

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawaii 96813

January 27, 2017

Chairperson and Members
Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Land Board Members:

SUBJECT: REQUEST APPROVAL OF THE KEAUHOU BIRD CONSERVATION CENTER DISCOVERY FOREST RESTORATION PROJECT FOREST STEWARDSHIP MANAGEMENT PLAN AND FOREST STEWARDSHIP AGREEMENT WITH ZOOLOGICAL SOCIETY OF SAN DIEGO DBA SAN DIEGO ZOO GLOBAL, TMK (3) 9-9-001:004, KA'Ū, ISLAND OF HAWAII

AND

REQUEST APPROVAL OF DECLARATION OF EXEMPTION FROM CHAPTER 343, HRS ENVIRONMENTAL COMPLIANCE REQUIREMENTS FOR THE PROJECT.

This Board Submittal requests approval of a Forest Stewardship Agreement with the Zoological Society of San Diego dba San Diego Zoo Global and associated management plan for the Keauhou Bird Conservation Center Discovery Forest Restoration Project, Tax Map Key (3) 9-9-001:004, Ka'ū District, Hawaii County.

BACKGROUND

The State of Hawai'i Forest Stewardship Program (FSP) provides technical and financial assistance to private landowners and land managers committed to the stewardship, conservation, and restoration of important forest resources across the state. These private properties provide a variety of public benefits for the residents of Hawaii, including but not limited to: fresh water capture and production, decreased soil erosion, wildlife habitat, forest products, carbon sequestration, recreational and educational opportunities, and local jobs. The assistance provided by FSP enables private landowners to develop and implement long-term multi-resource management plans to conserve, restore and maintain forested areas on their property.

The program was established through Chapter 195F-6, Hawai'i Revised Statutes (HRS). The Department of Land and Natural Resources (DLNR) has the authority to provide financial assistance

to approved Forest Stewardship projects for private landowners to manage, protect, and restore important natural forest resources on forested and formerly forested properties. The Forest Stewardship Program is implemented pursuant to Chapter 195F, HRS, and Hawai'i Administrative Rules (HAR) Chapter 109. The program provides cost-share reimbursement for the development of long-term forest management plans and for the implementation of approved Forest Stewardship management plans.

To participate in FSP, interested landowners and managers follow a sequence of steps for the development of a long-term Forest Stewardship management plans, including reviewed by the Forest Stewardship Advisory Committee (FSAC). Landowners interested in FSP submit an application to the FSAC, whom reviews and recommends the development of a Forest Stewardship management plan based on program eligibility requirements, assuring the proposed project is in line with the program's goals of conservation, restoration and/or forest production. Landowners then create a forest management plan; submit the plan for review by Division staff and FSAC; revise their actions based on the feedback received; and ultimately the committee recommends the management plan for approval by the Division and Department.

The award of cost-share support for Forest Stewardship Agreement, which includes the implementation of approved management plans, follows a similar review and approval process. Upon approval of a project's management plan, the FSAC reviews the implementation schedule and budget summary to ensure that the practice costs are reasonable and follow the program's approved cost-share rates. The FSAC recommends approval by the Board of Land and Natural Resources (BLNR) for cost-share support for project implementation based on the 10-year implementation schedule. Review and approval of the Forest Stewardship project and management plan as well as authorization of cost-share support for the project by the BLNR is required in order for Department to enter into the Forest Stewardship Agreement. The Division has previously worked with the Department of the Attorney General to developing a Forest Stewardship Agreement template (Exhibit A) for eligible projects.

The Keauhou Bird Conservation Center Discovery Forest Restoration Project (KBCC) Forest Stewardship project proposes to actively manage and restore approximately 120.6 acres of native forest on Tax Map Key number (3) 9-9-001:004, in the Ka'ū District of Hawaii County. The Forest Stewardship project area is designated by the State of Hawai'i as Agriculture District and as Agriculture by the County of Hawaii. The Zoological Society of San Diego dba San Diego Zoo Global (SDZG) leases 170 acres of Keauhou Ranch, owned by Kamehameha Schools, which is adjacent to the residential lots in Volcano town and near Hawai'i Volcanoes National Park. The SDZG primary mission is to reestablish self-sustaining populations of critically endangered Hawaiian birds, and the approximately 120.7 acre KBCC Forest Stewardship project will expand that mission, restoring the native forest surrounding their bird conversation facilities. The long-term goal of this FSP project is to protect and restore the native forest, increase native plant diversity, and to provide locally sourced fruits and seeds for the endangered bird breeding program.

The FSAC approved the KBCC Forest Stewardship management plan at their meeting on May 29, 2015 and the State Forester/Division Administrator approved the Forest Stewardship management

plan on December 30, 2016 (Exhibit B).

DISCUSSION

The Division is requesting approval of a Forest Stewardship Agreement with Zoological Society of San Diego dba San Diego Zoo Global for the implementation of the Keauhou Bird Conservation Center Discovery Forest Restoration Project Forest Stewardship management plan. The project area was grazed until 1996 resulting in an alien pasture grass understory with a remnant koa/ohia forest overstory. Over the course of the 10-year management plan, SDZG intends to promote the recovery of the native forest by restoring four distinct management strategies within the 120.7 acre project area and as detailed in the Forest Stewardship plan (Exhibit B). Management approaches include restoration of an *Acacia koa* dominated overstory, supplementing the understory diversity with planting of appropriate native species, suppressing invasive weeds, and incorporation of an educational program for local students and public groups visiting KBCC.

The Forest Stewardship management plan for KBCC includes a set of forest management prescriptions for each of the four distinct management strategies identified as Restoration, Intensive Planting, Maintenance, and Access units. Management activities within Restoration units will include the restoration of a koa canopy in grass-dominated abandoned pastures; enrichment plantings in existing forested areas; and increasing populations of native fruit and seed plants to support endangered bird breeding programs. The general schedule of management activities will include herbaceous vegetation control; site preparation using a mechanical spot cultivator prior to out-plantings; planting of native seedlings and application of fertilizers; competing invasive weed control after planting; pruning and singling for out-planted koa to improve forest structure and forest bird habitat; and incorporation of integrated pest management to control acacia psyllid after koa planting.

Management actions within the Intensive Planting units will primarily focus on concentrated plantings of seed and fruit producing native species at high densities while minimizing impacts on the sensitive native bird species housed in SDZG enclosures, including unnecessary foot or vehicle traffic, excavator operation, herbicide application, or noise disruptions. Within these units, invasive weeds will be manually treated and removed; planting holes will be manually dug manually; and plantings will be at an approximate spacing of 5 feet by 5 feet. Species selection for plantings in this area will be determined by SDZG staff and may evolve over time with bird rearing priorities.

Management actions within Maintenance units will entirely focus on invasive species control. The suite of invasive species found in KBCC include those common throughout the Volcano area. Some of these species represent a significant threat to successful project outcomes, while others are less problematic. The management plan includes an assessment of weed control priority based on (1) the observed abundance of each species within the project area, (2) the threat that each species poses to establishing koa forest or enriching existing species composition, and (3) the Hawaii Weed Risk Assessment score. The control prescription for each species depends on its current abundance as well as its threat level.

Management Actions within the Access unit also includes control of invasive weeds, but is focused along main access routes in KBCC project area. Forest management activities along the road system

will be limited to one annual invasive weed suppression operation and periodic sweeps for incipient invasive species in a buffer zone surrounding the road system.

Additionally, the management plan actions related to the development of an education program at KBCC will include a partnership with Hawaii Forest Institute, SDZG, Kamehameha Schools, Hawaii Tourism Authority, education institutions, and other interested entities to provide learning opportunities about native Hawaiian birds and forest restoration activities. The area of SDZG and the KBCC project is on private land and contains sensitive endangered bird species that is not typically available for public access. By providing a structured, service-oriented opportunity for members of the public to access the land in organized, supervised groups, this project will improve for a unique public-forest interaction. The educational program will focus on both the ongoing captive breeding and release efforts for critically endangered Hawaiian birds, as well as incorporating forest restoration volunteer work into the KBCC visits. Further detail on KBCC management prescriptions and activities are included in Exhibit B.

Zoological Society of San Diego dba San Diego Zoo Global is seeking cost-share support for the implementation of their management plan from FSP. A total of **\$245,503.66** in State Forest Stewardship cost-share support is requested for the KBCC Forest Stewardship management plan and the SDZG Forest Stewardship Agreement. The Zoological Society of San Diego dba San Diego Zoo Global will be contributing **\$245,503.66** of match toward the Forest Stewardship Agreement equal to a one to one match. The costs associated with the proposed practices are consistent with the intensity of management required for this type of project. Cost-share funds are provided as reimbursement payments for implementation of approved management practices through the State fiscal year 2028. In addition, Zoological Society of San Diego dba San Diego Zoo Global has agreed to continue maintenance of the installed Forest Stewardship practices following the completion of the 10-year cost-share contributions under the Agreement for the duration of their existing lease with Kamehameha Schools, or through the end of State fiscal year 2029.

CHAPTER 343 – ENVIRONMENTAL COMPLIANCE

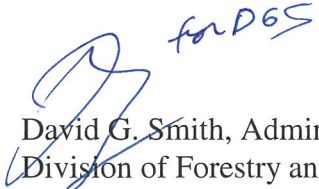
In accordance with “Exemption List for the Department of Land and Natural Resources, reviewed and concurred upon by the Environmental Council on June 5, 2015,” the proposed activities are exempt from the preparation of an environmental assessment. Specifically, the proposed activities fall under Exemption Class No. 4 Item 6; Item 8; Item 12; Item 13; and Item 22. Refer to attached Exemption Notification labeled Exhibit C.

RECOMMENDATION

That the Board:

1. Approve the Keauhou Bird Conservation Center Discovery Forest Restoration Project Forest Stewardship management plan;
2. Approve cost-share support in the amount of **\$245,503.66** to Zoological Society of San Diego dba San Diego Zoo Global for the implementation of the Keauhou Bird Conservation Center Discovery Forest Restoration Project Forest Stewardship management plan;
3. Authorize the Chairperson to amend, finalize and execute a Forest Stewardship Agreement with Zoological Society of San Diego dba San Diego Zoo Global to participate in the State Forest Stewardship Program subject to the following:
 - A. Availability of State Forest Stewardship funds; and
 - B. Review and approval as to form of the Forest Stewardship Agreement by the Department of the Attorney General.
4. Declare that, after considering the potential effects of the proposed dispositions provided by Chapter 343, HRS, and Chapter 11-200, HAR, this project will likely have minimal or no significant effect on the environment and is therefore exempt from the preparation of an environmental assessment.

Respectfully submitted,


David G. Smith, Administrator
Division of Forestry and Wildlife

Attachment: (Exhibit A, B, C)

APPROVED FOR SUBMITTAL:



Suzanne D. Case, Chairperson

**STATE OF HAWAII
FOREST STEWARDSHIP AGREEMENT**

This AGREEMENT, made this _____ day of _____, 20____, by and between the BOARD OF LAND AND NATURAL RESOURCES, STATE OF HAWAII (“STATE”), by its Chairperson, whose address is 1151 Punchbowl Street, Honolulu, Hawaii 96813, and _____, (“LANDOWNER”) whose address and federal and state taxpayer identification numbers are as follows: _____

Business address

Federal and state taxpayer identification numbers

RECITALS

WHEREAS, Chapter 195F, Hawaii Revised Statutes (HRS), provides for the establishment of a forest stewardship program to encourage and assist private landowners in managing, protecting, and restoring important watersheds, native vegetation, fish and wildlife habitats, isolated populations of rare and endangered plants, and other forest lands that are not recognized as potential natural area reserves; and

WHEREAS, in accordance with HRS Chapter 195F and Title 13, Subtitle 5, Part 1, Chapter 109 of the Hawaii Administrative Rules (HAR), the LANDOWNER has applied, and qualifies, for participation in the forest stewardship program; and

WHEREAS, the LANDOWNER has submitted a forest stewardship management plan, as set forth in Exhibit A hereto, that the STATE agrees is consistent with the policies, goals, and objectives of the forest stewardship program; and

WHEREAS, the STATE desires to assist the LANDOWNER in implementing the forest stewardship management plan with financial and other assistance; and

WHEREAS, money is available to fund this agreement pursuant to: Act 195, SLH 1993, Hawaii Revised Statutes, Section 247-7.

NOW, THEREFORE, in consideration of the promises contained in this AGREEMENT, the STATE and the LANDOWNER agree as follows:

A. SCOPE OF SERVICES

The LANDOWNER hereby agrees to implement the forest stewardship management plan set forth in Exhibit A and the project described in the "Scope of Services" set forth in Attachment S1 in proper and satisfactory manner as determined by the STATE, both of which are hereby made a part of this AGREEMENT. The STATE hereby agrees to assist the LANDOWNER in implementing the forest stewardship management plan, all in accordance with the terms and conditions set forth in Attachments S1, S2, S3, S4, S5, and S6, attached hereto.

B. COMPENSATION

The LANDOWNER shall be compensated for performance of the project under this AGREEMENT according to the "Compensation and Payment Schedule," set forth in Attachment S2, which is hereby made a part of this Agreement.

C. TIME OF PERFORMANCE

The performance required of the LANDOWNER under this AGREEMENT shall be completed in accordance with the "Time of Performance" set forth in Attachment S3, which is hereby made a part of this AGREEMENT.

D. CERTIFICATE OF EXEMPTION FROM CIVIL SERVICE

The "State of Hawaii Certificate of Exemption from Civil Service," set forth in Attachment S4, is hereby made a part of the AGREEMENT.

E. OTHER TERMS AND CONDITIONS

The "State of Hawaii Special and General Conditions for Forest Stewardship Program Agreements," set forth in Attachment S5, and the General Conditions attached hereto, are hereby made a part of this AGREEMENT. For the purposes of this AGREEMENT the term "CONTRACTOR" in the "General Conditions" shall mean the LANDOWNER.

F. STANDARDS OF CONDUCT DECLARATION

The "Standards of Conduct Declaration" by LANDOWNER, set forth in Attachment S6, is hereby made a part of this AGREEMENT. For the purposes of this AGREEMENT the term "CONTRACTOR" in the "Standards of Conduct Declaration" shall mean the LANDOWNER.

IN WITNESS WHEREOF, the parties execute this AGREEMENT by their signatures to be effective as of the date first above written.

STATE

By _____
Chairperson of the Board of Land and Natural
Resources

Print Name

Date _____

LANDOWNER

By _____

Print Name

Date _____

Approved by the Board of
Land and Natural Resources on

_____.

APPROVED AS TO FORM:

Deputy Attorney General

LANDOWNER'S ACKNOWLEDGMENT

STATE OF HAWAII)
) SS.
COUNTY OF _____)

On this _____ day of _____, 20____, before me personally appeared _____, to me personally known, who being by me duly sworn, did say the he/she is the _____, the LANDOWNER named in the foregoing instrument, and the he/she is authorized to sign said instrument on behalf of the LANDOWNER, and acknowledges that he/she executed said instrument as the free act and deed of the LANDOWNER.

Notary Public, State of Hawaii

My Commission Expires: _____

Date of the Notarized Document: _____

Number of Pages: _____

Identification or Description of the Document being Notarized: _____

Printed Name of Notary: _____ Circuit

Notary's Signature and Notary's Official Stamp or Seal Date



STATE OF HAWAII
SCOPE OF SERVICES

SECTION 1 - SCOPE OF WORK

- 1.1 MANAGEMENT AREA - The project area to be managed is the _____ Forest Stewardship project area; TMK NUMBER(S) _____ as designated on maps found in Exhibit A to this AGREEMENT.
- 1.2 THE PRIMARY OBJECTIVES - The STATE and LANDOWNER shall direct their efforts under this AGREEMENT to do the following: fund the management of and manage the natural resources of the two hundred seventy-five (275) acres _____ Project Forest Stewardship project area (“Forest Stewardship project area”) in accordance with the MANAGEMENT PLAN, attached as Exhibit A to this AGREEMENT, and all approved amendments thereto, with the intention of providing for protection and restoration of a critically endangered dry-forest ecosystem type in the _____ community.
- 1.3 SCOPE OF WORK - The LANDOWNER shall perform the following technical and professional services:
- (a) Management plan. The LANDOWNER shall carry out the management activities outlined in the approved MANAGEMENT PLAN, attached as Exhibit A to this AGREEMENT.
 - (b) Consultation. The LANDOWNER shall be available for consultation regarding progress, upon request by the STATE.
- 1.4 AUTHORITY TO CARRY OUT MANAGEMENT PLAN - The LANDOWNER hereby represents that it has authority to carry out the MANAGEMENT PLAN and that it is the landowner of “Forest Stewardship project area” as defined in Section 195F-2, Hawaii Revised Statutes, as amended.
- 1.5 NO INCONSISTENT ACTIVITIES - The LANDOWNER shall not take any action on the “Forest Stewardship project area”, which will undermine or conflict with the approved MANAGEMENT PLAN.



STATE OF HAWAII
SCOPE OF SERVICES

II. SECTION 2 - CONTROL AND PROGRESS OF THE WORK

2.1 REPORTS - The LANDOWNER shall submit to the STATE, reports showing work accomplished at the following times:

- (a) Progress Reports. A progress report shall be due on December 31 of each year under this AGREEMENT for which funding has been approved. This report shall include a description of the approved MANAGEMENT PLAN accomplishments and activities, areas needing technical advice, an accounting of expenditures with documentation, and proposed modifications to the current year's management activities. This report shall be submitted to the STATE within 30 days following the due date. If the LANDOWNER would like more than 2 reimbursements per year, a progress report shall accompany each reimbursement request and the "Forest Stewardship project area" shall be made available for a site visit by Department of Land and Natural Resources personnel.
- (b) Annual Report. An annual report shall be due on or before June 30 of each year under this AGREEMENT for which funding has been approved. In the event the contract is executed less than 6 months prior to June 30, then no annual report is due on June 30 of that year. This report shall include a description of MANAGEMENT PLAN accomplishments and activities, areas needing technical advice, and proposed modifications to the next year's approved management objectives, projects and budget. This report shall also include a detailed accounting of expenditures for the preceding 12-month period to provide the basis for the annual reconciliation of the STATE's and the LANDOWNER's respective shares of funding as determined pursuant to Attachment S2, Section 1.1. This report shall be submitted to the STATE within 60 days of due date. This report may also request, subject to approval by the STATE, changes to the management plan, for either or both the practice implementation schedule and/or the budget/payment schedule in order to best consolidate and rectify the past year's outcomes or lack thereof.



STATE OF HAWAII
SCOPE OF SERVICES

- 2.2 DELEGATION OF AUTHORITY - As used herein and throughout this AGREEMENT, unless the context clearly indicates otherwise, the STATE shall include the State of Hawaii Department of Land and Natural Resources and its authorized employees, agents and representatives.



