Draft
Environmental Assessment

addressing
Effects of Implementing the
Kaua‘i Seabird Habitat Conservation Plan
under
Associated Applications for Incidental Take Permits/Licenses

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Joint NEPA and HRS Chapter 343 Document

prepared for
U.S. Fish & Wildlife Service
&
Department of Land and Natural Resources
Division of Forestry and Wildlife
State of Hawai‘i

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List of Acronyms

BLNR	Board of Land and Natural Resources
CEQ	Council of Environmental Quality
CZM	Coastal Zone Management
DBEDT	Department of Business, Economic Development, and Tourism
DLNR	Department of Land and Natural Resources
DOFAW	Division of Forestry and Wildlife
EA	Environmental Assessment
ESA	Endangered Species Act
ESRC	Endangered Species Recovery Committee (State of Hawai‘i)
GCP	General Conservation Plan
GIS	Geographic Information Systems
HAR	Hawai‘i Administrative Rules
HCP	Habitat Conservation Plan
HEPA	Hawai‘i Environmental Policy Act
HRS	Hawai‘i Revised Statutes
ITL	Incidental Take License
ITP	Incidental Take Permit
KESRP	Kaua‘i Endangered Seabird Recovery Project
KIUC	Kaua‘i Island Utility Cooperative
KSHCP	Kaua‘i Seabird Habitat Conservation Plan
MBTA	Migratory Bird Treaty Act
NAR	Natural Area Reserve
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTBG	The National Tropical Botanical Garden
OEQC	Office of Environmental Quality Control
PIP	Participant Inclusion Plan
SHPO	State Historic Preservation Officer
SOS	Save Our Shearwaters
TMK	Tax Map Key
TNC	The Nature Conservancy
US	United States of America
USFWS	U.S. Fish and Wildlife Service

Environmental Assessment of the Federal Action of Issuance of Incidental Take Permits to Qualifying Applicants

Introduction

This environmental assessment (EA) evaluates the effects of a no-action alternative and two action alternatives.

The Proposed (preferred) Action Alternative presented in this EA is U.S. Fish and Wildlife Service (USFWS or Service) issuance of Incidental Take Permits (ITPs) to qualifying Applicants that request take authorization for the Newell's shearwater (*Puffinus auricularis newelli*, Hawaiian name: ʻaʻo), Hawaiian petrel (*Pterodroma sandwichensis*, Hawaiian name: ʻuaʻu), and the Hawaiʻi distinct population segment (DPS) of the band-rumped storm-petrel (*Oceanodroma castro*, Hawaiian name: ʻakēʻakē, hereafter band-rumped storm-petrel) (collectively referred to as "Covered Species") caused by Covered Activities based on the Applicants' commitment to implement the Kauaʻi Seabird Habitat Conservation Plan (KSHCP) under individual Habitat Conservation Plan (HCP) permit applications. Implementation of the KSHCP is likely to result in the implementation of actions to minimize and fully offset the impacts of the taking of up to 1,738 ʻaʻo, 73 ʻuaʻu, and 26 ʻakēʻakē over 30 years due to light attraction. Under the KSHCP, minimization measures emphasize reducing the amount of artificial, night-time light that shines upward and reducing the amount of light output or intensity, which have been shown to reduce the effects of light attraction on the Covered Species. Under the KSHCP, mitigation activities include creating and managing the Kahuamaʻa Seabird Preserve (Preserve), conducting barn owl (*Tyto alba*) control in Kalalau Valley, and conducting feral cat (*Felis catus*) control along Kalalau Valley rim to reduce depredation on existing seabirds and colonies near the Preserve.

The No-action Alternative involves not issuing ITPs to qualifying Applicants, which would result in implementation of reasonable minimization measures but no mitigation offset for any continued unavoidable, unauthorized take.

The Translocation Alternative consists of the issuance of ITPs by the USFWS in association with modified HCP permit applications that augment KSHCP mitigation measures to include translocation of chicks of the Covered Species from remote breeding sites in the mountains into the Preserve to augment recruitment and productivity of breeding seabirds at the Preserve. All other aspects of the proposed action would remain the same under the Translocation Alternative.

1. Purpose and Need

1.1. Purpose and Need of Action

The proposed Federal action considered in this EA is issuance of ITPs in response to permit applications submitted under this HCP in accordance with the requirements of section 10(a)(1)(B) of the Endangered Species Act (ESA). If approved, these ITPs would each authorize incidental take of the Covered Species caused by Covered Activities.

The Service's purpose is to fulfill its ESA section 10 conservation obligations. Non-Federal Applicants whose otherwise lawful activities may result in take of ESA-listed wildlife can apply to the Service for an ITP so that their activities may proceed without potential violation of the ESA section 9 prohibition against such take.

In considering ITP applications, the Service must comply with a number of Federal laws and regulations, Executive Orders, and agency directives and policy. As the Service fulfills these responsibilities and obligations, it will strive to ensure that issuance of any ITP and implementation of the HCP achieve long-term conservation objectives for the Covered Species and ecosystems over the long-term or for a period commensurate with the scope of the take impacts caused by Covered Activities on the Covered Species.

The Service's need for the action is to respond to the applications for ITPs. Once applications are received, the Service needs to review each application to determine if it meets issuance criteria.

The Service also needs to ensure that if it decides to issue ITPs pursuant to the associated HCP that these ITPs comply with other applicable Federal laws, regulations, and treaties such as the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), the Migratory Bird Treaty Act (MBTA), and Executive Orders 11998, 11990, 13186, 12630, and 12962, as appropriate.

As of October 17, 2019, the Service received ITP applications from eight initial Applicants under the KSHCP. If these applications are approved, and the Service issues associated ITPs, the permits would authorize take of the Covered Species caused by Covered Activities as stipulated on the ITP.

As such, this document was prepared to meet the requirements of NEPA, and to:

- Inform the public of its proposed and alternative actions, and their effects on the human environment;
- Seek relevant information from the public;
- Inform the agencies of the environmental effects of their proposed actions and, under NEPA, aid the Service in determining whether to prepare an Environmental Impact Statement (EIS) for the proposed action of issuance of the permits or whether a finding of no significant impact (FONSI) is appropriate; and to
- Use the information collected and analyzed to help make informed decisions concerning ITP applications.

1.2. Authority for Action and Authorities Governing the Action

The proposed action would be carried out in compliance with various Federal and State laws including those listed below.

1.2.1. Authorizing Federal Laws, Executive Orders, and Supporting Agency Guidelines

National Environmental Policy Act of 1969 (NEPA), as amended. NEPA requires that Federal agencies evaluate the impacts of their proposed actions on the human environment, that these impacts be considered by the decision maker(s) prior to implementation, and that the public be informed of these impacts. This EA was prepared in compliance with NEPA (42 USC Section 4231, et seq.) and the President's Council for Environmental Quality Regulations, 40 CFR Section 1500 – 1508.

