will be barely visible to the public unless they are utilizing the Mauna Kea Access Road, Keanakolu/Mana Road or they have stopped along the Saddle Road where a small portion of the Legacy Program area may be visible. The buildings and infrastructure for the most part can be obscured by the rough terrain that dominates the area.

These buildings are not likely to present an unsightly view or ruin the larger view-shed. Over time as the vegetation near construction areas grow and mature the buildings will become less noticeable.

Thus, locating the Legacy Program within the 'Āina Mauna will not substantially affect scenic vistas and view-planes identified in the Hawai'i County General Plan. The Legacy Program will not block or substantially obstruct the views and view-planes of the mountain. Therefore, the Legacy Program will not exceed significance criteria 12 as stated in §11-200-12 of the HAR.

Multiple buildings, parking lots, helipads, infrastructure, solar panels and utilities will change the appearance in the foreground from forested pasture and native tropical forest to that of rural development. The desired scenic character for the project area includes two elements: the blending of built structure into the forest surrounding so as not to diminish the natural aesthetic and to use an architecture style fitting into the 'Āina Mauna place, including the nearby rural community.

If the buildings proposed follow the locally accepted and encouraged plantation architectural style and use carefully muted, blending colors, textures and forms, the development will be suitable for the locale and relate visually to the area. Most of this will initially have a very limited viewing audience: a few ranchers and hunters, restoration personnel and the research scientists. In the future, access will remain limited and the majority will be beneficiaries, scientists, researchers, educators and their audiences using the structures.

4.5.4 Mitigation Measures

The effect is long term, local, and major to the immediate foreground. Middle and far ground views have less effect because vegetation and topography can screen carefully selected sites from view.

Re-vegetation with native plants and removal of invasive species on the site will be a beneficial, long-term effect to scenery. All efforts in facility design will minimize impact to existing native trees. Re-vegetation with native plants will occur in areas disturbed by construction activities.

The location and design of the proposed Legacy Program incorporate measures that mitigate the potential visual impacts.

For example, the Humu'ula Sheep Station Adaptive Reuse Plan outlines many guidelines for creating structures which are both visually appealing and blend in with the scenery around them.

The following general design guidelines are recommended based on development outcomes envisioned in the Adaptive Reuse Plan.

Location Guidelines

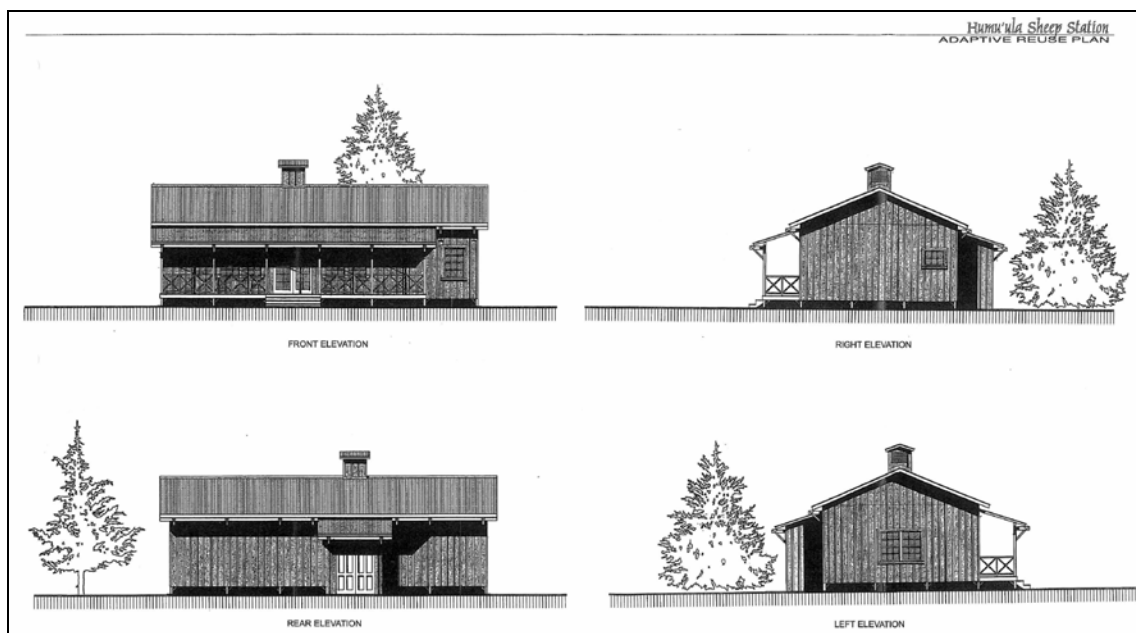
- Retain corrals and open fields on the south and west sides of the site so that the roadway approaches from Saddle Road and Mauna Kea Access Road convey an ambiance of wide open spaces and pastureland.
- Limit long-term parking to lots near the entrance of the site. This will maintain a more natural look in the interior portions. Consider alternatives to black-top for the parking lots and obscuring expansive views of parked cars with berms and landscaping.
- The northern, upslope areas are most appropriate for the cabins, offering views to adjacent open spaces.

Height, Bulk and Density Guidelines

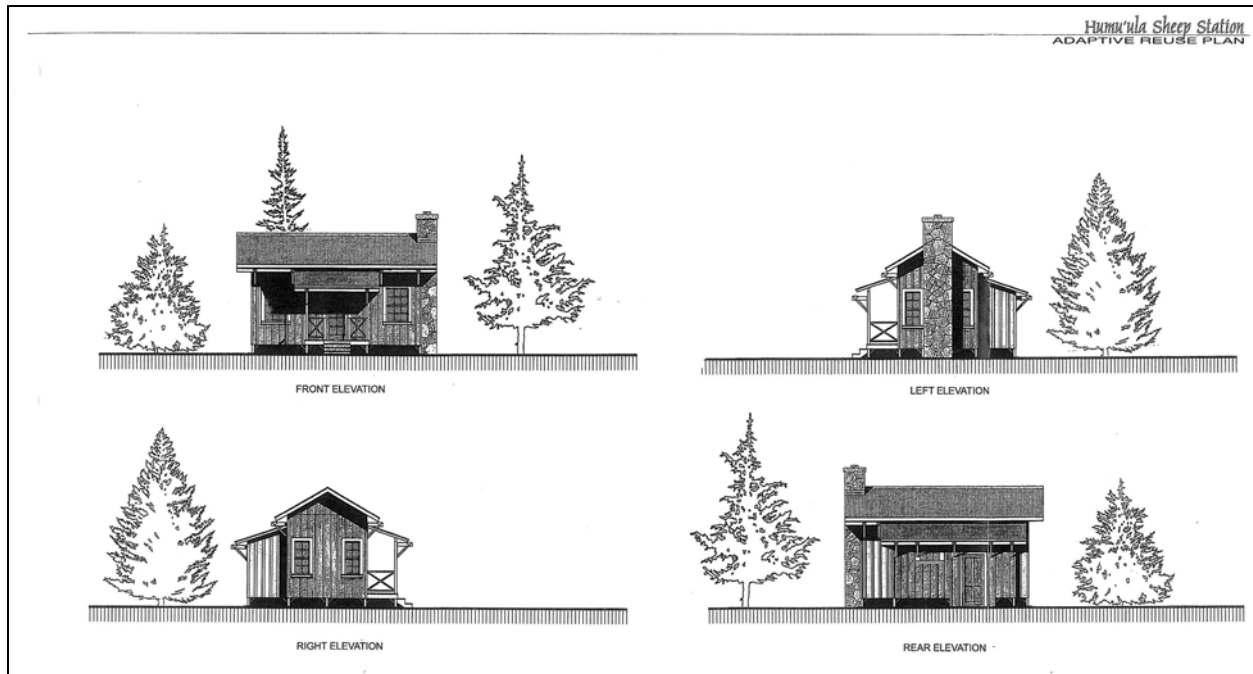
- Buildings should not exceed a maximum height of two stories, not including architectural or mechanical features, such as a chimneys and air shafts.

Architectural Styles and Materials Guidelines

- The buildings shown in the concept design drawings below were inspired by the simple, rustic structures built during the heyday of livestock production that still remain on-site. By incorporating similar design elements in modern buildings, the site as a whole will convey a unified aesthetic that highlights its historical roots.



Concept Design of General Store (Kimura International, 2004)



Concept Design of Typical Cottage/Cabin (Kimura International, 2004)

4.5.5 Level of Impact after Mitigation

The mitigation for the impacts to visual and aesthetic resources is incorporated into the Legacy Program's design. Therefore, the level of the visual impact after mitigation will be less than significant.

4.5.6 References

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4.6 Geology, Soils, and Slope Stability

This section discusses the geology, soils and slope stability in the region and specific Legacy Program areas, the potential impact of the Legacy Program on those characteristics, and mitigation measures the Legacy Program will employ to mitigate those potential impacts.

4.6.1 Environmental Setting

The 'Āina Mauna land parcel is comprised of several ahupua'a. The Pi'ihonua mauka parcel is one subsection (approximately 7,078 acres). The north Humu'ula subsection is the area north of Nauhi Gulch (approximately 5,290 acres), the middle subsection of Humu'ula encompasses the approximate area from Nauhi Gulch to the Wailuku River (approximately 7,513 acres), the south subsection of Humu'ula encompasses the approximate area from the Wailuku River to Saddle Road (approximately 20,377- acres), and 'Āinahou is the subsection of Humu'ula south of Saddle Road (approximately 11,124-acres).

Major Geographic and Geologic Features

Lava flows of 1843, 1855 and 1880 underlie portions of this area. These areas are designated within the Volcanic Hazard Zone 2, defined as areas which generally have had 15 to 25 percent of the area covered with lava since 1800. The balance of the site is categorized in Lava Hazard Zone 7, which reflects areas where only 20 percent of the area was covered with lava over 3,500 years ago.

The land parcel includes the following pu'us within its boundaries: Pu'u Nēnē, Pu'u 'Ō'ō, Pu'u Loa, Pu'u Kahinahina, Pu'u Kaiwi'iwi, and Pu'u Palaoalelo. The pu'u or cinder cones are probably the most characteristic feature of the Legacy Program area. These pu'u add scenic value to the landscape and may offer other resources, such as cinder material or vantage points for antennas. However, these features, as well as gullies, gulches or sink holes, may be refuges for endangered or other native plants. In general, these features are somewhat protected from heavy grazing.

Soils

Aina Mauna contains several soil types. Soil conditions are reflective of the environmental variations with sandy, rocky soils generally found in the upper and drier elevations; the better sandy loams in the mid-elevations, and poorly draining clay loams in the lower and wetter elevations, especially within Pi'ihonua.

Pi'ihonua mauka primarily consists of two soil types: PND and PUC. PND is from the Pi'ihonua soil series. This series consists of well drained silty clay loams formed in layers of volcanic ash. The PND has 6 to 20 percent slopes on elevations ranging from 4,500 to 6,500 feet and receive from 90 to 150 inches of rainfall annually. This soil dehydrates irreversibly into fine gravel size aggregates and is extremely stony in places. Permeability is rapid, runoff is slow and the erosion hazard is slight.

PUC is from the Pu'u 'Ō'ō soil series consisting of well drained silt loams formed from volcanic ash. It ranges from 6 to 12 percent slopes at elevations ranging from 5,000 to 6,500 feet and receives from 65 to 100 inches of rainfall annually.

The subsoil dehydrates irreversibly into fine sand size aggregates. Permeability is moderately rapid, runoff is slow and the erosion hazard is slight. Pu'u 'Ō'ō soils are used for pasture.

The north Humu'ula subsection consists primarily of three soil types: ASD, HDD, and HCD. ASD is from the Apakuie series which consists of well-drained very fine sandy loams formed from volcanic ash, sand and cinders. It has 12 to 20 percent slopes at elevations ranging from 5,000 to 8,000 feet and receives from 20 to 35 inches of rainfall annually. In some years it is covered by snow for a few days. Permeability is rapid, and runoff is slow. The hazard of soil blowing is moderate. This soil is used for pasture and wildlife habitat.

HDD and HCD are from the Hanipoe soil series which consist of well-drained silt loams formed from volcanic ash. They have 12 to 20 percent slopes at elevations ranging from 5,000 to 6,500 feet. They receive from 30 to 50 inches of rainfall annually, runoff is slow and the erosion hazard is slight. In places this soil is very rocky. These soils are used for pasture, woodland, and for wildlife habitat.

The middle Humu'ula subsection consists primarily of five soil types: LAD, LUC, AFD, ASD and HDD. HDD is described above. The AFD and ASD soils are from the Apakuie series which is described above. LAC and LUC are from the Laumai'a soil series which consists of well drained silt loams formed from volcanic ash. These soils are on 6 to 20 percent slopes at an elevation ranging from 5,500 to 8,000 feet. They receive from 35 to 70 inches of rainfall annually, permeability is moderately rapid, runoff is slow to medium and the erosion hazard is slight to moderate. The surface is extremely stony in places, covering 3 to 15 percent of the surface. Laumai'a soils are used for pasture.

The south Humu'ula subsection consists of primarily six soil types: ASD, AFD, LAD, LUC, KZD and rLV. ASD, AFD, LAD and LUC are described above. KZD is from the Kilohana soil series with somewhat excessively drained loamy fine sands formed from volcanic ash, sand and cinders. This soil is on slopes of 12 to 20 percent at elevations ranging from 5,000 to 6,500 feet. They receive from 20 to 40 inches of rain fall annually, permeability is rapid, runoff is slow and the erosion hazard is slight. Kilohana soils are used for pasture, wildlife habitat and recreation areas.

rLV is from the a'ā soil series which is a lava flow. rLV is located at elevations ranging from near sea level to 13,000 feet and receives from 10 to 250 inches of rainfall annually. In areas of high rainfall, it contributes substantially to the underground water supply and is used for watershed. It has practically no soil covering.

The 'Āinahou lands south of the Saddle Road, are comprised almost entirely of pāhoehoe and a'ā lavas, the most recent of which includes portions of the 1935 lava flow. 'Āinahou consists primarily of two soil types, both lava flows: rLV and rLW. rLV is described above. rLW is from the Pāhoehoe soil series. The rLW is located at elevations ranging from sea level to 13,000 feet and receives from 10 to 250 inches of rainfall annually and contributes to the ground water supply. It has no soil covering.

The Humu'ula/Pi'ihonua land parcels also has several scattered areas rCL (Cinder Land) which consists of bedded cinders, pumice, and ash. Cinder land commonly supports some grass, but it is not good pasture land because of its loose consistency and poor trafficability. This land is a source of material for surfacing roads.

4.6.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it affects or is likely to suffer damage by being located in an environmentally sensitive area such as geologically hazardous land. Therefore, a significant impact will occur if the Legacy Program affected or suffered damage by being located in an environmentally sensitive area.

4.6.3 Potential Environmental Impacts

The Legacy Programs are located in former pasture lands and none of the areas slated for development are in geologically exceptional areas nor do they contain any geologically unique features. Some of the development may require digging activities which may remove surface geologic structures present, such as lava flow morphology and glacial features. However, such geologic features are not unique to the 'Āina Mauna area.

Roads may be built on steep terrain; however, any road construction activities will be in compliance with applicable standards and will mitigate slope stability concerns.

Impact on soils in the Legacy Program area will be short term in nature. Soil structure, especially in the organic and A horizons, will be temporarily disrupted during logging and the scarification process as the new stand is established. As the forest reestablishes itself, soils will stabilize and improve over time. Management objectives for the long term productivity and sustainability of Humu'ula's potential forest resources require the protection of the soil onsite. Applicable law will be followed to minimize soil movement, erosion and compaction during salvaging operations, road improvement and maintenance, and site preparation.

Soils are expected to improve and erosion will decrease within the koa and gorse management projects as the area becomes reforested.

Managed pig populations will alter surface soils on occasion, thus populations must be maintained at levels where said alternation are acceptable and do not exceed approximately 2,000-contiguous square feet (1/50-acre) at any one time.

4.6.4 Mitigation Measures

Applicable law will be followed to minimize soil movement, erosion and compaction during all 'Āina Mauna actions.

Implementation actions will include Best Management Practices (BMPs) to ensure that the alterations to the terrain minimize erosion, water quality degradation and other environmental impacts. Required practices will include avoiding disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing dips, water bars, and cross drainage on roads and skid trails to minimize erosion will be followed.

Both short-term construction and long-term maintenance BMPs will be included in any permit conditions. Roadside swales, as required, will direct storm water flow within the road right of way to natural drainage ways.

The existing natural drainage ways will continue to convey storm water and drainage from the non-road areas. Roadway fords will be designed for roadway crossing of existing drainage ways.

Soils are expected to improve with 'Āina Mauna Legacy Program's implementation and erosion will decrease with the native forest restoration, sustainable koa and gorse removal projects as the area becomes reforested. Site preparation will be conducted in such a manner as to minimize the amount of exposed soil at any one time.

4.6.5 Level of Impact after Mitigation

The mitigation measures proposed will further reduce the level of impact to geologic resources, which is considered less than significant without any mitigation.

4.6.6 References

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.

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4.7 Water Resources and Wastewater

This section discusses the water resources and wastewater management practices in the region and in the Legacy Program area and the potential impacts of the Legacy Program on those resources, and mitigation measures the Legacy Program will employ to mitigate those potential impacts.

4.7.1 Environmental Setting

Resource experts over the last century have recognized the importance of the forested watershed in promoting infiltration and groundwater recharge, with the overstory and understory both performing important watershed functions.

More recently, scientists have proven that fog drip represents a significant amount of precipitation captured, most notably in the fog belt on the windward sides of tropical montane cloud forests. The structurally-complex Hawaiian forest plays a vital role in intercepting cloud water.

- Water Source Opportunities
 - Investigate reported springs and restoration to supplement water needs
 - Rainwater Capture/Collection
 - Catchment (water tanks) for small scale-residential, pasture
 - Reservoirs for larger scale collection
 - Fog drip to supplement rainwater catchment
 - Investigate groundwater wells (deep well) for potable system
 - Initial exploratory well and development of potable water system

The following is a summary of a portion of the Hawaiian Homes Commission Act relating to water resources.

§ 221. Water.

(c) In order to adequately supply livestock, the aquaculture operations, the agriculture operations, or the domestic needs of individuals upon any tract, the department is authorized (1) to use, free of all charge, government-owned water not covered by any water license or covered by a water license issued after the passage of this Act or covered by a water license issued previous to the passage of this Act but containing a reservation of such water for the benefit of the public, and (2) to contract with any person for the right to use or to acquire, under eminent domain proceedings similar, as near as may be, to the proceedings provided in respect to land by sections 101-10 to 101-34, Hawai'i Revised Statutes, the right to use any privately owned surplus water or any government-owned surplus water covered by a water license issued previous to the passage of this Act, but not containing a reservation of such water for the benefit of the public. Any such requirement shall be held to be for a public use and purpose. The department may institute the eminent domain proceedings in its own name.

‘Āina Mauna Region

The land parcel is within the Big Island's hydrographic area that is most abundant in water supply (Area II that includes the North and South Hilo districts and portions of the Ka'ū and Puna districts), in that groundwater sources have been located on Hawai'i at the 5,000 foot level (the Waiki'i Ranch area).

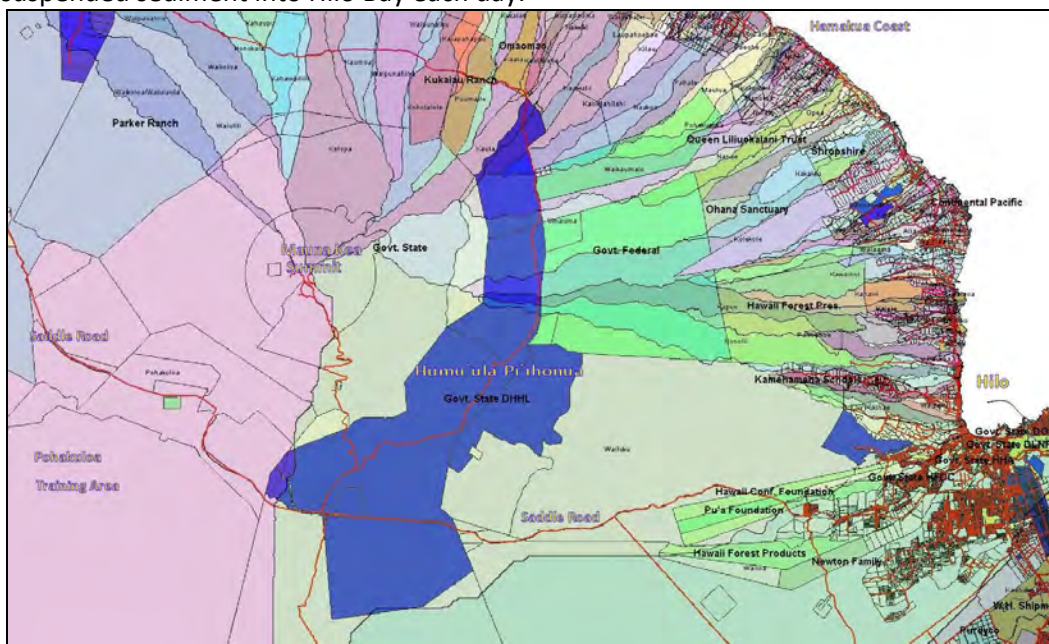
It is suggested that water source potential be investigated in the portion of the land parcel at the elevation of approximately 4,700 feet. Since the area has been characterized as having poor drainage, there is a possibility that a perched groundwater source could be located and developed economically.

Watersheds

The Wailuku River watershed is located on Hawai'i Island and drains both the tallest and the most massive mountains in the world, Mauna Kea and Mauna Loa, respectively. The Hawaiian meaning of the name is "water [of] destruction." The area of the watershed is 252.2 square mi, with maximum elevation of 13,779 ft (4,200 m). The percent of the watershed in the different land use districts is as follows: 22.4% agricultural, 76.9% conservation, 0% rural and 0.7% urban.

The Wailuku River is an important landmark to geologists, because it marks the approximate boundary between the lava flows of Mauna Kea and Mauna Loa. The Wailuku River is the second longest perennial river in the state of Hawai'i (total stream length is 196.1 mi) and the largest source of surface water to Hilo Bay.

An average of 1-million cubic meters (275-million gallons) of water flows through the Wailuku to Hilo daily, generating some of the electrical power used on the Big Island. During intense storms, the discharge can be more than 20-times greater. On average, the Wailuku transports approximately 10-tons of suspended sediment into Hilo Bay each day.



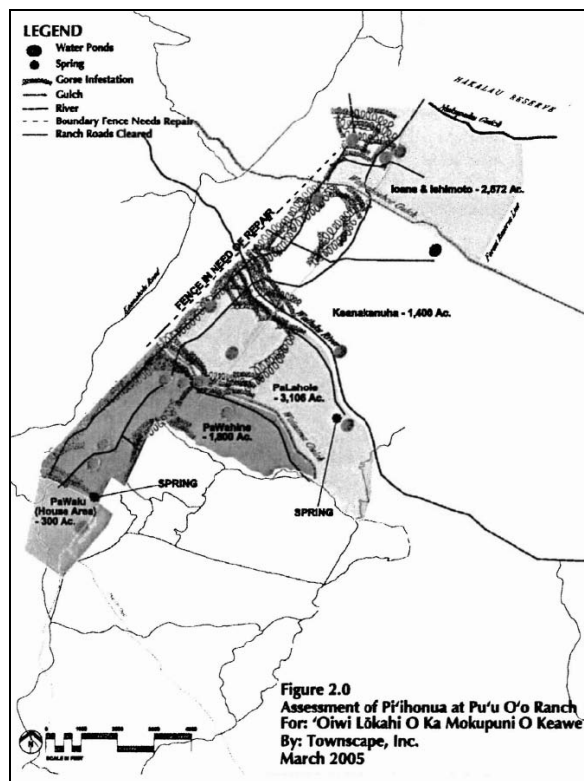
Map Noting Watersheds

Water Sources

Water will be a vital part of the 'Āina Mauna Legacy Program. Water is the foundation for any restoration, homesteading, pasture or commercial activity. There are numerous water sources which will need to be investigated in order to supply water to the 'Āina Mauna region. As previously stated, there are no known wells in the vicinity of the property.

Springs/Springs Restoration

Water resources may come from springs located on the property. Historic records indicate that springs are located on the property in the vicinity of the Pu'u 'Ō'ō Ranch section of the site. Follow-up work needs to be done to verify the condition of the springs and reported condition noted below are based on a review conducted 10-years ago and reported in the document, "Assessment of Pi'ihonua – Brief Assessment for Beneficiary Ranching Leases at Pu'u 'Ō'ō Ranch".



Map Identifying Water Ponds, Springs, Gulches and Rivers (Townscape Inc, 2005)

The first spring is located near the ranch camp. This spring, can supply water to the camp, the coral, and surrounding paddocks. The spring is in need of repair and no longer is able to provide water; the spring tunnel has caved in and will need to be cleaned up and dirt material removed. The holding tanks are leaking badly; they will need to be repaired or replaced to provide water to the camp for use. The waterline, a 1" black rubber-hose-like pipe called a driscoll, transfers water and is disconnected in a few places. The piping is repairable.

The second spring is located midway through the ranch, next to the Waiama Gulch. This spring used to be the main water source for the ranch. The water was piped to different areas for cattle to drink. Records show that even in times of drought, this water source was still providing water. The waterbox area is filled with dirt and rocks; it will take some bulldozer work to fill in the deep ruts and erosion caused by cattle trying to get into the water box area. The large water pond that this spring used to service has dried up and the bottom has grass and cracks in it; this pond needs to be restored to enable use of this paddock.

A third spring is reported to also be on the site.

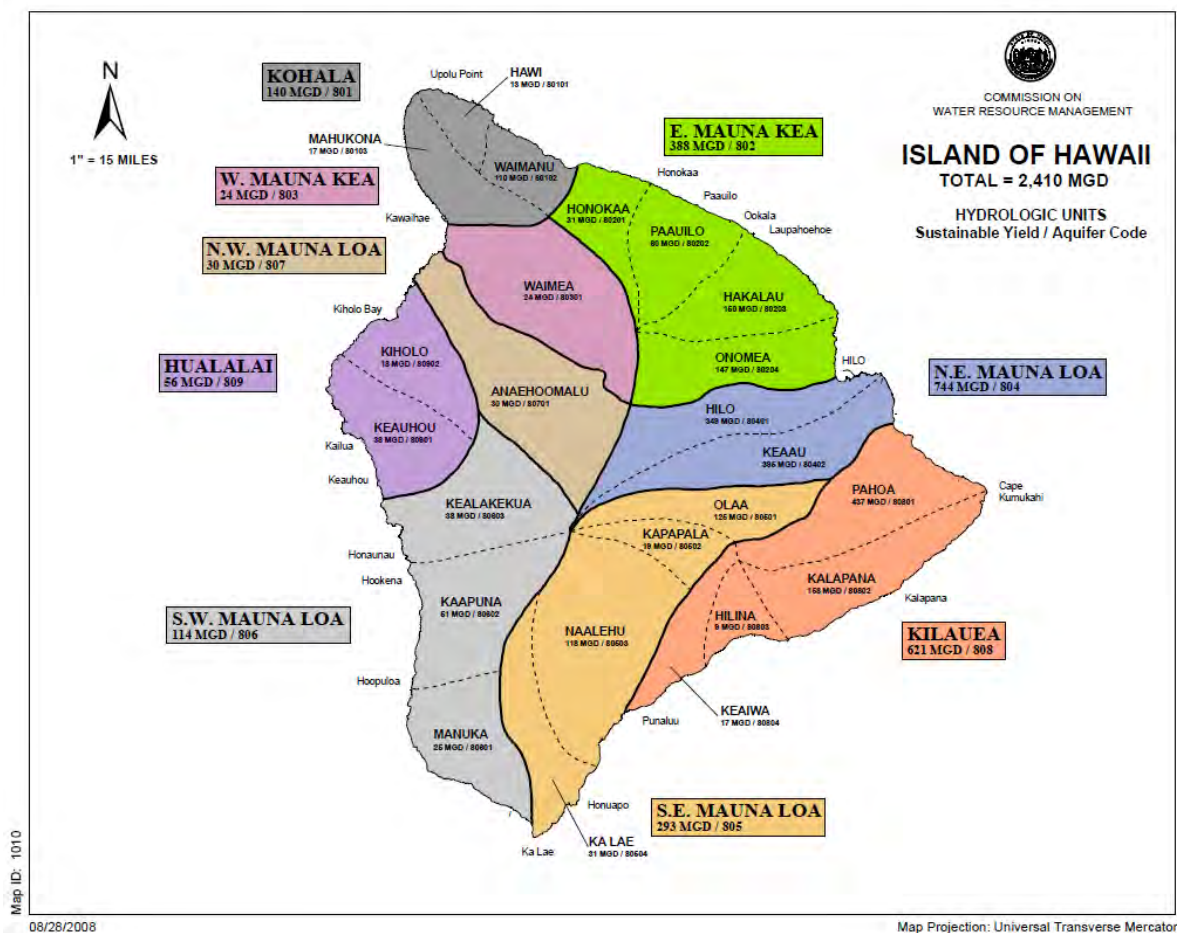
East Mauna Kea Aquifer Sector Area (Information from Hawai'i County Water Use and Development Plan)

The East Mauna Kea Aquifer Sector Area (ASEA) includes the Honokaa, Pa'auilo, Hakalau and the Onomea Aquifer System Areas (ASYA), and spans three districts, capturing most of the northern section of the Hāmākua district, and the northern sections of the North Hilo and South Hilo districts.

Aquifer Sector	Aquifer System	Sustainable Yield (2008) MGD
E. Mauna Kea	Pa'auilo	60
E. Mauna Kea	Hakalau	150
E. Mauna Kea	Onomea	147
NE. Mauna Loa	Hilo	349

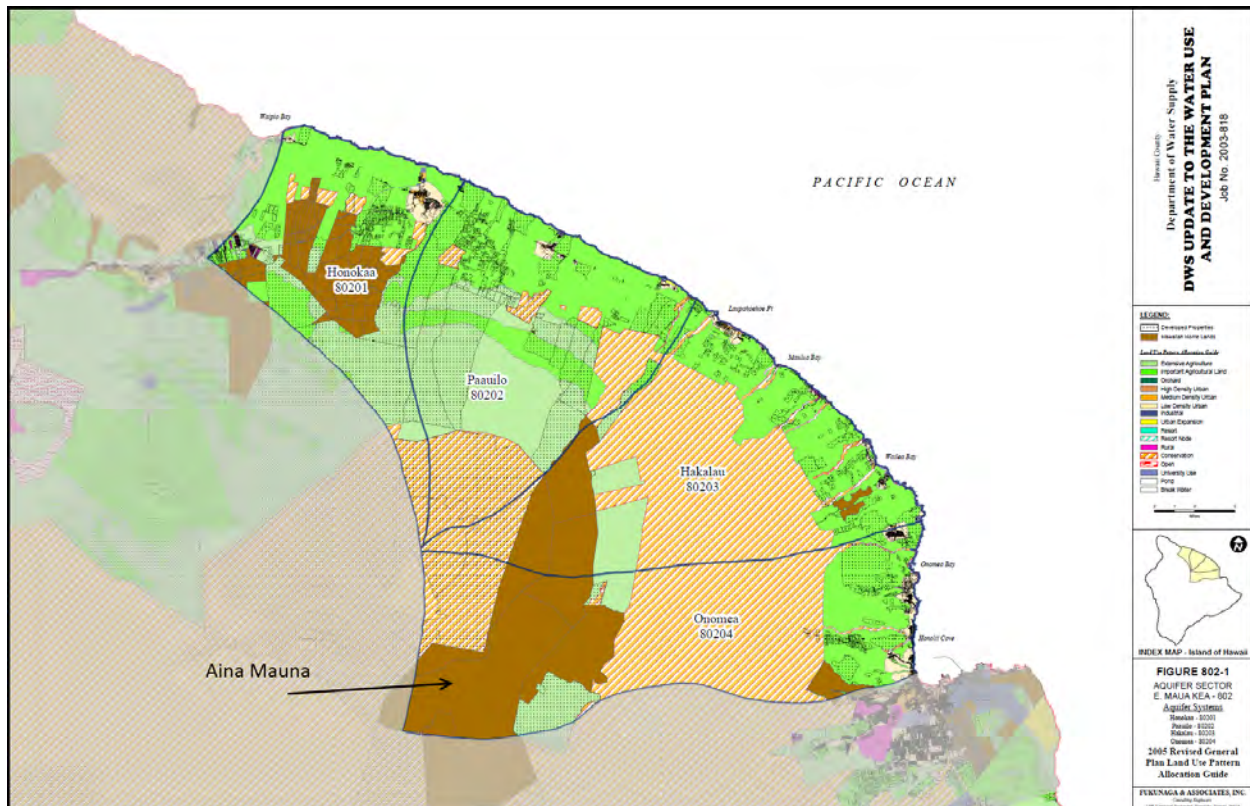
The sector includes the northern and eastern slopes of Mauna Kea and most of the northeastern coast of the island from Waipi'o Bay to Hilo Bay.

Rainfall is extremely variable throughout the sector area. Rainfall in the coastal areas average less than 100 inches and up to 150 inches per year, which increases to 300 inches per year in a lateral band in the 2,000 to 4,000 foot elevation range 5 miles inland of Hilo. The summits of Mauna Kea experience less than 20 inches per year.



Groundwater - East Mauna Kea ASEA has a sustainable yield of 388 mgd. According to the CWRM database, there are 26 production wells in the sector, including 9 municipal, 5 domestic, 4 irrigation, 7 industrial, and 1 other. There are also 33 wells drilled and categorized as “unused.”

The Hakalau ASYA has the highest sustainable yield of the four system areas at 150 mgd, followed by the Onomea ASYA at 147 mgd, the Pa‘auilo ASYA at 60 mgd and the Honokaa ASYA at 31 mgd.



Surface Water - Most of the surface water used for non-potable requirements originates in the Kohala ASEA and is transferred through the Upper and Lower Hāmākua Ditch Systems. Surface water can and should be used for localized non-potable uses. The number of stream diversions registered with the CWRM indicates that this is already taking place.

According to the Water Use and Development Plan, surface water should continue to be the primary source of non-potable water.

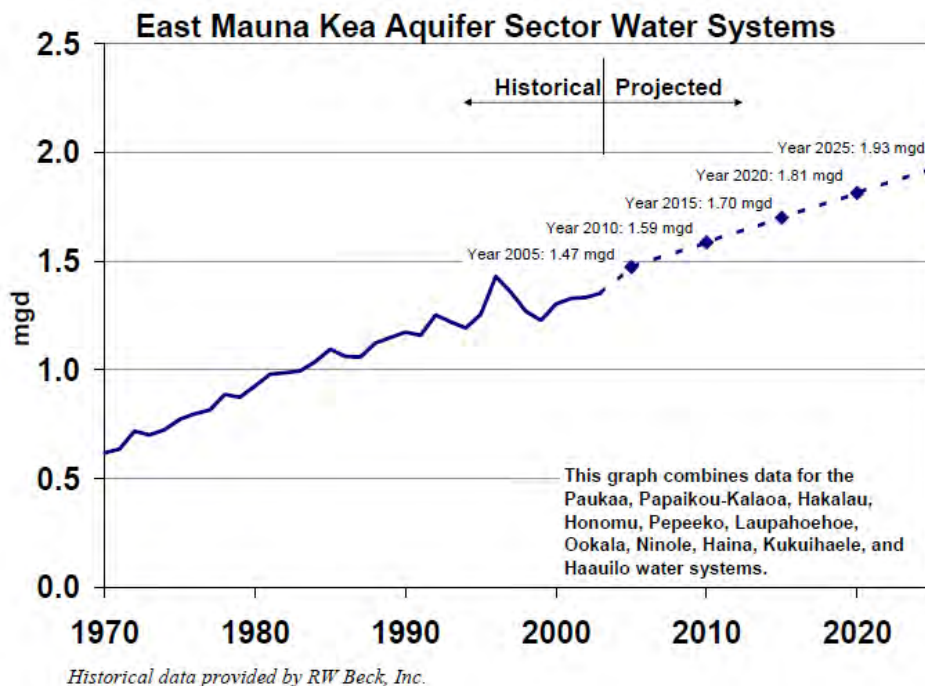
The Agricultural Water Plan recommended significant improvements to the Lower Hāmākua Ditch system that will properly service future diversified agricultural activities. These recommendations may change in light of the damage sustained by the ditch systems during the recent earthquake.

Water Transfer

Transfer of non-potable source water into the East Mauna Kea ASEA from Kohala is already taking place. This is not viewed as a problem considering the abundance of surface water in Kohala.

Currently, an undetermined quantity of potable water is being transferred into the DWS Haina System from the DWS Waimea Water System, the sources of which are streams and one high-level groundwater well in the ASEA 801.

Transfer of potable water into the East Mauna Kea ASEA may continue due to the abundance of potable sources in both sector areas.



DWS Water Demand Projection - East Mauna Kea Aquifer Sector Area - DWS

Given the sustainable yield of 388 MGD, opportunity for surface water for agricultural and other uses, and the limited water demand projected, a groundwater well will not impact groundwater resource supply in the region.

Potable Water Supply

Catchment systems supply some water to the area and water is also hauled from outside supply sources. There are a few water tanks on the land parcel, two water reservoirs, and 12 to 16 dirt water ponds. The two major water users in the area, Pōhakuloa Military Training Area and Mauna Kea Science Reserve, depend on County water hauled from Hilo in 5,000-gallon tankers.

The Science Reserve has two 40,000-gallon storage tanks. 25,000-gallons of water per week are trucked to the Mid-Level Facility and an additional 15,000-gallons per week are trucked to the summit.

The Army pays over \$100 per 1,000 gallons for delivery of water to the facility. Water is stored in a 1.5-million gallon tank, re-chlorinated then delivered into the local area water system. (Rechlorination is needed due to higher water standards maintained by the Department of Defense. Under State health regulations, County water is usable “as delivered” if it contains “residual” chlorination.)

Water Catchment

Hawai'i County went through a process where it adopted a rule and a standard to allow the construction of an ohana unit with water catchment and adopted a rule that set 80-inches annual rainfall as the standard before you are allowed to build your second house in a water catchment area. They determined that in order to meet the water needs capacity of a family you needed 80-inches of annual rain fall.

Since then, the Planning Director has been a bit more lenient than the ohana standard of 80-inches and has approved variances in areas with 60-inches of rainfall. The Planning Director has consistently denied variances for catchment water systems for construction of new ohana dwellings where the mean annual rainfall is below 60-inches.

While a rule applies for water systems for ohana dwelling permits, the matter is subject to variance for subdivision approvals. To get an indication of prior approval, using the ohana rule, variance history and discussions during appeals for catchment water variances for home water systems, the former Planning Director noted the administration been using as a minimum standard of 60-inches mean annual rainfall for allowing variances from a County decidable water system for initial dwellings.

Domestic water to each homestead parcel will be supplied through individual water tanks, wells and catchment basins. A variance may be required from the County as part of the subdivision application. All of the proposed homestead sites fall within an area meeting this rainfall criteria (annual rainfall exceeds 60 inches).

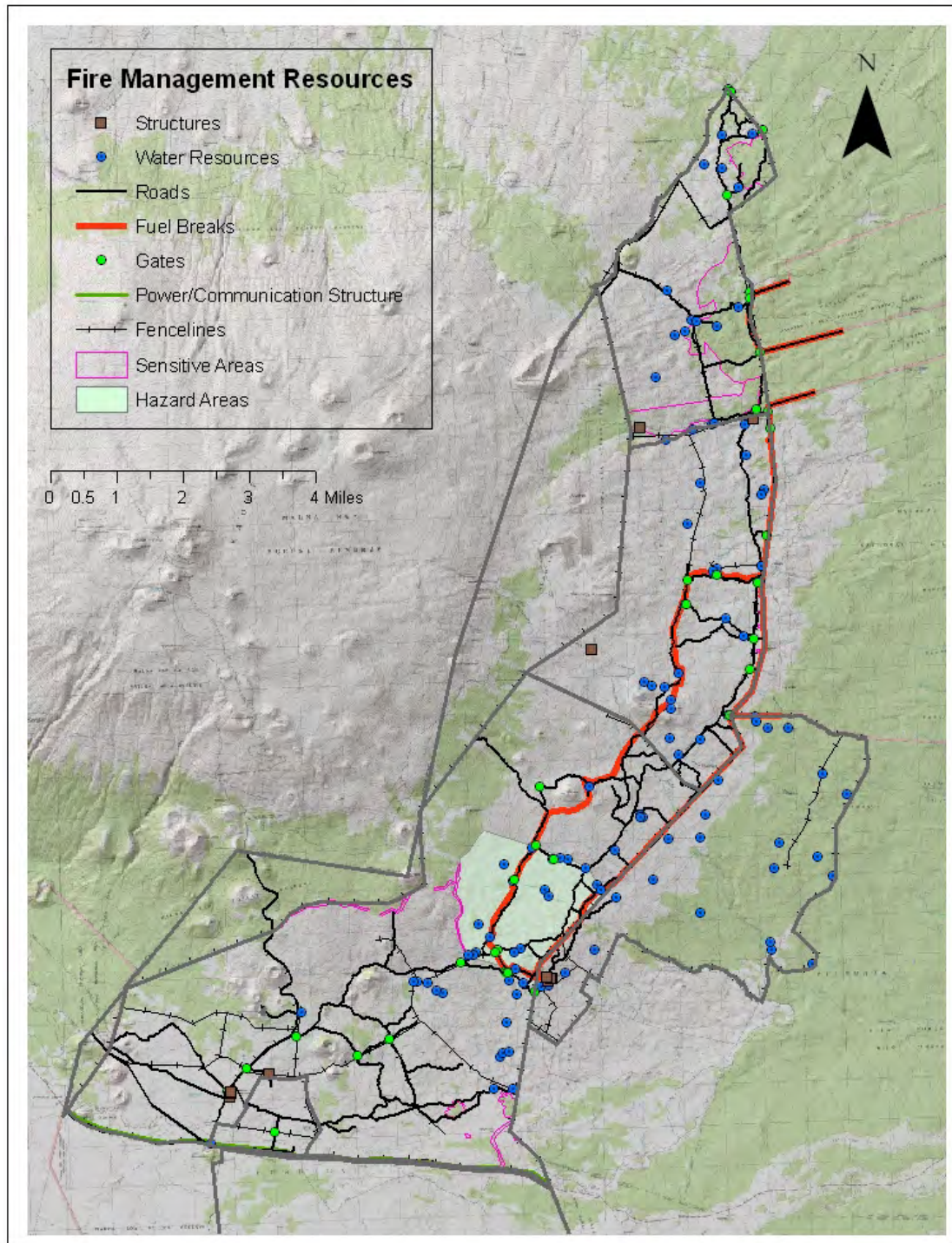
Fog Drip Fences

Fog drip fences have the advantages of being passive, requiring no artificial energy input for operation. They are simple to design and can be constructed quickly and easily with little skill. The system is modular, easy to maintain, and can be expanded as demand increases or money allows. Investment costs are low, much less than conventional sources in the areas where this technology can be applied. The water quality usually is good, though some treatment may be necessary for human consumption.

Mesh fog collectors are limited by the local conditions of climate and topography. The yield is affected by season and weather, included macro-systems such as El Nino and La Nina. Unless the collectors are close to the consumers, the system requires uneconomical pipelines that also present hydraulic problems. The site must be easily accessible and have clear ownership. Site security also may be an issue. Management of the water distribution must be fair, efficient and self-sufficient.

Reservoirs and Stock Ponds

To date, there are several water reservoirs on site and 12 to 16 dirt water ponds. These reservoirs and ponds serve several important water storage needs. They provide water to ranching in the area. This will become more important as pasture lands are developed along the roadways. Fire continues to be a concern for the entire area. Water storage is needed for the area in case of fire. Although water can be hauled for this purpose, the length of time need to get the water to the area may be too long. Additionally if fire breaks out in an isolated area, aerial water dumping may be needed and helicopters will need reservoirs in order to access water.



Map Identifying Fire Management Resources (Stock Ponds and Reservoirs) of 'Āina Mauna - DHHL

The ability to partner with others in the area is a great asset. The 'Āina Mauna program should continue discussions with nearby landowners especially the Pōhakuloa Training Area on on-going water and water storage needs and issues.

Deep Wells

No deep wells are known to be within the general area of the 'Āina Mauna property. It is reported that several years ago the Army attempted deep-well drilling, but halted after determining that drilling depths of 4,500-feet were required.

Following this episode, the Army together with the State built a water pipeline that ran from a natural surface lake on the flanks of Mauna Kea down to the Pōhakuloa area. The pipeline served the training area and Pōhakuloa State Park until it failed to meet new health regulations for surface drinking water, leading to closure of the park. The Army then turned to a sand filtration system, but this also failed to meet State health regulations and the Army was forced to begin hauling water.

Water from the pipeline continues to be used for dip tanks in firefighting. Meanwhile, the pipeline maintenance agreement between the State and Army has entered into hard times since the State stopped its pipeline use.

In the 1986 Water Resources Development Plan for DHHL lands, no plan for water development was established at Humu'ula because the area was considered too remote and water systems too costly to develop. Rainwater catchment systems were considered effective for residential use in the area.

A study conducted by the Army Corps of Engineers in 1996 for the Pōhakuloa Training Area analyzed various sources for domestic water, including drilling deep wells to intercept perched water source. Should army proceed with the well drilling at PTA (7,000-foot elevation), the results of this project will provide valuable information as to the likelihood of encountering perched water at the DHHL lands and the costs involved for well development.

Presently, the Army is negotiating the drilling of a well for the Pōhakuloa Training Area. Preliminary discussions with the consultant working with the Army (Don Thomas from the University of Hawai'i) notes that a similar exploratory well at DHHL property could be in the neighborhood of \$3-million (finishing the well with other infrastructure could add approximately \$2-million). The situation on well development will be monitored through ongoing discussions with the Army, Don Thomas and others.

A proposal in the 'Āina Mauna Legacy Program, and an action included in this Environmental Assessment is for DHHL to drill, test, and, if successful, convert the well to a production well, with storage, on-site drainage system and distribution. Water from the well will be used for potable water needs, as well as supplement reforestation and other needs. In order to minimize the potential for sedimentation and erosion, the contractor shall perform all earthwork and grading in conformance with applicable codes and law.

Drainage

The entire parcel is naturally drained. There are five major gulches/streams within the land parcel, the Nauhi, Waia'ama, Waipāhoehoe, Honohina and Nukupahu. The gulches run mauka-makai. The Wailuku River runs through Humu'ula and there are several stream beds throughout the parcel including the 'Āwehi, Hakalau, and Kapue. There is no known flood hazard in the area. Over \$1 million has been spent "hardening" major stream crossings on Keanakolu Road to improve access to the Hakalau Forest NWR via concrete and blacktop approaches.

Wastewater

The Legacy Program will conform to all applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." Thus, no cumulative negative effects on water quality will occur. Any wastewater generated on the site will require composting toilets and/or septic tank/leaching fields for treatment. In view of the large area covered by the project and the relative low density of the proposed development, wastewater treatment and disposal is not considered a major constraint on the land parcel.

4.7.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact to water resources and wastewater if it involves a substantial degradation of environmental quality and/or detrimentally affects water quality. Therefore, a significant water quality impact will occur if the Legacy Program affected water resources so that their quality was degraded to the point that they were no longer fit for their designed use and/or the chemical composition exceeded applicable regulatory water quality standards.

4.7.3 Potential Environmental Impact

The Legacy Program will result in new impervious surfaces, additional consumption of fresh (potable) water, and additional wastewater discharges. The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the Legacy Program type and location.

Forestry

Forestry projects (koa, timber to shade gorse, native forest restoration) should have little or no significant impact on water quality. The major sources of water quality degradation from forest management activities are sediment, nutrients, herbicides and debris.

To minimize nonpoint source pollution from sediments, the required practices include avoiding disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing dips, water bars, and cross drainage on roads and skid trails to minimize erosion.

To minimize water quality degradation from nutrients and herbicides, practices include efficient and safe application of chemicals according to manufacturer's label. For example, site preparation herbicides will not be applied in rainy conditions to avoid or minimize herbicide runoff. It is anticipated that reforestation will improve water percolation into the soil via root penetration and by catching fog drip. Soil erosion will decrease over time.

Site preparation may involve the use of herbicide. It is anticipated that planting a dense shade producing tree species will reduce future herbicide use in order to control the gorse. Applicable law will be followed regarding the selection, use and storage of chemicals for forest management activities. When necessary, DHHL will report violations to the Occupational Safety and Health Administration (OSHA) regarding the improper use of chemicals in the Legacy Program area.

Impervious Surfaces

Paved areas and buildings are impervious surfaces that prevent rainwater from naturally percolating into the subsurface and recharging the underlying groundwater aquifer. They may also increase the volume of storm water runoff. The Legacy Program may create new impervious surfaces with the creation of new buildings across the site.

In compliance with existing regulations and requirements, all facilities will be designed to maximize groundwater recharge to the extent possible. Site grading and landscaping will be designed to direct storm water to pervious areas so that it may percolate into the ground. Storm drain drywells may also be utilized. New drywells will be designed by a professional engineer, permitted per HDOH requirements and maintained properly. Therefore, the potential impact associated with impervious surfaces will be less than significant.

Water for Pastoral/Farming Needs

Water for pastoral and farming needs will be supplied through use of on-site catchment systems, which will include existing or new ranch ponds on the property and dispersed water storage with water distribution to troughs or farms.

Stock ponds and reservoirs have been known to be nēnē attractants. Due to possible impacts due to vehicles on the road, stock ponds and reservoirs within 50-yards of Keanakolu Road that are used by nēnē will be closed and not used. Additionally, the existing reservoir near Mauna Kea Access Road will be fenced. This will help to keep nēnē away from road areas where they can be hit by passing vehicles.

The 'Āina Mauna has been used for ranching for over 150 years, thus, stock ponds and reservoirs currently on site have been used for generations. The program seeks to reduce ranching operations across the property and, where ranching is allowed, it will be managed. To the extent possible, existing stock ponds and reservoirs will be used for pasture and irrigation for reforestation.

Domestic Homestead Water

Domestic water to each homestead parcel will be supplied through individual water tanks, wells and catchment basins. The County has indicated that catchment basins are practical where the annual rainfall exceeds 60 inches. All of the proposed homestead sites fall within an area meeting this rainfall criteria. Supplemental sources of water could come from regular water truck deliveries. A variance may be required from the County as part of the subdivision application. The variance would request relief from the requirements for a water system meeting the requirements of the Department of Water Supply.

Potable Water

Freshwater is a limited resource on Hawai'i Island. The sustainable use of freshwater from all island aquifers has been estimated by DLNR-CWRM at 2,410 million gallons a day. Currently the approximate daily groundwater pumpage is about 32-million gallons. The Legacy Program will vary slightly increase the amount of freshwater currently used island-wide.

Assuming a new well is tapped and water is able to be pumped to the various sites, there will be a slight increase the amount of freshwater currently used island-wide due to water use by homesteads, commercial activities, employees and visitors at these various sites.

Also, in compliance with the existing requirements, water efficient fixtures will be installed and water efficient practices implemented to reduce the demand on freshwater resources. Therefore, this impact will be less than significant.

Catchment verses Groundwater

Due to lower cost and flexibility of use, catchment will be the initial primary water source for the various 'Āina Mauna projects. Catchment also allows homesteaders to collect, store and use water for their needs by incorporating a catchment system with their home. Groundwater will also be implemented dependent upon funding and success of exploratory well.

Domestic Wastewater and Spillage

Each parcel will manage domestic waste through either or a combination of individual septic systems and/or composting toilets. No adverse impact is expected because systems will be designed and permitted per applicable rules and regulations administered by the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."

4.7.4 Mitigation Measures

Through compliance with existing regulations and requirements, Legacy Program impacts will be less than significant and no additional mitigation is required.

The Legacy Program's design features and policies to comply with applicable rules and regulations will include:

- The installation of water efficient fixtures and the implementation of a water saving practices to reduce the demand for freshwater resources.
- Conformance to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."
- Stock ponds and reservoirs within 50-yards of Keanakolu Road that are used by nēnē will be closed and not used and the existing reservoir near Mauna Kea Access Road will be fenced, to keep nēnē away from road areas.
- To the extent possible, existing stock ponds and reservoirs will be used for pasture and irrigation for reforestation to mitigate attracting nēnē to the property.

4.7.5 Level of Impact after Mitigation

Mandatory compliance with existing regulations and requirements will ensure that the Legacy Program will not result in a significant impact on water resources or water quality.

4.7.6 References

- Geometrician Associates LLC. 2010. Final Environmental Assessment, 'Āhualoa to Honoka'a Transmission Waterline. Prepared for Department of Water Supply, County of Hawai'i.
- Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.
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- Macomber, Patricia S. H. 2001. Guidelines on Rainwater Catchment Systems for Hawai'i. Honolulu, HI: University of Hawai'i at Mānoa, College of Tropical Agriculture and Human Resources.
- Pacific Southwest Research Station-Institute of Pacific Islands Forestry-Hawai'i Experimental Tropical Forest. 2009. Draft Environmental Assessment, Hawai'i Experimental Tropical Forest Laupāhoehoe Research and Education Center Construction Project.
- PB Americas. 2009. Draft Environmental Impact Statement for the Proposed TMT Observatory.
- PBR Hawai'i. 1997. Humu'ula/Pi'ihonua Master Plan.
- Planning Solutions. 2009. Final Environmental Assessment & Finding of No Significant Impact, Kapulena Well & Reservoir. Prepared for Department of Water Supply, County of Hawai'i.
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- State of Hawai'i, Department of Land and Natural Resources, Division of Aquatic Resources. 2008. Atlas of Hawaiian Watersheds & Their Aquatic Resources, Island of Hawai'i.
- Townscape, Inc. 2005. Humu'ula Rural Villages and Landscape Restoration Plan (Final Report).
- Wilson Okamoto Corporation. 2008. Hawai'i Water Plan: Water Resource Protection Plan. Prepared for State of Hawai'i Commission on Water Resource Management.
- U.S. Fish & Wildlife Service. 2010. Hakalau Forest National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment.

4.8 Solid and Hazardous Waste and Material Management

This section discusses the solid and hazardous waste and materials management practices within the 'Āina Mauna including the Legacy Program area and potential impacts of the Legacy Program on those practices. Measures that will be implemented by the Legacy Program to reduce the possible impacts of solid and hazardous waste on the environment are also presented.

4.8.1 Environmental Setting

There are two landfills on the Hawai'i Island, the South Hilo Landfill in Hilo, East Hawai'i and the Pu'uānāhulu Landfill in North Kona, West Hawai'i. The South Hilo Landfill has an estimated remaining capacity of 400,000-cubic yards and is expected to close operations in about four years. As of 2002, the Pu'uānāhulu landfill had more than 12,000,000-cubic yards of permitted air space, which will accommodate the current waste stream from West Hawai'i for about 40-years.

Solid Waste

Solid waste, as defined under Section 1004(27) of the Resource Conservation and Recovery Act (RCRA), refers to any discarded solid, semisolid, liquid, or contained gaseous materials. Currently because of the very limited use of the area, no significant amount of solid waste is produced. The current leases in the adjoining area remove their own trash. Any trash which is generated on site by work activities will be hauled off site and disposed of off properly.

Hazardous Material and Waste

Hazardous waste, as defined by the EPA (Title 40 of the CFR, Chapter 1, Subchapter I-Solid Wastes, Part 261-299), refers to substances that have "imminent and substantial danger to public health and welfare or the environment." The regulations provide criteria to define a waste a "characteristic" hazardous waste and a listing of "listed" hazardous wastes. Only small quantities of hazardous waste are generated by the activities within the 'Āina Mauna and are periodically transported to permitted treatment and disposal facilities.

A gas station could be developed on-site. It would provide both gas and diesel fuel to vehicles along the Saddle Road. The gas storage tanks could be above and/or below ground. Other substances such as oil and lubricants which are typically used in gas service stations will also be used. DHHL and its lessees will adhere to all procedural actions for gas stations related to safely, handling, and disposing of hazardous materials and emergency procedures for attending to accidents and spills.

Other potentially hazardous materials that are used on site by DHHL consist primarily of herbicides used to control and manage invasive species. DHHL has a written procedure for safely, handling, and disposing of hazardous materials and emergency procedures for attending to accidents and spills.

4.8.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it substantially affects the public health, involves a substantial degradation of environmental quality, and/or detrimentally affects air or water quality. Therefore, if the generation, storage, use,

transportation or disposal of hazardous materials, solid waste or hazardous waste by the Legacy Program resulted in the degradation of air, soil or water quality to the point it no longer could be used for its intended purpose, or contained pollutants or toxic elements exceeding allowable levels, a significant impact will occur.

4.8.3 Potential Environmental Impact

Solid waste and trash at the proposed projects will primarily be generated from three sources: construction activity, visitors, and ongoing operational and maintenance activities. Certain facilities may have fuel tanks for emergency generator diesel fuel which is stored on site. The size of the tanks varies with the size of the facility and associated generator. Fuels are also stored for use in motor vehicles and emergency generator.

The Legacy Program will result in additional generation of solid and hazardous wastes. The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the program type and location. Current regulations and requirements regarding solid and hazardous waste include:

- Occupational Safety and Health Administration (OSHA), Title 29, Code of Federal Regulations, Section 1910.120
- Resource Conservation and Recovery Act (RCRA)
- Emergency Planning and Community Right-To-Know Act (EPCRA)
- Hazardous Waste Operations and Emergency Response
- HRS Chapter 342J, Hawai'i Hazardous Waste Law
- HAR Title 11, Chapter 260, Hazardous Waste Management General Provisions
- HAR Title 11, Chapter 262, Standards Applicable to Generators of Hazardous Waste
- HAR Title 12, Chapter 74.1, Hawai'i Occupational Safety and Health

The Legacy Program will develop and implement a Waste Minimization Plan (WMP), Materials Storage/Waste Management Plan and a Spill Prevention and Response Plan (SPRP). These plans and policies will be used to manage hazardous materials, solid waste and hazardous waste. With implementation of these plans and actions, detailed below, the impact of the Legacy Program's hazardous materials, solid waste and hazardous waste will be less than significant.

The Legacy Program's WMP will follow the State of Hawai'i's WMP and develop procedures for efficient operation through the use of appropriate planning techniques and methods and utilizing the best available technologies for operations to reduce solid waste generation. The WMP will be regularly updated to include the most current methods to reduce the amount of waste generated at the facility, as new products and practices become available.

The Materials Storage/Waste Management Plan and SPRP will spell out protocols for proper handling, storage, use, and disposal of liquid, hazardous and solid materials and wastes. Standard practices and emergency procedures will be outlined in compliance with applicable rules and regulations. The plan will outline steps to be taken to ensure that the accidental occurrence of a spill is minimized and, that if a spill did occur, that it will be quickly managed.

Written safety procedures for both the handling and disposing of hazardous materials will be included in the plan along with emergency procedures for attending to spills of hazardous waste. The plans will also require inspections to ensure that systems are working properly, no leaks are occurring, and any necessary maintenance measures are taken.

The Legacy Program's design, plus implementation of the plans and programs, all designed to comply with applicable rules and requirements, will result in the Legacy Program's impact related to solid waste, hazardous materials, and hazardous waste less than significant.

Solid Waste

Trash and other solid waste generated as part of the activities associated with the Legacy Program will result in a minor increase in the generation and disposal of solid waste. Solid waste and trash generated by the daily operation will be primarily composed of waste paper, spent containers, and limited amounts of food waste. The Legacy Program's waste or leftover material will be recycled and reused to the extent possible.

Scrap metal, plastic and glass will be collected for recycling, and the remaining solid waste rubbish will be removed and trucked off site for disposal in a County landfill. Between pickups, rubbish will be stored in lidded trash containers. Cans, plastic, and glass bottles, paper and cardboard, and scrap metal will be collected in separate containers and transported to the administrative base facility for reuse or recycling. No solid waste will be disposed of on site.

Hazardous Materials and Waste

Certain facilities may have fuel tanks for emergency generator diesel fuel which is stored on site. The size of the tanks varies with the size of the facility and associated generator. Fuels are also stored for use in motor vehicles and emergency generator.

Facility engineering measures will also be taken to provide proper chemical and fuel storage enclosures. The Spill Prevention and Response Plan will protect against the release of chemicals or fuel to the environment. The Spill Prevention and Response Plan will require inspections to ensure that systems are working properly, and any necessary maintenance measures are taken. The development and implementation of a Spill Prevention and Response Plan that will outline measures to appropriately use and store chemicals including:

- Facility engineering measures to provide proper chemical and fuel storage enclosures to protect against the release of chemicals or fuel to the environment.
- Efficient and safe application of chemicals according to manufacturer's label.
- Applicable law will be followed regarding the selection, use and storage of chemicals for forest management activities.
- When necessary, DHHL will report violations to the OSHA regarding the improper use of chemicals in the Legacy Program area.

4.8.4 Mitigation Measures

Implementation of the design and engineering features, techniques, and management procedures, and compliance with existing regulations and requirements will ensure that Legacy Program impact will be less than significant, and no additional mitigation is required.

The Legacy Program's design features and policies to comply with applicable rules and regulations include:

- Collecting all solid waste in secured and covered storage containers and trucking it down the mountain for proper disposal at an off-site disposal facility.
- Instituting a Waste Minimization Plan
- Instituting a Materials Storage/Waste Management Plan
- Instituting a Spill Prevention and Response Plan
- Storing a minimal amount of hazardous materials on site.
- Development of proper protocol for disposal and management of solid and hazardous waste.
- Recycling solid and non-hazardous waste material and reusing them to the extent possible.
- Develop and implement resource efficiency programs for beneficiaries to reduce, reuse and recycle resources. These resources include construction and demolition materials, household items, yard waste and other items which might be sent to landfills or incineration.
- The area will be maintained and kept free of trash, debris, and other wastes through regular maintenance and the proper removal and disposal of all solid waste from the area.
- All trash containers will be required to be covered and secured to prevent providing a food source for invasive fauna and to reduce the possibility of escaping debris.
- DHHL will encourage through contract specifications the use of durable materials that will require less frequent replacement, reducing the amount of construction waste generated over time.

4.8.5 Level of Impact after Mitigation

Mandatory compliance with existing regulations and requirements and the implementation of the mitigation measures proposed above, will ensure that the Legacy Program will not result in a significant impact due to its solid and hazardous waste management.

4.8.6 References

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.

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PB Americas. 2009. Draft Environmental Impact Statement for the Proposed TMT Observatory.

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4.9 Socioeconomic Conditions and Public Services Facilities

This section discusses the socioeconomic conditions and public services and facilities in the region and in the Legacy Program area, and the potential long-term socio-economic impacts of the Legacy Program.

4.9.1 Environmental Setting

Population

The total resident population of the Hawaiian Islands in 2010 was 1,360,301. The Island of Hawai'i is home to 13.6% of this total, or 185,079 individuals. Within its 4,028.02 mi², the Island of Hawai'i has an average resident population density of 45.9 persons per mi². If tourists and visitors are included in the total island population, the average density increases to 47.6 persons per mi². In comparison, the average density of the State during the same year was 211.8 persons per mi². The median age of the Hawai'i Island population in 2010 was 40.9 years.

The majority of the resident population on Hawai'i Island lives in the District of South Hilo. In 2010, approximately 50,927 residents lived in the 394.38 mi² district. The density of South Hilo is estimated to be 129.1 persons per mi². The North Hilo District had a much smaller population with 2,041 residents in 2010. The density of this area is about 5.2 persons per mi².

Hawai'i County, in 2010, had 67,096 households with an average of 2.70 persons per household.

The ethnic composition of the County of Hawai'i is diverse. In 2010, 70.5% of Hawai'i County residents identified themselves as one race, of which 47.7% were White, 31.4% were Asian, 12% were Native Hawaiian and or other Pacific Islander, less than 1% were Black or African American, as well as American Indian or Alaskan Native and .02% were some other race. Approximately 29.5% of the population identified themselves as having a mixed ethnic background of two or more races. Both the North and South Hilo Districts are largely comprised of people identifying themselves as Asian.

Housing

There were a total of 82,324 housing units on the Island of Hawai'i in 2010. This number increased from 63,019 housing units in 2000. The majority of the housing is in the South Hilo District, with 19,652 housing units. The North Hilo District contains 853 housing units.

Employment and Income

In 2010, an estimated 75,150 people were employed in the County of Hawai'i. The Government (Federal, State, County) employed the largest amount of residents in 2010. The top five employers in the County of Hawai'i in 2009 were (1) the State of Hawai'i (8,265 employees); (2) the County of Hawai'i (2,725 employees); (3) the U.S. Government (1,359 employees); (4) Hilton Waikoloa Village Resort (900 employees); and (5) Wal-Mart (830 employees).

The county unemployment rate is slightly higher than the State average. In 2007, the county had an unemployment rate of 3.4%. In 2008, unemployment had increased to 5.5% and in 2010 it reached 9.9%.

The estimated median household income for the State of Hawai'i in 2009 was \$63,741. On the Island of Hawai'i, the estimated median household income was \$50,739 which was the lowest of the four counties. The minimum wage for the State increased between 2005-2006 from \$6.75 per hour to \$7.25 per hour, and has stayed the same since.

Economy

The economy of the Island of Hawai'i, and the State as a whole, is primarily driven by the visitor/tourist industry. The Hawai'i DBEDT estimates 6,982,425 visitors traveled to the Hawaiian Islands in 2010. Of this total, 72% came from the continental United States and 28% from other countries. Visitor related expenditures contributed \$10.9 billion to the State in 2010.

The tourism industry became the primary economic generator for Hawai'i County during the 1980s. Although visitor arrivals have fluctuated over the years, it remains the key industry for the island. During 2010, 1,290,859 individuals visited the Island of Hawai'i, of which 986,086 were domestic and 304,773 were international. In 2010, the average length of stay on Hawai'i Island was 7.05 days. The largest proportion of the Hawai'i Island visitors were from the continental western U.S., eastern U.S. and Japan. Estimated expenditures of total visitors to Hawai'i Island in 2010 was \$1,365.7 million, with an average of \$150 spent per person per day.

Public Services and Facilities

Because of the isolated nature of the 'Āina Mauna, the area has relatively few public services or facilities.

Police and Fire Protection

The Hawai'i County Police Department provides law enforcement for the island; operations are separated into two areas of the island. The Area I Operations Bureau includes investigative and patrol operations in East Hawai'i and includes the districts of Hāmākua, North Hilo, South Hilo, and Puna, and is home to Police Headquarters and four stations.