STATE OF HAWAII
COMPENSATION AND PAYMENT SCHEDULE

SECTION 1 – PAYMENT

1.1 SCOPE OF PAYMENT -

- (a) STATE's Payment. In full satisfaction of the STATE's funding share of the approved MANAGEMENT PLAN, which is contingent upon satisfactory completion by the LANDOWNER of the management activities described in the approved MANAGEMENT PLAN, attached as Exhibit A to this AGREEMENT, the STATE agrees to pay the LANDOWNER a total sum not to exceed four hundred sixty-six thousand nine hundred thirty-eight and 00/100 Dollars (\$466,938.00) according to the schedule outlined below that includes fiscal year 2010 through 2019 for completion of the management activities described in the approved MANAGEMENT PLAN. Payments shall be made by the STATE to the LANDOWNER as partial annual reimbursements for actual expenditures made by the LANDOWNER in completing the management activities described in the approved MANAGEMENT PLAN only after the corresponding progress or annual report has been reviewed by the STATE and all reported management activity accomplishments have been verified following an inspection of the "Forest Stewardship project area" by the STATE. Actual expenditures may include but are not limited to in-kind services such as heavy equipment operation and sources of labor. All funds to be paid by the STATE to the LANDOWNER shall be encumbered on an annual basis for the forthcoming fiscal year provided that the STATE has approved the continuation of management activities outlined in Exhibit A of this AGREEMENT for the forthcoming fiscal year.

If in any fiscal year the allocated annual funds are not exhausted due to the LANDOWNER not completing all management activities described in the MANAGEMENT PLAN for that year, the LANDOWNER may request that these funds be incorporated in the following year's encumbrances to complete the management activities which were not completed. If there are sufficient funds available to accommodate LANDOWNER's request and the STATE approves the



STATE OF HAWAII

COMPENSATION AND PAYMENT SCHEDULE

request, this change will be incorporated by written amendment to the AGREEMENT.

If in any fiscal year the STATE does not appropriate, and/or the STATE does not approve the expenditure of, funds sufficient to meet the STATE's funding share of the approved MANAGEMENT PLAN, this AGREEMENT shall automatically terminate without penalty at the end of the last fiscal year for which any funds have been appropriated and approved, subject to Attachment S5, Section 4.1, regarding partial State funding.

- (b) LANDOWNER's Share. In full satisfaction of the LANDOWNER's funding share of the approved MANAGEMENT PLAN, the LANDOWNER agrees to fully complete the management activities described in the approved MANAGEMENT PLAN, and to initially assume all corresponding actual annual expenditures in expectation of the STATE's partial reimbursement for satisfactory completion of these management activities. Expenditures for implementation of the approved MANAGEMENT PLAN which are less than the amounts allocated in the approved budget may be made by the LANDOWNER in its discretion so long as the quality of materials and work as called for in the approved MANAGEMENT PLAN are not adversely affected.



STATE OF HAWAII

COMPENSATION AND PAYMENT SCHEDULE**PATRICK & SHEILA CONANT FOREST STEWARDSHIP
PROJECT BUDGET/PAYMENT SCHEDULE:**

YEAR	Total Budget	Land Owner share	State Share
1	\$185,950	\$110,950	\$75,000
2	\$156,235	\$84,867.50	\$71,367.50
3	\$108,900	\$61,200	\$47,700
4	\$74,650	\$44,075	\$30,575
5	\$76,463	\$44,981.50	\$31,481.50
6	\$84,963	\$42,981.50	\$41,981.50
7	\$83,963	\$41,981.50	\$41,981.50
8	\$83,963	\$41,981.50	\$41,981.50
9	\$83,963	\$41,981.50	\$41,981.50
10	\$83,963	\$41,981.50	\$41,981.50
Total	\$ 1,023,013	\$556,981.50	\$466,031.50

1.2 PAYMENT SCHEDULE –

- (a) Progress Payment. Within 30 days following receipt of the progress report as provided in Attachment S1, Section 2.1(a) for each year for which the STATE has agreed to pay the LANDOWNER as outlined in the schedule above and for which funding has been appropriated, the STATE shall pay to the LANDOWNER a portion of the STATE's funding share of the approved MANAGEMENT PLAN as a partial reimbursement of actual expenditures made to complete approved management activities. This payment shall be subject to the LANDOWNER's satisfactory completion of the corresponding approved management activities described in the approved MANAGEMENT PLAN, attached as Exhibit A to this AGREEMENT, and calculated on the basis of actual expenditures made by the LANDOWNER. This payment shall also be subject to the STATE's approval of such progress report.
- (b) Annual/Final Payment. Within 30 days of receipt of the annual report as provided in Attachment S1, Section 2.1(b), the STATE shall pay to the LANDOWNER the balance of the STATE's approved annual funding share. This payment shall be subject to the LANDOWNER's satisfactory completion of the corresponding



STATE OF HAWAII

COMPENSATION AND PAYMENT SCHEDULE

annual management activities described in the approved MANAGEMENT PLAN, attached as Exhibit A to this AGREEMENT, and calculated on the basis of actual expenditures made by the LANDOWNER.

- (1) Annual or Final Acceptance and Payment - Annual or final acceptance means a written notice from the STATE to the LANDOWNER advising the LANDOWNER of the satisfactory fulfillment of the AGREEMENT's annual or final requirements.

- 1.3 UNAUTHORIZED WORK - The LANDOWNER shall not receive matching STATE funds for management activities not designated in the approved MANAGEMENT PLAN. All work completed by the LANDOWNER prior to receipt of a fully-executed copy of this AGREEMENT, and prior to STATE approval of funding for any subsequent years and prior to STATE approval of any subsequent amendments to the approved MANAGEMENT PLAN, shall be at the LANDOWNER's own volition and risk, including work performed during the period of any deliberations by the STATE in anticipation of approval; provided, however, that if funding and/or amendments applicable to such work are subsequently approved, the LANDOWNER may be paid for such work even if performed prior to such approval.

SECTION 2 - FISCAL RECORDS MAINTENANCE, RETENTION, AND ACCESS

- 2.1 The LANDOWNER shall maintain, in accordance with generally acceptable accounting practices, fiscal records and supporting documents and related files, papers and reports that adequately reflect all direct and indirect expenditures and management and fiscal practices materially related to the LANDOWNER's performance of services paid for by State funds under this AGREEMENT.
 - (a) The STATE, the Comptroller of the State of Hawaii, and any of their authorized representatives, the committees (and their staff) of the Legislature of the State of Hawaii, and the Legislative Auditor of the State of Hawaii shall have the right of access to any book, document, paper, file, or other records of the LANDOWNER that is materially related to the performance by the LANDOWNER of services



STATE OF HAWAII

COMPENSATION AND PAYMENT SCHEDULE

funded by the STATE under this AGREEMENT, in accordance with generally accepted audit procedures, for the purposes of monitoring and evaluating the LANDOWNER's performance of services and the LANDOWNER's management program and fiscal practices to assure the proper and effective expenditure of funds under this AGREEMENT; provided, however, that no party conducting any such audit or examination shall copy, distribute, or retain any of such information or records, with the understanding that it is not the intention that the LANDOWNER's financial and other records and information be made public.

- (b) The right of access shall not be limited to the required retention period but shall last as long as the records are retained. The LANDOWNER shall retain all records related to the LANDOWNER's performance of services funded under this AGREEMENT for at least 3 years after the date of submission of the LANDOWNER's annual reports for any designated period and payment for such expenditures by the STATE in accordance with its matching share, except that if any litigation, claim, negotiation, investigation, audit, or other action involving the records has been started before the expiration of the 3-year period, the LANDOWNER shall retain the records until completion of the action and resolution of all issues that arise from it or until the end of the regular 3-year retention period, whichever occurs later.



STATE OF HAWAII
TIME OF PERFORMANCE

SECTION 1 - EXECUTION OF AGREEMENT

- 1.1 EXECUTION OF AGREEMENT - This AGREEMENT shall be promptly executed by the STATE and the LANDOWNER upon approval by each party.
- 1.2 CERTIFICATION AND APPROVAL OF AGREEMENT - This AGREEMENT shall not be considered binding upon the STATE, unless the availability of the funds therefore has been duly certified as prescribed by Section 103-39, Hawaii Revised Statutes, as amended. Further, this AGREEMENT shall not be considered to be fully executed unless the Office of the Attorney General of the State of Hawaii has approved this AGREEMENT as to form.

SECTION 2 - TERM

- 2.1 INITIAL TERM - The initial term will be for a minimum of _____ (____) years following the completion of any and all management practices for which the LANDOWNER has received cost-share assistance. Accordingly, this AGREEMENT shall commence on the date of full execution hereof and shall be in effect until **September 25, 2022**; subject, however to earlier termination as provided in this AGREEMENT.
- 2.2 STATE FUNDING CONDITION - This AGREEMENT is subject to continued funding of the STATE's share of the approved management budget as outlined in Attachment S2, Section 1.1. Annual funding is provided by the Conveyance Tax pursuant to Act 195, SLH 1993, Section 247-7, Hawaii Revised Statutes, whereby twenty-five percent of the amount collected from this tax shall be paid into the natural area reserve fund from which funds are dispersed to the natural area partnership and forest stewardship programs, and by way of Act 269, SLH 2000 to projects undertaken in accordance with watershed management plans. Payments are then made through the forest stewardship program to reimburse landowners for implementing approved stewardship management practices. Any balance remaining in this fund at the end of any fiscal year shall be carried forward into the fund for the next fiscal year. If in any fiscal year the STATE does not



STATE OF HAWAII
TIME OF PERFORMANCE

appropriate, and/or the STATE does not approve the expenditure of, funds sufficient to meet its share of the approved management budget, this AGREEMENT shall automatically terminate without penalty at the end of the last fiscal year for which any funds have been appropriated and approved, subject to Attachment S5, Section 4.1, regarding partial State funding.



STATE OF HAWAII
**CERTIFICATE OF EXEMPTION
FROM CIVIL SERVICE**

1. By Heads of Departments Delegated by the Director of the Department of Human Resources Development (“DHRD”).*

Pursuant to a delegation of the authority by the Director of DHRD, I certify that the services to be provided under this Contract, and the person(s) providing the services under this Contract are exempt from the civil service, pursuant to § 76-16, Hawaii Revised Statutes (HRS).

(Signature)

(Date)

(Print Name)

(Print Title)

* This part of the form may be used by all department heads and the heads of attached agencies to whom the Director of DHRD expressly has delegated authority to certify § 76-16, HRS, civil service exemptions. The specific paragraph(s) of § 76-16, HRS, upon which an exemption is based should be noted in the contract file. If an exemption is based on § 76-16(b)(15), the contract must meet the following conditions:

- (1) It involves the delivery of completed work or product by or during a specific time;
- (2) There is no employee-employer relationship; and
- (3) The authorized funding for the service is from other than the "A" or personal services cost element.

NOTE: Not all attached agencies have received a delegation under § 76-16(b)(15). If in doubt, attached agencies should check with the Director of DHRD prior to certifying an exemption under § 76-16(b)(15). Authority to certify exemptions under §§76-16(b)(2), and 76-16(b)(12), HRS, has not been delegated; only the Director of DHRD may certify §§ 76-16(b)(2), and 76-16(b)(12) exemptions.

2. By the Director of DHRD, State of Hawaii.

I certify that the services to be provided under this Contract, and the person(s) providing the services under this Contract are exempt from the civil service, pursuant to §76-16, HRS.

(Signature)

(Date)

(Print Name)

(Print Title, if designee of the Director of DHRD)



STATE OF HAWAII
SPECIAL CONDITIONS

SECTION 1 – INSPECTIONS

1.1 The STATE shall have the right to make inspections of the “Forest Stewardship project area” after prior notice to the LANDOWNER. In addition, the STATE shall be obligated to inspect the work on the “Forest Stewardship project area” not less frequently than once per year under this AGREEMENT, and more frequently in the case of a LANDOWNER default as provided in Section 4.1(d) below or when the LANDOWNER makes more than 2 reimbursement requests per year as provided in Attachment S1, Section 2.1. The STATE shall notify the LANDOWNER within a reasonable time thereafter of any perceived defaults in the LANDOWNER's implementation of the approved MANAGEMENT PLAN. The LANDOWNER hereby represents that it has authority to allow access to the “Forest Stewardship project area” by the STATE in connection with this AGREEMENT, conditional upon receipt of a liability waiver, acceptable to the LANDOWNER for all state personnel visiting the “Forest Stewardship project area”.

SECTION 2 - AMENDMENTS

2.1 The LANDOWNER may propose for approval by the STATE, and the STATE may approve, minor alterations to the approved MANAGEMENT PLAN, which will not have a material adverse impact on the achievement of the overall management objectives of the approved MANAGEMENT PLAN. This includes minor changes to the practice implementation schedule and/or changes in the budget/payments schedule so long as the total management activities do not subtract from or exceed the total scope of the approved MANAGEMENT PLAN and the budget/payments schedule does not exceed the total annual budget allocations up to and including the budget request for that year, and so long as the STATE has sufficient funding available to accommodate such a request.

2.1 The LANDOWNER may propose for approval by the STATE, and the STATE may approve, significant changes to the approved MANAGEMENT PLAN or budget to adapt to current conditions. Significant amendments to the approved MANAGEMENT PLAN



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shall include an amended budget, which will increase the overall STATE's funding share above the total amount set forth in the approved budget/payment schedule. The STATE shall make the proposed amendments available for public review prior to final approval.

- 2.3 The proposed amendments may include, without limitation, re-establishment of management priorities, increase or reduction of the specified work, increases to the budget/payments schedule, or time for performance of specified tasks, all as determined considering the natural conditions of the “Forest Stewardship project area,” existing management priorities, threats, potential for decline of the natural resource during any period under consideration, availability of specialized labor or technical expertise, permitting requirements and time needed to obtain permits, and other material factors.
- 2.4 Any proposed expenditures which will increase the overall STATE's funding share above the amount set forth in the approved budget of the approved MANAGEMENT PLAN, which are proposed either as a result of additional costs required to implement the approved MANAGEMENT PLAN or as a result of amendments to the approved MANAGEMENT PLAN, must be mutually agreed upon in advance by and between the STATE and the LANDOWNER. If so agreed upon the approval of these expenditures shall be incorporated in written amendment to this AGREEMENT.
- 2.5 Economic Hardship. Notwithstanding other provisions of this AGREEMENT, in the event that the LANDOWNER determines in good faith that it is financially unable without undue economic hardship to fulfill its funding share as provided in Attachment S2, Section 1.1(b), or to carry out fully the management activities described in the approved MANAGEMENT PLAN, attached as Exhibit A to this AGREEMENT, within the budget and time period established thereby, the LANDOWNER may apply to the STATE to renegotiate the terms thereof.
- (a) Negotiation of Amendment. In such event, the STATE and the LANDOWNER shall meet and negotiate in good faith an acceptable amendment to the approved MANAGEMENT PLAN that seeks to accomplish the significant objectives of the approved MANAGEMENT PLAN reasonably within the LANDOWNER's



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financial means. The amendment may include, without limitation, re-establishment of management priorities and reduction and/or deferral of the specified work, involving significant costs, and/or extension of time for performance of specified tasks, all as determined considering the natural conditions of the “Forest Stewardship project area,” existing management priorities, threats, potential for decline of the natural resource during any period under consideration, other potential sources of funding, and other material factors.

- (b) Disputes. If the STATE and the LANDOWNER are unable to agree reasonably and in good faith on a suitable amendment to the approved MANAGEMENT PLAN, the parties shall refer any such disputes to arbitration as provided in the General Conditions, Section 11.

- (c) No Termination for Economic Hardship. This provision shall not be construed to allow the LANDOWNER or the STATE to terminate this AGREEMENT for economic hardship; it is rather intended to provide a mechanism for reasonable revisions to the approved MANAGEMENT PLAN for economic hardship.

SECTION 3 - PAYBACK OF STATE FUNDS

- 3.1 In the event that the LANDOWNER sells, conveys, or otherwise transfers LANDOWNER’s right, title, or interest in the “Forest Stewardship project area,” or any portion thereof, during the initial term of this AGREEMENT as defined in Attachment S3, Section 2.1, the LANDOWNER shall within 90 days of the sale, conveyance or transfer of title or interest in the “Forest Stewardship project area,” pay back to the STATE a portion of the amount paid by the STATE to the LANDOWNER pursuant to this AGREEMENT. The amount to be paid back to the STATE shall be that fraction of the total matching funds received by the LANDOWNER under this AGREEMENT that is equal to the fraction of the “Forest Stewardship project area” that is sold, conveyed or otherwise transferred by the LANDOWNER.



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3.2 In the event that the LANDOWNER sells, conveys, or otherwise transfers LANDOWNER's right, title, or interest in the "Forest Stewardship project area," or any portion thereof, during the initial term of this AGREEMENT as defined in Attachment S3, Section 2.1, the LANDOWNER will not be required to reimburse the STATE as set forth in Attachment S5, Section 3.1 for the cost-share assistance received if the person(s) who acquire the property contractually agree to assume full responsibility for this AGREEMENT for the initial term of the AGREEMENT, including but not limited to management and financial responsibilities and penalties contained herein. See Agenda Item **C-3**, as amend, approved at the Board of Land and Natural Resources **June 13, 2008** meeting. Nothing in this provision shall relieve the LANDOWNER of its obligations under this AGREEMENT.

SECTION 4 - TERMINATION; DEFAULT; PENALTY PAYBACK

4.1 TERMINATION OF THE AGREEMENT - It is mutually agreed that this AGREEMENT may be terminated for any one of the following reasons on the following terms:

- (a) No State Funding. This AGREEMENT shall be terminated if the STATE does not approve funding for the forthcoming fiscal year of the approved MANAGEMENT PLAN. In such event, this AGREEMENT shall automatically terminate without penalty at the end of the funding period then in effect.
- (b) Partial State Funding. This AGREEMENT may be terminated by the LANDOWNER if the STATE approves only a portion of its share of funding for the forthcoming fiscal year as outlined in the budget provided in the approved MANAGEMENT PLAN.
 - (1) In such event, the LANDOWNER shall elect, by written notice to the STATE, either:
 - (A) to terminate this AGREEMENT without penalty at the end of the funding period then in effect; or



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- (B) to revise the approved MANAGEMENT PLAN and budget in the LANDOWNER's reasonable discretion to accomplish significant management goals which can reasonably be funded with the amount of STATE funding actually approved.
- (c) Transfer to Government Agency. This AGREEMENT may be terminated without penalty if the “Forest Stewardship project area” is transferred or sold to a government agency committed to forest stewardship and that possesses the technical and professional skills to manage the “Forest Stewardship project area” natural resources.
- (d) LANDOWNER Default. This AGREEMENT may be terminated by the STATE upon substantial evidence that progress being made by the LANDOWNER in carrying out the approved MANAGEMENT PLAN is inadequate, incorrect, or insufficient to substantially complete on a timely basis the work called for in the approved MANAGEMENT PLAN subject to the lack of performance notification provisions set forth below.
- (1) Penalties Apply. In the event of termination for default in accordance with these provisions, the penalty payback provisions set forth below shall apply.
- (2) Lack of Performance Notification. In such event, the STATE may terminate for default, provided the STATE adheres to the following procedures for notice and opportunity to cure prior to termination:
- (A) The STATE shall first notify the LANDOWNER in writing of any perceived inadequacy, incorrectness or insufficient progress. The STATE and the LANDOWNER shall meet within two weeks thereafter, and every three months thereafter until one year following the date of the notice, and discuss in good faith the



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perceived failure and the reasons therefore and any subsequent progress or lack thereof. If the reason for the failure is a good faith inability of the LANDOWNER to carry out the terms of the MANAGEMENT PLAN for reasons beyond the LANDOWNER's reasonable control, including without limitation economic hardship as described in Attachment S5, Section 2.5 above, the STATE and the LANDOWNER shall specifically consider the need to amend the approved MANAGEMENT PLAN, including extending the time to carry out the work called for in the approved MANAGEMENT PLAN and/or revising the budget established in the approved MANAGEMENT PLAN, subject to the provisions of Attachment S1, Section 1.5 and Attachment S5, Section 2 of this AGREEMENT regarding amendments to this AGREEMENT and the approved MANAGEMENT PLAN. Following the date of the notice, the STATE shall be obligated to inspect the "Forest Stewardship project area" once each quarter after notifying the LANDOWNER, to determine the updated status of the perceived default.