National Historic Preservation Act of 1966 (54 U.S.C. 300101 et seq.)(NHPA). NHPA requires Federal agencies: (1) evaluate the effects of any Federal undertaking on historic properties; (2) consult with the State Historic Preservation Office; and (3) consult with appropriate American Indian tribes or Native Hawaiians. The Service may use its public involvement procedures under NEPA or other program requirements to satisfy the public involvement requirements for NHPA. Cultural resources are resources examined under NEPA, and the NHPA regulations encourage coordination and integration of the NHPA compliance process with the NEPA process.

Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l, 70 Stat. 1119), as amended. This Act provides general guidance, which can be construed to include consideration of alien species control that requires the Secretary of the Interior to take steps "required for the development, management, advancement, conservation, and protection of fish and wildlife resources."

ESA of 1973, as amended (16 U.S.C. 1531-1544, 87 Stat. 884). The ESA requires that all Federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). Section 7 consultations with the USFWS are conducted based on best available information to ensure that any proposed Federal action to be authorized, funded, or carried out by a Federal agency is not likely to jeopardize the continued existence of any endangered or threatened species or to destroy or adversely modify designated critical habitat.

Migratory Bird Treaty Act of 1918 (16 USC § 703-712), as amended (MBTA). The MBTA protects more than 1,000 species of birds by implementing U.S. obligations under four treaties within the United States. Under the MBTA, it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior. In Hawai'i, all native birds are protected by the MBTA.

Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR 3853, Jan. 17, 2001) – This order requires Federal agencies, to the extent practicable, to avoid or minimize adverse impacts on migratory bird resources when conducting agency actions, and to restore and enhance the habitat of migratory birds. Specifically, it requires Federal agencies to

develop and use principles, standards, and practices that will lessen the amount of unintentional take reasonably attributed to agency actions.

1.2.2. Applicable Hawai'i State Laws and Supporting Agency Regulations

Hawai'i Environmental Policy Act (Hawai'i Revised Statutes (HRS) Chapters 343 and 344). HRS Chapter 343 and its associated regulations (HAR 11-200) provides guidance to develop an informational document which discloses the environmental effects of a proposed ITL action, the effects of that action on the economic welfare, social welfare, and cultural practices of the affected community and State, the effects of economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and the alternatives to the proposed action and their environmental effects. In this case, the triggers for HRS Chapter 343 compliance are the proposed use of Conservation District land for implementation of mitigation measures proposed in this HCP, and the use of State and County lands and funds as both State and County agencies are among the nine applicants seeking an ITP/ITL under the KSHCP. HRS Chapter 343 contains comprehensive environmental policy to encourage productive and enjoyable harmony between people and their environment, to promote efforts which will prevent damage to the environment, and to enrich the understanding of ecological systems and natural resources important to the people of Hawai'i.

HRS Chapter 6E (Historic Preservation). This chapter and its associated regulations (HAR 13-198 and 13-276) provide guidance to identifying, evaluating, and assessing the adverse effects of undertakings on cultural resources under State law.

HRS Chapter 195D (Conservation of Aquatic Life, Wildlife, and Land Plants). HRS Chapter 195D provides general agency authority to the DLNR to conserve, manage and protect indigenous Hawaiian species, including the authority to review and approve HCPs and issue ITLs. The DLNR is also authorized to acquire by purchase, donation or otherwise, lands or interests therein needed to carry out the programs relating to the intent and purpose of this chapter.

HRS Chapter 183D (Wildlife). HRS Chapter 183D authorizes the DLNR to manage and administer the wildlife and wildlife resources of the State. Additionally, it allows the DLNR to enact and enforce all laws relating to the protecting, taking, hunting, killing, propagating, or increasing wildlife within the State and within waters subject to its jurisdiction.

1.3. Purpose of this Analysis

This document serves as the analysis of the proposed Service action of issuing ITPs to qualifying Applicants and implementation of the KSHCP on the human environment.

This document discusses the following topics:

- The purpose and need of the proposed action;
- A description of the proposed action alternative, no-action alternative, and a translocation alternative;

- The natural and physical environment potentially affected by the action; and
- The range of potential environmental impacts caused by the proposed action, no-action, and translocation alternatives.

The authorized decision-maker can use this EA to determine which alternative best meets the purpose of the proposed action, identify significant environmental impacts of the proposed action, and respond to unresolved environmental issues.

1.4. Resource Areas to be Analyzed

Based on the Service's scoping process and coordination with the Hawai'i Department of Land and Natural Resources, the Service selected a range of resources in the human environment to consider in this EA: Covered Species and other federally listed species and critical habitat; Fauna; Flora; Hydrology and Water Resources; Air Quality; Soils; Archaeological, Historic and Cultural Resources; Recreational Activities. The Service selected these resources based on their potential to be affected by the Federal action (proposed approval of the ITP applications, including implementation of minimization and mitigation measures under the HCP) or its alternatives, and the likely extent of the effect. Consistent with NEPA, potential impacts to these resources are described in terms of direct and indirect effects of each alternative evaluated separately, and cumulatively with other known and foreseeable impacts.

The Service considered the potential effects of the Federal action on other resources of the human environment, and determined that detailed discussion of these resources is not warranted because there would be no or negligible effects. A complete list of these other resources, and the reasons they are excluded from detailed analysis, are as follows.

- Scenic Resources: Issuance of ITPs and implementation of the KSHCP does not substantially affect scenic vistas or viewplanes. Modifications to existing lighting facilities is not anticipated to impact scenic vistas or view planes. The siting and design of the Kahuama'a Seabird Preserve predator-proof fencing was specifically planned to limit its visibility by visitors of Kōke'e State Park. The fencing will not be visible from roadways and will not block viewplanes or scenic vistas or seem obtrusive; however, it may be visible at times from scenic lookouts, by those looking back along the cliff-face. Under the no action alternative (Alternative A), the impact to scenic resources in the form of improved nighttime aesthetics associated with darker skies is difficult to quantify, but would be anticipated to remain similar to current conditions. Under the Proposed Action (Alternative B), impacts related to minimization measures at existing Applicant facilities would be similar to Alternative A; potential impacts to scenic resources associated with the proposed mitigation site is anticipated to be minor (localized, small and of little consequence). Impacts under Alternative C would be similar in scale and intensity as Alternative B.
- Effects on Demographics, Economics, Land Use, and Infrastructure: Under Alternative A, the economic impact associated with voluntary light minimization measures, including the potential exposure to fines or penalties associated with unauthorized take of Covered Species would be anticipated to remain similar to current conditions. Under Alternative

B, impacts related to minimization measures at existing Applicant facilities would be similar to Alternative A. The development and management of Kahuama‘a Seabird Preserve as a mitigation site does not change the existing land use or require improvements to existing infrastructure. Impacts of Alternative C would be similar in scale and intensity as Alternative B.