The Area II Operations Bureau includes investigative and patrol operations in West Hawai'i and includes the districts of North Kohala, South Kohala, Kona, and Kā'u, with five stations located throughout the districts. Each of the two areas is run by a Commander, and each district in the county is headed by a police captain.

The most recent data presented in the County of Hawai'i Data Book is for the year of 2008, and lists the ratio of resident population to police officers at 408 to 1; there is no further breakdown of the number by district.

The Hawai'i County Fire Department is the primary agency responsible for the delivery of a variety of emergency services for the County of Hawai'i. Services include fire suppression, emergency medical services (EMS), land and sea rescues, vehicular and other extractions and hazardous materials mitigation. The county is divided into two battalion areas, East and West, with one Assistant Fire Chief for each battalion area.

There are twenty County fire stations and two Federal fire stations (Hawai'i Volcanoes National Park and PTA). PTA has a Mutual and Automatic Aid Agreement with the County of Hawai'i and provides first response to 911 calls for all fires, traffic accidents and other emergencies in its vicinity, including at a minimum, the area from Saddle Road Mile Post 17 to 46 and the summits of Mauna Kea and Mauna Loa.

Education

There are roughly 42 public, 13 charter and 17 private schools located within the County of Hawai'i; some serve grades K-12, while others serve only certain grade levels. Approximately 29,741 students were enrolled in these schools in 2010 and the majority (88%) were registered within the public school system.

Educational attainment on the Island of Hawai'i is comparable to the State average. In 2009, approximately 91.6% of the Hawai'i County population 25 years and over had received a high school diploma. Furthermore, approximately 27.3% have a Bachelor's degree or higher. The State averages during the same year were 90.4% and 29.6%.

The University of Hawai'i system includes one community college and one university on the Island of Hawai'i. Enrollment at the University of Hawai'i at Hilo for the 2011 Fall semester was 4,141. Enrollment at Hawai'i Community College for the 2011 Fall semester was 3,916.

Recreational Facilities

There are various recreational facilities sponsored by the County of Hawai'i on the island, including parks, golf courses, pools, tennis courts and community centers.

Healthcare Services

There are six major hospitals on the island of Hawai'i: Kohala Hospital, Hale Ho'ola Hāmākua, Kona Community Hospital, Kā'u Hospital, North Hawai'i Community Hospital and Hilo Medical Center.

4.9.2 Thresholds Used to Determine Level of Impact

Socioeconomics

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if the Legacy Program substantially affects the economic or social welfare of the community or state. Therefore a significant socioeconomic impact will occur if the Legacy Program adversely affected the revenue, employment or overall economic conditions of the island community or the state as a whole.

Public Services and Facilities

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact on public services and facilities if the Legacy Program involves substantial secondary impacts, such as population changes or effects on public facilities.

Therefore, a significant impact on public services and facilities will occur if the Legacy Program caused a substantial change in population or adversely affected public facilities.

4.9.3 Potential Environmental Impact

The project is easily accessible via the Saddle Road, Mauna Kea Access Road and Keanakolu/Mana Road and has gentle slopes for homestead development. The area is suited for ranching, agriculture and/or low density residential use. The target population who will benefit from this project will be limited to native Hawaiians who have or will have a lease for one or more of the lots within the site. The Hawai'i County Council has exempted Hawaiian homesteads lessees from payment of real property taxes apportioned to the land; however, taxes must be paid on the value of any improvements.

Socioeconomics

The implementation of the 'Āina Mauna Legacy Program offers the opportunity for others to visit and experience the natural and cultural resources of the Humu'ula/Pi'ihonua region and provide formal and informal educational opportunities for children and adults to:

- Connect with the world around them
- Have hands on experiences in a healthy Hawai'i native forest
- Foster awareness, appreciation and understanding of Hawai'i and its natural and cultural environment
- Encourage wise stewardship of precious island ecosystems
- Participate in an unique and educational experience

The educational programs will consider involvement and participation with native Hawaiian immersion charter schools, other organized public and private educational entities as well as partnership with existing private non-profit entities.

There is a need to manage and restore the forest resources on these lands, not only for their economic value, but also as a cultural and educational resource for future generations. The 1997 Master Plan's "Vegetation Sensitivity Analysis" notes the educational potential of the area's natural resources. The natural resources of the Legacy Program area provide abundant attraction for eco-tourism and environmental education. Many geological and biological elements come together within Humu'ula and Pi'ihonua.

The plan states that "most striking may be the contrast between the stark lava lands of Mauna Loa on the south side of Saddle Road and the Pu'u-studded slope of Mauna Kea to the North.

Similarly, the change in elevation and rainfall provide a range of biological communities, from tall rain forest in Pi'ihonua to pioneer shrub lands in 'Āinahou. Unique or endangered birds, plants and biological communities can be viewed by visitors or students of Hawaiian natural history."

Additionally, according to a report by Carver and Caudill, local communities benefit from having national wildlife refuges in the area. Historically, consumptive wildlife-dependent uses, such as hunting and fishing, were the basis for estimating benefits. Increasingly, non-consumptive uses (i.e., photography, education and wildlife viewing) are also considered.

Outreach and Education

One avenue for education is through public charter schools. Many of the charter schools on the Island of Hawai'i have curriculum which deals with Hawaiian culture, agriculture and natural history. Humu'ula presents an excellent place for these students to learn and take part in "hands on" educational experiences.

There is also the opportunity for public school and private school students to also benefit from the educational opportunities in this region.

Employment Opportunities

Employment opportunities and e-commerce development are an important component of the 'Āina Mauna Legacy Program. While developing the 'Āina Mauna Legacy Program the importance of job opportunities and training were emphasized by many. The 'Āina Mauna Legacy Program will require a wide range of jobs and provide a wide range of job and training opportunities.

It is suggested that there be three initial full time employees dedicated to implementing and managing the Legacy Program. These employees can be phased in over time, during the transition from DHHL staff implementing projects only via contracts to fully staffed DHHL employees. The suggested positions for Āina Mauna would include a Program Coordinator; a Contract Management, Compliance and Grant Specialist; and at least one Field Worker capable of organizing volunteers and leveraging DHHL's human resources.

In addition to the direct employment through these DHHL jobs, the Legacy Program will result in the creation of additional employment opportunities by continued contracting for work and services with local companies for a variety of services ranging from tree planting to construction work. Many state agencies currently use contracts to expand on-site field work.

The restoration of the 'Āina Mauna native forest will require a multitude of conservation oriented jobs. As noted in the DHHL Pi'ihonua Mauka Conservation Management proposal, the following, written as if it is the year 2060, is an attainable vision statement for restoration efforts throughout 'Āina Mauna:

"Pi'ihonua Mauka has been managed for natural resource production for fifty years. The native Hawaiian community benefits economically from this managed area via conservation jobs which maintain the 'ōhi'a forest, commercial jobs which reforest and harvest the koa forest, and by new visitor enterprises such as hiking, horseback riding, and bird watching."

At Humu'ula, koa forest management is well under way. From 2003 to 2010, approximately 221-acres of koa harvest created five full time jobs and supplied enough koa wood to meet the annual needs of at least 60-woodworkers. These jobs have continued with the on-going koa salvage currently taking place at Humu'ula. Not only can jobs be created through koa salvage operations, if some of DHHL's lands that can support koa forests were managed on a reasonable 50-year rotation between harvests, 5,000-acres will sustain this level of output indefinitely (50-years times 100-acres = 5,000-acres), thus, creating a permanent industry and job opportunities. If the koa forest is restored where possible (K1, K2, K3, K4) and managed properly, these employment numbers could easily be doubled or tripled.

Commercial forestry to control gorse at 'Āina Mauna is also expected to support dozens of new jobs. As a fully renewable industry, replicable over generations, it will help Hawai'i reduce its current dependence on wood product and energy imports, create an export industry, and create job opportunities for generations to come.

The adaptive reuse of the Humu'ula Sheep Station will generate eco-tourism opportunities and homestead development will also offer a variety of job and career opportunities.

Employment and economic development are key factors in considering ecotourism's business potential. One of the strongest arguments favoring ecotourism is the creation of employment opportunities for residents in rural areas. Although employment data on ecotourism is lacking in current literature, there is evidence, particularly from nature-based tourism that ecotourism jobs are more desirable than other forms of employment in rural areas.

It has been reported that a tour guide may collect an average of \$100 to \$300 per group and a guide working year-round can make up to \$30,000 annually. There are also suggestions that nature-based tourism jobs have better advancement opportunities and a longer duration of employment.

A recent DBEDT-TIM ecotourism survey indicates that for-profit nature-based operators in Hawai'i employ an estimated 5,195 full-time employees and an additional 2,000 part-time employees. The Legacy Program will also generate direct revenues associated with payments for electricity, communication infrastructure, and local and state taxes.

Overall, the Legacy Program will result in a beneficial socioeconomic impact by directly and indirectly generating new revenues for local and state economies, contributing to the state's gross domestic product, and generating new employment opportunities for local residents and the state.

Research

The uniqueness of the 'Āina Mauna region presents an unparalleled opportunity for scientists and researchers to learn about the area. Historians, as well as cultural practitioners can also benefit from the area. The 'Āina Mauna region will be viewed as a place where people can come to learn about Hawai'i.

The various forestry projects will provide educational opportunities for organizations and institutions for the study of reforestation of koa/'ōhi'a forest communities at the higher elevations. Institutions and organizations such as the U.S. Fish & Wildlife Service, U.S. Forest Service and students of tropical forestry have used 'Āina Mauna and other public forests to conduct field research. For examples, a 2010 Master's thesis at UH-Hilo evaluated the effects of various levels of tree shade and how it can control gorse growth, reproduction and survival.

Some of the research projects in lower elevation areas have included nutrient cycling, watershed quality of native forest plant communities, wood properties of native tree species, and the occurrence of 'ōhi'a decline. The gorse project area may provide educational opportunities for organizations and institutions to continue studying reforestation and bio-controls as methods to control gorse and other noxious weeds.

Public Services and Facilities

The impact on public services and facilities should be negligible and it is anticipated that there will not be any disproportionate adverse impact on any single public service or facility. For the reasons outlined above, the Legacy Program's impacts on public services and facilities will be beneficial and less than significant.

Humu'ula is a unique environment that historically has had limited settlement. It is important that beneficiaries are made aware and understand the advantages and disadvantages of living in this area. It is not clear what the demand will be for these types of homesteads.

The homestead sites and area will be rurally-developed initially with limited infrastructure (cinder/gravel roads, catchment water, photovoltaic with generator backup, septic/composting toilets, etc.) The area is relatively isolated from employment, schools, shopping and other DHHL communities. Demand and interest for the first rural-development Homestead Area and the availability of funds for needed infrastructure need to be taken into consideration. Subsequent homestead development may occur depending on demand, costs and policy relative to the overall use of the site.

4.9.4 Mitigation Measures

Socioeconomics

The 'Āina Mauna lands have the potential to provide a variety of long term benefits to the native Hawaiian community. While there will be a significant upfront investment needed to jump start the Legacy Program, there will be corresponding significant economic benefits in terms of new agricultural assets created and employment created by the careful management of these lands. These economic benefits are in addition to fulfilling DHHL's mission of "develop[ing] and deliver[ing] lands to Native Hawaiians."

Consistent with the fundamental purposes of the Hawaiian Homes Commission Act, to the extent permitted by law, it is the goal of the 'Āina Mauna Legacy Program to support economic development, maximize opportunities for beneficiaries and give preference for Native Hawaiian beneficiary involvement at all stages of the program's implementation.

Disposition of the respective commercial licenses, leases, etc to implement 'Āina Mauna Legacy Program actions will be through a broad RFQ/RFP process to select the best qualified applicants (background, experience, financial capability, business plan, etc) to conduct the respective activities. To the extent permitted by law, preference will be given to Native Hawaiians when all other qualifications are equal.

Public Services and Facilities

Because Legacy Program impacts on public services and facilities will be beneficial and less than significant, no mitigation measures related specifically to public services and facilities are required.

4.9.5 Level of Impact after Mitigation

The mitigation measures proposed will increase the Legacy Program's benefit to the island community and the State. Beyond these important collateral employment and economic impacts, the Legacy Program will provide the area with a magnet of educational excellence that could form the basis for natural resource/conservation-based, innovation-driven job-producing activities around complementary activities in alternative energy, agriculture, and natural and cultural research and support.

The 'Āina Mauna Program and mitigation measures will help to maximize the number of local residents qualified for all levels of Legacy Program jobs or other conservation type projects on Hawai'i Island. Because the mitigation measures may ensure fewer new island residents directly related to the Legacy Program, potential impacts to public services and facilities will also be reduced.

4.9.6 References

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4.10 Traffic

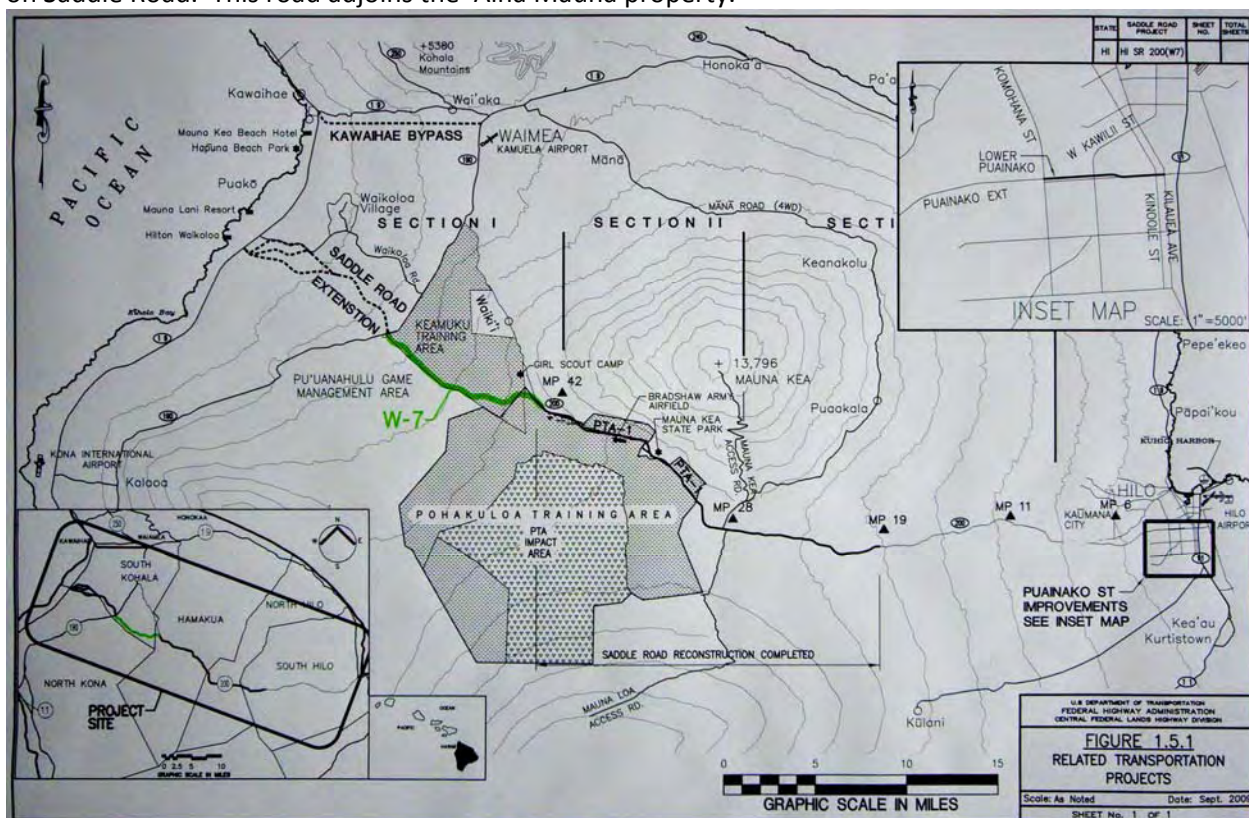
This section discusses the traffic in the region and the specific Legacy Program area, the potential impacts of the Legacy Program on traffic, and the mitigation measures the Legacy Program will employ to mitigate potential impacts.

4.10.1 Environmental Setting

Hawai'i Island has a number of State and County highways. The primary highways are the Hawai'i Belt Road, Route 19, and Māmalahoa Highway, Route 190. The State of Hawai'i Department of Transportation's Saddle Road, Route 200, connects Hilo to Māmalahoa Highway near Waimea and gets its name because it crosses the island through the saddle between Mauna Kea and Mauna Loa.

The primary access to the site is from the Saddle Road, a paved two-lane highway connecting East and West Hawai'i, and the paved access road to the Mauna Kea Observatories and summit area. Saddle Road reaches an elevation of 6,632-feet above mean sea level (msl) at its highest. Near that location the Mauna Kea Access Road branches north toward Mauna Kea. The Saddle Road is the most direct route between the east and west sides of the island. Thus, it is a shorter route for tourists and local commuters than the longer coastal routes between Hilo and Kona.

The Department of Transportation and the Federal Highway Safety Administration are presently implementing major roadway widening, straightening and other safety and traffic flow improvements on Saddle Road. This road adjoins the 'Āina Mauna property.



Map Noting Saddle Road with New Alignment (DOT)

The Saddle Road is undergoing these extensive improvements and its realignment to upgrade the cross-island Saddle Road into a modern 48-mile highway connecting the tourism centers in West Hawai'i with the County seat in East Hawai'i.

The two most recent environmental impact analysis of the road improvements, Final Environmental Impact Statement; Saddle Road (State Route 200); Māmalahoa Highway (State Route 190) to Milepost 6 - November 1999 (FEIS-1999) and Final Supplemental Environmental Impact Statement And Final 4(f) Evaluation; Saddle Road (State Route 200); Māmalahoa Highway (State Route 190) to Milepost 41 - February 2010 (SEIS-2010) are referenced throughout this analysis of traffic.

The purpose of the overall Saddle Road Improvement Project is to provide a safe and efficient route for access to land uses along Saddle Road and for cross-island traffic between East and West Hawai'i. The ongoing and planned improvements to Saddle Road also address five general types of needs:

- roadway deficiencies;
- conflicts and hazards with military operations;
- capacity;
- safety; and
- social demand and economic development

Roadway deficiencies, conflicts/hazards with military operations, and capacity limitations contribute to safety concerns on Saddle Road. An analysis of accidents indicated that the most important factors are the horizontal and vertical alignment (leading to limited sight distance), road width and pavement conditions. Roadway deficiencies also hinder the response of emergency vehicles responding to fires, accidents, and other incidents along Saddle Road.

During the recent environmental impact analysis of the impacts of the proposed project (SEIS-2010) the 'Āina Mauna Legacy Program and its proposed actions were included in the document and analysis.

Following are statements and general references noted in the 2010 analysis of the Saddle Road (SEIS-2010); these include identification of the purpose and need for the road improvement project, as well as statements concerning anticipated actions on the DHHL property at Humu'ula/Pi'ihonua (the description addresses proposed actions in the 'Āina Mauna Legacy Program.)

Statements from the SEIS-2010 follow:

S.1.2 Purpose and Need

The purpose of the overall Saddle Road Improvement Project is to provide a safe and efficient route for access to land uses along Saddle Road and for cross-island traffic between East and West Hawai'i. The ongoing and planned improvements to Saddle Road also address five general types of needs: roadway deficiencies; conflicts and hazards with military operations; capacity; safety; and social demand and economic development. (Page S-2)

Completion of this segment of the project, combined with the already improved portions of Saddle Road, would likely induce more rental car companies to remove driving restrictions on Saddle Road. Improvements would decrease the travel time for tourists traveling between the east and west sides of the island. An improved Saddle Road would increase the number of

tourists visiting the east side of the island since, at present, only about one-third include the Hilo area in their itineraries. Visitation to attractions accessed by Saddle Road would also increase. Tourist expenditures on the east side of the island would increase with more visitors. (Page S-11)

W-7, combined with other Saddle Road improvements, would shorten the travel distance between Hilo and coastal West Hawai'i by approximately 30 minutes. The road would be safer and easier to drive than the existing road, and less likely to be congested than the other circumisland routes. At peak drive times, the difference could be much greater. All of the following users would be beneficially affected:

- Visitors traveling between West Hawai'i and the Kilauea Volcano area;
 - East Hawai'i residents commuting to and from work in West Hawai'i;
 - Residents of either side of the island, making occasional cross-island trips;
 - Residents of Waiki'i, whose subdivision is adjacent to the existing Saddle Road;
 - Visitors and residents traveling from West Hawai'i to the Mauna Kea Access Road; and
 - Workers at Pōhakuloa Training Area and the Mauna Kea and Mauna Loa observatories.
- (Page S-10)

Related to the purpose and need, the SEIS-2010 further describes existing and planned uses that may be affected by the road improvement. The following two sections from the SEIS-2010 identify some of the references to the DHHL property and the 'Āina Mauna Legacy Program actions, specifically.

Table 6.3.2 (SEIS-2010) (Page 6-10))

Partial List of Ranching Era Historic Properties Resource Study Area

Humu'ula Sheep Station. In 1867, Waimea Grazing and Agricultural Co. started sheep stations here and elsewhere. Parker Ranch held a ranching lease from the early 1900s to 2002. Initially, Parker Ranch invested in sheep raising until 1964 and then focused on cattle operations until the end of their lease. Pasture lands were demarcated with barrier walls made of stone. The old wagon road between Waimea and Humu'ula was created to carry wool and walk sheep from the Humu'ula Sheep Station to the harbor at Kawaihae west of Waimea.

Property	Location	State Historic Site No. (prefix 50-10)	Preservation Status
Humu'ula Sheep Station buildings, including stables, workshops, residences. Various walls and roads	Humu'ula (Center of Saddle)	Humu'ula Sheep Station Perimeter Wall: 32-7119 Old Waimea- Humu'ula Wagon Road: 32-21150.	DHHL draft plans identify the Humu'ula Sheep Station for adaptive reuse with a mix of land uses in 3 main sub-areas: Historic/Community Center (5.5 to 6.0 acres); Open Campground (2.0 to 2.5 acres) and Commercial (7.0 to 8.0 acres), including admin, commercial, retail, lodge, and restaurant activities for visitor market.

Table 6.5.1

Description of Reasonably Foreseeable Project in Resource Study Areas

Department of Hawaiian Home Lands 'Āina Mauna Legacy Program Projects at Humu'ula

Summary of Project and Impacts

Project: DHHL is rethinking its plans for 56,200 acres in Humu'ula/Pi'ihonua, adjacent to Saddle on northeast slopes of Mauna Kea. Includes economically self-sustaining improvement and preservation program for natural and cultural resources, with invasive species eradication, native ecosystem restoration, revenue generation, reinvestment in land to sustain activities, alternative/ renewable energy projects, and educational and cultural opportunities, and ecotourism.

Summary of Mitigation

Historic Properties:
Preservation and adaptive re-use planned for Humu'ula Sheep Station.

The stated Purpose and Need for the Saddle Road SEIS-2010 include safety, capacity and economic development improvements. As part of the SEIS-2010 analysis, the DHHL 'Āina Mauna Legacy Program was referenced as a "Reasonably Foreseeable Project" and was therefore included in the Saddle Road SEIS-2010 analysis (various actions in the 'Āina Mauna Legacy Program are summarized in the document and many of these actions address the purpose of increased capacity on the road and economic development opportunities.)

The expectation for economic development can be seen in the following projections:

- Residential development at both ends of the road
- Recreation and tourism
- Military operations
- Mauna Kea telescope complex
- Increasing congestion along alternative cross-island routes

As noted, the SEIS-2010 contemplates increased traffic and further concludes, "Improvements (to the road) would decrease the travel time for tourists traveling between the east and west sides of the island. An improved Saddle Road would increase the number of tourists visiting the east side of the island since, at present, only about one-third include the Hilo area in their itineraries. Visitation to attractions accessed by Saddle Road would also increase. Tourist expenditures on the east side of the island would increase with more visitors."

With respect to capacity, the SEIS-2010 concludes, "The existing capacity is currently inadequate. Level of Service, which measures the quality of traffic flow, is currently E, or poor. Without improvements, LOS is expected to decline to F, the worst level. Traffic volumes are expected to almost triple from the current average daily traffic (ADT) of 1,400 to 4,058 by 2013, because of improvements taking place in the other sections of Saddle Road."

With respect to social demand and economic development issues (like those proposed in the 'Āina Mauna Legacy Program,) the SEIS-2010 concludes, "A safe and efficient Saddle Road is needed for access to employment and recreation areas located between Mauna Kea and Mauna Loa, and more importantly, as a cross-island transportation route to connect East and West Hawai'i for business travel, the transport of goods and services, tourism/recreation, shopping, and commuting." It also concludes, "Over the last thirty years, however, much of the tourism-related growth in employment and the economy has been occurring in West Hawai'i. Tourists currently do not have easy access to the interior of the island."

This analysis and conclusions are consistent with the 1999 Final EIS (FEIS-1999). The FEIS-1999 also states the Purpose and Need as, " The purpose of this project is to provide a safe and efficient route for access long Saddle Road and for cross-island traffic between East and West Hawai'i. The proposed improvements to Saddle Road address five general types of needs:

- roadway deficiencies,
- conflicts with and hazards of military operations,
- capacity,
- safety, and
- social demand and economic development."

The FEIS-1999 analysis also considered and incorporated existing and proposed uses by potentially affected properties. At the time, DHHL was preparing a Humu'ula/Pi'ihonua Master Plan; proposals in the Master Plan were incorporated into the analysis of the FEIS-1999.

According to the DHHL Humu'ula/Pi'ihonua Master Plan; December 1997, the following are land uses proposed in the plan:

Homesteading: the initial plan provides for range of 50 to 150 pastoral/homesteads; future homesteading for more intensive homesteading settlement of several hundred lots (awards will be phased.)

Commercial/Service Oriented Businesses: "oriented to serve the Saddle Road traffic, as well as nearby Pōhakuloa Training Area and Mauna Kea observatories and related activities" (including gasoline station with convenience retail store, outfitters facility, incubator office space (targeted for completion with the Saddle Road enhancements))

Ecotourism and Service Facilities: tour operations and remote lodge accommodations (eco-lodge - 20-units) and ecotourism activities

In addition, many of the same kinds of uses included in the 'Āina Mauna Legacy Program were also in the 1997 Master Plan: Forestry, Ranching, Truck Farming and Floriculture, Cinder, Quarrying, Gorse Control and Management and Resource Areas.

Under the section addressing "Land Use" (section 3.1) the FEIS-1999 identifies existing and proposed uses in the vicinity of the Saddle Road enhancement project. In part, it states, "The land use plan includes a mix of homesteading commercial/service oriented business, ecotourism and service facilities, forest, and ranching activities. Table 3.1.1, *Draft Humu'ula Pi'ihonua Master Plan Proposed Uses*, summarizes the proposed uses identified in this draft plan." (Page 3-5)

The FEIS-1999 further quantifies some of these land uses proposed by DHHL as:

Homesteads/Pastoral - A total of 35 to 220+ lots

Ecotourism Areas - at the Saddle Road, and Mauna Kea Access Road junction. Ecotourism activities are targeted to the remote areas to provide unique wilderness experiences.

Commercial/Service Oriented Business - These areas are oriented toward the Saddle Road/Mauna Kea Access Road Junction. These are opportunities for service oriented business to serve the Saddle Road traffic, as well as the nearby PTA and Mauna Kea observatories and related activities. Proposed uses include a service station and convenience store, as well as space to support eco-tourism businesses proposed within DHHL lands.

The FEIS-1999 further concludes: "The completion of the Saddle Road project will provide increased traffic along this corridor, providing greater potential for a viable convenience commercial facility within the DHHL lands. Such a facility would provide a much needed service for those traveling this remote section of roadway."

After receiving appropriate permits and approvals, including a jurisdictional determination finding no Waters of the U.S. in the portions between Milepost 14 and 53 as part of the EIS process in 1999, construction of the Saddle Road improvements began in 2004 on a 6.5-mile part of Section II from Milepost 28 to 35. This segment was opened to public traffic in May 2007.

Construction for the portion in Section III between MP 19 and 28 was completed in October 2008.

The final part of Section II, north of the PTA cantonment area from MP 35 to 41, was completed and opened in August 2009.

A portion of Section III between MP 11 and 19 began construction in late 2009 and should be completed in late 2011.

The remainder of the eastern side of project - i.e., the portion in Sections III and IV from MP 6 to MP 11 - is in final design but has not yet been fully funded for construction. The western portion of the project, Section I, from the "Seven Steps" near MP 42 to Māmalahoa Highway, has had an alignment selection.

The recent Saddle Road improvement project established several access points fronting the DHHL 'Āina Mauna property. The lowest, near the 23-mile marker and identified as Pu'u Ō'ō Ranch provides an improved intersection and access road that cuts through the lowest portion of the area proposed for homesteading.

Additionally, there are other access points near the 26-mile marker, Kīpuka 'Āinahou and the 27-mile marker. As noted in the traffic impact section of this EA, the Saddle Road improvements address the anticipated demand in the area which include the preferred alternatives described in this EA.

The following are representative images of designated and improved intersections that may serve the 'Āina Mauna property:



Pu'u 'Ō'ō Ranch Designated and Improved Intersection on Saddle Road – Photo: Ho'okuleana LLC



Kipuka 'Āinahou Designated and Improved Intersection on Saddle Road - Photo: Ho'okuleana LLC

The degree of congestion and ease of traffic flow are commonly expressed by Level of Service (LOS), a qualitative measure of operational conditions within a traffic stream and motorists' perception of those conditions. It relates to the density of traffic relative to roadway capacity. It expresses conditions of speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. The quality of traffic flow is described in six categories of service, A through F, with LOS A representing traffic in a free flow condition, and LOS F representing serious congestion and considerable delays. On a two-lane road, LOS is primarily determined by the ability to pass, which is largely dependent on the roadway geometrics, percentage of steep grades, traffic volumes and sight distance. Most experienced motorists are comfortable with LOS C, where roads remain safely below but efficiently close to capacity, and posted speed is maintained.

In 1994, the average daily traffic (ADT) on Saddle Road was 900 vehicles per day, in 2006 the ADT was 1,150 and traffic volumes are expected to almost triple from the current ADT of 1,400 to 4,058 by 2013. Saddle Road is undergoing extensive improvements and realignment in order to service the forecast increase in ADT. Roughly 7% of the 2006 ADT on Saddle Road were Observatory related. Prior to Saddle Road improvements, LOS was E, or poor. However with current Saddle Road improvements, LOS is expected to improve to B upon completion of the improvements. For the long term (as late as the design year 2034,) the LOS on the Saddle Road is expected to be C.

As noted, there are several intersections that were designated and improved during the Saddle Road improvement projects. It is anticipated that the road access noted in the various actions in the Legacy Program will use the existing intersections on the Saddle Road.

The homesteading preferred alternative notes the use will be in the lower portion of the property, fronting the Saddle Road. In the following image below indicates where the intersection near the 23-mile marker on the Saddle Road first enters DHHL property before the road leads to other state-owned properties. This will be the primary intersection for access to the homesteading area (H1).



‘Āina Mauna Intersections and Road Access - Photo: Ho‘okuleana (Google Earth Image)

The Keanakolu/Mana Road is a cinder/gravel road which extends from the Mauna Kea Summit Road through the property for approximately 21-miles. The Keanakolu/Mana Road was built in 1870 to connect Hilo and Waimea. It is of historical interest because it developed a more efficient route for transportation between Hilo and Waimea and opened up land for grazing and sugar cane.

On November 8, 2002, Hawai'i County Council Resolution 250-02 was passed "authorizing the Mayor to enter into a project agreement ... for spot improvements on Keanakolu Road...". That resolution further states that "the County of Hawai'i Office of the Corporation Counsel has reviewed available history regarding Keanakolu Road, and has opined that Keanakolu Road should be considered a County Highway pursuant to Hawai'i Revised Statutes (HRS) Section 264-1".

Those spot improvements were completed in 2006 and as a result Keanakolu Road has several stream crossings hardened with concrete and asphalt approaches, a short (200-yard) paved area at the Wailuku River crossing, and several areas that have been widened for safety. At present, the County maintains the road with appropriations from the State. Most recently a DHHL licensee has improved and maintained the road to the gorse-to-charcoal demonstration site.

Other internal roadways leading from the Keanakolu/Mana Road are primarily 4-wheel drive dirt/cinder/gravel pasture roads used for DHHL activities such as fire management and gorse eradication. Other infrastructure systems (potable water, power, communication, etc) are largely nonexistent.

4.10.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it involves a substantial degradation of environmental quality.

Therefore, the Legacy Program impact will be considered to be significant if it will increase traffic thereby resulting in a substantial deterioration of traffic conditions and/or requiring additional road improvements beyond minor modifications and those already identified and planned for the region.

4.10.3 Environmental Impacts

The current roads accessing the property are a group of ranch road which are normally dirt with grass cover and require a four wheeled drive vehicle to access them. All of the road ways proposed to be built will be dirt road with permeable surfaces and will be similar to existing roads.

For the native forest restoration program and commercial timber operations, employees and volunteers will stay in accommodations on site, in part, optimize the amount of vehicle traffic on area roads. Additionally, to control traffic and manage potential traffic risks, timber operations will be a limited as far as the number and hours that large equipment and flatbed trucks access the area.

Although the additional traffic generated by operations, employees and volunteers is expected to increase slightly in relation to the existing traffic volumes currently using Keanakolu Road, alternative existing routs via ranch roads will be used and will not lead to substantial congestion and/or deterioration on Keanakolu Road.

A need for roadway improvements on these former ranch roads to provide additional capacity to accommodate Legacy Program-related traffic will be needed, but will only involve occasional spot graveling to reduce soil erosion and improve traction during wet weather conditions.

Homestead lot access will be provided to two access roadways. The roadways servicing the homesteading area will provide access connections to each parcel and to the Keanakolu/Mana Road and Saddle Road. The Keanakolu/Mana Road is expected to serve primarily as an alternative emergency evacuation route, as homesteaders are expected to use the more developed Saddle Road for daily transportation needs. Wherever possible, former ranch roads will be incorporated into the road layout.

The proposed road network right-of-way will be non-dedicable rural roads. These standards include a roadbed of packed gravel/cinder, paved where the slope exceeds 8% and unlined drainage swales are installed on each side of the roadway.

While the right-of-ways will be sized to county dedicable standards (50 feet,) the roadways themselves will not be constructed to County dedicable standards at this time. In the event the roads are to be conveyed to the County for operation and maintenance in the future, they will be required to be upgraded to dedicable standards.

4.10.4 Mitigation Measures

It is assumed that proposed improvements to Saddle Road will be implemented and completed in a timely fashion and that future traffic volume along Saddle Road will increase in general accordance with forecasts set forth within the Saddle Road project's Environmental Impact Statement (EIS).

According to that project's EIS, the average daily traffic on Saddle Road was estimated at 900 vehicles per day in 1994. Assuming completion of proposed improvements, the EIS forecasts the average daily traffic count on Saddle Road to be an estimated 14,400 vehicles per day.

In addition, a variety of mitigation measures will be incorporated into implementation of the 'Āina Mauna Legacy Program that will reduce traffic demands on public roads to a minimum. Following are mitigation measures that correspond with various actions addressed in the EA.

1. Native Forest Restoration; 2. Sustainable Koa Forestry; 3. Outplanting Centers and Field Worker Accommodations and 13. Gorse Eradication through Commercial Timber Planting and Harvesting

As noted, the FEIS-1999 and SEIS-2010 for the Saddle Road improvements addressed these and other related issues.

Due to the scale of the reforestation effort (including the number of seedlings needed and remoteness of the site,) and because commuting back and forth from the planting areas to population centers such as Hilo and Waimea is not economically viable, it is recommended that overnight accommodations be constructed to temporarily house field workers, rather than have them daily drive to/from the site. This will reduce traffic on public roads to a minimal amount.

Accommodations will be in the form of bunkhouse type facilities with accommodations (for up to 20-person sleeping quarters capacity) with appropriate facilities (restrooms/baths, kitchen/dining) and utility storage buildings. A campground area, for periodic need for expanded overnight stays, will be in the vicinity of the permanent facilities.

It is envisioned that workers will spend the workweek working and living near the outplanting/planting site. The workers can then spend time away from the site on weekends.

They will be able to work longer days, planting more trees at a time, by not having to commute to and from the site. Having the workers stay on site will considerably cut down on the amount of traffic coming in and out of the area (workers will be shuttled from the base facility to the site on Mondays and from the site to the base facility on Fridays), thus cutting down on the usage of the road (wear and tear) and reducing other traffic impacts.

For commercial timber/koa operations, contract compliance agreements will place a limit on the number of trucks accessing the Saddle Road per day. Harvest hauling operations will be limited to up to 11 trucks per day, from 6 am to 4 pm, weekdays. These mitigation measures are twofold. Therefore, only an average of 1-hauling vehicle per hour will be permitted to haul timber material down the mountain.

Contract compliance agreements will limit commercial timber traffic to weekdays, thus allowing the general public to utilize Keanakolu Road without truck traffic on the weekends when the general public will be more prone to accessing the area and utilizing the Saddle Road. This will also help limit any potential for accidents between commercial vehicle and the public.

Secondly, the mandated day light operation hours will allow motorists to better see the timber trucks during daylight hours and limit road use to times when fog is not as prevalent.

The hauling of koa (salvage and sustainable harvest) will lead to minimal use of roads in the area for hauling timber. Harvest hauling operations will be limited to not more than 1-truck per day for koa operations. The same restrictions (days of the week and times of the day) will be used for koa harvest as commercial timber harvesting. This is a nominal increase in traffic due to koa harvesting.

As necessary, the Legacy Program will implement a Ride-Sharing Program for employees who do not stay on site during the week. Commercial timber operations will be encouraged to develop or participate in such a program for their employees, as well.

13. Sheep Station Adaptive Reuse, 14. Remote Accommodations and 15. Eco-tourism Facilities, Services and Activities

As noted, the FEIS-1999 and SEIS-2010 for the Saddle Road improvements addressed these and other related issues.

Ecotourism operators will use vans to minimize individual traffic when taking visitors to and through the 'Āina Mauna lands. Likewise, the proposed uses are intended to attract passing traffic and people participating in recreational activities in the saddle region.

As noted in the FEIS-1999, "The purpose of this project is to provide a safe and efficient route for access long Saddle Road and for cross-island traffic between East and West Hawai'i. The proposed improvements to Saddle Road would address five general types of needs: roadway deficiencies, conflicts with and hazards of military operations, capacity, safety, and social demand and economic development."

The FEIS-1999 further concludes, "The completion of the Saddle Road project will provide increased traffic along this corridor, providing greater potential for a viable convenience commercial facility within the DHHL lands. Such a facility would provide a much needed service for those traveling this remote section of roadway."

This is consistent with the SEIS-2010 that states the purpose and need includes safety, capacity and economic development improvements. The expectation for economic development can be seen in the following projections: Residential development at both ends of the road, Recreation and tourism, Military operations, Mauna Kea telescope complex and Increasing congestion along alternative cross-island routes.

16. Commercial Facilities and Activities

As noted, the FEIS-1999 and SEIS-2010 for the Saddle Road improvements addressed these and other related issues.

Due to the remoteness of the 'Āina Mauna property and the significant distance to population centers (i.e. Hilo – 25+ miles is the closest,) it is expected that the commercial facilities and activities at 'Āina Mauna will address the existing traffic that travels through the region, as well as the uses at 'Āina Mauna. The proposed uses are intended to attract passing traffic and people participating in recreational activities in the saddle region. As such, traffic counts will not increase due to the commercial facilities.

The following design guidelines are recommended based on development outcomes envisioned in the adaptive reuse plan: Locate the rest stop or general store (with gas pumps) near the main entrance so that high volume, in-and-out traffic remains near the roadway. An alternative site for the rest stop/general store is closer to the intersection of Saddle Road and Mauna Kea Access Road. This location has the advantage of higher visibility and easier access from the Saddle Road; however, it may reduce opportunities to create market synergy with people staying at the Sheep Station cabins and campground if the distance between the two facilities is too great.

Site Preparation and Construction

Site preparation and construction traffic will be limited as much as possible, particularly traffic related to hauling heavy equipment, to minimize interaction with vehicular traffic on the existing roads. Construction activities will be coordinated with the Office of Mauna Kea Management and other neighbors to avoid potential conflicts with their observatory construction projects. Site preparation and construction-related impacts, such as soil erosion and sedimentation, the generation of air pollutants and dust, traffic congestion due to detours and delays, and noise from construction equipment, will be temporary and are not be expected to affect the area's long-term productivity.

4.10.5 Level of Impact after Mitigation

As noted, the FEIS-1999 and SEIS-2010 for the Saddle Road improvements addressed these and other related issues.

1. Native Forest Restoration; 2. Sustainable Koa Forestry; 3. Outplanting Centers and Field Worker Accommodations and 13. Gorse Eradication through Commercial Timber Planting and Harvesting

Commercial timber harvest hauling operations will be limited to up to 10 trucks per day, from 6 am to 4 pm. Koa harvesting hauling (salvage and sustainable harvest) will be limited to 1 truck per day. Therefore there will only be 11 trucks per day. The same restrictions (days of the week and times of the day) will be used for both koa harvest and commercial timber harvesting.

Therefore, only an average of 1-hauling vehicle per hour will be permitted to haul timber material down the mountain for commercial timber to fight gorse operations.

4. Invasive Plant Control and Remnant Invasive Species Eradication, 5. Administration Base Facility, 6. Groundwater Water System, 7. Surface Water Catchment System, 8. Road System, 9. Non-Native Wildlife Control and Management and 11. Pasture (Interim and Long Term)

The above activities will have limited and periodic traffic demands. During construction phases there will be temporary large and small vehicles traversing the roads and the site. In the long-term, the above activities will have nominal traffic impacts.

12. Infrastructure for Initial Homesteading Area

A total of 100-200 homestead sites are contemplated for the 'Āina Mauna Legacy Program over its vast 56,000-acres. The traffic generated from this level of development will not be significant. Additionally, prior Saddle Road EIS documents noted up to 200-homestead/pasture uses were to be on the DHHL site. The roadway system is designed to provide two ingress/egress routes throughout the site, primarily to assist emergency services and provide a secondary route for residents.

13. Sheep Station Adaptive Reuse, 14. Remote Accommodations and 15. Eco-tourism Facilities, Services and Activities

Ecotourism operators will use vans to minimize individual traffic when taking visitors to and through the 'Āina Mauna lands. Likewise, the proposed uses are intended to attract passing traffic and people participating in recreational activities in the saddle region.

16. Commercial Facilities and Activities

The proposed uses are intended to attract passing traffic and people participating in recreational activities in the Saddle region. As such, traffic counts will not increase due to the commercial facilities.

17. Research

The Legacy Program's impact level prior to mitigation will be less than significant. Current research traffic levels on DHHL lands account for approximately one vehicles per month.

This may increase to as many as one vehicles per week, but may be offset by technologies such as remote sensing and satellite uploading of automated collected field data. With the mitigation measures proposed, the less than significant level of impact will be further reduced.

4.10.6 References

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program. Prepared for the Department of Hawaiian Home Lands.

PB Americas. 2009. Draft Environmental Impact Statement for the Proposed TMT Observatory.

PBR Hawai'i. 1997. Humu'ula/Pi'ihonua Master Plan.

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State of Hawai'i, Department of Transportation, Highways Division & U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division. 1999. Final Environmental Impact Statement, Saddle Road (State Route 200) Māmalahoa Highway (state Route 190) to Milepost 6, County of Hawai'i, State of Hawai'i, FHWA Project No. A-AD-6(1).

State of Hawai'i, Department of Transportation, Highways Division & U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division. 2010. Final Supplemental Environmental Impact Statement And Final 4(f) Evaluation, Saddle Road (State Route 200) Māmalahoa Highway (State Route 190) to Milepost 41, County of Hawai'i, State of Hawai'i, FHWA Project No. 200(00).

4.11 Power and Communications

This section discusses the power and communications facilities in the region, the potential impact of the Legacy Program on those facilities, and mitigation measures the Legacy Program will employ to mitigate potential impacts.

4.11.1 Environmental Setting

Power

HELCO experienced a peak island-wide demand of approximately 203 megawatts (MW) during December 2006; the latest system peak load was 198 MW. HELCO has the generating capacity of 288 MW, resulting in a reserve margin of 45 percent over the latest system peak. Alternative renewable sources, such as wind, solar, and geothermal, account for roughly 40 percent of the generating capacity. Currently the largest consumer of power on Hawai'i Island is the Hilton at Waikoloa which reaches a peak demand of 4 to 5 MW.

There is an electronics site located on the land parcel, an electrical line along Saddle Road and the Mauna Kea Access Road, and an electrical line running east-west, north of Saddle Road. The nearest electrical substation is located approximately near the Pōhakuloa Training Area.

Communications

Fiber optic lines already serve the area from an existing network that serves the Observatories. The State of Hawai'i's Information and Communication Services Division (ICSD) currently operates and maintains a radio tower within the subject area (TMK 3-8-1: por. 7.) This tower maintains communication links for agencies responsible for public safety and emergency response.

4.11.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it requires substantial energy consumption. Therefore, a significant impact will occur if the Legacy Program required provisions for additional capacity beyond what is already available or planned.

4.11.3 Potential Environmental Impacts

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the project type and location.

Power

The electricity use associated with the Legacy Program will not have a significant impact on other facilities on the mountain or island-wide. Because of the areas isolated location and lack of infrastructure, conventional energy use on the property is limited. The cost of developing power infrastructure is very high and instead the Legacy Program will focus on alternative energy systems to provide power for the Legacy Program.

The Legacy Program will consider a variety of alternative/renewable energy opportunities in relation to power including:

- Solar
- Photovoltaic (with backup generators)
- Consideration for low-wind-speed generators

Each individual homestead site will be responsible for securing their own electrical needs. It is anticipated that homesteaders will incorporate solar, photovoltaic and wind for electrical needs. Thus, renewable resources (sun and wind) will provide a majority of power for the Legacy Program

Communications

Fiber optic lines already serve the area from the existing network that serves the current area. The Legacy Program's communication demands will be well within the expected capacity which will be provided by the existing communications system. Each individual homestead site will be responsible for securing their own communications needs. Communications will be via cellular service. No significant impact will result.

ICSD's radio tower requires direct line of sight to connecting communication equipment at Hilo, Mauna Loa and Ka'upulehu. Thus, coordination with ICSD will be necessary to ensure that construction within the 'Āina Mauna does not impact communication lines, such as this.

4.11.4 Mitigation Measures

Energy-conserving lighting, appliances and systems will be used in the Legacy Program construction to reduce energy use. Appropriate energy saving designs will be employed into all aspects of the Legacy Program's buildings and facility design, as well. The Legacy Program will consider a variety of alternative/renewable energy opportunities in relation to power including: Solar, Photovoltaic and Consideration for low-wind-speed generators (with backup generators). Solar hot water systems will be employed for domestic water use, as well. Maximum use will be made of natural lighting and lighting will use energy efficient light fixtures. Electrical appliances will be efficient Energy Star rated equipment. All Buildings will be designed to make maximum use of the climate and natural ventilation.

In regards to communication towers already on-site, DHHL will coordinate with ICSD and other entities to ensure that projects within the 'Āina Mauna are sited and constructed as to not interfere with already existing lines of communication.

4.11.5 Level of Impact after Mitigation

The isolation of the 'Āina Mauna warrants the use of alternative energy systems, which will have no effect on current energy grids or resources. Thus, the Legacy Program's energy consumption will have a less than significant impact. The use of alternative/renewable energy will serve to further reduce the impact of the Legacy Program on energy grids and resources.

4.11.6 References

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program. Prepared for the Department of Hawaiian Home Lands.

Oceanit. 2006. Honokaia Pastoral Lands Subdivision Final Environmental Assessment, Honokaia, Hāmākua District, County of Hawai'i. Prepared for the Department of Hawaiian Home Lands.

PB Americas. 2009. Draft Environmental Impact Statement for the Proposed TMT Observatory.

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State of Hawai'i, Department of Transportation, Highways Division & U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division. 2009. Saddle Road Improvement Supplemental Environmental Impact Statement, County of Hawai'i, State of Hawai'i.

4.12 Noise

This section discusses the noise conditions in the region and in the Legacy Program area, the potential impacts of the Legacy Program on those conditions, and the mitigation measures the Legacy Program will employ to mitigate those potential impacts.

4.12.1 Environmental Setting

Sound levels are fluctuating air pressure waves expressed on a logarithmic scale in decibels (abbreviated as dB). A change of 10 units on a decibel scale reflects a 10-fold increase in sound energy. A 10-fold increase in sound energy roughly translates to a doubling of perceived loudness. In general, humans can barely hear a change of 1 decibel, can usually hear a change of 3 decibels and can easily hear a change of 5 decibels. In evaluating human response to noise, acousticians compensate for people's varying abilities to discern frequency or pitch components of sound.

While a healthy young ear may be able to hear sounds over the frequency range of 20 hertz (Hz) to 20,000 Hz, the human ear is most sensitive to sounds in the middle frequency range used for human speech, and less sensitive to lower- and higher-pitched sounds. The "A" weighting scale is used to account for this varying sensitivity. Thus, most community noise standards are expressed in decibels on the A-weighted scale, abbreviated dBA.

Zero on the decibel scale corresponds to the threshold of human hearing, while sound levels of 120 dBA and higher can be painful and cause hearing damage. For reference, human speech at 10-feet is about 60-70 dBA. Noise-sensitive uses include residences, hospitals, schools, parks and similar uses. Noise could also be a sensitive issue for cultural practices and nature-watching activities.

Ambient noise levels within the 'Āina Mauna are generally low, reflecting the light traffic volumes on the road accessing the area and the undeveloped and unpopulated nature of much of the landscape. Noise within 'Āina Mauna is generated from airplane and helicopter overflights, cattle primarily during dawn and dusk hours, and existing licensee activities such as koa salvage and gorse control machinery. Of the three, aircraft overflights generate the most, followed by cattle, then machinery. Average daily ambient noise for 'Āina Mauna is estimated between 60 to 80 dBA.

There are present and anticipated continued (and possibly expanded) noise from the neighboring Pōhakuloa Training Area. Noise levels in the vicinity of PTA and emanating into the 'Āina Mauna can be periodically high in association with military training activities (e.g., live firing of artillery) and low-flying aircraft, including helicopters and jet fighters.

The Department of the Army is preparing a Programmatic Environmental Impact Statement (PEIS) for the modernization of training ranges, training support infrastructure and the cantonment area at Pōhakuloa Training Area (PTA) to better meet the readiness needs of military units in Hawai'i.

The PEIS will also evaluate an initial modernization project proposed to construct and operate an Infantry Platoon Battle Area (IPBA) that would include an Infantry Platoon Battle Course (IPBC), live-fire shoot house, and a Military Operations on Urban Terrain (MOUT) facility.

The Department of the Navy, U.S. Marine Corps, is preparing an Environmental Impact Statement (EIS) for the basing and operation of MV-22 tiltrotor Osprey aircraft and H-1 Cobra and Huey attack helicopters in support of III Marine Expeditionary Force elements stationed in Hawai'i. Because the squadrons would train on land owned or controlled by the Department of the Army, the Navy has requested that the Army be a cooperating agency for preparation of this EIS.

The EIS will evaluate a proposal to introduce up to two Marine Medium Tiltrotor (VMM) squadrons with a total of 24 MV-22 aircraft, and one Marine Light Attack Helicopter (HMLA) squadron composed of 18 AH-1Z and 9 UH-1Y helicopters, construction of improvements to accommodate the new aviation squadrons, improvements to training facilities in Hawai'i used by the Marine Corps, and use of Department of Defense training areas statewide. The plan calls for training, including gunnery exercises, at Pōhakuloa; for refueling facilities and night exercises at Moloka'i Training Support Facility and Kalaupapa Airfield, respectively; for additional activities at the Pacific Missile Range Facility on Kaua'i, and possibly for target practice on an islet called Kau'ula Rock, near Ni'ihau.

Given the remoteness of the 'Āina Mauna and expectations of reforestation approximately 85% of the area with noise absorbing forest cover, there are no noise-sensitive areas. The proposed actions in this EA do not significantly increase noise on the property or surrounding area, therefore, no mitigation measures for noise are required.

4.12.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it detrimentally affects ambient noise levels, which could then lead to substantial degradation in environmental quality. Therefore, a significant noise impact will occur if the Legacy Program will result in increased ambient noise levels to the extent that noise-sensitive receptors will be exposed to noise exceeding regulatory levels.

4.12.3 Potential Environmental Impacts

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the project type and location. This includes state noise standards under HAR Section 11-46, and requirements of the Occupational Safety and Health Administration (OSHA).

Noise in the area will be increased by the following activities that produce sounds above the natural background level:

- Vehicular travel - Traffic is discussed in Section 4.10.
- Facility Operations - Facility use will be generally quiet with operations occurring indoors during the day.
- Generators - Generator backup for energy production (wind and solar).
- Timber and Koa Harvesting Operations - Harvesting, onsite chipping and chainsaw operations will generate periodic noise from the felling of trees. Current koa harvesting activities on site are already generating noise and the effects of noise increase minimal, due to the remoteness of the project site and its isolation from population centers.

- Construction operations - Construction operations will generate periodic noise from vehicles traveling to and from the area, roadwork and drilling and pounding. Most noise will be generated from initial construction efforts with some upgrades and improvements occurring long term. The remoteness of the project site and its isolation from population centers will make the effects of noise increase minimal. These noise impacts will be short term and no adverse impacts are anticipated.

Timber and koa harvesting operations including harvesting, onsite chipping and chainsaw operations will generate periodic noise from the felling of trees. Current koa harvesting activities on site are already generating noise and the effects of noise increase are minimal. Proper mitigation measures will be employed to minimize harvesting-related noise impacts and comply with all Federal and State noise control regulations.

During construction there will likely be noise impacts associated with operation of construction machinery and material transport vehicles. Proper mitigation measures will be employed to minimize construction-related noise impacts and comply with all Federal and State noise control regulations. Increased noise activity due to construction will be short-term, limited to daytime hours and persist only during the construction period.

Other potential contributors to noise levels are the Army's Pōhakuloa Training Area, Bradshaw Army Airfield, and local and tourist-related air travel. However, nothing has been documented in literature to suggest that military-related noise is an issue within the area.

4.12.4 Mitigation Measures

The Legacy Program operations are not expected to cause a significant noise impact, and no mitigation measures beyond compliance with applicable regulations, requirements, and standards, are required. Nevertheless, the Legacy Program will implement the following mitigation measures:

- Generators will be used only when needed.
- The Legacy Program will include worker housing and institute a Ride-Sharing Program for employees who do not stay one site during the week. The program, detailed in Section 4.10, will further reduce traffic noise by reducing the number of vehicles accessing the area.
- For commercial timber (including Koa salvage and sustainable harvest) operations, contract compliance agreements will place limit on the number of trucks accessing the Saddle Road per day.
 - o Commercial timber harvest hauling operations will be limited to up to 10 trucks per day, from 6 am to 4 pm, weekdays. Therefore, only an average of 1-hauling vehicle per hour will be permitted to haul timber material down the mountain.
 - o Koa timber harvest hauling operations will be limited to 1 truck per day, from 6 am to 4 pm, weekdays.
- The program, detailed in Section 4.10, will further reduce traffic noise by reducing the number of vehicles accessing the area.
- Construction and commercial timber harvesting operations will comply with all Federal and State noise control regulations.
- Whenever noise is expected to exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction.

4.12.5 Level of Impact after Mitigation

The implementation of the mitigation measures identified will serve to further reduce the noise associated with the Legacy Program. It is expected that the Legacy Program will result in a negligible increase in noise and a minor increase in vehicular traffic noise.

4.12.6 References

Faucette, David T. 2009. Draft Environmental Assessment for Construction of a 275-acre Fence Enclosure South of Waikoloa Village.

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program. Prepared for the Department of Hawaiian Home Lands.

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State of Hawai'i, Department of Transportation, Highways Division & U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division. 2009. Saddle Road Improvement Supplemental Environmental Impact Statement, County of Hawai'i, State of Hawai'i.

4.13 Climate, Air Quality and Lighting

This section discusses the air quality, climatic, and lighting conditions in the region and specific Legacy Program area, the potential impact of the Legacy Program on those resources, and mitigation measures the Legacy Program will employ to mitigate potential impacts.

4.13.1 Environmental Setting

Air Quality

In the State of Hawai'i, both federal and state environmental health standards pertaining to outdoor air quality are generally met due to prevalent trade winds and the absence of major stationary sources of pollutant emissions. The relative absence of stationary pollutant sources in the area keep air quality in the Legacy Program area at levels considered good (i.e., well within the air quality standards).

There are no non-attainment areas for air quality in the State of Hawai'i, and air quality monitoring data is thus, very limited. There are currently no air quality monitoring stations on the north end of Hawai'i County. The closest monitoring stations are at Hilo and Captain Cook (Kailua-Kona).

Except for periodic vog and occasional localized impacts from traffic congestion, and dust from farms and ranches during very windy periods, the present air quality of the Legacy Program area is believed to be relatively good.

Climate

The lands of Humu'ula are characterized by their isolation, high elevation, cool temperatures and lack of infrastructure (roads, potable water, telephone, power, etc.) The area is somewhat isolated with the closest public facilities (schools, hospitals, police and fire services) located in Hilo (25-miles and 40 minutes by car) and Waimea (30-miles and 55 minutes by car.)

With elevations ranging from approximately 4,500 to 9,000-feet mean sea level, the lands experience cooler temperatures ranging from annual mean of 58 °F at the 5,000-foot elevations to 45 °F at the 9,000-foot elevations, with frost conditions occurring during the winter months.

The average rainfall varies dramatically over various areas of the parcel. In the northern portions (north of Pu'u 'Ō'ō) the average annual rainfall ranges from 120-inches in the lower elevations, to 45-inches in the upper elevations. However, in the upper elevations (above 7,000-feet) high evaporation rates create extremely dry conditions during most the year, as evidenced by the sparse vegetation in these areas.

In the western portions, generally southwest of Pu'u 'Ō'ō, the mean annual rainfall decreases from 80-inches near Pu'u 'Ō'ō to less than 40-inches near the Humu'ula Sheep Station adjacent to the Mauna Kea Access Road. The land parcel generally receives the prevailing northeasterly trade winds.

Lighting

The areas remoteness from urban development, absence of air pollution, absence of large, brightly-lit cities on the Island of Hawai'i, as well as the County of Hawai'i's island-wide lighting ordinance requirements, mean that there are very few light sources or lighting impacts within the 'Āina Mauna region.

4.13.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it will result in a detrimental effect on air quality leading to a substantial degradation in environmental quality. Thus, the Legacy Program's impact will be considered to be significant if it will result in emissions of air pollutants that could substantially impair the existing air quality through generation of substantial pollutant concentrations and/or lead to the area becoming a non-attainment area for State and NAAQS.

4.13.3 Potential Environmental Impact

Air Quality

The activities associated with the Legacy Program will generate some fugitive dust. Most of this dust will emanate from the construction activities associated with the movement of vehicles, drilling and pounding activities. These impacts will be periodic and negligible due to their temporary nature and will dissipate with completion of construction.

This Legacy Program will not additionally impact air quality, as there will be no uses or structures generating air emissions other than gas generators and the existing traffic that is already traversing through the area.

The environmental benefits of forestry, e.g. clean water and air, soil augmentation, and wildlife habitat, are well known. The Legacy Program's numerous native forest restoration projects will help to increase air quality through the planting of trees and other forest products.

Additionally, the preventative fire measures proposed in this project will decrease the frequency and severity of wildfire which contribute to ash material blown around by heavy trade wind events, resulting in a positive effect on air quality in the region.

Climate

In the early 1980s, scientists were beginning to raise concerns about global warming and climate change. The Earth is heating up because gases produced from vehicles, power plants, deforestation and other sources are building up in the atmosphere, acting like a thick blanket over our planet.

The terms global warming and climate change are often used interchangeably, but the two phenomena are different. Global warming is the rise in global temperatures due to an increase of heat-trapping carbon emissions in the atmosphere. Climate change, on the other hand, is a more general term that refers to changes in many climatic factors (such as temperature and precipitation) around the world.

The world mostly agrees that something needs to be done about global warming and climate change. With global warming on the increase and species and their habitats on the decrease, chances for ecosystems to adapt naturally are diminishing. Many are agreed that climate change may be one of the greatest threats facing the planet.

Lighting

If lighting is unshielded, nighttime construction activity or equipment maintenance can attract and disorient native birds. On a permanent basis, unshielded streetlights may have a similar effect.

4.13.4 Mitigation Measures

The following mitigation measures will be incorporated into the Legacy Program.

Air Quality

Standard dust control and construction equipment emission control measures will be implemented as necessary to reduce temporary impacts to air quality during construction activities.

Construction equipment will be required to meet all applicable emission standards and Best Management Practices will be followed to reduce any fugitive dust during construction activities.

Lighting

All construction activities will integrate lighting mitigation measures to reduce lighting impacts. Any streetlights that may be installed as part of the Legacy Program will be shielded to reduce the potential for interactions of nocturnally flying native birds with external lights and man-made structures. This minimization measure will both minimize the threat of disorientation and downing of native birds and fully comply with Hawai'i County Code § 14 - 50 et seq., which requires the shielding of exterior lights so as to lower the ambient glare to the astronomical observatories located on Mauna Kea.

Climate

Tropical reforestation can mitigate global warming because trees sequester carbon through photosynthesis, converting carbon dioxide and water into oxygen and plant matter. Hence, forests that grow in area or density will reduce atmospheric CO₂ levels. (Carbon is released if a tree or its lumber burns, but as long as the forest is able to grow back the net result is carbon neutral.)

Carbon offset can best be described as an act of paying a third party for reducing ("offsetting") greenhouse gas emissions when one is unable or unwilling to reduce one's own emissions. Some countries (or companies) seek to trade emission rights in carbon emission markets, purchasing the unused carbon emission allowances of others.

The idea of paying for emissions elsewhere instead of directly reducing your own emissions is closely related to the concept of emissions trading. However, while emissions trading is mostly in a strict formal and legal framework, carbon offsets generally refer to voluntary acts, often arranged by a commercial carbon offset provider.

Carbon credits are a key component of national and international emissions trading schemes that have been implemented to mitigate global warming. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing market price. Credits can be used to finance carbon reduction schemes between trading partners and around the world.

There are also many companies that sell carbon credits to commercial and individual customers who are interested in lowering their carbon footprint on a voluntary basis. These carbon off setters purchase the credits from an investment fund or a carbon development company that has aggregated the credits from individual projects. The quality of the credits is based in part on the validation process and sophistication of the fund or development company that acted as the sponsor to the carbon project. DHHL will retain any carbon credit opportunities that are created due to the management and actions on the property.

4.13.5 Level of Impact after Mitigation

The Legacy Program will not have a significant adverse impact on air quality or climate, even without mitigation. Compliance with existing requirements and the implementation of mitigation measures described above will ensure that the air quality will remain in compliance with the State and NAAQS and therefore no significant impacts are expected.

4.13.6 References

Faucette, David T. 2009. Draft Environmental Assessment for Construction of a 275-acre Fence Enclosure South of Waikoloa Village.

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Oceanit. 2006. Honokaia Pastoral Lands Subdivision Final Environmental Assessment, Honokaia, Hāmākua District, County of Hawai'i. Prepared for the Department of Hawaiian Home Lands.

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State of Hawai'i, Department of Transportation, Highways Division & U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division. 2009. Saddle Road Improvement Supplemental Environmental Impact Statement, County of Hawai'i, State of Hawai'i.

4.14 Natural Hazards

This section discusses the natural hazards which may affect the 'Āina Mauna including flooding, hurricanes, volcanic activity and earthquakes.

4.14.1 Environmental Setting

Flooding

Based on the latest available (DLNR's on-line Flood Hazard Assessment Tool) Flood Insurance Rate Map for the area, the project site lies outside a defined floodplain (Zone X, map not printed.)

Hurricane

The island of Hawai'i is uniquely exposed to hurricanes due to its varied topography dominated by five mountains, which can lead to complex hurricane wind acceleration patterns, as well as its exposure as the eastern most location in the Hawaiian Islands chain.

Volcanic Activity

The potential for renewed volcanic activity in this region is extremely remote. Mauna Kea last erupted about 4,600 years ago, and the volcano is considered dormant. In 1997, Wolfe and others mapped a dozen separate post-glacial (post-10,000 year old) eruptive vents on Mauna Kea's middle flanks, but none younger than 40,000 years were found in the summit area.

Earthquakes

Hawai'i Island is one of the most seismically active areas on Earth, and about two dozen earthquakes with magnitude 6 or greater have been documented on Hawai'i since the devastating earthquakes of 1868. Earthquakes will continue to impact the Mauna Kea region in the future, and any future construction must include design considerations for significant seismic forces.

4.14.2 Thresholds Used to Determine Level of Impact

In accordance with the Chapter 343 significance criteria, the Legacy Program will result in a significant impact if it affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone or geologically hazardous land. A significant impact will occur if the Legacy Program affected or suffered damage by being located in an environmentally sensitive area.

4.14.3 Potential Environmental Impact

Flooding

The project does not involve construction within a 100-year flood plain (Zones A or V), and it does not involve a "critical action" within a 500-year flood plain. Site Preparation and construction of the proposed project is not anticipated to result in flooding of the project site or lower elevation properties, thus it is consistent with applicable regulations and guidance relating to floodplain management.

Hurricane

The Central Pacific Hurricane season runs from June 1 to November 30. On average each year 4 to 5 tropical cyclones, which include tropical depressions, tropical storms and hurricanes, develop in or move into the central north Pacific Ocean.

Approximately one-third of these tropical cyclones reach hurricane strength. While there are changes in tropical cyclone frequency over a period of decades, there is no clear, long-term trend. Increase tropical cyclone activity in the basin appears tied to the El Nino phenomenon, which is marked by an increase in sea surface temperatures along the equatorial regions of the central and eastern Pacific Ocean. Since 1971, 4 of the 5 most active central Pacific hurricane seasons are associated with El Nino years.

Volcanic Activity

The U. S. Geological Survey determines volcanic hazard maps. The zones are ranked from 1 through 9 based on the probability of coverage by lava flows, with Zone 1 being the highest hazard and Zone 9 being the lowest.

The 'Āina Mauna is within Zone 2. Zone 2 has had approximately 15-25% covered by lava since 1800. This zone is characterized by areas adjacent to and down slope of active rift zones. Since portions of the 'Āina Mauna (M2, R4, P1, H1, H2) lies between Mauna Kea and Mauna Loa, this rating is not surprising.

Earthquakes

Because Hawai'i Island is in a seismically active area, the Legacy Program will comply with applicable regulations and standards, with the design for all structures meeting all applicable seismic safety codes to ensure life safety of personnel and visitors.