- (B) Following the expiration of the one year period following notice of default given by the STATE to the LANDOWNER and failure of the LANDOWNER to remedy the default, or to make significant progress to remedy the default if by its nature the default cannot reasonably be remedied within one year, the STATE may elect to notify the LANDOWNER of its intention to terminate this AGREEMENT for default. Such notice shall be in writing, shall state that the STATE will terminate the AGREEMENT for default on a date not less than 3 months thereafter if the LANDOWNER does not remedy the default, or to make significant progress to remedy the default if by its nature the default cannot reasonably be



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remedied within 3 months, and shall specify that penalties as provided under this AGREEMENT shall apply.

- (C) If the LANDOWNER fails to remedy the default within 3 months thereafter, or to make significant progress to remedy the default if by its nature the default cannot reasonably be remedied within 3 months, the STATE may terminate this AGREEMENT effective immediately for default by written notice thereof to the LANDOWNER.
 - (D) The STATE shall be deemed to have complied with these provisions if it attempts in good faith to meet with the LANDOWNER and to inspect the “Forest Stewardship project area” as provided above, whether or not the LANDOWNER cooperates in such procedures.
- (3) All disputes regarding default and termination under this AGREEMENT, which cannot be resolved by the parties, shall be referred to arbitration as provided in the General Conditions, Section 11.
 - (4) If the LANDOWNER has not fully performed its work under this AGREEMENT on expiration or termination of this AGREEMENT, the STATE may withhold the final payment to the LANDOWNER pending full completion of the LANDOWNER's work. This withheld payment shall be paid by the STATE to the LANDOWNER on final acceptance and tax clearance as provided in Attachment S2, Section 1.2 (b) and the General Conditions, Section 17.

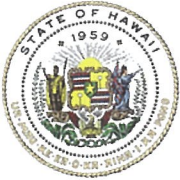
4.2 PENALTY PAYBACK -



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EXHIBIT A

Waikoloa Dry Forest Recovery Project Forest Stewardship Management Plan.



STATE OF HAWAII

CONTRACTOR'S

STANDARDS OF CONDUCT DECLARATION

For the purposes of this declaration:

"Agency" means and includes the State, the legislature and its committees, all executive departments, boards, commissions, committees, bureaus, offices; and all independent commissions and other establishments of the state government but excluding the courts.

"Controlling interest" means an interest in a business or other undertaking which is sufficient in fact to control, whether the interest is greater or less than fifty per cent (50%).

"Employee" means any nominated, appointed, or elected officer or employee of the State, including members of boards, commissions, and committees, and employees under contract to the State or of the constitutional convention, but excluding legislators, delegates to the constitutional convention, justices, and judges. (Section 84-3, HRS).

On behalf of _____, CONTRACTOR, the undersigned does declare as follows:

1. CONTRACTOR is is not a legislator or an employee or a business in which a legislator or an employee has a controlling interest. (Section 84-15(a), HRS).
2. CONTRACTOR has not been represented or assisted personally in the matter by an individual who has been an employee of the agency awarding this Contract within the preceding two years and who participated while so employed in the matter with which the Contract is directly concerned. (Section 84-15(b), HRS).
3. CONTRACTOR has not been assisted or represented by a legislator or employee for a fee or other compensation to obtain this Contract and will not be assisted or represented by a legislator or employee for a fee or other compensation in the performance of this Contract, if the legislator or employee had been involved in the development or award of the Contract. (Section 84-14 (d), HRS).
4. CONTRACTOR has not been represented on matters related to this Contract, for a fee or other consideration by an individual who, within the past twelve (12) months, has been an agency employee, or in the case of the Legislature, a legislator, and participated while an employee or legislator on matters related to this Contract. (Sections 84-18(b) and (c), HRS).

CONTRACTOR understands that the Contract to which this document is attached is voidable on behalf of the STATE if this Contract was entered into in violation of any provision of chapter 84, Hawaii Revised Statutes, commonly referred to as the Code of Ethics, including the provisions which are the source of the declarations above. Additionally, any fee, compensation, gift, or profit received by any person as a result of a violation of the Code of Ethics may be recovered by the STATE.

* Reminder to Agency: If the "is" block is checked and if the Contract involves goods or services of a value in excess of \$10,000, the Contract must be awarded by competitive sealed bidding under section 103D-302, HRS, or a competitive sealed proposal under section 103D-303, HRS. Otherwise, the Agency may not award the Contract unless it posts a notice of its intent to award it and files a copy of the notice with the State Ethics Commission. (Section 84-15(a), HRS).

CONTRACTOR

By _____
(Signature)

Print Name _____

Print Title _____

Name of Contractor _____

Date _____

Exhibit B.

KEAUHOU BIRD CONSERVATION CENTER

Discovery Forest Restoration Project



PO Box 2037
Kamuela, HI 96743
Tel +1 808 776 9900
Fax +1 808 776 9901

Responsible Forester:

Nicholas Koch
nick_koch@forestsolutionsinc.com
+1 808 319 2372 (direct)

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1. CLIENT AND PROPERTY INFORMATION

1.1. Client

Landowner Name: Kamehameha Schools

Physical Address:
99-1808 Pii Mauna Drive, Volcano, HI 96785

Licensee: Zoological Society of San Diego dba San Diego Zoo Global

Licensee contact: Bryce Masuda, P.O. Box 39, Volcano, HI 96785

Licensee Phone | Email: +1 (808) 987-7300 | bmasuda@sandiegozoo.org

TMK number: (3)-9-9-001-004

State and County Zoning: Agriculture (20)

Total property acreage: 170.6 acres

Proposed stewardship area: 120.7 acres

Elevation range: 4,026 ft – 4,092 ft ASL

Slope: 0% - 17%

Streams, gulches: None

1.2. Consultant

Company: Forest Solutions, Inc.


Name: Nicholas Koch, Thomas Baribault, Ph.D.

Title: General Manager, Research Forester

Address: P.O. Box 250
Paauilo, HI 96776

Email: nick_koch@forestsolutionsinc.com

Phone | Fax: +1 (808) 776-9900 x 2 | +1 (808) 776-9901

Signature:


Date: April 27, 2016

2. Executive Summary

This document constitutes a forest management plan (FMP) designed to restore native *Acacia koa* (koa) and *Metrosideros polymorpha* ('ōhi'a) forest and associated plant and animal communities on TMK (3)-9-9-001-004 in Ka'ū, Hawaii Island. The property is licensed by the San Diego Zoo Global (SDZG) from Kamehameha Schools (KS), and the project will be implemented by the San Diego Zoo Global, HFI, and several partner entities. The licensed area is commonly known as the Keauhou Bird Conservation Center (KBCC). The license encompasses 170.6 acres, of which 120.7 acres will be restored by implementing this FMP. This management plan advances several objectives:

- i. Restore abandoned pasture lands to endemic *Acacia koa* dominated forest emulating natural canopy structure and understory species diversity.
- ii. Improve habitat quality for endemic birds by maintaining the forest free of invasive species.
- iii. Provide educational context for local students and public groups, emphasizing the interdependence of rare endemic birds on habitat quality, forest composition, and structure.
- iv. Provide forest materials (fruits, browse, and perching) for captive birds at the Keauhou Bird Conservation Center.

The temporal scope of this plan is ten (10) years from date of initialization, and would establish 161.3 acres of restored *Acacia koa* overstory, enriched extant native forest, and native plant gardens for endangered bird food production. Although understory plant species exist in some abundance in adjacent forest areas, natural recruitment is limited by invasive grass cover and will be augmented by planting. In addition, maintenance activities, including invasive weed control, forest stand improvement, and endemic species enrichment plantings, will be conducted across 1.8 acres of previously established koa plantings.

A broader purpose of this FMP is to enhance public awareness of, and direct involvement in, native Hawaiian forest restoration projects. Collaborators on the project will include KS, SDZG, HFI, the Hawai'i Community Foundation (HCF), and the Hawai'i Tourism Authority (HTA), together coordinating a combination of smaller entities, volunteer groups, and educational groups to implement several types of forest restoration. Demographics that otherwise rarely see native Hawaiian forests will be given opportunities to learn about these ecosystems and contribute to their expansion.

The primary reforestation overstory species proposed for planting in this project, *Acacia koa*, is among the most valuable Hawaiian species in terms of timber. Harvesting and monetization, however, are outside the scope of this plan and the long-term objectives of KBCC; the forest is intended to serve as native bird habitat and an outdoor classroom rather than for timber production. Implementation of this plan will yield a closed canopy koa forest to replace abandoned pastures within five years. In areas with varying degrees of extant forest cover, endemic species diversity will be increased by enrichment plantings, and some intensively planted areas adjacent to bird breeding enclosures will improve the locally available food supply for the endangered birds. Along with the adjacent Keauhou Ranch and Kilauea Forest, this KBCC-HFI forest restoration project will enlarge the contiguous available habitat for supporting native fauna and flora. The project seeks funding opportunities from the State of Hawaii Forest Stewardship Program (FSP).

3. Introduction

3.1. Site description

3.1.1. Parcel and location

The surveyed property, TMK (3)-9-9-001-004, subsumes the area defined in this FMP as the KBCC. The KBCC subset area spans elevations between 4,026 and 4,092 feet above sea level, near the town of Volcano, Hawai'i Island, in the Ka'u District. The Southern border of the KBCC is adjacent to residential lots in Volcano, but the land itself is zoned agricultural (Ag-20). The site can be accessed from Hilo by travelling on Highway 11 to Volcano, then proceeding approximately one (1) mile past the Hawai'i Volcanoes National Park entrance and turning right on Pi'i Mauna Drive. Continuing to the end of Pi'i Mauna, the property is accessed via a gate to Kamehameha Schools Keauhou Ranch property.

3.1.2. Site History

3.1.2.1. Land use history

Ownership records and consultation with KS staff indicated a mixed land use history for KBCC, including intensively grazed areas at the bottom of the parcel with varying levels of grazing intensity throughout. Cattle were removed not later than 2002 from the entire ranch, and before 1996 from the KBCC (construction of the Center began in 1995). The San Diego Zoo Global has preserved and restored endangered Hawaiian birds since 1993, including the 'alalā. The license extends beyond the 10-year planning period of this FMP.

3.1.2.2. Historical or cultural resources

No historical or archaeological items have been found either during Forest Solutions (management planner) site visits or in consultation with KS or KBCC personnel. The significant distance from the ocean, high rainfall, and long-term ranching and potentially logging are all factors that make the discovery of archaeological or cultural elements highly improbable. In the unlikely event that objects of historical, cultural, or archaeological importance are discovered during the course of any forest management activities, these items will be reported to the State of State Historic Preservation Division of the Department of Land and Natural Resources (SHPD, dlnr@hawaii.gov, (808) 692-3015).

3.1.2.3. Infrastructure

The principal infrastructure elements featured in this FMP are road and trail access routes. Although the KBCC also contains headquarters buildings, bird rearing enclosures, water catchments, and ponds, areas containing these structures or features are excluded from this FMP.

3.2. Plant ecosystems

The main defined, original forest types present on the parcel are (1) tall stature wet koa-ōhi'a-hāpu'u forest, type 159A¹, and 'ōhi'a-koa-hāpu'u-kanawao forest, type 159B. Although some areas within this forest are dominated by alien pasture grasses as a result of decades of grazing, the original forest cover was one of these two types, and remaining forest canopy satisfies the species composition and vegetation stature definitions for these classifications. The dominant native tree species are *Acacia koa* (koa) and *Metrosideros polymorpha*

¹http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCAQFjAA&url=http%3A%2F%2Fwww.nrcc.usda.gov%2FInternet%2FFSE_DOCUMENTS%2Fnrcs142p2_036810.xlsx&ei=ZA9U5aBAZHdoATi-IFY&usq=AFQjCNFAX7W8pKP05Dhw6GQ4oBdz99aTBw&bvm=bv.74035653,d.cGU&cad=rja

(‘ōhi‘a), which are present in most size classes from 1” or 2” diameter through trees as large 40” diameter. Other native tree species such as kolea (*Myrsine sandwicensis*), ōlapa (*Cheirodendron trigynum*), and kāwa‘u (*Ilex anomala*) are present in the understory at reasonable abundance.

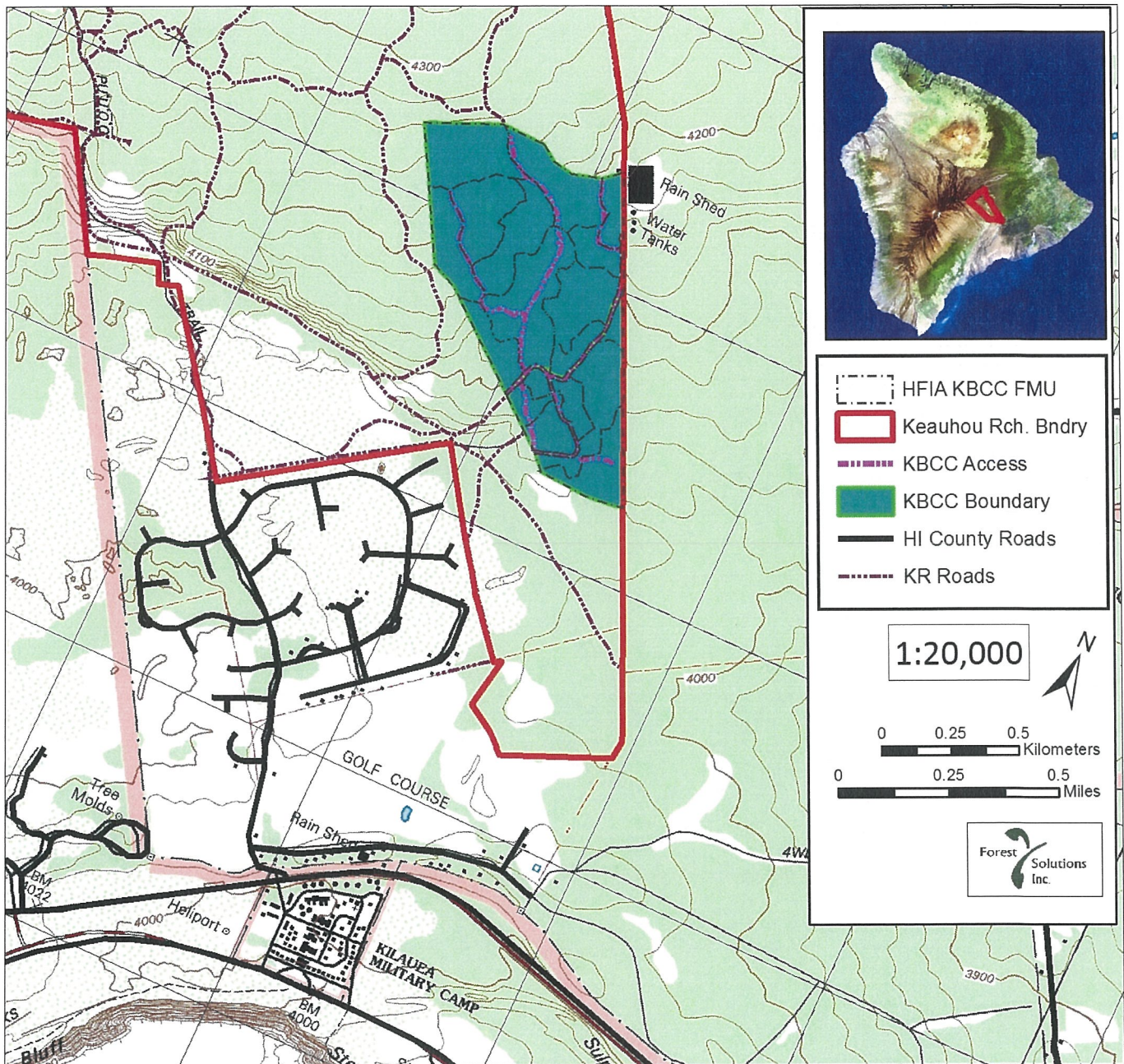


Figure 1. The Discovery Forest project is located near the town of Volcano, Ka’ū, Hawai’i Island, and can be accessed via Pi’i Mauna Drive. Public access is via permission and invitation only, since KBCC is located on private land.

Table 1. Species diversity is relatively low in both endemic and alien taxa; list derived from aerial and ground surveys.

Species name	Species	Origin	HWRA [‡]	Flower	Fruit	Seed
koa	<i>Acacia koa</i>	Endemic	---	X		X
'olapa	<i>Cheirodendron trigynum</i>	Endemic	---	X	X	
pilo	<i>Coprosma spp.</i>	Endemic	---	X	X	
kawa'u	<i>Ilex anomala</i>	Endemic	---	X		
alani	<i>Melicope clusiifolia</i>	Endemic	---	X		
'ohi'a	<i>Metrosideros polymorpha</i>	Endemic	---	X	X	X
naio	<i>Myoporum sandwicense</i>	Endemic	---	X	X	
kolea	<i>Myrsine lessertiana</i>	Endemic	---	X	X	
faya / fire tree	<i>Morella faya</i>	Alien	17	X	X	
Bushes/Shrubs						
pa'iniu	<i>Astelia menziesiana</i>	Endemic	---			
a'a li'i	<i>Dodonea viscosa</i>	Endemic	---	X	X	
mamaki	<i>Pipturus albidus</i>	Endemic	---	X		X
'akala	<i>Rubus hawaiiensis</i>	Endemic	---	X	X	
puki'awe	<i>Styphelia tameiameia</i>	Endemic	---	X	X	
'ohelo	<i>Vaccinium reticulatum</i>	Endemic	---	X	X	
firethorn	<i>Pyracantha koidzumii</i>	Alien	7	X	X	
blackberry	<i>Rubus argutus</i>	Alien	21.5	X	X	
yellowberry	<i>Rubus ellipticus</i>	Alien	(>15)	X	X	
Grass and Sedges						
meadow rice	<i>Eragrostis elliottii</i>	Alien	12			X
guinea grass	<i>Pennisetum clandestinum</i>	Alien	18	X		
Ferns						
uluhe	<i>Dicranopteris linearis</i>	Indigenous	---			
hāpu'u	<i>Cibotium glaucum</i>	Endemic	---			
palapalai	<i>Microlepia strigosa</i>	Endemic	---			
pala'a	<i>Sphenomeris chinensis</i>	Endemic	---			
Vines and herbaceous plants						
'ie 'ie	<i>Freycinetia arborea</i>	Indigenous	---			
maile	<i>Alixia oliviformis</i>	Endemic	---	X		X
ala ala wainui	<i>Piperomia spp.</i>	Endemic	---	X	X	

[‡] <https://sites.google.com/site/weedriskassessment/>

3.2.1. Hydrology

Although the KBCC is located toward the windward side of Hawai'i (Figure 2) on the wetter side of Keauhou Ranch and receives abundant rainfall (Figure 2), there are no perennial streams or seasonal watercourses on the parcel, nor are there wetlands. The unique management concerns of streamside management zones (SMZ, aka Special Management Zones) are not necessary for this FMP. Mean annual rainfall in this location is quite high, ranging from above 4" per month in the comparatively dry summer months to more than 12" monthly (Figure 2) in the relatively wetter months of November through March². The area is at virtually no risk of drought.

² Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas

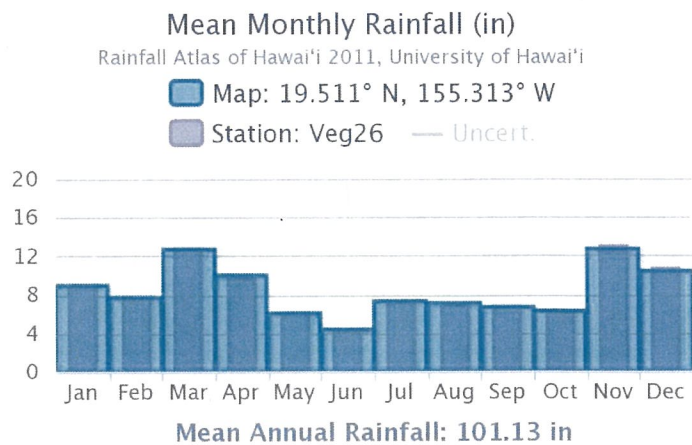
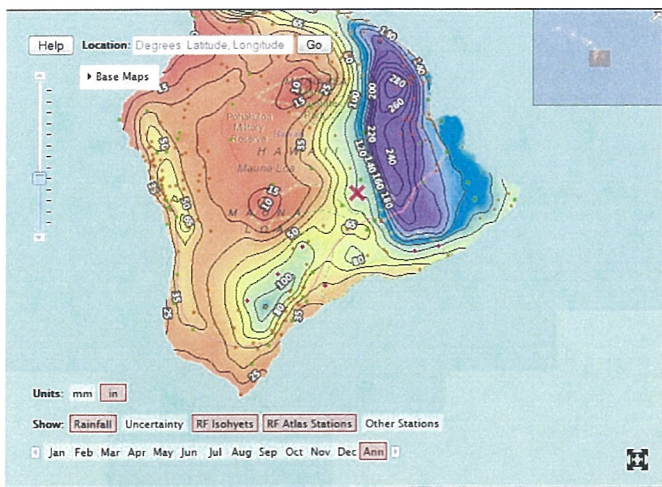


Figure 2. The property is located in an intermediate rainfall zone on Hawaii Island, with 101.13 inches of rain accumulation annually.

3.2.2. Soils

3.2.2.1. Soil classification

The major soil types across the property, which contains Map Units 530, 603, 719, and 727, with soil series including the Hilea-lava flow complex, Pekailio stony medial loam, Heake ashy loam, and the Puaulu hydrous silt loam. These are relatively deep soils, with depth to first restrictive layer typically greater than 60", good drainage, and no flooding, ponding, or hydrous components (with the exception of Puaulu, Appendix A)³.

3.2.3. Flora and Fauna

Although a full biological assessment is not available for this planning exercise, KBCC personnel have reported the presence of numerous native bird species⁴. The relatively common 'io (*Buteo solitarius*) has been sighted numerous times in the area, and it is highly likely that the KBCC also harbors the Hawaiian hoary bat ('ope'ape'a, *Lasiurus cinereus semotus*), pueo (*Asio flammeus*), and 'i'iwi (*Vestiaria coccinea*). Other native bird species that occur in varying densities include 'apapane (*Himatione sanguinea*), Hawai'i 'Amakihi (*Hemignathus virens*), 'ōma'ō (*Myadestes obscurus*), Hawai'i 'elepaio (*Chasiempis sandwichensis*), and nēnē (*Branta sandvicensis*). Non-native bird species include Japanese bush-warbler (*Horornis diphone*), red-billed leiothrix (*Leiothrix lutea*), Northern cardinal (*Cardinalis cardinalis*), common myna (*Acridotheres tristis*), barn owl (*Tyto alba*), Japanese white-eye (*Zosterops japonicus*), kalij pheasant (*Lophura leucomelanos*), and Erckel's francolin (*Francolinus erckelii*). In captivity, the KBCC propagates and/or supports 'alalā (*Corvus hawaiiensis*), kiwikiu (*Pseudonestor xanthophrys*), puaiohi (*Myadestes palmeri*), palila (*Loxioides bailleui*), and 'akikiki (*Oreomystis bairdi*); management of these five species is categorically not a component of this FMU; enclosures should not be considered as part of the area under management. Other non-native birds common to the area can be found in the ecological site description prepared by the USDA NRCS.

3.3. Threat assessments

Principal threats to this property and forest restoration projects include biotic agents (invasive plants, animals, pests, and diseases) as well as abiotic events such as wildfire and wind damage. Geological threats could

³ <http://soildatamart.nrcs.usda.gov/templates.aspx>

⁴ Masuda, Bryce. 2014. Pers. Comm.

include earthquake or lava inundation, although the latter is more remote possibility because the Kilauea caldera is at a lower elevation and the Mauna Kea lava flow zones bypass Volcano.

3.3.1.1. Invasive species

By a large margin, invasive species present the most serious persistent threat to integrity of native Hawaiian forest ecosystems. Eliminating those invasive species currently present, suppressing their regeneration, and preventing recruitment of incipient invasive species is a major priority of this FMP.

3.3.1.2. Fire risk

Fire risk is typically low to nonexistent during the wet season at KBCC, but fires have occurred in the recent past at adjacent sections of Keauhou Ranch, most recently in 2012 only a few hundred meters from the KBCC border. In the event of atypical, prolonged drought, it is conceivable that fire could pose a risk to this project, and as such this FMP recommends the maintenance vegetation-free roads and trails to act as fire breaks. A fire response plan is maintained by KS for the entire Keauhou Ranch parcel, within which KBCC is subsumed. The adjacent Hawai'i Volcanoes National Park is the preferred first responder.

3.3.1.3. Flood risk

The absence of streams and wetlands mitigates flood risk at the KBCC.

3.3.1.4. Human access control

Intentional damage by human activity is a low threat to this property due to its public profile, gated access, and constant presence of KBCC and KS personnel.

3.5. Map Plates

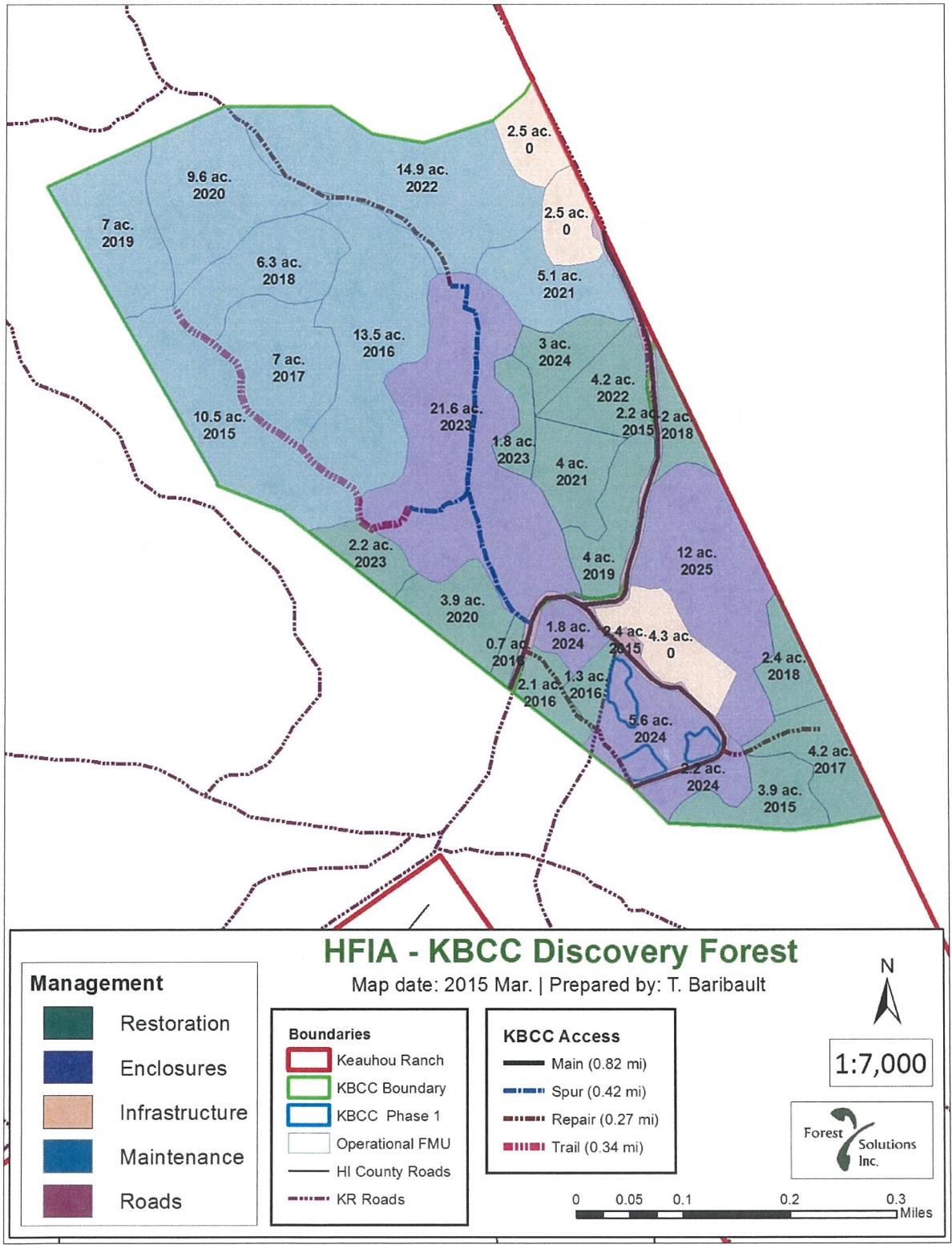


Figure 3. Forest Management Units (FMU) include prescriptions for 39.7 acres of koa forest restoration (green), 73.9 acres of maintenance (light blue), 4.6 management for roads (purple), and 2.5 acre plantings around bird enclosures (KBCC Phase 1).

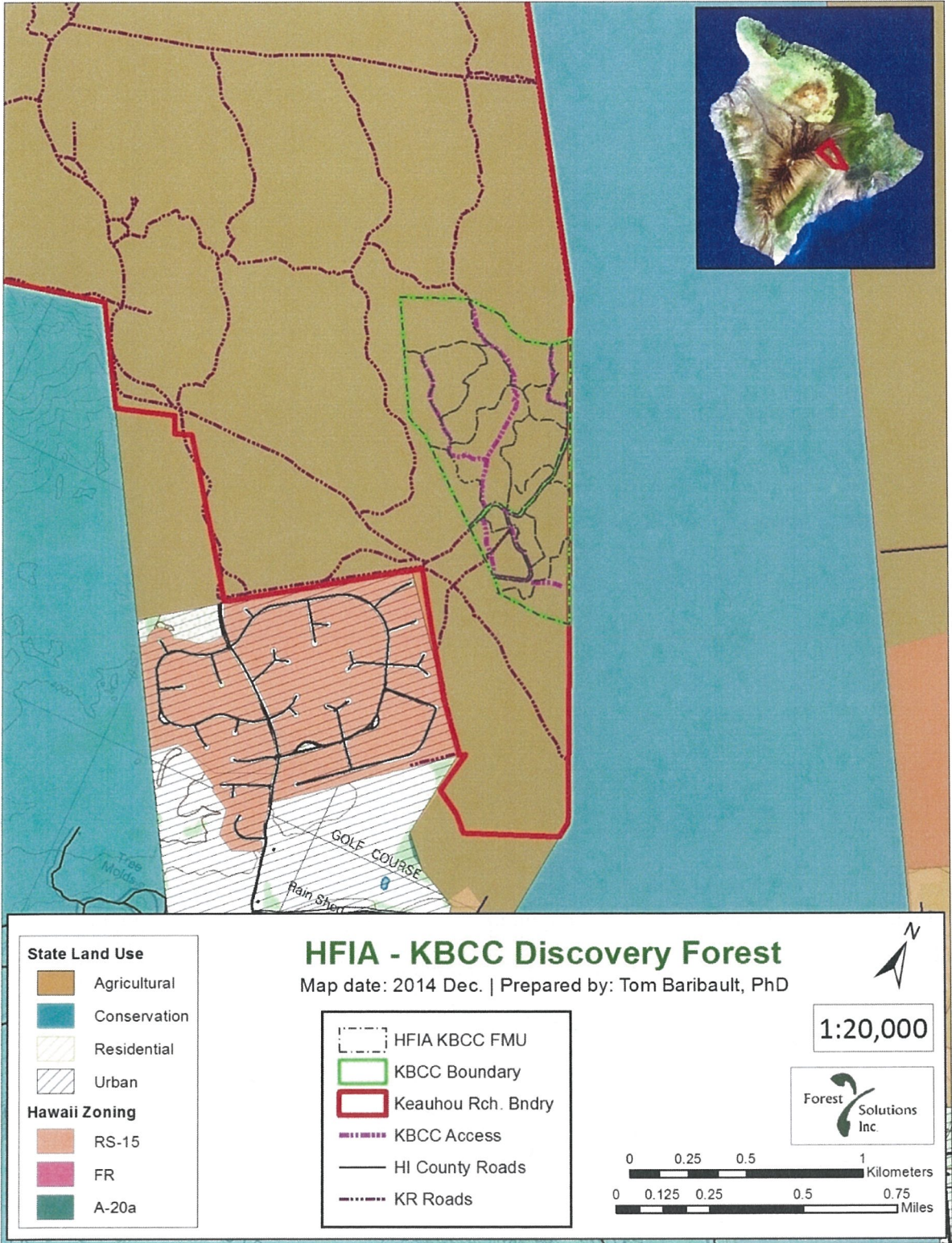


Figure 4. State land use district for the KBCC location is Agricultural, and the County of Hawai'i Zoning is A-20a.

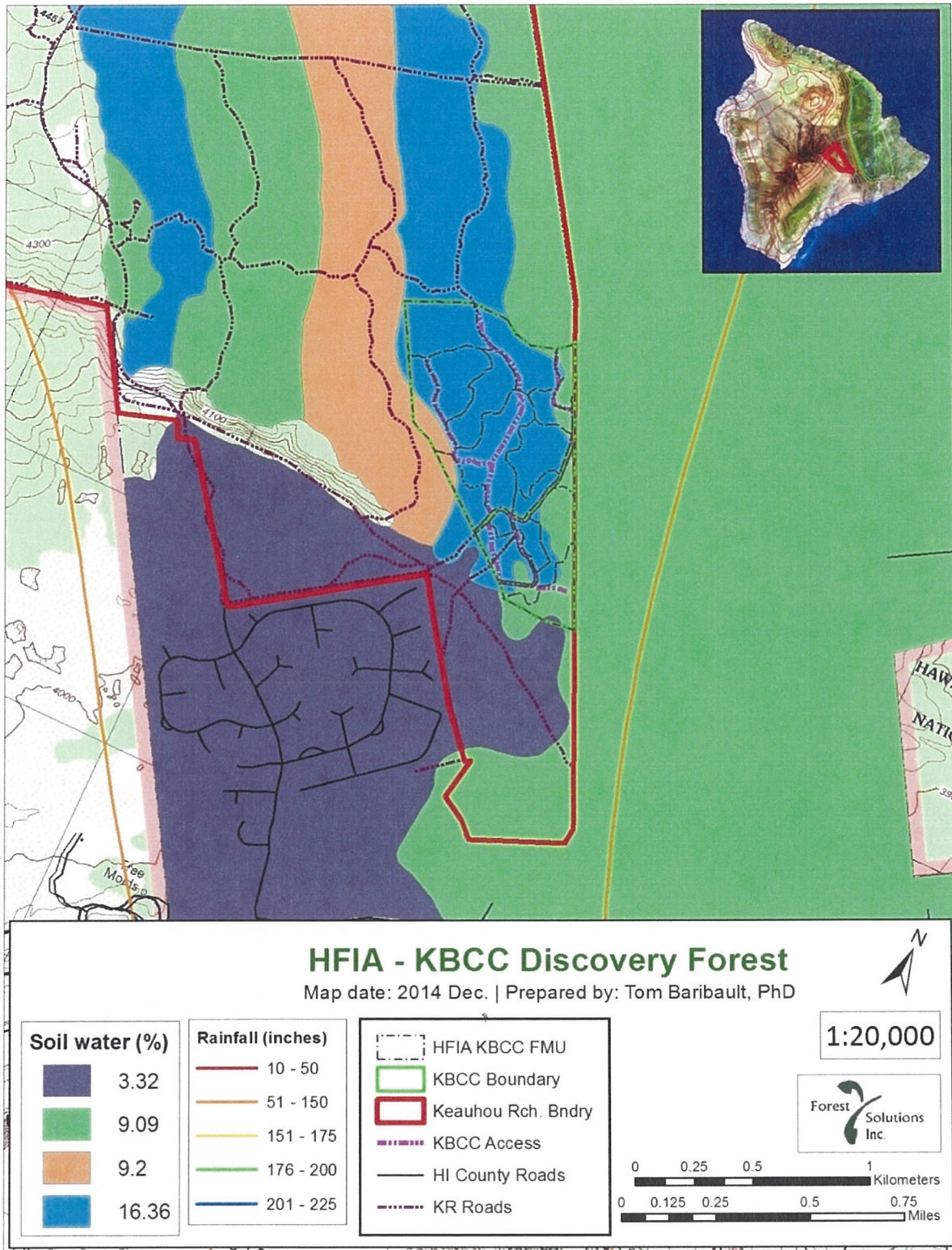


Figure 5. Soil water content ranges between 3.3% and 16.4%, and the area is within the 51" to 150" rainfall isohyet.