1.5 Permit Issuance Criteria

Under provisions of the ESA, the Service (under authority delegated by the Secretary of the Interior) would issue an ITP if the application meets the following issuance criteria identified in section 10(a)(2)(B) of the ESA and its implementing regulations:

- The taking of the listed species would be incidental to an otherwise legal activity;
- The Applicant would, to the maximum extent practicable, minimize and mitigate the impacts of such taking on the listed species;
- The Applicant would ensure that adequate funding for the implementation of the HCP would be provided, including for procedures to deal with unforeseen circumstances;
- The taking would not appreciably reduce the likelihood of survival and recovery of the species in the wild; and
- Other measures required by the Service as being necessary or appropriate for purposes of the HCP would be implemented.

The Service will document its assessment of the ITP and HCP in an ESA section 10 findings document, which will include a determination of consistency with the issuance criteria. If the Service makes the requisite findings, the Service will issue an ITP and approve the Applicant’s HCP. In such cases, the Service will decide whether to issue an ITP conditioned on implementation of the proposed HCP as submitted, or as amended to include the other measures the Service determines are necessary or appropriate. If the Service finds that the requisite criteria are not satisfied, the permit request will be denied.

2. Alternatives

NEPA regulations require, among other things, that Federal agencies examine a range of reasonable alternatives to a proposed Federal action, including a "No Action" alternative (40 CFR 1500.02). In addition to the requirements of 40 CFR 1502.14, reasonable alternatives include alternatives that are technically and economically practical or feasible and meet the purpose and need of the proposed action (43 CFR 46.420(b)). To comply with NEPA requirements, the alternatives that the USFWS must analyze in the EA are alternatives to the Federal action of issuing ITPs based on the proposed KSHCP including terms and conditions to comply with the KSHCP. The NEPA alternatives should meet the purpose and need of the action, which essentially is to fulfill USFWS conservation obligations under the ESA while responding to each Applicant's request for authorization of take incidental to Covered Activities.

This chapter will describe three alternatives, including the No-Action Alternative.

2.1. Alternatives Development

Section 102(e) of NEPA states that all Federal agencies shall "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." In addition to responding to unresolved conflicts, an environmental analysis must "rigorously explore and objectively evaluate all reasonable alternatives." (40 CFR 1502.14(a)).

The alternatives detailed below were developed to focus on the issues identified by USFWS and DLNR biologists, the Kaua'i Endangered Seabird Recovery Project (KESRP) seabird biologists, State and Federal regulatory agencies, and the general public.

2.2. Scoping and Public Involvement

DLNR received grant funds through the Service's Cooperative Endangered Species Program, which administers HCP planning grants under Section 6 of the ESA, to develop an island-wide conservation plan as an approach to reconcile the complex issue of widespread ongoing take of listed seabirds on the island of Kaua'i. Public involvement and agency coordination served as an integral component of the development of the KSHCP and this draft EA. For over a decade, DLNR has been working with numerous entities on Kaua'i regarding the longstanding problem of seabird light attraction, the causes of light attraction, the regulatory status of seabirds, and opportunities to avoid and minimize the effects of light attraction on the listed species. In the course of that decade, over 100 businesses and other entities were contacted, resulting in many voluntary changes at facilities to avoid and minimize take of the Covered Species by installation of seabird-friendly lighting and an overall reduction in the number of lights on Kaua'i. Changes to lighting at some specific facilities were the result of litigation and settlement agreements. During the subsequent decade-long development process for the KSHCP, some entities have determined that minimization alone will not completely avoid incidental take, and these entities are among the Applicants seeking an ITP/ITL under the KSHCP.

The KSHCP was developed through the collaborative efforts of staff from the Service, DLNR, KESRP, and potential Applicants. The Service provided technical assistance. Additional advice

and guidance was received from The Nature Conservancy (TNC), The National Tropical Botanical Garden (NTBG), and Save Our Shearwaters (SOS). Additional agencies, organizations and individuals consulted in the development of the KSHCP are listed in Appendix A.

The Service also initiated NEPA compliance on the KSHCP. The formal scoping process began on November 9, 2010, with the publication of a notice of a meeting to conduct public scoping for the proposed KSHCP, Hawaiʻi (Federal Register Volume 75, Number 216 at 688619 [November 9, 2010]). The notice provided information on the project (which at that time the purpose of the KSHCP was to address the incidental take of the ʻaʻo, ʻuaʻu, and ʻakēʻakē due to existing and planned artificial lights as well as overhead utility lines and associated structures that were broader in scope than now proposed), announced the date, time and location of the scoping meeting, and requested written comments by December 9, 2010.

The Service published legal notices, a press release, and an advertisement in two local newspapers prior to the public scoping meeting. The names and dates of publications are as follows:

- Legal notice: The Garden Island News, October 31, 2010;
- Press release: The Garden Island News, November 3, 2010;
- Midweek News: published in the November 10, 2010 issue that was distributed November 8, 2010; and
- KKCR community radio played on-air announcements during the week prior to the event.

In addition, the Service sent a news release to the following media outlets: KHNL television, KHON television, Hawaiʻi Tribune-Herald, Hawaiʻi Public Radio, Big Island Weekly, West Hawaiʻi Today, Star Advertiser, Hawaiʻi News Now, Maui News, Molokaʻi News, Environmental News Service, University of Hawaiʻi newspaper (Ka Leo), and the Associated Press. The Service also placed a notification on their website listing the date, time, and location of the public scoping meeting.

The Service conducted one public scoping meeting on the KSHCP on November 10, 2010, at the Chiefess Kamakahelei Middle School Cafeteria, Līhuʻe, Kauaʻi.

The State of Hawaiʻi Endangered Species Recovery Committee (ESRC) conducted public meetings on December 6, 2010, October 23, 2014, December 17, 2015, February 25, 2016, June 9, 2016, and December 9, 2016, where the development and status of the KSHCP was an agenda item for discussion and subject to public comment. More recently, the State published the availability of the draft KSHCP and Applicants' Participant Inclusion Plans (PIPs) in the Environmental Notice published by the Office of Environmental Quality Control (OEQC). These were made available for public review and comment for a 60-day period beginning on September 8, 2019. The State ESRC conducted public meetings to discuss the draft KSHCP, conduct site visits, and discuss the PIPs on September 30, 2019, October 7-8, 2019, and on October 23, 2019, respectively.

In addition, Kaua‘i County has afforded multiple opportunities for public comment and involvement between January 2009 and May 2019, at Council meetings on issues related to the KSHCP, including:

- Preparation of applications for ITPs/ITLs and associated HCPs;
- Stadium facilities lighting retrofits;
- ESA and MBTA liabilities at County facilities;
- The *United States of America vs. County of Kaua‘i* court decision, No. 10-00614, and the terms and conditions of probation; and
- The relationship of the shearwater fledgling season to evening football games.

In summary, the public and many agencies have been invited to provide comments on and engage in dialogue with the Service as well as State and County agencies on the matter of ongoing lighting impacts to seabirds on the island of Kaua‘i, including the impact of lighting at public facilities such as the County's football stadiums. The public and the Kaua‘i community have played an integral role in addressing this matter thus far, and the Service and DLNR will continue to involve them in the public review of the draft KSHCP, this draft EA, and accompanying draft ITP/ITL applications.