The Uniform Building Code (UBC), prepared by the International Conference of Building Officials (ICBO), rating system is based on a scale of 1 to 4, with a rating of 4 having the highest risk associated with seismic activity. The Hawai'i County Building Code requires that all new structures be designed to resist forces to seismic Zone 4 standards. The UBC recommends that the Island of Hawai'i meet the UBC standards for Seismic Zone 4, as well.

As stated previously, structures designed under seismic Zone 4 standards must resist seismic design loads based on the seismic importance factor, seismic use group, mapped structural response accelerations, S_s and S₁, seismic design category, and other factors corresponding to the specific location and characteristics of the building under consideration.

4.14.4 Mitigation Measures

Impacts from natural hazards can be mitigated by adherence to appropriate civil defense evacuation procedures. DHHL will coordinate with the State of Hawai'i Department of Defense, Office of Civil Defense regarding civil defense measures, necessary to serve the property.

Additionally, the initial homestead community will have two access roads, (one access onto the Saddle Road and one access on to Keanakolu Road) allowing alternative routes in and out of the community during an emergency. It is believed that the access point used by the adjoining rancher to access the Saddle Road is on DHHL property. If so, that will be the access used by the homestead community. If not, the access will be in same the vicinity (on DHHL land). An alternative access will be over existing ranch roads that lead to Keanakolu Road.

DHHL will also be looking at the opportunity to integrate new technologies and house design (size, shape of windows etc) in the mitigation of potential impacts from natural hazards.

Flooding

The 'Āina Mauna Legacy Program will be consistent with applicable regulations and guidance relating to floodplain management. Thus, as stated previously, the proposed projects are not anticipated to result in flooding.

Hurricane

The Uniform Building Code (UBC) prepared by the International Conference of Building Officials, details "Prescriptive Details for Hurricane-Resistant Construction" (1991 UBC Appendix Chapter 25). These prescriptive details help buildings withstand wind acceleration and gusts from hurricanes. Buildings within the 'Āina Mauna will be built with these prescriptive details, where applicable.

Volcanic Activity

The Hawai'i County Code relating to the Universal Building Code does not address lava flows, however measures to address potential risks, such as developing emergency evacuation procedures, may be devised by the homestead association and DHHL.

Earthquakes

As stated previously, structures designed under seismic Zone 4 standards must resist seismic design loads based on the seismic importance factor, seismic use group, mapped structural response accelerations, S_s and S_1 , seismic design category, and other factors corresponding to the specific location and characteristics of the building under consideration. Thus, in accordance with the Hawai'i County Code, all permanent structures will be designed to resist forces to seismic Zone 4 standards.

In addition, the design of the structures will incorporate techniques to minimize the seismic risk of potential damage. With these measures, the likelihood of damage will be lessened, and the risk will be less than significant.

4.14.5 Level of Impact after Mitigation

The Legacy Program will not have a significant impact on natural hazards. Compliance with existing requirements and the implementation of mitigation measures described above will ensure that no significant impacts are expected.

4.14.6 References

County of Hawai'i Civil Defense Agency in coordination with the Planning Department and Department of Data Systems with assistance from consultants Dr. George Curtis and Planner Brian Nishimura. 2005. Multi-Hazard Mitigation Plan: County of Hawai'i.

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4.15 Fire

This section discusses fire hazards and fire safety in the region and specific Legacy Program areas, the potential impacts of the Legacy Program on fire hazards and the mitigation measures the Legacy Program will employ to mitigate potential impacts.

4.15.1 Environmental Setting

In 2007, the DHHL Land Management Division developed a Wildland Fire Management Plan for Humu'ula/Pi'ihonua Mauka. This fire plan was re-approved in 2011 by the Hawaiian Homes Commission and represents the current fire management policy and strategy for the Humu'ula and Pi'ihonua Mauka lands of the Department of Hawaiian Home Lands, Hawai'i Island.

The 'Āina Mauna has many resource values to be protected, all of which are beneficial to future homestead communities. Primary concerns include the protection and augmentation of native koa (*Acacia koa*) forests that provide habitat for native fauna and may be utilized in sustainable forestry production. Introduced grass ecotypes provide ranching opportunities that supply food for livestock and a culturally rich paniolo (cowboy) lifestyle.

Historically, DHHL has relied on lessees or neighboring landowners for fire planning and mitigation. Due to recent lease terminations and potential uses of these Hawaiian Home Lands for homesteading, DHHL has assumed these fire planning and mitigation responsibilities.

Fire appears to be a relatively infrequent, low intensity disturbance in native Hawaiian ecosystems, occasionally ignited by lava flows or lightning strikes. It is generally agreed that fire was not an important aspect of the evolution of native ecosystems. However, there are some native species that have been shown to be fire tolerant including māmane, naio, 'ōhelo and native bunchgrass. However, none of these species require fire to regenerate and all can be killed by intense fire.

Protection of basic resources, such as soil and water, will sustain eco-processes and make available more productive and verdant lands. Proactive approaches and fire mitigation will aid in suppressing unwanted wildland fires on Hawaiian Home Lands while ensuring adjacent lands, primarily state and federal, are not adversely affected. Prevention and suppression of fires will protect existing ecosystems that are fire intolerant while managing fire fuels like gorse and most grasses at Humu'ula.

Vegetation variations are patterned by elevation, temperature and rainfall, with some exceptions due to general topography, soils and underlying geologic substrate, and microclimate. There are several remnant patches of high elevation native forests scattered amongst primarily introduced grasses and shrubs at Humu'ula.

The introduced species in the area are the product of a long history of grazing and subsequent land conversion from high elevation native forest ecosystems to pasture lands. Remnant native forests that can still be found in the project area are koa/'ōhi'a, pūkiawe shrub complex, and high elevation māmane/naio. The dominant introduced species are non-native grasses, primarily composed of kikuyu grass, sweet vernal grass and narrow-leaved carpet grass, the invasive shrub gorse and timber trees that have been planted for research and as windbreaks near areas of former habitation.

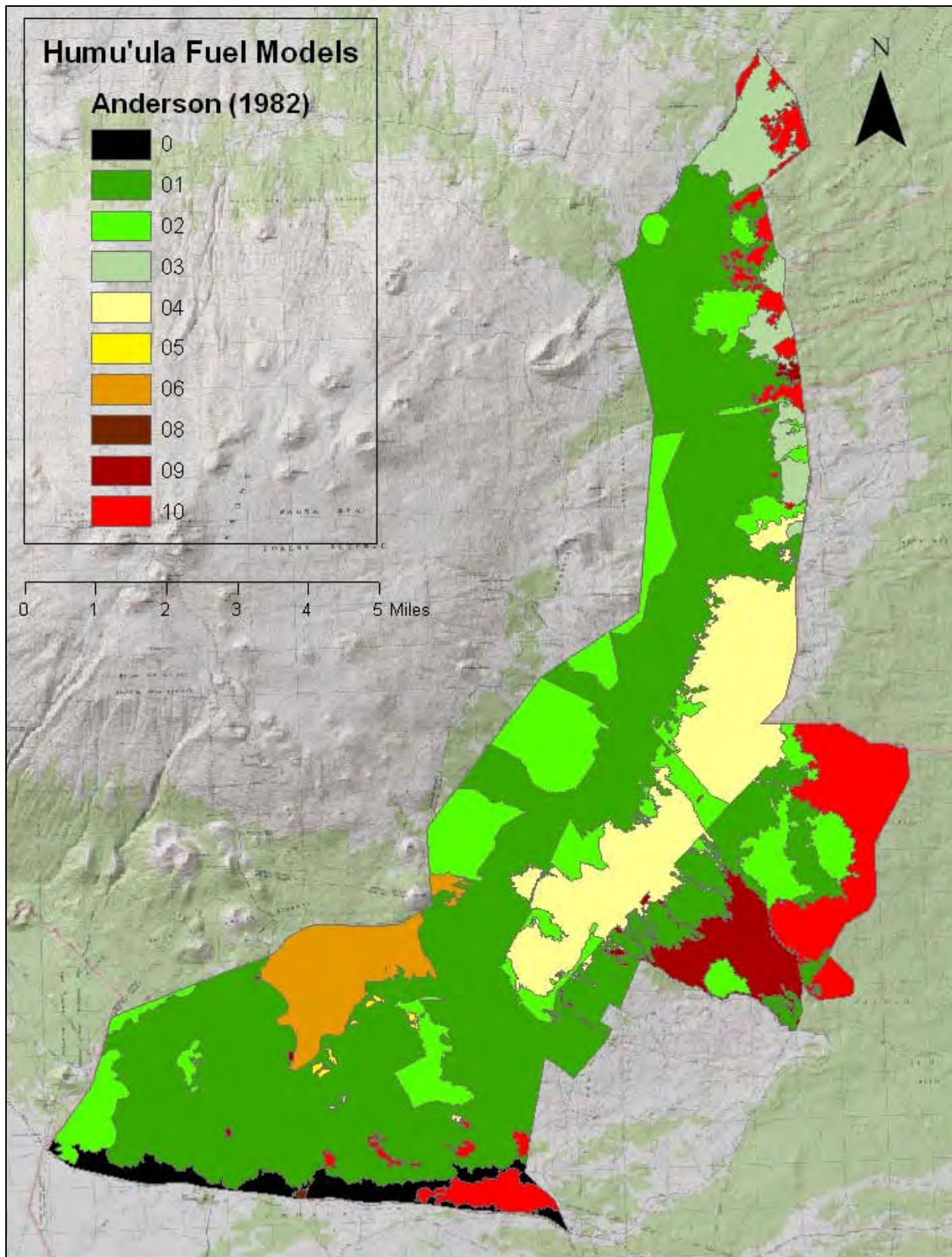
The most notable fuel type is the noxious weed gorse. In combination with grasses, gorse constitutes the greatest fire risk. Hazard fuel reeducation strategies include treatment of hazard fuels and debris disposal including:

- Physical treatment can be accomplished by hand cutting or utilizing specialized equipment.
- Prescribed burning of gorse, in combination with timely herbicide applications, reduces biomass, stimulates gorse seed germination to deplete the gorse seed bank and is cost effective for large, inaccessible areas. Additional care must be taken during prescribed burn applications as dead biomass is more flammable.
- If additional bio-control release is necessary than strict guidelines and a continued monitoring program is necessary. Bio-control agents that have been released require sufficient habitat to be effective. Spraying and burning significant portions of these habitat areas should be avoided until the bio-control's effectiveness is accurately determined.
- Cattle or other grazers may be utilized as a cost effective way to reduce fuel load in approved areas and under strict management guidelines to avoid conversion from one undesirable fuel to another, e.g. tall grass to gorse.
- Reducing forest fuel loads in strategically located areas can occur through selective manual thinning and appropriate treatment of logging slash. This reduces ladder fuels and overly dense and potentially fire prone tree canopies.
- Applying low intensity, management-ignited, prescribed fire can reduce surface fuels and simulate the effects of natural low intensity fire.
- Reducing hazard fuels and removing hazard trees around DHHL structures diminishes fire risk to said structures.

Fuel management units (FMU) and identified fuel models at Humu'ula were used to develop management recommendations by DHHL and are shown in the table below. The following surface fuel types were mapped in Humu'ula and identified for fire management purposes utilizing Andersons (1982) Fuel Models For Estimating Fire Behavior.

Table 4.15.1.1 Fuel Models Found at Humu'ula

FUEL MODELS FOUND AT HUMU'ULA		
Fuel Model by Acres at Humu'ula (DHHL)		
Fuel Model	Description	Acres
Model 0	lava, open areas	978
Model 1	annual grasslands	21,031
Model 2	annual grasslands and shrubs and/or timber trees	6,239
Model 3	grasslands that are coarse structured, above knee level (most intense burning grass)	1,467
Model 4	large shrubs with significant dead component (most intense burning shrub)	4,811
Model 5	short green shrubs	60
Model 6	medium green/dead shrubs	1,722
Model 8	timber with little to no under story, light fuel loading	11
Model 9	timber with some under story, moderate fuel loading	1,293
Model 10	timber with heavy under story and/or midstory, greatest total fuel load (most intense burning timber)	3,236
	Total Acres	40,848



Map of Humu'ula Fire Models - DHHL

Although koa can be killed by intense fires, seeds in the soil often survive and can be stimulated to germinate after fire. Healthy forest cover at Humu'ula reduces the risk of wildfire by reducing surface temperature fluctuations, increasing relative humidity, and reducing wind speeds. In most cases, introduced species such as gorse and introduced grasses, are better adapted to fire than native plants. As a potential fuel, these introduced species represent a significant increase in fire risk at Humu'ula, especially the highly flammable shrub gorse.

The greatest wildfire threat to human life and property in Humu'ula is within the wildland-urban interface where astronomy facilities on Mauna Kea, ranch homes, state lodging facilities, and U.S. Fish & Wildlife Service lodging and structures intermingle with pasture and forested lands. There is only one reliable access route to and from the Mauna Kea summit and it passes through Humu'ula lands. There are two reliable exits from Humu'ula itself in the event of wildland fire but that access is limited to 4 x 4 vehicles. Terrain there is hilly with frequent ravines. The few jeep trails that are accessible by the Keanakolu/Mana road can be hazardous and are relatively impassable during the rainy season.

There are several important issues that define Humu'ula's wildland fire predicament:

- Threat of wildfire spread to or from adjacent properties/sensitive resources;
- Fire-prone shrubland and grasses;
- Limited access in the form of ingress/egress routes in the event of wildfire;
- Lack of reliable water sources for firefighting;
- Public unawareness of the threat of wildfire at Humu'ula.

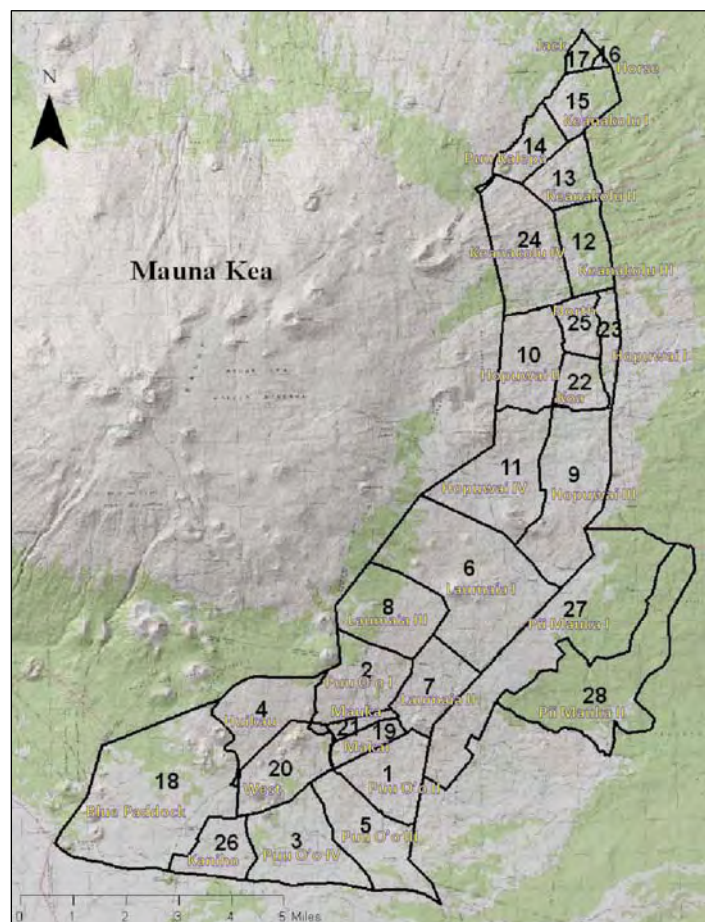
Fire Management Units

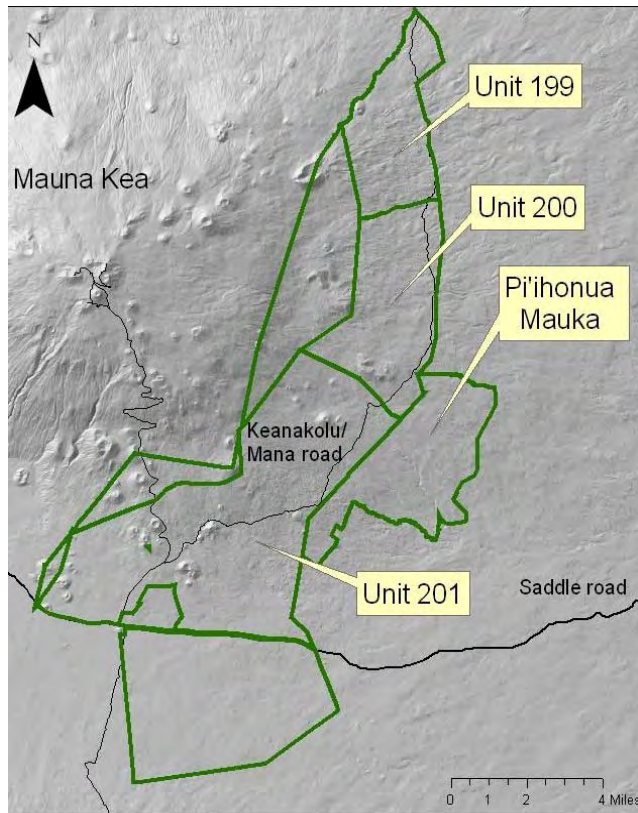
Twenty-eight Fire Management Units (FMU's) have been created in ArcGIS using traditional and proposed ranching paddocks.

These FMU's in combination with the Humu'ula Fuel models may be utilized to make informed fire management decisions.

These FMU's benefit managers and homesteaders by providing essential fire behavior information for examination to be used for a prioritized focus on specific fuel types at Humu'ula.

Map of Traditional and Potential Cattle Removal Blocks at 'Āina Mauna (Historic Paddocks) - DHHL





Humu'ula/Pi'ihonua Data Collection Units - DHHL

The Project Area was further analyzed using four data collection units: 199, 200, 201 and Pi'ihonua Mauka, that correspond to former pasture leases.

Each data collection unit is slightly different and defined by its physical and biological characteristics.

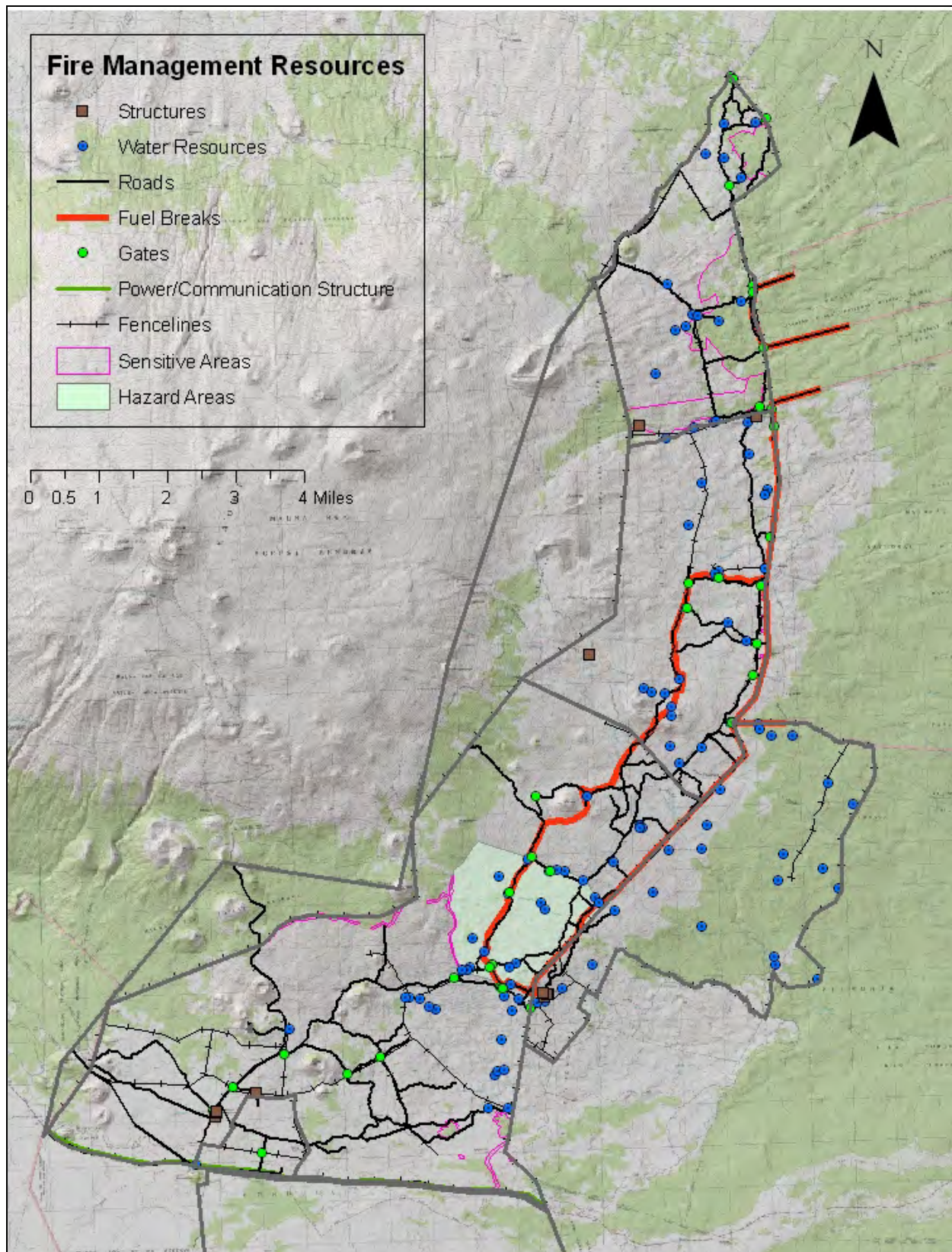
Data collection unit 199 is most representative of native forests prior to the introduction of cattle with native koa/'ōhi'a forests at lower elevations and māmane at higher elevations. This unit has a heavy kikuyu grass component at lower elevations eventually thinning out to less dense open pasture grasses with increase in elevation. There are few introduced plants in this area besides pasture grasses. Introduced trees and saplings can be found along state boundaries and banana poka has been found within DHHL boundaries. Only a few individual gorse plants have been found in this area and are treated and monitored annually.

Data collection unit 200 is dominated by the main gorse infestation which is located along Keanakolu/Mana Road. The main gorse infestation begins near Pu'u 'Ō'ō in Unit 201 and ends just north of the gated entrance to Hakalau Forest National Wildlife Refuge in unit 200.

Lands mauka (towards the mountains) of the gorse infestation are dominated by introduced grasses with pockets of small māmane forests. North of the Hakalau Forest National Wildlife Refuge entrance there are small groups of remnant old growth koa forest and introduced grasses. There are pockets of native species communities that thrive in the ravines here and consist of koa, 'ōhi'a, and diverse native shrub and tree understory. Remnant koa can be found interspersed within the gorse infestation.

Data collection unit 201 is composed of scattered māmane and introduced pasture grasses west of Mauna Kea access road. There are pūkiawe native mix shrub complexes south of Keanakolu/Mana road with occasional remnant koa/'ōhi'a forests interspersed throughout the area. These remnant koa/'ōhi'a forests are very diverse with many native understory species. The dominant vegetation is introduced grasses and large incipient populations of gorse.

The main gorse infestation begins along the northeastern boundary of this unit near Pu'u 'Ō'ō. There is a large band of high elevation native māmane/naio forests mauka of Keanakolu/Mana road upon entry from the Mauna Kea access road. These native populations are relatively intact and should be considered a valuable natural and cultural resource in the event of wildland fire.



Map Identifying Fire Management Resources of 'Āina Mauna - DHHL

Pi'ihonua Mauka was most recently leased as Pu'u 'Ō'ō Ranch until the early 1990s and there are still quite a few feral cattle in this area. This unit is made up mostly of introduced grasses with a significant 'ōhi'a over-story. Access, especially during wet periods, is very difficult. There are sporadic patches of gorse in the mauka grasslands and gorse populations established along stream courses and gullies. The makai portion of the unit is mostly 'ōhi'a forests with occasional large koa trees and a few stumps indicating past logging.

Areas comprised of fire-prone trees or shrubs are especially hazardous as these fires are more intense and cause more extensive damage to resources when wildfire occurs. In Humu'ula the most hazardous fuel type has been identified as gorse.

Fire History

During the period between 2000 and 2008, Humu'ula was exposed to periodic drought conditions and ten fires occurred (Table 1). In fires from 2000 to 2002 and in November, 2011, the primary fuel was gorse. The 2006 fire fuels were grass and scattered remnant māmane and the Piha fire was scattered koa/māmane forest and pasture grasses. All ten fires were human caused. In 2007, there was one fire to the north of the Humu'ula boundary on other state agency lands. This fire occurred in a grass fuel type. The fire north of Humu'ula was caused by lightning.

Table 4.15.1.2 - Wildland Fire History at Humu'ula (2000-2008)

Name of Fire	Inclusive Dates	Approximate Acreage
'A'ahuwela	2/24/00 - 2/26/00	1400
'A'ahuwela II	3/16/00	3
Maulua	7/28/00 - 8/1/00	5
Pi'ihonua	8/16/00 - 8/18/00	200
'A'ahuwela	1/04/01 - 1/06/01	3
Gorse Fire	6/23/01	0.5
Pua Ākala Gorse Fire	11/7/02 - 11/13/02	250
Sheep Station West	11/06	760
Piha	3/1/08-3/6/08	2,970
'A'ahuwela	11/08	538

Fire Protection

Primary responsibility for fighting fires within the 'Āina Mauna rests with the Hawai'i County Fire Department, with backup provided by the Department of Land and Natural Resources Division of Forestry and Wildlife if requested. The Army Pōhakuloa Training Area assists on fires that affect adjacent State and private lands, as well. PTA has a fire station with a 25-personnel firefighting detail, extensive firefighting equipment and infrastructure such as dip tanks and a system of firebreaks.

The Hawai'i County Fire Department provides multiple emergency services for the Big Island, including fire suppression, emergency medical services (EMS), and hazardous materials mitigation. The county is divided into two battalion areas, East and West, with one Assistant Fire Chief for each battalion area. There are twenty full-time fire/medic stations and twenty volunteer fire stations, with over sixty pieces of equipment available for a variety of emergencies that may occur on the island.

4.15.2 Thresholds Used to Determine Level of Impact

The Legacy Program will result in a significant impact if it will result in an increase of fire potential leading to a substantial degradation in environmental quality. Thus, the Legacy Program's impact will be considered to be significant if it will result in increased fire hazards that could substantially impair the biological and cultural resources of the property.

4.15.3 Potential Environmental Impact

Fire could originate at a construction or staging area. Firefighting in this rugged habitat is difficult. A fire could destroy large portions of habitat before it could be controlled. The Legacy Program could increase the likelihood of wildfire caused by human activity. Fires in dry areas of Hawai'i have been ignited by construction activities, cigarettes thrown from car windows, by hot catalytic converters of vehicles driving through tall grass, and by arsonists.

Construction fires can largely be controlled by proper management, and the chief fire risk is the increase in ignition potential from arson or accidental fires within an area that is currently not highly subject to fire starts. Improvements and the addition of the roads in the area will increase the number of vehicles traversing the area and thus, increase the number of visitors to the area.

The Legacy Program will also bring fire-fighting benefits, including on-going creation of road firebreaks and fuel-breaks to impede the spread of fires, and increased water for firefighting activities. Each homestead will be responsible for providing fire suppression systems on their property. If homesteaders wish to secure fire insurance, they may be required to provide water tanks on-site for fire protection.

4.15.4 Mitigation Measures

The Humu'ula/Pi'ihonua Mauka Wildland Fire Management Plan and the Humu'ula/Pi'ihonua Mauka Community Wildfire Protection Plan both serve as a guide to prevention and management of fire in the Legacy Program area. Thus, the Legacy Program implements portions of these plans and will use these plans for fire management in the Legacy Program area.

Humu'ula land managers have identified several hazards and are taking steps to reduce and mitigate them to protect public health, on and off site structures, and sensitive resources using an integrated and proactive management approach that includes the following elements:

- Map Fire Management Resources (completed)
- Determine Fuel Models for Estimating Fire Behavior (completed)
- Improve and/or augment the existing Fuelbreak Network (in progress)
- Reduce fire-prone shrubs and other hazardous fuels (in progress)
- Improve and maintain access/egress throughout Humu'ula (in progress)
- Improve access to fire management resources such as water (in progress)
- Design and implement a Wildfire Awareness program for Humu'ula (in progress)

An aggressive program of reducing the presence of gorse outside of the containment area will continue to reduce the area of land at risk from intensive gorse fires. Strategies for reducing introduced pasture grasses, which are the second most dangerous fuel type at Humu'ula, may also be employed.

Grazing can play a key role in managing these grass fuel types and may assist in the control of undesirable shrubs. However, it is important that close coordination is used with ongoing gorse eradication efforts because cattle and other ungulates are primary vectors of gorse. Reducing the gorse infestation while managing fire hazards from grass via grazing is a challenging yet possible solution to reducing hazardous fuels at Humu'ula.

Pasture Uses to Address Wildfire Mitigation

Wildfire can quickly destroy important yet fragile assets of DHHL's lands. The Humu'ula and Pi'ihonua Mauka areas are especially vulnerable because of their remoteness, and the flammable fuel types found there. The closest public fire station is located in Hilo 25-miles away. Thus, the prevention of wildfires is of the upmost importance if homesteading is to take place in this area. One way to help control wildfire fuels is through pasturing in selected areas.

In 2007 DHHL produced the report "Pasture Recommendations at Humu'ula for Controlling Wildfire Fuels". This report discusses the harm that cattle have had on the Humu'ula landscape over the years, as well as how pasturing can help reduce fire risks in the future.

Since cattle leases expired in 2002, many areas have little or no cattle present and important natural resources at Humu'ula have begun to show significant recovery. This recovery is most evident in the mauka and certain makai areas of Humu'ula where water and/or feed is limited and feral cattle have not yet congregated.

Giving this land "a rest" after more than 150 years of grazing is beneficial to the landscape by minimizing soil loss and allowing natural processes to recover the area's productivity. Mauka areas (7,600 – 8,000-ft. elevation) are exhibiting a re-growth of the historic native Hawaiian ecosystem, including māmane, pūkiawe, and other species. Makai and gulch areas up to about 7,000-foot elevation are seeing a resurgence of koa natural regeneration.

Reintroducing cattle to these recovering areas will be a setback for the natural resources while contributing minimally to the priority reduction of fire fuels. The "Pasture Recommendations at Humu'ula for Controlling Wildfire Fuels" report suggests areas for cattle licensing which will:

- Reduce wildfire fuels most at risk from ignition
- Avoid the spread of gorse by ungulates
- Generate income from cattle ranching
- Ranch the most suitable areas based on soils and estimated animal units per year (AUY's)
- Continue the natural recovery of most lands at Humu'ula

Wildfire fuel types were mapped throughout Humu'ula and Pi'ihonua Mauka in 2007 as part of a DHHL Fire Management Plan. Using GIS technology, these fuel types were analyzed to determine where pasturing might be most beneficial to accomplish the five objectives listed above.

The Keanakolu/Mana Road is a county road open to public access. Along this road corridor, therefore, is an area at greatest risk from heavy fuels being ignited by a careless visitor.

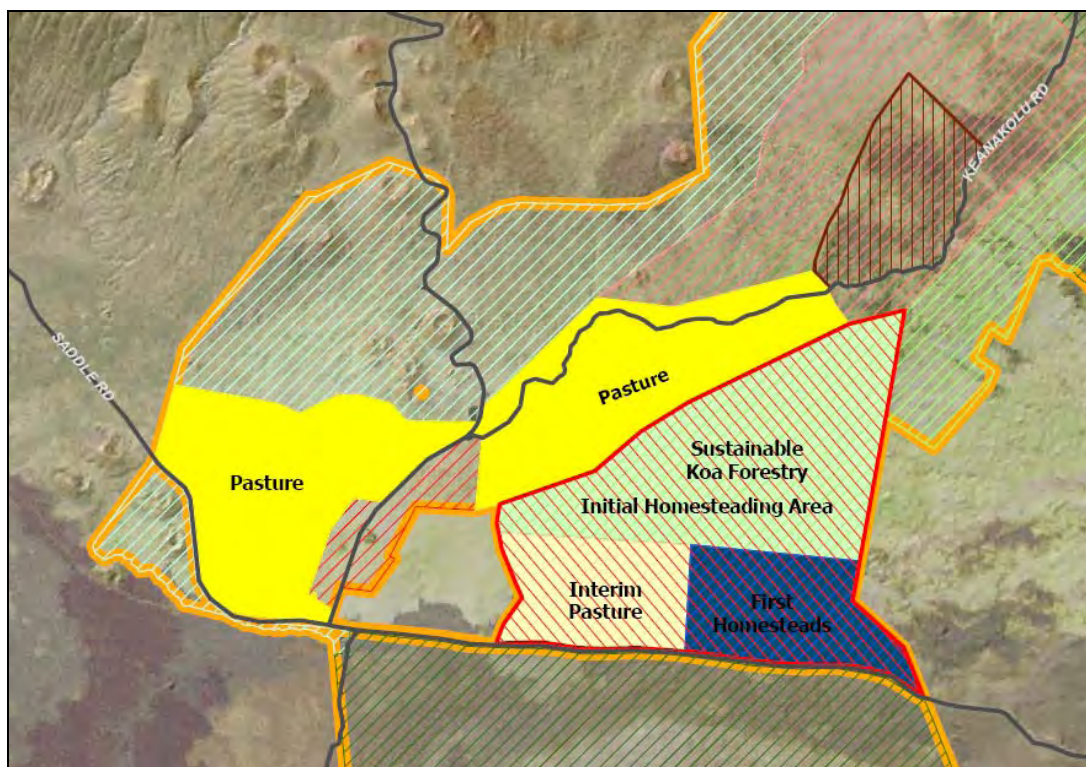
The rest of Humu'ula/Pi'ihonua Mauka is much less at risk because of its limited access and DHHL's no hunting policy. In short, most fires are started by humans and the limited human presence at Humu'ula greatly reduces the risk.

Control of fuels along the Keanakolu Road corridor is further complicated, however, by the presence of heavy gorse infestations in certain areas along the corridor. The presence of cattle in areas of medium to heavy gorse should be avoided as cattle easily spread gorse. Alternatively, in areas of light gorse infestations cattle can act as a tool for revealing isolated, young gorse plants so eradication strategies can be fully employed.

Careful coordination of ranching and gorse eradication efforts is needed. For example, cattle should not be grazed in light gorse infestation areas while gorse plants are actively seeding. Cattle can pick up gorse seed pods in their hair and tails and move it far distances in a short period of time.

The designated gorse containment area has an established grass fuel break surrounding it and is further segmented and surrounded by access roads. Eventually this entire buffer will be planted with trees, resulting in a shaded, cooler, and a wetter understory that is less susceptible to wildfire and the spread of gorse.

In the interim, wildfires originating inside the gorse containment area could be controlled by quickly "blacklining" the grassed fuel break and using backfires to determine the acceptable size of the gorse fire. If the spread of gorse is to be minimized, cattle should not be grazed in the gorse containment area or its grassed buffer as the risk of moving gorse seed outside through the sale or escape of cattle is high.



Map Noting Potential Pasture Areas for Fire Mitigation

For Humu'ula South the Pasture Recommendations at Humu'ula for Controlling Wildfire Fuels report indicates ideal grazing areas south of the gorse infestation and along Keanakolu Road where fuels will be reduced, gorse movement will be minimized, best AUY's exist, and natural recovery of adjacent lands could continue.

Additional acreage pasture use is proposed for approximately 4,000-acres (these land areas are approximate references) - with about 2,000-acres designated for pasture along the Keanakolu-Mana Road and another 2,000-acres on the west side of the Mauna Kea Access Road (below the Radio Tower site and fronting Saddle Road and Mauna Kea Access Road.) These areas proposed for additional acreage for pasture use are consistent with the Fire Plan and are proposed to be immediately available for beneficiary use. Additional acreage pasture use could also be in the form of Community Pasture. Land reserved for future homesteads, beyond the initial area noted on the map above, is available for interim pasture use (in the south-eastern portion of the property - approximately 1,000-acres).

This land is ultimately proposed for homesteading in the Initial Homesteading Area, however, while the homesteads are planned and awaiting development, in the interim, this land can be used as pasture. So, whether beneficiaries obtain a homestead or not, there is the opportunity for direct beneficiary benefit and use through additional acreage for pasture use.

Existing, improved and new roads across the property will serve enhance management access and serve as firebreaks. The gaps in vegetation the roads create act as a barrier to slow and/or stop the progress of wild fires. Firebreak management is a low-cost method of addressing the issues of wildfire hazards, property damage and increased access to management areas.

Operations will follow applicable law to insure the control and prevention of possible fire hazards. The Legacy Program will be specifically designed to reduce the probability of fire ignition from accidental and purposeful actions.

In addition, the following mitigation measures will be incorporated into the Legacy Program:

- Existing roads will be improved and additional roads on the property will enhance management access and serve as firebreaks. Grassed roadways will be mowed as needed to reduce grass height and minimize catalytic converter fire starts.
- Grazing in selected areas will help reduce grass fuels types and may assist in the control of undesirable shrubs.
- DHHL will install additional mile marker and fire risk signs along Keanakolu Road. Sign information will be based upon the National Fire Danger Rating System.
- To minimize the risk of wildfire during construction, requirements will mandate that all construction activity shall be restricted within the clearly delineated areas.
- Operations within the forestry project areas will follow applicable laws to ensure the control and prevention of possible fire hazards, as well as herbicide application and site preparation in the gorse project area.
- Fire breaks between tree species and gorse will be used to minimize fire losses.
- Access to the Legacy Program site may be limited during the salvage and reforestation activities, if fire risk is heightened.

- Construction projects will be required to develop and employ a Fire Prevention and Response Plan. The Fire Prevention and Response Plan will outline steps to be taken during construction activities to decrease the chance of fire.
- Motorized equipment will be properly maintained and inspected regularly for possible ignition sources.
- Motorized equipment will be equipped with fire extinguishers. The extinguishers will be appropriately sized to respond to that piece of equipment catching fire for any reason.
- Contractors will also be required to notify the local fire department of activities and coordinate with them on a regular basis. Construction personnel will be required to have cell phones or other communication equipment that provides coverage at the work site that can be used to contact the fire department immediately in the event of a fire.
- Implementation, periodic review and as-needed updating of the Humu'ula/Pi'ihonua Mauka Wildland Fire Management Plan and the Humu'ula/Pi'ihonua Mauka Community Wildfire Protection Plan will continue.

4.15.5 Level of Impact after Mitigation

The Legacy Program will not have a significant impact on increased fire hazards. Compliance with existing requirements and the implementation of mitigation measures described above will ensure that the area is not impacted by fire from Legacy Program activities.

4.15.6 References

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4.16 Recreation and Tourism

This section discusses recreation and tourism in the region and within the Legacy Program area, the potential impact of the Legacy Program on those activities, and mitigation measures that Legacy Program will employ to mitigate potential impacts.

4.16.1 Environmental Setting

Currently Hawai'i Forest and Trail, a Big Island eco-tourism company, has a license to use portions of the 'Āina Mauna for eco-tourism activities. They utilize the Humu'ula Sheep Station area as a rest area for eating and orientation.

The Big Island Soaring Association has a Revocable Permit to access Pu'u Loa and conduct non-commercial paragliding activities in return for controlling and eradicating gorse on and around the pu'u.

Recreational Trends and Demands

There are two elements in the value of any commodity: what you pay for it and the additional benefit you derive from it over and above what you pay for it. If there were no additional benefit, you will most likely not buy it since you could spend your money on an alternative good that will give some additional benefit. Surveys show people are almost always willing to pay more for recreation than they actually spend. Economists call this additional value "consumer surplus" or "net economic value."

Ecotourism visitors pay for recreation through entrance fees, lodging and purchases from local businesses for items to pursue their recreational experience. The spending generates economic activity through the local economy. Some of that money "leaks" out of the local area (thus called "leakage") and some are recycled through the local economy (the "multiplier effect").

Recreation is a special kind of good. Eco-tourists pay for their recreation not only in entrance fees but in the costs of traveling and staying and taking time away from other activities.

The 2009 State Comprehensive Outdoor Recreation Plan Update built upon the 2003 SCORP, which concluded that a general decrease in leisure time has influenced the demand for more recreational opportunities close to home. This decrease is due to a rise in single adults and working women, as well as an increase in the national median work week.

The top five priority issues for the 2009 update as determined from the agency and public meeting discussions and survey results are:

- Protection of natural and cultural resources;
- Management of recreation resources and facilities;
- Meeting the needs of recreation users;
- Access to recreation resources; and
- Funding.

Surrounding Uses

The location of Humu'ula can be taken advantage of by potential ecotourism operators. Its proximity to a variety of unique places can be added to its appeal. Surrounding recreational and tourism related uses include the Hale Pōhaku Astronomical Facility, the Mauna Kea Science Reserve, the Hakalau Forest National Wildlife Refuge and various State forest and natural area reserves.

Hakalau Forest National Wildlife Refuge

Hakalau Forest National Wildlife Refuge consists of the 33,000-acres Hakalau Forest Unit and the 5,300-acre Kona Forest Unit, located at elevations between 2,000 and 6,600-feet on the east and west sides of the island of Hawai'i. The sloping terrain is forested with some of the finest remaining stands of native montane rainforests in Hawai'i.

The Refuge was established to conserve endangered forest birds and their habitat. Together, the two units support 9 endangered bird species, 1 species of endangered bat and more than 20 rare and endangered plant species.

Major habitat management programs include the control and removal of feral pigs and cattle, control of invasive weeds, restoration of native forests and wildfire suppression. Major wildlife management programs include population monitoring, predator control and biological research support.

The refuge permits pig hunting and select portions of the NWR are limitedly open to the public for hiking and photography.

Mauna Kea

Hale Pōhaku, a support facility for the astronomical research on Mauna Kea, is located on the Mauna Kea Access Road west of the Humu'ula land parcel at approximately the 9,200 foot elevation. Hale Pōhaku has been used as a construction camp/astronomical research support facility to house people working on the summit for acclimatization purposes. There are several buildings and stone cabins in the area.

The Mauna Kea Science Reserve is located at the summit of Mauna Kea and includes the Mauna Kea Observatory. With ideal natural conditions and a critical mass of world class telescope facilities, Mauna Kea has become a premier site for astronomical research. Along with the scientists have come steady streams of visitors taking part in summit tours and stargazing programs at the Visitor Information Station (VIS).

Additionally, during snowfalls, the summit area can attract 200 vehicles on busy days. Vehicles park alongside roadways and visitors play (ski, snowboard, sled etc) nearby. The Humu'ula Sheep Station Economic Analysis states that potential eco-tourism activity in the vicinity of the Mauna Kea Summit could be as substantial as, perhaps, 150 to 180 people per day.

Natural Area Reserve System (NARS)

The State of Hawai'i Natural Area Reserve System (NARS) is managed by DOFAW. Hiking and nature study (in groups of 10 or less) are permitted within these areas. All reserves are open to the public for recreational hunting, based on DLNR rules (HAR § 13-209-3). Environmental education programs occur on several of these reserves (DLNR 2003).

Mauna Kea Ice Age Natural Area Reserve is located west of the Humu'ula land parcel between the elevations of 10,400 and 13,200 feet. The Pōhakuloa Gulch (formed by glacial melt water), Lake Waiau (one of the highest lakes in the United States), and the Keanakako'i Adze Quarry, are all features of the Reserve.

The Mauna Kea Ice Age NAR is a rare alpine desert ecosystem with the state's only alpine lake. It also contains important cultural resources at an ancient Hawaiian adze quarry site. The area is first and foremost a refuge, but hiking and nature study are permitted. Laupāhoehoe NAR and Kīpāhoehoe NAR are also nearby.

Wildlife Sanctuaries

Several wildlife sanctuaries were established throughout the island to protect indigenous wildlife (HRS, Sections 13-125). These sanctuaries are managed by DOFAW. Within these sanctuaries, it is prohibited to remove, disturb, kill or possess any form of plant or wildlife and to introduce any form of plant or animal life. Also, human activity is strictly limited.

The Pu'u Wa'awa'a Forest Bird Sanctuary is found within the Pu'u Wa'awa'a Forest Reserve. The Kīpuka 'Āinahou Nēnē Sanctuary is open to the public, except November-February. Birds and game mammals may be hunted within the Kīpuka 'Āinahou Nēnē Sanctuary (HAR § 13-125)

Forest Reserve System

The State of Hawai'i Forest Reserve System, managed by DOFAW, consists of 22-Forest Reserves encompassing 448,000-acres. This system is guided by the Hawai'i State Constitution, Hawai'i Revised Statutes Chapter 183, and Hawai'i Administrative Rules, Chapter 104. Camping, gathering activities, commercial harvest, hunting, and other uses are permitted on the forest reserves by permit (HAR § 13-104).

Numerous forest reserves owned and managed by DLNR are located adjacent to or near the subject parcels. The Hilo Forest Reserve is located adjacent to the eastern boundary of the land parcel. The Upper Waiākea Forest Reserve is located outside of the property boundaries, adjacent to the southeastern boundary. The Mauna Loa Forest Reserve is located adjacent to the southwestern portion of the land parcel and the Mauna Kea Forest Reserve is located within the western portion of the property on the higher elevations.

Wildlife Observation

Opportunities for wildlife observation are plentiful on the Island of Hawai'i. During 2006, it is estimated that 262,000 individuals (both residents and visitors) participated in wildlife watching in the State. Approximately 16% of the resident population in Hawai'i participated in wildlife watching activities during the time period. Tourists also enjoy natural resources on the island. Each year, roughly 50,000- visitors to Hawai'i Island purchase tours where they are exposed to native species.

According to the 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation published by the USFWS, about 48-million Americans over the age of 16 observe birds every year. Participation in wildlife-watching (of which birds constitutes a significant portion) away from home is up by 5% as a recreationalist pursuit since 2001.

Watching birds continues to be an attractive non-consumptive activity. Birding can occur in virtually any wildlife habitat open to the public and just about any time of the year. Moreover, recreationalists find that birds are usually accessible, attractive and can serve as a functional portal to other aspects of nature-study. Watching birds can also be a high-quality activity for children and families and provided a great way to introduce them to the natural world.

Nationally, wildlife observation and photography of wildlife continue to grow. In FY 2006, birding visits to 80 USFWS National Wildlife Refuges were over 3.6-million, averaging 3.3-hours per visit. Birding also has considerable expenditures associated with visitation.

Camping

Camping is permitted within three State parks: Hāpuna Beach State Recreation Area, Kalōpā State Recreation Area and Manukā State Wayside. Maximum length of stay is limited to 5 consecutive nights.

In addition to tent camping, four State parks offer cabin lodging. Hāpuna State Recreation Area has four-person A-frame shelters available. At the Kalōpā State Recreation Area, the State rents eight-person cabins. The Manukā State Wayside offers six-person cabins and Mauna Kea State Recreation Area offers cabins which can accommodate six-people.

Ten County of Hawai'i facilities permit overnight camping and camping permits are required in order to camp at all county parks. These permits can be obtained from the Department of Parks and Recreation main office or online. The maximum camping period is 1 week during the summer (June-August) and 2 weeks during the remainder of the year.

Trails

DOFAW's Na Ala Hele Program maintains and provides access to state hiking trails. Established in 1988, Na Ala Hele offers approximately 97 trails throughout the State. The purpose of the program is to "preserve and perpetuate the integrity, condition, naturalness and beauty of State trails and surrounding areas and to protect ... environmental resources" (HRS Chapter 198D; HAR, Title 13, Chapter 130).

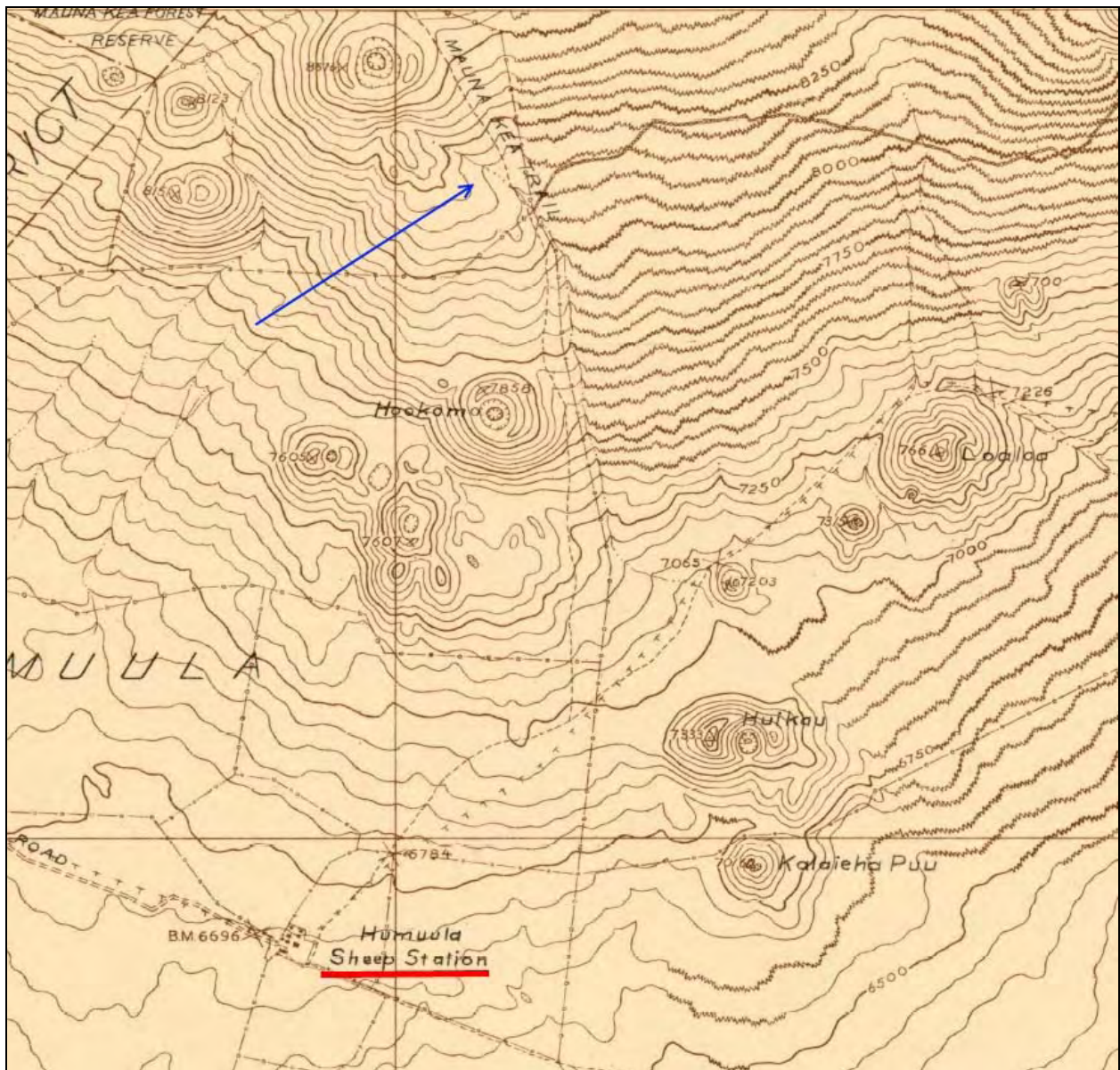
On the island of Hawai'i, the system maintains 16 trails. Trails in the immediate vicinity of the 'Āina Mauna include Kaluakauka Trail (0.4 mi); Humu'ula Trail (10.5 mi); Mauna Kea Access Road/Hunters Road (32 mi); Kaūmana Trail (3 mi); and Onomea Trail (0.5 mi).

Native trails, portions of which, on the ascent to the summit, and around the base of Mauna Kea, are overlaid by modern routes of access. Following is a summary of some of the historic trails that are on or near the 'Āina Mauna property:

Trails of Humu'ula - Mauna Kea

- Mauna Kea-Humu'ula Trail (Kalai'eha-Wai'au Trail) (ancient trail between Kalai'eha and the summit of Mauna Kea) (generally parallels Mauna Kea Access Road)
- Waimea-Kula'imano trail (cutting across the lands of Ka'ohe, Hāmākua and Hilo), running above the forest line and to the coast of Hilo (earliest recorded improvements date from 1854)
- Upper trail between Kula'imano-Makahānaloa

- Alanui Aupuni (Trail between Hilo and Waimea via Kalai'eha) and (Trail from Kalai'eha towards Kula'imano-Makahalanaloa, and around through Hanaipoe-Mānā and Waimea)
- 'Umikoa-Ka'ula Trail
- Kemole-Pu'u Nanahu Trail
- Old foot trail from Kalai'eha, past Kalepeamoa, Keonehe'ehe'e and up to the summit.
- Early Saddle Road
 - o Kalai'eha-Waipunalei section of the road to Waimea
 - o Kalai'eha-Waiki'i route
 - o Kalai'eha-Hilo section of the road
 - o Routes diverging to Kalai'eha and Pu'u 'Ō'ō



Humu'ula-Mauna Kea Trail - USGS Quad

[illegible]

A few trails are located at the northern most point of the property near the Keanakolu ranger station. The Ka'ali'ali trail runs along the higher elevations near the western boundary of Humu'ula. The Kahinahina trail extends from the western boundary to near the Waipāhoehoe gulch and on to Laumai'a Corral near the Pí'honua boundary. Another trail follows the Nauhi gulch and provides access to the Kanakaleonui cabin. Several other trails exist in Humu'ula, as well.

The Humu'ula-Mauna Kea Trail runs from the Sheep Station to Lake Waiau in the Mauna Kea Ice Age Natural Area Reserve.

Horseback riding and bicycling are possible along existing jeep trails and could be further enhanced by defining and marking scenic routes with interpretive and destination signs.

Humu'ula Sheep Station

The Humu'ula Sheep Station is located at a transportation crossroad, in a region that abounds with recreational, environmental, cultural and educational resources. There is tremendous potential to develop the Humu'ula sheep station in a way that complements and enhances the enjoyment of these resources. It is also proposed as a staging area for other activities across the property.

4.16.2 Thresholds Used to Determine Level of Impact

The Legacy Program will result in a significant impact if it involves a substantial degradation of environmental quality. Therefore, the Legacy Program impact will be considered to be significant if it negatively affected recreation and tourism in the area.

4.16.3 Potential Environmental Impact

The Legacy Program will prove beneficial in terms of increasing recreational opportunities in the area. While access to the area will be limited with areas fenced off in order to protect the project site, guided groups will be admitted, and have an opportunity to experience and see a rehabilitating native forest.

The recovery may bring with it a return of native flora and fauna which might not otherwise been seen in the current state. The creation of new trails and roads will allow those who may not otherwise be able to visit the area to do so. These trail and roads will also help protect the area from fire so that out-planting sites may be better protected which will increase the aesthetic and recreational opportunities within the area.

Ecotourism and recreation related activities, a growing sector of the island's visitor industry, have great potential within the 'Āina Mauna due to the natural resources of these lands. Other than providing an area, such as the Humu'ula Sheep Station, to service and manage these activities, these uses and activities could be integrated and managed within other proposed economic uses. The Humu'ula Sheep Station may serve as a central site to coordinate eco-tourism activities over the property.

Eco-tourism uses typically have a small footprint and limited impact. Ecotourism can provide a valuable economic use for an area, which, until now, has not been utilized to its full potential and which do not require permanent structures or impact.

The potential eco-tourism uses and activities include:

- Biking Tours
- Hiking Tours
- ATV* Tours
- Horse Drawn Wagon Tours
- Camping
- Lodge
- Nature Tours
- Horseback Tours
- Wilderness Resort
- Guest Ranch
- Historical Tours
- Bird Watching Tours
- Volunteer “Service” Trips
- Hunting

These uses will increase the amount of people that enter the ‘Āina Mauna. With an increase in people comes an increase in the potential for the spread of invasive species, natural resource degradation and safety issues. The mitigation measures to combat these impacts are described in the section below.

4.16.4 Mitigation Measures

Applicants entering into a license agreement with DHHL for ecotourism activities will be required to adhere to numerous equipment and procedural requirements for the health and safety of visitors, as well as protection of the area’s natural and cultural resources.

In order to help assure that the activities are respectful, careful and safe, operators will have to:

- Adhere to required procedures/equipment protocols. Such requirements may include:
 - Minimal amount of water available per guest
 - Proof of CPR and First Aid training for all employees working within the subject property
 - Ability to communicate (via radio/satellite phone) with emergency services while conducting activities within the subject property
 - Provide portable toilet facilities and proper disposal of all waste
 - Provide liability insurance
 - Provide proof of vehicle insurance for all vehicles accessing the subject property
 - Mandatory helmet use for all guests engaging in bicycle/ATV/horseback riding activities
 - Provide safety briefing and demonstrations on use of all equipment/animal used by guests before commencing an activity
 - Maintain activities within approved designated areas
- Include volunteer “service” trip components to augment the reforestation and invasive species control activities
- Incorporate cultural, natural resources and safety briefing to guests
- Incorporate cultural, natural resources and safety employee/volunteer training program

Guided Tours and Educational Briefings Reduce Risks of Impact to the Resources

Resource managers generally agree that a group of people having first been given an educational briefing about appropriate/inappropriate behavior and then led into an area under the watchful eye of a guide has a lower risk of harm to the resources compared to a like number of people not having an educational brief and venturing out on their own.

The recently updated (2008) State Comprehensive Outdoor Recreation Plan (SCORP) addresses opportunities to reduce the impact to the resources through guided tours and educational briefings. In addition, the UH Sea Grant College Program Newsletter highlights resource protection success at Hanauma Bay following the implementation of their education program at the bay.

Following are some quotes from these documents:

Guided Tours Can Reduce Impacts on the Resources (SCORP 2008-Update)

"Commercial operations, such as guided tours, can promote more appropriate visitor activities and the level of commercial activity can be regulated to reduce impacts on the resources and set times aside for residents' use of an area."

Educational Briefing Minimizes Impacts on the Resources (SCORP 2008-Update)

"During the 1980s, it was not uncommon to see visitors to Hanauma Bay walking on top of the coral reefs in addition to feeding fish bread and peas. A direct consequence of these actions resulted in serious, long-term damage to the Bay's ecosystem. To combat the potential damage caused by visitors, the City and County of Honolulu, in partnership with the University of Hawai'i's Sea Grant College Program, developed the Hanauma Bay Education Program. Before entering the park, visitors are required to watch a six-minute video that emphasizes not only the bay's unique ecological features, but also simple ways to have an enjoyable experience while minimizing one's impact on the reef."

"In addition to increasing the amount of people visiting a natural area, the actual type of use and behavior of the user can have a significant impact on the natural resource, as well. For example, a low-impact recreational activity such as hiking assumingly has less impact on the environment than a high-impact type of use such as OHV (Off Highway Vehicle) riding. User behavior, however, should also be taken into consideration with type of use. The hiker that goes off trail and extracts fragile resources could have a more damaging impact on the environment than a responsible OHV rider that stays within designated trail areas. Therefore, to address increased usage of an area, there also needs to be an increase in education on type of use and behavior for that area."

Educational Briefing Minimizes Impacts on the Resources (UH Sea Grant College Program Newsletter)

"Now, each of the one million annual visitors to the (Hanauma) Bay is shown a short orientation video that prepares beach-goers on what to expect regarding the protected reef habitats of the Bay, and informs all visitors of appropriate reef etiquette. This brings to life the unique nature of the Bay and ways each visitor may lessen their environmental impact or 'footprint.' Prior to the introduction of the education orientation, it was estimated that approximately half of Hanauma Bay's visitors stood or walked on the reef. That estimate has now been reduced to less than two percent of Hanauma Bay's visitors. While it is clear that this expanded knowledge has had a profound impact on the health of Hanauma Bay's ecosystem, this knowledge is also carried with them once they leave our shores and ultimately, translates into more conservation-minded individuals." *Source: Ka Pili Kai University of Hawai'i Sea Grant College Program - Vol. 29, No. 4 - Winter, 2007-08*

‘Āina Mauna Legacy Program’s Impacts to Recreation

Activities proposed for ‘Āina Mauna lands have been considered because they are able to co-exist. The variety of uses proposed were chosen in part for their ability to not interfere with other activities proposed for the ‘Āina Mauna.

4.16.5 Level of Impact after Mitigation

The mitigation measures proposed will make the level of impact of the Legacy Program’s increased tourism and recreational uses less than significant.

4.16.6 References

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4.17 Site Preparation and Construction

This section discusses the potential site preparation and construction impacts related to the natural and built environment and the potential mitigation measures that could be employed. Site preparation and construction effects will be temporary.

Various project site preparation and construction projects could begin as early as 2011. No unusual site preparation or construction techniques or materials are anticipated. During site preparation and construction related activities, DHHL will comply with all applicable rules and regulations.

4.17.1 Potential Environmental Impacts

Several of the actions addressed in the Environmental Assessment require site preparation in order to implement the action. In some cases, this is limited to tree and other vegetation removal, while others will require grading and leveling of portions of the site.

Site preparation in areas for forest recovery, sustainable koa and timber to fight gorse, are focused on maximizing the successful establishment of the targeted species while protecting soil structure and properties for long-term health of the ecosystem.

The purposes of forest-related site preparation include:

- reduce the competition of unwanted vegetation in order to increase the survival and growth rate of the desired trees
- reduce slash and logging debris if the site has been harvested, and
- prepare or modify the soil to achieve greater outplanting success

Ultimately, the process is designed to provide better light, nutrients and moisture to make conditions favorable for germination, survival and growth. This may be accomplished using two general means, physical treatments and chemical treatments.

Physical site preparation for vegetation removal with can be divided into three categories:

- Burning unwanted vegetation
- Mulching or crushing vegetation in place
- Removing vegetation from the planting areas

Burning and/or mulching/crushing has proven to be an effective means to remove unwanted vegetation with limited impact to the surrounding area. Likewise, physical removal of vegetation using brush blades on heavy equipment, although more costly, can also be an effective unwanted vegetation removal alternative.

Primary means of physical removal of vegetation include discing, scarifying and/or brush blading an area by scrapping the vegetation off. Applications may involve heavy or light equipment, or simply hand-labor. In addition, a means proposed by the 'Ōiwi Lōkahi O Ka Mokupuni O Keawe group in their experimental gorse removal and processing proposal is to pull the plants (roots and all) from the soil. The gorse is then proposed to be processed through a gasification technique with carbon and bio-fuel the end products.

There are challenges associated with these two physical removal alternatives: exposure of soils that could lead to soil erosion and run-off, and breakdown in the soil structure. These can be mitigated through incorporation of Best Management Practices in the implementation activities, scattered patch clearing (rather than landscape scale,) alternative use of equipment (brush blade versus flat blade, tire versus track vehicle, etc) and adding supplements (fertilizers and organic matter) to the soil. Likewise, wherever feasible, when using heavy soil-moving equipment elevation contours will be followed.

Chemical site preparation involves the use of various herbicides to kill vegetation. Application of all chemicals will be done in accordance with registered uses, directions on label and all other applicable federal, state and local policies, and it is expected that there will be minimal impact on soils and surrounding environment.

The physical and chemical treatments for vegetation control and/or removal may also be used in site preparation for construction and other actions addressed in this Environmental Assessment. On a small scale, site grubbing and grading will be necessary to prepare for the foundation of proposed improvements (Administrative Base Facility, Outplanting Centers, Remote Accommodations, Sheep Station improvements, Commercial activities, Development, Construction, Road, Water system and Fence installation/maintenance, etc.)

Heavy equipment including bulldozers, rippers, excavators, loaders, jack hammers, backhoes, dump trucks, pick-up trucks, boom-mounted flatbed trucks, asphaltic concrete hauling trucks, pavers and rollers will be employed, and diesel-powered generators may be used if on-site temporary electric power is required.

Activities will occur in phases and involve short-term, temporary impacts from site preparation, cutting, filling, trenching, backfilling and clean-up operations. Activities and facilities may require minimal leveling of ground but will not require significant soil excavation; therefore, site preparation will have a negligible effect on the environment.

Environmental impacts associated with the site preparation and construction phase of a Legacy Program are generally localized and temporary in nature. Anticipated impacts include noise from heavy construction equipment, fugitive dust from earthmoving activities, air pollutant emissions from internal combustion engines, and soil erosion and sedimentation.

Construction activities will include site preparation, foundation construction, drainage structure construction or installation, preparation of roads, and clean up. Construction will also generate solid waste in the form of packaging from building materials, detergents, paint, metals and solvents.

Due to the 56,000-acre size of the Legacy Program area, it will not be feasible to implement the entire Legacy Program at one time. Because of the expected levels and timing of construction, with implementation of mitigation measures, construction-related impacts are not expected to be significant. Necessary construction-phase permits will be obtained and complied with including:

- National Pollutant Discharge Elimination System (NPDES) and component Best Management Practice (BMP) plan
- Noise permit
- Noise variance
- Oversize and Overweight Vehicles Permit (OOVP)

4.17.2 Mitigation Measures

Mitigation measures for all phases and types of project site preparation and construction include:

- Focus and priority is to restore the native ecosystem
- Conform to all laws, codes, rules and regulations
- Mandatory 'Āina Mauna cultural, natural resources and safety briefing detailed in section 4.2, for all who enter the property including contractors.
 - Contractors are required to incorporate the 'Āina Mauna cultural, natural resources and safety briefing into their programs. This requirement will be included in the various permit conditions and in all other contracts. The training program will be updated regularly to incorporate changing conditions within the region.

The potential construction impacts are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the project type and location. Applicable rules, regulations and requirements will include OSHA, and necessary permits.

To maintain compliance, the Program will develop and implement the various plans and programs outlined in this EA. These plans and programs will include policies and procedures to be employed during construction as well as long-term operation. They will be a requirement of any lease or license for construction activities on site.

The plans and programs that will contain construction phase policies include:

- Invasive Species/Pest Management and Control Program
- Waste Management Plan
- Spill Prevention and Response Plan
- Ride-Sharing Program
- Fire Prevention and Response Plan

The following mitigation measures have been identified to minimize potential impacts:

Cultural, Archaeological and Historic Resources

- Pre-analysis of cultural, archeological and historic resource will be conducted prior to on site disturbance.
- If evidence of any archeological or culturally significant site is encountered during construction or vegetation clearing, work within 25-feet of the finding will suspended and the State Historic Preservation Division will be contacted.
- The Legacy Program will consult with SHPD, and the 'Āina Mauna Legacy Program Implementation Advisory Council to establish appropriate protocols if Cultural/Archaeological/Historic items are found.
- In order to mitigate any impacts to cultural and historic resources, everyone who visits/enters the area, including contractors and their staff, will be required to participate in a mandatory 'Āina Mauna cultural, natural resources and safety briefing. The Briefing will be used to raise awareness and appreciation of the area being experienced.