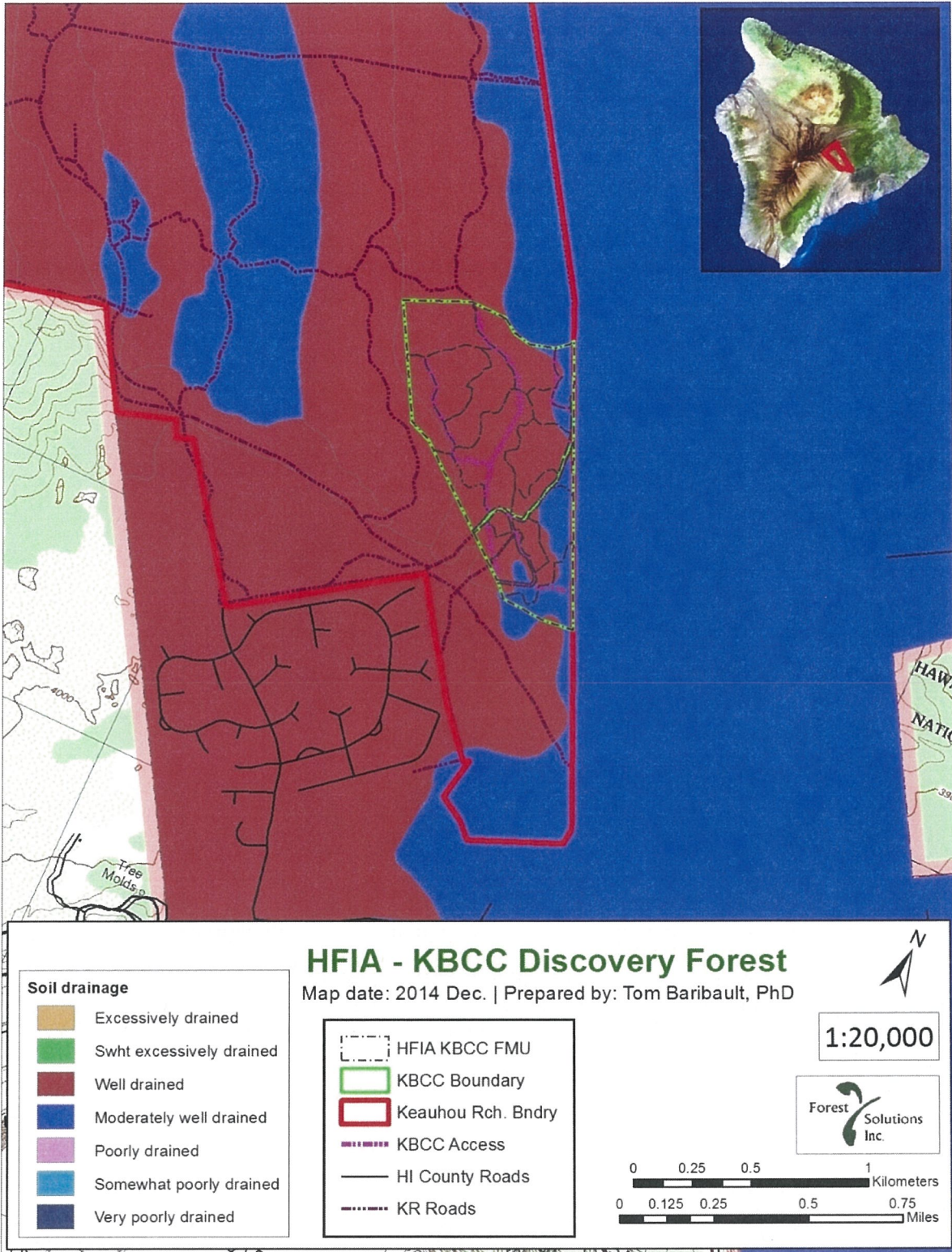


Figure 6. The property is located on well-drained soils spanning several soil types. The most common soils are loams, with one lava flow type (Appendix A).

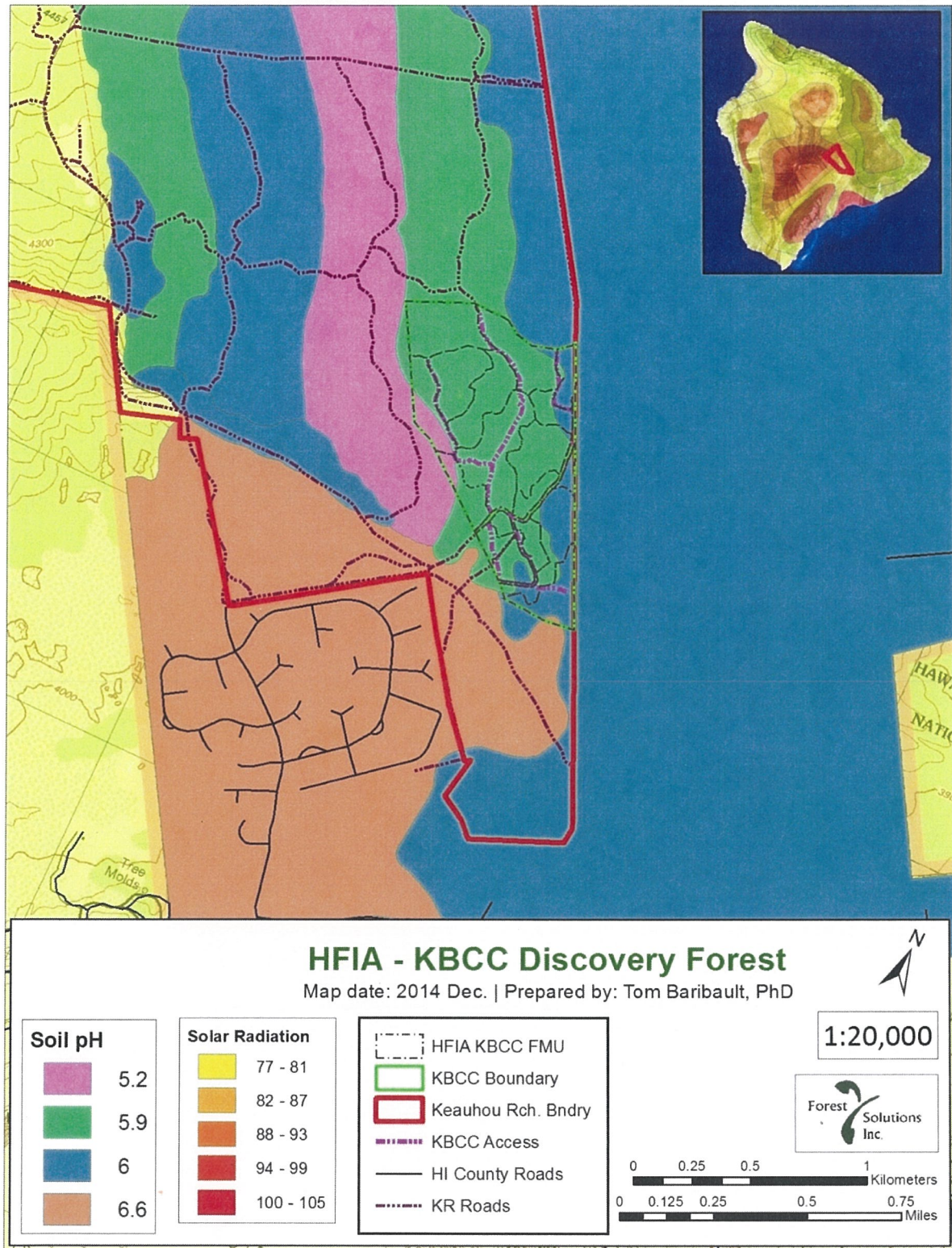


Figure 7. Soils at KBCC are somewhat acidic to nearly neutral, with pH ranging from 5.2 to 6.6. Solar irradiation is intermediate, at approximately 77 to 81 W m⁻² (yellow, inset).

4. Management Prescriptions

4.1. Forest management units

A set of forest management prescriptions (R_x) will be presented for each of three (3) broad classes of management strategies, koa Restoration (R), intensive plantings of native species for bird food and foliage near bird Enclosures (E), and invasive weed suppression along roadsides and within maintenance (M) areas. The project site has been divided into 20 active forest management units (FMU, Table 2, Table 3), which will be managed according to 10 FSP management practices based on 11 practice codes from the Natural Resource Conservation Service (NRCS, Table 4). Similar practices will be applied toward koa restoration (Restoration, R 1 – 10) and intensive native species plantings around bird enclosures (Intensive, En). A somewhat different set of practices will be applied toward maintenance of existing native forest (Maintenance, M 15 - M22), which will primarily focus on brush management, herbaceous weed control, and facilitating regeneration of native trees and shrubs by suppressing the invasive kikuyu grass cover.

Table 2. Forest Management Units and associated codes, unit acreage, annual practice acreage, and practice descriptions.

Name	Code	Area (ac.)	Type	Objective
Roads	Rd	4.6	Roads	Suppress invasive weeds; prevent incipient weeds
Enclosure	En	2.5	Enrichment plantings	
Restore 1	R1	3.9	Restoration	
Restore 2	R2	4.1	Restoration	
Restore 3	R3	4.2	Restoration	
Restore 4	R4	4.4	Restoration	Restore <i>Acacia koa</i> overstory and assorted native species understory
Restore 5	R5	4	Restoration	
Restore 6	R6	3.9	Restoration	
Restore 7	R7	4	Restoration	
Restore 8	R8	4.2	Restoration	
Restore 9	R9	4	Restoration	
Restore 10	R10	3	Restoration	
Maintenance 15	M15	10.5	Maintenance	
Maintenance 16	M16	7	Maintenance	
Maintenance 17	M17	5.1	Maintenance	
Maintenance 18	M18	14.9	Maintenance	Suppress invasive weeds; prevent incipient weeds
Maintenance 19	M19	13.5	Maintenance	
Maintenance 20	M20	9.6	Maintenance	
Maintenance 21	M21	6.3	Maintenance	
Maintenance 22	M22	7	Maintenance	
Forest Stewardship:		120.7		
Excluded:	X	49.9	Excluded	Enclosures, infrastructure
	Total:	170.6		

Table 3. Procedures prescribed in this section are modeled on the NRCS practice codes. For clarity, some of these codes have been partially or completely renamed to reflect specific procedures relevant to KBCC and this management plan.

FMP Simplified Name	NRCS Practice Name	NRCS Code	Cost per unit
Trail maintenance	Trails and Walkways	568	\$ 84.87
Access road	Access Road	560	\$ 74.66
Roadside weed control	Herbaceous Weed Control	315	\$ 250.00
Incipient weed mgmt	Rare and declining habitat	643	\$ 50.00
Brush management	Brush Management	314	\$ 200.00
Forest improvement	Forest Stand Improvement	666	\$ 120.00
Monitoring	Rare and declining habitat	643	\$ 65.00
Site preparation	Tree/Shrub Site Preparation	490	\$ 380.00
Seedlings: Koa	Tree Establishment	612	\$ 1.00
Seedlings: Native	Tree Establishment	612	\$ 6.50
Planting	Tree Establishment	612	\$ 200.00
Fertilizer / application	Nutrient management	590	\$ 88.00
Integrated pest mgmt.	Integrated Pest Management	595	\$ 250.00
Competition control	Herbaceous Weed Control	315	\$ 220.00

4.2. Forest restoration prescriptions

Restoration activities prescribed in this plan include three broad categories, (1) restoration of koa canopy on grass-dominated abandoned pastures, (2) enrichment of native plant species diversity within existing forested areas, and (3) increasing populations of native plants around bird enclosures to provide locally-sourced fruits and seeds to support endangered bird breeding programs. These objectives can be accomplished by following the detailed prescriptions available in the remainder of this section. The objectives share some procedures in common, particularly nursery operations, silviculture, and phytosanitary procedures:

- i. Seeds used for plant propagation will be sourced from Keauhou Ranch or within the KBCC, promoting genetically conserved adaptations to local conditions.
- ii. Nurseries contracted to produce seedlings will be required to conform to phytosanitary procedures to avoid importation of pests and diseases, including but not limited to:
 - a. Fungal pathogens such as *Fusarium oxysporum*, *Ceratocystis spp.*
 - b. Insect pests such as little fire ants (*Wasmannia auropunctata*), black twig borer (*Xylosandrus compactus*), or acacia psyllid (*Acizzia uncatoides*).
 - c. Invasive weeds, e.g. Melastomataceae, Australian tree fern, *Psidium spp.*
- iii. Site preparation will be conducted either manually or using specialized machines in ways that have a demonstrated track record of successful forest establishment.
- iv. Silvicultural techniques will include fertilizer application to improve establishment outcomes, herbicide applications where necessary to combat weed cover, and stem form improvement.

Among the species to be planted (Table 4), most already grow at varying densities in or around KBCC, allowing locally targeted seed collection. In special cases, notably māmane and 'ie 'ie, local abundance is limited, so seed collection may need to occur elsewhere at Keauhou Ranch. More abundant māmane populations exist on the dry side of the property, while 'ie 'ie may need to be imported from other locations. In general, nursery stock will be produced from seeds collected as close to KBCC as possible; collections will be recorded in a

project database with information including date, time, species, elevation, latitude, and longitude.

Table 4. Endemic tree, shrub, and vine species prescribed for planting at the KBCC.

Species name	Species	FMU type	Form	Cost
koa	<i>Acacia koa</i>	Restoration	Tree	\$1.00
maile	<i>Alixia oliviformis</i>	Enrichment	Vine	\$4.50
māmaki	<i>Pipturus albidus</i>	Enrichment	Tree	\$4.50
‘ōhi‘a	<i>Metrosideros polymorpha</i>	Enrich., Encl.	Tree	\$8.50
pilo	<i>Coprosma spp.</i>	Enrich., Encl.	Tree	\$6.50
kōlea	<i>Myrsine lessertiana</i>	Enrich., Encl.	Tree	\$8.50
‘ōlapa	<i>Cheirodendron trigynum</i>	Enrich., Encl.	Tree	\$8.50
‘ōhelo	<i>Vaccinium reticulatum</i>	Enclosure	Shrub	\$4.50
hō‘awa	<i>Pittosporum hosmeri</i>	Enclosure	Tree	\$6.50
māmāne	<i>Sophora crysophylla</i>	Enclosure	Tree	\$6.50
‘ie ‘ie	<i>Freycinetia arborea</i>	Enclosure	Vine	\$6.50

4.2.1. Seedlings

Seedlings will be sourced from the following locations:

1. Grown on-site in a volunteer greenhouse (enclosure/enrichment plants)
2. Big Island commercial nurseries: Aileen Yeh nursery (Hilo), Future Forests (Kona)
3. Maui commercial nursery: Native Nursery – for large number of seedlings

Seedling procurement strategy is to keep the source as local as possible. There are several reasons for this: increase project flexibility by having a stable source of seedlings, safeguard against outside pathogen spread, promote genetically conserved adaptations to local conditions, and introduce volunteers to this aspect of forestry. The laudable objective of locally sourced seedlings must not come at the expense of achieving overall forest management goals, however.

Seedling size will necessarily depend on the species in question:

- Pioneer species such as koa will be 25-30 cm in height with a small dibble pot size of 65 cc, which is sufficient for a more aggressive species.
- Enrichment and enclosure species will be in 20-40 cm in height in a small to medium pot of 250 to 500 cc, with the objective of providing an older, more robust seedling for these more sensitive species.

4.2.2. Restoration: koa canopy establishment

4.2.2.1. Forest management units

Restoration of *Acacia koa*-dominated canopy will occur in FMU R1 – R10, located in the southwestern half of KBCC. Annual acreage targets range from a low of 3.0 acres in year 10 to as much as 4.4 acres in year 4, but the average annual target is 4 acres.

4.2.2.2. Schedule of operations

The general schedule should begin with herbaceous vegetation control two to four months in advance of site preparation, followed by site preparation using a mechanical spot cultivator. Approximately three months

before scheduled planting, koa seedlings should be ordered from competitive nurseries. Planting should occur within a month of site preparation to avoid gravitational compaction; plants should be fertilized at planting. When competing invasive weed cover becomes problematic, herbicide application should be implemented—precise timing will depend on weed regeneration rates, but two competition control entries should be expected within two years of planting. For koa trees only, form control (pruning, singling) should occur 12 and 24 months after planting; integrated pest management (IPM) should occur to control acacia psyllid 24 and 36 months after planting. Although these stands are not intended for commercial production, we nonetheless recommend pruning and form control because of the consequences for forest structure. Unpruned koa trees fork and branch excessively, yielding short-statured stands with limited canopy depth and therefore low canopy volume. Higher habitat quality for endemic birds is achieved with deep koa canopy that can only develop when trees are generally single-stemmed and as tall as possible. In an ecological restoration context, form control is an important treatment to produce high quality habitat. Integrated pest management (IPM) should occur to control acacia psyllid 24 and 36 months after planting.

4.2.2.3. Site preparation and planting

A pre-plant herbicide application to control of herbaceous vegetation and grass cover in abandoned pasture areas should be accomplished using a combined herbicide mixture of imazapyr and glyphosate.⁵ This application should occur two to four months ahead of planting, typically in September or October. After the vegetation has died and begun to decompose, an excavator equipped with a spot cultivation attachment should be used to prepare planting holes at a spacing of approximately 10' x 10', or an average stem density of 435 trees per acre, with 400 koa trees and 35 trees of assorted other native species. The spot cultivator should prepare soils to a depth of 24" to 36", depending on substrate and operating conditions; preparation should occur in early January, not more than one month prior to first planting (usually late January). Hand planting will be accomplished using a tree spade or dibble as appropriate for the nursery stock. The soil surface should be perforated to a depth slightly greater than the length of the seedling root stock, and the seedling should be placed into this hole. The root collar should be marginally lower than the level of the soil, between 1/8" and 1/4", with the root mass oriented vertically; the tip of the root mass should not bend outwards (so-called "J-rooting"). Soil is then compacted lightly around the root system.

4.2.2.3(1) Nutrient management

A crown fertilizer treatment assists with early seedling growth and development, and typically consists of a 2-oz. dose of fertilizer distributed evenly within a 12" diameter area centered on the seedling stem. Care should be taken to avoid concentrating fertilizer in one particular area, as this nutrient inundation can lead to toxic effects and tree mortality. A second fertilizer treatment at eight (8) months after planting is sometimes required. The parcels are located in a high-rainfall area, so nutrient leaching is a concern and the seedlings will likely need additional nutrients at the eight-month point. A 10-30-10 (percentage of Nitrogen (N), Phosphorus (P), and Potassium (K)) formula with micronutrients is recommended at planting, while an 11-52-0 formula is usually appropriate

Table 5. Fertilizer recommendations for *A. koa*.

Formula (N-P-K)	Treatment	Timing
10-30-10+	2 oz / tree, crown 12" in diameter	At planting
11-52-00	4 oz / tree, crown at dripline	8 months

⁵ Leary, J. 2010. Research Updates in Rangeland and Natural Area Weed Management. Hawaii For. Journal, 5, 12 – 13.

for the second fertilizer treatment.

4.2.2.4. *Competition control*

Both selective and broad-spectrum herbicides should be used as necessary for controlling competition after planting through approximately two (2) years of age, or the point where the young forest canopy begins to close. Two competition control entries are expected per year. In the event that the dominant weed species are grasses, herbicides with grass-specific modes of action may be applied directly over the entire planting area. These compounds do not affect broadleaf biochemistry, and are thus safe for use without physical barriers around seedlings. Examples of these grass-specific herbicides are fluazifop (Fusilade DX) and quizalofop (Assure II). On the other hand, the weed species assemblage may be dominated by broadleaf species, necessitating use of more general herbicides such as glyphosate (Roundup PowerMax). Particular weed species, plant size, and time of application all determine the precise formula needed to control weeds. Rather than prescribing a certain formula at this juncture, the land manager should consult with weed control professionals, University of Hawaii Extension, with the management planner, and / or with the chemical label at the time of application.