2.3. Alternatives Being Considered

The following alternatives are considered in this EA:

- Alternative A: No-Action;
- Alternative B: The Proposed Action, which involves the USFWS issuing ITPs to qualifying Applicants who will implement avoidance, minimization, and mitigation measures set forth in the KSHCP. This alternative is the preferred alternative;
- Alternative C: This alternative consists of Alternative B with the addition of seabird translocation as part of the mitigation measures.

Note: section 2.7 of the EA describes alternatives that were considered but not analyzed in detail and explains why those alternatives were excluded from detailed analysis.

2.4. Alternative A: No-Action Alternative

Under the No-Action Alternative, the USFWS would not issue ITPs to multiple, qualifying non-Federal entities on Kaua‘i for incidental take of the Covered Species from the effects of light attraction, and the conservation program under the KSHCP would not be implemented. This alternative assumes that prospective Applicants would implement all possible reasonable avoidance or minimization measures to reduce the risk of take of the Covered Species. The "No-Action Alternative" provides a benchmark to compare the magnitude of environmental effects of the action alternatives, and to determine the significance of effects resulting from issuance of ITPs under the other two alternatives.

The KSHCP is designed to address impacts on the Covered Species caused by existing facilities. Nighttime lighting supports operational needs at existing facilities and provides for human health, safety and general welfare for island residents and visitors. Ongoing (unauthorized) take due to light attraction inspired the development of this HCP, but also resulted in legal actions for unpermitted take of listed seabirds. As a result of previous legal action, the County of Kaua‘i entered into a plea agreement with the U.S. Department of Justice which stipulated that the County of Kaua‘i contribute funds ($111,000) to benefit the ‘a‘o, restrict the use of sports stadium lighting during the seabird fledgling season for a probationary period, conduct an inventory of County lighting and develop a plan to minimize the impacts of lighting, and conduct educational public outreach and seabird awareness and response training for County employees. Kaua‘i Island Utility Cooperative (KIUC) also entered into a plea agreement with the U.S. Department of Justice and developed their Short-Term HCP specifying certain research, minimization, and mitigation actions, and the USFWS issued a 5-year ITP to KIUC that authorized the take of the ‘a‘o, the ‘ua‘u, and the ‘akē‘akē over the 5-year period. The St. Regis Princeville Resort (now Princeville Resort Kaua‘i) came to a settlement on the legal action with an agreement to fund seabird conservation on Kaua‘i for the ‘a‘o, and to reduce the impacts of lighting at its resort. Non-governmental organizations have also filed lawsuits to enforce the ESA prohibition on incidental take of listed species absent a valid ITP.

During the planning process for developing the KSHCP, many entities have been implementing measures to avoid or minimize the adverse effects of nighttime lighting at their facilities on the Covered Species. These actions include installing light shields, re-directing lights downward, shifting the use of lights during fledging fallout season, and replacement of lights with full cut-off features. For example, the County of Kaua‘i replaced existing lighting with full cut-off fixtures at several stadiums and parks, and made scheduling changes to nighttime activities (such as ending night football games). The Service assumes these measures would remain in place under the No-Action Alternative.

Measures to minimize the adverse effects of lighting on the Covered Species vary in complexity and cost, generally according to the type of lighting present at a facility, the amount of effort required to alter the lighting, and the effectiveness of the measure to reduce seabird light attraction. Replacing and retrofitting high-intensity lights can incur high costs; simpler measures, such as installing shields on existing light fixtures, are less expensive.

The cost, degree of effort, and anticipated benefit of additional measures to the Covered Species affect whether individuals or groups would enact such measures. The effectiveness provided by existing minimization measures have not been catalogued or evaluated. The extent to which additional minimization measures might take place under the No-Action Alternative cannot be known with certainty, but for purposes of the No-Action Alternative, the Service assumes that parties that might otherwise have been participants in an HCP and been issued an ITP would implement all additional reasonable minimization measures in light of the history of legal actions on this matter.

Under the No-Action Alternative, individual entities with the continued potential for the unauthorized take of the Covered Species at their facility due to light attraction, despite their implementation of reasonable avoidance and minimization measures, would have to make a

choice: continue to operate, exposing themselves to potential civil and criminal penalties for any (future) unauthorized take, or eliminate sources of artificial lighting during the seabird fallout season. In some situations, this may be possible but difficult, but in other situations it may not be feasible due to economic or public safety and security requirements. Under this alternative, any incidental take of Covered Species would not be authorized, and the responsible party would assume all legal liability for operating without an ITP. Under the No-Action Alternative, it is foreseeable that some unauthorized take would continue to occur, and the effects would not be mitigated.

2.5. Alternative B: Proposed Action Alternative (implementation of the proposed KSHCP)

The Proposed Action consists of the issuance of ITPs by the USFWS to qualifying Applicants that would authorize the incidental taking of Covered Species that may result from Covered Activities, provided the Applicants implement avoidance, minimization, and mitigation measures as outlined in the KSHCP and committed to under individual Participant Inclusion Plans (PIPs).

Nighttime lighting is an essential activity in most homes, businesses, and industry centers. The KSHCP was developed to provide an efficient and effective process for implementing an island-wide seabird conservation program and for obtaining regulatory compliance for Applicant activities that are likely to incidentally take listed seabirds. In addition, the KSHCP identifies avoidance and minimization measures to avoid take of the endangered Central North Pacific distinct population segment (DPS) of the green sea turtle (honu or *Chelonia mydas*, hereafter referred to as honu).

Applicants seeking ITPs (also referred to below as a "permit" or "permits") under the KSHCP would be seeking authorization for incidental take of the Covered Species under specific terms and conditions defined by the Plan and included in PIPs. Each permit application identifies the estimated incidental take associated with that Applicant's facilities; the maximum take amounts for each Covered Species as proposed under the KSHCP is shown in Table 2.1. The maximum total take requested under the KSHCP is shown in Table 4.4 (see Section 4.2). Under the KSHCP, the impacts of any authorized incidental taking of the Covered Species is intended to be minimized and mitigated, and offset with a net recovery benefit to the affected Covered Species. The duration of the HCP is 30 years; however, the term of individual permits issued under the Plan may vary within that 30-year period.

Table 2.1. Maximum Take Amounts of Covered Species as Proposed under the KSHCP.

Species	Total Annual		Total 30-Year	
	Mortality (Lethal)	Injury (Non-lethal)	Mortality (Lethal)	Injury (Non-lethal)
‘A‘o				
fledglings	30	45	900	1,350
adults or sub-adults	0.33	0.33	10	10
eggs/chicks	<0.1		2	
‘Ua‘u				
fledglings, adults, or sub-adults	2	2	60	60
eggs/chicks	0.33		10	
‘Akē‘akē				
fledglings, adults, or sub-adults	1	1	30	30
eggs/chicks	0.1		3	
Honu	0	0	0	0

2.5.1. KSHCP Conservation Strategy

The KSHCP is an island-wide conservation program under which individual Applicants may receive a separate Federal ITP and State ITL authorizing take of the Covered Species. The KSHCP “bundles” multiple Applicants, recognizing that many entities on Kaua‘i have a desire to comply with Federal and State endangered species statutes and to address effects of light attraction on the Covered Species. This approach facilitates coordinated, cost-efficient mitigation actions to achieve long-term biological goals and objectives needed to offset incidental take impacts and to provide a net conservation benefit to the Covered Species.