Biological Resources

- Legacy Program activities will be appropriately altered if endangered or threatened species' are observed during timber harvest.

- If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to bats and forest birds, the areas and trees scheduled for harvest will first be reviewed by a qualified land manager, biologist, forester, etc prior to timber harvest. The DLNR and the USFWS, will be notified if the 'ōpe'ape'a is found to be in trees planted for commercial timber purposes and scheduled for harvest.
- The total amount of land disturbance will be minimized. The construction contractor will be limited to the delineated construction work areas within the Legacy Program area or clearly marked staging areas.

Visual and Aesthetic Resources

- The location and design of the proposed Legacy Programs will incorporate measures that mitigate the potential visual impacts.

Power

- Use of renewable energy and energy-conserving techniques.

Geology, Soils and Slope Stability

- Compliance with applicable seismic safety regulations and standards in the design of structures to meet applicable codes to ensure the safety of personal.
- Site preparation will be conducted in such a manner as to minimize the amount of exposed soil at any one time.
- Applicable laws will be followed to minimize soil movement, erosion and compaction during site preparation.

Water Resources and Wastewater

- Catchment, water re-use and water conservation measures will be implemented.
- Stock ponds and reservoirs within 50-yards of Keanakolu Road that are used by nēnē will be closed and not used and the existing reservoir near Mauna Kea Access Road will be fenced, to keep nēnē away from road areas.
- To the extent possible, existing stock ponds and reservoirs will be used for pasture and irrigation for reforestation to mitigate attracting nēnē to the property.
- Conformance with applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."
- Development of proper protocol for disposal and management of wastewater (composting toilets, gray water reuse.)
- Required practices include avoiding disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing dips, water bars and cross drainage on roads and skid trails to minimize erosion will be followed.

Solid and Hazardous Waste and Material Management

- Collecting all solid waste in secured and covered storage containers and trucking it down the mountain for proper disposal at an off-site disposal facility.
- Recycling solid and non-hazardous waste material and reusing them to the extent possible.
- DHHL will encourage through contract specifications the use of durable materials that will require less frequent replacement, reducing the amount of construction waste generated over time.

Traffic

- The Legacy Program will include onsite field worker accommodations and encourage Ride-Sharing Programs for employees who do not stay onsite during the week.
- Construction traffic will be limited as much as possible, particularly traffic related to hauling heavy equipment, to minimize interaction with vehicular traffic on the existing roads.

Noise

- Generators will be used only when needed.
- Whenever construction noise is expected to exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction.
- The number of vehicles accessing the area will be reduced through onsite field worker accommodations and Ride-Sharing Programs.

Air Quality

- Standard dust control and construction equipment emission control measures will be implemented as necessary to reduce temporary impacts to air quality during construction activities.
- Water or a dust palliative may be applied as necessary to minimize particulate pollution. Areas to receive such treatment will include unpaved access roads, staging sites and construction areas where the movement and operation of construction equipment produces airborne dust.
- Construction equipment will be required to meet all applicable emission standards and be maintained in good working order.

Lighting

- To avoid the potential downing of native birds by their interaction with external construction lighting, no construction or unshielded equipment maintenance lighting will be permitted after dark between the months of April and October.
- All construction lights will comply with Hawai'i County Code § 14 – 50 et seq., which requires the shielding of exterior lights so as to lower the ambient glare to the astronomical observatories located on Mauna Kea.

Fire

- To minimize the risk of wildfire during construction, requirements will mandate that all construction activity shall be restricted within the clearly delineated areas.
- Fire breaks between tree species and gorse will be used to minimize fire losses.
- Access to the Legacy Program site may be limited during the salvage and reforestation activities, if fire risk is heightened.
- Construction projects will be required to employ a Fire Prevention and Response Plan. The Fire Prevention and Response Plan will outline steps to be taken during construction activities to decrease the chance of fire.
- Smoking will be restricted at construction sites to avoid starting fires.
- Welding and grinding will be restricted to designated areas at least 20-feet from any combustible materials, including dry grass, and will not be performed during periods of high wind.

- Motorized equipment will be properly maintained and inspected regularly for possible ignition sources. Carburetors and motors will be required to have protective screens and covers to reduce the likelihood of heat sources starting fires.
- Motorized equipment will be equipped with fire extinguishers.
- Construction personnel will be required to have cell phones or other communication equipment that provides coverage at the work site that can be used to contact the fire department immediately in the event of a fire.

Mitigation measures related to construction impacts are also provided in more detail in other sections of this chapter, including Chapter 4 sections 4.2-4.17).

4.17.3 Level of Impact after Mitigation

Prior to the implementation of the mitigation measures described above, the potential impact was found to be less than significant. The implementation of the mitigation measures will serve to further reduce the potential impacts related to Legacy Program construction, to a level less than significant.

4.17.4 References

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program Implementation Work Plan. Prepared for the Department of Hawaiian Home Lands.

Ho'okuleana LLC. 2009. 'Āina Mauna Legacy Program. Prepared for the Department of Hawaiian Home Lands.

PB Americas. 2009. Draft Environmental Impact Statement for the Proposed TMT Observatory.

PBR Hawai'i. 1997. Humu'ula/Pi'ihonua Master Plan.

State of Hawai'i, Department of Hawaiian Home Lands. 2001. Final Environmental Assessment, Koa Salvage-Reforestation and Gorse Containment, Humu'ula, Island of Hawai'i.

State of Hawai'i, Department of Transportation, Highways Division & U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division. 2009. Saddle Road Improvement Supplemental Environmental Impact Statement, County of Hawai'i, State of Hawai'i.

Chapter 5 – Laws, Regulations, Land Use Plans and Policies

This chapter discusses laws, regulations, land use plans and policies on the County, State and Federal level in relation to the 'Āina Mauna Legacy Program. This chapter will explore the 'Āina Mauna Legacy Program's potential land use planning effects and its compatibility with existing land uses.

Compliance with existing regulations and requirements and the implementation of the mitigation measures proposed above, will ensure that the Legacy Program will not result in a significant impact on current land programs and policies in the area. The implementation of the mitigation measures identified will serve to further reduce any potential impacts the Legacy Program may have on land use.

Land use impacts that will result from implementing the 'Āina Mauna Legacy Program include temporary construction-related impacts, direct impacts associated with use the area, and indirect impacts resulting from changes in the character and use of the area. Construction activities will be expected to result in short-term impacts on land uses. These impacts include construction noise and dust, and community disruption.

The potential impacts of the Legacy Program are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the project type and location.

Overall, since the Legacy Program will be consistent with all applicable land use regulation and will not conflict with the applicable land use plans, it will not result in a significant land use planning impact in the State of Hawai'i or on the Island of Hawai'i.

The following sections examine the Legacy Program's compliance with applicable land use plans and policies.

5.1 County of Hawai'i

County General Plan

The General Plan for the County of Hawai'i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan was adopted by ordinance in 1989 and revised in 2005. The General Plan itself is organized into thirteen elements, with policies, objectives, standards and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i.

County General Plan Policies For Housing - Chapter 9.2 Goals

- (a) Attain safe, sanitary and livable housing for the residents of the County of Hawai'i.
- (b) Attain a diversity of socio-economic housing mix throughout the different parts of the County.
- (c) Maintain a housing supply that allows a variety of choices.
- (d) Create viable communities with affordable housing and suitable living environments.
- (e) Seek sufficient production of new affordable rental and fee-simple housing in the County in a variety of sizes to satisfactorily accommodate the needs and desires of families and individuals.
- (f) Ensure that housing is available to all persons regardless of age, sex, marital status, ethnic background and income.
- (g) Make affordable housing available in reasonable proximity to employment centers.
- (h) Encourage and expand home ownership opportunities for residents.

This project will result in up to a potential of 100-200 additional homesteads. These will be affordable in the form of long term leases with DHHL. The homesteads will be subdivided to accommodate the needs of families and individuals identified by DHHL. This project will comply with the County of Hawai'i General Plan policies for housing.

DHHL is not subject to the County General Plan. Additionally, the County General Plan does not address this project or project area directly. However, the plan does state that soil conservation in areas mauka of urban areas is important for flood control.

Hawai'i County Subdivision and Zoning Regulations

As stated above, DHHL is not subject to the County General Plan. However, the County zoning designation is Agriculture. The General Plan Land Use Pattern Allocation Guide Map designation for the Legacy Program area is Open. Forestry is a permitted use within the Agricultural and Open designations.

Section 25-5-70. Purpose and applicability. The A (agricultural) district provides for agricultural and very low density agriculturally-based residential use, encompassing rural areas of good to marginal agricultural and grazing land, forest land, game habitats, and areas where urbanization is not found to be appropriate.

The existing County zoning is Ag-40; however, under provisions of the Memorandum of Agreement dated January 7, 2003, between DHHL and the County of Hawai'i, Section III "Relating to Planning and Land Use", DHHL asserts its land use authority over Hawaiian Home Lands through its General Plan, Hawai'i Island Plan and ultimate designation of the appropriate County zoning district.

5.2 State of Hawai'i

Hawai'i State Plan, HRS Chapter 226

Adopted in 1978 and last revised in 1991, the plan establishes a set of themes, goals, objectives, and policies meant to guide the long term growth and development within the state. The three themes are individual and family self-sufficiency, social and economic mobility, and community and social wellbeing.

The Legacy Program will contribute to the diversification of the State's economic base by generating economic benefits associated with forestry industries, protecting and restoring native forests with significant natural resources; and providing for educational access to the its facilities, thereby supporting research programs and activities that enhance the education programs of the State. The combination of generating new revenues to the state and local economies, providing new and stable employment opportunities, and enhancing educational opportunities will enhance the quality of life, as well as the community and social wellbeing on the island. Therefore, the Legacy Program will be consistent with the Hawai'i State Plan objectives.

The Department of Hawaiian Home Lands is exempt from land classification requirements for homestead development. Sections of the Hawai'i State Plan which are applicable to the 'Āina Mauna Legacy Program are discussed in the following pages.

Under Section 226-4 State Land Use Goals include:

- (1) A strong, viable economy, characterized by stability, diversity and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations.
- (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- (3) Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

The Legacy Program will be consistent with all these policies and will enhance economic diversity in the area, economic stability and community responsibility for native Hawaiian residents of the 'Āina Mauna.

§226-5 Objective and policies for population:

- a) It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.
- (b) To achieve the population objective, it shall be the policy of this State to:
 - (1) Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each county.
 - (2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.
 - (3) Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.
 - (4) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.

This Legacy Program will promote increased opportunities for native Hawaiians through ranching and land stewardship, encourage economic activity through ranching and agriculture, and will guide growth and development to Hawaiian Home Lands as directed by the Hawaiian Home Lands Commission Act of 1920.

§226-6, HRS: Objectives and policies for the economy:

Sustainable koa, gorse eradication, ecotourism, Humu'ula Sheep Station reuse, commercial uses and other projects will increase employment opportunities and will add to the growth of the forest industry on the island of Hawai'i.

§226-7, HRS: Objectives and policies for the agriculture:

The restoration, timber and koa harvesting projects are consistent with the state's objective to diversify the agricultural industry.

§226-10, HRS: Objectives and policies for the economy - potential growth activities:

The restoration, timber and koa harvesting projects will add to diversification of the forest industry through employment opportunities in research, education, production and manufacturing.

§226-11 Objectives and policies/or the physical environment-land-based, shoreline & marine resources:

(a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:

- (1) Prudent use of Hawai'i's land-based, shoreline, and marine resources.
- (2) Effective protection of Hawai'i's unique and fragile environmental resources.

(b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:

- (1) Exercise an overall conservation ethic in the use of Hawai'i's natural resources.
- (2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
- (3) Take into account the physical attributes of areas when planning and designing activities and facilities.
- (4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- (5) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.
- (6) Pursue compatible relationships among activities, facilities and natural resources.

Each homesteader shall be responsible for complying with conditions of ranch plans and home site parcels resulting in the conservation of resources, sustainability of development and the avoidance of costly or irreparable environmental damage.

The restoration, timber and koa harvesting projects, exercise a conservation ethic in the use of natural resources and serves to protect Hawai'i's unique and fragile environmental resources.

§226-13, HRS: Objectives and policies for the physical environment - land, air & water quality:

The restoration, timber and koa harvesting projects will improve the quality of Hawai'i's land, air and water resources by limiting the use of fire and herbicide to limit gorse expansion; minimize erosion and enhance water catchment through reforestation; and improve air quality through carbon sequestration.

§226-19 Objectives and policies for socio-cultural advancement-housing:

- (a) Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:
- (1) Greater opportunities for Hawai'i's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawai'i's population.
 - (2) The orderly development of residential areas sensitive to community needs and other land uses.
 - (3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawai'i's people.
- (b) To achieve the housing objectives, it shall be the policy of this State to:
- (1) Effectively accommodate the housing needs of Hawai'i's people.
 - (2) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style and size of housing.
 - (3) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.
 - (4) Foster a variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods that reflect the culture and values of the community.

The Legacy Program will advance each one of the objectives above. The Legacy Program will specifically advance lifestyles traditional to Hawai'i through the design of a neighborhood that reflects the culture and values of the native Hawaiian community with an economic and sustainable use of the land in the form of ranching.

§226-20, HRS: Objectives and policies for the socio-cultural advancement - health:

The koa and gorse projects will maintain environmentally healthful conditions by limiting the use of herbicides and fire by providing a natural barrier to contain gorse.

§226-21, HRS: Objectives and policies for the socio-cultural advancement - education:

The koa project will enhance understanding of Hawai'i's cultural heritage through reforestation. The project will provide employment training programs and other related educational opportunities.

State Land Use Law, HRS Chapter 205

Administered by the Land Use Commission. All lands in the State of Hawai'i are classified into one of four major land use districts: urban, rural, agricultural, and conservation. Each category has a range of allowable uses.

Chapter 205, HRS, relating to the Land Use Commission, establishes four major land use districts into which all lands of the State are placed. The districts are designated Urban, Rural, Agricultural and Conservation. Portions of the property are zoned Conservation, with the remaining portion zoned Agriculture. Koa salvage and reforestation and other forestry activities are a permitted use within the Agricultural District. DHHL may preempt itself from Conservation District rules pursuant to the Hawaiian Homes Commission Act.

Environmental Review, HRS Chapter 343 and Hawai'i Administrative Rules (HAR) Section 11-200

HRS Chapter 343, the State of Hawai'i Environmental Review Law, requires that any proposed use within a conservation district, use of State land or use of State funds be subject to review. The statute and rules establish a system of environmental review and provide that environmental concerns are considered for all proposed actions on State and county lands. As part of this review, this EA has been prepared to ensure that environmental concerns are given appropriate consideration in decision making, along with economic and technical considerations.

State Environmental Policy, HRS Chapter 344

The broad goals of this policy are to conserve natural resources and enhance the quality of life in the State. It encourages productive and enjoyable harmony between people and their environment to promote efforts which will prevent or eliminate damage to the environment and biosphere, stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i.

The Legacy Program will abide by the guidelines promulgated by HRS §344-4(1)–(10), including, but not limited to, encouraging management practices which conserve natural resources, protection of endangered species of indigenous plants and animals, adoption of guidelines to alleviate environmental degradation caused by motor vehicles, and encouraging the efficient use of energy resources.

5.3 Department of Hawaiian Homes Lands

Specific laws and plans related to the Department of Hawaiian Homes Lands are summarized below.

Hawaiian Homes Commission Act of 1920

The Hawaiian Homes Commission Act authorizes the DHHL to lease Hawaiian home lands to eligible native Hawaiians for residential, agricultural and pastoral purposes. Other provisions related to financing, infrastructure improvements and technical assistance.

This Legacy Program will comply with the provisions of the Hawaiian Homes Commission Act of 1920. This Legacy Program will provide homesteads to enhance economic self-sufficiency. Pastoral and Homesteading parcels are designed to be useable and accessible, with provisions for community growth and additional infrastructure improvements in the future.

DHHL - County of Hawai'i Memorandum of Agreement

A Memorandum of Agreement (MOA) between the County of Hawai'i and the Department of Hawaiian Home Lands was adopted by Resolution No. 19-03 and became effective December 30, 2002. The MOA limits the County's regulatory purview on DHHL land uses and contains procedures, which the County of Hawai'i will follow with respect to DHHL property.

Included in the MOA are Section III - Relating to Planning and Land Use and Section IV - Relating to Public Facilities and Infrastructure Serving Hawaiian Home Lands. DHHL asserts its land use authority over Hawaiian home lands through its General Plan, Hawai'i Island Plan and ultimate designation of the appropriate County zoning district. The MOA covers the respective roles, responsibilities and obligations of both parties (DHHL and the County).

Based on its plans and DHHL land use designations, DHHL will determine the appropriate County zoning districts that shall apply to the property in question. DHHL will communicate these zoning districts to the County. Hawai'i County will apply all normal land use controls to DHHL property according to the zoning district selected by DHHL. Except as specifically provided in the Agreement, DHHL will follow all normal land use procedures, regulations and standards applicable to the zoning district.

DHHL General Plan

The DHHL General Plan was approved by the Hawaiian Homes Commission on February 26, 2002. Applicable objectives include:

- Increase the number of agricultural and pastoral leases awarded each year.
- Provide agricultural and pastoral homestead lots for subsistence and supplemental purposes.

This Legacy Program will further the above objectives by providing more pastoral homestead opportunities utilizing a process to consult with beneficiaries and determine an array of parcels of adequate sizes to accommodate individual large scale ranching operations.

DHHL Hawai'i Island Plan

The DHHL Hawai'i Island Plan was approved by the Hawaiian Homes Commission on October 22, 2002. The portion of 'Āina Mauna covered by the Legacy Program was designated as a special district. The Legacy Program is consistent with the land use designated by the Hawai'i Island Plan.

DHHL 'Āina Mauna Legacy Program

The 'Āina Mauna Legacy Program was approved by the Hawaiian Homes Commission on December 15, 2009. The 'Āina Mauna Legacy Program incorporates prior planning efforts and serves as a policy framework related to the overall use and management of the property.

The 'Āina Mauna Legacy Program was developed to take into consideration not only the immediate needs of the area, but also traditional cultural knowledge, and how best to manage the legacy for the area for future generations. By creating a sustainable plan for the area, the lands can be conserved and restored while also providing an economic resource for DHHL and its beneficiaries. The time commitment for the Legacy Program and restoration of the land is long term, essentially for the next 100-years and beyond. However, it is expected that each of the actions will be implemented immediately and well underway in 5-10 years.

DHHL Designated Zoning

As noted previously, per its MOA with Hawai'i County, the DHHL will designate the appropriate Hawai'i County zoning districts for various portions of the 'Āina Mauna. The parcel size designations will range in size with some parcels being created at this time with designations allowing for future subdivision.

5.4 Federal “Cross-Cutting” Authorities

The State of Hawai‘i Drinking Water State Revolving Fund program was established by the 1997 State Legislature as the result of the 1996 Federal amendments to the Safe Drinking Water Act. This program provides low interest loans for the construction of drinking water infrastructure projects. These projects help achieve or maintain compliance with drinking water standards, protect public health and the environment. Since various water-related actions are proposed, this additional review and analysis is included. The following sub-sections address the proposed project's relationship to other “cross-cutting” environmental, economic, social and miscellaneous federal authorities as required by the State of Hawai‘i’s Drinking Water State Revolving Fund (DWSRF) program.

5.4.1 Environmental Authorities

Archaeological and Historic Preservation Act (16 U.S.C. § 469a-1)

This Act became law on June 27, 1960 (Public Law 86-523, 16 U.S.C. 469-469c-2). It is the purpose of this Act [16 U.S.C. 469-469c-1] to further the policy set forth in the Act entitled, “An Act to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance, and for other purposes,” approved August 21, 1935 [Historic Sites Act, as amended, 16 U.S.C. 461-467] by specifically providing for the preservation of historical and Archaeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of (1) flooding, the building of access roads, the erection of workmen’s communities, the relocation of railroads and highways, and other alterations of the terrain caused by the construction of a dam by any agency of the United States, or by any private person or corporation holding a license issued by any such agency or (2) any alteration of the terrain caused as a result of any Federal construction project or federally licensed activity or program.

Proposed actions include the restoration of the historic Humu‘ula Sheep Station, as well as the possible restoration/reuse of Pu‘u ‘Ō‘ō Ranch. The reuse of these facilities and the development of buildings in the same ranch “style” will bring back the historic nature of the area.

Should historic remains be encountered during construction activities, work will cease in the immediate vicinity of the site and the State Historic Preservation Division will be contacted for appropriate mitigation, if necessary. The Legacy Program will consult with SHPD, the ‘Āina Mauna Legacy Program Implementation Advisory Council and other appropriate entities to establish appropriate protocols if Archaeological/historic items are found. Consequently, the proposed actions are in compliance with the Act.

Clean Air Act (42 USC 7401)

The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. One of the goals of the Act was to set and achieve NAAQS in every state by 1975 in order to address the public health and welfare risks posed by certain widespread air pollutants. The setting of these pollutant standards was coupled with directing the states to develop state implementation plans (SIPs), applicable to appropriate industrial sources in the state, in order to achieve these standards.

All applicable emission and ambient air quality standards will be met. Normal operation of the proposed facilities will not produce on-site air emissions, will not alter air flow in the vicinity and will have no other measurable effect on the area's micro-climate. Consequently, the proposed project complies with the provision of the Clean Air Act.

Coastal Zone Management Act, 16 U.S.C. 1456 (c) 2

The Federal CZM Program was created through passage of the CZM Act of 1972. In that act, the Congress stated that it is the national policy to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations; and to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values, as well as the needs for compatible economic development.

The Hawai'i CZM program was established in 1977 (through Chapter 205A, Hawai'i Revised Statutes). §205A-2 Coastal zone management program objectives include:

- (1) Recreational resources; Provide coastal recreational opportunities accessible to the public.
- (2) Historic resources; Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
- (3) Scenic and open space resources; Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- (4) Coastal ecosystems; Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.
- (5) Economic uses; Provide public or private facilities and improvements important to the State's economy in suitable locations.
- (6) Coastal hazards; Reduce hazard to life and property from tsunamis, storm waves, stream flooding, erosion, subsidence and pollution.
- (7) Managing development; Improve the development review process, communication and public participation in the management of coastal resources and hazards.
- (8) Public participation; Stimulate public awareness, education, and participation in coastal management.
- (9) Beach protection; Protect beaches for public use and recreation.
- (10) Marine resources; Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

The proposed project is located about several miles from the coastline. None of the proposed actions involve the placement, erection or removal of materials near the coastline. The type and scale of the activities that it involves typically do not have the potential to affect coastal resources. Finally, it is consistent with the CZM objectives that are relevant to a project of this sort.

Coastal Barrier Improvement Act (Coastal Barrier Resources Act), 16 U.S.C. 3501

The Coastal Barrier Resources Act designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System. No coastal barriers are present in the State of Hawai'i.

This Act does not apply to the State of Hawai'i at this time; therefore the proposed project will not affect any areas protected by this Act.

Endangered Species Act, 16 U.S.C. 1536 (a) (2) and (4)

Each Federal agency shall, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary (after consultation as appropriate with affected States) to be critical, unless such agency has been granted an exemption for such action. In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available. Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under section 1533 of this title or result in the destruction or adverse modification of critical habitat proposed to be designated for such species.

The area is known to have rare and/or threatened flora and fauna. The planning and implementation process considers the habitat, as well as specific species of concern. Some issues of interest include:

- ‘Āhinahina (Silversword found on upper slopes of Mauna Kea)
- Palila habitat (Special attention is paid to past court cases and management plans that dictate not only management for the population but also on how the bird’s habitat is affected.)
- Besides the Palila, the Hawai’i ‘Ākepa, Hawai’i Creeper, ‘Akiapōlā’au, ‘Io, Koloa, Nēnē, and Hawaiian Dark Rumped Petrel are all found at Humu’ula/Pi’ihonua.
- Besides bird species, the area has the ‘Ōpe’ape’a, Hawaiian Hoary Bat and the Amastrid land snail

Restoration of primarily former pastureland to a diverse native forest, and restoration of native habitat, will be an ongoing process. Approximately 38,000-acres of native forest will be planted and/or retained in native forest or included in sustainable forestry uses. By species the break down is approximately Māmane - 10,000-acres, Sustainable Koa - 10,000-acres, ‘Ōhi’a - 11,000-acres and ‘Ōhi’a/Koa mix - 7,000-acres. Likewise, bird and habitat corridors have been established to help with habitat conservation.

Sustainable koa forest practices can bring economic diversity and employment for DHHL beneficiaries; enhance the environment, while retaining the rural character of the islands. DHHL's forested lands on the island of Hawai’i are well placed to contribute to and support the forest industry with a range of value-added opportunities.

Planting eucalyptus/Sugi pine under the commercial timber to fight gorse action is expected to a beneficial impact on the native ‘ōpe’ape’a. The ‘ōpe’ape’a, or Hawaiian hoary bat (Family: *Vespertilionidae*), is Hawai’i’s only native terrestrial mammal. Likewise, koa is a known habitat for the ‘akiapōlā’au.

If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to bats and forest birds, the areas and trees scheduled for harvest will first be reviewed by a qualified land manager, biologist, forester, etc prior to timber harvest. Appropriate agencies will be consulted.

Since the sustainable koa forestry and commercial timber to fight gorse activities mean eventual harvesting of the trees that may have created habitat for endangered birds and bats, Safe Harbor Agreements will be incorporated into those actions.

The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the sustainable koa restoration attracts endangered or threatened species or result in increased numbers or distributions of listed species already present.

The Legacy Program will abide by the guidelines promulgated by HRS §344-4(1)–(10) and other laws and regulations, including, but not limited to, encouraging management practices which conserve natural resources, protection of endangered species of indigenous plants and animals, adoption of guidelines to alleviate environmental degradation caused by motor vehicles and encouraging the efficient use of energy resources; it is therefore in compliance with the Endangered Species Act.

Environmental Justice, Executive Order 12898

The Environmental Justice Executive Order was issued in 1994. To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Marian Islands.

The proposed project is located about several miles from any community. One of the proposed actions is to make homesteads available to DHHL beneficiaries. The project will have a positive effect by creating employment and housing opportunities to the DHHL beneficiaries.

Farmland Protection Policy Act, 7 U.S.C. 4202(8)

On January 1, 1987, and at the beginning of each subsequent year, the Secretary of Agriculture shall report to the Committee on Agriculture, Nutrition and Forestry of the Senate and the Committee on Agriculture of the House of Representatives on the progress made in implementing the provisions of this subtitle. Such report shall include information on (1) the effects, if any, of Federal programs, authorities and administrative activities with respect to the protection of United States farmland; and (2) the results of the reviews of existing policies and procedures required under Section 4(a) of this subtitle.

Federal agencies identify and assess any adverse effects of their programs on the preservation of farmland. The assessment is done to evaluate project's relative impact on farmland in a region, county and state. It takes into account the acreage of farmland directly converted, the potential to indirectly convert agricultural land to non-agricultural uses, impacts to individual farms, and the relative size and importance of the farms affected.

The evaluation process derives an impact rating that varies from 0 to 260 points. If an alternative receives a total score equal to or greater than 160 points, alternatives that avoid farmland must be considered.

“Farmland,” as used in the FPPA, includes prime farmland, unique farmland and land of statewide or local importance. “Farmland” subject to FPPA requirements does not have to be currently used for cropland. It can be forestland, pastureland, cropland or other land, but not water or urban built-up land.

The land area at 'Āina Mauna ranges in elevation from approximately 4,800 to 8,000-feet. Rainfall at lower elevations can exceed 120-inches per year. At elevations above 7,000-feet rainfall drops to less than 20-inches per year coupled with high evaporation which lowers the effectiveness of rainfall. Temperatures are cool with frost in the winter. Soils are generally low in calcium and contain high amounts of cinder at elevation above 6,500-feet.

These higher elevation soils are generally low in organic matter and have poor water holding capacity. The area generally is difficult to farm due to low water availability, porous soils and cooler temperatures.

Several of the proposed actions include continued farming in the proposed pasture areas and sustainable commercial koa. As such, the project is in compliance with FPPA.

Fish and Wildlife Coordination Act (16 U.S.C. § 661)

The Fish and Wildlife Coordination Act was enacted for the purpose of recognizing the vital contribution of our wildlife resources to the Nation and to provide that wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource development programs. The Fish and Wildlife Coordination Act, as amended, authorizes the Secretaries of Agriculture and Commerce to require consultation with the Fish & Wildlife Service and the fish and wildlife agencies of States where the “waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted ... or otherwise controlled or modified” by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of “preventing loss of and damage to wildlife resources.”

As noted previously, the actions are focused on the restoration of primarily former pastureland to a diverse native forest. The proposed actions will not result in the diversion of any water body and are in compliance with the Act.

Floodplain Management (Executive Order 11988, as amended by Executive Order 12148)

Signed in 1977, Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, “each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities.” The amendment (EO 12148 transferred responsibilities to the Federal Emergency Management Agency (FEMA).

Based on the latest available (DLNR’s on-line Flood Hazard Assessment Tool) Flood Insurance Rate Map for the area, the project site lies outside a defined floodplain (Zone X, map not printed.) The project does not involve property acquisition, management, or construction within a 100-year flood plain (Zones A or V), and it does not involve a “critical action” within a 500-year flood plain. Consequently, it is consistent with applicable regulations and guidance relating to floodplain management.

National Historic Preservation Act (16 U.S.C. § 470)

This Act became law on October 15, 1966 (Public Law 89-665; 16 U.S.C. 470 et seq.). It shall be the policy of the Federal Government, in cooperation with other nations and in partnership with the States, local governments, Indian tribes, and private organizations and individuals to:

- (1) use measures, including financial and technical assistance, to foster conditions under which our modern society and our prehistoric and historic resources can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations;
- (2) provide leadership in the preservation of the prehistoric and historic resources of the United States and of the international community of nations and in the administration of the national preservation program in partnership with States, Indian tribes, Native Hawaiians, and local governments;
- (3) administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations;
- (4) contribute to the preservation of non-federally owned prehistoric and historic resources and give maximum encouragement to organizations and individuals undertaking preservation by private means;
- (5) encourage the public and private preservation and utilization of all usable elements of the Nation's historic built environment; and
- (6) assist State and local governments, Indian tribes and Native Hawaiian organizations and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

Although the major burdens of historic preservation have been borne and major efforts initiated by private agencies and individuals, and both should continue to play a vital role, it is nevertheless necessary and appropriate for the Federal Government to accelerate its historic preservation programs and activities, to give maximum encouragement to agencies and individuals undertaking preservation by private means, and to assist State and local governments and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

Proposed actions include the restoration of the historic Humu'ula Sheep Station, as well as the possible restoration/reuse of Pu'u 'Ō'ō Ranch. The reuse of these facilities and the development of buildings in the same ranch "style" will bring back the historic nature of the area.

Should historic remains be encountered during construction activities, work will cease in the immediate vicinity of the site and the State Historic Preservation Division will be contacted for appropriate mitigation, if necessary. The Legacy Program will consult with SHPD, the 'Āina Mauna Legacy Program Implementation Advisory Council and other appropriate entities to establish appropriate protocols if Archaeological/historic items are found. Consequently, the proposed actions are in compliance with the Act.

Protection of Wetlands, Executive Order No. 11990 & Executive Order No. 12608

Under this Executive Order (signed in 1977,) each Federal agency must provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

Each agency must avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds: there is no practical alternative to such construction; the proposed action includes all practical measures to minimize harm to wetlands that may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors (Section 2(a)). Each agency must also provide opportunity for early public review of any plans or proposals for new construction in wetlands.

There are no wetlands on or near the site.

Safe Drinking Water Act, 42 U.S.C. 300f)

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources. The Act authorizes EPA to establish minimum standards to protect tap water and requires all owners or operators of public water systems to comply with these primary (health-related) standards. The 1996 amendments to SDWA require that EPA consider a detailed risk and cost assessment, and best available peer-reviewed science, when developing these standards. State governments, which can be approved to implement these rules for EPA, also encourage attainment of secondary standards (nuisance-related). Under the Act, EPA also establishes minimum standards for state programs to protect underground sources of drinking water from endangerment by underground injection of fluids.

The proposed water systems will assist DHHL in providing water for homesteaders and property users, an area not presently served by any water systems. Testing of the water from the well will be undertaken before it is connected to the system to ensure that the water is consistent with all State of Hawai'i and federal standards for potable water. All appropriate laws and regulations will be followed in the development and operation of the water system.

As identified by the U.S. Environmental Protection Agency, Region IX groundwater Office (http://www.epa.gov/safewater/sourcewater/pubs/qrg_ssamap_reg9.pdf, Accessed February 2011,) there are only two Sole Source Aquifers in Hawai'i. They are the Southern O'ahu Basal Aquifer on the Island of O'ahu and the Moloka'i Aquifer on the island of Moloka'i. There are no sole source aquifers on the Island of Hawai'i where the proposed project is located. The Project will not, therefore, affect sole source aquifers and is consistent with the Act.

Wild and Scenic Rivers Act, 15 U.S.C. 1271-1287

The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection. Rivers may be designated by Congress or, if certain requirements are met, the Secretary of the Interior. Rivers are classified as wild, scenic or recreational.

There are no designated Wild and Scenic Rivers in the State of Hawai'i at this time; consequently, the Project is consistent with the provisions of the Wild and Scenic Rivers Act. (<http://www.rivers.gov/wildriverslist.html>, Accessed February 2011.)

Essential Fish Habitat Consultation Process Under The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801)

The fish off the coasts of the United States, the highly migratory species of the high seas, the species which dwell on or in the Continental Shelf appertaining to the United States and the anadromous species which spawn in United States rivers or estuaries, constitute valuable and renewable natural resources. These fishery resources contribute to the food supply, economy and health of the Nation and provide recreational opportunities. A national program for the conservation and management of the fishery resources of the United States is necessary to prevent overfishing, to rebuild overfished stocks, to insure conservation, to facilitate long-term protection of essential fish habitats, and to realize the full potential of the Nation's fishery resources.

According to the Western Pacific Regional Fishery Management Council (WESPAC) in its *Fishery Ecosystem Plan for the Hawai'i Archipelago (2009)*, several areas of Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPCs) in the Hawaiian Archipelago have been designated and approved by the Secretary of Commerce.

EFH and HAPC designations for Bottomfish and Seamount Groundfish, Crustaceans, Precious Corals, Coral Reef Ecosystems and Pelagic Management Unit Species (MUS) were approved by the Secretary on February 3, 1999 (64 FR 19068). EFH designations for Coral Reef Ecosystem MUS were approved by the Secretary on June 14, 2002 (69 FR 8336). Maps available at the National Marine Fisheries Service's Essential Fish Habitat Mapper website do not indicate any areas of EFH near the project area. (http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx, Accessed February 2011.)

No aspect of the project will affect Essential Fish Habitat, as it does not affect or occur near the sea.

The following is a summary table noting the Federal Cross Cutting Authorities:

Table 5.4.1.1 - Federal Cross Cutting Authorities

Environmental Authorities	Procedure	Responsible Agency
Archaeological and Historical Preservation Act	Obtain review for all projects	State Historic Preservation Office
Clean Air Act	Coordinate to assure project conforms with state implementation plan	State Department of Health, Clean Air Branch
Coastal Barrier Resources Act	Obtain review if project is located on a coastal barrier island	State Coastal Zone Management Agency
Coastal Zone Management Act	Obtain review if project is located in coastal zone	State Coastal Zone Management Agency
Endangered Species Act	Obtain review by U.S. Fish & Wildlife Service for all projects	U.S. Fish & Wildlife Service
Environmental Justice	Are low income and minority groups affected?	U.S. Environmental Protection Agency
Floodplain Management	Obtain review if project is located in or affects 100-year flood plain	Federal Emergency Management Agency

Environmental Authorities	Procedure	Responsible Agency
Protection of Wetlands	Obtain review if project area contains wetlands	U.S. Army Corps of Engineers
Farmland Protection Policy Act	Obtain review if project area contains prime farmland	Natural Resources Conservation Service-State Conservationist
Fish and Wildlife Coordination Act	Obtain review for all projects	U.S. Fish & Wildlife Service
National Historic Preservation Act	Obtain review for all projects	State Historic Preservation Office
Safe Drinking Water Act	Obtain review if project could affect sole source aquifer	State Department of Health, Safe Drinking Water Branch
Wild and Scenic Rivers Act	Obtain review if project is in area with Wild and Scenic Rivers	National Park Service
Essential Fish Habitat consultation under Magnuson-Stevens Fishery Conservation and Mgmt Act	Obtain review if it will affect essential fish habitat	National Marine Fisheries Service (NMFS)

5.4.2 Economic Authorities

Administration of the Clean Air Act and the Water Pollution Control Act with respect to Federal Contracts or Loans (Executive Order 11738)

This Executive Order prohibits the provision of Federal assistance to facilities that are not in compliance with either the Clean Water Act or the Clean Air Act unless the purpose of the assistance is to remedy the cause of the violation.

DHHL will comply with the requirements for the ‘Āina Mauna Legacy Program projects and actions.

Demonstration Cities and Metropolitan Development Act of 1966, Pub.L. 89-754, as Amended (42 USC § 3331)

To demonstrate compliance with this Act, the Hawai‘i State Department of Health requires DWSRF assistance recipients to describe the proposed project’s effect on local development plans.

DHHL will comply with the requirements for the ‘Āina Mauna Legacy Program projects and actions.

Procurement Prohibitions (Executive Order 11738, Section 306 of the Clean Air Act)

This Executive Order requires recipients of Federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA’s list of Clean Air Act violators.

DHHL will comply with the requirements for the ‘Āina Mauna Legacy Program projects and actions.

Procurement Prohibitions (Section 508 of the Clean Water Act)

This Executive Order requires recipients of Federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA's list of Clean Water Act violators.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

5.4.3 Social Authorities

Age Discrimination Act of 1975 (42 USC § 6102)

This Act stipulates that no person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Civil Rights Act of 1964, Title VI (42 USC §2000(d))

This Act stipulates that no person in the United States shall, on the grounds of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Equal Employment Opportunity (Executive Order 11246, as amended)

This Executive Order requires all recipients of Federal contracts to include certain non-discrimination and "affirmative action" provisions in all contracts. The provisions commit the contractor or subcontractor to maintain a policy of non-discrimination in the treatment of employees, to make this policy known to employees, and to recruit, hire and train employees without regard to race, color, sex, religion and national origin.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Minority Business Enterprise Development (Executive Order 12432)

This Executive Order sets forth in more detail the responsibilities of Federal agencies for the monitoring, maintaining of data and reporting of the use of minority enterprises.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

National Program for Minority Business Enterprise (Executive Order 11625)

This Executive Order directs Federal agencies to promote and encourage the use of minority business enterprises in projects utilizing federal funds.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

National Women's Business Enterprise Policy (Executive Order 12138)

This Executive Order directs each department or agency empowered to extend Federal financial assistance to any program or activity to issue regulations requiring the recipient of such assistance to take appropriate affirmative action in support of women's business enterprises and to prohibit actions or policies which discriminate against women's business enterprises on the grounds of sex.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Rehabilitation Act of 1973 (29 USC § 794)

This Act stipulates that no otherwise qualified handicapped individual in the United States shall, solely by reason of his handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Small Business Administration Reauthorization and Amendment Act of 1998 (Pub. L. 100-590, Section 129)

This Amendment directs Federal agencies to promote and encourage the use of small business enterprises in projects utilizing federal funds.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Department of Veterans Affairs and Housing and Urban Development, and Agencies Appropriations Act (1993, Pub. L. 102-389)

This Act requires the Administrator of the Environmental Protection Agency to ensure that at least 8 per centum of Federal funding for prime and subcontracts awarded in support of authorized programs, including grants, loans and contracts for wastewater treatment and for leaking underground storage tanks, be made available to businesses or other organizations owned or controlled by socially and economically disadvantaged individuals (within the meaning of Section 8(a)(5) and (6) of the Small Business Act (15 USC 637(a)(5) and (6)), including historically black colleges and universities.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Disadvantaged Business Enterprise Rule (2008, 40 CFR Part 33)

This Rule sets forth the responsibilities of entities receiving an identified loan under a financial assistance agreement capitalizing a revolving loan fund, for the monitoring, maintaining of data and reporting of the use of disadvantaged business enterprises (DBEs). It requires the Applicant to fully comply with 40 CFR Part 33, entitled "Participation by Disadvantaged Business Enterprises in Procurement Under Environmental Protection Agency (EPA) Financial Assistance Agreements" and ensure that all contracts funded by a DWSRF loan include a term or condition requiring compliance with 40 CFR Part 33.

The Rule further stipulates that the applicant shall not discriminate on the basis of race, color, national origin, or sex in the performance of its contract and that the applicant carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

5.4.4 Miscellaneous Authorities

Debarment and Suspension (Executive Order 12549)

Prior to the award of a consultant or construction contract, the Applicant (County) shall fully comply with Subpart C of 40 CFR Part 32, entitled "Responsibilities of Participants Regarding Transactions" and ensure that any lower tier covered transaction and subsequent lower tier transaction, includes a term or condition requiring compliance with Subpart C. The Applicant shall certify that the General Contractor, Consultant, sub-consultants, subcontractors and suppliers are not on the Excluded Parties List. The Applicant acknowledges that failing to disclose the information required under 40 CFR 32.335 may result in the delay or negation of payment, or pursuance of legal remedies, including suspension and debarment.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Uniform Relocation and Real Property Acquisition Policies Act (Pub. L. 91-646 (1971), as Amended, 42 USC 4601-4655)

The Act establishes a policy for fair and equitable treatment of persons who are displaced from their homes, farms or businesses to make way for a federally assisted project.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

Preservation of Open Competition and Government Neutrality towards Contractor's Labor Relations on Federal and Federally Funded Construction Projects (Executive Order 13202 (2001), as amended by Executive Order 13208 (2001))

DWSRF assistance recipients must ensure that bid specifications, project agreements and other controlling documents for construction contracts awarded after February 17, 2001 do not require or prohibit agreements with labor organizations. Further, DWSRF assistance recipients and any construction manager acting upon their behalf must not otherwise discriminate against bidders, offerors, contractors or subcontractors for entering into, or refusing to enter into, agreements with labor organizations.

DHHL will comply with the requirements for the 'Āina Mauna Legacy Program projects and actions.

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Chapter 6 - Cumulative Impacts

A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.

Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Although not required of an EA, an assessment of cumulative impacts is included as a separate chapter in this EA to give a full disclosure of all activities proposed and the cumulative impacts associated with the Legacy Program's implementation.

A cumulative impact occurs when two or more individual effects taken together are either substantial or they compound or increase other environmental impacts.

Thus, cumulative impacts can result from an action that is individually limited but cumulatively has considerable effect upon the environment when added to other individually minor, but collectively significant, actions taking place over time.

Hence, a cumulative impact will occur when the incremental environmental effects of the Project added to other past, present, and reasonably foreseeable future actions result in substantial significant impacts.

There are direct effects from implementing the alternatives for this project and this section discusses the overall, or cumulative, effects.

6.1 Cumulative Effects Analysis

A cumulative effect is an impact on the environment which results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions.

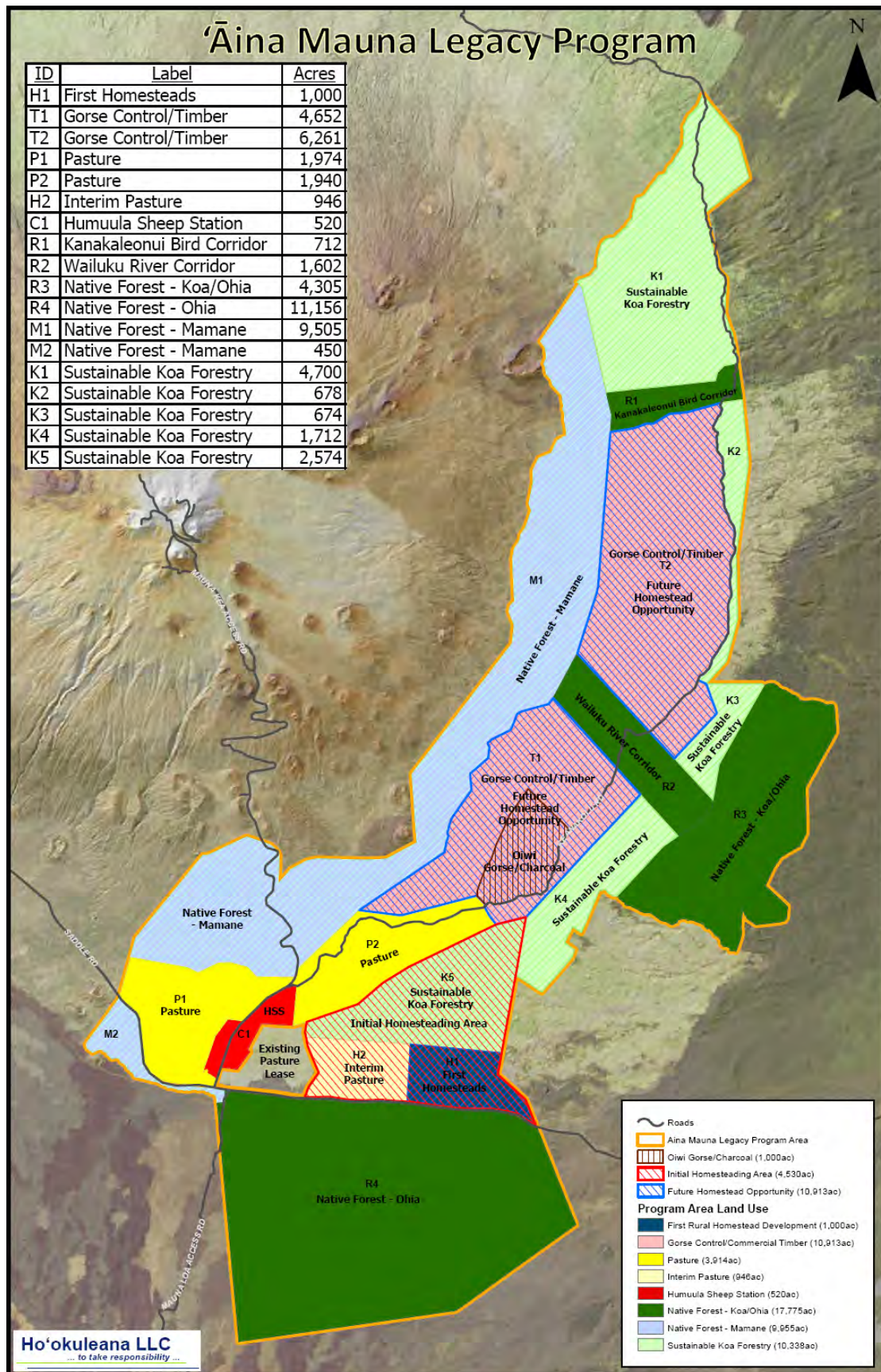
Cumulative effects can result from individually minor but collectively significant actions taking place over time. Cumulative projects considered below are similar to the Legacy Program, large enough to have far reaching effects, or are in proximity to the 'Āina Mauna with similar types of effects.

6.1.1 Cumulative Effects Evaluation Methodology

Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects.

Interactive effects may be countervailing, where the negative cumulative effect is less than the sum of the individual effects, or synergistic, where the net negative cumulative effect is greater than the sum of the individual effects.

Where applicable, the resource sections below include a discussion of whether project effects will accelerate any ongoing trends of resource degradation.



6.1.2 Past, Present and Reasonably Foreseeable Future Project Activities

The table below identifies activities on or adjacent to the Legacy Program area that have contributed to the level of cumulative impact.

Table 6.1.2.1 - Past, Present and On-going Activities on and off-site

Activity	Location	Sponsor	Description	Dates
Adze Quarry Activity	Southern Slopes of Mauna Kea		Radiocarbon dates from adze quarry sites document Native Hawai'i use of quarries.	1100 to 1800
Cattle and other ungulates graze	Mauna Kea		First cattle introduced through a gift from Captain Vancouver to Kamehameha I. Continues with cattle and sheep ranches, and feral ungulates for hunting.	1793 to 2002 (feral ungulates still present)
Keanakolu/Mana Road Built	Eastern slope of Mauna Kea	Territory of Hawai'i	Built to connect Hilo and Waimea. It developed a more efficient route for transportation between Hilo and Waimea and opened up land for grazing and sugar cane.	1870
Humu'ula Sheep Station	Eastern slope of Mauna Kea	H. Hackfeld and Company	The Humu'ula Sheep Station Company was chartered by the Hawaiian Government. The company erected large and extensive paddocks at Kalai'eha and also had a station at Keanakolu.	Company Chartered in 1883
Hawai'i Forest Reserve system established	Mauna Kea	Territory of Hawai'i	System established to protect forests against fire and grazing.	established in 1903
Hilo Forest Reserve	Eastern slope of Mauna Kea	Territory of Hawai'i	Established by the Territory of Hawai'i and inspired by a series of devastating fires in Hāmākua.	1905
Keanakolu Cabin/Field Station Established	Keanakolu	Territory of Hawai'i	Built by Territorial foresters from a log cabin.	1924-1926
Civilian Conservation Corps (CCC) activities	Mauna Kea	CCC	CCC plants trees and constructs horse and truck trails; trail around Mauna Kea at 7,000 feet elevation completed in 1935.	1930s
Keanakolu Cabin/Field Station expanded to CCC camp	Keanakolu	CCC	It was one of several such camps established throughout the mid-slopes of Mauna Kea. The camp consisted of a bunkhouse for as many as 40 workers, mess hall, foreman's quarters and other service buildings.	1934

Activity	Location	Sponsor	Description	Dates
David Douglas Monument	Eastern slopes of Mauna Kea	Hilo Burns Society (a social club for people of Scottish decent)	The club erected a monument to David Douglas who was killed in a bullock pit nearby. The club also planted 200 Douglas fir trees around the site.	1934
Keanakolu/Mana Road Improved	Eastern slope of Mauna Kea	CCC	The cobble roadbed was made of basalt cobbles and small boulders set to form a relatively level surface, and it is evenly bordered with cobbles. The stones for the roadbed were quarried from various places along the road.	1935
Mauna Kea Forest Reserve fences	Mauna Kea	Territory of Hawai'i/CCC	60 mile fence erected around the 85,000-acre Mauna Kea Forest Reserve to keep sheep and goats out; more than 40,000 sheep and goats are exterminated within the forest reserve.	1935-1936
CCC Camps Abandoned	Across the property	CCC	The CCC camps were disbanded but the Keanakolu cabin/camp was once again used as a field station for Territory forest rangers.	1940s
Saddle Road paved	Saddle Road	Territory of Hawai'i	Paving of Saddle Road is complete, increasing access to Mauna Kea.	1949
Mauna Kea Access Jeep Trail established	Mauna Kea southern slope	State of Hawai'i	First road is bulldozed to facilitate astronomy development, originally built to support astronomical testing on Mauna Kea.	1964
Hakalau Forest National Wildlife Refuge	Windward slope of Mauna Kea	USFWS	Hakalau Forest NWR was established to protect and manage endangered Hawaiian forest birds and their rain forest habitat. Its 32,733-acres support a diversity of native birds and plants.	1985
Pu'u 'Ō'ō	Pu'u 'Ō'ō	Humu'ula Sheep Station Company	Pu'u 'Ō'ō Ranch Station was established as part of the Humu'ula Sheep Station Company. It was used for livestock and ranching activities.	1890s
Fencing at Hakalau Forest National Wildlife Refuge	Hakalau Forest National Wildlife Refuge	USFWS	Managers now have enclosed 14,150 acres in 8 units, using almost 44 miles of fencing. Since the feral ungulate management program began, more than 1,100 pigs and 260 wild cattle have been removed.	1988-present

Activity	Location	Sponsor	Description	Dates
Gorse Containment Area and Koa Salvage Activities	Eastern slopes of Mauna Kea	DHHL	The koa project involves salvaging koa from pasture lands and reforests the 125 acre parcel with koa. The area will be fenced to control feral ungulates and the soil scarified to stimulate koa seedling growth from existing seed present in the soil. The gorse project proposes to plant a 250 foot wide perimeter of Sugi pine to contain the leading edge of a gorse infestation. The perimeter totals about 320-acres.	2001
Hawai'i Experimental Tropical Forest	Windward slope of Mauna Kea	USFS	The need for research targeted towards solving resource management issues led the DLNR and the USDA Forest Service Institute of Pacific Islands Forestry to establish the Hawai'i Experimental Tropical Forest (HETF).	2007
Saddle Road Realignment/Widening	47 miles from Hilo to South Kohala	DOT, Federal Highways Administration	Realignment, widening, paving of the entire Saddle Road to make it a two-lane highway with climbing lanes where appropriate, paved shoulders, and a design speed of 60 miles per hour.	1997-present

6.1.3 Summary Cumulative Effects

It is anticipated that the cumulative projects will have overall beneficial cumulative effect for all resources area with the exception of environmental justice, where the project will have no effect.

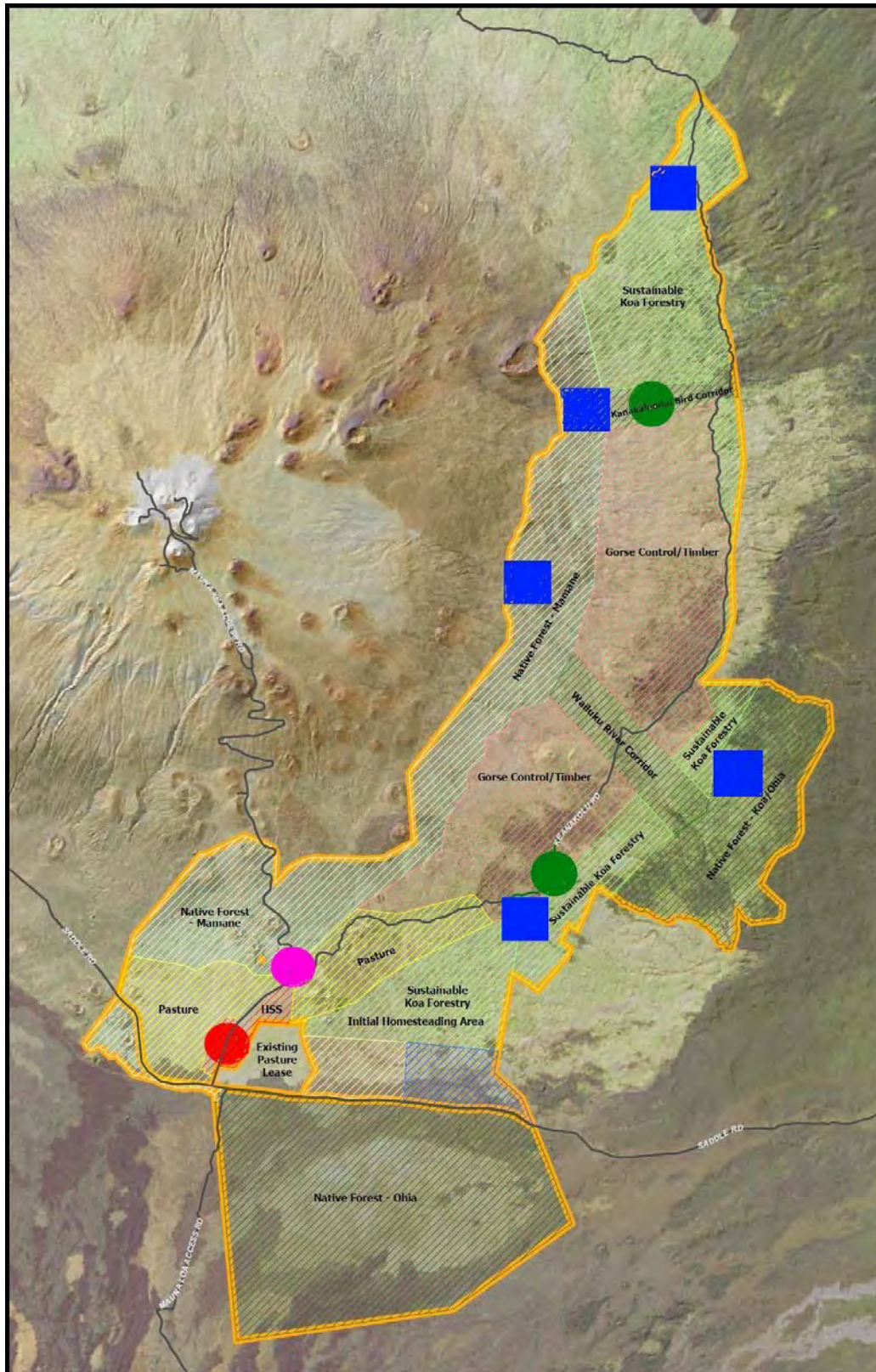
Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The adverse effects of the project - minor and temporary disturbance to air quality, noise or visual quality during construction - are very limited in severity, nature and geographic scale. The small-scale restoration projects gradually being undertaken are not of a scale or number as to negatively interact with the Legacy Program.

Table 6.1.3.1 - Summary of Potential Contribution of the Preferred Alternatives to Cumulative Effects

Resource Area	Effects	Description of Effects
Cultural Resources	Beneficial— Native Forest Restored to Enhance Cultural Practices	• 'Āina Mauna Cultural, Natural Resources and Safety Briefing will apprise visitors of the areas cultural significance and appropriate behavior

Resource Area	Effects	Description of Effects
Cultural Resources	Beneficial – Native Forest Restored to Enhance Cultural Practices	• The restored, healthy native forest provides beneficiaries cultural practices and gathering access as the only site of this type in the Hawaiian Home Lands Trust inventory and presents a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems.
Archaeological/Historic Resources	Beneficial through Historic Restoration	• The restoration of historic properties including the Humu'ula Sheep Station & Pu'u 'Ō'ō Ranch. • The reuse of these facilities and development of buildings in the same ranch "style" will bring back the historic nature of the area.
Biological Resources	Beneficial – Native Forest Restored	A restored native forest will provide numerous of benefits including: • Valuable water recharge • Soil stabilization and augmentation • Clean air • Habitat for native species • Bird and habitat corridors to help with habitat conservation • Conservation encumbrance over portions of the property • Safe Harbor Agreements for threatened/endangered species
Visual & Aesthetic	Beneficial after Mitigation Measures	• Restoration of native forest canopy
Geology, Soils & Slope Stability	Less than Significant	• Soils will improve and erosion will decrease as the area becomes reforested and healthy
Water Resources & Wastewater	Beneficial/Less than Significant	• Restoration of watersheds thru native forest restoration actives • Management of wastewater
Solid & Hazardous Waste	Less than Significant	• Proper disposal of solid and hazardous waste
Socioeconomic Conditions & Public Service	Beneficial – Jobs and Housing	• Variety of job opportunities • Economic benefits in terms of new agricultural assets created and employment • Housing opportunities through homesteading
Land Use Plans, Policies & Controls	Beneficial – Implements HHC Policy	• HHC unanimous approval and call for implementation of the 'Āina Mauna Legacy Program
Roadways & Traffic	Beneficial/Less than Significant	• New and improved roads will lead to easier access and increased road safety • Traffic will be mitigated through ride-sharing programs and development of outplanting centers

Resource Area	Effects	Description of Effects
Power & Communications	Beneficial – Alternative Energy	• Use of renewable energy throughout program area
Noise	Less than Significant	• Noise will be mitigated through compliance with applicable regulations, requirements and standards
Climate, Air Quality & Lighting	Beneficial/Less than Significant	• Restoration of native forests will increase clean air and benefit climate changes • Lighting will be minimal with mitigation measures in place • Possible development of Carbon Credits
Fire Hazards	Beneficial after Mitigation Measures	• Implements the Humu‘ula /Pi‘ihonua Mauka Wildland Fire Management Plan and the Humu‘ula /Pi‘ihonua Mauka Community Wildfire Protection Plan • Additional Roadways built for access will also serve as beneficial fire breaks • Improved access to portions of the site
Recreation & Tourism	Less than Significant	• Increased opportunities for recreational activities in a restored native forest • Eco-tourism opportunities • Restoration and use of remote accommodations and Humu‘ula Sheep Station for recreation and tourism uses
Ecological Services	Beneficial – Native Forest Restoration	• Restoration and enhancement of DHHL trust resources • Preservation of Natural and Cultural Resources and Endangered Species • Address Native Forest Restoration and restoration of the ecosystem • Removal of invasive species - gorse, etc • Provide educational and cultural opportunities • Be a lead and/or model for others to engage in ecosystem restoration in a culturally sensitive manner based on partnerships to develop a self-sustaining model
Construction	Less than Significant	• Construction impacts will be short term during the construction phase of the program • Mitigation measures will ensure less than significant impacts



Map Noting Cumulative Effects of Construction Activities Across the Property
 Red-Humu'ula Sheep Station Adaptive Re-use, Fuchsia-Administration Base Facility, Blue-Remote Accommodations and Green-Outplanting Centers and Field Worker Accommodations.

The cumulative projects described above will have a beneficial effect beyond the Legacy Program boundary. The Legacy Program actions will have a beneficial effect downstream for all watersheds in the area.

Cumulative effects are assessed based on the past trends. These trends are important because they are used as the context for determining whether the project alternatives will contribute to negative trends occurring in the area.

The effects of the project alternatives are then added to the past, present, and reasonably foreseeable future project effects to determine if the incremental effects of all the projects will add to the historical or existing trends in land use and recreation.

Cultural Resources

The mandatory 'Āina Mauna Cultural, Natural Resources and Safety Briefing for all visitors, contractors, employees will have beneficial effects to cultural resources by the cumulative projects. This briefing will educate visitors of the areas cultural significance and lead to a better understanding the area.

Additionally, a restored, healthy native forest provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory and presents a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems.

No other projects were identified in the foreseeable future that will result in cumulative effects to cultural and historical resources under the Preferred Alternatives.

Archaeological and Historical Resources

Under the Preferred Alternatives, beneficial effects to Archaeological and Historical resources by the cumulative projects are anticipated. The historic properties on-site have not been up kept and are in a state of decline.

The restoration and reuse of the historic Humu'ula Sheep Station and Pu'u 'Ō'ō ranch will benefit the historic properties, as well as help tell the story of the areas rich history and culture. The reuse of these facilities and the development of buildings in the same historic ranch "style" will bring back the historic nature of the area.

Since the area was not routinely occupied and the area has been previously disturbed by pasture uses, the cumulative impact to Archaeological resources is minimal. With an increased awareness of Archaeological resources, rules and laws are in place to mitigate impacts if Archaeological remains are found. The Legacy Program will follow all procedures to ensure compliance with the appropriate agencies.

No other projects were identified in the foreseeable future that will result in cumulative effects to cultural and historical resources under the Preferred Alternatives.

Biological Resources

The cumulative projects are anticipated, under the Preferred Alternatives, to have beneficial effects to biological resources. The infrastructure projects, which will typically be built on existing disturbed area, will improve waste treatment, communications, water treatment, housing, reforestation, access and will result in better management of resources and more efficient power generation through alternative energy. These projects will reduce potential pollution from wastewater discharges and fuel spills and increase ecological services via clean air, water and soil through native forest restoration.

Biological resources are not expected to be negatively impacted cumulatively as a result of the Legacy Program. The wildlife, both native and non-native will be impacted only slightly and temporarily. Once the Legacy Program is complete, native wildlife will have a restored, healthy habitat.

Visual and Aesthetic Resources

The Legacy Program will construct buildings that may be seen briefly from the Saddle Road, Mauna Kea Access Road and Keanakolu/Mana Road. It is not likely to present an unsightly view or ruin the larger view-shed. Over time as the vegetation near construction areas grow and mature the buildings will become less noticeable.

Effects to visual and aesthetic resources are subjective. Although the project will involve new structures on the property, none will impact current view planes. Additionally, the forestry restoration components of the Legacy Program will enhance the former pasture lands into native forests which some may find more attractive.

Geology, Soils and Slope Stability

The Legacy Program area is located in former pasture lands and none of the areas slated for development are in geologically exceptional areas nor do they contain any geologically unique features. The areas geological history has created what the land looks like today.

Construction activities will involve drilling and pounding for the installation of the fences, and foundations for various buildings, into the substrate. These activities will be minor and take place over the course of several years, and as such, will not contribute to any significant cumulative impacts.

Trail and road construction will generate some dust. Over land flow during storms will be quickly absorbed into the surrounding terrain. As such, these activities will not contribute cumulatively in any negative manner.

The Legacy Program will have a positive cumulative effect by the native forest restoration component of the project that will help with soil stabilization and soil augmentation. Additionally, upgrading the dirt roads to make them more stable and less susceptible to erosion.

Water Resources and Wastewater

Historic activities and actions have resulted in limited water use on site. However, because of the long time span between events, in some cases decades, these past activities have had a less than significant cumulative effect.

Much of the proposed water use will be through catchment which will not have a cumulative effect on water resources. Additionally, the restoration of the native forest and the planting of trees for gorse eradication will assist with water recharge through photosynthesis and transpiration, creating water resources for the future.

The Legacy Program will conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." Thus, no cumulative negative effects on water quality will occur.

Solid and Hazardous Waste and Materials Management

The area has had minimal activity thus, the cumulative effects of past activities on safety and hazardous materials is minimal. However, present and future cumulative projects will improve conditions, particularly with the improvement of the infrastructure. For example, development of homestead and lodgings will improve living conditions, and improvements to roads will improve access and road safety. Appropriate waste disposal is incorporated into the actions.

Socioeconomic Conditions and Public Facilities

Historic events have resulted in various levels and types of human use and activity. Over the past 150 years, the level of human use has remained minimal. Human use is now limited to minimal management activities, koa salvage contractors, researchers, and an ecotourism lease holder. Increased use through research and education opportunities and eco-tourism will occur. The Legacy Program will control this increased human use which will have a beneficial cumulative effect on the area as a whole

The 'Āina Mauna lands have the potential to provide a variety of long term benefits to the native Hawaiian community. While there will be a significant upfront investment needed to jump start the Legacy Program, there will be a corresponding significant economic benefits in terms of new agricultural assets created, and employment created by the careful management of these lands. These economic benefits are in addition to fulfilling DHHL's mission of providing homestead lease lands to native Hawaiian beneficiaries.

Under the Preferred Alternatives, the cumulative effects to socioeconomics will be beneficial, with the establishment of homesteads and economic opportunities such as public visitation and construction of the infrastructure facilities on site to accommodate visitors. The increase in visitation could provide increased income to the surrounding communities, the service industry supporting these activities, and the agencies responsible for management activities.