4.2.2.5. *Pruning and singling*

Acacia koa shows a strong tendency to branch and fork even when grown at relatively high stem densities. At the planting geometries prescribed herein, pruning and singling treatments will be necessary to enhance form and growth rates. The singling operation should occur when trees first begin to show evidence of competing leaders. The most vigorous leader should be promoted by cutting the inferior leader tips back by 1/3 their length. This operation usually occurs between 10 and 18 months of age. At a point between 14 and 20 months, depending on growth performance, the first pruning treatment will likely be required. Lower branches should be pruned up to a height of approximately 50% to 65% of the crown depth, with the smaller percentage crown depth removed from unhealthy / shorter trees, and the larger percentage from healthy / taller trees. Branches should be pruned when their basal diameter is less than 1/2". Depending on growth rates, a second pruning entry may be required after 24 months of age. The objective should be to yield an expanse of tree trunk free of branches for at least 8' above the ground.

4.2.2.6. *Integrated pest management*

Maintaining healthy trees is the first and best defense against pests and pathogens, but some level of disease or pest infestation may be unavoidable even in healthy plantings. This plan prescribes an integrated pest management (IPM) approach to dealing with pests and pathogens. The IPM framework involves three sequential assessments, (1) monitoring potential pest agents, (2) identifying threshold densities or populations at which pests cause unacceptable economic damage, and (3) identifying and applying the most effective control agent. To control insect pests in IPM, the first step is to identify potential pest species. This requires a monitoring program that can take on varying degrees of sophistication. When damaging levels of the pest are discovered, the first option for control methods is typically a pheromone-based trapping system or adhesive traps. Chemical insecticides are used if control is impossible with more benign methods. Likely insect pests on *A. koa* include the acacia psyllid (*Acizzia uncotoides*), a non-native sap-sucking insect, and koa moth (*Scotorythra paludicola*), a native defoliating insect. Chemical options for controlling the psyllid include dinotefuran (Safari 20 SG) or spirotetramat (Movento), both of which have labeling appropriate or adaptable to use in koa plantings on Hawaii Island. The koa moth may also respond to these treatments, although such a

use is not explicitly defined for Movento.

4.2.2.7. *Enrichment plantings*

Restored koa forest supports greater tree, shrub, and vine species diversity than an unassisted succession. Seeds should be collected in advance to allow adequate time for growth in the nursery. At least nine (9) months should be allowed for māmane and 'ōhi'a seedlings, six (6) months for maile, kea, 'ōlapa, and pilo seedlings, and four (4) months for the other enrichment species (Table 4). Enrichment plantings should be implemented at the same time as koa plantings, with the exception of their spatial arrangement. Species intended for bird food production should be aggregated to facilitate harvesting, while species intended to increase their own recruitment (expand their range) should be diffused across the planting area. Enrichment plantings typically do not require any special IPM or form control (forest stand improvement) operations, and are unaffected by the herbicide or IPM treatments prescribed for koa.



Figure 8. Site preparation methods will include spot cultivation with an excavator in open areas, augmented by manual digging of planting holes in areas with closed canopy forest. Image: K. Derasin 2012.

4.2.3. Endangered bird plantings

4.2.3.1. *Forest management units*

This management plan has been written to mitigate any disturbance around enclosure FMU (Excluded), including unnecessary foot or vehicle traffic, excavator operation, herbicide application, or noise disruptions. The two nearby areas (21.6 acres each) are reserved for concentrated plantings of seed and fruit producing species at high densities, although the implementation of these plantings is not covered by this plan, either in terms of explicit schedules or budgets. To minimize impacts on the sensitive native bird species housed in KBCC enclosures, no herbicides should be used in site preparation for these FMU. Vegetation cover should be removed by manual methods such as machete chopping, scything, pick-axing, or hand sawing. Planting holes should be dug using a pick-axe and at a density of approximately 60 to 70 plants per acre. Holes should be sized according to nursery stock, but typically this will mean 1' in diameter and 1.5' in depth. These plantings should not be evenly distributed, however, as these areas will be intensively tended for seed and fruit production. A spacing of 8' x 8' between planting holes is recommended. These plantings should be located on a grid system, as these areas will be intensively tended for seed and fruit production. Intensive plantings

should occur in the first through the fifth years of the planning horizon, targeting establishment of 0.5 acres per year. Species selection for these plantings should be determined by SDZG staff, and may evolve over time with bird rearing priorities. For example, provision of māmane seeds for palila would justify planting predominantly this species. More mixed dietary requirements could justify including olapa, pilo, or other fruit-bearing tree species. At this time, the species composition of intensive plantings cannot be predetermined. To accommodate a likely composition, this prescription assumes average seedling costs across all listed enrichment species.

Management regimes for intensive plantings will differ from forest establishment in terms of competition control and fertilizer application. To promote maximum growth rates, these plots should be kept free of invasive weeds and any grass competition. Due to the proximity of bird enclosures, competition control should use manual weed removal or, when required to address more recalcitrant infestations, minimally toxic herbicides such as glyphosate and imazapyr. Fertilizers should also be applied at a frequency of twice annually. A nutrient formula of 11-52-0 is recommended for maximum growth rates, applied at a dosage of 2 oz per seedling per entry.

4.3. Invasive species control

4.3.1. Target species

The suite of invasive species found in KBCC include those common throughout the Volcano area (Table 6). Some of these aliens represent a significant threat to successful project outcomes, while others are less problematic. This plan presents a composite assessment of weed control priority based on (1) the observed abundance of each species within the project area, (2) the threat that each species poses to establishing koa forest or enriching existing species composition, and (3) the Hawaii Weed Risk Assessment score. Priority is calculated as the product of these three quantities, which though unit-less and not strictly quantitative, allows for a reasonable prioritization in this particular case. Specifically, weed species with priority scores (Table 6) near or exceeding the value of 100 are the most problematic and should be principal control targets. The control prescription (R_x) for each species depends on its current abundance as well as its threat level. For example, although *P. cattleianum* is a serious threat by HWRA score, its low abundance at KBCC reduces the priority score: this species needs to be prevented from invading KBCC. In contrast, *R ellipticus*, which has the same HWRA, is present at medium (sometimes high) abundance, resulting in a priority of 108 and a strong need to eradicate the species. Methods to implement each R_x are presented subsequently (§4.3.2, §4.3.3).

Table 6. Invasive species of the KBCC are assigned control priorities by combining assessments of abundance, level of threat to forest restoration and weed risk assessment score (HWRA). Weed species with Priority scores near or exceeding a score of

100 will be given highest control priority during this project. Control objectives for each species are listed under R_x.

Name	Species	Form	Abundance	Threat	HWRA [‡]	Priority [†]	R _x
kahili ginger	<i>Hedygium gardnerianum</i>	herb	Med	High	16	96	Suppress
faya / fire tree	<i>Morella faya</i>	tree	Med	High	17	102	Eradicate
banana poka	<i>Passiflora tarminiana</i>	vine	Low	High	24	72	Suppress
strawberry gauva	<i>Psidium cattleianum</i>	tree	Low	High	18	54	Prevent
firethorn	<i>Pyracantha koidzumii</i>	shrub	Med	High	7	42	Eradicate
yellowberry	<i>Rubus ellipticus</i>	shrub	Med	High	18	108	Eradicate
glory bush	<i>Tibouchina urvilleana</i>	shrub	Low	High	10	30	Prevent
blackberry	<i>Rubus argutus</i>	shrub	High	Med	21.5	129	Eradicate
meadow rice	<i>Eragrostis elliottii</i>	grass	High	Low	12	36	NA
kikuyu grass	<i>Pennisetum clandestinum</i>	grass	High	Low	18	54	NA

† Priority = Abundance * Threat * HWRA, where High = 3, Medium = 2, and Low = 1 for Abundance and Threat

‡ <https://sites.google.com/site/weedriskassessment/>

4.3.2. Tree removal techniques

Invasive tree removal, interchangeably called brush management in accordance with the relevant NRCS practice code(s), should be implemented in FMU Restoration (1-10) as described by NRCS code 314. This practice concerns removal of target tree and brush species in advance of plantings in enrichment and enclosure FMU; species include *M. faya*, *P. koidzumii*, *R. argutus*, and *R. ellipticus*. Larger trees may be controlled using a frill treatment (Figure 9) of concentrated herbicide agents effective against the target. For example, *M. faya* of diameters of 2" or less may be killed using a frill / drill application of at least 3 ml triclopyr (Garlon 4, Element 4), but the same trees are easily killed using only 1 or 2 ml of aminopyralid (Milestone) or aminocyclopyrachlor (Perspective). Smaller individuals of any of these species may be terminated using a foliar application of aminocyclopyrachlor and metsulfuron methyl (Streamline).



Figure 9. Frill (left) drill (center) techniques may be applied to terminate *Morella faya*. Effective herbicide agents for this application type include Milestone, Polaris AC, Roundup PowerMax, and Garlon 4 / Element 4; effects vary strongly by target species. (Right image: Leary et al. 2012).

4.3.3. Herbaceous vegetation

Herbaceous (e.g. *Hedychium spp.*) or low-stature woody vegetation (e.g. *Rubus spp.*) should be controlled using foliar applications of appropriate herbicide mixtures. Various chemical herbicide agents are viable for this use, including sulfometuron methyl, metsulfuron methyl, aminocyclopyrachlor, and 2,4-D. Foliar herbicide applications should be accompanied by use of an adjuvant or surfactant to reduce spray drift and improve plant cell wall permeability. Where possible, chemicals with lower toxicity and / or higher effectiveness and lower doses should be substituted. All applications should be made by trained personnel equipped with proper protective gear; any and all volunteer labor groups should be prevented from applying herbicides, and should not be allowed into areas sprayed with herbicides until at least 24 hours plus the label mandated restricted entry interval. Control of herbaceous vegetation may occur as part of site preparation for restoration or enrichment, or as roadside weed control. Herbicides shall not be applied within a buffer distance surrounding endangered bird enclosures; this distance is to be defined by KBCC, and may vary based on the bird species in question.

4.3.4. Invasive animals

Several invasive animal species, including ground mammals (rats, *Rattus rattus* and *R. norvegicus*), feral pigs (*Sus scrofa*), mongoose (*Herpestes javanicus*), and cats (*Felis catus*) and birds (see §3.2.3) are present at KBCC. Most of these species do not represent a threat to the forest restoration objective of this project. Feral pigs can certainly compromise forestry projects when present at high densities, but their populations at KBCC are relatively low due to a combination of limited area to forage, strict control on adjacent parcels (HAVO, KS Keauhou Ranch), hunting / trapping, and nearby fenced areas. At this time, feral pig control is not a necessary element of forest restoration and enrichment planting at KBCC, and is therefore not included as a practice code or in the project budget. The long-term objective of increasing native bird habitat may in the future be impacted by the presence of rats—which may eat tree fruits / seeds as well as eggs and nestlings—and cats—which may eat birds at various life stages. The viability of bird populations, however, is not the immediate concern of this FMP nor is it the primary purpose of the Forest Stewardship Program. As native forest areas are restored and enriched during the course of this project, the KBCC may implement its own invasive animal control protocols as necessary, but prescriptions for invasive animal control are not proposed in this plan.

4.4. Community and volunteer programs

4.4.1. Partner entities

The SDZG will partner with HFI and Kamehameha Schools, the Hawai'i Tourism Authority, the Hawai'i Forest Institute, and other interested entities to implement this plan. Partnerships with educational institutions, from elementary schools through university groups, will be emphasized. Each year, nearly 2000 visitors, primarily students, tour the KBCC and engage in restoration activities. Many of these students are part of long-term partnerships. An earlier phase of this project included a partnership with the Punahou school 5th grade class; elsewhere at Keauhou Ranch, school groups from KS Kea'au Campus and the Island Pacific Academy have worked on koa restoration projects and are expected to continue their participation. As the plan is implemented, other interested groups will be included.

4.4.2. Public benefits

The area occupied by KBCC is on private land and contains sensitive endangered bird species; it is not typically

available for public access. By providing a structured, service-oriented opportunity for members of the public to access the land in organized, supervised groups, this FMP improves public-forest interaction. Public stakeholders will benefit from working on koa and native forest restoration in the following ways:

- i. Recreation and physical fitness
- ii. Education
 - a. Ecological
 - b. Forestry practices
 - c. Species identification
 - d. Horticulture
- iii. Sense of place
- iv. Cultural connectivity

4.4.3. Educational opportunities

Approximately 2,000 school children have, on an annual basis, learned about the ongoing captive breeding and release efforts for critically endangered Hawaiian birds during visits to the Keauhou Bird Conservation Center (KBCC). This management plan will broaden existing learning opportunities for these school children by incorporating forest restoration volunteer work into the student visits. For example, an earlier phase of this project included a visit by the Punahou School 5th grade class to observe and learn about native Hawaiian birds and plant seedlings on the property. Elsewhere at Keauhou Ranch, school groups from KS Keaau Campus and the Island Pacific Academy (Oahu) have planted seedlings for koa restoration projects, then visited KBCC as a supplemental educational opportunity. Feedback from both students and teachers has been overwhelmingly positive and these three schools are expected to continue their annual field trip to KBCC in future years to both learn about native Hawaiian birds and conduct forest restoration activities.



Figure 10. Students from the Punahou School 5th grade class conducting koa plantings at KBCC, 2013. Volunteers hiking to the planting site (top left), posing next to a planted koa (top right), dipping a koa seedling in hydrating gel-fertilizer mixture before planting (top left), and students with o'o bar (bottom left).

4.6. Access

4.6.1. Existing roads

Main roads within the KBCC sum to a length of 0.82 miles, and are surrounded by a buffer zone of 4.6 acres for the purposes of this plan. Forest management activities along this road system are limited to one (1) annual invasive weed suppression operation, which should consist of a mechanized herbicide spray application with a mixture of imazapyr and glyphosate. In addition, periodic sweeps for incipient invasive species are prescribed within the buffer zone. Any incipient weeds should be dealt with according to invasive species control techniques recommended previously (§4.3).

4.6.2. Road repair

Several existing road routes have become practically impassable due to grass cover and fallen trees. To facilitate access by contractor and volunteer working groups, this management plan proposes mechanized and or manual improvement to access routes where necessary. A total of 0.27 miles of existing roads would be upgraded using a combination of tree removal (chain saw) and some resurfacing (bulldozer, earth volumes not exceeding levels that would trigger grading / grubbing permit requirements). All access improvements will be conducted within the confines of the existing road alignment following Hawaii Best Management Practices (BMP)⁶.

4.6.3. Trail construction

Several FMU are currently difficult to access via existing roads. Improving access to these sites is critical for efficient deployment of volunteer labor forces, and will necessitate some trail construction. A total of 0.34 miles of trails will be constructed to levels accessible by foot and by capable 4x4 utility vehicles.

4.7. Streamside management zones

There are no streamside or special management zones (SMZ) in the KBCC. Procedures covered by NRCS SMZ practice codes are not relevant to this plan.

4.8. Ecological monitoring

Some degree of ecological monitoring is an important component of forest management. For the scale of tree planting proposed in this FMP, and because the objective is to establish native forest rather than a commercial project, KBCC-HFI can conduct ecological monitoring with volunteer groups and at relatively low expense. An adequate monitoring effort would comprise one or two vegetation sampling plots (fixed radius circular areas, diameter 16.8', area 1/50th acre) established in each 2-acre mechanized site preparation area, and by periodically spot-checking survival in the 0.125-acre forest restoration cells along the trail network. Although zoological monitoring is beyond the scope of this management plan, a low-level or passive zoological monitoring program may be implemented by the landowner. Species sightings, particularly those of T/E fauna such as the 'ope'ape'a or io, should be recorded with location, date, and time of day as they are encountered.

⁶ <http://www.hawaiiiforest.org/files/Bestmana.pdf>

5. Budget and Schedule

Commercial timber extraction is not a long term objective of this proposal, and as such a financial analysis is beyond the scope of this FMP. In place of a financial analysis, we provide detailed restoration prescriptions (R_x) and annual budgets for ten (10) years to establish a koa forest.

The preceding management R_x are planned around a specific budget and implementation schedule for each FMU. Each R_x corresponds to USDA NRCS code, and is assigned a per-unit cost based on contractor experience. Costs of brush management, planting, competition control, roadside weed control, SMZ activities, and incipient weed management are calculated on a per-acre basis. Costs of seedlings are calculated per individual plant. Costs of train maintenance are matched to the acre increments of forest restoration in blocks adjacent to the access routes. Detailed budgets are presented for each of the ten (10) years of the project (Table 8), and summary budgets for the entire project duration (Table 7). Schedules are presented on an annual basis (Table 10), and R_x are implemented in the years in which corresponding cells are shaded dark green. **Budgets have been prepared such that costs are allocated to each of the FMU as well as separated by operational year. The net project budget sums to \$491,007.32, or \$4,140.03 per actively managed acre per year and an average annual cost of \$49,100.73.**

Table 7. Annual expenditures to implement koa forest restoration and native species enrichment plantings at the KBCC-HFI Discovery Forest project.

Period	Maintenance			Restoration			Annual Total
	Applicant	FSP	Subtotal	Applicant	FSP	Subtotal	
Year 1	\$ 10,181.84	\$ 10,181.84	\$ 20,363.67	\$ 12,769.66	\$ 12,769.66	\$ 25,539.32	\$ 45,902.99
Year 2	\$ 8,286.39	\$ 8,286.39	\$ 16,572.78	\$ 14,727.71	\$ 14,727.71	\$ 29,455.42	\$ 46,028.20
Year 3	\$ 7,891.48	\$ 7,891.48	\$ 15,782.96	\$ 15,665.05	\$ 15,665.05	\$ 31,330.10	\$ 47,113.05
Year 4	\$ 12,992.83	\$ 12,992.83	\$ 25,985.66	\$ 16,653.68	\$ 16,653.68	\$ 33,307.36	\$ 59,293.02
Year 5	\$ 12,120.29	\$ 12,120.29	\$ 24,240.58	\$ 16,073.49	\$ 16,073.49	\$ 32,146.98	\$ 56,387.56
Year 6	\$ 11,250.02	\$ 11,250.02	\$ 22,500.04	\$ 13,384.08	\$ 13,384.08	\$ 26,768.17	\$ 49,268.21
Year 7	\$ 9,177.65	\$ 9,177.65	\$ 18,355.30	\$ 14,015.12	\$ 14,015.12	\$ 28,030.24	\$ 46,385.54
Year 8	\$ 9,173.74	\$ 9,173.74	\$ 18,347.47	\$ 14,469.34	\$ 14,469.34	\$ 28,938.69	\$ 47,286.16
Year 9	\$ 11,504.31	\$ 11,504.31	\$ 23,008.62	\$ 13,958.07	\$ 13,958.07	\$ 27,916.14	\$ 50,924.77
Year 10	\$ 9,564.10	\$ 9,564.10	\$ 19,128.20	\$ 11,644.80	\$ 11,644.80	\$ 23,289.61	\$ 42,417.81
Total:	\$ 102,142.65	\$ 102,142.65	\$ 204,285.30	\$ 143,361.01	\$ 143,361.01	\$ 286,722.02	\$ 491,007.32

5.1. Budget

Table 8. Annual budgets for forest management activities in project years 1-10 (2016-2026).