Under the KSHCP, as of October 17, 2019, eight initial Applicants on Kaua‘i that conduct actions with the potential to cause incidental take of the Covered Species have submitted applications for ITPs as appropriate to their site-specific situations. Each of their applications included a draft PIP specific to the Applicant’s facilities. The total, 30-year incidental take levels requested by these initial Applicants are presented below in Table 4.3 and Table 4.4.

Over the 30-year term of the HCP, additional Applicants will have the opportunity to prepare and submit a complete application for an ITP (including a PIP) covering their activities and requesting take coverage pursuant to the KSHCP, as long as there is sufficient mitigation “cushion” to accommodate them. After public review and comment on their draft PIP, if applicable issuance requirements are met and the inclusion of the additional Applicant does not exceed the maximum take threshold established under the KSHCP, an ITP will be issued to the Applicant authorizing incidental take of the Covered Seabirds. New ITPs will be granted, as appropriate, on a first come/first served basis, until the maximum take allowed for under the KSHCP has been fully assigned to individual Applicants. If the addition of a new Applicant would exceed that maximum total take number, then an amendment to the KSHCP would be required before issuance of any additional ITPs.

2.5.2. Covered Activities

The KSHCP covers incidental take requests involving a full range of artificial nighttime lighting types present on Kaua‘i. Kaua‘i contains a variety of lighting types. The specific type and intensity depends upon the purpose for the lighting. Under the KSHCP, all types of artificial lighting including land-based lights found at parks, retail stores, resorts, condominium complexes, agribusiness, and industrial facilities can be covered, as well as lighting on ocean-going vessels such as cruise ships. Artificial lighting includes the placement and operation of current light structures as well as the placement and operation of new or future lights that have similar effects. Outdoor lighting fixtures may include, but are not limited to parking lot lights; security lights; spotlights, and floodlights; building and structural or architectural lights; landscape lighting; recreational lights; and signage lights.

Each PIP submitted in support of an ITP would need to identify the specific lights to be covered, the specific combination of minimization strategies to be implemented at the covered facility, and the level of funding the Applicant will provide to support implementation of KSHCP conservation measures to mitigate for the effects of their unavoidable take of the Covered Species. Conservation measures to mitigate for the maximum level of take covered by the KSHCP will be implemented by a contracted party, even if the total requested take by Applicants is less than the maximum provided for under the KSHCP.

2.5.3. KSHCP Avoidance and Minimization Measures

Measures to avoid and minimize the adverse impacts of light attraction on the Covered Species are an integral part of the KSHCP. Initial Applicants have each submitted an applicant-specific PIP which provide specific detailed information on outdoor lighting, including: light type, quantity, location, purpose, and light output. The PIPs describe the lighting standards required for facility operations or other requirements that necessitate the use of lighting (e.g., required for security, safety, or operations), and any plans for future lights. Finally, the PIPs describe the measures to avoid or minimize the impacts of light attraction specific to their facilities on the Covered Species, using the *Guidelines to Adjusting Lighting at Facilities* in Appendix E of the KSHCP. These guidelines were prepared using best available science on seabird friendly lighting. Possible avoidance and minimization measures include, but are not limited to, deactivation of non-essential lights, installation of full cut-off light fixtures, shielding of light fixtures, moving the light fixtures, decreasing lighting levels, and installation of motion sensors to trigger light activation. The PIPs will identify the timing for implementation of take avoidance and minimization measures, and compliance with the minimization plan will be monitored yearly.

Seabirds that are downed at Applicant facilities are vulnerable to direct mortality from depredation by free-roaming dogs, cats, rats, and other predators, so individual PIPs are expected to describe facility-specific planned measures to minimize such mortality. These measures may include actions to reduce on-site populations of potential predators, the development and use of appropriate searching strategies targeted to finding downed birds quickly, and outreach and training for hotel workers and guests to ensure proper responses to detections of downed seabirds. All downed seabirds will be turned in to the “Save our Shearwaters” Program for

evaluation, treatment, rehabilitation, and possible release. The KSHCP conservation measure of recovering, evaluating, rehabilitating (if needed), and releasing Covered Seabirds in adequate condition is also anticipated to minimize the injury or harm of the affected individual caused by light attraction when the individual released meets the SOS release standard and is released within 48 hours (2 days) of being grounded.

2.5.4. KSHCP Mitigation Measures

Mitigation measures to offset the impacts of taking Covered Species are an integral part of the KSHCP. Instead of each Applicant doing small-scale individual mitigation projects with limited benefit, Applicants will contribute funding, and using the pooled resources, a contracted implementation entity (referred to below as the "Prime Contractor") will: (1) create and manage the Kahuamaʻa Seabird Preserve; (2) conduct barn owl control in Kalalau Valley; and (3) conduct feral cat control along the rim of the Kalalau Valley to reduce depredation at existing seabird breeding colonies, and to deter cat presence in the vicinity of the Preserve. The conservation measures described below were developed to offset the maximum level of seabird incidental take covered by the KSHCP and are required to be implemented even if the actual collective level of requested incidental take is less than than the maximum level. Over the 30-year term of the KSHCP, these actions are anticipated to increase seabird breeding probability, breeding success, and survival of the Covered Species and to provide a net conservation benefit to these species.

Kahuamaʻa Seabird Preserve

The goal of the Kahuamaʻa Seabird Preserve is to create a new protected breeding colony of ʻaʻo through the use of predator-proof fencing and social attraction. Social attraction techniques will be used to lure prospecting seabirds to breed at restoration sites by utilizing acoustic playbacks of vocalizations and the use of decoys, mirrors, scents and artificial burrows, all of which replicate features of an established seabird breeding colony from a distance (Jones and Kress 2012). Because ʻaʻo are most heavily impacted by light attraction, the development of the Preserve is designed primarily to mitigate for unavoidable take of ʻaʻo.

The Kahuamaʻa Seabird Preserve is anticipated to increase the productivity of breeding ʻaʻo to levels that support colony growth and result in a positive ʻaʻo population growth rate on Kauaʻi, vitally important for a K-selected species with a marginalized baseline condition. K-selected species are characterized by relatively low reproductive output as it is late to reach sexual maturity, and produces at most one young per year. In addition, creating a "new" colony serves to expand the ʻaʻo's distribution, which is recognized as important to increasing the likelihood of its persistence and survival in the wild (USFWS 2017b, a; USFWS 1983).

Based on observations at Kīlauea Point National Wildlife Refuge (NWR) and at Makamakaʻole on Maui, it is believed that social attraction will be effective to lure ʻaʻo to the predator-free site. At Makamakaʻole, acoustic attraction successfully lured a prospecting ʻaʻo to land and investigate a burrow (SunEdison 2015), with attempted breeding in 2017 (TerraForm 2017).