Land Use Plans, Policies and Controls

The actions are consistent with DHHL plans and policies. Past activities over the past 150-years have caused a major shift in land use from undisturbed native habitat to pasture land. Present and future cumulative projects will take place on the existing footprint of buildings or facilities presently in place or in disturbed pasture resulting in little changes in land use. The proposed actions will result in many beneficial cumulative changes detailed in this EA.

Roadways and Traffic

Historic activities and actions have had little effect on traffic. Past and present projects have had no cumulative effect on traffic. The proposed road improvements will improve roadway safety. Minimal increases in traffic will be mitigated through ride sharing programs and programs to transport and house many of the area workers on site, thus limiting their use of the roads.

Power and Communications

There were no cumulative effects of past activities on utilities, as adequate capacity was constructed based on demand. However, some of the present and future cumulative projects will place a demand on the utilities. The Legacy Program will have little effect on this demand, since alternative energy projects will be used to power the Legacy Program area. Therefore, the Legacy Program will have no cumulative effect on utilities.

Noise

Historic activities and actions have increased noise on the property, although it is still minimal. Contributors to noise levels are the Army's Pōhakuloa Training Area, Bradshaw Army Airfield, vehicles on roads, and local and tourist-related air travel.

Noise generated from the Legacy Program construction will be temporary and short in duration. Vehicular travel and facility operations will minimally increase noise levels in area. The site is far enough away from population centers, such that very little of the activities will be heard. The noise generated is likely to be absorbed into the surrounding terrain.

Climate, Air Quality and Lighting

Scientists continue to raise concerns about global warming and climate change. The cumulative effects gases produced from vehicles, power plants, deforestation and other sources are building up in the atmosphere, acting like a thick blanket over our planet.

However, reforestation can mitigate global warming because trees sequester carbon through photosynthesis, converting carbon dioxide and water into oxygen and plant matter. Hence, forests that grow in area or density will reduce atmospheric CO₂ levels.

The Legacy Program will affect air quality minimally. The dust generated will be temporary and fall out quickly. As such, the Legacy Program is not expected to contribute to the cumulative impacts on air quality in any significant manner. Native forest restoration projects also will help to increase air quality through the planting of trees and other forest products. The development of Carbon Credits may also be explored.

Fire Hazards

Fire has been occurring on site since written history and has had cumulative effects on the area's natural resources. These fires have been both part of a natural forestry process and human induced. Fire control and management has increased with the allocation of resources and equipment to deal with fires on site.

The Humu'ula /Pi'ihonua Mauka Wildland Fire Management Plan and the Humu'ula /Pi'ihonua Mauka Community Wildfire Protection Plan serve as guides to fire management for the area. Additionally, the new roadways and roadway improvements proposed for site access in the Preferred Alternatives in will also serve as beneficial fire breaks.

Recreation and Tourism

Past tourism on the property have been limited by difficult access and the depletion of native forest resources, thus, the cumulative impacts of eco-tourism on site have been very small. Additionally, hunting is not allowed on the property, and public access is restricted, so recreation has been very limited.

Feral ungulate eradication will involve hunting activities on site which will create hunting opportunities in those areas that are open to hunting. Additionally, the creation of trails allow for more recreational activities on site. In that regard, the Legacy Program will benefit the recreational opportunities in the area.

Eco-tourism uses typically have a small footprint and limited impact. Ecotourism can provide a valuable economic use for an area, which, until now, has not been utilized to its full potential and which do not require permanent structures or impact. An additional positive cumulative effect is the incorporation of the "volun-tourism" (visitors volunteer) opportunities on site. The cumulative impact on this action will be that more trees are planted and managed through the programs entirety.

Ecological Services

Ecological goods and services are the benefits arising from the ecological functions of healthy ecosystems. Such benefits accrue to all living organisms, including animals and plants, rather than to humans alone. However, there is a growing recognition of the importance to society that ecological goods and services provide for health, social, cultural and economic needs.

The Preferred Alternatives provide the greatest advantages to these ecological services with positive impacts on: Restoration and enhancement of DHHL trust resources; Preservation of Natural and Cultural Resources and Endangered Species; Native Forest Restoration and restoration of the ecosystem; Removal of invasive species - gorse, etc; Educational and cultural opportunities; and Being a lead and/or model for others to engage in ecosystem restoration in a culturally sensitive manner based on partnerships to develop a self-sustaining model.

Site Preparation and Construction

Cumulative impacts from past construction activities on-site and within the surrounding region have occurred. Environmental impacts associated with the construction phase of a Legacy Program are generally localized and temporary in nature.

Construction activities will include site preparation, foundation construction, drainage structure construction or installation, preparation of roads, and cleaning up. Construction will also generates solid waste in the form of packaging for building materials, detergents, paint, metals and solvents. Because construction activities will be short term in nature, these impacts will not be cumulative.

The infrastructure projects, which will be built on existing disturbed area, will have a positive cumulative effect through improved waste treatment, communications, water treatment, housing, reforestation, access and will result in better management of resources and more efficient power generation through alternative energy.

6.1.4 Relationship between Short-Term Uses of the Environment and Long-Term Productivity

The short-term uses of the environment relating to the Preferred Alternatives will improve the health and quality of the environment by managing human use of the area, reducing the potential for the spread of invasive species, reducing human activities and restoring the native ecosystem.

In addition, control of invasive species, restoration of native habitat and species populations, upgrades in infrastructure and establishment of health, safety and cultural briefing for all who enter the area will reduce the potential for the spread of invasive species, reduce stressors to native species, reduce potential hazards such as fire, and improve the health and safety for management staff, visitors, and researchers.

The long-term productivity related to the Preferred Alternatives is based on the 'Āina Mauna Legacy Program which establishes the vision, mission and goals for the 'Āina Mauna region, as well as defines strategies and activities to achieve the long-term productivity of the resources.

As noted in the previous map, various uses are dispersed and separated from others to minimize impacts to each. For instance, ecotourism-related uses are placed away from the core of the gorse eradication through commercial timber uses, so that ecotourism activities do not get in the way of potential heavy equipment associated with commercial timber operations.

Likewise, facilities with accommodations are also separated to avoid each other (each is approximately 3 to 5-miles from each other.)

6.1.5 Irreversible and Irretrievable Commitments of Resources

The Proposed Action alternative will require minor commitments of both renewable and nonrenewable energy and material resources for the management, use and research activities associated with the project.

The project will also commit substantial resources, staff time and funds for restoration, conservation and management activities. Nonrenewable resources that will be used during the project include fuel, water and other resources necessary to maintain and operate the equipment and facilities necessary within the 'Āina Mauna.

Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources) also are irretrievable.

Alteration of substrates by construction activities and road improvements will be irreversible. Implementation of the Preferred Alternatives will result in the irreversible commitment and expenditure of human labor that could not then be expected in the service of other projects. These commitments of resources are neither unusual nor unexpected, given the nature of the action.

Construction could result in irreversible commitment of fuel for construction vehicles and equipment and irretrievable commitment of land. Construction could result in irreversible commitment and expenditure of human labor that could not then be expected in the service of other projects, as well.

6.1.6 Conclusion

Implementation of the proposed action will not result in significant impacts that will not be able to be mitigated, to any environmental resource area. Therefore, the proposed actions, in conjunction with other actions on and in the vicinity of the 'Āina Mauna, will not result in significant cumulative impacts.

6.2 Anticipated Determination, With Findings and Reasons Supporting

This environmental assessment has examined the environmental and socio-economic impact associated with DHHL's 'Āina Mauna Legacy Program. Pursuant to Section 11-200-12, HAR, an action shall be determined to have a significant impact on the environment if it meets any one of the following criteria listed below. The expected determination of the project will be a Finding of No Significant Impact (FONSI). Every phase of the Legacy Program, including the expected primary and secondary consequences, short and long term and the cumulative effects were considered.

The analysis reports that the Legacy Program will not result in significant environmental impacts to natural and cultural resources on the site or in the immediate area. Public infrastructure including roadways are adequate to serve the project and will not be significantly impacted by the Legacy Program. The Legacy Program will enhance public view corridors and the visual character of the site and its immediate environs. The Legacy Program is in conformance with State and County land use plans and policies including chapter 205A, HRS, as well as the Hawaiian Homes Commission Act of 1920, as amended.

A Finding of No Significant Impact (FONSI) is anticipated, based on the Legacy Program meeting the following criteria (Chapter 11-200-12, Hawai'i Administrative Rules, outlines those factors agencies must consider when determining whether an action has significant effects).

In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action shall be determined to have a significant effect on the environment if it:

- 1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

No significant natural or cultural resources will be irrevocably committed or lost.

The Legacy Program and the preferred alternatives will both reverse the loss of native koa forests through extensive planting and restoration of koa and other native species, and it will get rid of many invasive species that threaten the health of native forests. In addition, cultural plant resources will be enhanced by the proposed project.

The restored, healthy native forest provides a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. Since the land is DHHL owned, beneficiaries will have significant benefit for the exercise of cultural traditions.

The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory.

Restoration of the land upon which native Hawaiians have always depended is key to the success of the beneficiaries. Over the past 150-years the land transformed away from a healthy, dense native forest. It will take generations to restore the land back to this healthy condition. Ultimately, and as an over-arching principle, the 'Āina Mauna Legacy Program is about and for the Beneficiaries, Hawaiian Home Lands Trust and the Land.

Although both native and non-native plants may be damaged and/or killed during some of the actions, i.e. site preparation, road construction, maintenance, etc, most will grow back naturally.

Certain actions may create a temporary disturbance in the area. Because operations will be implemented in a manner sensitive to the surrounding environment, the proposed project will have little to no impact on other resources or values in the project area and its nearby surroundings.

Following applicable laws and incorporation of the mitigation measures will reduce impacts from project activities. For the preferred alternatives, no direct, indirect or cumulative impacts to natural or cultural resources will occur.

2) Curtails the range of beneficial uses of the environment;

No future beneficial use of the environment will be curtailed by the proposed project.

The ultimate long-term goal for DHHL is an economically-sustainable, healthy native forest ecosystem, homesteading and other activities at Humu'ula/Pi'ihonua. In achieving this goal, the 'Āina Mauna Legacy Program will serve as a guide for managing existing and future activities and uses, and to ensure ongoing protection of DHHL's trust property in perpetuity by linking traditional cultural knowledge and modern science.

The lands of Humu'ula and Pi'ihonua represent the most important native forest areas remaining in the DHHL trust. These lands provide a glimpse into the natural environment and native forests which are disappearing throughout the state.

The area serves as valuable habitat to many native and endemic species. The area's proximity to Mauna Kea also makes it a valuable cultural resource. These lands have the potential for serving as a sustainable native forest and land unit by simultaneously providing environmental, economic and social benefits to the trust and its beneficiaries in perpetuity.

The 'Āina Mauna Legacy Program serves as a guiding framework to enable DHHL to effectively and efficiently achieve the overall vision of the 'Āina Mauna Legacy Program to ensure the health, diversity and resources of the land and the mission of DHHL. The ecosystem will be managed over the long-term to achieve DHHL and the 'Āina Mauna Legacy Program's missions and purposes.

The objectives of establishment of the 'Āina Mauna Legacy Program are to provide lands for the restoration, conservation and management of forests in Hawai'i; in addition to providing opportunities for the DHHL trust and the general public.

The Legacy Program will increase beneficial uses by restoring native koa forest, creating new habitat for native flora and fauna, expanding outdoor recreational opportunities and enhancing the quality of the Mauna Kea watershed which will have a positive impact far downstream.

3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

No aspect of the proposed project actions conflict with the State's long-term policies, goals or guidelines.

The purpose of Chapter 344 is to establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i.

The 'Āina Mauna Legacy Program and the preferred alternatives in this EA are consistent with the Chapter 344's overall policy seeking to conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected.

Likewise, the Program is consistent with the Chapter's policies to "encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i."

In addition, the actions and Preferred Alternatives enhance the quality of life by creating opportunities for the residents of Hawai'i to improve their quality of life through diverse economic opportunities; establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and establishing a commitment on the part of each person to protect and enhance Hawai'i's environment and reduce the drain on nonrenewable resources.

- 4) Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;

An important aspect of this project is to improve the economic and social welfare of DHHL beneficiaries.

The restored, healthy native forest provides a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. Since the land is DHHL owned, beneficiaries will have significant benefit for the exercise of cultural traditions.

The opportunities for beneficiaries are extensive and diverse; and, there are opportunities for beneficiaries within each component of the recommendations, whether it is homesteading, pasture, feral ungulate eradication, native forest restoration, commercial timber, koa forestry, ecotourism or cultural practices.

Some of the benefits are proposed to be relatively immediate, while others will necessarily take time for the real benefit to come to fruition. Additionally, the implementation process will include opportunities for Beneficiary and community involvement and participation at all stages of the process.

Consistent with the fundamental purposes of the Hawaiian Homes Commission Act, to the extent permitted by law, it is the goal of the 'Āina Mauna Legacy Program to support economic development, maximize opportunities for beneficiaries and give preference for native Hawaiian beneficiary involvement at all stages of the program's implementation.

Immediate direct and indirect opportunities are jobs related to the forest restoration, including on-the-ground work, supplying restoration needs and services (whether it is equipment, supplies or services to support the reforestation,) as well as the ongoing monitoring and research associated with the restoration efforts.

The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory.

5) Substantially affects public health;

The proposed actions will have a positive impact on public health by protecting native forest.

The Legacy Program will have a positive affect by increasing the quality of the Mauna Kea watershed and by removing carbon dioxide (a greenhouse gas) from the atmosphere through the reforestation efforts. All activities pertaining to this program will be performed in accordance with the State's Best Management Practices (BMP).

To minimize water quality degradation from herbicide use in the project area, contractor's will be required to adhere to manufacturer's label instructions. Safety and health laws and regulations regarding workers will be strictly enforced. When necessary, DHHL will report violations to the Occupational Safety and Health Administration.

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

No adverse secondary effects are expected.

Due to the scale of the property and the dispersion of the various uses, conditions in the area will essentially remain the same for decades, with a slight population increase with the development of homesteads and limited need or impact on public facilities.

7) Involves a substantial degradation of environmental quality;

The implementation of best management practices and other mitigation measures will ensure that the project will not degrade environmental quality in any substantial way.

Sound forest and resource management of sustainable, long term productivity will insure that there will not be a significant degradation of the project areas.

The ultimate long-term goal for DHHL is an economically-sustainable, healthy native forest ecosystem, homesteading and other activities at Humu'ula/Pi'ihonua.

In achieving this goal, the 'Āina Mauna Legacy Program will serve as a guide for managing existing and future activities and uses, and to ensure ongoing protection of DHHL's trust property in perpetuity by linking traditional cultural knowledge and modern science.

The preferred alternatives address multiple goals and define areas for focused attention, including ecosystem restoration, beneficiary needs, conserving wildlife and habitats, reducing threats to the ecosystem, income generation to be reinvested into the property, coordinating conservation and management efforts and achieving effective management of the 'Āina Mauna.

Restoration of the land upon which native Hawaiians have always depended is key to the success of the beneficiaries. It will take generations to restore the land back to this healthy condition. Ultimately, and as an over-arching principle, the 'Āina Mauna Legacy Program is about and for the Beneficiaries, Hawaiian Home Lands Trust and the Land.

Environmental quality is expected to improve due to the creation of new native forest areas, the provision of habitat for native flora and fauna, the improvement in water capacity and quality, and the sequestering of carbon dioxide (a greenhouse gas) that the new trees will provide. The preferred alternatives will have less than significant impacts on the environment.

- 8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

Cumulative effects of the project are expected to be positive.

While there are 17 different actions included in the EA, each is not necessarily independent of the others nor isolated from other activities in the region. The 'Āina Mauna Legacy Program is based on the Hawaiian Homes Commission Mission Statement and the Legacy Program Mission, Goals and Priority Issues. The 'Āina Mauna Legacy Program evaluates and balances conformance of competing uses with these overarching principles.

The ultimate long-term goal for DHHL is an economically-sustainable, healthy native forest ecosystem, homesteading and other activities at Humu'ula/Pi'ihonua. These are consistent and compatible with the uses in the surrounding area.

- 9) Substantially affects a rare, threatened, or endangered species, or its habitat;

There will be a beneficial effect on rare, threatened or endangered species and its habitat.

A primary goal of the 'Āina Mauna Legacy Program is to develop an economically self-sustaining improvement and preservation program for the natural and cultural resources (invasive species eradication and native ecosystem restoration) and implementation strategy. Related to this, the focus of the 'Āina Mauna Legacy Program is on restoration and enhancement of DHHL trust resources; removal of invasive species - gorse, etc; and conservation of natural and cultural resources and endangered species.

The area serves as valuable habitat to many native and endemic species. The area's proximity to Mauna Kea also makes it a valuable cultural resource. These lands have the potential for serving as a sustainable native forest and land unit by simultaneously providing environmental, economic and social benefits to the trust and its beneficiaries in perpetuity.

Koa and 'ōhi'a forests are found in the lower portions of Humu'ula and Pi'ihonua, especially in the lands adjacent to the USFWS Hakalau Forest National Wildlife Refuge. Scattered koa and māmane are found over the northern portions of Humu'ula with scattered māmane found in the upper elevations.

The māmane forests serve as critical habitat for the palila. Additionally, the koa/'ōhi'a and koa/māmane forests provide habitat for several endangered and threatened native bird species.

Implementation of mitigation measures associated with the preferred alternatives will result in little or no impacts to wildlife or State listed species, and no adverse effects to federally listed species. The Legacy Program will enhance the quality and quantity of native forest habitat, and possibly benefit native species in this way.

10) Detrimentially affects air or water quality or ambient noise levels;

The preferred alternative actions will have no detrimental effects on air quality, water quality or noise levels.

The reforestation and related projects will improve the quality of Hawai'i's land, air and water resources by expanding habitat; limiting the use of fire and herbicide to limit gorse expansion; minimize erosion and enhance water catchment through reforestation; and improve air quality through carbon sequestration.

The environmental benefits of forestry, e.g. clean water and air, soil augmentation, and wildlife habitat, are well known. The Legacy Program's numerous native forest restoration projects will help to increase air quality through the planting of trees and other forest products.

The proposed project will have little or no significant negative impact on water quality. To minimize nonpoint source pollution from sediments, the required practices include avoiding any disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing culverts, dips, water bars and cross drainage to minimize erosion. To minimize water quality degradation from nutrients and herbicides, practices include efficient and safe chemical use according to manufacturer's label.

Reforestation will enhance water quality concerns. Due to the nature and condition of various portions of the property, certain areas are recommended for protection, restoration and enhancement as biodiverse, healthy native forests. The Native Forest is more than just trees; it includes the various ferns and other levels of understory, mosses, etc making up a biodiverse ecosystem and habitat of various insects, plants and animals. These also serve to filter water as it flows through.

The Legacy Program operations and preferred alternatives are not expected to cause a significant noise impact, and no mitigation measures beyond compliance with applicable regulations, requirements, and standards are required.

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

Although the Legacy Program is located in an area with volcanic and seismic risk, the entire Island of Hawai'i shares these risks. The site is not within a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater or coastal water and the Proposed actions and Preferred Alternatives will not have a significant effect on these sensitive areas.

- 12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies;

No scenic vistas or view planes identified in the Hawai'i County General Plan will be adversely affected by the Legacy Program, and visual impacts will be negligible.

Due to the scale of the property and topography of the area, most of the proposed Legacy Program actions will not be visible. Therefore, those facilities will not result in an adverse visual impact. The constructed buildings and infrastructure around the Legacy Program site will be barely visible to the public unless they are utilizing the Mauna Kea Access Road, Keanakolu/Mana Road or they have stopped along the Saddle Road where a small portion of the Legacy Program area may be visible. Over time as the vegetation near construction areas grow and mature the buildings will become less noticeable. Re-vegetation with native plants in areas disturbed by construction activities and removal of invasive species on the site will be a beneficial, long-term effect to scenery.

- 13) Requires substantial energy consumption.

The energy consumption associated with the Legacy Program will not have a significant impact on other facilities on the mountain or island-wide.

Because of the area's isolated location and lack of infrastructure, conventional energy use on the property is limited. The Legacy Program will focus on alternative/renewable energy systems to provide power for the Legacy Program, including Solar, Photovoltaic and Wind. Thus, renewable resources (sun and wind) will provide a majority of power for the Legacy Program.

The preferred alternatives typically incorporate alternative energy component (consistent with DHHL's Energy Policy) which will include Photovoltaic electrical power (with battery and generator back-up); Solar hot water heating; Passive solar/insulation; Gray-water re-use; Water catchment with fog drip catchment augmentation; and Low-wind-speed generators for electrical power, where appropriate. Mitigation measures have been incorporated for those that may have limited impact on wildlife.

For the reasons above, the proposed action will not have any significant effect in the context of Chapter 343, Hawai'i Revised Statutes and section 11-200-12 of the State Administrative Rules.

Chapter 7 - Agency and Public Participation

7.1 'Āina Mauna Legacy Program Outreach Activities

A component of the 'Āina Mauna Legacy Program was to develop an outreach program to gain interest, participation, and support from the Hawaiian Homes Commission, DHHL Staff, beneficiaries groups, cultural practitioners, natural resource scientists, and the broader community for the Legacy Program and its implementation. Outreach was extensive and included the following outreach activities.

7.1.1 Hawaiian Homes Commission Informational Workshops (public meetings)

- Kona on June 22, 2009
- Waimea on September 21, 2009
- Kalaeloa on December 14, 2009

7.1.2 Hawaiian Homes Commission Meeting (public meeting)

- Kalaeloa on December 15, 2009

7.1.3 Beneficiary Consultations (public meetings)

- Waimea on September 23, 2009 (Kūhiō Hale)
- Hilo on September 25, 2009 (Hilo High School)
- Hilo on October 14, 2009 (Keaukaha Elementary School)

(Invitation letters were sent to over 5,000 beneficiaries by mail; in addition, over 2,500 postcards were mailed to Hilo addresses for the second Hilo meeting)

7.1.4 Humu'ula/Pi'ihonua Legacy Plan Scope of Services Meeting

On November 24, 2008, a Legacy Plan Scope of Services Meeting was held in Waimea. DHHL Hawai'i Island Commissioners, representatives of Ōiwi Lōkahi O ka Mokupuni O Keawe and members of the community were able to comment on the scope of services the Legacy Program will include.

7.1.5 Office of Hawaiian Affairs (Statewide radio program)

On September 14, 2009, Hawaiian Homes Commission Chairperson Kaulana Park and Peter Young (Ho'okuleana LLC) participated in a statewide OHA radio program with Jonathan Schemer and discussed the 'Āina Mauna Legacy Program.

7.1.6 Office of Hawaiian Affairs (public meetings)

On October 28, 2009, the Office of Hawaiian Affairs (OHA) Beneficiary Advocacy and Empowerment (BAE) Committee (which includes all OHA Trustees) was given a briefing on the 'Āina Mauna Legacy Program. The OHA BAE Committee met again on November 18, 2009 and discussed and provided support for the 'Āina Mauna Legacy Program.

7.1.7 'Āina Mauna Legacy Program Advisory Group

The Advisory Group was formed to provide advice and recommendations in identifying the optimum land use, infrastructure patterns, best management practices and estimated financial requirements to achieve the goals of the 'Āina Mauna Legacy Program.

Advisory Group members served as liaisons between their constituents and communities, as well as helped with outreach to their respective communities on behalf of the 'Āina Mauna Legacy Program. An Advisory Group site visit of the area was held on June 30, 2009 and video conferences with the group were held on August 19, 2009 and November 2, 2009. Advisory Group members were e-mailed multiple drafts of portions of and the entire Legacy Program document throughout the process.

Advisory Group members included: George Applegate, Dr. Sam Gon, Dr. Jim Jacobi, Guy Kaniho, Duke Kapuniai, Kanani Kapuniai, John Kekua, Julie Leialoha, Sheri Mann, Kapua Sproat and Ed Stevens.

7.1.8 DHHL Website

The 'Āina Mauna Legacy Program informational documents were posted on the DHHL website and sent to numerous Hawaiian, environmental, government and non-profit agencies for comments and feedback. Responses to comments from the various beneficiary consultation meetings are posted on the DHHL website, as are the Pre-final Executive Summary and full document.

7.1.9 Mauna Kea Neighbors Meetings

The Mauna Kea Neighbors group is made up government, public and private entities that work on or around Mauna Kea. The group generally includes representatives from: the Department of Hawaiian Homes Lands, Department of Land and Natural Resources, US Fish & Wildlife Service, Office of Hawaiian Affairs, Office of Mauna Kea Management, Saddle Road Task Force, University of Hawai'i at Hilo - College of Agriculture, Forestry and Natural Resource Management, US Army - Pōhakuloa Training Area, Waiki'i Ranch Inc., Parker Ranch, Hawai'i Experimental Tropical Forest, Institute for Astronomy, and Hawai'i Island Economic Development Board.

On December 17, 2008, a Mauna Kea Neighbors meeting was held at the Pōhakuloa Training Area. The meeting served as a scoping meeting in regards to the development of the 'Āina Mauna Legacy Program.

On September 16, 2009 there was another Mauna Kea Neighbors meeting at the Pōhakuloa Training Area. DHHL provided the Neighbors group with an update on the status of the 'Āina Mauna Legacy Program and received input from neighboring agencies on the Program.

7.2 ‘Āina Mauna Legacy Program Environmental Assessment Scoping Activities

The scoping process for the ‘Āina Mauna Legacy Program Environmental Assessment involved a variety of means for input and comments from the public as well as from State, County and Federal agencies.

7.2.1 Scoping Letters

In March 2011, Ho‘okuleana mailed approximately 25 scoping letters and emailed approximately 110 scoping letters to individuals, local conservation and interest groups, research organizations, County, State, and Federal government agencies, those that were involved in or commented on the ‘Āina Mauna Legacy Program and others. The scoping letter described the ‘Āina Mauna Legacy Program’s purpose and goals, draft actions, and preliminary issues to be considered in the EA.

Ho‘okuleana received 14 letters from County, State and Federal agencies, commenting on the ‘Āina Mauna Legacy Program scoping process. These letters, along with responses to questions posed in the letters are included in the Appendix of the EA.

7.2.2 Public Scoping Meetings

The first scoping meeting was with the group “Mauna Kea Neighbors” held on February 3, 2011 at the Pōhakuloa Training Area. Since 2003, Mauna Kea Neighbors, which is made up of individuals and entities that represent adjoining landowners or other related interest on Mauna Kea, has held periodic meetings to discuss issues of common interest and concern related to Mauna Kea.

The first scoping meeting was with the group “Mauna Kea Neighbors” held on February 3, 2011 at the Pōhakuloa Training Area. At the meeting an overview of the ‘Āina Mauna EA process was given.

Those in attendance included:

Lt. Col. Rolland “Chris” Niles - Army-Pōhakuloa Training Area
Major Tom Barrett - 25 CAB
Steve Troute - Army-Pōhakuloa Training Area
Pete Hendricks - PTA Citizen Advisory Group
Gordon Rogers - PTA Deputy Commander
Julie Taomia - PTA DPW Environmental
Peter Peshut - PTA DPW Environmental
Mike Robinson - Department of Hawaiian Home Lands
Jim DuPont - Department of Hawaiian Home Lands
Roger Imoto - DLNR-Division of Forestry and Wildlife
Dean Takebayashi - DLNR-State Parks
Donna Ball - USFWS Conservation Partnerships
Jim Kraus - USFWS Hakalau Wildlife Refuge
Carolyn Stewart - Hawai‘i Wildfire Management Organization
Peter Young - Ho‘okuleana LLC
Guenther Hasinger - Institute for Astronomy
Bob McLaren - Institute for Astronomy
Stephanie Nagata - Office of Mauna Kea Management
Bill Steiner - UHH-College of Ag, Forestry and Natural Resource Mgmt

Bill Bergin - Waiki'i Ranch Homeowner's Association
TJ McAniff - Waiki'i Ranch Homeowner's Association
Bill Moore - Waiki'i Ranch, Inc
John Ray - Sunfuels Hawai'i
David Tarnas - Sunfuels Hawai'i

Additionally, two public scoping meetings were held to further inform DHHL beneficiaries on the process and solicit additional input on the proposed actions. The meetings were held on March 30, 2011 at Kūhiō Hale in Waimea, and on March 31, 2011 at the County Aupuni Conference Room in Hilo.

At the meetings, Ho'okuleana staff explained the EA planning process, the Legacy Program's purpose, vision, and management, and preliminary management issues, concerns, and opportunities. Ho'okuleana staff also answered questions from attendees. Outreach for the meetings included mailing postcards to over 400 beneficiaries, flyers placed around beneficiary communities, and media press releases sent to West Hawai'i Today and Hawai'i Tribune Herald.

Summaries of issues raised in the community scoping process include:

Propagation (Outplanting) Centers and Field Worker Accommodations

Where were the numbers for the Field Worker Accommodations derived from?

Field worker accommodations are addressed under action #3, Outplanting Centers and Field Worker Accommodations within the EA. The sleeping quarter capacity of 20 was derived from other similar sleeping quarters in Hawai'i forest settings (both the Hakalau Forest National Wildlife Refuge and the Hawai'i Experimental Tropical Forest Laupāhoehoe Research and Education Center have 20 people capacities for their sleeping quarters.)

Where and why is there a propagation (outplanting) center proposed at Pu'u 'Ō'ō?

Propagation (Outplanting) Centers are addressed under action #3, Outplanting Centers and Field Worker Accommodations. The outplanting center near Pu'u 'Ō'ō was chosen because the nearby gulches and gullies are an ideal seed source for native species. Both the Pu'u 'Ō'ō and Kanakaleonui Bird Corridor sites are centrally located to the areas that need planting.

The DHHL 'Āina Mauna region is 19-miles long by 6-miles across. This is a vast 56,000-acres. A large majority of this area will be restored to native forest. Early estimates are that over 10-million trees and shrubs will need to be planted across the property.

This restoration effort will require an estimated 10-million new tree and shrub seedlings. This large amount of tree seedlings requires that outplanting facilities be built to provide a suitable outplanting site for the seedling to be raised. Foresters agree that propagation of seeds from the reforestation areas will work best with replanting, so it is important that the seedlings be from the area into which they will be planted. This is why the establishment of outplanting centers on site is so critical.

The remoteness of certain areas across the Humu'ula-Pi'ihonua property also dictate that centralized outplanting facilities be placed in Kanakaleonui and north of Pu'u 'Ō'ō. These outplanting centers will be used for both the restoration and sustainable koa forests.

Additionally, the labor involved in propagating and planting over 10-million trees is extensive. A highly skilled, experienced planter can plant approximately 1,000-trees per day (this is planting only, not site preparation, fertilization or other management functions). In order to best utilize the tree planters, having them stay within the planting area, in field worker accommodations, for multiple days, serves a variety of purposes.

They will be able to work longer days, planting more trees at a time, not having to commute to and from the site. Having the workers stay on site will considerably cut down on the amount of traffic coming in and out of the area. Thus, cutting down on the usage of the road (wear and tear) and reducing other traffic impacts.

The cost of professional tree planters and the amount of trees needs to be planted presents an opportunity to utilize other, additional resources in the planting efforts.

Volunteers are an excellent supplement to these tree planting activities. On weekends, holidays and other times, when the field workers are off site, volunteers can be organized to plant trees, prepare areas for planting, weed, help with outplanting, etc. The field worker accommodations can also be utilized to house the volunteers, providing them more time for activities and cutting down on traffic across the site.

Additionally, once the trees are planted, the area will still need to be managed and maintained. Research, monitoring and education components will be phased into the area, as well. The field worker accommodations will provide places for scientists, educators, managers, field workers and volunteers to stay while utilizing and experiencing the area. Or, the facilities could be used for ecotourism, overnight uses or other activities.

The above discussion on the benefits associated with the location and development of outplanting centers is addressed in the EA.

Gorse Eradication through Commercial Timber Planting and Harvesting

The EA should consider other alternatives (such as 'Ōiwi Lōkahi O Ka Mokupuni O Keawe's flash carbonization) for gorse eradication.

The EA addresses site preparation in Chapter 4, Section 17, Site Preparation and Construction.

A site preparation means proposed by the 'Ōiwi Lōkahi O Ka Mokupuni O Keawe group in their experimental gorse removal and processing proposal is to pull the plants (roots and all) from the soil. The gorse is then proposed to be processed through a gasification technique with carbon and bio-fuel the end products.

Several of the actions addressed in the Environmental Assessment require site preparation in order to implement the action. In some cases, this is limited to tree and other vegetation removal, while others will require grading and leveling of portions of the site. The 'Ōiwi Lōkahi O Ka Mokupuni O Keawe's technique can also be considered as a site preparation approach.

Site preparation in areas for forest recovery, sustainable koa and timber to fight gorse, are focused on maximizing the opportunity to success of the targeted species while protecting soil structure and properties for long-term health of the ecosystem.

Burning and mulching/crushing have proven to be effective means to remove unwanted vegetation, with limited impact to the surrounding area. Likewise, physical removal of vegetation using brush blades on heavy equipment, although more costly, can also be an effective unwanted vegetation removal alternative. Primary means of physical removal of vegetation include discing, scarifying and/or brush blading an area by scrapping the vegetation off. Applications may involve heavy or light equipment, or simply hand-labor.

‘Ōiwi Lōkahi O Ka Mokupuni O Keawe’s site preparation technique, as well as other techniques are included in the EA.

Pasture (Interim and Long Term)

The area reserved for pasture area is not ideal pasture land.

This issue is addressed under action #11, Pasture (Interim and Long term).

The “Pasture Recommendations at Humu’ula for Controlling Wildfire Fuels” report indicates ideal grazing areas south of the gorse infestation and along Keanakolu Road where fuels will be reduced, gorse movement will be minimized and natural recovery of adjacent lands could continue. The analysis in this report was based upon the 1997 Summary Appraisal Report for a former Parker Ranch lease and conversations with Parker Ranch employees.

Additionally, the pasture area west of Humu’ula Sheep Station was previously used by Parker Ranch and identified as good for pasture. According to the Ranch, this area was an ideal place for birthing cattle and it was used accordingly. The area was also chosen as pasture because beneficiaries had requested the area for a pasture lease previously.

The above discussion on the determination of placement of pasture lands is addressed in the EA.

How will pasture in designated areas be operated and leased? Is community pasture considered?

This issue is addressed under action #11, Pasture (Interim and Long term).

Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu’ula/Pi’ihonua come under existing DHHL planning, design, development, funding, disposition and management. These proposed uses can fit in the “queue” for development scheduling and disposition with other Homesteading and Pasture uses.

Additional acreage propose for pasture use covers approximately 4,000-acres (these land areas are approximate references) - with about 2,000-acres designated for pasture along the Keanakolu- Mana Road and another 2,000-acres on the west side of the Mauna Kea Access Road (below the Radio Tower site and fronting Saddle Road and Mauna Kea Access Road.)

These areas proposed for additional acreage for pasture use are consistent with the Fire Plan and are proposed to be immediately available for beneficiary use.

Additional acreage pasture use could also be in the form of Community Pasture. According to DHHL, Moloka’i uses a community pasture program and it has been successful. Previous tries at community pasture on Hawai’i Island have apparently not been as successful.

However, the Program is open to a variety of scenarios, with community pasture being only one of the options or combinations of options for management.

Additionally, since 2005 the Department has taken an active role at looking into the needs of Beneficiaries in regard to pasture use. The Honokaia model assesses how much land Beneficiaries need for pasture and distributes pasture land accordingly. Thus, it is incumbent upon the lessees to utilize their land accordingly.

The above discussion on pasture leases, community pasture and other pasture options for beneficiaries is addressed in the EA.

Sheep Station Adaptive Re-Use

Are the Quonset huts at the Humu'ula Sheep Station considered historic sites? Can they be torn down and better use made of the space?

The Humu'ula Sheep Station Re-use is addressed under action #13 within the EA.

According to the State Historic Preservation division guidelines, anything over 50 years old is considered a historic property. Thus, State Historic Preservation Division will be consulted on the redevelopment of the Sheep station and its various components including the Quonset huts currently on the property.

The Humu'ula Sheep Station Adaptive Reuse Plan does call for the adaptive re-use of improvements in and around the Humu'ula Sheep Station. Initially, depending on their structural condition, the Quonset huts may serve a useful purpose as office space, storage and potentially other interim uses. They are not considered for long-term restoration as part of the Humu'ula Sheep Station restoration effort.

The above discussion on Quonset huts is addressed in the EA.

Remote Accommodations

The old stone corral would be a good site for remote accommodations.

Based on this feedback, locating remote accommodations at the old stone corral is considered in the EA as part of action # 14, Remote Accommodations.

Eco-Tourism Facilities, Services and Activities

ATVs can have negative effects on the environment through noise, pollution and ground disturbance.

The use of ATVs is addressed in both action # 14 Remote Accommodations and action #15 Ecotourism Facilities, Services and Activities.

The use of ATVs within the 'Āina Mauna will be closely regulated. No unsupervised, independent recreational use of ATVs on the 'Āina Mauna property will be permitted ('Āina Mauna management personnel may use ATVs in fulfilling management functions.) ATV use in the ecotourism activities action will be permitted only when supervised by the ecotourism operator and the ATV throttle will be modified so that its maximum speed is reduced to that of a typical walk or jog.

The above discussion on ATV use is included in the EA.

Horse drawn wagon tours would fit well into the culture of the 'Āina Mauna area and its rich cattle history and would have minimal impact on the environment and give a unique perspective of the area.

Based on this suggestion, horse drawn wagons have been added as an alternative use in ecotourism activities, under action #14 Remote Accommodations and action #15 Ecotourism Facilities, Services and Activities.

How will invasive species control (flora) in eco-tourism activities be addressed?

Invasive species control in eco-tourism activities is addressed in Chapter 4, Section 4, Biological Resources.

Ecotourism permits will include conditions regarding taking precautions to prevent the introduction of alien plants and insects to the area. Vehicles, boots, clothing and equipment must be cleaned and inspected for seeds, eggs and larvae at the staging area, before proceeding further into the 'Āina Mauna property.

The Legacy Program will also reduce the probability for invasive species being introduced to the environment by implementing an Invasive Species/Pest Management and Control Program. The Program will include:

- Education regarding the status, condition, diversity and protection afforded the natural resources present on the mountain and the harm invasive species/pests can inflict on these natural resource.
- Requirements that everyone who enters 'Āina Mauna Property brush down their clothes and shoes to remove invasive plant seeds and invertebrates. This will be done at the Humu'ula Sheep Station, Administration Base Facility, Offices, or other lower elevation locations prior to boarding vehicles bound for the upper areas of the 'Āina Mauna.
- Regular inspections and washing, at lower elevation facilities such as the Humu'ula Sheep Station, Administration Base Facility, Offices of DHHL vehicles and other items that are regularly transported between the upper and lower elevations of the area.
- Regular monitoring of the habitat along Keanakolu/Mana Road, Mauna Kea Access Road and internal roadways for invasive species, and eradication of such species when found using methods that will not impact indigenous resident species.

The above discussion concerning invasive species control in eco-tourism activities is addressed in the EA.

Compatibility of ecotourism and commercial forestry operations.

Compatibility of the various actions included in the 'Āina Mauna Legacy Program are addressed in Chapter 6, Cumulative Impacts.

Various uses are dispersed and separated from others to minimize impacts to each. For instance, ecotourism-related uses are placed away from the core of the gorse eradication through commercial timber uses, so that ecotourism activities do not get in the way of potential heavy equipment associated with commercial timber operations.

Commercial Facilities and Activities

Could the Lodge designated for the "commercial area" be located within the pasture area to afford a better location and better views?

Commercial Facilities and Activities are addressed in action #16. Based on scoping discussions, an additional site is considered for a lodge and restaurant in the EA. The EA notes that the lodge, restaurant and visitor center may also be developed in the area immediately above the 500-acre commercial area on either side of the Mauna Kea Access Road generally at the elevation of the tree stand above the Mauna Kea Access Road/Keanakolu-Mana Road intersection.

Could a community/ranch type store be included in the commercial area? The homesteads will need access to building supplies and other items.

Commercial Facilities and Activities are addressed in action #16. As stated in the EA, commercial uses will provide both periodic (ecotourism) and long-term (commercial, lodge, etc.) opportunities for revenue generation.

Commercial uses could take on a variety of uses including a lodge, restaurant, visitor center, retail activities, office, commercial/general/convenience store(s), rest stops, gas station and other facilities that are appropriate to a transient or visitor market.

How will pest control (ants, roaches, rats etc) and trash removal in commercial areas be addressed?

Pest control and trash removal within commercial areas is addressed in Chapter 4, Section 4, Biological Resources.

The EA address a number of techniques that have been developed and will be used with in the 'Āina Mauna, including pitfall trapping, non-insecticidal bait stations, timed searching and searching specific habitats.

As stated in the EA, the Legacy Program will reduce the probability for pests and invasive species being introduced to the environment by implementing an Invasive Species/Pest Management and Control Program. The Program will include education regarding the status, condition, diversity and protection afforded the natural resources present on the mountain and the harm invasive species/pests can inflict on these natural resource.

Additionally, any trash which is generated on site will be required to be hauled off site and disposed of off properly.

The above discussion concerning pest control and trash removal in commercial areas is included in the EA.

Groundwater Water System and Surface Water Catchment Systems

Will DHHL partner with Pōhakuloa Training Area for groundwater development in the area?

Groundwater development is addressed under action # 6. The Army and any other appropriate entity will be sought for water partnerships.

Issues were raised related to groundwater and water catchment systems, operations and management of water systems.

The EA evaluates two actions related to water, action #6, Groundwater Water System and action #7, Surface water Catchment System.

Initial water will come from catchment. The area for homesteading fits within the County's required rain amount for a catchment system. A well will also be explored, although its cost (it could be in excess of \$5 million) makes it not an immediate choice or option.

Water Resource Management and Planning will include the following Water Source Opportunities: Investigate reported springs and restoration to supplement water needs, Rainwater capture/collection including catchment (water tanks) for small scale residential, pasture and reservoirs for larger scale collection; Fog drip to supplement rainwater catchment and Investigate groundwater wells (Initial exploratory well above the Sheep Station.) This discussion is included within the EA.

Non-Native Wildlife Control and Management

Discussion regarding aerial shooting and State law.

Aerial shooting is addressed in action #9, Non-Native Wildlife Control and Management. Based on comments regarding aerial shooting, the EA includes reference to Hawai'i Administrative Rule §13-123-22 (d) (2), Rules Regulating Game Mammal Hunting, Conditions and restrictions, states:

“No person shall use any aircraft to herd or drive game mammals, or land any aircraft for the purpose of hunting, or discharge any weapon from any aircraft into a public hunting area except as provided by the department”

The EA notes however, that the 'Āina Mauna is not a public hunting area and wild ungulate eradication is not “hunting.” DHHL will consult and work closely with DLNR-DOFAW if aerial shooting is used for non-native wildlife control.

Policy and Operations Issues Raised in Scoping Meetings Included:

- *Benefits to beneficiaries*
- *Formation of the 'Āina Mauna Advisory Group*
- *Preference to native Hawaiians for contracts etc.*
- *Lease rental amounts*
- *Cost of water*
- *Reinvestment of funds*
- *Department/Beneficiary consultation and collaboration*
- *Prior lessee's responsibility for gorse eradication*
- *Transfer of existing DHHL leased lands*

Hawai'i Revised Statutes Chapter 343 is the law regulation Environmental Impact Statements. Chapter §343-1 Findings and purpose states:

“The legislature finds that the quality of humanity's environment is critical to humanity's well-being, that humanity's activities have broad and profound effects upon the interrelations of all components of the environment, and that an environmental review process will integrate the review of environmental concerns with existing planning processes of the State and counties and alert decision makers to significant environmental effects which may result from the implementation of certain actions. The legislature further finds that the process of reviewing environmental effects is desirable because environmental consciousness is enhanced, cooperation and coordination are encouraged and public participation during the review process benefits all parties involved and society as a whole.

It is the purpose of this chapter to establish a system of environmental review which will ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations.”

Thus, the issues listed above do not directly relate to Chapter 343 and the Environmental Assessment process. However, these matters were referred to DHHL staff for their consideration.

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(808) 254-2223 (Oahu)
(808) 329-4447 (Big Island)
(808) 226-3567 (Cell Phone)
PeterT.Young@Hookuleana.com
www.hookuleana.com

Ho'okuleana LLC

... to take responsibility ...

Mr. Marshall Lum, P.E., Acting Chief
State of Hawaii, Department of Health
Wastewater Branch
P.O. Box 3378
Honolulu, Hawaii 96801

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Mr. Lum,

Thank you for your letter dated March 24, 2011 regarding the Department of Hawaiian Home Lands Aina Mauna Legacy Program Environmental Assessment Scoping.

In your letter, you stated that you have no objections as long as the domestic wastewater generated by the project is handled by a wastewater system that is designed and constructed in accordance with applicable provision of DOH's Administrative Rules, Chapter 11-62, "Wastewater Systems."

We will note DOH's Administrative Rules, Chapter 11-62, "Wastewater Systems" in the Draft EA and the projects required conformance.

We will be providing the Department a copy of the Draft EA when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,


Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division



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

March 24, 2011

Mr. Peter T. Young
Hookuleana LLC
25 Kanehine Bay Drive Suite 212
Kailua, Hawaii 96734

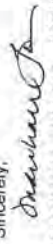
Dear Mr. Young:

Subject: Aina Mauna Legacy Program Environmental Assessment Scoping
Pre-Assessment Scoping / Consultation and Notice of Preparation of an
Environmental Assessment for the Department of Hawaiian Home Lands
Aina Mauna Legacy Program, Humuula / Pihonua, North Hilo, Hawaii 96740
TMK (3) 8-1-001: 001 inclusive

Thank you for the opportunity to review and comment on the subject project. We have no objections as long as the domestic wastewater generated by the project is handled by a wastewater system that is designed and constructed in accordance with our rules.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294 or fax to 586-4300.

Sincerely,


MARSHALL LUM, P.E., ACTING CHIEF
Wastewater Branch

LM:cle

c: DOH's Environmental Planning Office (EPO 11-045)
DOH-WWB's Kona Staff - Mr. Dane Hiromasa

REL ABANDONED
DO NOT REUSE

LORETTA J. FUDRY, A.C.S.W., M.P.H.
ASSISTANT DIRECTOR OF HEALTH

INVESTIGATIVE UNIT
DOH

LUD 381 001 001-00635
Aina Mauna Legacy



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 16, 2011

RECEIVED
STATE OF HAWAII
MARCH 16 2011

54670

WILLIAM J. ALIA, JR.
DIRECTOR OF LAND AND NATURAL RESOURCES
COMMISSIONER OF WATER RESOURCES MANAGEMENT

MEMORANDUM

TO: **DLNR Agencies:**
☒ Div. of Aquatic Resources
☒ Div. of Boating & Ocean Recreation
☒ Engineering Division
☒ Div. of Forestry & Wildlife
☒ Div. of State Parks
☒ Commission on Water Resource Management
☒ Office of Conservation & Coastal Lands
☒ Land Division - Hawaii District
☒ Historic Preservation

FROM: Charlene Unoiki, Assistant Administrator

SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Aina Mauna Legacy Program
 Island of Hawaii

LOCATION: Island of Hawaii

APPLICANT: Ho'okuleana LLC on behalf of the Department of Hawaiian Home Lands

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 30, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

() We have no objections.
 () We have no comments.
 () Comments are attached.

Signed: *[Signature]*
 Date: 3/29/11

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
 25 Kane Ohi Bay Drive, Suite 212
 Kailua, Hawaii 96734
 (808) 254-2223 (O.ahu)
 (808) 329-4447 (Big Island)
 (808) 226-3567 (Cell Phone)
 Peter.Young@hookuleana.com
 www.hookuleana.com

Mr. Dan Quinn, Administrator
 State of Hawaii, Department of Land and Natural Resources
 Division of State Parks
 P.O. Box 621
 Honolulu, Hawaii 96809

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Dan,

Thank you for your letter dated March 24, 2011 regarding the Department of Hawaiian Home Lands Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you stated that you have no comments at this time.

We look forward to your review of the Draft EA, which we will be providing to the Department when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

[Signature]
 Ho'okuleana LLC
 Peter T. Young

cc: Linda Chinn, DHHL Land Management Division

NEIL ABERCROMBIE
GOVERNOR

MAJOR GENERAL DARRYL D. M. WONG
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
ATTENTION: DEPT. SEC. 100
HONOLULU, HAWAII 96810-4005

March 28, 2011



PHONE (808) 733-4300
FAX (808) 733-4387

Ho'okuleana LLC
25 Kane'ole Bay Drive, Suite 212
Kailua, Hawaii 96734

To Whom It May Concern:

Āina Mauna Legacy Program Environmental Assessment (EA) Scoping

Thank you for the opportunity to comment on this proposed project. After review of the documents you have sent for this development, we defer to the appropriate federal and state agencies to address mitigation of archeological, historical, and cultural issues as well as environmental issues.

We strongly recommend that mitigation measures be considered in planning and the design phase of any new construction, as mitigation prevents loss of life, minimizes loss of property, and plans for continuity of essential services. Generally, the cost of integrating mitigation measures during construction is approximately one-third the cost of post-construction retrofit.

We anticipate reviewing the Draft Environmental Assessment when it becomes available. If you have any questions, please call Havanne Okamura, Hazard Mitigation Planner, at (808)733-4300, extension 556.

Sincerely,

EDWARD T. TEIXEIRA
Vice Director of Civil Defense

c: Major General Darryl M. Wong, Department of Defense

Ho'okuleana LLC
... to take responsibility ...

Peter T. Young
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Kailua, Hawaii 96734
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(808) 329-4447 (Big Island)
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PeterYoung@Hookuleana.com
www.hookuleana.com

Mr. Edward Teixeira, Vice Director
State of Hawai'i, Department of Defense
3949 Diamond Head Road
Honolulu, Hawai'i 96816

April 29, 2011

Subject: Āina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Mr. Teixeira,

Thank you for your letter dated March 28, 2011 regarding the Department of Hawaiian Home Lands' Āina Mauna Legacy Program Environmental Assessment Scoping.

In your letter, you recommended that mitigation measures be considered in planning and the design phase of any new construction.

The Āina Mauna Legacy Program will follow recommendations of the Uniform Building Code (UBC) including Prescriptive Details for Hurricane-Resistant Construction and Standards for Seismic Zone 4.

DHHL will also be looking at the opportunity to integrate new technologies and house design (size, shape of windows etc) in the mitigation of potential impacts from natural hazards.

Additionally, the initial homestead community will have two access roads, (one access onto the Saddle Road and one access on to Keanakolu Road) allowing alternative routes in and out of the community during an emergency. This information will be included in the Draft EA.

Once again, we would like to thank you for your comments on the Āina Mauna Legacy Program EA. We will be providing the Department a copy of the Draft EA when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division

PHONE (808) 594-1888



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

FAX (808) 594-1865

HRD11/4642B

March 29, 2011

Ho'okuleana, LLC
25 Kane'ole Bay Drive, Suite 212
Kailua, Hawaii 96734

Re: Pre-Draft Environmental Assessment
Department of Hawaiian Home Lands
'Aina Mauna Legacy Program
Humu'ula and Pi'ihonua, Island of Hawai'i

Aloha e Ho'okuleana, LLC.

The Office of Hawaiian Affairs (OHA) is in receipt of your letter requesting comments ahead of a draft environmental assessment for the 'Aina Mauna Legacy Program (program) which was unanimously approved by the Hawaiian Homes Commission. The program provides a guiding framework and priority actions for the restoration and management of native forest on approximately 56,000 acres of Department of Hawaiian Home Lands (DHHL) in Humu'ula and Pi'ihonua on the Island of Hawai'i.

OHA has no specific comments at this time. We look forward to seeing the program achieve its full potential and we applaud the DHHL for your efforts. Please provide OHA with the DEA when it becomes available. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keola@oha.org.

'O wau iho nō me ka 'ōia i'ō.

Clyde W. Nāmu'o

Clyde W. Nāmu'o
Chief/Executive Officer

C: OHA- Hawai'i Island Trustee Robert K. Lindsey, Jr.
OHA- East and West Hawai'i COC

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
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petertyoung@hookuleana.com
www.hookuleana.com

Mr. Clyde Nāmu'o, CEO
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawaii 96813

April 29, 2011

Subject: 'Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Clyde,

Thank you for your letter dated March 29, 2011 regarding the Department of Hawaiian Home Lands 'Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you stated that you have no specific comments at this time.

We look forward to your review of the Draft EA, which we will be providing to OHA when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Peter T. Young
Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM L. LAILA, JR.
BOARD OF LAND AND NATURAL RESOURCES
COMMISSIONER OF LAND AND NATURAL RESOURCES

Michael

March 16, 2011

MEMORANDUM

TO: **DLNR Agencies:**
☒ Div. of Aquatic Resources
☒ Div. of Boating & Ocean Recreation
☒ Engineering Division
☒ Div. of Forestry & Wildlife
☒ Div. of State Parks
☒ Commission on Water Resource Management
☒ Office of Conservation & Coastal Lands
☒ Land Division - Hawaii District
☒ Historic Preservation

FROM: Charlene Unoki, Assistant Administrator

SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Aina Mauna Legacy Program

LOCATION: Island of Hawaii

APPLICANT: Ho'okuleana LLC on behalf of the Department of Hawaiian Home Lands

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 30, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

() We have no objections.
(☒) We have no comments.
() Comments are attached.

Signed: *Michael*
Date: 3/30/11

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
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www.Hookuleana.com

Mr. Paul J. Conry, Administrator
State of Hawaii, Department of Land and Natural Resources
Division of Forestry and Wildlife
P.O. Box 621
Honolulu, Hawaii 96809

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Paul,

Thank you for your letter dated March 30, 2011 regarding the Department of Hawaiian Home Lands Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you stated that you have no comments at this time.

We look forward to your review of the Draft EA, which we will be providing to the Department when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Peter T. Young
Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

March 30, 2011

Ho'okuleana LLC
25 Kanohe Bay Drive, Suite 212
Kailua, Hawaii 96734

Dear Sirs:

Subject: Aina Mauna Legacy Program
Pre-Assessment – Environmental Assessment Scoping

Thank you for providing the Department of Transportation (DOT) notification by a scoping letter for a proposed Aina Mauna Legacy Program project on the Island of Hawaii.

The DOT submits the following initial comments:

1. The DOT highway facilities that are part of Route 200, Saddle Road, will be affected by the project. The roadway access connection for the project shown on the map you provided is on a stretch of highway under DOT jurisdiction.
2. In the scoping letter, the sixth paragraph that begins with the sentence, "The need for the Aina Mauna Legacy Program EA is ...identified by DHIHL," mentions there is an attached summary of actions for EA review of priority actions and management needs. There was no separate attachment accompanying the letter. However, as part of the scoping letter there were two sections titled "Aina Mauna Legacy Program – Environmental Assessment – Proposed Actions and ...approved Aina Mauna Legacy Program)" and "Contemplated Mitigation Measures...Legacy Program". Please clarify what is the attached summary and provide the stated "attached summary".
3. A colored map with a legend (page 11 of the scoping letter), that appears to depict a plan for the legacy program, accompanied the program's description. Any master plan for the legacy program should be part of your environmental assessment. Besides the master plan, a development plan needs to be included. The development plan should contain a detailed description of the various projects and developments (e.g. types, sizes, units, quantity, etc.) and build out phases/increments for the entire planned area of the legacy program. The

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors:
Fred A. Flanagan
Jim S. Goussard
Nancy Grane
Julianne Graham

IN REPLY REFER TO:

STP 8.0386

Ho'okuleana LLC
Page 2
March 30, 2011

STP 8.0386

master plan and development plan needs to be supported by a traffic impact assessment report (TIAR) that reflects the traffic generated by and associated with the developments and build outs, as well as internal road network and highway access connections. Homestead residences and worker or business commuting is part of the traffic assessment. The TIAR should cover both project and regional traffic impacts, and any improvements and mitigation measures that would be necessary for and by the project, particularly along Saddle Road and at and around the access connection to Saddle Road. The environmental assessment should also address any drainage impacts from the entire planned area of the legacy program area that could affect Saddle Road.

4. The DOT requests that at least four (4) copies of the environmental assessment be provided for our departmental staff review and further comments.

The DOT appreciates the courtesy of your early notification and the opportunity to provide initial comments. If you have any questions, including a need to meet with Highway Division staff to further discuss highway impact matters, please call Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at 831-7976.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

c: Department of Hawaiian Home Lands, Planning Office

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
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Kailua, Hawaii 96734
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PETER.YOUNG@HOOKULEANA.COM
www.hookuleana.com

Mr. Glenn M. Okimoto, Director
State of Hawai'i, Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Mr. Okimoto,

Thank you for your letter dated March 30, 2011 regarding the Department of Hawaiian Home Lands Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you offered four initial comments. The following is a list of your comments, followed by a response.

1) The DOT highway facilities that are part of Route 200, Saddle Road, will be affected by the project. The roadway access connection for the project shown on the map you provided is on a stretch of highway under DOT jurisdiction.

We acknowledge that the property fronts the Saddle Road, which is under DOT jurisdiction. The Environmental Assessment will note ownership of the Saddle Road.

2) In the scoping letter, the sixth paragraph that begins with the sentence, "The need for the Aina Mauna Legacy Program EA is ... identified by DHHL," mentions there is an attached summary of actions for EA review of priority actions and management needs. There was no separate attachment accompanying the letter. However, as part of the scoping letter there were two sections titled "Aina Mauna Legacy Program - Environmental Assessment Proposed Actions and ... approved Aina Mauna Legacy Program" and "Contemplated Mitigation Measures ... Legacy Program". Please clarify what is the attached summary and provide the stated "attached summary".

The scoping letter contained two parts, stapled together. The first page contained a letter on Ho'okuleana LLC stationery titled "Aina Mauna Legacy Program Environmental Assessment (EA) Scoping", which gave a summary of the EA process.

The next document (beginning on the back page of the scoping letter) titled "Aina Mauna Legacy Program - Environmental Assessment - Proposed Actions and Contemplated Mitigation Measures (Proposed actions are taken from the approved Aina Mauna Legacy Program)", contained 11 pages and gives a summary of the proposed actions to be included in the EA. This is what the scoping letter referred to as "the attached summary."

3) A colored map with a legend (page 11 of the scoping letter), that appears to depict a plan for the legacy program, accompanied the program's description. Any master plan for the legacy program should be part of your environmental assessment. Besides the master plan, a development plan needs to be included. The development plan should contain a detailed description of the various projects and developments (e.g. types, sizes, units, quantity, etc.) and build out phases/increments

for the entire planned area of the legacy program. The master plan and development plan needs to be supported by a traffic impact assessment report (TIAR) that reflects the traffic generated by and associated with the developments and build outs, as well as internal road network and highway access connections. Homestead residences and worker or business commuting is part of the traffic assessment. The TIAR should cover both project and regional traffic impacts, and any improvements and mitigation measures that would be necessary for and by the project, particularly along Saddle Road and at and around the access connection to Saddle Road. The environmental assessment should also address any drainage impacts from the entire planned area of the legacy program area that could affect Saddle Road.

The colored map referred to in your letter is part of the Aina Mauna Legacy Program which is the Master Plan for DHHL lands in Humu'ula and Pi'ihonua. In addition, a Work Plan (Aina Mauna Legacy Program Work Plan) was also completed for the Aina Mauna Legacy Program.

DHHL's Master Plan and Aina Mauna Legacy Program actions are included in the review and analysis of the Saddle Road Environmental Impact Statement reports.

The 1997 DHHL "Humu'ula/Pi'ihonua Master Plan" and its proposed actions are included in the 1999 "Final EIS Saddle Road (State Route 200) Māmalahoa Highway (State Route 190) to Milepost 6." The 2009 Aina Mauna Legacy Program is included in the 2010 "Final Supplemental Environmental Impact Statement and Final 4(F) Evaluation, Saddle Road (State Route 200) Māmalahoa Highway (State Route 190) to Milepost 4.1", as well.

The following summarizes some of the discussion on traffic that will be included in the Draft EA.

The primary access to the site is from the Saddle Road, a paved two-lane State highway connecting East and West Hawai'i, and the paved access road to the Mauna Kea Observatories and summit area. Saddle Road reaches an elevation of 6,632-feet above mean sea level (msl) at its highest. Near that location, Mauna Kea Access Road branches off toward Mauna Kea through the Aina Mauna.

The Saddle Road is undergoing extensive improvements and realignment to upgrade the cross-island Saddle Road into a modern 48-mile highway connecting the tourism centers in West Hawai'i and the County seat in East Hawai'i.

The purpose of the overall Saddle Road Improvement Project is to provide a safe and efficient route for access to land uses along Saddle Road and for cross-island traffic between East and West Hawai'i. The ongoing and planned improvements to Saddle Road would also address five general types of needs:

- roadway deficiencies;
- conflicts and hazards with military operations;
- capacity;
- safety; and
- social demand and economic development

The stated Purpose and Need for the Saddle Road SEIS (February 2010) includes safety, capacity and economic development improvements. As part of the SEIS analysis, the DHHL Aina Mauna Legacy Program was referenced as a "Reasonably Foreseeable Project" and was therefore included in the Saddle Road SEIS analysis.

Various actions in the 'Āina Mauna Legacy Program are summarized in the SEIS document and many of these actions address the purpose and need of increased capacity on the road and economic development opportunities.

As noted, the 'Āina Mauna Legacy Program includes such actions as: Homesteading (initial phase 100-200 homesteads), Forest restoration and timber harvesting, Infrastructure development, Sheep Station Adaptive Reuse (cabin and open campground, lodge, camp store, eco-tourism staging/community center, campground area, etc.) Remote Accommodations (accommodations for up to 20-people each at 5 sites), Eco-tourism Facilities, Services and Activities (including campgrounds, rest areas, shelters with cooking facilities, etc) Commercial Facilities and Activities (lodge, restaurant, visitor center, retail activities, office, commercial/general/convenience store(s), rest stops, gas station and other.) These actions address the purpose of increased capacity of the road and economic development opportunities which satisfy the intended purpose and need of the Saddle Road Improvement and realignment.

The expectation for economic development that the Saddle Road Improvement and realignment project addresses can be seen in the following projections:

- Residential development at both ends of the road
- Recreation and tourism
- Military operations
- Mauna Kea telescope complex
- Increasing congestion along alternative cross-island routes

As noted, the SEIS contemplates increased traffic and further concludes, "Improvements (to the road) would decrease the travel time for tourists traveling between the east and west sides of the island. An improved Saddle Road would increase the number of tourists visiting the east side of the island since, at present, only about one-third include the Hilo area in their itineraries. Visitation to attractions accessed by Saddle Road would also increase. Tourist expenditures on the east side of the island would increase with more visitors."

With respect to capacity, the 2010 SEIS concludes, "The existing capacity is currently inadequate. Level of Service, which measures the quality of traffic flow, is currently E, or poor. Without improvements, LOS is expected to decline to F, the worst level. Traffic volumes are expected to almost triple from the current average daily traffic (ADT) of 1,400 to 4,058 by 2013, because of improvements taking place in the other sections of Saddle Road."

With respect to social demand and economic development issues (like those proposed in the 'Āina Mauna Legacy Program,) the 2010 SEIS concludes, "A safe and efficient Saddle Road is needed for access to employment and recreation areas located between Mauna Kea and Mauna Loa, and more importantly, as a cross-island transportation route to connect East and West Hawai'i for business travel, the transport of goods and services, tourism/recreation, shopping, and commuting." It also concludes, "Over the last thirty years, however, much of the tourism-related growth in employment and the economy has been occurring in West Hawai'i. Tourists currently do not have easy access to the interior of the island."

This analysis and conclusions are consistent with the Final Environmental Impact Statement, Saddle Road (State Route 200): Māmalahoa Highway (State Route 190) to Milepost 6 (accepted November 1999.) Under the section addressing "Land Use" (section 3.1 of the 1999 EIS,) the EIS identifies DHH existing and proposed uses in the vicinity of the Saddle Road enhancement project. In part, it

states, "The land use plan includes a mix of homesteading commercial/service oriented business, ecotourism and service facilities, forest, and ranching activities. Table 3.1.1, *Draft Humu'ula Pūhonia Master Plan Proposed Uses*, summarizes the proposed uses identified in this draft plan." (Page 3-5)

The 1999 EIS further concludes: "The completion of the Saddle Road project will provide increased traffic along this corridor, providing greater potential for a viable convenience commercial facility within the DHH lands. Such a facility would provide a much needed service for those traveling this remote section of roadway."

Furthermore, in citing the DHH Master Plan in the 1999 EIS, the analysis included analysis and review of various actions from that document, including: Homesteads/Pastoral - (35 to 220+ lots,) Ecotourism Areas - (targeted to the remote areas to provide unique wilderness experiences,) Commercial/Service Oriented Business (service oriented business to serve the Saddle Road traffic, as well as the nearby PTA and Mauna Kea observatories and related activities - including service station and convenience store,) Forestry, Truck Farming and Floriculture, Cider, Quarrying, Gorse Control and Management and Resource Areas. These proposed actions evaluated in 1999 are almost identical to the actions in the 'Āina Mauna Legacy Program which were also reviewed and analyzed in the 2010 SEIS.

With respect to drainage, the EA will address mitigation measures to ensure drainage impacts are addressed properly. Site preparation of construction work areas will be conducted in such a manner as to minimize the amount of exposed soil at any one time.

Required practices will include avoiding disruption of natural drainage, preventing excessive soil displacement, providing drainage in case of slope instability, and providing dips, water bars, and cross drainage on roads and skid trails to minimize erosion will be followed. Roadway fords will be designed for roadway crossing of existing drainage ways. In addition, swales will be constructed on either side of the roads to allow adequate roadway drainage during storm events that will direct water flow to natural drainage ways. The existing natural drainage ways will continue to convey storm water and drainage from the non-road areas.

4) The DOT requests that at least four (4) copies of the environmental assessment be provided for our departmental staff review and further comments.

As requested, we will provide DOT with four copies of the Draft EA.

Once again, we would like to thank you for your comments on the 'Āina Mauna Legacy Program EA. We will be providing you a copy of the Draft EA when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,



Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHH Land Management Division



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2011 MAR 21 P 1:20

RECEIVED
LAND DIVISION
HILO, HAWAII

March 16, 2011

MEMORANDUM

TO: **DLNR Agencies:**
☒ Div. of Aquatic Resources
☒ Div. of Boating & Ocean Recreation
☒ Engineering Division
☒ Div. of Forestry & Wildlife
☒ Div. of State Parks
☒ Commission on Water Resource Management
☒ Office of Conservation & Coastal Lands
☒ Land Division - Hawaii District
☒ Historic Preservation

FROM: Charlene Unoki, Assistant Administrator
 SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Aina Mauna Legacy Program
 LOCATION: Island of Hawaii
 APPLICANT: Ho'okuleana LLC on behalf of the Department of Hawaiian Home Lands

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 30, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- ☐ We have no objections.
- ☒ We have no comments.
- ☐ Comments are attached.