Activity	NRCS code	Units	Cost unit ⁻¹	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 1 (2016)															
Trail construction	568	acre	\$84.87	1	\$ 333	\$ 344	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Brush management	314	acre	\$560.00	4	\$ 2,195	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improvement	660	acre	\$350.00	4	\$ 1,372	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improve. intns.	666	acre	\$780.00	4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Monitoring	643	acre	\$125.00	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Site preparation	490	acre	\$450.00	6	\$ 1,764	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Koa	612	seedling	\$2.35	9	\$ 3,685	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Native	612	seedling	\$6.50	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Planting: Restoration	612	seedling	\$5.50	12	\$ 8,624	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2,831
Planting: Intensive	612	seedling	\$5.50	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fertilizer / application	590	acre	\$168.00	12	\$ 659	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2,395
Integrated pest mgmt.	595	acre	\$250.00	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	84
Competition control	315	acre	\$320.00	12	\$ 1,254	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year subtotal:	---	---	---	---	\$ 19,885	\$ 344	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,310
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 9,942	\$ 172	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,655
FSP Share:	---	---	---	---	\$ 9,942	\$ 172	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,655
Year 1 Applicant Sum:	\$				12,769.66	Year 1 FSP Sum:	\$								12,769.66

Activity	NRCS code	Units	Cost unit ⁻¹	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 2 (2017)															
Trail construction	568	acre	\$85	1	\$ -	\$ 344	\$ 360	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Brush management	314	acre	\$560	1	\$ -	\$ 2,273	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improvement	666	acre	\$350.00	2	\$ -	\$ 1,420	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improve. intns.	666	acre	\$780.00	3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	390
Monitoring	643	acre	\$125.00	4	\$ 490	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Site preparation	490	acre	\$450.00	4	\$ -	\$ 1,826	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Koa	612	seedling	\$2.35	5	\$ -	\$ 3,815	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Native	612	seedling	\$6.50	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2,831
Planting: Restoration	612	seedling	\$5.50	9	\$ -	\$ 8,928	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Planting: Intensive	612	seedling	\$5.50	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fertilizer / application	590	acre	\$168.00	12	\$ -	\$ 682	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2,395
Integrated pest mgmt.	595	acre	\$250.00	12	\$ 980	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	168
Competition control	315	acre	\$320.00	12	\$ 1,254	\$ 1,299	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year subtotal:	---	---	---	---	\$ 2,724	\$ 20,587	\$ 360	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,784
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 1,362	\$ 10,293	\$ 180	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,892
FSP Share:	---	---	---	---	\$ 1,362	\$ 10,293	\$ 180	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,892
Year 2 Applicant Sum:	\$				14,727.71	Year 2 FSP Sum:	\$								14,727.71

Activity	NRCS code	Cost unit ¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 3 (2018)															
Trail construction	568	\$85	acre	1	\$ -	\$ 344	\$ 360	\$ 370	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Brush management	314	\$560	acre	1	\$ -	\$ -	\$ 2,378	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improvement	660	\$350.00	acre	2	\$ -	\$ -	\$ 1,486	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improve. intns.	666	\$780.00	acre	3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 780
Monitoring	643	\$125.00	acre	4	\$ -	\$ 507	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Site preparation	490	\$450.00	acre	4	\$ -	\$ -	\$ 1,911	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Koa	612	\$2.35	seedling	5	\$ -	\$ -	\$ 3,991	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Native	612	\$6.50	seedling	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,831
Planting: Restoration	612	\$5.50	seedling	9	\$ -	\$ -	\$ 9,340	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Planting: Intensive	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,395
Fertilizer / application	590	\$168.00	acre	12	\$ -	\$ -	\$ 713	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 252
Integrated pest mgmt.	595	\$250.00	acre	12	\$ -	\$ 1,015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Competition control	315	\$320.00	acre	12	\$ -	\$ 1,299	\$ 1,359	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year subtotal:	---	---	---	---	\$ -	\$ 3,165	\$ 21,537	\$ 370	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,258
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ -	\$ 1,582	\$ 10,769	\$ 185	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,129
FSP Share:	---	---	---	---	\$ -	\$ 1,582	\$ 10,769	\$ 185	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,129
Year 3 Applicant Sum:	---	---	---	---	\$ -	\$ 15,665.05	Year 3 FSP Sum:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,665.05

Activity	NRCS code	Cost unit ¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 4 (2019)															
Trail construction	568	\$85	acre	1	\$ 333	\$ -	\$ 360	\$ 370	\$ 341	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Brush management	314	\$560	acre	1	\$ -	\$ -	\$ -	\$ 2,440	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improvement	660	\$350.00	acre	2	\$ -	\$ -	\$ -	\$ 1,525	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Forest improve. intns.	666	\$780.00	acre	3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,170
Monitoring	643	\$125.00	acre	4	\$ 490	\$ -	\$ 531	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Site preparation	490	\$450.00	acre	4	\$ -	\$ -	\$ -	\$ 1,961	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Koa	612	\$2.35	seedling	5	\$ -	\$ -	\$ -	\$ 4,095	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Seedlings: Native	612	\$6.50	seedling	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,831
Planting: Restoration	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ 9,585	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Planting: Intensive	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,395
Fertilizer / application	590	\$168.00	acre	12	\$ -	\$ -	\$ -	\$ 732	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 336
Integrated pest mgmt.	595	\$250.00	acre	12	\$ -	\$ -	\$ 1,061	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Competition control	315	\$320.00	acre	12	\$ -	\$ -	\$ 1,359	\$ 1,394	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year subtotal:	---	---	---	---	\$ 823	\$ -	\$ 3,311	\$ 22,101	\$ 341	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,732
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 411	\$ -	\$ 1,656	\$ 11,051	\$ 170	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,366
FSP Share:	---	---	---	---	\$ 411	\$ -	\$ 1,656	\$ 11,051	\$ 170	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,366
Year 4 Applicant Sum:	---	---	---	---	\$ 16,653.68	Year 4 FSP Sum:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 16,653.68

Activity	NRCs code	Cost unit ⁻¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 5 (2020)															
Trail construction	568	\$85	acre	1	\$	\$	344	\$	370	\$	341	\$	335	\$	\$
Brush management	314	\$560	acre	1	\$	\$	\$	\$	2,247	\$	\$	\$	\$	\$	\$
Forest improvement	660	\$350.00	acre	2	\$	\$	\$	\$	1,404	\$	\$	\$	\$	\$	\$
Forest improve. intns.	666	\$780.00	acre	3	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	1,560
Monitoring	643	\$125.00	acre	4	\$	\$	507	\$	545	\$	\$	\$	\$	\$	\$
Site preparation	490	\$450.00	acre	4	\$	\$	\$	\$	1,806	\$	\$	\$	\$	\$	\$
Seedlings: Koa	612	\$2.35	seedling	5	\$	\$	\$	\$	3,772	\$	\$	\$	\$	\$	\$
Seedlings: Native	612	\$6.50	seedling	6	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	2,831
Planting: Restoration	612	\$5.50	seedling	9	\$	\$	\$	\$	8,828	\$	\$	\$	\$	\$	\$
Planting: Intensive	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	2,395
Fertilizer / application	590	\$168.00	acre	12	\$	\$	\$	\$	674	\$	\$	\$	\$	\$	420
Integrated pest mgmt.	595	\$250.00	acre	12	\$	\$	\$	\$	1,089	\$	\$	\$	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	1,394	\$	1,284	\$	\$	\$	\$
Year subtotal:	---	---	---	---	\$	\$	852	\$	3,398	\$	20,356	\$	335	\$	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	\$	426	\$	1,699	\$	10,178	\$	168	\$	\$
FSP Share:	---	---	---	---	\$	\$	426	\$	1,699	\$	10,178	\$	168	\$	\$
Year 5 Applicant Sum:	\$ 16,073.49 Year 5 FSP Sum: \$ 16,073.49														

Activity	NRCs code	Cost unit ⁻¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 6 (2021)															
Trail construction	568	\$85	acre	1	\$	\$	\$	360	\$	341	\$	335	\$	343	\$
Brush management	314	\$560	acre	1	\$	\$	\$	\$	\$	2,212	\$	\$	\$	\$	\$
Forest improvement	660	\$350.00	acre	2	\$	\$	\$	\$	\$	1,382	\$	\$	\$	\$	\$
Forest improve. intns.	666	\$780.00	acre	3	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	1,950
Monitoring	643	\$125.00	acre	4	\$	\$	\$	531	\$	502	\$	\$	\$	\$	\$
Site preparation	490	\$450.00	acre	4	\$	\$	\$	\$	\$	1,777	\$	\$	\$	\$	\$
Seedlings: Koa	612	\$2.35	seedling	5	\$	\$	\$	\$	\$	3,712	\$	\$	\$	\$	\$
Seedlings: Native	612	\$6.50	seedling	6	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Planting: Restoration	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	8,689	\$	\$	\$	\$	\$
Planting: Intensive	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Fertilizer / application	590	\$168.00	acre	12	\$	\$	\$	\$	\$	664	\$	\$	\$	\$	420
Integrated pest mgmt.	595	\$250.00	acre	12	\$	\$	\$	\$	\$	1,003	\$	\$	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	1,284	\$	1,264	\$	\$	\$
Year subtotal:	---	---	---	---	\$	\$	\$	891	\$	3,129	\$	20,035	\$	343	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	\$	\$	446	\$	1,565	\$	10,017	\$	171	\$
FSP Share:	---	---	---	---	\$	\$	\$	446	\$	1,565	\$	10,017	\$	171	\$
Year 6 Applicant Sum:	\$ 13,384.08 Year 6 FSP Sum: \$ 13,384.08														

Activity	NRCs code	Cost unit ⁻¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 7 (2022)															
Trail construction	568	\$85	acre	1	\$ 333	\$ -	\$ -	\$ 370	\$ -	\$ 335	\$ 343	\$ 358	\$ -	\$ -	\$ -
Brush management	314	\$560	acre	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,261	\$ -	\$ -	\$ -	\$ -
Forest improvement	660	\$350.00	acre	2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,413	\$ -	\$ -	\$ -	\$ -
Forest improve. intns.	666	\$780.00	acre	3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Monitoring	643	\$125.00	acre	4	\$ 490	\$ -	\$ -	\$ 545	\$ -	\$ 494	\$ -	\$ -	\$ -	\$ -	\$ 1,950
Site preparation	490	\$450.00	acre	4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,817	\$ -	\$ -	\$ -	\$ -
Seedlings: Koa	612	\$2.35	seedling	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,796	\$ -	\$ -	\$ -	\$ -
Seedlings: Native	612	\$6.50	seedling	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Planting: Restoration	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8,884	\$ -	\$ -	\$ -	\$ -
Planting: Intensive	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fertilizer / application	590	\$168.00	acre	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 678	\$ -	\$ -	\$ -	\$ 420
Integrated pest mgmt.	595	\$250.00	acre	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 987	\$ -	\$ -	\$ -	\$ -	\$ -
Competition control	315	\$320.00	acre	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,264	\$ 1,292	\$ -	\$ -	\$ -	\$ -
Year subtotal:	---	---	---	---	\$ 823	\$ -	\$ -	\$ 914	\$ -	\$ 3,080	\$ 20,485	\$ 358	\$ -	\$ -	\$ 2,370
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 411	\$ -	\$ -	\$ 457	\$ -	\$ 1,540	\$ 10,243	\$ 179	\$ -	\$ -	\$ 1,185
FSP Share:	---	---	---	---	\$ 411	\$ -	\$ -	\$ 457	\$ -	\$ 1,540	\$ 10,243	\$ 179	\$ -	\$ -	\$ 1,185
Year 7 Applicant Sum:	\$				\$ 14,015.12										\$ 14,015.12

Activity	NRCs code	Cost unit ⁻¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 8 (2023)															
Trail construction	568	\$85	acre	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 343	\$ 358	\$ 339	\$ -	\$ -
Brush management	314	\$560	acre	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,361	\$ -	\$ -	\$ -
Forest improvement	660	\$350.00	acre	2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,476	\$ -	\$ -	\$ -
Forest improve. intns.	666	\$780.00	acre	3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Monitoring	643	\$125.00	acre	4	\$ -	\$ 507	\$ -	\$ -	\$ 502	\$ -	\$ 505	\$ -	\$ -	\$ -	\$ 1,950
Site preparation	490	\$450.00	acre	4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,897	\$ -	\$ -	\$ -
Seedlings: Koa	612	\$2.35	seedling	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,963	\$ -	\$ -	\$ -
Seedlings: Native	612	\$6.50	seedling	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Planting: Restoration	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,275	\$ -	\$ -	\$ -
Planting: Intensive	612	\$5.50	seedling	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fertilizer / application	590	\$168.00	acre	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 708	\$ -	\$ -	\$ -	\$ 420
Integrated pest mgmt.	595	\$250.00	acre	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,010	\$ -	\$ -	\$ -	\$ -
Competition control	315	\$320.00	acre	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,292	\$ 1,349	\$ -	\$ -	\$ -
Year subtotal:	---	---	---	---	\$ -	\$ 852	\$ -	\$ -	\$ 842	\$ -	\$ 3,149	\$ 21,386	\$ 339	\$ -	\$ 2,370
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 426	\$ 426	\$ -	\$ -	\$ 421	\$ -	\$ 1,575	\$ 10,693	\$ 170	\$ -	\$ 1,185
FSP Share:	---	---	---	---	\$ 426	\$ 426	\$ -	\$ -	\$ 421	\$ -	\$ 1,575	\$ 10,693	\$ 170	\$ -	\$ 1,185
Year 8 Applicant Sum:	\$				\$ 14,469.34										\$ 14,469.34

Activity	NRCs code	Cost unit ¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 9 (2024)															
Trail construction	568	\$85	acre	1	\$	\$	\$ 360	\$	\$	\$ 335	\$	\$ 358	\$ 339	\$ 255	\$
Brush management	314	\$560	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$ 2,239	\$	\$
Forest improvement	660	\$350.00	acre	2	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,399	\$	\$
Forest improve. intns.	666	\$780.00	acre	3	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,950
Monitoring	643	\$125.00	acre	4	\$	\$	\$ 531	\$	\$	\$ 494	\$	\$ 527	\$	\$	\$
Site preparation	490	\$450.00	acre	4	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,799	\$	\$
Seedlings: Koa	612	\$2.35	seedling	5	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Seedlings: Native	612	\$6.50	seedling	6	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Planting: Restoration	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	\$	\$	\$	\$ 8,797	\$	\$
Planting: Intensive	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Fertilizer / application	590	\$168.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$ 672	\$	\$ 420
Integrated pest mgmt.	595	\$250.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$ 1,054	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$ 1,349	\$ 1,280	\$	\$
Year subtotal:					\$	\$	\$ 891	\$	\$	\$ 829	\$	\$ 3,288	\$ 20,284	\$ 255	\$ 2,370
FSP%					50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:					\$	\$	\$ 446	\$	\$	\$ 414	\$	\$ 1,644	\$ 10,142	\$ 127	\$ 1,185
FSP Share:					\$	\$	\$ 446	\$	\$	\$ 414	\$	\$ 1,644	\$ 10,142	\$ 127	\$ 1,185
Year 9 Applicant Sum:					\$	\$	\$ 13,958.07	\$	\$	\$	\$	\$	\$	\$	\$ 13,958.07

Activity	NRCs code	Cost unit ¹	Units	FMU Area	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	En
					3.9 ac	4.1 ac	4.2 ac	4.4 ac	4 ac	3.9 ac	4 ac	4.2 ac	4 ac	3 ac	0.5 ac
Year 10 (2025)															
Trail construction	568	\$85	acre	1	\$	\$	\$	\$ 370	\$	\$	\$ 343	\$	\$ 339	\$ 255	\$
Brush management	314	\$560	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,680	\$
Forest improvement	660	\$350.00	acre	2	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,050	\$
Forest improve. intns.	666	\$780.00	acre	3	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,950
Monitoring	643	\$125.00	acre	4	\$	\$	\$	\$ 545	\$	\$	\$ 505	\$	\$ 500	\$	\$
Site preparation	490	\$450.00	acre	4	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,350	\$
Seedlings: Koa	612	\$2.35	seedling	5	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 2,820	\$
Seedlings: Native	612	\$6.50	seedling	6	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Planting: Restoration	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 6,599	\$
Planting: Intensive	612	\$5.50	seedling	9	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Fertilizer / application	590	\$168.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$ 504	\$ 420
Integrated pest mgmt.	595	\$250.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,000	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$ 1,280	\$ 960	\$
Year subtotal:					\$	\$	\$ 823	\$ 914	\$	\$	\$ 848	\$	\$ 3,118	\$ 15,217	\$ 2,370
FSP%					50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:					\$	\$	\$ 411	\$ 457	\$	\$	\$ 424	\$	\$ 1,559	\$ 7,608	\$ 1,185
FSP Share:					\$	\$	\$ 411	\$ 457	\$	\$	\$ 424	\$	\$ 1,559	\$ 7,608	\$ 1,185
Year 10 Applicant Sum:					\$	\$	\$ 11,644.80	\$	\$	\$	\$	\$	\$	\$	\$ 11,644.80

Table 9 Annual budgets for forest management activities related to maintenance (M) of existing native forest by invasive weed suppression, years 1-10 (2016-2026).