These positive milestones have been achieved despite a very small Maui population estimated by Pyle and Pyle (2009) at 50 breeding pairs.

Appendix A of the KSHCP contains the Kahuama‘a Seabird Preserve Management Plan, which provides a detailed description of planned activities from pre-construction through post-construction at the Preserve, including best management practices associated with the construction and operation of the site. The bullet points below summarize specific planned actions:

- *Construction of predator-proof fencing*. Installing a predator-proof fence entails trimming woody vegetation along the delineated fence route, installing posts, and attaching the metal grid paneling. Clearing vegetation within a corridor up to six feet wide using hand tools is necessary to facilitate fence construction. The fence route will avoid large native trees and rare plant species to the greatest extent possible. The fence posts will be sunk into the ground about 1 meter (3 feet). Wire mesh panels consisting of mesh with spacing small enough to prevent 3-day old mice from getting through, will be attached to the posts. The bottom of the mesh panels will be buried about 15 centimeters (6 inches) under ground or attached firmly to the ground depending on site conditions to prevent animals from digging under the fence. A rolled “hood” will extend outward from the top of the fence to prevent animals from climbing over the fence. The total fence height above grade will be approximately 2 meters (6-8 feet). Reflective metal materials may be colored dark to minimize any visual impacts, such as glare. After fence construction, additional vegetation clearing may be required on the outside of the fencing along a 6-foot wide corridor to remove overhanging branches or tree saplings, and to prevent predators from entering the fenced unit (e.g., by jumping from overhead limbs).

  During construction, best management practices will be employed to minimize the potential for erosion. These practices include: hand-clearing of vegetation along the fence corridor rather than with machinery in steep grade areas; cessation of clearing activities during periods of heavy rain; placing control devices (e.g., sand bag barriers) in place prior to ground disturbance and inspecting these devices daily; restoring disturbed areas; restricting the window for vegetation clearing to 1 week prior to fence construction; and ensuring soil and vegetation stabilization (re-vegetation) is put into place immediately after construction or as soon as practicable.

- *Predator removal*. It is assumed that most large predators (pigs, dogs, and cats) will leave the fenced unit during construction. If any pigs or dogs remain after the closure of the fence, they will be driven out through the gate, trapped, or removed by other methods as necessary. If any cats remain after the closure of the fence, they will be removed through the use of traps that are checked every 24-48 hours. Rodents will be removed through a combination of methods, including the use of automatic self-resetting traps, snap traps, and the use of rodenticide (diphacinone) in bait boxes used in accordance with all label instructions. After predator eradication, a subset of bait stations and self-resetting traps would be used in combination with a system of tracking tunnels as part of ongoing monitoring actions to ensure rapid responses to any rodent re-entry. In addition, a low-pest buffer zone would be established along the length of the exterior of the fence,

using bait boxes and traps, to reduce the potential for predator incursion in the event of a fence breach.

- *Implementation of seabird social attraction methods*. Because ʻaʻo come and go from colonies under cover of full darkness, social attraction techniques may consist primarily of acoustic playback from a solar-powered sound system playing non-aggressive vocalizations from dusk to dawn from late February through November, and the installation of approximately 100 artificial burrows. These burrows follow the designs used in New Zealand and Hawaiʻi for similar projects and consist of enclosed insulated boxes with open tubes to simulate a seabird burrow. Nest boxes will be buried approximately 15-30 cm (6-12 in) into the ground to ensure appropriate insulation and ventilation for nesting birds and chicks.

  Long-term management and monitoring. Long-term management is necessary to maintain the suitability of the site as seabird nesting habitat. Management personnel will periodically walk the fence to check for any breaches in the integrity of the fence. Remote cameras and tracking tunnels placed strategically within the site will be used to confirm predator eradication and to detect re-invasions. Control of invasive plants by hand and where appropriate, replanting of native vegetation, will occur to enhance the site as seabird breeding habitat. Monitoring the use of the site by Covered Seabirds, particularly ʻaʻo, will be done remotely as much as possible to minimize disturbance of the birds, and incorporate the use of night vision instruments, song meters (to record seabird calls), hand binoculars, and cameras, to monitor use and reproductive success. Unbanded birds will be banded whenever possible by trained personnel.

- *Barn owl control.* Barn owl control in Kalalau Valley will be conducted beginning in year one and continue throughout the term of the KSHCP to reduce the threat of depredation on the Covered Species by non-native barn owls at the Preserve and the surrounding area. Barn owls are aerial predators with a large home range of up to 31 square kilometers (km^2) (Martin et al. 2014). Control actions are anticipated to enhance adult seabird survivorship and the reproductive success of ʻaʻo, ʻuaʻu, and ʻakēʻakē breeding in the vicinity of the Kahuamaʻa Seabird Preserve, including populations nesting along the Nā Pali coast and along the Pihea side of the Kalalau rim. Control of the predatory barn owl will involve monitoring for roosting areas, the use of bal chatri or goshawk traps, the playing of owl or prey calls, and shooting individual owls at dusk and dawn. Technicians will be trained in the use of firearms and in identifying the non-native barn owl to avoid causing harm to the native Hawaiian owl (pueo) (*Asio flammeus sandwichensis*). Best management practices to be incorporated include use of existing footpaths, maintaining distance from known seabird nesting areas, and closing traps each morning to prevent non-target effects.

- *Feral cat control.* Feral cat control in Kalalau Valley will be conducted beginning in year one and continue throughout the term of the KSHCP. Control actions would be anticipated to enhance adult survivorship and the reproductive success of ʻaʻo, ʻuaʻu, and ʻakēʻakē breeding in the vicinity of the Kalalau Valley. Feral cats utilize the roads and trails in Kōkeʻe as ingress points to prey upon established seabird colonies in the Kalalau

Valley and rim, Pihea, and Honopū valleys. Feral cats are voracious predators of seabirds and are regularly documented visiting known colonies (Ainley et al. 2001, Hodges and Nagata 2001, Raine and Banfield 2015, Raine et al. 2017). Control of feral cats will involve linear trapping lines off roadways between the Kalalau and Pu‘u o Kila lookouts, trapping lines along likely cat trails into neighboring seabird colonies, and ad hoc trap placement based on monitoring information. It is anticipated that trapping will remove individual cats, reduce migration towards existing colonies, and reduce feline breeding in the area. Technicians will be trained in the use of a variety of traps, lures, and baits to maximize effectiveness of the control actions.

Adaptive Management

The KSHCP identifies potential actions that may be implemented in response to monitoring results and changed circumstances. Compliance and effectiveness monitoring will be conducted to ensure that authorized amounts of incidental take are not exceeded and to enable the wildlife agencies to determine if mitigation actions are meeting the conservation goals of the Plan. Adaptive Management procedures will be implemented in the event that monitoring indicates the mitigation actions are not likely to meet the conservation goals of the KSHCP.