Signed: *[Signature]*
 Date: 3-30-11

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
 25 Kame 'Ole Bay Drive, Suite 212
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 (808) 329-4447 (Big Island)
 (808) 226-3567 (Cell Phone)
 PeterYoung@Hookuleana.com
 www.Hookuleana.com

Mr. Kevin Moore, District Land Agent
 Department of Land and Natural Resources
 Land Division, Hawai'i Island
 75 Aupuni Street, Room 204
 Hilo, Hawaii 96720

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Mr. Moore,

Thank you for your letter dated March 30, 2011 regarding the Department of Hawaiian Home Lands 'Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you stated that you have no comments at this time.

We look forward to your review of the Draft EA, which we will be providing to the Department when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

[Signature]
 Ho'okuleana LLC
 Peter T. Young

cc: Linda Chinn, DHHHL Land Management Division

Jennifer Barra

From: Peter T. Young [PeterYoung@Hookuleana.com]
Sent: Friday, April 01, 2011 11:05 AM
To: JenniferBarra@Hookuleana.com
Subject: FW: Aina Mauna Legacy Program EA scoping

Peter T. Young, President
Ho'okuleana LLC

... to take responsibility ...

25 Kane'one Bay Drive, Suite 212
Kailua, Hawai'i 96734

(808) 254-2223 (O ahu)
(808) 329-4447 (Big Island)
(808) 226-3567 (Cell Phone)

PeterYoung@Hookuleana.com
www.hookuleana.com

Da well by doing good

 Save paper, save money - you may not need to print this e-mail.

From: Janice N. Takahashi@hawaii.gov [mailto:Janice.N.Takahashi@hawaii.gov]
Sent: Friday, April 01, 2011 10:25 AM
To: AinaMauna@Hookuleana.com
Subject: Aina Mauna Legacy Program EA scoping

Aloha,
We have no comments to offer at this time. Thanks.

Janice Takahashi
Chief Planner
Hawaii Housing Finance and Development Corporation
677 Queen Street, Suite 300
Honolulu, Hawaii 96813
Phone: 808-587-0639 Fax: 808-587-0600
Email: Janice.N.Takahashi@hawaii.gov

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Ho'okuleana LLC

... to take responsibility ...

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Ms. Janice Takahashi, Chief Planner
Hawaii Housing Finance and Development Corporation
677 Queen Street, Suite 300
Honolulu, Hawai'i 96813

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Ms. Takahashi,

Thank you for your email on April 1, 2011 regarding the Department of Hawaiian Home Lands' Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you stated that you have no comments to offer at this time.

We look forward to your review of the Draft EA, which we will be providing to HHFDC when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,



Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 1, 2011

Ho'okuleana LLC
25 Kaneohe Bay Drive Suite 212
Kailua, Hawaii 96734

Ladies and Gentlemen:

Subject: Pre-Assessment Scoping/Consultation and Notice of Preparation of an Environmental Assessment for the Department of Hawaiian Home Lands' Aina Mauna Legacy Program

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of Forestry & Wildlife, Division of State Parks, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

Maureen G. Lindner
for Russell Y. Tsuji
Administrator

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
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Kailua, Hawaii 96734
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Peter.Young@Hookuleana.com
www.Hookuleana.com

Mr. Russell Y. Tsuji, Administrator
State of Hawaii, Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Russell,

Thank you for your letter dated April 1, 2011 regarding the Department of Hawaiian Home Lands' Aina Mauna Legacy Program Environmental Assessment Scoping and for coordinating DLNR Division comments.

We look forward to your review of the Draft EA, which we will be providing to the Department when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Peter T. Young
Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 6, 2011

Ho'okuleana LLC
25 Kamehameha Bay Drive Suite 212
Kailua, Hawaii 96734

Ladies and Gentlemen:

Subject: Pre-Assessment Scoping/Consultation and Notice of Preparation of an Environmental Assessment for the Department of Hawaiian Home Lands' Aina Mauna Legacy Program

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to Land Division-Hawaii District for their review and comment.

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

Charlene Unoki
Charlene Unoki
Assistant Administrator

Ho'okuleana LLC

to take responsibility

Peter T. Young
25 Kamehameha Bay Drive, Suite 212
Kailua, Hawaii 96734
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(808) 329-4447 (Big Island)
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Peter.Young@Hookuleana.com
www.hookuleana.com

Ms. Charlene Unoki, Assistant Administrator
State of Hawaii, Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Charlene,

Thank you for your letter dated April 6, 2011 regarding the Department of Hawaiian Home Lands' Aina Mauna Legacy Program Environmental Assessment Scoping and for coordinating DLNR Division comments.

We look forward to your review of the Draft EA, which we will be providing to the Department when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Peter T. Young
Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division

William P. Kanae
Mayor



County of Hawai'i

PLANNING DEPARTMENT
Annex Center • (O) Pualu Street, Suite 3 • Hilo, Hawai'i 96720
Phone (808) 961-8288 • Fax (808) 961-8742

133 Ledhead Todd
Director
Margaret K. Masunaga
Deputy

April 11, 2011

Ms. Jennifer Barra
Ho'okuleana LLC
25 Kaneohe Bay Drive, Suite 212
Kailua HI 96734

Dear Ms. Barra:

Pre-Assessment Scoping/Consultation
Subject: 'Aina Mauna Legacy Program
TMK: 3-8-1-2-4 and 7-9, North Hilo, Hawai'i

This is in response to your letter which we received on March 9, 2011 requesting our preliminary comments on the 'Aina Mauna Legacy Program.

The mission of the 'Aina Mauna Legacy Program and its implementation is to restore approximately 56,000 acres of native Hawaiian forest that will be ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands trust, its beneficiaries and the community.

A Memorandum of Agreement (MOA) between the County of Hawai'i and the Department of Hawaiian Home Lands (DHHL) was adopted by Resolution No. 19-03 and became effective December 30, 2002. This Agreement contains procedures which we will follow with respect to DHHL property. Included in the MOA are *Section III- Relating to Planning and Land Use* and *Section IV - Relating to Public Facilities and Infrastructure Serving Hawaiian Home Lands* which covers the respective roles, responsibilities and obligations of both parties.

Hawai'i County is an Equal Opportunity Provider and Employer.

Ms. Jennifer Barra
Ho'okuleana LLC
Page 2
April 11, 2011

The above listed parcels, which we understand to be included in the program, have the following State Land Use and General Plan Designations, as well as County Zoning:

TMK: 3-8-1:	Acreage	State Land Use	General Plan Designation	County Zoning
1	2	7,512.8	Agricultural & Conservation	A-40a
2	3	1037	Conservation	"Forest Reserve"
3	4	3184	Conservation	"Forest Reserve"
4	7	19,351.981	Extensive Agriculture & Conservation	A-40a & "Forest Reserve"
5	8	11,123.7	Conservation	"Forest Reserve"
6	9	5,290	Extensive Agriculture & Conservation	A-40a

In reference to the table above, please note the following:

- For the parcels designated State Land Use Conservation, there is no County Zoning per se. Therefore the Department of Land and Natural Resources (DLNR) has jurisdiction on any use within the Conservation area.
- "Forest Reserve" is not a Zoning designation, but a description of the area.
- The Hawai'i County Zoning Code, Division 7 includes a list of permitted uses, height limit, minimum yards and other regulations for the Agricultural Districts. Please note the separate list of uses that will require either a Use Permit or a Special Permit. (See enclosure)

All of these parcels are not located in the County's Special Management Area. Therefore, Special Management Area rules and regulations are not applicable.

If you have questions, please contact Esther Imamura of this office at 961-8139.

Sincerely,

BJ LEDHEAD TODD
Planning Director

ETI
p:\public\wawm\et\hilo\aina mauna legacy program.doc
Enclosure

- (d) An ohana dwelling may be located on any building site in the FA district, as permitted under article 6, division 3 of this chapter.
- (e) Exceptions to the regulations for the FA district regarding heights, building site areas, building site average widths and yards, may be approved by the director within a planned unit development.
- (f) Plan approval shall be required prior to the construction or installation of any new structure or development, or of any addition to an existing structure or development which is used for minor agricultural products processing.
- (1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Division 7. A. Agricultural Districts.

Section 25-5-70. Purpose and applicability.

The A (agricultural) district provides for agricultural and very low density agriculturally-based residential use, encompassing rural areas of good to marginal agricultural and grazing land, forest land, game habitats, and areas where urbanization is not found to be appropriate.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-71. Designation of A districts.

Each A (agricultural) district shall be designated on the zoning map by the symbol "A," followed by a number together with the lower case letter "a" which indicates the required or minimum number of acres for each building site. For example, A-10a means an agricultural district with a minimum building site area of ten acres.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-72. Permitted uses.

- (a) The following uses shall be permitted in the A district:

- (1) Agricultural parks.
- (2) Agricultural products processing, major and minor.
- (3) Agricultural tourism as permitted under section 25-4-15.
- (4) Animal hospitals.
- (5) Aquaculture.
- (6) Botanical gardens, nurseries and greenhouses, seed farms, plant experimental stations, arboreta, floriculture, and similar uses dealing with the growing of plants.
- (7) Campgrounds, parks, playgrounds, tennis courts, swimming pools, and other similar open area recreational facilities, where none of the recreational features are entirely enclosed in a building.
- (8) Cemeteries and mausoleums, as permitted under chapter 6, article 1 of this Code.
- (9) Crop production.
- (10) Dwelling, single-family, as permitted under chapter 205, Hawai'i Revised Statutes and as permitted under section 25-5-77(b).
- (11) Farm dwellings, as permitted under section 25-5-77(b) and (c).
- (12) Fertilizer yards utilizing only manure and soil, for commercial use.
- (13) Forestry.
- (14) Game and fish propagation.
- (15) Group living facilities.
- (16) Kennels.
- (17) Livestock production, provided that pigeries, apiaries, and pen feeding of livestock shall only be located on sites approved by the State department of health and the director, and must be located no closer than one thousand feet away from any major public street or from any other zoning district.

- (18) Public uses and structures which are necessary for agricultural practices.
- (19) Renovation, restoration, rehabilitation, or improvement of building or sites of historic or scenic interest.
- (20) Riding academies, and rental or boarding stables.
- (21) Roadside stands for the sale of agricultural products grown on the premises.
- (22) Telecommunication antennas, as permitted under section 25-4-12.
- (23) Utility substations, as permitted under section 25-4-11.
- (24) Vehicle and equipment storage areas that are directly accessory to aquaculture, crop production, game and fish propagation, livestock grazing and livestock production.
- (25) Veterinary establishments.
- (26) Wind energy facilities.
- (b) The following use may be permitted in the A district, provided that a use permit is issued for each use:
- (1) Golf courses and related golf course uses, including golf driving ranges, golf maintenance buildings and golf club houses.
 - (2) Adult day care homes.
 - (3) Airfields, heliports, and private landing strips.
 - (4) Bed and breakfast establishments, as permitted under section 25-4-7.
 - (5) Community buildings, as permitted under section 25-4-11.
 - (6) Excavation or removal of natural building material or minerals, for commercial use.
 - (7) Family child care homes.
 - (8) Guest ranches.
 - (9) Home occupations, as permitted under section 25-4-13.
 - (10) Lodges.
 - (11) Meeting facilities.
 - (12) Model homes, as permitted under section 25-4-8.
 - (13) Public dumps.
 - (14) Public uses and structures, other than those necessary for agricultural practices, as provided under section 25-4-11.
 - (15) Temporary real estate offices, as permitted under section 25-4-8.
 - (16) Trailer parks with density of three thousand five hundred square feet of land area per trailer, provided that plan approval is secured prior to commencing such use.
 - (17) Uses, other than those specifically listed in this section, which meet the standards for a special permit under chapter 205, Hawai'i Revised Statutes.
- (c) The following uses may be permitted in the A district, provided that a use permit is issued for each use if the building site is outside of the State land use agricultural district or a special permit is issued for each use if the building site is within the State land use agricultural district:
- (1) Crematoriums.
 - (2) Churches, temples and synagogues.
 - (3) Day care centers.
 - (4) Hospitals, sanitariums, old age, convalescent, nursing and rest homes.
 - (5) Major outdoor amusement and recreation facilities.
 - (6) Mortuaries.
 - (7) Schools.

- (e) Buildings and uses accessory to the uses permitted in this section shall also be permitted in the A district.
- (f) No building site shall be established after December 1, 1996 which shall in any way restrict or limit aquaculture, horticulture, production of crops, keeping of livestock, game and fish propagation, or the processing, sale or other commercial use of the products of such uses.

(1996, Ord. No. 96-160, sec. 2; ratified and amended April 6, 1999; Am. Ord. No. 08-155, sec. 13.)

Section 25-5-73. Height limit.

The height limit in the A district shall be thirty-five feet for any residential structure, including any single-family dwelling, or farm dwelling, and forty-five feet for all other structures. The director may, however, permit by plan approval, any nonresidential agricultural structures to be constructed to a height of one hundred feet, if the director determines that the additional height above the forty-five foot height limit is necessary.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-74. Minimum building site area.

The minimum building site area in the A district shall be five acres.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-75. Minimum building site average width.

Each building site in the A district shall have a minimum average width of two hundred feet for the first five acres of required area plus twenty feet for each additional acre of required area. Provided that no building site shall be required to have an average width greater than one thousand feet.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-76. Minimum yards.

- (a) Except as otherwise provided in this section, the minimum yards in the A district shall be thirty feet for front and rear yards, and twenty feet for side yards.

(b) For accessory uses such as shade cloth structures used in controlling the amount of sunlight in the raising of plants and flowers, rear, side and front yards in the A district shall be at least ten feet, except where the A district shares common boundaries with urban zones and main government roads.

- (c) For accessory uses such as plastic roofed and shade cloth wooden or metal framed structures used in controlling the amount of sunlight, rainfall, wind and other elements of nature in the raising of fruits, vegetables and similar agricultural products, rear, side and front yards shall be at least ten feet except where:

- (1) Exterior walls of any type other than shade cloth are added to the wooden or metal framed structure;
- (2) The specific use allowed is abandoned; and
- (3) The A district shares common boundaries with urban zones and main government roads.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999; Am. Ord. No. 99-110, sec. 1.)

Section 25-5-77. Other regulations.

- (a) If any legal building site in the A district has an area of less than five acres, then the yard, minimum building site average width and height requirements for the building site shall be the same as the yard and height requirements in the FA district.

- (b) One single-family dwelling or one farm dwelling shall be permitted on any building site in the A district. A farm dwelling is a single-family dwelling that is located on or used in connection with a farm or if the agricultural activity provides income to the family occupying the dwelling.

- (c) Additional farm dwellings may be permitted in the A district only upon the following conditions:

- (1) A farm dwelling agreement for each additional farm dwelling, on a form prepared by the director, shall be executed between the owner of the building site, any lessee having a lease on the building site with a term exceeding one year from the date of the farm dwelling agreement, and the County.

The agreement shall require the dwelling to be used for farm-related purposes.

- (2) The applicant shall submit an agricultural development and use program, farm plan or other evidence of the applicant's continual agricultural productivity or farming operation within the County to the director. Such plan shall also show how the farm dwelling will be utilized for farm-related purposes.

- (d) An on-site dwelling may be located on any building site in the A district, as permitted under article 6, division 3 of this chapter.

- (e) Exceptions to the regulations for the A district regarding heights, building site areas, building site average widths and yards, may be approved by the director within a planned unit development.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Division 8. 1A, Intensive Agricultural Districts.

Section 25-5-80. Purpose and applicability.

The 1A (intensive agricultural) district provides for the preservation of important agricultural lands as provided for in the general plan and characterized by a mix of small and large scale commercial farms and other agricultural operations which may include residential use in the form of farm dwellings closely tied to intensive agricultural use. The lands in the 1A district are those lands which have the soil, quality, growing season, and moisture supply needed to sustain high yields of crops generally or of specific crops of statewide or local importance when managed according to modern farming methods. All 1A districts shall be located within the State land use agricultural or conservation district.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-81. Designation of 1A districts.

The 1A (intensive agricultural) district shall be designated by the symbol "1A" followed by a number together with the lower case letter "a," which indicates the required or minimum number of acres for each building site.

(1996, Ord. No. 96-160, sec. 2; ratified April 6, 1999.)

Section 25-5-82. Permitted uses.

- (a) The following uses shall be permitted in the 1A district:

- (1) Agricultural parks.
- (2) Agricultural products processing, major and minor.
- (3) Agricultural tourism as permitted under section 25-4-1.5.
- (4) Aquaculture.
- (5) Ceneries, as permitted under chapter 6, article 1 of this Code.
- (6) Crop production.
- (7) Farm dwellings, as permitted under sections 25-5-87(b) and (c).
- (8) Forestry.
- (9) Livestock production, provided that pigeries, apiaries and pen feeding of livestock shall not be closer than one thousand feet to any major road or to any district other than the A district on building sites approved by the State department of health and the director.

- (10) Public uses and structures which are necessary for agricultural practices.

Ho'okuleana LLC

... to take responsibility ...

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(808) 326-3567 (Cell Phone)
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www.Hookuleana.com

Ms. BJ Leithead Todd, Planning Director
County of Hawai'i, Planning Department
Aupuni Center
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Bobby Jean,

Thank you for your letter dated April 11, 2011 regarding the Department of Hawaiian Home Lands' Aina Mauna Legacy Program Environmental Assessment Scoping.

In your letter, you reference the Memorandum of Agreement between the County of Hawai'i and the Department of Hawaiian Home Lands, which contains procedures the Department will follow with respect to DHHL property. We will reference the MOA in the Draft EA, as well as the respective roles, responsibilities and obligations of each party.

We will be providing the Planning Department a copy of the Draft EA when it is completed, and look forward to any further comments you may have. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,


Ho'okuleana LLC
Peter T. Young

cc: Unda Chien, DHHL Land Management Division



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850



In Reply Refer To:
2011-PA-0191

APR 11 2011

Hookuleana LLC
25 Kanohe Bay Drive, Suite 212
Kailua, Hawaii 96734

Subject: Pre-Assessment Environmental Assessment for the Aina Mauna Legacy Program, Hawaii

To Whom it May Concern:

The U.S. Fish and Wildlife Service received your letter on March 9, 2011, requesting our comments regarding the development of a draft Environmental Assessment (EA) for the Aina Mauna Legacy Program located on southeastern portion of Mauna Kea on the island of Hawaii. Your letter states, "The mission of the Aina Mauna Legacy Program and its implementation is to restore approximately 56,000 acres of native Hawaiian forest that will be ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries, and the community." The proposed project has many components including: the development a homestead area on the southeastern portion of the property; ecotourism; remote forestry; enhancement of native forests; pasture around Keanakolu-Mana focused on fire fuel mitigation; and feral ungulate eradication over the entire property.

We reviewed the letter, the Department of Hawaiian Home Land's website, and pertinent information in our files and evaluated the proposed project for potential impacts to listed species and native ecosystems. The following federally endangered bird species are known to occur in the vicinity of the proposed project: palila (*Loxioides bailleui*), akiapolaau (*Hemignathus munroii*), Hawaiian creeper (*Oreomystis mana*), and Hawaii akela (*Loxops coccyzus coccineus*) (collectively known as forest birds); Hawaiian goose (*Branta sandvicensis*) and Hawaiian duck (*Anas wyvilliana*), Hawaiian petrel (*Pterodroma sandwichensis*) and Hawaiian hawk (*Buteo solitarius*). The federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotis*) is also known to occur in the vicinity of the proposed project. Additionally, two species of oha wai, *Clermontia lindseyana* and *C. pyralaria*, both federally endangered plants, and makou (*Ranunculus hawaiiensis*), a candidate plant for listing, are known to occur in the vicinity of the proposed project. A portion of the project footprint is federally designated critical habitat for palila.

We commend the Department of Hawaiian Homelands for the proposed actions that will protect and restore native ecosystems, thereby benefiting listed species in the long-term. We recommend you coordinate with our office, and the Hakalau National Wildlife Refuge, in an effort to maximize the benefits of the project while minimizing any negative impacts to listed species. We offer the following suggestions and recommendations to help you develop your draft EA.

Listed species

- Many bird species are known to strike objects such as antennas or guy-wires that protrude above the surrounding vegetation. In Hawaii, seabirds are attracted to lights and are known to collide with buildings, light poles, wires, and other tall objects. To minimize impacts to the Hawaiian petrel, we recommend shielding outdoor lights so the bulb can only be seen from below.
- Hawaiian forest birds generally utilize only native forests. If you will be working in or clearing occupied native forests, we recommend avoiding disturbing these areas during the forest bird peak breeding periods from January 15 to August 15, in order to avoid disturbing active forest bird nests. Before native forests are cleared or native timber trees are harvested, we recommend a qualified biologist survey the area for native Hawaiian forest birds.
- Hawaiian forest birds require a mix of native tree species. When areas are reforested, we recommend avoiding monocultures of koa (*Acacia koa*). We recommend diversifying the plant palette by adding lapa (a *Cheirodendron* sp.), kolea (*Myrsine* sp.), ohia (*Metrosideros* sp.), manane (*Sophora chrysophylla*) and other appropriate native trees.
- The Hawaiian goose is known to frequent the project area particularly where there are water sources. Actions associated with the project may attract Hawaiian geese to the area, and potential impacts to this species should be addressed.
- Hawaiian hoary bats roost in both exotic and native woody vegetation and leave their young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for roosting are cleared during the Hawaiian hoary bat breeding season (May to August), there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet tall should not be removed or trimmed during the bat-birthing and pup-rearing season (May 15 through August 15).
- Fences constructed of barbed wire may result in bat entanglement and mortality, thus no barbed wire should be utilized.
- Hawaiian hawks also nest in both exotic and native woody vegetation. To avoid impacts to Hawaiian hawks we recommend not clearing any brush or trees during their breeding season (March through September). If you are unable to avoid clearing vegetation during these months, we recommend you conduct surveys for nests prior to any clearing activity.

- The draft EA should include an analysis of potential project impacts to palila critical habitat.
- To avoid impacts to listed and candidate plants, areas slated for disturbance should be surveyed by a qualified botanist. If listed plants cannot be avoided, the draft EA should include mitigation measures to offset impacts to these plants.
- We note that you have planned for two corridors (Wailuku River and Kanakaleonui) that will connect the forests below the project with forests that are above the areas slated for disturbance. We recommend increasing the width of the corridors to support altitudinal movement of the Hawaiian forest bird populations.
- We note that the project calls for alternative energy use including wind. Wind turbines are known to affect the Hawaiian petrel, Hawaiian goose and Hawaiian hoary bats, and could impact Hawaiian hawks. If wind energy is pursued, we recommend coordination with our office to address impacts to listed species.

Invasive species

- A biosecurity plan for the project should be developed and implemented. The plan should include a funding source for early detection and rapid response activities.
- A strategic plan should be developed and implemented to prevent reinvasion by feral ungulates. The plan should incorporate development of invasive wildlife exclusion and/or eradication regionally in cooperation with neighbors.
- To minimize project impacts to trust resources occurring in the project vicinity, we recommend prohibiting free movement of pets, implement public education to discourage the feeding of feral animals, especially cats, and install sturdy animal-proof garbage containers to prevent increases in the populations of house mice, rats, mongoose, and feral cats. These measures should also be incorporated into any Community Rules and Regulations instituted for homestead project.
- A plan should be developed and implemented for educating the public regarding the negative impacts of invasive species on native species, specifically the impacts from cats, pigs, sheep, goats, rats and mongoose and methods to prevent the spread of these animals. An informed public is the key to maintaining and restoring the ecological integrity of the area.
- Rats and mice should be controlled if development occurs near important nesting areas for native birds or habitats known to harbor rare native plants. Our office can assist you in identifying areas where rare and listed taxa are located and appropriate rodent abatement and control methods.
- Areas of focus for invasive species eradication should be prioritized with rare or listed native species receiving the benefit of invasive species management and control first.

- Contractor equipment should be cleaned before entering and leaving the site regardless of activities (e.g. the draft EA scoping letter only mentions "ground-disturbing activities").
- Building material (sand, gravel, rock, mulch, etc.) receptor sites within the project area should be monitored by trained biologists at specified intervals to detect any invasive species that may have inadvertently been brought to the site (e.g. weeds that germinate). A contingency plan should be developed, and funding set aside, to facilitate rapid response (eradication) to any incipient invasive species at the project site.

If a project may affect listed species and is funded, authorized, or permitted by a Federal agency, then that agency is required to consult with us pursuant to section 7(a)(2) of the Endangered Species Act (ESA). If no Federal agency is involved with the project, and implementation of the project could result in take of a listed species, the applicant should apply for an incidental take permit under section 10(a)(1)(B) of the ESA. In addition to a Federal incidental take permit, implementation of the plan may also require obtaining a State incidental take license.

If you have further questions regarding this letter, please contact Dr. Jeff Zimpfer, Fish and Wildlife Biologist (phone: 808-792-9400; jeff_zimpfer@fws.gov).

Sincerely,



for Loyal Mehrhoff
Field Supervisor

Ho'okuleana LLC

... to take responsibility ...

Peter T. Young
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Peter.Young@hookuleana.com
www.hookuleana.com

Mr. Loyal Mehrhoff, Field Supervisor
United States Department of Interior, Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Room 3-122, Box 50088
Honolulu, Hawaii 96850

April 29, 2011

Subject: Āina Mauna Legacy Program Pre-Assessment Scoping Letter (2011-TA-0191)

Dear Mr. Mehrhoff

Thank you for your letter dated April 11, 2011 regarding the Department of Hawaiian Home Lands Āina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you offered some initial comments. The following is a list of your comments, followed by a response.

1) *Many bird species are known to strike objects such as antennas or guy-wires that protrude above the surrounding vegetation. In Hawai'i, seabirds are attracted to lights and are known to collide with buildings, light poles, wires, and other tall objects. To minimize impacts to the Hawaiian petrel, we recommend shielding outdoor lights so the bulb can only be seen from below.*

We will include lighting mitigation in the EA. All construction activities will integrate lighting mitigation measures to reduce lighting impacts. Any streetlights that may be installed as part of the Legacy Program will be shielded to reduce the potential for interactions of nocturnally flying native birds with external lights and man-made structures. This minimization measure will both minimize the threat of disorientation and downing of native birds and fully comply with Hawai'i County Code § 14 - 50 et seq., which requires the shielding of exterior lights so as to lower the ambient glare to the astronomical observatories located on Mauna Kea.

2) *Hawaiian forest birds generally utilize only native forests. If you will be working in or clearing occupied native forests, we recommend avoiding disturbing these areas during the forest bird peak breeding periods from January 15 to August 15, in order to avoid disturbing active forest bird nests. Before native forests are cleared or native timber trees are harvested, we recommend a qualified biologist survey the area for native Hawaiian forest birds. (2 and 3 answered below)*

3) *Hawaiian forest birds require a mix of native tree species. When areas are reforested, we recommend avoiding monocultures of koa (Acacia koa). We recommend diversifying the plant palette by adding lapa'apa (Chelodendron sp.), kolea (Myrsine sp.), ōhi'a (Metrosideros sp.), māmane (Sophora chrysophylla) and other appropriate native trees.*

In areas designated to native forest restoration, replanting efforts will focus on a diversification, using combinations of native plants grouped together (for example, pūkiawe, pilo, 'a'ali) and 'ohelo may be planted together) that will grow outward until they all connect into one diverse native forest. Additionally, natural processes will be utilized to distribute seed (wind, birds etc.)

koa and 'ōhi'a (maka areas) and māmane (mauka areas) trees may be planted around the existing shrubs so that they can utilize the beneficial traits of the 'islands.'

One of the central focuses of the 'Āina Mauna Legacy Program is that the activities and programs implemented need to be economically self-sustaining, with the goal to reinvest the revenue into the management of the property.

The 'Āina Mauna Legacy Program proposes that 50% of the landscape be restored and conserved as diversified native forest. With the addition of sustainable koa, 88% of the area will be in native forest species. However, the means of getting to this 88% native forest species is through raising funds that will have significant positive impacts in the long term.

A sustainable koa forest, with the focus on sustainable commercial forestry management practices, can be very lucrative, financially. Management of DHHL lands as koa forests combines high quality hardwood returns from the sale of koa wood, eco-tourist opportunities as the forest is restored and cultural uses such as gathering and canoe logs.

Plantation and infill sustainable commercial koa forestry is proposed in various areas at 'Āina Mauna. This proposal is different from the native forest restoration. The sustainable koa project will promote economic opportunity in the community by providing jobs and provide a base source of koa wood for various artisanal and cultural activities - as well as raise necessary funds for other management needs.

Harvesting of koa is expected to be limited to salvage and selected harvest, not clear-cutting of areas. If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to forest birds, the EA will suggest that the area and trees scheduled for harvest will first be reviewed by a qualified land manager or forester prior to timber harvest.

Since the sustainable koa forest may attract wildlife, including possible endangered birds and bats, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated. The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the sustainable koa restoration attracts endangered or threatened species or result in increased numbers or distributions of listed species already present.

- 4) *The Hawaiian geese is known to frequent the project area particularly where there are water sources. Actions associated with the project may attract Hawaiian geese to the area, and potential impacts to this species should be addressed.*

The EA will address the possibility of stock ponds and reservoirs becoming Hawaiian goose attractants. Due to possible impacts due to vehicles on the road, stock ponds and reservoirs within 200-yards of Keanakolu Road will be closed and not used. Additionally, the existing reservoir near Mauna Kea Access Road will be fenced. This will help to keep Hawaiian geese away from road areas where they can be hit by passing vehicles.

The 'Āina Mauna has been used for ranching for over 100 years, thus, stock ponds and reservoirs currently on site have been used for generations. The program seeks to reduce ranching operations across the property and, where ranching is allowed, it will be managed. To

the extent possible, existing stock ponds and reservoirs will be used for pasture and irrigation for reforestation.

- 5) *Hawaiian hoary bats roost in both exotic and native woody vegetation and leave their young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for roosting are cleared during the Hawaiian hoary bat breeding season (May to August), there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet tall should not be removed or trimmed during the bat-birthing and pup-rearing season (May 15 through August 15).*
In addition to the issues addressed in #2 and #3, DHHL also proposes interim commercial-scale timber planting/harvesting that can serve both as a geese eradication mechanism, as well as an income generator.

Eucalyptus and Sugi have been proposed because the initial development of these crops in the general area have given rise to increased investment in required infrastructure including marketing and market development efforts by a number of public and private entities and field trials have demonstrated their effectiveness. However, other trees may also be considered. (Tree species to be planted will be evaluated with minimum scores of L or U (Hawaii) under the Hawaii I-Pacific Weed Risk Assessment (HPWRA) and Evaluation Group 1 (low risk) in the Hawaii Exotic Plant Evaluation Protocol (HEPEP) programs.)

Harvesting in this area is expected to be on an industrial scale and wide areas will be harvested at a time. With approximately 10,000-acres in commercial timber to fight geese and a 10-year growing cycle, approximately 1,000-acres will be harvested each year. If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to forest birds, the EA will suggest that the area and trees scheduled for harvest will first be reviewed by a qualified land manager or forester prior to timber harvest.

Since the commercial timber may attract wildlife, including possible endangered birds and bats, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated. The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the commercial timber attracts endangered or threatened species or result in increased numbers or distributions of listed species already present.

- 6) *Fences constructed of barbed wire may result in bat entanglement and mortality, thus no barbed wire should be utilized.*

Fencing for cattle/feral ungulate enclosures and enclosures will be installed around various sites. To ensure exclusion of wild ungulates some barbed and hog wire fence (the top wire of the fence will be smooth to reduce any chances of injury to birds or bats) may be used and fencing mesh size may be more tightly woven closer to the ground and buried to exclude nonnative predators.

- 7) *Hawaiian hawks also nest in both exotic and native woody vegetation. To avoid impacts to Hawaiian hawks we recommend not clearing any brush or trees during their breeding season (March through September). If you are unable to avoid clearing vegetation during these months, we recommend you conduct surveys for nests prior to any clearing activity.*

The issues and responses here are similar to 2, 3 and 5 above. If any roosting trees or active nests of rare, threatened or endangered species are encountered, a no-harvest zone (250-foot radius) will be established around each site. In order to mitigate impacts to forest birds, the EA will suggest that the area and trees scheduled for harvest will first be reviewed by a qualified land manager or forester prior to timber harvest.

8) *The draft EA should include an analysis of potential project impacts to palila critical habitat.*

The EA will address the potential project impacts to the palila critical habitat. The impacts are expected to be beneficial, with the restoration of the native forest, including māmane, within the Mauka boundary of the project. Māmane plantings will provide food resources for the endangered palila, increase suitable palila habitat and improve year-round palila foraging opportunities along an elevational gradient.

9) *To avoid impacts to listed and candidate plants, areas slated for disturbance should be surveyed by a qualified botanist. If listed plants cannot be avoided, the draft EA should include mitigation measures to offset impacts to these plants.*

In order to mitigate impacts, the EA will suggest that areas slated for disturbance be reviewed by a qualified land manager or forester prior to timber harvest.

10) *We note that you have planned for two corridors (Mailuku River and Kanakaleonui) that will connect the forests below the project with forests that are above the areas slated for disturbance. We recommend increasing the width of the corridors to support altitudinal movement of the Hawaiian forest bird populations.*

The Kanakaleonui corridor was created by an agreement between parties several years ago and thus, the size has already been determined and agreed to.

The Āina Mauna Legacy Program adds another corridor, approximately 700-feet wide (Walluku River.) In the Southern area of the property which is designated for diverse native forest.

Sustainable koa is proposed north of Kanakaleonui. Once the area is created, the koa will be selectively harvested, rather than clear-cut. Thus, the tree canopy will remain and help provide a contiguous partial habitat from the lower koa forest to the higher elevation māmane forest that may attract the migration of native forest birds between habitats.

Since the sustainable koa forest may attract wildlife, including possible endangered birds and bats, a Safe Harbor Agreement and Habitat Conservation Plan may be initiated. The Safe Harbor program provides regulatory assurances that future property-use restrictions will not be imposed if the sustainable koa restoration attracts endangered or threatened species or result in increased numbers or distributions of listed species already present.

11) *We note that the project calls for alternative energy use including wind. Wind turbines are known to affect the Hawaiian petrel, Hawaiian goose and Hawaiian hoary bats, and could impact Hawaiian hawks. If wind energy is pursued, we recommend coordination with our office to address impacts to listed species.*

The EA will address potential impacts to listed species from wind turbines, as well as mitigation measures, including the following:

Installation of wind generators will provide green energy for facilities. Wind generators will have a maximum height of 120-feet and will be located at least 100-feet away from existing native trees. Installation of alternative energy sources will comply with all county building codes.

Direct effects to wildlife in the form of mortality from operation of wind turbines are well documented; birds and bats can be killed by collisions with wind turbine rotors or towers. Potential risks of collision are reduced by implementation of project mitigations that increase visibility of the tower/turbine and curtail wind generation in the evening, when risk of collision will be greatest.

To reduce potential impacts to foraging bats and birds, no lights will be installed on wind generator towers. To reduce the likelihood of collision and the potential for injury or harm to resident or migratory species, towers installed for wind generators will be painted white and utilize 1-inch poly tape to increase visibility. Bird diverters will also be used. In order to ensure that project design features are effective at reducing impacts, visual monitoring will be conducted along fence lines and within 100-feet of any wind tower for a period of 3 years. If injury or mortality to any threatened or endangered species is documented, agencies will be contacted and site appropriate mitigation measures implemented.

12) *A biosecurity plan for the project should be developed and implemented. The plan should include a funding source for early detection and rapid response activities.*

The three roads which currently access the property (Saddle Road, Mauna Kea Access Road and Keanakolu Road) are public roads. Thus, DHHL cannot control access conditions on everyone that enters the property.

DHHL can, however, impose conditions on a large portion of those accessing the area including staff, contract workers and visitors. Therefore, the Legacy Program will reduce the probability for invasive species being introduced to the environment by implementing an Invasive Species/Pest Management and Control Program. DHHL will review and use ideas in already prepared plans in developing their plan for Āina Mauna. The Program DHHL will include, as conditions on contracts, permits etc, the following:

- Education regarding the status, condition, diversity and protection afforded the natural resources present on the mountain and the harm invasive species/pests can inflict on these natural resource.
- Requirements that everyone who enters Āina Mauna Property brush down their clothes and shoes to remove invasive plant seeds and invertebrates. This will be done at the Humu ʻula Sheep Station, Administration Base Facility, Offices, or other lower elevation locations prior to boarding vehicles bound for the upper areas of the Āina Mauna.
- Regular inspections and washing, at lower elevation facilities such as the Humu ʻula Sheep Station, Administration Base Facility, Offices of DHHL vehicles and other items that are regularly transported between the upper and lower elevations of the area.

- Regular monitoring of the habitat along Keanakolu/Mana Road, Mauna Kea Access Road and internal roadways for invasive species, and eradication of such species when found using methods that will not impact indigenous resident species.
- Inspection and monitoring of major shipments of new equipment bound for the upper 'Āina Mauna regions prior to transportation beyond Administration Base Facility.
- Controlling and monitoring established species.
- Reporting any observation of intentional and/or accidental introductions to appropriate DHHL management staff.
- All contractor equipment will arrive at the work site clean and free of invasive species/pests. Prior to leaving the work site, contractor equipment will be re-cleaned to avoid transporting invasive species/pests from 'Āina Mauna.
- Where appropriate, onsite materials will be used. When off site materials are used, including sand, gravel, cinder, rock and/or mulch, they will be inspected for invasive species/pests.
- Research activities will utilize proper cleaning of investigator equipment and clothing, as well as quarantine methods where necessary to minimize the potential spread or introduction of invasive species/pests.
- Research work on site will be governed by a Memorandum of Agreement between parties which will incorporate protocols for combating the spread of invasive species/pests in research activities.
- Tree species to be planted under the commercial timber to fight gorse must first be evaluated under the Hawai'i-Pacific Weed Risk Assessment (HPWRA) and Hawai'i Exotic Plant Evaluation Protocol (HEPEP) programs. Transport of products from commercial areas infested with noxious weeds will be conducted in ways which preclude the spread of such noxious weeds.

13) A strategic plan should be developed and implemented to prevent reinvasion by feral ungulates. The plan should incorporate development of invasive wildlife exclusion and/or eradication regionally in cooperation with neighbors.

Currently, DHHL is conducting a cattle removal project within the project area. Once a majority of cattle are removed, fencing will become a very important tool in preventing the reinvasion of these animals. Pasture areas will be fenced to enclose cattle and ungulate free areas, such as the bird corridors, will be fenced to exclude ungulates.

Thus, fencing for cattle/feral ungulate becomes critical, as does the use of some barbed and hog wire fence (the top wire of the fence will be smooth to reduce any chances of injury to birds or bats) to ensure exclusion of wild ungulates.

14) To minimize project impacts to trust resources occurring in the project vicinity, we recommend prohibiting free movement of pets, implement public education to discourage the feeding of feral animals, especially cats, and install sturdy animal-proof garbage containers to prevent increases in the populations of house mice, rats, mongoose, and feral cats. These measures should also be incorporated into any Community Rules and Regulations instituted for homestead project.

The EA will address waste storage and removal. All solid waste rubbish will be removed and trucked off site for disposal in a County landfill. Between pickups, rubbish will be stored in lidded trash containers.

15) A plan should be developed and implemented for educating the public regarding the negative impacts of invasive species on native species, specifically the impacts from cats, pigs, sheep, goats, rats and mongoose and methods to prevent the spread of these animals. An informed public is the key to maintaining and restoring the ecological integrity of the area.

As noted in response to number 12, above, the EA will address the development of an Invasive Species/Pest Management and Control Program, which will include an education component regarding the status, condition, diversity, and protection afforded the natural resources present on the mountain and the harm invasive species/pests can inflict on these natural resource.

In addition, the 'Āina Mauna cultural, natural resources and safety briefing will be required for all who enter the property including visitors, tour operators and staff, DHHL staff, contractors, researchers and volunteers on an annual basis. The briefings will note the area's sensitive natural resources, as well as its cultural and historic significance. Likewise, the educational program will discuss appropriate behavior that people on the property are expected to follow - increasing understanding, care and respect for the area.

Commercial tour operators and existing and potential future staff and contractors are required to incorporate the 'Āina Mauna cultural, natural resources and safety briefing into their programs. This requirement will be included in the various permit conditions and in all other contracts. The training program will be updated regularly to incorporate changing conditions within the region.

A separate training program for employees and volunteers will also be developed and approved by DHHL, in addition to the 'Āina Mauna cultural, natural resources and safety briefing. The training will address field-personnel training, volunteer training and general staff training. General training requirements include review of applicable laws and regulations, and basic cultural and natural resources training.

16) Rats and mice should be controlled if development occurs near important nesting areas for native birds or habitats known to harbor rare native plants. Our office can assist you in identifying areas where rare and listed taxa are located and appropriate rodent abatement and control methods.

We will note in the EA your willingness to assist in the ultimate implementation process. Your assistance in identifying areas where rare and listed taxa are located and appropriate rodent abatement and control methods, is greatly appreciated. We will suggest to DHHL that the USFWS be contacted to further discuss this issue.

17) Areas of focus for invasive species eradication should be prioritized with rare or listed native species receiving the benefit of invasive species management and control first.

The 'Āina Mauna Legacy Program addresses invasive species control and eradication on multiple levels with a variety of approaches across the landscape. Many of these approaches will be implemented simultaneously. DHHL will work with others, including neighbors, on priority areas and funding availability.

NEIL ABERCROMBIE
Governor of Hawaii

GARY L. HOOSER
Director



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Department of Health
235 South Beretania Street
Lindopia A Kamehameha, Suite 702
Honolulu, Hawaii 96813

Telephone: (808) 586-4125
Facsimile: (808) 586-4186
Electronic Mail: enq@doh.hawaii.gov

April 13, 2011

Ho'okuleana LLC
25 Kane'ole Bay Drive, Suite 212
Kailua, Hawaii 96734

Subject: Pre-Assessment Scoping/Consultation and Notice of Preparation of an
Environmental Assessment for the Department of Hawaiian Home Lands
- Ana Mauna Legacy Program, Humu'ula/Pi'ihonua, Hawaii -

To Whom It May Concern:

Thank you for the information you provided soliciting comments regarding the subject project.
Your letter identified the trigger(s) of Chapter 343, Hawaii Revised Statutes, and the approving
agency for the required environmental study.

Your letter states that you will be preparing a draft environmental assessment for the subject
action on behalf of your client, the Department of Hawaiian Home Lands. Section 11-200-10,
Hawaii Administrative Rules, requires that the environmental assessment shall contain, but not
be limited to the following information:

- A. Identification of applicant or proposing agency;
- B. Identification of approving agency, if applicable;
- C. Identification of agencies, citizen groups, and individuals consulted in making the
assessment;
- D. General description of the action's technical, economic, social, and environmental
characteristics;
- E. Summary description of the affected environment, including suitable and adequate
regional, location and site maps such as Flood Insurance Rate Maps, Floodway Boundary
Maps, or United States Geological Survey topographic maps;
- F. Identification and summary of impacts and alternatives considered;
- G. Proposed mitigation measures;
- H. Agency determination or, for draft environmental assessments only, an anticipated
determination;
- I. Findings and reasons supporting the agency determination or anticipated determination;
- J. Agencies to be consulted in the preparation of the EIS, if an EIS is to be prepared;

18) Contractor equipment should be cleaned before entering and leaving the site regardless of
activities (e.g. the draft EA scoping letter only mentions "ground-disturbing activities").

The EA will note that contractor equipment be cleaned before entering and leaving the site
regardless of activities. As noted in response to number 12, above, the EA will address the
development of an Invasive Species/Pest Management and Control Program, which will include
this reference to contractor equipment.

19) Building material (sand, gravel, rock, mulch, etc.) receptor sites within the project area should be
monitored by trained biologists at specified intervals to detect any invasive species that may
have inadvertently been brought to the site (e.g. weeds that germinate). A contingency plan
should be developed, and funding set aside, to facilitate rapid response (eradication) to any
incipient invasive species at the project site.

As noted in response to number 12, above, the EA will address the development of an Invasive
Species/Pest Management and Control Program, which will include the requirement that
building materials including sand, gravel, cinder, rock and/or mulch for use at the site will be
inspected for invasive species/pests.

20) If a project may affect listed species and is funded, authorized, or permitted by a Federal agency,
then that agency is required to consult with us pursuant to section 7(a)(2) of the Endangered
Species Act (ESA). If no Federal agency is involved with the project, and implementation of the
project could result in take of a listed species, the applicant should apply for an incidental take
permit under section 10(a)(1)(B) of the ESA. In addition to a Federal incidental take permit,
implementation of the plan may also require obtaining a State incidental take license.

The implementation of the project could result in take of a listed species. Thus, the EA will
address the potential need for an incidental take permit, as well as a State incidental take
license.

Once again, we would like to thank you for your comments on the Ana Mauna Legacy Program EA. We
will be providing you a copy of the Draft EA when it is completed. In the meantime, if you have any
further questions or concerns, please feel free to contact us at 254-2223 or by email at
AnaMauna@Hookuleana.com

Sincerely,


Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHHL Land Management Division

K. List of all permits and approvals (State, federal, county) required; and
L. Written comments and responses to the comments under the early consultation provisions of sections 11-200-9(a)(1), 11-200-9(b)(1), or 11-200-15, and statutorily prescribed public review periods.

Once your environmental study is complete, please coordinate with the approving agency for determination of the proposed action and submittal requirements to the Office of Environmental Quality Control for publication on the Environmental Notice. The OEQC website has more information with respect to the document submittal for publication in The Environmental Notice.

Please feel free to call me at (808) 586-4185 if you have further questions.

Sincerely,


HERMAN TUIOLOSEGA
Planner

Ho'okuleana LLC

... to take responsibility ...

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Mr. Herman Tuiolesega, Planner
State of Hawai'i, Department of Health
Office of Environmental Quality Control
235 South Beretania Street
Lelopapa A Kamehameha, Suite 702
Honolulu, Hawai'i 96813

April 29, 2011

Subject: Āina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Mr. Tuiolesega,

Thank you for your letter dated April 13, 2011 regarding the Department of Hawaiian Home Lands' Āina Mauna Legacy Program Environmental Assessment Scoping.

In your letter, you reference Section 11-200-10, Hawai'i Administrative Rules and its requirements related to the preparation of an EA. We will ensure that the EA includes this list of information.

We will be providing you copies of the Draft EA when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,


Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHL Land Management Division



NEIL ABERCROMBIE
COMPTROLLER

BRUCE A. COPPA
COMPTROLLER
RYAN T. OKAMURA
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 118 HONOLULU, HAWAII 96833-0118

(P)1079.1

APR 14 2011

Ho'okuleana LLC
25 Kaneohe Bay Drive, Suite 212
Kailua, Hawaii, 96734

Dear Ho'okuleana LLC:

Subject: 'Aina Mauna Legacy Program Environmental Assessment (EA) Scoping
Pre-Assessment Scoping/Consultation and Notice of Preparation of an
Environmental Assessment for the Department of Hawaiian Home Lands'
'Aina Mauna Legacy Program, Humu'ula/Pi'ihonua, Hawai'i.

Thank you for the opportunity to provide comments for the subject project. The Information and Communication Services Division (ICSD) currently operates and maintains a radio tower within the subject project area, located in TMK: 3-8-1; por. 7. This tower maintains communication links for agencies responsible for public safety and emergency response. Direct line of sight will be required to connecting communication equipment at Hilo, Mauna Loa, and Kaupulehu. We ask that you coordinate the design of this project with ICSD to ensure that these projects do not impact each other.

If you have any questions regarding the above, please call me at 586-0400 or have your staff call Mr. David DePonte of the Public Works Division at 586-0492.

Sincerely,

BRUCE A. COPPA
State Comptroller

c: DHHH.
Mr. Bob Hivak, DAGS ICSD

Ho'okuleana LLC

... to take responsibility ...

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www.hookuleana.com

Mr. Bruce Coppa, Comptroller
State of Hawai'i, Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawaii 96810

April 29, 2011

Subject: 'Aina Mauna Legacy Program Pre-Assessment Scoping Letter

Dear Mr. Coppa,

Thank you for your letter dated April 14, 2011 regarding the Department of Hawaiian Home Lands 'Aina Mauna Legacy Program Environmental Assessment Scoping.

In your letter, you reference ICSD's radio tower within the subject property area. We will include this information, as well as reference to the required line of sight needed to connect communication equipment across the island. Additionally, we will ask DHHH to coordinate with ICSD to ensure that the 'Aina Mauna Legacy Program does not negatively impact their operations.

Once again, we would like to thank you for your comments on the 'Aina Mauna Legacy Program EA. We will be providing you a copy of the Draft EA when it is completed. In the meantime, if you have any further questions or concerns, please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Ho'okuleana LLC
Peter T. Young

cc: Linda Chinn, DHHH Land Management Division



STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
Benefit, Employment & Support Services Division
820 Milliani Street, Suite 606
Honolulu, Hawaii 96813

April 26, 2011

Refer to 11-0140

Ho'okuleana LLC
25 Kaneohe Bay Drive, Suite 212
Kailua, Hawaii 96734

To Whom It May Concern:

Thank you for your letter received on March 9, 2011 requesting comments for the Aina Mauna Legacy Program Environmental Assessment (EA) Scoping. Aina Mauna Legacy Program, Humu'ia/Pi'ihonua, Hawaii. The Director of the Department of Human Services has forwarded your letter us for a response.

We have reviewed the above named document and the online information for the proposed project, as requested. We do not foresee any negative impact from this project on any child care services in the community.

If you have any questions or need further information, please contact Ms. Marja Leivo, Child Care Program Specialist, at (808) 586-7112.

Sincerely,

Luanne Murakami
Acting Division Administrator

c: Patricia McManaman, Director

AN EQUAL OPPORTUNITY AGENCY

Ho'okuleana LLC

... to take responsibility ...

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Ms. Luane Murakami, Acting Division Administrator
State of Hawaii, Department of Human Services
Benefit, Employment & Support Services Division
820 Milliani Street, Suite 606
Honolulu, Hawaii 96813

April 29, 2011

Subject: Aina Mauna Legacy Program Pre-Assessment Scoping Letter (11-0140)

Dear Ms. Murakami,

Thank you for your letter dated April 26, 2011 regarding the Department of Hawaiian Home Lands' Aina Mauna Legacy Program Environmental Assessment Scoping. In your letter, you state that you do not foresee any negative impacts from this project on any child care services in the community.

We look forward to your review of the Draft EA, which we will be providing to the Department when it is completed. In the meantime, if you have any further questions or concerns please feel free to contact us at 254-2223 or by email at AinaMauna@Hookuleana.com

Sincerely,

Ho'okuleana LLC
Peter T. Young

cc: Linda Churn, DHHL Land Management Division

ʻĀina Mauna Legacy Program
Department of Hawaiian Home Lands

Cultural Impact Assessment

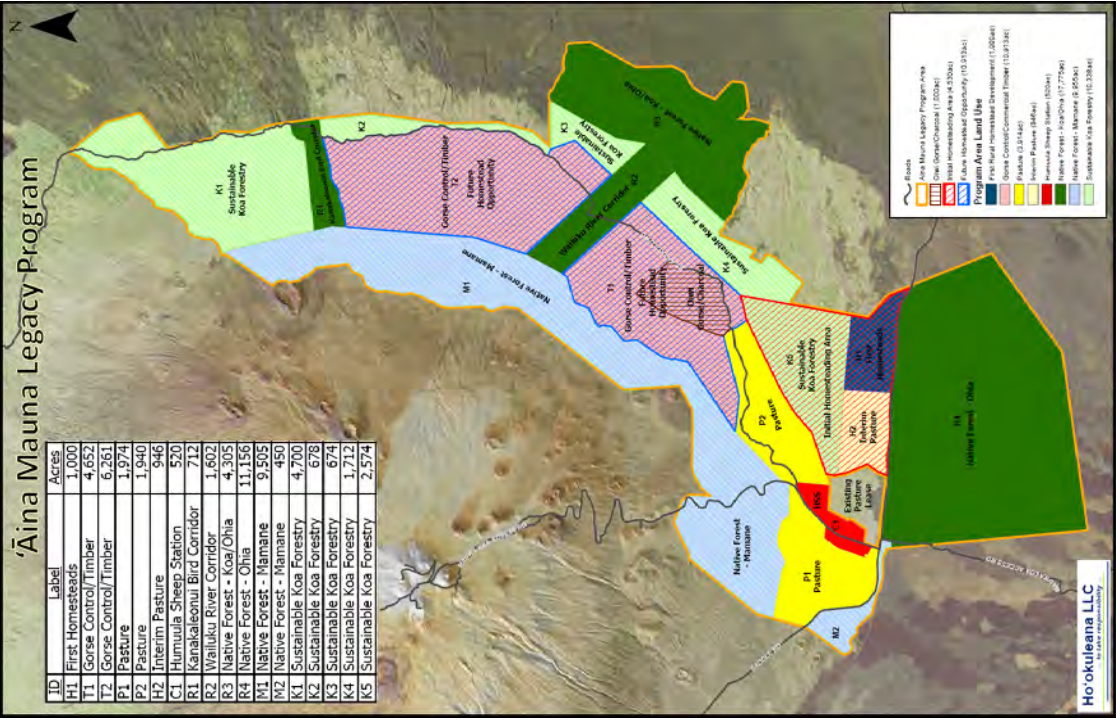


Ola ka ʻāina, ola ke kanaka
(Healthy/Living Land, Healthy/Living People)

The good of the land results in the good of the people.

Table of Contents

Introduction	4
ʻĀina Mauna Legacy Program Background - Enhancing the Legacy at Humuʻula/Piʻihonua	4
Legacy Program Mission	4
Scope of Work	5
Physical and Natural Setting	6
ʻĀina Mauna: Humuʻula, Piʻihonua, Ka ohe	7
Genealogical Accounts and Traditional Features	7
Historical Overview of Settlement, Land Uses and Travel in the ʻĀina Mauna	8
Historic Features	15
Archaeological Investigation	15
Native Hawaiian Traditions & Historical Narratives of the ʻĀina Mauna	18
Moʻolelo ʻĀina: Native Traditions of the Land	19
Valued Facets of the Cultural Landscape on the ʻĀina Mauna	21
The ʻĀina Mauna Described in Oral History Interviews	22
Overview of Documentation from Oral Historical Accounts by Maly and Maly	22
Heiau (Ceremonial Sites) and Spiritual Significance	27
Trails and Access	28
Pā Ilina (Burial Practices and Sites)	30
Outreach and Consultation During the Preparation of the ʻĀina Mauna Legacy Program	31
Hawaiian Homes Commission Informational Workshops (public meetings)	31
Beneficiary Consultations (public meetings)	32
Office of Hawaiian Affairs (OHA) (Statewide radio program)	32
Office of Hawaiian Affairs (public meetings)	32
ʻĀina Mauna Legacy Program Advisory Group	32
DHHL Website	32
Waimea Consultation Meeting - 09/23/09	32
Hilo Consultation Meeting - 09/25/09	38
Hilo (Keaukaha) Consultation Meeting - 10/14/09	43
Consultation Email and Written Comments	52
ʻĀina Mauna Legacy Program – Letters of Support	67
ʻĀina Mauna Legacy Program – Environmental Assessment	68
Scoping Letters	68
Public Scoping Meetings	68
Assessment of Impacts to Historic & Cultural Resources and Cultural Practices	70
ʻĀina Mauna Legacy Program and Cultural Impact Assessment References	71



Introduction

'Āina Mauna Legacy Program Background - Enhancing the Legacy at Humu'ula/Pi'ihonua

DHHL is looking at its responsibility as a land manager not just to provide homes to its beneficiaries, but also to provide for the management and protection of native lands to support both cultural and resource management activities and create homesteading opportunities for the future.

DHHL seeks to restore portions of the Humu'ula/Pi'ihonua lands in perpetuity to conserve these native forests and natural habitats for future generations. In doing so the Department is looking beyond housing and into a more holistic approach for communities and land management.

DHHL believes that the Humu'ula/Pi'ihonua lands have the potential for serving as a sustainable native forest and land unit by simultaneously providing environmental, economic and social benefits to the trust and its beneficiaries, in perpetuity by linking traditional cultural knowledge and modern science.

Therefore, the 'Āina Mauna Legacy Program is developed to take into consideration not only the immediate needs of the area, but also traditional cultural knowledge and how best to manage the legacy for the area for future generations. By creating a sustainable plan for the area, the lands can be conserved and restored while also providing an economic resource for DHHL and its beneficiaries. The time commitment for the Legacy Program and restoration of the land is long term, essentially for the next 100-years and beyond.

The 'Āina Mauna Legacy Program serves as a guide as DHHL moves forward in managing the Humu'ula/Pi'ihonua area to conserve its legacy for future generations while also serving as an economic resource. The Legacy Program is an extension of prior planning and activities at the site. Findings, recommendations, background information and other references from many of these prior documents are included and edited into this program.

The lands of Humu'ula and Pi'ihonua represent the most important native forest areas remaining in the DHHL trust. These lands provide a glimpse into the natural environment and native forests which are disappearing throughout the state. The area serves as valuable habitat to many native and endemic species. The area's proximity to Mauna Kea also makes it a valuable cultural resource. These lands have the potential for serving as a sustainable native forest and land unit by simultaneously providing environmental, economic and social benefits to the trust and its beneficiaries in perpetuity.

The 'Āina Mauna Legacy Program incorporates prior planning efforts and serves as a policy framework related to the overall use and management of the property; the implementation process will occur after the Legacy Program is adopted. The following principles, areas of focus and goals serve as the foundation to the preparation and implementation of the 'Āina Mauna Legacy Program.

Legacy Program Mission

The mission of the 'Āina Mauna Legacy Program and its implementation is to protect approximately 56,000-acres of native Hawaiian forest that is ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries and the community.

Goals

Initial goals for the 'Āina Mauna Legacy Program include:

Goal 1: Develop an economically self-sustaining improvement and preservation program for the natural and cultural resources (invasive species eradication and native ecosystem restoration) and implementation strategy.

The focus of the 'Āina Mauna Legacy Program shall be on:

- Restoration and enhancement of DHHL trust resources;
- Identify immediate and future opportunities for DHHL beneficiaries;
- Removal of invasive species - gorse, etc.;
- Conserve natural and cultural resources and endangered species;
- Address reforestation and restoration of the ecosystem;
- Develop revenue generation, reinvestment in land to sustain activities;
- Provide educational and cultural opportunities;
- Identify and secure partners to sustain activities;
- Identify opportunities for alternative/renewable energy projects; and
- Be a lead and/or model for others to engage in ecosystem restoration in a culturally sensitive manner based on partnerships to develop a self-sustaining model

Goal 2: Develop an outreach program to gain interest, participation, and support from the Hawaiian Homes Commission, DHHL Staff, beneficiaries groups, cultural practitioners, natural resource scientists, and the broader community for the Legacy Program and its implementation.

Scope of Work

The scope of work for this Cultural Impact Assessment includes:

- Examination of cultural and historical resources, including historic maps, and previous research reports and interviews, with the specific purpose of identifying traditional Hawaiian activities including religious practices, gathering of plant, animal, and other resources, or agricultural pursuits as may be indicated in the historic or oral history records;
- A review of previous archaeological work that may be relevant to reconstruction of traditional land use activities; and the identification and description of cultural resources, practices, and beliefs associated with 'Āina Mauna;
- Consultation and interviews with knowledgeable parties regarding traditional cultural practices, present and/or past uses of the area; and
- Preparation of a report summarizing the results of these research activities.

The following references provided the information used in the historical traditions and oral histories considered in this CIA.

- "Mauna Kea - Ka Piko Kaulana O Ka 'Āina" (Mauna Kea-The Famous Summit of the Lands), A Collection of Native Traditions, Historical Accounts, and Oral History Interviews for: Mauna Kea, the Lands of Ka'ōhe, Humu'ula and the 'Āina Mauna on the Island of Hawai'i - Kumu Pono Associates LLC - March 30, 2005

- "He Moolelo 'Āina" A Cultural-Historical Study of the Upper Waiākea-Humu'ula Mountain Lands: The Proposed Kipuka 'Āina Mauna Natural Area Reserve District of Hilo, Island of Hawai'i - Kumu Pono Associates LLC - March 23, 2005
- Humu'ula and Pi'ihonua Native Traditions, Historical Accounts and Oral Interviews Report - Kepā Maly & Onaona Maly, Kumu Pono Associates, LLC - Included as Appendix C in the Humu'ula Rural Villages and Landscape Restoration Plan (Final Report) - Townscape, Inc. - March 2005
- "Humu'ula A Me Pi'ihonua: He Mau 'Āina Lei Ali'i Ma Ka 'Āina Mauna O Hawai'i" (Humu'ula and Pi'ihonua: Lands that Adorn the Chiefs on the Mountain Lands of Hawai'i, A Collection of Native Traditions, Historical Accounts, and Oral History Interviews - Kumu Pono Associates LLC - March 15, 2004
- Overview: Excerpts From - "He Wahi Mo'olelo No Ka 'Āina A Me Na 'Ohana O Walki'i Ma Waikōloa (Kalana O Waimea, Kohala), A Me Ka 'Āina Mauna" (A Collection of Traditions and Historical Accounts of the Lands and Families of Walki'i and Waikōloa (Waimea Region, South Kohala), and the Mountain lands, Island of Hawai'i) - Kumu Pono Associates LLC - November 12, 2002
- Malama Pono I Ka 'Āina -An Overview of the Hawaiian Cultural Landscape - Kumu Pono Associates LLC - 2001

Physical and Natural Setting

'Āina mauna, or mountain lands, reflects a term used affectionately by elder Hawaiians to describe the upper regions of all mountain lands surrounding and including Mauna Kea.

Native Hawaiian traditions and historical accounts describe the lands of Humu'ula and neighboring Ka'ōhe - those areas extending from shore to around the 6,000-foot elevation - as having once been covered with dense forests, and frequented by native practitioners who gathered forest-plant resources, birds and food. The larger 'āina mauna were frequented by individuals who were traveling to the upper regions of Mauna Kea to worship, gather stone, bury family members, or deposit the piko (umbilical cords of newborn children) in sacred and safe areas; and by those who were crossing from one region of the island to another.

The 'āina mauna was also used by travelers making their way through the area. The area was frequented by native practitioners and contained a native and cultural landscape that provided among other things:

- Places to worship
- Places to gather stones
- Kanu iwi (places to bury human remains)
- Kanu piko (places to bury umbilical cords)
- Places to traverse, i.e. for those who were crossing from one region to another
- Places to gather food, and catch birds
- Sacred and safe areas

Historically, uses of the Humu'ula/Pi'ihonua lands were limited to managed sheep and cattle grazing. The introduction of cattle, sheep, goats and the proliferation of wild dogs on the 'āina mauna is believed to have started as early as the 1820s. By 1850, the cultural and natural landscape had been significantly altered by roving herds of wild ungulates. Ranching interest, having become formalized, began to establish ranching stations and operations on the mountain lands. Thus, areas once forested soon became open pasture lands.

Parker Ranch held the longest ranching lease to the property, from the early 1900s to 2002, and their lease extended around Mauna Kea to the Pu'uhuluhulu vicinity. Initially, Parker Ranch invested in sheep ranching and then focused on cattle operations until the end of their lease with DHHL in 2002. Since 2002, when existing cattle leases expired, most of these lands have been inactive. Efforts to restore the land's productivity via gorse eradication/control, native bird corridors and koa forest restoration have begun in priority areas.

The Humu'ula/Pi'ihonua area is made up of approximately 56,200-acres owned by the Department of Hawaiian Home Lands located on the northeast slopes of Mauna Kea. The Humu'ula/Pi'ihonua lands are the largest contiguous parcel under jurisdiction of DHHL. The Humu'ula parcel is approximately 49,100-acres in size and the Pi'ihonua parcel, located adjacent to the eastern boundary of Humu'ula, is approximately 7,078-acres in size. 'Āinahou, comprising approximately 11,124-acres, is the subsection of Humu'ula south of Saddle Road and is currently under license to the State of Hawai'i, Department of Land and Natural Resources.

‘Āina Mauna: Humu'ula, Pi'ihonua, Ka'ōhe

The following is summarized from the "Humu'ula Rural Villages and Landscape Restoration Plan, Final Report" prepared by Townscape, Inc., for 'Ōiwi Lōkahi o ka Mokupuni o Keawe, March 2005, except where noted.

The cultural and historical research conducted by Kumu Pono Associates documents descriptions of Ka'ōhe, Humu'ula, and Pi'ihonua. The study provides readers with documentation pertaining to the traditional, cultural and historical setting of the 'āina mauna on the island of Hawai'i. It is concluded that the Hawaiian way of life was the product of strict land use management.

The historical record coupled with oral history interviews provide clues as to the types of sites, hence past land uses, that may be found at Humu'ula/Pi'ihonua: native trails (some overlaid by current access routes), stone mounds/land markers, altars and types of ceremonial sites, shelters and habitation caves, resource collection sites, ilina (burial features), later dated features (1800s) such as pens, walls, fence lines, stone and wooden houses, water collection and storage, bird hunting blinds, former garden plots, and support features.

'Āina mauna, or mountain lands, reflects a term used affectionately by elder Hawaiians to describe the upper regions of all mountain lands surrounding and including Mauna Kea.

Genealogical Accounts and Traditional Features

In Hawaiian culture, the natural and cultural resources are one and the same. Native traditions describe the birth of the islands and the life that exists on them in terms of genealogical accounts.

All natural forms of the environment are believed to be embodiments of gods and deities. From godly forces the Hawaiian Islands are born of Wākea (the expanse of the sky-father) and Papahānaumoku (Pāpā who gave birth to the islands). Wākea and Pāpā are credited for being the parents of the first man, Hāloa, the ancestor of all people. It is from this genealogical thread that Hawaiians address their environment and it forms the basis of the Hawaiian system of land use.

The generations that followed developed a refined system of land use and management. 'Ūmi a Līloa, the ruler of Hawai'i, created land divisions according to a chiefly management system.

The island, or mokupuni, was divided into moku o loko, or districts. Hilo district contained Humu'ula, an ahupua'a. Subdivisions within a moku are 'okana and kalana, both of these would contain several ahupua'a. Manageable parcels of land would typically run mauka to makai and would be marked with stone wall alignments.

These parcels are known as: 'ili, kō'e'e, mahina 'ai, māla and kihāpai. Tenants cultivated smaller crops for family consumption, to supply the needs of chiefs, and provide tributes. Kapu were observed as a matter of resource and land management among other things. Access to resources was tied to residency and earned as a result of taking responsibility to steward the environment and supply the needs of ali'i. The social structure reinforced land management.