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 1 (2016)													
Trail construction	568	\$84.87	acre	1	\$	891	\$	\$	\$	\$	\$	\$	\$
Access road	560	\$74.66	acre	1	\$	340	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$	1,139	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$	433	\$	667	\$	1,280	\$	907	\$
Brush management	314	\$560.00	acre	4	\$	5,880	\$	\$	\$	\$	\$	\$	\$
Monitoring	643	\$125.00	acre	5	\$	1,312	\$	\$	\$	\$	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	3,360	\$	\$	\$	\$	\$	\$	\$
Year subtotal:	---	---	---	---	\$	1,912	\$	667	\$	1,411	\$	907	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	956	\$	334	\$	706	\$	454	\$
FSP Share:	---	---	---	---	\$	956	\$	334	\$	706	\$	454	\$
Year 1 Applicant Sum:	\$					10,181.84				Year 1 FSP Sum:	\$		10,181.84
Year 2 (2017)													
Trail construction	568	\$85	acre	1	\$	\$	596	\$	\$	\$	\$	\$	\$
Access road	560	\$75	acre	1	\$	340	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$	1,139	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$	433	\$	667	\$	1,280	\$	907	\$
Brush management	314	\$560.00	acre	4	\$	\$	3,932	\$	\$	\$	\$	\$	\$
Monitoring	643	\$125.00	acre	5	\$	\$	878	\$	\$	\$	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	2,247	\$	\$	\$	\$	\$	\$
Year subtotal:	---	---	---	---	\$	1,912	\$	8,320	\$	1,411	\$	907	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	956	\$	4,160	\$	706	\$	454	\$
FSP Share:	---	---	---	---	\$	956	\$	4,160	\$	706	\$	454	\$
Year 2 Applicant Sum:	\$					8,286.39				Year 2 FSP Sum:	\$		8,286.39

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 3 (2018)													
Trail construction	568	\$85	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$
Access road	560	\$75	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$	\$	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$	\$	\$	\$	\$	\$	\$	\$	\$
Brush management	314	\$560.00	acre	4	\$	\$	\$	\$	\$	\$	\$	\$	\$
Monitoring	643	\$125.00	acre	5	\$	\$	\$	\$	\$	\$	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$
Year subtotal:	---	---	---	---	\$	\$	\$	\$	\$	\$	\$	\$	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	\$	\$	\$	\$	\$	\$	\$	\$
FSP Share:	---	---	---	---	\$	\$	\$	\$	\$	\$	\$	\$	\$
Year 3 Applicant Sum:	\$							7,891.48					7,891.48

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 4 (2019)													
Trail construction	568	\$85	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$
Access road	560	\$75	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$	\$	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$	\$	\$	\$	\$	\$	\$	\$	\$
Brush management	314	\$560.00	acre	4	\$	\$	\$	\$	\$	\$	\$	\$	\$
Monitoring	643	\$125.00	acre	5	\$	\$	\$	\$	\$	\$	\$	\$	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$
Year subtotal:	---	---	---	---	\$	\$	\$	\$	\$	\$	\$	\$	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	\$	\$	\$	\$	\$	\$	\$	\$
FSP Share:	---	---	---	---	\$	\$	\$	\$	\$	\$	\$	\$	\$
Year 4 Applicant Sum:	\$							12,992.83					12,992.83

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22	
														4.6 ac
Year 5 (2020)														
Trail construction	568	\$85	acre	1	\$	-	\$	-	\$	-	\$	1,143	\$	-
Access road	560	\$75	acre	1	\$	340	\$	-	\$	-	\$	-	\$	-
Roadside weed control	315	\$250.00	acre	2	\$	1,139	\$	-	\$	-	\$	-	\$	-
Incipient weed mgmt	643	\$95.00	acre	3	\$	433	\$	667	\$	1,411	\$	1,280	\$	907
Brush management	314	\$560.00	acre	4	\$	-	\$	-	\$	-	\$	7,545	\$	-
Monitoring	643	\$125.00	acre	5	\$	-	\$	637	\$	-	\$	1,684	\$	-
Competition control	315	\$320.00	acre	12	\$	-	\$	-	\$	-	\$	4,311	\$	-
Year subtotal:	---	---	---	---	\$	1,912	\$	667	\$	1,411	\$	15,964	\$	907
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	956	\$	334	\$	706	\$	7,982	\$	454
FSP Share:	---	---	---	---	\$	956	\$	334	\$	706	\$	7,982	\$	454
Year 5 Applicant Sum:	\$							12,120.29		Year 5 FSP Sum:	\$			12,120.29
Year 6 (2021)														
Trail construction	568	\$85	acre	1	\$	-	\$	-	\$	-	\$	-	\$	-
Access road	560	\$75	acre	1	\$	340	\$	-	\$	-	\$	-	\$	-
Roadside weed control	315	\$250.00	acre	2	\$	1,139	\$	-	\$	-	\$	-	\$	-
Incipient weed mgmt	643	\$95.00	acre	3	\$	433	\$	667	\$	1,411	\$	1,280	\$	907
Brush management	314	\$560.00	acre	4	\$	-	\$	-	\$	-	\$	5,349	\$	-
Monitoring	643	\$125.00	acre	5	\$	-	\$	1,312	\$	1,857	\$	1,194	\$	-
Competition control	315	\$320.00	acre	12	\$	-	\$	-	\$	-	\$	3,057	\$	-
Year subtotal:	---	---	---	---	\$	1,912	\$	2,310	\$	3,268	\$	1,280	\$	11,318
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	956	\$	1,155	\$	1,634	\$	640	\$	5,659
FSP Share:	---	---	---	---	\$	956	\$	1,155	\$	1,634	\$	640	\$	5,659
Year 6 Applicant Sum:	\$							11,250.02		Year 6 FSP Sum:	\$			11,250.02

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 7 (2022)													
Trail construction	568	\$85	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$
Access road	560	\$75	acre	1	\$ 340	\$	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$ 1,139	\$	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$ 433	\$ 997	\$ 667	\$ 484	\$ 1,411	\$ 1,280	\$ 907	\$ 599	\$ 662
Brush management	314	\$560.00	acre	4	\$	\$	\$	\$	\$	\$	\$	\$ 3,532	\$
Monitoring	643	\$125.00	acre	5	\$	\$ 878	\$	\$	\$	\$ 1,684	\$	\$ 788	\$
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$ 2,018	\$
Year subtotal:	---	---	---	---	\$ 1,912	\$ 997	\$ 1,545	\$ 484	\$ 1,411	\$ 2,964	\$ 907	\$ 7,472	\$ 662
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 956	\$ 499	\$ 772	\$ 242	\$ 706	\$ 1,482	\$ 454	\$ 3,736	\$ 331
FSP Share:	---	---	---	---	\$ 956	\$ 499	\$ 772	\$ 242	\$ 706	\$ 1,482	\$ 454	\$ 3,736	\$ 331
Year 7 Applicant Sum:	\$				\$	\$	\$	\$	\$	\$	\$	\$	\$
Year 7 FSP Sum: 9,177.65													

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 8 (2023)													
Trail construction	568	\$85	acre	1	\$	\$	\$	\$	\$	\$	\$	\$	\$
Access road	560	\$75	acre	1	\$ 340	\$	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$ 1,139	\$	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$ 433	\$ 997	\$ 667	\$ 484	\$ 1,411	\$ 1,280	\$ 907	\$ 599	\$ 662
Brush management	314	\$560.00	acre	4	\$	\$	\$	\$	\$	\$	\$	\$	\$ 3,903
Monitoring	643	\$125.00	acre	5	\$	\$	\$	\$ 637	\$	\$	\$ 1,194	\$	\$ 871
Competition control	315	\$320.00	acre	12	\$	\$	\$	\$	\$	\$	\$	\$	\$ 2,231
Year subtotal:	---	---	---	---	\$ 1,912	\$ 997	\$ 667	\$ 1,120	\$ 1,411	\$ 1,280	\$ 2,102	\$ 599	\$ 8,259
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$ 956	\$ 499	\$ 334	\$ 560	\$ 706	\$ 640	\$ 1,051	\$ 300	\$ 4,129
FSP Share:	---	---	---	---	\$ 956	\$ 499	\$ 334	\$ 560	\$ 706	\$ 640	\$ 1,051	\$ 300	\$ 4,129
Year 8 Applicant Sum:	\$				\$	\$	\$	\$	\$	\$	\$	\$	\$
Year 8 FSP Sum: 9,173.74													

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 9 (2024)													
Trail construction	568	\$85	acre	1	\$	891	\$	\$	\$	\$	\$	\$	\$
Access road	560	\$75	acre	1	\$	340	\$	\$	\$	\$	\$	\$	\$
Roadside weed control	315	\$250.00	acre	2	\$	1,139	\$	\$	\$	\$	\$	\$	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$	433	\$	667	\$	1,411	\$	1,280	\$
Brush management	314	\$560.00	acre	4	\$	-	\$	-	\$	-	\$	-	\$
Monitoring	643	\$125.00	acre	5	\$	-	\$	-	\$	1,857	\$	-	\$
Competition control	315	\$320.00	acre	12	\$	-	\$	-	\$	-	\$	-	\$
Year subtotal:	---	---	---	---	\$	1,912	\$	667	\$	3,268	\$	1,280	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	956	\$	334	\$	1,634	\$	640	\$
FSP Share:	---	---	---	---	\$	956	\$	334	\$	1,634	\$	640	\$
Year 9 Applicant Sum:	\$					11,504.31				Year 9 FSP Sum:	\$	11,504.31	

Activity	NRCS code	Cost unit ⁻¹	Units	FMU Area	A	M15	M16	M17	M18	M19	M20	M21	M22
Year 10 (2025)													
Trail construction	568	\$85	acre	1	\$	-	\$	596	\$	-	\$	-	\$
Access road	560	\$75	acre	1	\$	340	\$	-	\$	-	\$	-	\$
Roadside weed control	315	\$250.00	acre	2	\$	1,139	\$	-	\$	-	\$	-	\$
Incipient weed mgmt	643	\$95.00	acre	3	\$	433	\$	667	\$	1,411	\$	1,280	\$
Brush management	314	\$560.00	acre	4	\$	-	\$	-	\$	-	\$	-	\$
Monitoring	643	\$125.00	acre	5	\$	-	\$	3,932	\$	-	\$	-	\$
Competition control	315	\$320.00	acre	12	\$	-	\$	878	\$	-	\$	-	\$
Year subtotal:	---	---	---	---	\$	1,912	\$	8,320	\$	484	\$	1,411	\$
FSP%	---	---	---	---	50%	50%	50%	50%	50%	50%	50%	50%	50%
Applicant share:	---	---	---	---	\$	956	\$	4,160	\$	242	\$	706	\$
FSP Share:	---	---	---	---	\$	956	\$	4,160	\$	242	\$	706	\$
Year 10 Applicant Sum:	\$					9,564.10				Year 10 FSP Sum:	\$	9,564.10	

5.2. Schedule

Table 10. Plan of operations from project years 1 (2016) to 10 (2025).

Activity	NRCS code	Start month	FMU										
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Year 1 (2015)													
Management plan	---	---											
Trail maintenance	568	1											
Access road	560	1											
Roadside weed control	315	2											
Incipient weed mgmt	643	3											
Brush management	314	4											
Forest improvement	666	4											
Monitoring	643	5											
Site preparation	490	6											
Seedlings: Koa	612	9											
Seedlings: Native	612	9											
Planting	612	12											
Fertilizer / application	590	12											
Integrated pest mgmt.	595	12											
Competition control	315	12											
Year 2 (2016)													
Trail maintenance	568	1											
Access road	560	1											
Roadside weed control	315	2											
Incipient weed mgmt	643	3											
Brush management	314	4											
Forest improvement	666	4											
Monitoring	643	5											
Site preparation	490	6											
Seedlings: Koa	612	9											
Seedlings: Native	612	9											
Planting	612	12											
Fertilizer / application	590	12											
Integrated pest mgmt.	595	12											
Competition control	315	12											

Activity	NRCS code	Start month	FMU									
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9
Year 3 (2017)												
Trail maintenance	568	1										
Access road	560	1										
Roadside weed control	315	2										
Incipient weed mgmt	643	3										
Brush management	314	4										
Forest improvement	666	4										
Monitoring	643	5										
Site preparation	490	6										
Seedlings: Koa	612	9										
Seedlings: Native	612	9										
Planting	612	12										
Fertilizer / application	590	12										
Integrated pest mgmt.	595	12										
Competition control	315	12										

Activity	NRCS code	Start month	FMU									
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9
Year 4 (2018)												
Trail maintenance	568	1										
Access road	560	1										
Roadside weed control	315	2										
Incipient weed mgmt	643	3										
Brush management	314	4										
Forest improvement	666	4										
Monitoring	643	5										
Site preparation	490	6										
Seedlings: Koa	612	9										
Seedlings: Native	612	9										
Planting	612	12										
Fertilizer / application	590	12										
Integrated pest mgmt.	595	12										
Competition control	315	12										

Activity	NRCS code	Start month	FMU									
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9
Year 5 (2019)												
Trail maintenance	568	1										
Access road	560	1										
Roadside weed control	315	2										
Incipient weed mgmt	643	3										
Brush management	314	4										
Forest improvement	666	4										
Monitoring	643	5										
Site preparation	490	6										
Seedlings: Koa	612	9										
Seedlings: Native	612	9										
Planting	612	12										
Fertilizer / application	590	12										
Integrated pest mgmt.	595	12										
Competition control	315	12										

Activity	NRCS code	Start month	FMU									
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9
Year 6 (2020)												
Trail maintenance	568	1										
Access road	560	1										
Roadside weed control	315	2										
Incipient weed mgmt	643	3										
Brush management	314	4										
Forest improvement	666	4										
Monitoring	643	5										
Site preparation	490	6										
Seedlings: Koa	612	9										
Seedlings: Native	612	9										
Planting	612	12										
Fertilizer / application	590	12										
Integrated pest mgmt.	595	12										
Competition control	315	12										

Activity	NRCS code	Start month	FMU									
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9
Year 7 (2021)												
Trail maintenance	568	1										
Access road	560	1										
Roadside weed control	315	2										
Incipient weed mgmt	643	3										
Brush management	314	4										
Forest improvement	666	4										
Monitoring	643	5										
Site preparation	490	6										
Seedlings: Koa	612	9										
Seedlings: Native	612	9										
Planting	612	12										
Fertilizer / application	590	12										
Integrated pest mgmt.	595	12										
Competition control	315	12										

Activity	NRCS code	Start month	FMU									
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9
Year 8 (2022)												
Trail maintenance	568	1										
Access road	560	1										
Roadside weed control	315	2										
Incipient weed mgmt	643	3										
Brush management	314	4										
Forest improvement	666	4										
Monitoring	643	5										
Site preparation	490	6										
Seedlings: Koa	612	9										
Seedlings: Native	612	9										
Planting	612	12										
Fertilizer / application	590	12										
Integrated pest mgmt.	595	12										
Competition control	315	12										

Activity	NRCS code	Start month	FMU										
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Year 9 (2023)													
Trail maintenance	568	1											
Access road	560	1											
Roadside weed control	315	2											
Incipient weed mgmt	643	3											
Brush management	314	4											
Forest improvement	666	4											
Monitoring	643	5											
Site preparation	490	6											
Seedlings: Koa	612	9											
Seedlings: Native	612	9											
Planting	612	12											
Fertilizer / application	590	12											
Integrated pest mgmt.	595	12											
Competition control	315	12											

Activity	NRCS code	Start month	FMU										
			Rd	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Year 10 (2024)													
Trail maintenance	568	1											
Access road	560	1											
Roadside weed control	315	2											
Incipient weed mgmt	643	3											
Brush management	314	4											
Forest improvement	666	4											
Monitoring	643	5											
Site preparation	490	6											
Seedlings: Koa	612	9											
Seedlings: Native	612	9											
Planting	612	12											
Fertilizer / application	590	12											
Integrated pest mgmt.	595	12											
Competition control	315	12											

6. References

Clausnitzer, D. 2007. Ecological Site Description. USDA NRCS FOTG publications.

Flint, M.L., Daar, S., Molinar, R. 2003. Establishing integrated pest management policies and programs: a guide for public agencies. UC Davis. 8093.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

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USDA NRCS Soil Data Viewer. <http://soildatamart.nrcs.usda.gov/templates.aspx>

7. Appendices

Appendix A.

Description and physical properties of dominant soil type(s).

Appendix B.

FMU map plates with satellite background.



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
 HONOLULU, HAWAII 96809

SUZANNE D. CASE
 CHAIRPERSON
 BOARD OF LAND AND NATURAL RESOURCES
 COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
 FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
 DEPUTY DIRECTOR - WATER

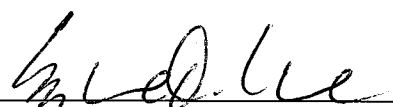
AQUATIC RESOURCES
 BOATING AND OCEAN RECREATION
 BUREAU OF CONVEYANCES
 COMMISSION ON WATER RESOURCE MANAGEMENT
 CONSERVATION AND COASTAL LANDS
 CONSERVATION AND RESOURCES ENFORCEMENT
 ENGINEERING
 FORESTRY AND WILDLIFE
 HISTORIC PRESERVATION
 KAHOLAWE ISLAND RESERVE COMMISSION
 LAND
 STATE PARKS

EXEMPTION NOTIFICATION

Regarding the preparation of an environmental assessment pursuant to Chapter 343, Hawaii Revised Statutes.

Project Title:	Keauhou Bird Conservation Center Discovery Forest Restoration Project Forest Stewardship management plan and Forest Stewardship Agreement with Zoological Society of San Diego dba San Diego Zoo Global
Project Number:	N/A
Project Description:	<p>Forest Stewardship Agreement and associated management plan for the Keauhou Bird Conservation Center Discovery Forest Restoration Project (KBCC), Zoological Society of San Diego dba San Diego Zoo Global (SDZG), Tax Map Key (3) 9-9-001:004, Ka'ū District, Hawaii County.</p> <p>Over the course of the 10-year management plan and agreement, SDZG intends to promote the recovery and protection of this native dominated forest. The project proposes to restore an Acacia koa dominated overstory, supplement the understory diversity with planting of appropriate native species, suppress invasive weeds, and incorporate an educational program for local students and public groups visiting KBCC.</p> <p>Management approaches will focus on:</p> <ol style="list-style-type: none"> (1) Restoration of a koa canopy in grass-dominated abandoned pastures; enrichment plantings in existing forested areas; and increasing populations of native fruit and seed plants to support endangered bird breeding programs. (2) Concentrated plantings of seed and fruit producing native species at high densities while minimizing impacts on the sensitive native bird species housed in SDZG enclosures. (3) Invasive species control of the suite of invasive species found in KBCC utilizing control methods appropriate for each species, its current abundance, and its threat level. (4) Control of invasive weeds along main access routes in KBCC project area; limited to one annual invasive weed suppression operation and periodic sweeps for incipient invasive species in a buffer zone surrounding the road system. (5) Development of an education program that highlights both the ongoing

	<p>captive breeding and release efforts for critically endangered Hawaiian birds, as well as incorporating forest restoration volunteer work into the KBCC visits.</p>
<p>Chapter 343 Trigger:</p>	<p>Use of State Funds</p>
<p>Exemption Class & Description</p>	<p>Exemption Class No. 4, Item 6, Minor vegetation clearing and management, including mowing, pruning, trimming, and application of federal and state approved herbicides in conformance with label instructions.</p> <p>Exemption Class No. 4, Item 8, Removal of invasive vegetation utilizing cutting, mowing, application of federal and state approved herbicides in conformance with label instructions, distribution of biocontrol agents approved by the State of Hawaii, and other approved methods.</p> <p>Exemption Class No. 4, Item 12, Establish temporary or permanent vegetative cover including trees, shrubs, grasses, and sod for landscaping, reforestation, soil stabilization, watershed protection, native wildlife habitat, native ecosystem restoration, and rare plant preservation; provided, however, that this exemption shall not apply to vegetation that is likely to be invasive or for tree plantings for which harvesting is planned or is reasonably foreseeable.</p> <p>Exemption Class No. 4, Item 13, Gathering plant seed, cuttings, or other vegetative matter for propagation.</p> <p>Exemption Class No. 4, Item 22, Natural resource management actions that the Department declares are designed specifically to monitor, conserve, or enhance the status of native species or native species' habitats, such as removal of introduced vegetation, reintroduction of native species into their historic range, or construction of fencing. This exemption would not apply to biocontrol of invasive species or commercial logging.</p>
<p>Recommendation</p>	<p>It is anticipated that this project will have minimal or no significant negative effect on the environment and is presumed to be exempt from the preparation of an environmental assessment.</p>



 Suzanne D. Case, Chairperson

 1/6/17
 Date