If the adaptive management provisions are triggered, from that point, all future covered actions would involve coordination with USFWS and DLNR staff to determine if adaptive management actions are practicable and appropriate and monitoring is in place to measure the success or effectiveness of the adaptive management measures. Such measures may include:

1) Incorporation of additional minimization and avoidance actions that were not detailed in the initial PIP for an Applicant facility if initial minimization actions are determined to be insufficient to reduce the level of incidental take to the amount authorized by the ITP.
2) Substituting new actions for initial minimization measures, to allow for adoption of new technologies, different lighting designs, or more effective searching strategies for downed birds.
3) Incorporation of additional mitigation actions if results of monitoring indicate that initial predator control methods are not adequately controlling predators in the Kalalau area.
4) Substituting new actions for initial mitigation actions for management of the social attraction site, such as expanded predator control of barn owls, feral cats, or rats or funding of other conservation efforts implemented by DOFAW, the Kaua‘i Watershed Alliance (KWA), the KESRP, or another entity approved by the USFWS and DLNR that provide direct benefit to the Covered Seabirds, if the social attraction site fails to meet identified objectives that would lead to a breeding colony.

The above changes to management protocols or the scope of the mitigation actions may need to be addressed as an amendment to the KSHCP, as determined by the USFWS and DLNR. An amendment would require compliance with applicable requirements, potentially including a supplemental NEPA analysis.

2.5.5. Actions related to the Honu

The KSHCP provides that Applicants identify in their PIPs whether their facility includes beachfront property with suitable honu habitat. If so, the PIP needs to include an evaluation of whether there is light from the facility that will likely impinge on honu habitat. If the facility does not include beachfront property, no suitable honu habitat is present, and/or no light is likely to impinge on honu habitat, then there is no potential for take of the honu. If beachfront habitat suitable for the honu is present and would be exposed to nighttime light, Applicants will need to identify light minimization measures to be implemented under their PIP, outline a plan for monitoring for honu nests, and specify specific actions to be taken on their property if nests are found to protect hatchlings from the effects of light disorientation. Such actions could include turning off lights, shielding lights so that they don't shine on honu nests, or erecting a temporary light-proof silt fence to shield the nest from nighttime light. Under the KSHCP, such measures are considered sufficient to avoid incidental take of the honu, and under those circumstances an ITP or ITL for the honu would not be needed.

2.5.6. Cost to Implement the KSHCP

The KSHCP utilizes both individual and shared costs to enable Applicants to take advantage of economies of scale for the mitigation actions. Costs associated with avoidance and minimization measures and on-site take monitoring are costs specific to each permit recipient. The cost of implementing program-level mitigation actions and the cost of compliance with State requirements and review is shared by the permit Applicants. Applicants requesting higher levels of take are expected to fund a correspondingly higher amount of the shared costs.

The total 30-year cost associated with the development and management of Kahuama'a Seabird Preserve as a mitigation site, the implementation and maintenance of barn owl and feral cat control, and compliance monitoring of the HCP is approximately $8.4 million dollars. This cost would be shared among the Applicants, based on their proportion of estimated annual take of the Covered Species. Required payments under the KSHCP are broken down as follows:

1) Annual payments addressing the cost to implement mitigation measures on an annual basis. These funds will be paid by Participants into the KSHCP Conservation Measures Implementing Funding Account. The first year's payment is higher than subsequent years due to the initial up-front cost associated with fence construction, predator removal, and social attraction and site equipment;

2) Participants will collectively provide funds into a KSHCP reserve account to provide for financial assurances (three years of annual payments) and to provide for costs associated with changed circumstances and adaptive management at a level necessary to cover the cost of one complete fence and social attraction equipment replacement.
    a. To provide financial assurances, Participants will collectively pay three times the anticipated annual payments after year one. The collective anticipated annual payment after year one is approximately $200,000. Therefore, the financial assurances payment will be $200,000 x 3 = $600,000. This fund is available to be drawn upon by the other Participants if a Participant does not make its annual

payment or elects to withdraw from the KSHCP. This will allow the remaining Participants to cover the mitigation costs that the delinquent or withdrawing participant would have paid. The collective financial assurances payment will be made to the KSHCP reserve fund with half ($300,000) to be paid in year 1 and the other half ($300,000) to be paid in year 2.

b. Participants will fund a reserve to provide for changed circumstances and adaptive management measures that exceed the annual payments. Up to two events requiring complete replacement of the fence and social attraction equipment are considered a changed circumstance. The reserve fund shall be funded initially in the amount of one complete fence and social attraction equipment replacement. This collective payment will be $225,000. These funds may be used if there are changed circumstances or adaptive management measures that require the expenditure of funds beyond those available from the annual payments. This collective payment will be made in year 2 (as the first year cost includes a cushion for increased costs in year 1). The reserve fund shall be replenished following withdrawals so that there are sufficient funds to pay for one complete replacement of the fence and social attraction equipment, provided that the changed circumstances reserve, as replenished, does not exceed the cost of up to 2 events requiring complete replacement of the fence and social attraction equipment. Notwithstanding any limits on replenishment of the changed circumstances/adaptive management reserve fund, the Participants remain responsible for meeting the biological goals of the KSHCP (in other words, although there is a stated limit on the reserve fund in the HCP, the HCP also recognizes that additional funding may be required to meet the biological goals of the HCP).

c. No later than Year 28 of the KSHCP, the Participants will determine whether they wish to seek an amendment to extend the term of the KSHCP. If the Participants conclude they will seek an amendment to extend the term, collective annual payments shall be made and the reserve fund maintained pending consideration of the Plan amendment. If the Participants conclude they will not seek an amendment to extend, they will advise the USFWS and DLNR accordingly. At the end of year 28, one year of the three years of financial assurance funds in the KSHCP Reserve Account ($200,000) shall be transferred to the KSHCP conservation measures implementing fund and shall offset the collective annual Participant payment for year 29 to the extent of the funds transferred. At the end of year 29 of the KSHCP, one year of the three years of financial assurance funds in the KSHCP Reserve Account ($200,000) shall be transferred to the KSHCP conservation measures implementing fund and shall offset the annual payment for year 30 to the extent of the funds transferred. At the end of the original term of the HCP, or any sooner termination, any interest accrued and remaining monies in both the KSHCP reserve account and the KSHCP conservation measures implementing fund will be paid to the Participants remaining in the HCP based on their proportional share of the authorized take.

3) Inflation payments, will be managed by the Participants and the Prime Contractor to implement the KSHCP. The budget includes inflation at three percent (3%) per annum

for the annual payments. Both the KSHCP conservation measures implementation funding account and the KSHCP reserve account will be invested by the National Fish and Wildlife Foundation (NFWF) in one or more investment portfolios or an interest-bearing account maintained by NFWF. Changed circumstances/adaptive management funds will be replenished following withdrawals so that there are sufficient funds in then-current dollars to pay for one complete replacement of the fence and social attraction equipment, provided that the changed circumstances reserve, as replenished, shall not exceed the cost of up to 2 such events.