Native Hawaiian tradition and historical accounts portray the lands of Humu'ula, Pi'ihonua, and Ka'ōhe as having been dense forests where native practitioners gathered forest resources, birds, and food. Humu'ula is named for a type of stone (red jasper) used to make ko'i or adze.

The final Environmental Assessment for the Koa Salvage-Reforestation and Gorse Containment Project prepared by DHHL in 2001, notes cultural practices and features in the area.

"Mauna Kea may be literally interpreted as "white mountain" because during the winters, the summit is covered in snow. Mauna Kea may also be translated as "Wākea's Mountain". Wākea, also written and pronounced as Ākea and Kea, was the god-father of the island of Hawai'i. The island child was born by Papa or Haumea, the goddess who gave birth to islands. The proposed project area was once heavily forested. Native Hawaiians viewed the mountain areas as the heavily forested zone (waoakua, forest of gods) where koa trees were cut for canoe hulls. Other traditional uses by pre-contact native Hawaiians were gathering medicinal plants and bird feathers." (Final Environmental Assessment, Koa Salvage-Reforestation and Gorse Containment, Page 24)

Historical Overview of Settlement, Land Uses and Travel in the 'Āina Mauna

The following historical overview is taken from "Mauna Kea – Ka Piko Kaulana O Ka 'Āina" (Mauna Kea-The Famous Summit of the Lands), A Collection of Native Traditions, Historical Accounts, and Oral History Interviews for: Mauna Kea, the Lands of Ka'ōhe, Humu'ula and the 'Āina Mauna on the island of Hawai'i" by Kumu Pono Associates LLC, March 30, 2005

Sequence of Hawaiian Settlement

Archaeologists and historians describe the inhabiting of these islands in the context of settlement which resulted from voyages taken across the open ocean. For many years archaeologists have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and

people) and Hawai'i were underway by AD 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population-the Hawaiian Kahiki-were the Marquesas and Society Islands (Emory in Tatar 1982:16-18).



Map Noting Ahupua'a in the Region

For generations following initial settlement, communities were clustered along the watered, windward (ko'olau) shores of the Hawaiian Islands. Along the ko'olau shores, streams flowed, rainfall was abundant and agricultural production became established. The ko'olau region also offered sheltered bays from which deep sea fisheries could be easily accessed. Also, near-shore fisheries, enriched by nutrients carried in the fresh water running from the mountain streams, could be maintained in fishponds and coastal fisheries. It was around these bays such as at Hilo, that clusters of houses where families lived could be found (see McEldowney 1979). In these early times, the residents generally engaged in subsistence practices in the forms of agriculture and fishing (Handy, Handy and Pukui, 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by ca. 900 to 1100 AD, the population began expanding to the Kona (leeward side) and more remote regions of the island (Cordy 2000:130). Kirch (1979) reported that by ca. AD 1200, there were small coastal settlements at various areas along the western shore line of Hawai'i (Kirch 1979: 198). In this system of settlement and residency, the near-shore communities shared extended familial relations with those of the uplands.

By the 1400s, upland regions to around the 3,000 foot elevation were being developed into areas of residence and a system of agricultural fields. By the 1500s to 1600s, residency in the uplands was

becoming permanent, and there was an increasing separation of royal class from commoners. During the latter part of this period, the population stabilized and a system of land management was established as a political and socio-economic factor (see Kamakau 1961; Ellis 1963: Handy, Handy & Pukui 1972: Tomonari-Tuggle 1985: and Cordy 2000).

The lowlands of Ka'ohē, Humu'ula and the other neighboring ahupua'a, extending from the shore to around the 3,000 foot elevation, supported residential, agricultural and subsistence activities, spanning the centuries of Hawaiian residency. The upper mountain lands of the Ka'ohē-Humu'ula region were frequented by travelers, collectors of natural resources, and for a wide range of cultural practices (see Kamakau, 1961; and Boundary Commission Testimonies, 1865 to 1891, in this study).

Traditions and historical records tell us that the dedication and personification of the land and natural resources, and the practices of district subdividing and land use as described above, were integral to Hawaiian life, and were the product of strictly adhered to resource management planning. In this system, the people learned to live within the wealth and limitations of their natural environment, and were able to sustain themselves on the land and ocean. It is in this cultural system that we can understand the significance of the lands of Ka'ohē, Humu'ula and the neighboring 'āina mauna.

This traditional knowledge will be an important part of the 'Āina Mauna Legacy Program implementation process. In order to restore the 'Āina Mauna to what ancient Native Hawaiians viewed the mountain lands as a heavily forested area, we recommend utilization of both traditional cultural knowledge and modern science in management efforts.

Land Use Practices

The land of Humu'ula - extending from sea level to the 9,000 foot elevation on Mauna Kea, and above the 13,000 foot elevation on Mauna Loa - is apparently named for a type of stone (Red Jasper stone) that was used in making ko'i (adze). The place name of Ka'ohē - a land area extending from sea level to the summits of Mauna Kea and Mauna Loa - may be literally translated as "The-bamboo" or named for a type of kalo (taro) that may have been common in the region (ct. Pukui. et al. 1974).

Native Hawaiian traditions and historical accounts describe the lands of Humu'ula and Ka'ohē -those areas extending from shore to around the 6,000 foot elevation -as having once been covered with dense forests, and frequented by native practitioners who gathered forest-plant resources, birds, and food. The larger 'āina mauna were frequented by individuals who were traveling to the upper regions of Mauna Kea to worship, gather stone, bury family members, or deposit the piko (umbilical cords of newborn children) in sacred and safe areas; and by those who were crossing from one region of the island to another.

As early as the 1820s, introduced cattle, sheep, goats, and wild dogs had made their way up to the mountain lands and were bothersome to those who traveled the 'āina mauna. In 1834, Scottish naturalist, David Douglas was gored and killed by a wild bullock near the boundary of Humu'ula and Laupāhoehoe. By 1850, the natural-cultural landscape of the 'āina mauna was being significantly altered by the roving herds of wild bullocks, sheep and other ungulates, and ranching interests were being formalized in the region. By 1857, the Crown and Government mountain lands -including Humu'ula and Ka'ohē -were leased to Francis Spencer and the Waimea Grazing and Agricultural Company, which established ranching stations and operations around the mountain lands. As a result, the 'āina mauna have been intensively ranchled for more than 150 years.

Humu'ula

Because hunting, and subsequently ranching of bullocks, cattle and sheep, was the primary activity on the mountain lands of Humu'ula, areas once forested, soon became open pasture land. While the first formal lease of Humu'ula was issued in 1857 (Keoni Ana to F. Spencer), it was interests of the Parker Ranch that held the longest lease on the Humu'ula mountain lands. The lease, from 1900 to 2002, covered the area extending around Mauna Kea to the 'Āina Hou-Pū'uhuluhulu vicinity. The Parker Ranch interests initially focused on sheep ranching in the Humu'ula-Kalai'eha section, but in 1964 the ranch terminated its sheep program. Cattle operations were maintained until the end of the Parker lease in August, 2002.

Today, limited ranching of cattle is continued on Humu'ula, under a permit by the Department of Hawaiian Home Lands, and leases from the State of Hawai'i. Also, some 10,000 to 13,000-acres have succumb to an infestation of the introduced gorse (first recorded on the land in 1892), which has had little maintenance since 1980.

Na 'Āina e pili 'ana iā Mauna Kea

All other lands lying on the slopes of Mauna Kea - those belonging to the districts of Hilo, Hāmākua and Kohala - generally extended through the forests, where they are cut off by the traditional boundaries of Ka'ōhe and Humu'ula. From the middle 1800s, those lands such as Waiākea, Pī'ihonua, Pāpa'ikou, Laupāhoehoe, 'Ō'ōkala, Ka'ala, Kūka'iau, Pā'auhau, and Waikōloa, were either held in fee simple interest or leased out by the Crown and Government, for development of lumber collection, bullock hunting, cattle and sheep grazing, and in the elevations below approximately the 2,000 foot level, to development of sugar plantations.

In the early 1900s, forest lands below Humu'ula and Ka'ōhe, and the Mauna Kea mountain lands from approximately the 9,000 foot elevation to the summit, were turned over to conservation in the form of forest reserves. The primary interest in the development of the reserves was the protection of water sheds to ensure that plantations would have access to water, necessary for the cultivation, harvesting, and processing of sugar. Interest in, and the value of Hawaiian forests and watersheds has since evolved as a greater awareness of the unique and fragile ecosystems of the Hawaiian mountain lands has been developed.

Travel - Na Ala Hele o ka 'Āina Mauna

Travel across the 'āina mauna is documented in native traditions, which describe ala hele (trails) passing from the coastal lowlands through the forest lands; along the edge of the forests; across the plateau lands of the Pōhakuloa-Ka'ōhe region, and to the summit of Mauna Kea. These ala hele approached Mauna Kea from Hilo, Hāmākua, Kohala, Kona and Ka'ū, five of the major districts on the island. Only Puna, which is cut off from direct access to the mountain lands, apparently did not have a direct trail to the 'āina mauna. Thus, people traveling to Mauna Kea from Puna traveled through the lands of Waiākea, Hilo or Keauhou, Ka'ū to reach Humu'ula and the slopes of Mauna Kea.

By the early 1820s, foreign visitors, in the company of native guides, began making trips across the 'āina mauna and to the summit of Mauna Kea. Based on their accounts, travel in the region through the middle 1800s basically followed the old trails, or cut across new areas-a result of dense forest growth, and new lava flows covering older routes. By the 1850s, the Kingdom of Hawai'i entered into a program

of improving ancient trails and identifying new routes, by which to improve travel between various locations and facilitate commerce. The earliest recorded improvements (describing government activity on a trail around Mauna Kea) document work on the Waimea-Kūla'imano trail (cutting across the lands of Ka'ōhe, Hāmākua and Hilo), running above the forest line and to the coast of Hilo, date from 1854, when the Waimea-Kūla'imano route was improved to accommodate wagon travel.

In the later 1850s, as leases were given out for the lands of Humu'ula and Ka'ōhe, and the sheep and bullock hunting interests grew, the 1854 route was maintained, and the upper trail between Kūla'imano-Makahānaloa, was improved to the Kalai'eha vicinity. In 1862, the Kingdom again initiated a program to improve the government roads across the 'āina mauna. Two routes were proposed, one between Hilo and Waimea via Kalai'eha, and the second to improve on the trail from Kalai'eha towards Kūla'imano-Makahānaloa, and around through Hanaipoe-Mānā and Waimea. These trails, termed Alanui Aupuni, were appropriated and work completed by the late 1860s. The routes appear on island maps through 1901, with subsequent designations as trails on later maps.

Several ancient trails approached the summit of Mauna Kea, and were used by maka'āinana through the 1920s. Most of these trails were accessed via the improved government roads around the mountain. Primary approaches included, but were not limited to the Kalai'eha-Waiāu Trail, the 'Umikoa-Ka'ula Trail, and the Kemole-Pū'u Nanahu Trail. Historical accounts and oral history interviews record that these trails provided travelers with access to various sites, including areas where rituals and practices were observed, and that the trails converged at Waiāu. At Waiāu, travelers found a sheltered area and water for their use while on the mountain. Those who were traveling to the summit of Mauna Kea or to other locations in the summit region then followed smaller trails that provided them with the access necessary for their purposes.

By the early 1870s, the ancient trail between Kalai'eha and the summit of Mauna Kea was improved into a horse trail by the Spencers, lessees of the Mauna Kea mountain lands. Other routes, accessing outlying ranching stations, such as at Pū'u 'Ō'ō and Puakala (Pua'ākala), Lahohinu, and Hanaipoe had also been improved by lessees, with routes running around the mountain, and down to Hilo or out to Waimea. In the leases of the Crown Lands and Government Lands, it was specified that improvements, including trails, reverted to the Crown or Government upon termination of the leases. Until the late 1940s, early 1950s, these trails and government roads were primarily used by lessees for transportation of goods-and cared for by the lessees. There are also numerous accounts by visitors to the 'āina mauna document travel in the region. By the late 1890s, the Kohala road supervisor reported that while the mountain roads belonged to the government, they were all but private by the nature of their use.

Between the 1930s to 1940s, improvements were made to the Kalai'eha-Waipunalei section of the road to Waimea as a part of the Civilian Conservation Corps (CCC) and Territorial Forestry programs, with work also being done by the Parker Ranch. Likewise, the Kalai'eha-Waiki'i route was maintained by the ranch, and improved by the United States Army-U.S.E.D., in 1942.

Apparently little work was done on the Kalai'eha-Hilo section of the road (trail), after the 1870s. The trail was accessed by ranchers, with routes diverging to Kalai'eha and Pū'u 'Ō'ō, as described in survey records, journals and kama'āina testimonies. It was also periodically used by visitors to the mountain lands, usually those who were traveling to view Mauna Loa lava flows, or to make the ascent of Mauna Kea. It was not until 1942, that the route was modified as a vehicular road in what became the Saddle Road, following in areas, the native trail and historic route, while also cutting across new lands in other

locations. The "Saddle Road" was formally turned over to the Territory in 1947, following which time the general public was then given an opportunity to travel to the mountain lands unhindered.

In 1963, interest in Mauna Kea as a site for a telescope, manifested itself. Hawai'i based scientists. Walter Steiger (with the University of Hawai'i) and Howard Ellis (with the National Weather Service's Mauna Loa Weather Station) facilitated trips by Dr. Gerard Kuiper and Ailka Herring (both associated with the University of Arizona and NASA) to the summits of Mauna Loa and Mauna Kea. The Mauna Kea route basically followed the old foot trail from Kalai'e, past Kalepeamoa, Keonehe'e and up to the summit. Over the years, the old trail was modified for horses and pack animals, and after World War II, for the occasional four-wheel drive vehicles that ascended the mountain. In 1964, Pu'u Poli'ahu on Mauna Kea had been chosen as the site for the first telescope, and state funds were released for grading a road to Pu'u Poli'ahu, to facilitate construction and access by the scientists. Since 1964, the primary route of access up the mountain slopes has remained generally the same, though as additional development in the summit region has occurred, new accesses and realignments of the earlier route have occurred.

Territorial Forestry and the Civilian Conservation Corps

The following history of Territorial Forestry and the Civilian Conservation Corps is taken from "Keanakolu: An Archaeological Perspective of Hawaiian Ranching and the Pacific Hide and Tallow Trade TMK 3-8-01:3" by Peter R. Mills.

In 1876, the legislature of Kamehameha III passed a law declaring all "forest lands" to be government property in an effort to conserve the forests from further encroachment on the seaward side by the plantations' need for fuel and on the mountain side from grazing animals. In 1901, approximately 30,000 acres of the upland forest were lost to a series of fires in Hāmākua. As a consequence, the Hilo Forest Reserve was formerly established by the Territory of Hawai'i in 1905 (Tomonari-Tuggle 1996:19, 33-35). Johnny Ah San, who worked as a territorial forester, claims that in the years from 1924 to 1926 forest rangers expanded the log cabin at Keanakolu for use as a field station. Hundreds of thousands of pigs, sheep, cattle and goats were reportedly removed from Hawai'i's Territorial forests in those years (Tomich 1986:113). It was during this period that additional fruit trees were planted in an orchard below the log cabin, as well as hardwood and softwood trees in the surrounding vicinity. A group of six men periodically stayed in the cabin for maintenance purposes (e.g. orchards, trails). These men were responsible for the construction of many miles of fence to contain cattle that freely roamed the area during this time.

The Forest Reserves were established as a cooperative arrangement between the Hawai'i Sugar Planters Association and the territorial government. Plantations needed wood for fuel, but they also needed to keep the forests intact to draw mist precipitation from the trade winds, which in turn fed the irrigation systems in the cane fields below. Their own consumption of fuel had clearly been contributing to the decline of the forest at lower elevations, where flume systems transported large quantities of wood as well as cane. The first Territorial forester, Ralph S. Hosmer, suggested that the forest had been declining in the uplands as a result of fire, grazing and insects (Hosmer 1904:317, in Tomonari-Tuggle 1996:16). In order to preserve the forest, it was necessary to keep the cattle and sheep out, but the planters were also worried about hunters in the woods starting fires from their camps. The commercial ranchers were also wary of individual hunters who could also shoot cattle from the ranch, a problem that was apparently at its worst near the World War II era (Langlas et al. 1999:40). Consequently, the burden of

maintaining fences and keeping cattle out of the upper forest were duties mainly shared by territorial foresters and the ranchers.

In 1934, the territorial foresters' camp at Keanakolu was expanded into a Civilian Conservation Corps (CCC) field camp. This was one of several such camps established throughout the mid-slopes of Mauna Kea in the early 1930s (Ah San 1992). The camp consisted of a bunkhouse that housed as many as 40 teenage boys, a mess hall, foreman's quarters, and other service buildings. Another foreman's quarters was added next to the *koa* cabin during this same year. All of these buildings are still standing today. In addition, the lower mess hall still contains the original kerosene stove and bunk beds. The corpsmen did not reside at Keanakolu Camp year-round due to water shortages. In an effort to conserve water, "the 'straw-boss' sat on the hill above the toilet and made sure the men were in and out of the showers quickly (Ah San 1992)." Major duties of the corpsmen included maintenance of trails that came up from the low lands, developing the Mana/Keanakolu wagon road into an auto road, construction of fences to keep cattle and sheep out of the forest, and the planting of a variety of forest and fruit trees. In all, over 20 varieties of pear, 25 varieties of plum, and 60 varieties of apple were planted. Ah San (1992) suggests that the orchard directly surrounding the log cabin complex was planted by the CCC, but a separate nearby orchard was planted earlier.

Also in 1934, the Hilo Burns Club erected a monument to David Douglas on a parcel of territorial forest land close to the location of Gurney's bullock pit. It appears that the actual pit was on ceded land, but because territorial forester L. W. Bryan was also a member of the club who sponsored the construction of the monument, its location is most likely due to it being on the parcel of territorial forest that is closest to the pit. The Club also planted about 200 Douglas fir seedlings around the monument, many of which have now grown to mature trees.

In 1935, the CCC began the monumental task of building a 60-mile long fence around the 85,000 acre Mauna Kea Forest Reserve to help keep an estimated herd of 40,000 wild sheep out of the reserve. Seven cabins were built around the forest reserve boundaries for shelter as the project proceeded (Langlas et al. 1999:55). The CCC camps were disbanded in the 1940s, after which Keanakolu was once again used as a field station for the forest rangers. Rangers stayed alone in the mountains for long periods and continued to maintain the local natural resources. Names of some of these rangers were Ignacio, Pimental, Kahele, and Ah San (Ah San 1992). Their duties included acting as hunting guides to ensure that hunters would abide hunting regulations on leased ranchlands. Rangers who patrolled the massive jurisdictional land area rode horses that were pastured at the ranger station. Many times a year, forestry crews from Hilo would come up to work with the rangers on large fencing, trail construction, and tree planting projects (Ah San 1992). From 1945-1953 a major movement took place to control the sheep population. According to Ah San (1992), "the pasture above the fence was so overgrazed that at one time the ground was bare of vegetation and only dirt and large trees were visible."

As part of their efforts, the CCC also improved the wagon road into an auto route using rock-laid masonry.

The cobble roadbed built by the CCC in 1935 is exposed in many places along Keanakolu Road. The cobble bed is made of basalt cobbles and small boulders set to form a relatively level surface, and it is evenly bordered with cobbles. Where both edges are preserved, the cobbled bed is 9 ft (2.8m) wide. The stones for the roadbed were quarried from various places along the

road; drilled holes are visible in rock faces at several places along the road, indicating that blasting powder was used to quarry rock (Williams and O'Hare 2001:16).

By the 1940s, the CCC camp at Keanakolu was converted into a field station for territorial rangers. Johnny Ah San stated "these rugged men stayed in the mountains by themselves for long periods and continued to maintain the management of natural resources. Names of some of these hardy rangers were Ignacio, Pimental, Kahale and Ah San" (Ah San 1992). Forestry crews from Hilo would work with the rangers on occasion to work in fences, trails, and reforestation.

Parker Ranch lease-lands along Keanakolu Road were also used for some military training going as late as the 1980s and early 1990s (Williams and O'Hare 2001:12-14).

Historic Features

The introduction of cattle, sheep, goats and the proliferation of wild dogs on the ʻāina mauna is believed to have started as early as the 1820s. Travelers accessing the mountain trails oftentimes found themselves under attack by the wild bullocks; a Scottish naturalist, for example, was killed by a wild bullock at Keahua-ai. By 1850, the cultural and natural landscape had been significantly altered by roving herds of wild ungulates. Ranching interest, having become formalized, began to establish ranching stations and operations on the mountain lands. Thus, areas once forested soon became open pasture lands.

Parker Ranch held the longest ranching lease to the property, from 1901 to 2002, and their lease extended around Mauna Kea to the Pu'uhuluhulu vicinity. Initially, Parker Ranch invested in sheep ranching and then focused on cattle operations until the end of their lease with DHHL in 2002. As well, portions of Pi'ihonua were leased to various native hunters during the middle 1860s.

Historic features include:

- Walls, pens, fence lines
- Stone and wooden houses
- Water collection and storage facilities
- Bird hunting blinds
- Former garden plots
- Kulaka "cattle pen", 1850, oldest-named wall feature in Humu'ula
- Stone wall extending from Pu'uhuluhulu, enclosing ʻŌma'okoili paddocks marking the boundary between Humu'ula and Ka ohe

Archaeological Investigation

Based on a field inspection conducted in June 2004 by Cultural Surveys Hawai'i, it is predicted that there is a relatively low concentration of surface sites in the project area. Areas where site densities are likely to be significant include ahupua'a borders, pu'u (cinder cones), caves or lava tubes, traditional bird feeding habitats, the paleo-forest scrub transition area, traditional resource convergence areas (water, fuel, and shelter locations), and along trails and roads. The archaeological field reconnaissance indicated that historic and prehistoric sites may be present in the parcel, including: burial sites, temporary habitation sites, markers or historic sites, trails and roads, ritual sites, and camps and processing sites (relating to bird hunting and/or adze production).

Based on archaeological surveys conducted in the area, those known archaeological features within the parcel are predominately historical sites, and a relatively low concentration of archaeological sites are expected to be found. The gulches and pu'us, in addition to serving as possible refuge areas endangered plant species, would be among the likely areas where archaeological sites, if present, would be found.

Historically uses of the Humu'ula/Pi'ihonua lands were limited to managed sheep and cattle grazing. The majority of the subject lands had previously been occupied by Parker Ranch, since at least 1909 when sheep grazing started. However, by 1963 the sheep operation was phased out due to a decline of wool prices caused by the depression, competition from foreign countries, and heavy losses from wild dogs and feral pigs. Parker Ranch then converted the land to a cattle operation. Gorse was used as a hedge to pen animals however, conversion from sheep to cattle gave way to the initial outbreak of gorse, which until that time had been effectively controlled by sheep grazing.

Since 2002, when existing cattle leases expired, most of these lands have been inactive. Efforts to restore the land's productivity via gorse eradication/control, native bird corridors, and koa forest restoration have begun in priority areas.

Surrounding uses include the Hale Pōhaku Astronomical Facility, a support facility for the astronomical research on Mauna Kea, the Pōhakuloa Military Training Area, the Hakalau Forest National Wildlife Refuge and various State natural area and forest reserves.

Throughout the property there are several ponds, trails, fences, and rock walls which are in various states of repair, which were put in place for ranching infrastructure. Additionally there are two cabins located on the property, the Kanakaleonui cabin and, reportedly, the Kahinahina forest cabin.

The Keanakolu/Mana Road is located in Humu'ula and was built in 1870 to connect Hilo and Waimea. It is of historical interest because it developed a more efficient route for transportation between Hilo and Waimea and opened up land for grazing and sugar cane. The road was surveyed by Mr. D. H. Hitchcock in 1870.

The Humu'ula Sheep Station Company chartered by the Hawaiian Government in 1883, was an operation of H. Hackfeld and Company. By 1894 the company had erected large and extensive paddocks at Kalai'eha and also had a station at Keanakolu. Ownership of the station came under Parker Ranch and operations continued for years, often little known by Hawai'i residents due to its comparatively isolated location.

It has historical and architectural interest because sheep raising was one of the oldest introduced agricultural pursuits in Hawai'i and while never a major industry it was carried on until the last large flock in the Islands located at Humu'ula was phased out in 1963. Humu'ula's relationship to Parker Ranch and to the general agricultural history of Hawai'i is significant.

Trails

A few trails are located at the northern most point of the land parcel near the Keanakolu ranger station. The Ka'ali'ali trail runs along the higher elevations near the western boundary of Humu'ula. The Kahinahina trail extends from the western boundary to a forest cabin near the Waipāhoehoe gulch and on to Laumai'a Corral near the Pi'ihonua boundary. Another trail follows the Nauhī gulch and provides access to the Kanakaleonui cabin.

The Mauna Kea-Humu'ula Trail was first plotted by Alexander in 1892, and is shown on two later maps, the U.S. Coast and Geodetic Survey 1925-1926 and U.S. Geological Survey 1956. In 1936 the Civilian Conservation Corps made improvements to what is believed to have been a section of the old Mauna Kea-Humu'ula Trail from near the Humu'ula Sheep Station at Kalai'eha to the summit. Several other trails exist in Humu'ula as well.

Surrounding Land Uses

Surrounding uses include the Hale Pōhaku Astronomical Facility, a support facility for the astronomical research on Mauna Kea, the Pōhakuloa Military Training Area, the Hakalau Forest National Wildlife Refuge and various State forest and natural area reserves.

Hale Pōhaku is located on the Mauna Kea Access Road west of the Humu'ula land parcel at approximately the 9,200 foot elevation. Hale Pōhaku has been used as a construction camp/astronomical research support facility to house people working on the summit for acclimatization purposes. There are several buildings and stone cabins in the area.

The Mauna Kea Science Reserve is located at the summit of Mauna Kea and includes the Mauna Kea Observatory.

Located adjacent to the westernmost boundary of the parcel within the Mauna Kea Forest Reserve, is the Pōhakuloa Military Training Area.

The Hakalau Forest National Wildlife Refuge is located east of the land parcel, the refuge permits pig hunting and is one of the last remaining places where a number of native Hawaiian forest birds are found.

Mauna Kea Ice Age Natural Area Reserve is located west of the Humu`ula land parcel between the elevations of 10,400 and 13,200 feet. The Pōhakuola Gulch (formed by glacial melt water), Lake Waiālu (one of the highest lakes in the United States), and the Keanakōi`ā Adze Quarry, are all features of the Reserve.

Numerous forest reserves owned and managed by DLNR are located adjacent to or near the subject parcels. The Hilo Forest Reserve is located adjacent to the eastern boundary of the land parcel. The Upper Waialea Forest Reserve is located outside of the property boundaries, adjacent to the southeastern boundary. The Mauna Loa Forest Reserve is located adjacent to the southwestern portion of the land parcel. And the Mauna Kea Forest Reserve is located within the western portion of the property on the higher elevations.

Native Hawaiian Traditions & Historical Narratives of the 'Āina Mauna

In Hawaiian *mō'ōleo* (traditions and historical narratives) are found expressions of native beliefs, customs, practices, and history. Indeed, in Hawai'i the very landscape is storied (*wahi pana*). Each place name is associated with a tradition—ranging from the presence and interactions of the gods with people, to documenting an event, or the characteristics of a given place. Unfortunately, today, many of those *mō'ōleo* have been lost, though some still remain, and from them we are able to glimpse into the history of the lands and people of the 'āina mauna.



This section of the study presents readers with several accounts written by native Hawaiian authors and nineteenth century historians, recording history, the occurrence of events and travel, and traditions of place names that have survived the passing of time. Several of the mo'olelo were translated here from the original Hawaiian by May. The cited traditions were formally written between 1862 to 1915.

Mo'olelo 'Āina: Native Traditions of the Land

One of the most significant sources of native mo'olelo are the Hawaiian language newspapers which were printed between 1838 and 1948. Most of the accounts that were submitted to the papers were penned by native residents of areas being described and noted native historians. Over the last 30 years, the author has reviewed and compiled an extensive index of articles published in the Hawaiian language newspapers, with particular emphasis on those narratives pertaining to lands, customs, and traditions.

Several traditions naming places on Humu'ula, Ka'ohē, Pi'ihonua, and neighboring lands have been located. Those accounts describe native practices, the nature of land use at specific locations, and native lore. Thus, we are given a means of understanding how people related to their environment and sustained themselves on the land.

"Ka Moololo o Laieikawai" (1862-1863)

One of the earliest mo'olelo which provides us with references to Humu'ula, Mauna Kea and neighboring lands, and associates the names of places on Mauna Kea with the goddesses of the mountain, is "Ka Moololo o Laieikawai" (The Tradition of Laieikawai). This tradition spans the Hawaiian Island group, and was collected by native historian, S. N. Haleole. While introducing the series, Haleole noted that he originally wrote out the tradition in 1844 (Haleole, November 29, 1862). It was published as a serial in the Hawaiian language newspaper, Ku Okoa, between November 29, 1862 and April 11, 1863. In 1919, Martha Beckwith published Haleole's account, titled "The Hawaiian Romance of Laieikawai by S. N. Haleole."

In Beckwith's translation, Poli'ahu is referred to as the "goddess of the snow covered mountain," Mauna Kea. Below, is a synopsis of the account, by Beckwith, focusing on the main characters of the tradition, and their association with Mauna Kea:

The young chief (Aiwohikupua) of Kaua'i when he goes to seek the beauty of Puna makes a vow to enjoy no other woman until he has won Laieikawai. At Hana on Maui, he is attracted by the lovely Hina-i-ka-malama as she rides the famous surf at Puhele, and he turns in at Hanoo. The chiefess falls in love with the handsome stranger and wins him at a game of konane (Hawaiian checkers). He excuses himself until his return and goes on to Hawai'i, where he courts an even more beautiful chiefess in the person of Poli'ahu, who also promises him her hand. When he finally loses hope of winning Laie-ika-wai, he "Claps his hands before his god" to free himself from his rash vow and proceeds to a marriage with Poli'ahu, whom he fetches home with a great cortege to Kauai. While the festivities are proceeding at Mana, the disappointed Hina, apprised of her lover's duplicity, appears and claims the forfeited stake. Aiwohikupua is obliged to relinquish himself to her embraces, but the angry Poli'ahu envelops the lovers in alternate waves of unendurable heat and cold until they are obliged to separate, when the mountain goddess retires to her home attended by her three maidens, Lilinoe, and Kahoupokane, and Aiwohikupua finds himself bereft of both ladies... [Beckwith 1970:222].

Heiau of the Mountain Lands Described in "Na Kaao a Kekahi Elemakule o Hawai'i" (1865)

Among the early accounts penned by Hawaiian writers, in which reference to features associated with Humu'ula, Ka'ohē and the 'āina mauna are found, is an 1865 account, originally collected in 1853. The Hawaiian newspaper "Ke Au Okoa" published an article titled "Na Kaao a Kekahi Elemakule o Hawai'i" (May 8, 15, & 22, 1865) taken from the stories collected by Jules Remy, a French man who came to Hawai'i in 1851. While introducing the article, readers are told that Remy dwelt in Hawai'i for about three years, during which time he became quite proficient in the Hawaiian language. While here, Remy traveled around the islands documenting sites and events which he witnessed, and recording histories that were related to him. His narratives, written in French, reached Hawai'i and were translated into Hawaiian by W. D. Alexander at Punahou (Ke Au Okoa, Mei 8, 1865).

"Na Kaao a Kekahi Elemakule Hawai'i" was collected by Remy in March 1853, when he visited Ho'opūloa, South Kona. Upon landing, Remy records that he was warmly greeted by the people on the shore, and among the many people gathered, he observed an elderly gentleman. He was "stout and broad-chested, and on the account of his age, his hair was reddish gray."

Remy learned that the old man was Kanuha, a man of chiefly descent, born before the time that Alapa'i-nui died, in 1752 (Ke Au Okoa, Mei 8, 1865). Remy noted that Kanuha was nearly 116 years old, and in good health. Because of his advanced age, he spoke with authority on ancient customs and history of the Hawaiian people, that few, if any, other people were able to (Ke Au Okoa, Mei 8, 1865).

Among the traditions which Kanuha told Remy, was an account of the ascent of 'Umi to the position of king on the island of Hawai'i. In the account, Kanuha describes the history behind the construction of the famed heiau (temple) Ahu-a-'Umi, and the construction of three other heiau on the 'āina mauna—one on Mauna Kea, one on Mauna Loa, and one on a hill near the Ka'ohē-Waikōloa boundary. By description, and in some cases physical features on the ground, these heiau were situated in the lands of Humu'ula (perhaps two of the heiau), Ka'ohē, and Keauhou.

It is noted here that, in his own work, Abraham Fornander (1973) acknowledged the age and authority of Kanuha, but he also found inconsistencies in the genealogical relationship of individuals mentioned by Kanuha (Fornander 1973:99-101). In particular, Remy reports that Kanuha conveyed to him that 'Umi went to war with Keli'iohaloa, a chief of Kona. Historical accounts by native writers and Fornander record that Keli'iohaloa was the son of 'Umi, and that he became King of Kona for a time following his father's death (Fornander 1973:99-101). It should be considered here that this historical inconsistency may actually be attributed to Remy's own hand, rather than the narratives of Kanuha.

Regardless of the possible genealogical differences, one of the unique qualities of the account is that it provides us with otherwise unrecorded documentation regarding construction and occurrence of heiau in the high mountainous region of Hawai'i.

"Ka 'ao Ho'oniua Pu'uwai no Ka-Miki" (The Heart Stirring Story of Ka-Miki)

Perhaps one of the most detailed native traditions which includes rich accounts of place names and practices of natives of the land, and describing features of Mauna Kea, Humu'ula, Ka'ohē, Pi'ihonua and the 'āina mauna, is a historical account titled "Ka'ao Ho'oniua Pu'uwai no Ka-Miki" (The Heart Stirring Tale of Ka-Miki).

The story of Ka-Miki was published in the Hawaiian language newspaper Ka Hoku o Hawai'i between 1914 to 1917. It is a long and complex account that was recorded for the paper by Hawaiian historians John Wise and J. W. H. I. Kihe with contributions by local informants.

While "Ka-Miki" is not entirely an ancient account, the authors used a mixture of local traditions, tales, and family accounts in association with place names to tie together fragments of site specific history that had been handed down over the generations. The complete narrative includes historical accounts of more than 800 place names (many personified, commemorating particular individuals) around the island of Hawai'i. While the personification of specific individuals in this account, and their associated place names may not at all times be an "ancient" application, such place name-person accounts are common throughout Hawaiian traditions (as noted in the preceding mo'olelo); and the locational documentation within the "story of Ka-Miki" is of both cultural and historical value.

Valued Facets of the Cultural Landscape on the 'Āina Mauna

There is an ancient Hawaiian saying "Mauna Kea kuahiwi ku ha'o i ka māle" (Mauna Kea is the astonishing mountain that stands in the calm) (Pukui 1983: No. 2147), that suggests that Mauna Kea is a source of awe and inspiration for the Hawaiian people. Mauna Kea figures in a number of traditional accounts, and many of its place names are directly attributed to the interaction of gods with the land and people. The discussion under the heading of "Heiau (Ceremonial Sites) and Spiritual Significance," provides readers with an introduction to native Hawaiian beliefs surrounding the birth of the islands, and the prominence of Mauna Kea in Hawaiian genealogies—the mountain is a respected elder, a spiritual connection to one's gods. Thus, landscape can be interpreted as a significant facet of a Hawaiian's identity. Also, the discussions above, under the heading of Waiau, add further insight into the relationship of land to cultural practices, customs, and beliefs.

There are people today who tie the name Mauna Kea to that of Wākea, the forefather of the Hawaiian race and liken the mountain to one of his body forms. Native families also retain names such as Mauna Kea, Poli'ahu, Lilinoe, and Waiau, which in some cases are directly tied to the mountain landscape. All of the interview participants, regardless of cultural affiliation, expressed deeply rooted sentiments about seeing Mauna Kea and the mountain lands. Everyone spoke of their sense of spiritual well-being in either viewing, or being on Mauna Kea. And a number of the interviewees affectionately refer to Mauna Kea as "my mountain."

During the interviews, several interviewees lamented that their parents or grandparents had passed away before an interview process was undertaken. The families recounted that their elders knew the names of every pu'u; they knew of all the trails, various sites and features, and traditions of Mauna Kea. But because of the remoteness of the summit region and historic changes in native Hawaiian land tenure and practices associated with resource usage, the interviewees noted that their primary experiences in the summit region of Mauna Kea came from infrequent visits made with elders, or later on their own.

Thus, only limited site specific documentation of summit sites and place names was recorded. As a result of historic ranching, forestry, and hunting activities much of the site specific information recorded as a part of oral history interviews pertains to the elevations below the summit and reaching into the forest zone.

The 'Āina Mauna Described in Oral History Interviews

Since 1998, Maly has conducted some 40 interviews with more than 35 individuals who have lived upon, worked on, and in some cases had born on the 'āina mauna surrounding Mauna Kea. The interviews have been conducted in the context of knowledge of Mauna Kea—travel from the lowlands to the plateau lands surrounding the mountain, and up to the summit region—and to document activities undertaken as a part of traditional and cultural practices and historical ranching and forestry work. The interviewees included elder native Hawaiians and beneficiaries of the Hawaiian Home Lands Commission Act of 1920; elder cowboys, former employees of either the Parker or Shipman Ranches; former employees of the Territorial and State Forestry programs; and other kama'āina with cultural attachments and first hand experiences upon the 'āina mauna.

During the interviews, participants were asked about their knowledge of the cultural and historical landscape of the 'āina mauna—including knowledge of places; traditional practices and access; historical features and trails; ranching practices, and changes in the landscape. Primary interviewees ranged in age from their 50s to mid 90s, and all spoke from personal experiences, and the recollections of their own elders or other elder kama'āina with whom they traveled the mountain lands. The interviewee's personal experiences in the region dated from the early 1900s to the present day.

Overview of Documentation from Oral Historical Accounts by Maly and Maly

While many of the interviews cited in the original studies conducted by Maly and Maly (1999, 2002b & 2003) focused on knowledge of Mauna Kea, it was found that discussions of the high mountain lands could not be undertaken without first talking of how one got there, and the activities that took one to the 'āina mauna. Indeed, for most living interviewees today, travel to Mauna Kea was associated with the ranching, forestry, and hunting activities. By the time of undertaking this study, all of the elders—the parent and grandparent generations of the interviewees, who were born in the period between 1850 to 1900, and who traveled to Mauna Kea with their own elders—had passed away. In reading the interviews, it will be seen that a significant portion of the information recorded focuses on the mountain as a whole feature in the cultural and natural landscape, rather than focusing on specific regions or zones. This attachment to the mountain landscape is rooted in antiquity and remains important in the lives of native Hawaiians today, who attribute spiritual and cultural values to Mauna Kea.

The following narratives provide readers with an overview of the primary information recorded about many of the resources on the 'āina mauna, considered to be significant by interviewees. The site, resource, cultural significance, and documentation on practices has been separated into several general categories below. These categories provide readers with immediate access to key points raised by interviewees and consultation participants. Each of the primary topic categories are also divided into two sub-categories—information recorded in a formal interview and information recorded in consultation. Please note that while the information below provides readers with an overview of the cultural-historical information that was recorded as a part of earlier studies, the full interview transcripts and consultation records should be read for further details and to understand the context in which the information was discussed.

The Table on the following pages, provides readers with an introduction to many of the primary interviewees conducted by Maly over time. The list is presented in alphabetical order, and identifies the interviewee's background and time period of the interviews. In addition to the primary interviewees

identified in the Table, consultation interviews with several individuals have contributed to cultural-historical information pertaining to the 'āina mauna. Participants included, but were not limited to: John Hale, Emma Kauli, Gabriel Kealoha, Maile Kukahiko-Akimseu, Iopa Maunakea, and Ed Stevens. The information was discussed and recorded as personal communications.

Name of Interviewee	Year Born	Ethnicity	Birth Place	Male (M) Female (F)	Place of Residence	Year(s) and Number of Interviews and Comments
Johnny Ah San	1907	Chinese Portuguese	Laupāhoehoe	M	Laupāhoehoe (deceased)	1998 (2). Retired Mauna Kea Forestry employee.
Teddy Bell, Sr.	1923	Part Hawaiian	Waimea	M	Waimea (deceased)	1998 & 2003 (3). Retired cowboy and construction worker.
Lloyd Case	1949	Part Hawaiian	Waimea	M	Waimea	1998 (1). Hawaiian practitioner; construction worker; and subsistence hunter.
Rally Greenwell & wife, Pat Greenwell	1913 1924	Caucasian	Honokōhau	M F	Waimea	2000, 2002, 2003 (4). Began working the Parker Ranch lands in the early 1930s, and traveled to Mauna Kea with elder Hawaiian cowboys. Worked at Humu'ula Ka'ōhe and served as ranch manager in the 1960s-1970s.
Albert Kahiwhiwaokalani Haa Sr. & son, Albert K. Haa Jr.	1930 1953	Hawaiian	Kapoho	M M	Waiākea	1998 (1). Retired from Military and State corrections program; Hawaiian ranching family with ties to Mauna Kea.
Jess Hannah & niece, Barbara Ka'apuni Phillips-Robertson	1916 1936	Caucasian Part Hawaiian	Pennsylvania Waikī'ī	M F	Waimea	2002 (2). Former Parker Ranch water man on the mountain lands; married to descendant of Ka'apuni family with generational attachments to the 'āina mauna.

Name of Interviewee	Year Born	Ethnicity	Birth Place	Male (M) Female (F)	Place of Residence	Year(s) and Number of Interviews and Comments
Coco K. Vredenberg Hind & son, Robby Hind	1923	Part Hawaiian	Honolulu (raised in Waimea)	F	Hōlualoa (deceased)	1998 (2). Descendants of Hawaiian ranching family, with generational ties to the 'āina Mauna.
Toshi Imoto	1928	Japanese	Pū'u Ō'ō	M	Pāpā'ikou (deceased)	1998 (1). Retired Cowboy, Shipman Ranch
Kalani Ka'apuni Phillips	1902	Hawaiian	Waimea	F	Waimea (deceased)	1967. Participant in family interview with Larry K. Kimura (Maly, translator).
Kaleohano Kalii	ca. 1884	Hawaiian	Kohala	M	Lā'ie (deceased)	1956. Participant in Bishop Museum interview; it was the family tradition to take the piko of children to Wai'au.
Pualani Kanaka'ole Kanahele	1937	Hawaiian	Hilo	F	Pana'ewa	1998 (1). Hawaiian Educator, cultural practitioner; Ho'opa'a Kumu Hula.
Sonny Kaniho	1922	Hawaiian	Kawaihae uka	M	Waimea (deceased)	1998 (1). Retired Cowboy; Humu'ula Hawaiian Home-Steader. Kaniho, father of Sonny Kaniho mā, was one of the preeminent guides on Mauna Kea between 1915 to 1950.
Daniel Kaniho, Sr.	1932	Hawaiian	Waimea	M	Waimea (deceased)	1998 (1). Retired Cowboy; Humu'ula Hawaiian Home-Steader. Brother of Sonny Kaniho.

Name of Interviewee	Year Born	Ethnicity	Birth Place	Male (M) Female (F)	Place of Residence	Year(s) and Number of Interviews and Comments
Hisao Kimura & Elizabeth Lindsey-Kimura	1912	Japanese	Waimea	M	Waimea (deceased)	2003 (3). Began traveling to Mauna Kea in the 1930s. Mr. Kimura was the ranch and worked the Humu'ula-Ka'ohe lands. Mrs. Kimura's family has generational ties to the 'āina mauna and has maintained the practice of taking the piko of children to the piko of the mountain.
	1921	Hawaiian		F	Waimea	
Alika Lancaster & wife, Anita (Kamaka 'āia-Poli'ahu)-Lancaster	1930	Part Hawaiian	Hilo	M	Keaukaha	1998 (1). Mason; Hawai'i Loa descendant; Hawaiian practitioner. Poli'ahu-Hawai'i Loa descendant.
	1942		Moloka'i	F		
Ah Fat Lee & wife, Barbara Lee	1914	Chinese	Hālawā, Kohala	M	Kohala	2002 (2). Began working for Parker Ranch on the mountain lands in the 1930s; later from the 1950s to 1970s, Mr. Lee worked with the Territorial Fish and Game Division, living at Pōhakuloa, and traveling the mountain lands.
James Kahalelaumāmane Lindsey	1882	Hawaiian	Waimea	M	Waimea (deceased)	1966. Participant in family interview with Larry K. Kimura (Maly, translator).

Name of Interviewee	Year Born	Ethnicity	Birth Place	Male (M) Female (F)	Place of Residence	Year(s) and Number of Interviews and Comments
Kamaki Lindsey	1932	Hawaiian	Pu'u Wa'awa'a	M	Kaulana	2002 (2). Retired cowboy, worked the Wai'iki-Pōhakuloa ranch lands; descended from families who traveled to Mauna Kea, to deposit the piko of new born children at locations on the summit.
Irene Lindsey-Fergerstrom & Romona Fergerstrom-Kalalau and family members	1932	Hawaiian	Waimea	F	Waimea	1998 (1). Descendants of families with generational ties to Mauna Kea, and ongoing cultural practices. In between the 1950s to 1970s, the family lived on the mountain lands, as the late Mr. Fergerstrom was a Territorial Forester.
Pete L'Orange	1933	Part Hawaiian	Waipahu	M	Waimea	1998 (1). Retired Parker Ranch/Humu'ula Station manager; land use planner.
Judge Martin Pence	1904	Caucasian	Kansas	M	Honolulu (deceased)	1998 (1). Federal Judge; Mauna Kea Hunter (1930s-1970s).
Tita Spielman & son, J.K. Spielman	1924	Part Hawaiian	Waiākea	F	'Ōuli	1998 & 2004 (2). Parker-Low family descendants; remains of family members buried on Mauna Kea.
Hannah Kīhalani Springer	1952	Part Hawaiian	Ka'ūpūlehu	F	Ka'ūpūlehu	1998 (1). Hawaiian practitioner; historian.

Name of Interviewee	Year Born	Ethnicity	Birth Place	Male (M) Female (F)	Place of Residence	Year(s) and Number of Interviews and Comments
David Woodside	1924	Caucasian	Kapa'au	M	Waimānalo	2002 (1). Began traveling the mountain lands in the early 1940s, and went on to become a Territorial Forester, with job responsibilities covering the Humu'ulaka'ohē mountain lands of Mauna Kea.
Jiro Yamaguchi	1924	Japanese	Waimea	M	Waimea (deceased)	1998, 2002 & 2003 (3). Retired Parker Ranch cowboy. Traveled and worked the mountain lands from the 1930s to the 1990s.

A couple common issues surfaced from the interviews: Ceremonial Sites (located at the Mauna Kea summit region, not the 'Āina Mauna lands), Trails (which cross over the 'Āina Mauna Lands) and Burial Practices (again, primarily in the summit region, but could also have taken place at lower elevations.)

Heiau (Ceremonial Sites) and Spiritual Significance

In Hawaiian culture, natural and cultural resources are one and the same. Native traditions describe the formation of the Hawaiian Islands and the presence of life on and around them, in the context of genealogical accounts. All forms of the natural environment, from the skies and mountain peaks, to the watered valleys and plains, and to the shore line and ocean depths were the embodiments of Hawaiian gods and deities.

One Hawaiian genealogical account, records that Wākea (the expanse of the sky) and Papa-hānau-moku (Papa who gave birth to the islands)—also called Haumea-nuihānau-wā-wā (Great Haumea—Woman-earth born time and time again)—and various gods and creative forces of nature, gave birth to the islands. Hawai'i, the largest of the islands, was the firstborn of these island children.

As the Hawaiian genealogical account continues, we find that these same god-beings, or creative forces of nature who gave birth to the islands, were also the parents of the first man (Hāloa), and from this ancestor, all Hawaiian people are descended (cf. David Malo 1951:3; Beckwith 1970; Pukui and Korn 1973).

In some genealogical chants, Mauna Kea is referred to as “Ka Mauna a Kea” (Wākea’s Mountain), and it is likened to the first-born of the island of Hawai’i (Pukui and Korn 1973). In Hawaiian practice, elders are revered—they are the connection to one’s past—and they are looked to for spiritual guidance (interview with Tita and JK Spielman; Pua Kanahēle pers comm. Dec. 1, 1998 and interview Dec. 11, 1998; and Handy and Pukui 1977). In this case, Mauna Kea, the mountain landscape itself is a sacred ancestor.

Detailed documentation of the “ritual landscape” of Mauna Kea as recorded in archaeological surveys is documented in studies prepared by the State Historic Preservation Division (DLNR-SHPD).

- None of the interviewees recalled hearing the names of heiau or other ceremonial sites on Mauna Kea and the neighboring 'āina mauna.
- Alika Lancaster (as a participant), Albert K. Haa Sr. (and Jr.), and Lloyd Case (being told by elders) share accounts learned from elders of individuals going to the summit region of Mauna Kea to offer prayers.
- Members of the Haa family specifically describe the work of their kupuna, Ioane Haa, on Mauna Kea as being work of Akua (Gods). He retreated to Mauna Kea to worship in secrecy (in the old way), because to do so publicly was kapu.
- Alika Lancaster describes Mauna Kea as a sanctuary in ancient times. The area above the forest line was so sacred that once in the upper region, your enemies could not pursue you.
- Other interviewees feel that it is likely that worship occurred on Mauna Kea.
- All interviewees attributed spirituality and healing qualities to being on Mauna Kea, and several stated that they still go to Mauna Kea for prayer and restoration.

Pua Kanaka'ole-Kanahēle provides readers with detailed narratives of the spiritual significance of Mauna Kea, the Mountain of Wākea in Hawaiian traditions of creation. She observes that Mauna Kea is considered to be kupuna (elder), the first born, and is held in high esteem. In native traditions, Mauna Kea is identified as “Ka mauna a Wākea” (The Mountain of Wākea—traditional god and father of Hawai’i—who’s name is also written “Kea”). There are many mele ali’i (chiefly chants) that identify Mauna Kea as foremost in the genealogies of the ali’i. Mauna Kea is the source of a high sense of spirituality. It is the ‘āha ho’owili mo’o (genealogical cord that ties earth to the heavens). (MKAC meeting Dec. 1, 1998 and interview of December 11, 1998)

Trails and Access

In the period leading up to the mid 1800s, travel to Mauna Kea was done on foot, along a system of trails that crossed the mountain lands. By the later nineteenth and early twentieth centuries, those trails were often traveled on horseback, and while fewer of the trails were used, travel still generally occurred on traditional trails. The trails of Mauna Kea are unique features that linked communities and cultural and natural resources together.

To reach the summit, people departed the near-shore and plains lands, and traveled the mountain slopes to the summit region. Thus, the signature or evidence of visitation and site use from pre-contact and through the historic period, has been recorded across the mountain. Family traditions pertaining to journeys on the mountain trails, and knowledge of Mauna Kea—handed down by elders—are still retained as important family history today. A number of the interview participants still travel to Mauna Kea for spiritual well-being and recreational opportunities.

- Interviews with James K. Lindsey, Johnny Ah San, Hisa and Elizabeth Lindsey-Kimura, Teddy Bell, Sr., Rally Greenwell, Sonny and Daniel Kaniho, Toshi Imoto, Ah Fat Lee, Alike and Anita Lancaster, Albert K. Haa Sr. (and Jr.), David Woodside, Irene Lindsey-Fergerstrom (with Romona Fergerstrom-Kalalau and relatives of the Lindsey-Kealamakia line), and Lloyd Case, provided descriptions of trail systems that approach Mauna Kea from all sides of the mountain. Several of these trails were still traveled by the interviewees in their youth, or were described by their elders who still used the trails through the 1930s. Two of the trails, the Makahāla-kemole-Waiālu Trail, Waikī'i-Pu'u Lā'au-Waiālu Trail (interviews with Kahalelaumāmane Lindsey and Teddy Bell, Sr.) are generally unknown to most people today. Another important trail described in the interviews is the Lauphohoe-Waipunalei-Keanakolu Trail to the summit of Mauna Kea (interviews with Johnny Ah San).
- Of particular interest to the history of trail use is the fact that many of the trails converge at Waiālu (reference interviews cited above). The trails ascend the slopes of Mauna Kea from nearly all the major-, and many-smaller ahupua'a which lie upon Mauna Kea. Testimonies gathered by the Commission on Boundaries from native informants in the 1870s (see excerpts earlier in this study), describe ahupua'a-specific rights of use and collection of resources from the forests and flat lands surrounding Mauna Kea, and to the slopes and summit region of the mountain. Historical accounts, and oral history interviews document that at certain on the 'āina mauna, travelers and practitioners would stop to offer prayers. The different trails leading up the mountain indicate that people from various regions of the island had reasons to visit Mauna Kea as well.
- Elizabeth Lindsey-Kimura, Irene Lindsey-Fergerstrom (and relatives of the Lindsey-Kealamakia line, including elders recorded in 1966 & 1967), Teddy Bell, Sr., and Kamaki Lindsey shared family traditions of travel along the trails of Mauna Kea. They also shared accounts of a visit made by Queen Emma to Mauna Kea in ca. 1881. The Queen was led by William Seymour Lindsey, and as a result of his help to her, the Queen named one of the Lindsey children "Kahale-lau-māmane" (The house made of māmane leaves.) The name commemorates an event that occurred on the ascent to Mauna Kea.
- Albert K. Haa Sr. (and Jr.), Alike and Anita Lancaster, and Lloyd Case, shared information that their elders traveled the Mauna Kea trails to worship in the summit region and gather water from Waiālu. The water was used for healing and ceremonial practices.
- Teddy Bell, Sr., Sonny and Daniel Kaniho, Tita Spielman (with JK), Albert K. Haa Sr. (and Jr.), Alike Lancaster, Barbara Ka'apuni Phillips-Robertson, and William Akau provided information they learned from their elders about travel to Mauna Kea to procure stone for adze making, which occurred in ancient times.
- Johnny Ah San also recalled information about the practice as he learned of it from old native informants.
- Toshi Imoto, Tita Spielman (with JK), Daniel Kaniho, Johnny Ah San, and Lloyd Case provided information about the use of the Mauna Kea-Humu'ula Trail (later the Mauna Kea Road) for the purpose of taking individuals ash remains to the summit of Mauna Kea for release.
- Martin Pence, Johnny Ah San, Rally Greenwell, Sonny and Daniel Kaniho, Theodore Bell, Toshi Imoto, Albert K. Haa, Sr. (and Jr.), Alike Lancaster, Pete L'Orange, David Woodside, Ah Fat Lee, and Lloyd Case provided detailed discussions of their own use of trails on Mauna Kea. Use was primarily associated with Territorial Forestry operations, ranching, hunting, and recreational activities.

- William Akau, a Kawaihae native, learned from his elders of the traditional use of a Mauna Kea trail. The trail was situated on the north-western slope of the mountain, and reached by individuals from other islands, who landed their canoes in the Kīholo vicinity and went to Mauna Kea to gather adze making stones from the summit region.
- John Hale and Gabriel Kealoha, native residents of the Puna District, learned from their elders that families of Puna traveled to the upland koa forests on Mauna Kea and made canoes there. They then returned to the shore with the canoes, and traveled back to Puna by sea.
- Ed Stevens describes the use of trails ('Umikoa and Waipunalei) by priests traveling to Mauna Kea for ceremonies.
- Maile Akimseu testified that her kūpuna walked the trails on Mauna Kea (noting that part of her genealogy ties back to 'Umi-a-Liloa; with whom the 'Umikoa-Mauna Kea Trail is associated).
- While most interviewees were unfamiliar with the 1870 alignment of the Government Road between Hilo, Kalai'ēha and Pu'u Ō'ō—they had not personally traveled it—Toshi Imoto had been told of the trail by his father, who in the period from ca. 1890 to the turn of the century, had traveled it and even driven pigs from Governor Baker's Puu Oo Ranch to Hilo on the route. Johnny Ah San also traveled the trail when employed by L. William Bryan in the CCC; and in a field visit, pointed out various locations that the old route could be seen from, or intersected the present-day Saddle Road.
- Interviewees, Rally Greenwell, Teddy Bell, and Toshi Imoto all traveled the Pu'u Ō'ō-Āina Hou-Keaouhou Trail as a part of ranching operations, but indicated that after 1940, most travel between ranch stations at Keaouhou and Kahuku, in Ka'u and the Hilo stations, was facilitated through use of vehicles. Johnny As San and David Woodside traveled the route as far as Keaouhou and Kahuku, while conducting work for the CCC or Territorial Forestry Division.
- It was noted by nearly all interviewees, that between 1900 to 1940, travel on the mountain lands surrounding Mauna Kea and Mauna Loa, was carefully controlled by the ranches and L. Bill Bryan of the CCC and Territorial Forestry programs (Figure 21). Hunting, except for official ranch and forestry programs was almost non-existent until after the 1940s, when the Territorial program was organized. While access to the mountain lands was controlled, it also appears from the interview records, that many of those families who had attachments to the 'āina mauna were also tied to the ranches, thus access was not an issue.

Pā Ilina (Burial Practices and Sites)

All of the interviewees who were asked about their feelings of the treatment of ilina (burial sites), expressed their desire that ilina be protected in place. While none of the interviewees reported knowing of specific locations of burials in the immediate area of the Mauna Kea summit, many spoke of ilina in cinder cones, and other natural features in the region extending from about the 12,000 to 7,000 foot elevation. The presence of many burials on Mauna Kea, ranging from the summit region to the forest zone was recorded as early as 1873 in testimonies before the Boundary Commission, with subsequent documentation in the 1880s and 1890s by surveyors and historic visitors (see historical documentation in this study). Knowledge of the occurrence of burials on Mauna Kea and the 'āina mauna has been handed down through present times.

- Alike and Anita Lancaster, Sonny and Daniel Kaniho, Albert K. Haa Sr. (and Jr.), Lloyd Case, and Irene Lindsey-Fergerstrom (with Romona Fergerstrom-Kalalau and relatives of the Lindsey-Kealamakia line) shared their understanding that the individuals buried on Mauna Kea were of an elite class, and considered sacred.

- Alikea Lancaster further records learning from his elders that all the high mountain pu'u contain ilina (burials).
- Johnny Ah San, Sonny and Daniel Kaniho, Alikea Lancaster, and Lloyd Case share first hand knowledge of the presence of ilina at several of the pu'u on Mauna Kea, including but not limited to—Mākanaka, Kaupō, Pu'u Loa, Kanakaleonui, Keanakolu, Pu'u Kihe, Pu'u Kālepa, Pu'u Mali, and Kemole.
- Albert K. Haa Sr. (and Jr.), and Pete L'Orange have heard of the presence of ilina on Mauna Kea from elders.
- Albert K. Haa Sr. (with his son), expressed the thought that his great grandmother (the wife of loane) was buried somewhere on Mauna Kea.
- Tita Spielman (with JK), Toshi Imoto, Johnny Ah San, Sonny and Daniel Kaniho, Theodore Bell, and Lloyd Case stated that since 1954 several family members or close friends of theirs have had their cremated remains taken to the summit of Mauna Kea for release.
- The ashes of Tita Ruddle-Spielman's grandfather (Eben Low) and her mother and father (Annabelle and Albert Ruddle), were taken to the summit of Mauna Kea to be released. Tita (with JK) stated that until a few years ago she was going to have her own ashes taken there as well. But because of the amount of development on the summit, Tita changed her plans and so notified her children.

While cremation of remains is not a traditional Hawaiian practice, the practice of taking loved one's remains to special landscapes—considered to be the realm of the gods—is an ancient Hawaiian custom. Today, the burial of family remains at a place such as one of the pu'u of Mauna Kea may not be feasible. Yet the depth of and on-going cultural attachment to landscape remains strong. Thus, the traditional practice of interment in special landscapes has been adapted to allow for its continuation (see also the interview with Pua Kanaka'ole-Kanahele for further discussion on the cultural significance of this practice).

All interviewees who were asked, specifically stated that burial remains should be protected in place. Both Teddy Bell and Alikea Lancaster worked on the original road and telescope pads in the mid 1960s, early 1970s. They stated that during that time, they did not see, or hear of burial sites being disturbed as a part of construction activities. Iopa Maunakea's kūpuna taught him that the reason people were buried atop Mauna Kea was because they desired to be close to Akua (God).

Outreach and Consultation During the Preparation of the 'Āina Mauna Legacy Program

Several Consultation meetings were held with DHHL beneficiaries during the preparation of the 'Āina Mauna Legacy Program. In addition, multiple outreach and public meetings were held where various people provided input and feedback to the 'Āina Mauna Legacy Program document.

Following is a summary of the Outreach and Consultation activities:

Hawaiian Homes Commission Informational Workshops (public meetings):

- Kona on June 22, 2009
- Waimea on September 21, 2009
- Kalaheo on December 14, 2009

Beneficiary Consultations (public meetings):

- Waimea on September 23, 2009
- Hilo on September 25, 2009 (Hilo High School)
- Hilo on October 14, 2009 (Kauakaha Elementary School)

(Invitation letters were sent to over 5,000 Hawai'i Island beneficiaries by mail; over 2,500 postcards were mailed to Hilo addresses for the second Hilo meeting)

Office of Hawaiian Affairs (OHA) (Statewide radio program)

On September 14, 2009, Hawaiian Homes Commission Chairperson Kaulana Park and Peter Young (Ho Okuleana LLC) participated in a statewide OHA radio program with Jonathan Scheuer and discussed the 'Āina Mauna Legacy Program.

Office of Hawaiian Affairs (public meetings)

On October 28, 2009, the OHA Beneficiary Advocacy and Empowerment (BAE) Committee (which includes all OHA Trustees) was given a briefing on the 'Āina Mauna Legacy Program. The OHA BAE Committee met again on November 18, 2009 and discussed and provided support for the 'Āina Mauna Legacy Program.

'Āina Mauna Legacy Program Advisory Group

The Advisory Group was formed to provide advice and recommendations in identifying the optimum land use, infrastructure patterns, best management practices and estimated financial requirements to achieve the goals of the 'Āina Mauna Legacy Program.

Advisory Group members served as liaisons between their constituents and communities, as well as helped with outreach to their respective communities on behalf of the 'Āina Mauna Legacy Program. An Advisory Group site visit of the area was held on June 30, 2009 and video conferences with the group were held on August 19, 2009 and November 2, 2009. Advisory Group members were e-mailed multiple drafts of portions of and the entire Legacy Program document throughout the process.

Advisory Group members included: George Applegate, Dr. Sam Gon, Dr. Jim Jacobi, Guy Kaniho, Duke Kapuniai, Kanani Kapuniai, John Kekua, Julie Leialoha, Sheri Mann, Kapua Sproat and Ed Stevens

DHHL Website

The 'Āina Mauna Legacy Program informational documents were posted on the DHHL website and sent to numerous Hawaiian, environmental, government and non-profit agencies for comments and feedback. Responses to comments from the various beneficiary consultation meetings are posted on the DHHL website, as are the Pre-final Executive Summary and full document.

The following are summaries of issues, questions and comments that came from the consultation process.

Waimea Consultation Meeting - 09/23/09 - Response to Questions/Comments

Approximately 30 people attended the September 23, 2009 Waimea DHHL Beneficiary Consultation meeting at Kuhio Hale. The following are questions and comments raised at the meeting. Each was responded to and, for the most part, the information was noted to already be contained in the report.

The responses on the right column reflect the response at the meeting, as well as generally stated in the report.

Homesteading	A small portion of that property has lava, near the road. Homesteads would be built away from the road, so this area would serve as a buffer to the road.
Program Process	The Program is based on several past studies. Ho'okuleana LLC was hired to write the Program and is the consultant for this project. During the development of the 'Āina Mauna Legacy Program, the 'Āina Mauna Legacy Program Advisory Group was formed to provide advice and recommendations in identifying the optimum land use, infrastructure patterns, best management practices and estimated financial requirements to achieve the goals of the 'Āina Mauna Legacy Program. Group members served as liaisons between their constituents and communities, as well as helped with outreach to their respective communities on behalf of the 'Āina Mauna Legacy Program. Additionally, the draft Executive Summary is posted on the DHHL website and the draft Program has been circulated to many different entities including native Hawaiian, environmental, and community groups. We would like to bring the Program before the HHC in November. Once it has been approved we would like to begin implementation immediately. The Program identifies 12 Initial Immediate Actions which would begin immediately: • Form the 'Āina Mauna Legacy Program Implementation Advisory Council • Initiate the first rural-development Homestead Area (on south-eastern portion of the property) • Initiate the Humu'ula Sheep Station Adaptive Reuse Plan • Initiate expanded Ecotourism opportunities • Initiate use of Remote Accommodations • Initiate gorse eradication (consider all viable gorse eradication opportunities, with commercial timber appearing to be the most viable and beneficial to the Department) on approximately 10,000-acres or other viable gorse eradication opportunities • Investigate and implement additional areas for sustainable koa forestry opportunities • Initiate a set-aside of portions of the property for restoration and enhancement purposes
Who were the different parties involved in the process? Who drew up the plan? Who was involved?	
What is the timetable for the Program? When will beneficiaries get on to the land?	

• Pasture uses (focused on fire fuel mitigation - additional acreage) around Keanakolu/Mana, Saddle and Mauna Kea Access Roads • Initiate unmanaged-ungulate eradication over entire property • Initiate state, federal and private grant applications to support resource restoration • Initiate Safe Harbor Agreement to address endangered species over the entire property	One of the central focuses of the 'Āina Mauna Legacy Program is that the activities and programs implemented need to be economically self-sustaining, with the goal to reinvest the revenue into the management of the property and implementation of the Program. In considering revenue generation, several opportunities exist including expansion of the existing commercial koa sales, adaptive reuse the Humu'ula Sheep Station, Ecotourism and others. The Program will also initiate State, Federal and Private Grant Applications to Support Resource Restoration including: • Conservation Resource Enhancement Program (CREP) • Partners for Fish and Wildlife • Wildlife Habitat Incentives Program (WHIP) • State Forest Stewardship Program (FSP) • Watershed Partnership Program (Mauna Kea Watershed Alliance) • Army Compatible Use Buffers Program The Program will seek separate earmarked funds through State and Federal funding sources. Due to limitations in Federal regulations, Na Kupa'a O Kuhio should be considered to take advantage of Federal funding opportunities
What funding is available? Who will get the money?	

Commercial Forestry to Eradicate Gorse	
Gorse should be eradicated first! How do you know Sugi and Eucalyptus will work? Why not plant native trees like 'nalo? Won't native trees work better with the ecosystem? The Program looks to begin gorse eradication as soon as possible. It will be one of the first actions taken, once the Program is approved. The Program suggests timber to fight gorse but also allows for other viable gorse eradication opportunities. Interim commercial-scale timber planting can serve both as a gorse eradication mechanism, as well as an income generator. Eucalyptus and Sugi have been proposed because they have proven successful in fighting gorse and others are willing to pay rent in order to plant and manage the trees. The existing development of these crops in the general area have given rise to increased investment in required infrastructure including	

	marketing and market development efforts by a number of public and private entities. Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. Eradication of this noxious plant, that has already rendered thousands of acres useless, is an essential component in any land use and management plan for these lands. Gorse has a life span of 30 to 40-years while the seed can remain viable in the soil for up to 70-years after that. DHHL field trials and research projects have shown that shade from trees inhibit the ability for gorse to grown and spread. It is anticipated that commercial-scale timber planting (the initiation of Gorse Eradication Utilizing Commercial Timber - to include biomass for alternative energy on approximately 10,000-acres) will shade the gorse sufficiently to keep it from producing seeds and perhaps kill it. With normal forestry operations, each year some portion of the seed bank will be removed. Shading has proven to be a method for killing gorse, and also generates revenue for the department however, if other viable gorse eradication processes are developed, they will be considered as well. DHHL field trials and research projects have shown that shade from native trees species such as koa are not effective on gorse because they do not produce enough shade. Eucalyptus, sugi or others trees are selected to eradicate and control the gorse; once the gorse eradication process is well underway, the area is to be reforested back to a native koa.
Feral Ungulates Wild pigs are part of the ecosystem; won't eradicating them hurt the environment?	- Unmanaged-ungulates (hoofed mammals such as cattle, sheep, pigs, goats, etc) introduced to Hawai'i can be detrimental to Hawai'i's native ecosystems via the damage they can inflict on both vegetation structure and composition. - Ungulates impact native plants and ground cover, facilitating sediment run-off - Soil disturbance caused by rooting ungulates also facilitates the introduction and expansion of invasive plants and creates breeding grounds for mosquitoes that transmit avian disease to native forest birds. - Feral Ungulates can have high population growth rates

	- Feral Ungulates are elusive and can jump or circumvent most existing fences. - Four main components in successful Feral Unmanaged-Ungulate population control (primarily sheep, cattle and goats) - Establishment of Barriers to Isolate Populations - Remove sufficient numbers of animals to prevent unacceptable damage to the land and its resources - Barrier Installation, Inspection and Maintenance - Vigilance in Monitoring of Animal Population Increase and Ingress - Methods for Removal of Feral Unmanaged-Ungulate Populations - Beneficiaries Capture - Professional Capture - Professional Eradication - Ultimately, additional Fencing is required to exclude ungulates from sensitive areas - Additional Roadways will need to be added for access (also serving as beneficial fire breaks) - Implementing unmanaged-ungulate eradication (primarily sheep, cattle and goats) and allowing management of pigs (so long as the resources are protected) will provide food for beneficiaries, reduce the impacts to the forest resources and generate revenue for the Trust.	
Water Where is the water going to come from? Will the current reservoir be used? Can homesteads survive on catchment?	Initial water will come from catchment. The area for homesteading fits within the County's required rain amount for a catchment system. A well will also be explored, although its cost (it could be in excess of \$5 million) makes it not an immediate choice or option. Water Resource Management and Planning will include the following Water Source Opportunities: - Investigate reported springs and restoration to supplement water needs - Rainwater Capture/Collection - Catchment (water tanks) for small scale residential, pasture - Reservoirs for larger scale collection - Fog drip to supplement rainwater catchment - Investigate groundwater wells (deep well) - Initial exploratory well above the Sheep Station	

With more forests won't there be more water?	We believe that increased forest cover will result in water resources benefits. The lands of Humu'ula and Pi'ihonua represent the most important native forest areas remaining in the DHHL trust. Based on soil, elevation, and rainfall characteristics, there are an estimated 17,800-acres in Humu'ula and adjacent Pi'ihonua mauka that could be restored back to a healthy, diverse native koa and 'ohi'a forest ecosystem. Likewise, there are approximately 10,000-acres across the mauka portions of the property that can be restored to māmane forest, a critical Palila bird habitat. There are strong recommendations to enhance and restore various areas in the overall property because of their importance as habitat, biodiversity and condition (and ability to restore) as native forest. The setting aside, protection and restoration of these areas is critical for the protection, restoration and enhancement of 'Āina Mauna.
Pasture What will the process be for pasture areas?	Dispositions of Homestead and Pasture Leases, Licenses and/or RPs: • Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu'ula/Pi'ihonua come under existing DHHL planning, design, development, funding, disposition and management. • These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses • While the Homestead lots will be rurally-developed, due to the areas remote location and lack of traditional infrastructure, the cost of development is likely to be significant and beyond the scope and capacity for the remaining revenue-generating opportunities proposed on the property.
Other Is Parker Ranch liable for gorse since they had the last lease? Is this Program consistent with the Hawai'i Island Plan?	The Program is moving forward with gorse eradication as described above. The department is free to pursue remedies outside of the Legacy Program. The 'Āina Mauna Legacy Program is consistent with the Hawai'i Island Plan.

Hilo Consultation Meeting - 09/25/09 - Response to Questions/Comments

Approximately 30 people attended the September 25, 2009 Hilo Beneficiary Consultation meeting at the Hilo High School Cafeteria. The following are questions and comments raised at the meeting. Each was responded to and, for the most part, the information was noted to already be contained in the report. The responses on the right column reflect the response at the meeting, as well as generally stated in the report.

Pasture What DHHL programs are in place now for agriculture/community pasture? Has the long term pasture area noted on the map been studied? Is it sustainable for cattle?	According to DHHL, Moloka'i uses a community pasture program and it has been successful. Previous tries at community pasture on Hawai'i Island have apparently not been as successful. However, the Program is open to a variety of scenarios, with community pasture being only one of the options or combinations of options for management. The pasture area west of Humu'ula Sheep Station was previously used by Parker Ranch and identified as good for pasture. According to the Ranch, this area was an ideal place for birthing cattle and it was used accordingly.
Commercial Forestry to Fight Gorse Are there other ways to eradicate gorse besides commercial timber? The emphasis on commercial timber seems to give a precedent for commercial timber, not other options. Why not use native trees to control gorse?	The Program suggests timber to fight gorse but also allows for other viable gorse eradication opportunities. Interim commercial-scale timber planting can serve both as a gorse eradication mechanism, as well as an income generator. Eucalyptus and Sugi have been proposed because they have proven successful in fighting gorse and others are willing to pay rent in order to plant and manage the trees. The existing development of these crops in the general area have given rise to increased investment in required infrastructure including marketing and market development efforts by a number of public and private entities. Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. Eradication of this noxious plant, that has already rendered thousands of acres useless, is an essential component in any land use and management plan for these lands. Gorse has a life span of 30 to 40-years while the seed can remain viable in the soil for up to 70-years after that. DHHL field trials and research projects have shown that shade from trees inhibit the ability for gorse to grown and spread.

	It is anticipated that commercial-scale timber planting (the initiation of Gorse Eradication Utilizing Commercial Timber - to include biomass for alternative energy on approximately 10,000-acres) will shade the gorse sufficiently to keep it from producing seeds and perhaps kill it. With normal forestry operations, each year some portion of the seed bank will be removed. Shading has proven to be a method for killing gorse, and also generates revenue for the department however, if other viable gorse eradication processes are developed, they will be considered as well. DHHL field trials and research projects have shown that shade from native trees species such as koa are not effective on gorse because they do not produce enough shade. Eucalyptus, sugi or others trees are selected to eradicate and control the gorse; once the gorse eradication process is well underway, the area is to be reforested back to a native koa. The RFQ/RFP process will be designed to provide for the best overall benefit to the department. The recommendation is to solicit proposals for a timber license for the planting and harvesting of commercial non-native tree species (i.e. eucalyptus, sugi or other) that will first serve to fight the gorse, but will also provide valuable wood products for a variety of uses which can include: • Lumber • Wood chips • Veneer • Forest products • Biomass for alternative energy opportunities (liquid fuel and electricity) Additionally, DHHL would retain rights to any Carbon Credit opportunities. The RFQ/RFP process would be initiated to find interested parties in commercial forestry. The Program does not anticipate allowing a processing plant. Additionally, Best Management Practices and other precaution will be made if hauling lumber off the mountain is anticipated.
What would "Commercial forestry" look like? Will trucks be hauling lumber off the mountain or will there be a processing plant? How much revenue can DHHL make thru commercial timber?	
Native Forest Restoration	
What is the plan to restore the māmane forest?	The lands of Humu'ula and Pihonua represent the most important native forest areas remaining in the DHHL trust. Based on soil, elevation, and rainfall characteristics, there are an estimated 10,000-acres across the mauka portions of the property that can be restored to māmane forest, a critical Pālia bird habitat. There are strong recommendations to enhance and restore various areas in the overall property because of their

	importance as habitat, biodiversity and condition (and ability to restore) as native forest. The setting aside, protection and restoration of these areas is critical for the protection, restoration and enhancement of 'Āina Mauna. Wildlife corridors help provide a contiguous habitat from the lower koa forest to the higher elevation māmane forest to facilitate the migration of native forest birds between these habitats. Additional Fencing, excluding and removing ungulates, would allow existing trees to produce and maintain root shoots and basal sprouts, thereby increasing foliage and subsequent tree processes. Centralized plant propagation, staging and storage facilities will be located at Kanakaleonui Bird Corridor and north of Pu'u 'Ō'ō. These propagation centers will be used for both the native forest restoration and sustainable koa forests. Replanting efforts would focus on a mosaic of 'islands' using combinations of native plants grouped together (for example, pūkiawe, pilo, 'ā'ali'i and 'ohelo may be planted together) that will grow outward until they all connect into one diverse native forest. Māmane (mauka areas) trees would then be planted around the existing shrubs so that they can utilize the beneficial traits of the 'islands.' Continued research is necessary to effectively evaluate the various experimental methods of out planting. Experimental plots should be established to be used for this research.
Homesteading	
What is meant by "new model" for future homesteading?"	The Program has been revised to further explain this concept. Instead of "a new model", the language has been revised to "an option". Once the gorse eradication process is well underway, the homesteading area will be planted with koa for reforestation. This area includes the significant portions of the site that are proposed for sustainable koa restoration. The forested areas also provide DHHL with an option for future agricultural homesteading. Once the koa restoration is accomplished, DHHL will have the opportunity to consider creation of agricultural homesteads using forestry for beneficiaries. Homesteaders would be responsible to control ungulates, gorse and other invasive species in the homestead area. The commercial koa forest management operations can continue, with

	the DHHL and beneficiaries benefitting directly from the commercial sale of koa.
Who will be able to sign up for homesteads?	Dispositions of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions: • Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu'ula/Pi'ihonua come under existing DHHL planning, design, development, funding, disposition and management. • These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses • While the Homestead lots will be rurally-developed, due to the areas remote location and lack of traditional infrastructure, the cost of development is likely to be significant and beyond the scope and capacity for the remaining revenue generating opportunities proposed on the property.

Koa Forestry	
Will the initial homesteading area need to be planted with koa? Is there koa there now?	There are scattered koa trees in the area now. Koa planting would begin immediately in the form of koa forest restoration. Koa is one of the predominant tree species found naturally in the Humu'ula/Pi'ihonua lands. It is presently the highest value timber crop in Hawai'i. It grows easily and well in this area if introduced ungulates are removed. Restoring the Humu'ula/Pi'ihonua lands to koa through carefully planned and managed reforestation is its highest and most compatible economic use. Based on soil, elevation, and rainfall characteristics, there are an estimated 10,000 acres in Humu'ula and adjacent Pi'ihonua mauka that could be restored and managed under a sustainable koa forest harvesting regime. A restored sustainable koa forest provides several opportunities and options for future decision-making by DHHL. • A sustainable koa forest would provide jobs and generate income to the DHHL trust. • Once a sustainable koa forestry operation is in place, portions of the property could be considered for future agricultural (sustainable koa forested) homestead opportunities, affording homesteaders a sustainable koa forest as a part of their homestead.

Other	
What is the elevation?	Elevations range from approximately 4,500 to 9,000 feet mean sea level.
There are three springs on the property? Where are they?	The three springs are reported to be near Pu'u 'Ō'ō Ranch.

Hilo (Keaukaha) Consultation Meeting - 10/14/09 - Response to Questions/ Comments

Approximately 35 people attended the October 14, 2009 Hilo Beneficiary Consultation meeting at the Keaukaha Elementary School Cafeteria. The following are questions and comments raised at the meeting. Each was responded to and, for the most part, the information was noted to already be contained in the report. The responses on the right column reflect the response at the meeting, as well as generally stated in the report.

Homesteading How big are the homesteads lots going to be?	A significant portion of the property (4,500-acres) is proposed for immediate homesteading. The concept is to develop the first rural-development Homestead Area for DHHL beneficiaries in the south-eastern portion of the property. The Legacy Program describes general ideas about subsequent development with specific design, sizes and layout to be determined during the implementation process. Preliminary design concepts call for a subdivision layout encompassing approximately 1,000-acres with a total of approximately 100 to 200-homesteads sites and other community uses. To take advantage of opportunities to further demonstrate the focus on efficient, self-sustainable communities, as well as provide for cost-effective development, the Legacy Program considers a variety of homestead development layouts to address various beneficiary needs: cluster homestead sites with separate agricultural/pasture lots, cluster homestead sites with community agricultural/pasture, homestead lot subdivision or a combination of alternatives. It is envisioned that these alternatives will enable DHHL beneficiaries to have sufficient land for self-sustaining homesteading: land for a home site and related improvements/uses, including land for alternative energy for their use, pasture, agricultural uses, and land available for subsistence farming. The Legacy Program also calls for an additional 10,000-acres that may be considered for future homesteading opportunities after the gorse in the area has been eradicated.
Who is going to finance the homesteaders for the homestead lots? What about families who have residential homesteads now but have always wanted this type of opportunity for a homestead?	Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions: Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu'ula/Pi'ihonua come under existing DHHL planning, design, development, funding, disposition and management.

	These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses Due to the area's remote location and lack of traditional infrastructure, the cost of development is likely to be significant and beyond the scope and capacity for the revenue generating opportunities proposed from the property, so the implementation will be through the typical homestead development process of the Department. The Program envisions all three types of homesteading being available for consideration. We would like to bring the Legacy Program for approval by the HHC in November. Once it has been approved we would like to immediately begin implementation. The Legacy Program describes general ideas about subsequent development with specific design, sizes and layout to be determined during the implementation process. Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of developments and dispositions.
Under which category will the homesteads fall (residential, agriculture, pastoral)? How long before the homestead awards are given out?	
Pasture How big are the pasture lots going to be?	Additional acreage propose for pasture use covers approximately 4,000-acres (these land areas are approximate references) - with about 2,000-acres designated for pasture along the Keanakolu-Mana Road and another 2,000-acres on the west side of the Mauna Kea Access Road (below the Radio Tower site and fronting Saddle Road and Mauna Kea Access Road.) These areas proposed for additional acreage for pasture use are consistent with the Fire Plan and are proposed to be immediately available for beneficiary use. Additional acreage pasture use could also be in the form of Community Pasture. The Legacy Program describes general ideas about subsequent development with specific design, sizes and layout to be determined during the implementation process. Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions. Since 2005 the Department has taken an active role at looking into the needs of Beneficiaries in regard to pasture use. The Honokaia model assesses how much land Beneficiaries need for pasture and distributes pasture land accordingly. Thus, it is incumbent upon the lessees to utilize their land accordingly.
Beneficiaries are allowed 300 acres of quality pastoral and 1,000 acres of additional acreage, how does that fit with only 4,000 acres of pasture?	

	Dispositions of Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions.
The proposed pasture lands are marginal.	The Pasture Recommendations at Humu'ula for Controlling Wildfire Fuels report indicates ideal grazing areas south of the gorse infestation and along Keanakolu Road where fuels would be reduced, gorse movement would be minimized, best AUY's exist, and natural recovery of adjacent lands could continue. Best AUY analysis in this report was based upon the 1997 Summary Appraisal Report for former Parker Ranch lease GL 201 and conversations with Parker Ranch employees. Additionally, the pasture area west of Humu'ula Sheep Station was previously used by Parker Ranch and identified as good for pasture. According to the Ranch, this area was an ideal place for birthing cattle and it was used accordingly. The Program envisions a variety of uses on site including agriculture, pasture and native forest restoration. Fencing and management will be an integral part of the program in order to prevent the various uses from impacting each other.
If the goal is to feed people, cattle are not the best thing. Maximize the use of the land by having food crops. Cattle do not mix well with native forests.	
Commercial Timber How long before sugi/eucalyptus is planted will it be harvested? When will we see results? Will the land be "tied up" in commercial timber for 75-100 years?	The Program suggests timber to fight gorse but also allows for other viable gorse eradication opportunities. Interim commercial-scale timber planting can serve both as a gorse eradication mechanism, as well as an income generator. Eucalyptus and Sugi have been proposed because they have proven successful in fighting gorse and others are willing to pay rent in order to plant and manage the trees. The existing development of these crops in the general area have given rise to increased investment in required infrastructure including marketing and market development efforts by a number of public and private entities. Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. Eradication of this noxious plant, that has already rendered thousands of acres useless, is an essential component in any land use and management plan for these lands. Gorse has a life span of 30 to 40-years while the seed can remain viable in the soil for up to 70-years after that. DHHL field trials and research projects have shown that shade from trees inhibit the ability for gorse to grow and spread.

	It is anticipated that commercial-scale timber planting (the initiation of Gorse Eradication Utilizing Commercial Timber - to include biomass for alternative energy on approximately 10,000-acres) will shade the gorse sufficiently to keep it from producing seeds and, depending on the species selected, perhaps kill it. With normal forestry operations, each year some portion of the seed bank will be removed. Shading has proven to be a method for killing gorse, and also generates revenue for the department. However, if other viable gorse eradication processes are developed, they will be considered as well. DHHL field trials and research projects have shown that shade from native trees species such as koa are not as effective on gorse because they often do not produce enough shade. Using native overstory species such as 'ōhi'a and koa as an option to eradicate gorse is also limited by the high elevations of the gorse infestation areas. Frost in these areas frequently kill out-planted native species that are not frost tolerant, such as koa. Creating an overstory that is frost tolerant and creates heavy shade will both eradicate gorse and create a more favorable environment for future conversion to a native forest. Such an overstory will maximize frost-free days. Eucalyptus, sugi or others trees are selected to eradicate and control the gorse; once the gorse eradication process is well underway, the area can then be gradually reforested back to a native species. The commercial forestry to eradicate gorse and the sustainable koa forest areas will create an environment friendly to certain bird and bat species. Since the program's goal is to restore the area to native koa forest after the gorse has been eradicated, it is essential that the program be allowed to take proactive management steps which in some cases may cause a temporary loss of habitat for bird species. Because the activities proposed in the 'Āina Mauna Legacy Program could affect habitat for threatened and/or endangered plants, birds and animals, it is recommended that a blanket Safe Harbor Agreement be developed and incorporated into the Legacy Program. Since one of the goals of the 'Āina Mauna Legacy Program is the restoration of habitat, as well as planting of trees that could attract native birds and bats, the Safe Harbor Agreement can protect DHHL from future impacts to the habitat and the species.
Will native birds live in sugi or eucalyptus?	

What are carbon credits and how would they be used? The credits should be for the entity that plants the trees not the Department.	Carbon offsets can best be described as an act of paying a third party for reducing ("offsetting") greenhouse gas emissions when one is unable or unwilling to reduce one's own emissions. Some countries (or companies) seek to trade emission rights in carbon emission markets, purchasing the unused carbon emission allowances of others. Carbon Offsets/Credits are a key component of national and international emissions trading schemes that have been implemented to mitigate global warming. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing prices. An added opportunity to enhance revenue opportunities is to consider carbon credits/offsets retained by DHHL in the event certain forestry programs are implemented.
Gorse How did the gorse get here? Did ranchers use it?	Early diary records note gorse on Mauna Kea is at Pi'ihonua Mauka (Pu'u O'o ranch - from diary of ranch manager August Haneburg): <u>Friday, February 20th, 1891</u> : "... uprooted Australian weeds [gorse] in Sheep Padd II and Horse Padd II", and another reference from W.D. Alexander, 6/1892 quotes "The present manager has been at much labor and expense in extirpating two pests, which are said to have been accidentally introduced from New Zealand, viz. the Scottish thistle and the gorse". Gorse is native to Northwest Europe but has become a major pest species in various parts of the world, including New Zealand. There is a long history of gorse in Hawai'i. It was apparently brought to Hawai'i in the 19th century as a hedge plant by a Scottish immigrant, and possibly utilized in the previous sheep operation at Humu'ula. It was first collected wild by J. R. Rock on Maui in 1910. On the island of Hawai'i it is found in pasture and scattered forest lands on Mauna Kea at elevations between 2,000 and 7,000 feet. Annual DHHL efforts to control gorse have been underway since 2003. A variety of contracts to control gorse include chemical, mechanical and biological efforts. Due to limited resources, focus has been on controlling outlying areas and containing the main infestation from spreading further. DHHL field trials and research projects have also shown that shade from trees inhibit the ability for gorse to grow and spread. DHHL has planted portions of the perimeter of the Humu'ula/Pi'ihonua lands with trees to begin establishing a boundary to limit the spread of the weed.
Are you working on gorse eradication right now?	

In addition, 'Ōiwi Lōkahi o ka Mokupuni o Keawe has a license over 1,000-acres within the containment area to conduct a research project processing the heaviest infestations of gorse into charcoal and biofuel.	As the gorse is eradicated where will it go?	Gorse will not be allowed to be removed from the site to prevent its spread to other areas of the island. All gorse eradication techniques will require the gorse to be dealt with and disposed of onsite.
As required in the Mission and goals of the Legacy program to be ecologically, economically and culturally self-sustaining, commercial forestry is considered to assist in a variety of ways, including the opportunity to provide additional funding to help with the overall management of the property.	Money should not be the driver for getting rid of the gorse.	The long-term eradication of gorse will require significant financial resources that may need to be subsidized by other economic uses. This makes timber planting as a gorse eradication mechanism so attractive. It can serve as both a gorse eliminator and income generator.
The environmental and cultural benefits of forestry, e.g. clean water and air, soil augmentation, wildlife habitat, and traditional forest uses are well known if not well quantified. Economic returns from commercial forestry in Hawai'i are not well quantified either, as a fully modernized industry is still developing. In combination, however, these multiple values from forest lands will represent significant value to DHHL trust lands.	Can gorse be used as a revenue generator?	Commercial forestry is considered to assist in a variety of ways, including the opportunity to provide additional funding to help with the overall management of the property.
The non-profit organization, 'Ōiwi Lōkahi o ka Mokupuni o Keawe, currently has a license on 1,000-acres at Humu'ula from DHHL for gorse control work. They have been working on a process in which burning harvested gorse produces carbon. Their studies and research are ongoing. It is hoped that as their project becomes successful in using gorse as a product, subsequent conversion to trees will replace gorse as the raw material for their project, thereby perpetuating the gorse eradication component of the Legacy Program.	There is nothing in the Program regarding the 'Ōiwi Lōkahi o ka Mokupuni o Keawe Gorse Project.	
'Ōiwi Lōkahi o ka Mokupuni o Keawe's gorse demonstration project is referenced several times in the 'Āina Mauna Legacy Program and the 1,000-acres currently under license with the Department is noted on the Program map and incorporated into the Program. They have been working on a research process in which burning harvested gorse produces charcoal and other carbon products, as well as a biofuel. Their studies and research are ongoing.		

Native Forest Restoration Are other trees besides koa being considered for forest restoration?	Besides Koa the program is proposing the planting of māmane and 'ōhi'a trees as well as a variety of native understory plants. One method being used onsite currently is "island planting" which creates pockets of diverse native species which can spread across the site that eventually grow together into a diverse forest.
Why will Pi'ihonua be "tied up" in a Conservation Easement for 50 years?	As a means to assist in the funding of the restoration and enhancement of these areas, the department may negotiate encumbrances such as easements and/or leases with various entities. A conservation easement is a legal agreement voluntarily entered into by a property owner and a qualified conservation organization such as a land trust or government agency. The easement contains agreed upon conditions on the use or development of land in order to protect its conservation values. These easement restrictions vary greatly for each agency or organization.
Has there been a study on the area's microsystems?	A variety of extensive studies have been done on the property and surrounding areas. Of particular note, the Biological Sensitivity Analysis delineates areas containing endemic faunal sensitivity within the Humu'ula/Pi'ihonua area. The assessment gives a brief description of each area and outlines the endemic vertebrate resources that should be factored into any master planning of the areas delineated. Additionally, studies on geography, geology, soil, endangered/threatened species, vegetation, and cultural resources have all been done and are included by reference in the Program.
Roads Are the roads shown on the map really there? Are they all open (not locked)? Who owns the Mana/keanakolu Road? Only Beneficiaries should be allowed to access the area.	The map shows Saddle Road, Mauna Kea Access Road and the Mana/keanakolu Road all of which are used currently. All roads are open although is it advised to use a four-wheeled vehicle on the Mana/keanakolu Road. A gate project by the Land Management Division is currently underway to install gates at strategic locations to limit unauthorized access to the Program area. The Mana/keanakolu is considered a "road in limbo", that, while considered a public road, ownership has not been established between the State and the County. The legal ownership of the road is beyond the scope of the Program but as stated above the road is believed to be a "road in limbo", and as such it is a public road which cannot be automatically be gated off.

Other What happened to homesteading in the Pi'ihonua Makai Area? Is it residential or agriculture?	Residential lots have been awarded in the Pi'ihonua Makai Area. The Pi'ihonua Makai area is outside of the Program area.
The Department needs to change its policy regarding the selling of leases.	This is out of the realm of the 'Āina Mauna Program, however the concern is noted and has been passed on to the Department.
Has the Department looked into having Beneficiaries take on a Konohiki role?	As an integral part of the implementation of the 'Āina Mauna Legacy Program, the Legacy Program includes the formation of an implementation advisory council ('Āina Mauna Legacy Program Implementation Advisory Council) to provide advice and recommendations to the Hawaiian Homes Commission and the Department of Hawaiian Home Lands regarding the implementation of the 'Āina Mauna Legacy Program. Additionally, the implementation process will include the Council, Beneficiary and community involvement and participation in advising the Department and Commission.
	The Council may serve as a forum for consultation and deliberation among its members and as a source of consensus advice to the Hawaiian Homes Commission and the Department of Hawaiian Home Lands. Such consensus advice shall fairly represent the collective and individual views of the Council members.
	The Council does not have the authority to perform operational or management functions, or to make decisions on behalf of the Hawaiian Homes Commission and/or the Department of Hawaiian Home Lands. The Council will be advisory only. The Department and Commission will have final decision-making authority.
We need to understand the Hawaiian names of the area and what they mean. There is a reason why the ahupua'a look like they do. We need to understand why.	This rich cultural history of the area, presents a unique opportunity to link traditional cultural knowledge and modern science in restoring the area back to a healthy native forest, and other uses that benefit the Land, Beneficiaries and the Trust. We concur. The cultural and historical research conducted by Kumu Pono Associates documents descriptions of Ka'ōhe, Humu'ula, and Pi'ihonua. The study provides readers with documentation pertaining to the traditional, cultural and historical setting of the 'āina mauna on the Island of Hawai'i.
This Program is something that the Department needs to do and has needed to do for a long time. While we may not agree with all of it, we need to do something and this is a first step.	We concur. The mission of the 'Āina Mauna Legacy Program and its implementation is to protect approximately 56,000-acres of native Hawaiian forest that is ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries and the community.

	Initial goals for the 'Āina Mauna Legacy Program include: Goal 1: Develop an economically self-sustaining improvement and preservation program for the natural and cultural resources (invasive species eradication and native ecosystem restoration) and implementation strategy. The focus of the 'Āina Mauna Legacy Program shall be on: • Restoration and enhancement of DHHL trust resources; • Identify immediate and future opportunities for DHHL beneficiaries; • Removal of invasive species - gorse, etc.; • Conserve natural and cultural resources and endangered species; • Address reforestation and restoration of the ecosystem; • Develop revenue generation, reinvestment in land to sustain activities; • Provide educational and cultural opportunities; • Identify and secure partners to sustain activities; • Identify opportunities for alternative/ renewable energy projects; and • Be a lead and/or model for others to engage in ecosystem restoration in a culturally sensitive manner based on partnerships to develop a self-sustaining model Goal 2: Develop an outreach program to gain interest, participation, and support from the Hawaiian Homes Commission, DHHL Staff, beneficiaries groups, cultural practitioners, natural resource scientists, and the broader community for the Legacy Program and its implementation. The creation of this Program is the first step in achieving these goals.
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Consultation Email and Written Comments - Response to Questions/Comments

The following are questions and comments raised in emails and comment letters from beneficiaries. The responses on the right column reflect the responses which are also generally stated in the report.

Eradication of ungulates	
So-called eradication of livestock (not ungulates) to be done by different strategies, all to be under management of Beneficiary committee.	The primary goal of the eradication of unmanaged ungulates (hoofed mammals such as cattle, sheep, pigs, goats, etc) is to protect the natural resources on the property.
Unmanaged "ungulates" is the problem created by the now uninformed, inexperienced DHHL management team.	The invasion of non-native species poses one of the greatest threats to Hawai'i's native ecosystems and their inhabitants. Unmanaged-ungulates are detrimental to Hawai'i's native ecosystems via the damage they inflict on both vegetation structure and composition; impact native plants and ground cover, facilitating sediment run-off. The soil disturbance caused by rooting ungulates also facilitates the introduction and expansion of invasive plants, and creates breeding grounds for mosquitoes that transmit avian disease to native forest birds.
This activity should not be conducted with a goal of collecting income for the trust.	A secondary benefit is that there may also be an opportunity for DHHL to raise funds from the process; however, revenue is a secondary benefit, the primary purpose is resource protection.
Any leases and plantings to be done with fencing. Hoping animals will be eradicated and therefore not around to eat the plantings has proven to be erroneous.	We note the need to fence sections of the property in several areas of the Legacy Program. We understand that each of the koa salvage permits have included perimeter fencing to exclude ungulates from the permit areas; these are included to help protect the regeneration of koa seed bank.
Koa Salvage/Sustainable Koa Forestry	
Koa Salvaging project should remain with the current contractor, at a price he feels is just; Beneficiary committee to monitor and make recommendations.	The program recommends that disposition of the respective commercial licenses, leases, etc. to implement these actions would be through a broad RFQ/RFP process to select the best qualified applicants (background, experience, financial capability, business plan, etc) to conduct the respective activities - to the extent permitted by law preference will be given to native Hawaiians. We understand the existing operator has been awarded two of the three harvesting permits granted for koa salvage.
The Sustainable Koa Forest (Initial Homesteading Area) is referred to as agriculture. To call a forest agriculture is ridiculous.	There are scattered koa trees in the area now. Koa planting would begin immediately in the form of koa forest restoration. Koa is one of the predominant tree species found naturally in the Humu'ula/Pi'ihonua lands. It is presently the highest value timber crop in Hawai'i.

Can you image agricultural homesteaders who don't do anything on it and leave it virgin justifying non-use because you folks call forest agriculture? If it is a Koa Forest, instead of cutting it up for individual homesteaders to use, keep it whole and assign it to the community to control harvest and replant. As a group, they would be better able to arrange for the cutting and selling of wood than on an individual basis. Proceeds would be split among the homesteaders.	Restoring the Humu'ula/Pi'ihonua lands to koa through carefully planned and managed reforestation is its highest and most compatible economic use. The forested areas also provide DHHL with an option for future homesteading, once the koa restoration is accomplished. Dispositions of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions.
Agriculture There is nothing offering agriculture opportunities in the present plan. Please allow for possible agriculture opportunities. At this elevation there is also high potential to grow unique crops of particular interest. Beneficiaries constantly express their wishes for more agricultural awards. This was not indicated or considered on the proposal or any designed "agricultural" lots.	The Legacy Program considers a variety of homestead development layouts to address various beneficiary needs: cluster homestead sites with separate agricultural/pasture lots, cluster homestead sites with community agricultural/pasture, homestead lot subdivision or a combination of alternatives. It is envisioned that these alternatives will enable DHHL beneficiaries to have sufficient land for self-sustaining homesteading: land for a home site and related improvements/uses, including land for alternative energy for their use, pasture, agricultural uses, and land available for subsistence farming.
Commercial Activity Initiate alternative living: development of cabin-like dwellings for eco-tourism to help restore some of the deforestation - supporting flexibility for the plan.	We agree that the use of remote accommodations cover a small footprint on the overall landscape and have limited impact on the resources, but provide opportunities for ecotourism uses, etc. In the Legacy Program, there are recommendations that require ecotourism operators to have their guests "volunteer" in the reforestation, invasive species control and other implementation activities. It is believed that this will not only assist with the implementation efforts, it will also provide for more meaningful experiences for the guests on the property.

Initiate a Mauna Kea-Loa Museum to educate the public of the fragile state of the area - income generating and self-sustaining.	The Legacy Program includes recommendations for the restoration of the Humu'ula Sheep Station and use of the site as an ecotourism staging area. Because the 'Aina Mauna region is such a special and unique place, orienting and educating visitors to this is important. The facility could be considered for a variety of uses, including redevelopment of the property into a lodge, serving as a focal point for education, staging, gatherings, meetings, etc.
Ecotourism and recreation use (red) may be possible but on a limited basis. I do not think any particular group should control this area for their own use or with DHHL funds.	The Program recommends ecotourism uses on various portions of the property, with the suggestion that staging areas be included around the Humu'ula Sheep Station.
Native Forest Restoration Trying to justify forestry and the so-called need to increase the acreage in forestry, island wide, to support whom? I would like to commend all of you for taking this step to realizing the goal and intent of the DHHL mission statement. The incorporation of long term planning, acknowledgment of native Hawaiian Forests (mamane at high elevation, koa, and koa/'ohi'a at montane/mesic elevations) as an important part of what makes Hawai'i unique and special, and planning for sustainable healthy native Hawaiian communities is uplifting.	The foundation of the 'Aina Mauna Legacy Program is the protection and restoration of the DHHL lands at Humu'ula/Pi'ihonua for future generations. These lands represent the most important native forest areas remaining in the DHHL trust. DHHL seeks to restore portions of the Humu'ula/Pi'ihonua lands in perpetuity for future generations. We concur.
Gorse Eradication We reside in an island "culture" in the middle of the Pacific Ocean. Each island should be self-sufficient, now. Will putting additional acres in commercial timber at the expense of decreasing lands for food production solve the self-	To take advantage of opportunities to further demonstrate the focus on efficient, self-sustainable communities, as well as provide for cost-effective development, the Legacy Program considers a variety of homestead development layouts to address various beneficiary needs: cluster homestead sites with separate agricultural/pasture lots, cluster homestead sites with community agricultural/pasture, homestead lot subdivision or a combination of alternatives.

sufficiency need for now and the future? True, we have to address the gorse problem, which, in Sonny Kaniho's words, was allowed by the HHC to get to such a state. Ōiwi's request for license was intended to encumber the whole gorse infected area. Ōiwi and its partners will sit with DHHL to develop the best plan. We expect to have a concrete plan for processing during this fourth year of the five-year license term.	It is envisioned that these alternatives will enable DHHL beneficiaries to have sufficient land for self-sustaining homesteading: land for a home site and related improvements/uses, including land for alternative energy for their use, pasture, agricultural uses, and land available for subsistence farming. The non-profit organization, Ōiwi Lōkahi o ka Mokupuni o Keawe, currently has a license on 1,000-acres at Humu'ula from DHHL for a gorse research and demonstration project. According to the DHHL License Agreement, the licensee may not use the premises for any purpose other than strictly a research and development project using the invasive gorse shrub. No other uses are permitted, including grazing rights to demonstrate gorse controlled by livestock. To date, the equipment to process the gorse to charcoal and biofuel has not been delivered and the process has not been demonstrated. It is hoped that as their project becomes successful in using gorse as a product; subsequent conversion to trees will replace gorse as the raw material for their project, thereby perpetuating the gorse control component of the Legacy Program.
Re-growth of gorse to be managed in a variety of ways, not only by chemicals or planting trees.	The goal is gorse eradication, not management. All viable gorse eradication opportunities will be considered. Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. The importance of eliminating this plant cannot be overstated.
The department plans to put (pink area) pasture lands into commercial operations. They plan to lease it out for commercial purposes with planting trees such as eucalyptus and shoji. This is not restoration of native forest. A better idea would be when the 13,000 acres of gorse are removing or managing, to divide the lands for pastoral pursuits for those lessees homesteading (living) at Humu'ula.	Eradication of this noxious plant, that has already rendered thousands of acres useless, is an essential component in any land use and management plan for these lands. All viable gorse eradication opportunities will be considered. Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. The Program looks to begin gorse eradication as soon as possible. It will be one of the first actions taken, once the Program is approved. The Program suggests timber to fight gorse but also allows for other viable gorse eradication opportunities. The goal is gorse eradication, not management. Interim commercial-scale timber planting can serve both as a gorse eradication mechanism, as well as an income generator. Eucalyptus, sugi or others trees are selected to address and control the gorse; once the gorse eradication process is well underway, the area is to be reforested back to a native koa.

Large parcels must be given to lessees due the less than productive pasture and the lack of water during certain times of the year. They will at least have good access to these parcels using the roads that the bio-fuel company is establishing. Why waste it and plant invasive forests for commercial companies. Planting invasive species is not conserving natural habitats for future generations. I am not convinced or believe that the Gorse plant seed will be inactive for 70 years. If the Gorse plant is still a sustainable food for cattle and can live for up to four decades, then why not work with the 'Ōiwi Pilot Project" in more depth while still controlling its boundaries from spreading. Wouldn't this be income-generating in and of itself for DHHL short and long term?	This area is considered for future homesteading, once the gorse is eradicated.
We propose that the homestead community will help with the <i>kuleana</i> of managing the gorse problem (as a part of <i>kuleana</i> for all of Humu'ula) with the DHHL land manager and that we may use diverse native Hawaiian forests to shade out gorse. Sugi pine provides the most shade, around 95-98 percent, but diverse native Hawaiian forest with at least two canopies is a close second and provides approximately 90-95 percent. In addition to shading most forest restoration scientific	All viable gorse eradication opportunities will be considered. Gorse is a noxious weed species that is threatening natural habitats and agro-ecosystems around the world, including Hawai'i. The Program looks to begin gorse eradication as soon as possible. It will be one of the first actions taken, once the Program is approved. The Program suggests timber to fight gorse but also allows for other viable gorse eradication opportunities. The goal is gorse eradication, not management. Interim commercial-scale timber planting can serve both as a gorse eradication mechanism, as well as an income generator.

journals cite the addition of litter fall. This technique has proven effective for controlling non-native grasses in several restoration studies including recent research from Hawai'i Volcanoes National Park. Therefore effective control of introduced and invasive plant species is a function of both shade and leaf litter fall. A diversity of trees is also essential in long term planning as leaf litter of this type is beneficial for soil production and healthy ecosystems.	As required in the Mission and goals of the Legacy program to be ecologically, economically and culturally self-sustaining, commercial forestry is considered to assist in a variety of ways, including the opportunity to provide additional funding to help with the overall management of the property. The long-term control of gorse will require significant financial resources that may need to be subsidized by other economic uses. This makes commercial timber planting as a gorse control and eradication mechanism so attractive. Once the gorse eradication process is well underway, the area is to be reforested back to native koa.
In Sugi or eucalyptus plantations there is little to nothing left of any native species in the understory. Some eucalyptus species even poison the ground so that other species can't grow. It is possible that we may find that if eucalyptus is used at Humu'ula, Hawaiian plants may not be able to grow due to chemical and biological changes in the soil. We already know that gorse acidifies the soil beneath it thereby changing the composition and makeup of those soils. It is unknown if acidified soils might be beneficial or not to native species in the long run such as those within the gorse containment area.	
Carbon Credits Carbon Credits, at least 80%, shall go to the gorse harvesting and gorse processor which invests in the project.	The goal is gorse eradication, not harvesting/processing. We are proposing that 100% of any benefit from Carbon Offsets/Credits be retained by DHHL in the event certain forestry programs are implemented.
The concept of carbon credits is a question of morality, not one of economics or legality. 'Āina is	The focus of the Legacy Program is the restoration of the land. This includes a variety of forestry opportunities.

'āina, here or there, North America, Europe, Africa, Antarctica, etc., each unique and special. The idea of buying and selling carbon credits to offset atmospheric pollution is reprehensible and is not a righteous action. This is an immoral action that will have far reaching consequences and is a human construct to justify the means to an end. This type of thinking is representative of western ideology and fails to incorporate the connectivity of humans and our environment, so thus fails to incorporate Hawaiian values.	An added opportunity to enhance revenue opportunities is to consider carbon credits/offsets retained by DHHL in the event certain forestry programs are implemented.
'Āina Mauna Legacy Program Implementation Advisory Council Convene a Beneficiary Committee, two members of which shall sit on the 'Āina Mauna Legacy Program Implementation Advisory Council: 1) To review proposed beneficiary lease schemes 2) To revise plan for proposed Beneficiary Leases 3) To recommend the best solutions for Beneficiary Lease, Revocable Permit, or License 4) To consider lease/RP/License to others and recommend	As an integral part of the implementation of the 'Āina Mauna Legacy Program, the Legacy Program includes the formation of an implementation advisory council ('Āina Mauna Legacy Program Implementation Advisory Council) to provide advice and recommendations to the Hawaiian Homes Commission and the Department of Hawaiian Home Lands regarding the implementation of the 'Āina Mauna Legacy Program. The Council may serve as a forum for consultation and deliberation among its members and as a source of consensus advice to the Hawaiian Homes Commission and the Department of Hawaiian Home Lands. Such consensus advice shall fairly represent the collective and individual views of the Council members. The Council does not have the authority to perform operational or management functions, or to make decisions on behalf of Hawaiian Homes Commission and/or the Department of Hawaiian Home Lands. The Council will be advisory only; the Department will have final decision making authority.
The 'ōlelo noeau referred to serves the narrow purpose of the 'Āina Mauna Legacy Program. The HHCA was created to take care of the people now, by	The opportunities for beneficiaries are extensive and diverse; and, there are opportunities for beneficiaries within each component of the recommendations, whether it is homesteading, pasture, unmanaged-ungulate eradication, native forest restoration, commercial timber, koa forestry, ecotourism or cultural practices.

providing a place, training, and opportunities for self-sufficiency. If this is the beneficiaries' land for self-sufficiency, the beneficiaries shall have direct participation in the decision-making for these trust lands and should carry the kuleana for stewarding thereof.	Some of the benefits are proposed to be relatively immediate, while others will necessarily take time for the real benefit to come to fruition. Additionally, the implementation process will include opportunities for Beneficiary and community involvement and participation at all stages of the process.
I agree and support the plan need for flexibility because of the diverse land and the amount of acreage to be allocated for specific purposes; however, under the condition that the beneficiaries are informed adequately before any change implementation to the program occurs. It is very obvious that flexibility with the plan is foremost importance as it moves forward.	The 'Āina Mauna Legacy Program is a "living document" that is intended to be flexible and is subject to change, as times and needs change. Therefore, the program should be re-examined on a periodic basis (possibly every 5-years) to ensure that it addresses DHHL's needs in the future. The Legacy Program includes the formation of the 'Āina Mauna Legacy Program Implementation Advisory Council to provide advice and recommendations to the Commission and DHHL regarding the implementation of the 'Āina Mauna Legacy Program. The implementation process will include the Council, Beneficiary and community involvement and participation in advising the Department and Commission. The Council serves as a forum for consultation and deliberation among its members and as a source of consensus advice to the Commission and DHHL. The Council does not have the authority to perform operational or management functions, or to make decisions on behalf of the Commission and/or the Department. The Council will be advisory only. The Department and Commission will have final decision-making authority.
Because of its unique and majestic location against Mauna Kea, which significance is the connection or piko of the Big Island, it is my proposed preferences that this land mass development be considered to a group of beneficiaries as a hui that will have stewardship over the various phases of land management.	The Legacy Program includes the formation of the 'Āina Mauna Legacy Program Implementation Advisory Council to provide advice and recommendations to the Commission and DHHL regarding the implementation of the 'Āina Mauna Legacy Program. The implementation process will include the Council, Beneficiary and community involvement and participation in advising the Department and Commission. The Council serves as a forum for consultation and deliberation among its members and as a source of consensus advice to the Commission and DHHL.

The Council does not have the authority to perform operational or management functions, or to make decisions on behalf of the Commission and/or the Department. The Council will be advisory only. The Department and Commission will have final decision-making authority.	Homesteading Prospective interested lessees for the Villages should determine land use within the area and around them. Village design shall be led by Ōiwi planners, with funds from DHHL - DHHL consultants stand by and provide assistance when asked. The Village concept is a beneficiary idea and shall be implemented with beneficiary input.	A significant portion of the property (4,500-acres) is proposed for immediate homesteading. The Legacy Program describes general ideas about subsequent development with specific design, sizes and layout to be determined during the implementation process. Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions: - Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu'ula/Pi'ihonua come under existing DHHL planning, design, development, funding, disposition and management. - These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses Since the property was not typically used for long term habitation, there are questions as to the demand for homesteads in this area. Humu'ula is a unique environment that historically has been minimally settled. It is important that beneficiaries are made aware and understand the advantages and disadvantages of living in this area. A significant portion of the property (4,500-acres) is proposed for immediate homesteading. The Legacy Program describes general ideas about subsequent development with specific design, sizes and layout to be determined during the implementation process. The opportunities for beneficiaries are extensive and diverse; and, there are opportunities for beneficiaries within each component of the recommendations, whether it is homesteading, pasture, unmanaged-ungulate eradication, native forest restoration, commercial timber, koa forestry, ecotourism or cultural practices. Some of the benefits are proposed to be relatively immediate, while others will necessarily take time for the real benefit to come to fruition. Additionally, the implementation process will include opportunities for Beneficiary and community involvement and participation at all stages of the process.
	It is not reasonable and somewhat offensive to expect beneficiaries to have to wait out their lifetime hoping that they may have an opportunity for homesteading as indicated on the map.	

I am also concerned about how the applicant wait list will be reconfigured to accommodate the new rural homestead residential leases concept development? How would this impact the existing categories with DHHL?	Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions. Since the property was not typically used for long term habitation, there are questions as to the demand for homesteads in this area. Humu'ula is a unique environment that historically has been minimally settled. It is important that beneficiaries are made aware and understand the advantages and disadvantages of living in this area.
There are also deep concerns about the new category of "rural homesteading" and the impact it will have on the applicants wait-list status as to the awarding processes - fairness, etc.	Given that the immediate homesteading area will be a rurally-developed (cinder roads, catchment water, photovoltaic, septic/composting toilets, etc) and the area is relatively isolated from employment, schools, shopping centers and other DHHL communities, it is not clear what the demand will be for these types of homesteads.
The ideas incorporated in the 'Aina Mauna Legacy report regarding rural homesteading is right on regarding green living. Included with the current ideas we suggest the incorporation of a glass greenhouse built into each home for growing <i>kalo</i> , sweet potato, etc., as well as to moderate temperature, provide healthy living environment, water collection, utilize natural lighting, etc.	The Legacy Program considers a variety of homestead development layouts to address various beneficiary needs: cluster homestead sites with separate agricultural/pasture lots, cluster homestead sites with community agricultural/pasture, homestead lot subdivision or a combination of alternatives. It is envisioned that these alternatives will enable DHHL beneficiaries to have sufficient land for self-sustaining homesteading: land for a home site and related improvements/uses, including land for alternative energy for their use, pasture, agricultural uses, and land available for subsistence farming.
Growing native Hawaiian plants for cultural uses (clothing, shelter, mats, etc.), to make high quality native Hawaiian products and for restoration across Humu'ula. In concept this allows every family to have their own food supply and work, thus minimizing their need to travel afar.	Since the property was not typically used for long term habitation, there are questions as to the demand for homesteads in this area. Humu'ula is a unique environment that historically has been minimally settled.
The sustainability of a Humu'ula homestead community is dependent on meeting the community needs at a local level. The overall homestead (many homesteads) should be designed in a way that supports	It is important that beneficiaries are made aware and understand the advantages and disadvantages of living in this area.

community and community interaction. This means that education, health care, cultural practices, recreation, carpentry skills, sustainable living (solar knowledge, catchment tanks) must all be available on site. We must also hunt and gather (sustainability of course) in the local area thus controlling to some extent cattle and other non-native fauna.	Given that the immediate homesteading area will be a rurally-developed (cinder roads, catchment water, photovoltaic, septic/composting toilets, etc) and the area is relatively isolated from employment, schools, shopping centers and other DHHL communities, it is not clear what the demand will be for these types of homesteads. Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions.
Pasture Additional parcels for farming, ranching, or forestry shall be awarded on separate lease, without any ties to the original lease. The current "Additional Acreage" strategy enforced by DHHL and the HHC is counter-productive, counter self-sustaining and counter self-determining. I believe that community pastoral and/or community agriculture is a plantation-like concept that will help restore and unify differences while appreciating the need for the crisis in the issues of sustainability and self-sustenance for the State.	Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions: • Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu'ula/Pi'ihonua come under existing DHHL planning, design, development, funding, disposition and management. • These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses According to DHHL, Moloka'i uses a community pasture program and it has been successful. The Program is open to a variety of scenarios, with community pasture being only one of the options or combinations of options for management.
The long term pasture (yellow), interim pasture (striped yellow) should also be given to the homesteaders in smaller parcels, along with the existing pasture leases when they expire. Perhaps homesteaders can use this area to rotate their cattle in dry periods.	Additional acreage propose for pasture use covers approximately 4,000-acres (these land areas are approximate references) - with about 2,000-acres designated for pasture along the Keanakolu-Mana Road and another 2,000-acres on the west side of the Mauna Kea Access Road (below the Radio Tower site and fronting Saddle Road and Mauna Kea Access Road.) These areas proposed for additional acreage for pasture use are consistent with the Fire Plan and are proposed to be immediately available for beneficiary use. Additional acreage pasture use could also be in the form of Community Pasture.

Budget The annual budget for wages, equipment, and supplies identified for managing the whole project shall include: 1) Training and employing interested beneficiary(ies) whose education has been in related fields, for a long-term position 2) Training and employing a beneficiary to eventually manage the whole project 3) Including one individual to develop educational curriculum and to manage educational retreats, extended excursions, etc. (1/2 FTE) and one to investigate and manage eco-activities (1/2 FTE). 4) Conducting Semi-annual status meetings to include all interested contractors, Humu'ula/Pi'ihonua Beneficiary Lessees, 'Aina Mauna Legacy Program Implementation Council and the Beneficiary Committee to provide and discuss up-dates and review progress in the different project areas 5) Fees for the Beneficiary Committee	It is suggested that there be three initial full time employees dedicated to implementing and managing the program. These employees can be phased in over time, during the transition from contractor to fully staffed employees. The positions will include a Program Coordinator, Contract Management, Compliance and Grant Specialist and a Field Worker. The Program Coordinator will primarily be working in and on issues related to 'Aina Mauna Legacy Program including: • Supervising • Administration • Outreach/Education • Field Work • Performs miscellaneous related duties, as required. The Contract Management, Compliance and Grant Specialist will manage procurement functions for 'Aina Mauna Legacy Program staff including: • Contract Management • Contract Compliance • Grant Writing, Management and Compliance • Outreach/Education • Performs miscellaneous related duties, as required. The Field Worker will assist in conducting operations to implement the 'Aina Mauna Legacy Program, as part of a team, including: • Fieldwork • Coordinates Volunteer Activities • Outreach/Education • Performs miscellaneous related duties, as required. Fencing is intended and included in many aspects of the implementation, from forest restoration, ungulate eradication and other aspects. The program, at this point, reflects many general uses. As more details of aspects of the Program are detailed, then the budget will further detail specific aspects. The final document includes further revenue and cost estimates, including allocations for fencing.
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DHHL/HHC Revise Procurement Law or Rule for use by DHHL; First offer to Beneficiary or Beneficiary organizations. Then, public bid process to others.	Revising state law is beyond the scope of this planning process. The program recommends that disposition of the respective commercial licenses, leases, etc. to implement these actions would be through a broad RFQ/RFP process to select the best qualified applicants (background, experience, financial capability, business plan, etc.) to conduct the respective activities - to the extent permitted by law, preference will be given to native Hawaiians. Homestead and Pasture agreements would be under the typical DHHL disposition process for these types of uses. The opportunities for beneficiaries are extensive and diverse; and, there are opportunities for beneficiaries within each component of the recommendations, whether it is homesteading, pasture, unmanaged-ungulate eradication, native forest restoration, commercial timber, koa forestry, ecotourism or cultural practices. Some of the benefits are proposed to be relatively immediate, while others will necessarily take time for the real benefit to come to fruition. Additionally, the implementation process will include opportunities for Beneficiary and community involvement and participation at all stages of the process. Land exchanges are beyond the scope of the Legacy Program. Dispositions and financing of Homestead and Pasture Leases, Licenses and/or RPs will be through the standard DHHL processes for these types of dispositions: • Since homesteading and pasture use are the typical and conventional disposition activities of DHHL, it is recommended that the proposed uses at Humu'ula/Pi'ihonua come under existing DHHL planning, design, development, funding, disposition and management. • These proposed uses can fit in the "queue" for development scheduling and disposition with other Homesteading and Pasture uses The opportunities for beneficiaries are extensive and diverse; and, there are opportunities for beneficiaries within each component of the recommendations, whether it is homesteading, pasture, unmanaged-ungulate eradication, native forest restoration, commercial timber, koa forestry, ecotourism or cultural practices. Some of the benefits are proposed to be relatively immediate, while others will necessarily take time for the real benefit to come to fruition.
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the cultural and resource management activities”.	Additionally, the implementation process will include opportunities for Beneficiary and community involvement and participation at all stages of the process.
When the beneficiaries can finally control the lands and conduct a self-sustaining activity in the area, what income-producing cultural activity does DHHL, HHC and the 'Āina Mauna Legacy Program Implementation Advisory Council foresee - bird catching for gathering feathers? Mr. Gumapac was correct when he asked about how these studies incorporated the traditional Ahupua'a concept.	The mission of the 'Āina Mauna Legacy Program and its implementation is to protect approximately 56,000-acres of native Hawaiian forest that is ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries and the community. It is recommended that traditional knowledge and modern science be used in making management decisions.
The 'Āina Mauna Legacy Program is just a discussion for the specific area and although it touts cultural and resource management, the plan has no cultural significance or strong points for future beneficiary stewardship, accept references to noted cultural studies.	DHHL believes that the Humu'ula/Pi'ihonua lands have the potential for serving as a sustainable native forest and land unit by simultaneously providing environmental, economic and social benefits to the trust and its beneficiaries, in perpetuity by linking traditional cultural knowledge and modern science. The goal of a restored forest is consistent with the DHHL Energy Policy.
	The restored, healthy native forest provides a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory. In addition there are multiple economic opportunities for beneficiaries.
Why did DHHL allow Parker Ranch to return the trust lands without restoring the land or take some responsibility to make it right again the way they first received it? Isn't this irresponsible stewardship and mismanaging of the lands?	The Legacy Program recommends a mandatory 'Āina Mauna cultural, natural resources and safety briefing to ensure that all visitors receive appropriate information they need in order to better understand and protect 'Āina Mauna's cultural and natural resources. Specific contents of the 'Āina Mauna cultural, natural resources and safety briefing will need to be determined.
DHHL is taking with the incoming leadership and any projected information as to next steps with award prioritization? What discussions, if any, about lands that are more realistically available and accessible closer	The Program is moving forward with gorse eradication as described above. The department is free to pursue remedies outside of the Legacy Program.
	The Lower Pi'ihonua and Honomu areas are outside of the Program area.

to the town vicinity of Hilo. Lower Pi'ihonua and Honomu areas should be the focus before further management plans are pursued by DHHL. What plans are in place for these attainable areas?	
Other	
We propose that a solution to current management and resource concerns be solved with the development of human infrastructure (training for the Hawaiian people), that the foundation of homesteads and economic activity be grounded in native Hawaiian culture, we base our decisions locally and thinking of sustainability keeping in mind that our decisions will have direct effects on our successors so should be made with the greatest of thought.	The 'Āina Mauna Legacy Program will provide a wide range of jobs and provide a wide range of job and training opportunities. The restoration of the 'Āina Mauna native forest will require a multitude of conservation oriented jobs. The native Hawaiian community will benefit from the 'Āina Mauna Legacy Program via conservation training and jobs which restore the native forest, commercial jobs which reforest and harvest the koa forest, and others, such as ecotourism activities.
We suggest that embracing Hawaiian culture as your guiding principle versus economic opportunity, believing in the Hawaiian people and providing for their success, and follow through on promises will go a long way in healing and bridging this divide.	We concur. The rich cultural history of the area, presents a unique opportunity to link traditional cultural knowledge and modern science in restoring the area back to a healthy native forest, as well as other uses that benefit the Land, Beneficiaries and the Trust.
The 'Āina Mauna Legacy Program map indicates two things: (a) ID Labels with area description and acreage, and (b) color schemes labels with area description and acreage. Neither of these descriptions & acreage coincides with the color scheme labels, so the viewer is unable to identify what the consultant is really talking about.	The mapping noted on the documents posted on the DHHL website-beneficiary consultation-executive summary and program document have correct color coded maps.
We received our notices after the meeting date.	Due to problems with the initial mailing, an additional beneficiary meeting was held in Keaukaha.

Will the Mauna Kea access road be relocated since it is cutting through some of the trust land property?	There are no plans to relocate any of the roads.
Would you kindly clarify why the numerous programs and their particular purposes, especially if they don't have an invested interest in the immediate communities of island.	The Program is based on several past studies. Ho'okuleana LLC was hired to write the Program and is the consultant for this project. During the development of the 'Āina Mauna Legacy Program, the 'Āina Mauna Legacy Program Advisory Group was formed to provide advice and recommendations in identifying the optimum land use, infrastructure patterns, best management practices and estimated financial requirements to achieve the goals of the 'Āina Mauna Legacy Program. Group members served as liaisons between their constituents and communities, as well as helped with outreach to their respective communities on behalf of the 'Āina Mauna Legacy Program.

'Āina Mauna Legacy Program – Letters of Support

The following individuals and groups provided written statements of support for the 'Āina Mauna Legacy Program, while it was being prepared.

Alli'i Trusts:

Kamehameha Schools - Ulialia Woodside, Manager, Land Legacy Resources
Queen Lili'uokalani Trust - LeeAnn E. P. Crabbe, Vice President
Queen Emma Land Company - Les Goya, Vice President

Native Hawaiian Entities:

Office of Hawaiian Affairs – Board of Trustees and Clyde Nāmu'o, Administrator
Royal Order of Kamehameha I, Ali'i Chapter - Alikea Desha
Kaheha Hawaiian-Environmental Alliance – Miwa Tamanaha & Marti Townsend
Hawaiian Civic Club of Kona-Kuakini - Gene "Bucky" Leslie, President
Bishop Museum - Tim Johns, President and Chief Executive Officer
Bishop Museum - Napua Harbottle, Botany Collections Manager

Business:

Hawai'i Island Economic Development Board - Jacqui Hoover, Executive Director
Hawai'i Island Chamber of Commerce - Jon Y. Miyata, Vice President
Hawai'i Forest Industry Association - Heather Gallo, Executive Director

Environmental:

The Nature Conservancy - Suzanne Case, Executive Director
Hawai'i Audubon Society - Wendy Johnson, First Vice President
Conservation Council for Hawai'i - Marjorie Ziegler, Executive Director
The Trust for Public Lands - Lea Hong, Hawai'i Islands Program Director
Big Island Invasive Species Committee - Zeada Pachecano, Manager

University of Hawai'i:

University of Hawai'i, CTAHR - J.B. Friday, PhD, Extension Forester
University of Hawai'i, NREM - James Leary, PhD, Invasive Weed Management
University of Hawai'i, Hilo - College of Ag, Forestry and Natural Resource Mgmt, Bill Steiner, Dean

Federal:

U.S. Fish and Wildlife Service - Jim Kraus, Refuge Manager, Hakalau Forest NWR
Army - Pōhakuloa Training Area - Stephen Troute, Community Relations

Individuals:

John De Fries - native Hawaiian
Ross Wilson Jr. - Member of the Royal Order of Kamehameha
David B. Kaapu - native Hawaiian
Paula Helfrich, Teacher/Archaeologist
Josh Stanbro - Former Hawai'i Project Manager, Trust for Public Lands

'Āina Mauna Legacy Program – Environmental Assessment

The scoping process for the 'Āina Mauna Legacy Program Environmental Assessment involved a variety of means for input and comments from the public as well as from State, County and Federal agencies.

Scoping Letters

In March 2011, Ho'okuleana mailed approximately 25 scoping letters and emailed approximately 110 scoping letters to individuals, local conservation and interest groups, research organizations, County, State, and Federal government agencies, those that were involved in or commented on the 'Āina Mauna Legacy Program and others. The scoping letter described the 'Āina Mauna Legacy Program's purpose and goals, draft actions, and preliminary issues to be considered in the EA.

Ho'okuleana received 14 letters from County, State and Federal agencies, commenting on the 'Āina Mauna Legacy Program scoping process. These letters, along with responses to questions posed in the letters are included in the Appendix of the EA.

Public Scoping Meetings

The first scoping meeting was with the group "Mauna Kea Neighbors" held on February 3, 2011 at the Pōhakuloa Training Area. Since 2003, Mauna Kea Neighbors, which is made up of individuals and entities that represent adjoining landowners or other related interest on Mauna Kea, has held periodic meetings to discuss issues of common interest and concern related to Mauna Kea.

The first scoping meeting was with the group "Mauna Kea Neighbors" held on February 3, 2011 at the Pōhakuloa Training Area. At the meeting an overview of the 'Āina Mauna EA process was given.

Additionally, two public scoping meetings were held to further inform DHHHL beneficiaries on the process and solicit additional input on the proposed actions. The meetings were held on March 30, 2011 at Kuhio Hale in Waimea, and on March 31, 2011 at the County Aupuni Conference Room in Hilo.

At the meetings, Ho'okuleana staff explained the EA planning process, the Legacy Program's purpose, vision, and management, and preliminary management issues, concerns, and opportunities. Ho'okuleana staff also answered questions from attendees. Outreach for the meetings included mailing postcards to over 400 beneficiaries, flyers placed around beneficiary communities, and media press releases sent to West Hawaii 'I Today and Hawaii 'I Tribune Herald.

Assessment of Impacts to Historic & Cultural Resources and Cultural Practices

The foundation of the 'Āina Mauna Legacy Program is based on the HHC Mission Statement:

"To manage the Hawaiian Home Lands trust effectively and to develop and deliver land to native Hawaiians. We will partner with others towards developing self-sufficient and healthy communities."

and the Legacy Program Mission (including its Goals and Priority Issues):

"The mission of the 'Āina Mauna Legacy Program and its implementation is to protect approximately 56,000-acres of native Hawaiian forest that is ecologically, culturally and economically self-sustaining for the Hawaiian Home Lands Trust, its beneficiaries and the community."

Ultimately, and as an over-arching principle, the 'Āina Mauna Legacy Program is about and for the Hawaiian Home Lands Trust, the Land and its Beneficiaries. The restored, healthy native forest provides a variety of benefits and opportunities to beneficiaries through gathering, cultural practices and opportunities to see and understand native forest ecosystems. Since the land is DHHL owned, beneficiaries will have significant benefit for the exercise of cultural traditions.

The site (with restoration to healthy native forest) provides beneficiaries cultural practices access as the only site of this type in the Hawaiian Home Lands Trust inventory. Restoration of the land upon which native Hawaiians have always depended is key to the success of the beneficiaries.

Over the past 150-years the land transformed away from a healthy, dense native forest. It will take generations to restore the land back to this healthy condition. Ultimately, and as an over-arching principle, the 'Āina Mauna Legacy Program is about and for the Hawaiian Home Lands Trust, the Land and its Beneficiaries.

Based on existing archaeological surveys conducted in the area, known archaeological features within the parcel are limited to predominately historical sites. These include paths, trails, roads and the Humu'ula sheep station. Additionally a variety of historic and prehistoric sites may be present in the parcel including burial sites, temporary habitation sites, markers or historical sites, communication routes (trails and roads), ritual sites, and camps and processing sites (relating to bird hunting and/or adze production).

Overall, it is predicted that a relatively low concentration of surface sites would be found throughout the parcel. Those areas where site densities are likely to be highest include: ahupua'a borders, cinder cones (pu'u) caves or lave tubes, traditional bird feeding habitats, the paleo-forest scrub transition area, traditional resource convergence area (water, fuel and shelter locations), and along communication routes (roads and trails). The gulches and pu'us, in addition to serving as possible refuge areas endangered plant species, would be among the likely areas where archaeological sites, if present, would be found.

The 'Āina Mauna Legacy Program is expected to have no significant negative impact on native Hawaiian cultural practices; rather, the Legacy Program is estimated to have an overall positive impact.

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Appendix A - Revised Substitute Motion -Hawaiian Homes Commission

Appendix B - Archaeological Filed Inspection Report - Todd Tulchin & Hallett H. Hammatt Ph. D, Cultural Surveys Hawai‘i, Inc.

Appendix C - Humu‘ula and Pi‘ihonua Native Traditions, Historical Accounts and Oral Interviews Report - Kepā Maly & Onaona Maly, Kumu Pono Associates, LLC

Appendix D - Personal Interview Final Report

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Appendix - A - Planning Team members and Special Study Consultants

Appendix - B - Planning Process/Work Plan

Appendix - C - Alternative Concepts Considered/Evaluation of Alternatives

Technical Reference Document - A - Community Input and Meeting Notes - PBR, Hawai‘i

Technical Reference Document - B - Agricultural Assessment - Agricon Hawai‘i

Technical Reference Document - C - Preliminary Market Assessment - RE2

Technical Reference Document - D - Economic Assessment - RE2

Technical Reference Document - E - Legal and Institutional Area: Overview of the Legal Context for Homestead Awards - Allen Hoe, Esq.

Technical Reference Document - F - Gorse Assessment Report - Ron Terry, Ph. D

Technical Reference Document - G - Vegetation Sensitivity Analysis - PBR Hawai‘i & Grant Gerrish, Ph. D, Natural Sciences Division, University of Hawai‘i at Hilo

Technical Reference Document - H - Biological Sensitivity Analysis - Reginald E. David, Pacific Biological Survey

Technical Reference Document - I - Archaeological Review and Predictive Model - D. Kyle Latinis, M.A., Scientific Consultant Services Inc.

Technical Reference Document - J - Infrastructure Feasibility Study - R. M. Towill Corporation

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