For the financial assurances portion of the reserve account, the Participants will have funded an initial three years of payments into a NFWF investment account. In the event of an early withdrawal of a Participant, the remaining Participants will replenish their individual pre-withdrawal shares for inflation, taking into account investment income, so that their three years of financial assurance payments are in then-current dollars.

The Prime Contractor shall have the right, but not the obligation, to accept payment in kind for materials or labor needed to implement the KSHCP from a Participant in satisfaction of its annual payment(s). The Participants shall have the right, but not the obligation, to provide a Letter of Credit in lieu of the Financial Assurances payment, provided that the Letter of Credit shall be made payable to NFWF or the KSHCP accounts, as directed by NFWF.

Issuance of permits to Applicants/Participants after the eight initial Applicants may occur up to the maximum take mitigated for under the KSHCP. As new Applicants apply for and receive permits, annual shared costs will be adjusted among the Participants. A Participant may withdraw from the KSHCP and surrender its permit before the conclusion of the permit term. In that circumstance, the early withdrawal payment will be forfeited, and no refund is available for previously paid shared costs. Shared costs for remaining Participants will be adjusted to cover all shared costs. There are no refunds for mitigation costs if actual incidental take is lower than estimated.

2.6. Alternative C: Translocation

2.6.1. Summary

The Translocation Alternative consists of the issuance of ITPs and ITLs by the USFWS and DLNR, respectively, in association with a modified KSHCP that incorporates translocation of chicks of the Covered Species from remote mountain breeding sites into the Kahuama‘a Seabird Preserve. The objective of the translocation is to augment recruitment and productivity of breeding seabirds at the Preserve as an additional element of the mitigation measures. All other aspects of the proposed action under this alternative would remain the same as for Alternative B.

2.6.2. Conservation Measures to Mitigate for Authorized Incidental Take

Conservation measures to mitigate for the authorized incidental take of the Covered Species consists of activities to increase their breeding probability, breeding success and survival to an extent that provides a net conservation benefit to these species over the 30-year duration of the KSHCP. To achieve this objective, translocation of ‘a‘o would be implemented in addition to social attraction at the Kahuama‘a Seabird Preserve, to increase the overall potential for or to accelerate the establishment of a stable breeding colony (Jones and Kress 2012) at this site.

Burrow-nesting seabird chicks are thought to gain cues from their surroundings during the emergence period shortly before fledging, and then use that information to imprint on their natal colony (locality imprinting). Chicks that have never ventured outside their natal burrows can be successfully translocated to a new colony location where after locality imprinting, fledging and returning from their time at sea, they would return to the new colony location to breed. Because success is optimized if chicks spend the greater proportion of the rearing period with their parents, under this approach, monitoring of the chick and source colony is necessary to maximize the time spent with the parent while minimizing the likelihood of emergence before translocation (Jones and Kress 2012).

Additional elements associated with this alternative include identification of source donor colonies, collection and retrieval of chicks from source locations, chick care after translocation, and translocation monitoring and assessment. Identification of source donor colonies would utilize the best available information regarding the status of existing colonies and suitability as a source population, using criteria such as the presence of a breeding colony, the number of known burrows, the threat level to the colony, the existence of on-site predator control, accessibility, and proximity (Young and Raine 2015).

Best management practices used on New Zealand and Hawai‘i would be utilized in all aspects of the translocation to prevent accidental injury to chicks during transfer and to ensure the highest level of care possible. Logistics would be coordinated to minimize the overall transfer time. After transfer, each individual translocated chick would be banded and placed in its own artificial burrow. The chicks would be hand-fed, weighed, and monitored daily until they fledge. The use of acoustic attraction techniques (playback of calls) would be used to provide auditory stimuli to the developing chicks. Monitoring of all facets of the translocation would be incorporated, from the long-term effect of chick removal on source colonies to monitoring the health of translocation chicks to long-term monitoring of the translocation site to determine the proportion of chicks that return after fledging (Young and Raine 2015).

Chick translocation would be anticipated to contribute to a sustainable breeding population at Kahuama‘a Seabird Preserve earlier than with social attraction alone by increasing the number of potential breeders at the mitigation site as translocated chicks mature and return. However, translocation takes time. Return rates and breeding success of translocated ‘a‘o chicks is unknown, though additional information should be available from the translocations at Kīlauea Point NWR over the next ten years as the chicks translocated from 2016 begin to return. At minimum, it will take three to six years from fledging for the chicks to survive at sea, mature, and return to the site to prospect; it may take as long as ten years for the first translocated chick to return and successfully breed.

2.6.3. Cost of Translocation

Based on cost estimates from other translocations on Kaua‘i, translocation would add an estimated $100,000 per year to the estimated cost of Alternative B for each year chicks are proposed for translocation. These costs reflect helicopter time, labor, and supply costs associated with chick transport and care until fledging. Some costs could be reduced by collaborating with existing endangered seabird conservation work.

2.7. Alternatives Considered but not Analyzed in Detail

The Council on Environmental Quality (CEQ) regulations, which implement NEPA, require that agencies discuss alternatives which were eliminated from detailed study, and briefly discuss the reasons why such alternatives were eliminated (40 CFR 1502.14). The DLNR and USFWS considered many additional alternatives to the Proposed Action as ways to meet both the purpose and need of the action. The following alternatives were considered but not analyzed in detail because they do not meet both the need and purpose for agency action. The sections below briefly describe each alternative and explain why the alternative was not analyzed in detail.

2.7.1. Achieving Zero Incidental Take

The “No Incidental Take” alternative would require all take associated with lawful activities to stop. This alternative was removed from further consideration for several reasons. No technology currently exists to completely prevent light attraction. Modifying lights may reduce the effects of light attraction on the listed seabirds (i.e., reduce the amount of take) but cannot reduce the amount of take to zero.

Thus, to completely avoid impacts to Covered Species would mean eliminating or restricting the use of artificial nighttime lighting during the fallout season. This is not feasible in practice. Artificial nighttime lighting expands the visibility of public spaces beyond the hours of natural daylight and extends the period of the day that a facility or area is usable (e.g., recreational facilities). Artificial nighttime lighting is also intended to enhance safety and security at night, and is utilized for this reason in many portions of Applicant facilities (including parking lots, roads, walkways, near buildings, etc.), as well as general welfare for the island residents and visitors. Changes which reduce lighting attract considerable public and media concern centering on impacts to personal safety, fear of crime, and potential for road accidents (Green et al. 2015).

In addition, eliminating lighting sources entirely during the seabird fallout season would be economically infeasible for some Applicant facilities. For example, eliminating artificial lighting associated with a hotel would require closure during the fallout season because of safety and security concerns associated with operating a hotel with no outdoor lighting. It is impractical for hotel guests to stay within their rooms absent light sources during nighttime hours for dining, recreational activities, or other activities. Similarly, shifting airport operations to daytime use during the fallout season could impact airlines and cargo operations by restricting the number of flights daily, which may have secondary impacts as well. Additionally, nighttime

lighting for general welfare of island residents and visitors includes operation of facilities that are important cultural activities for the Kaua‘i community (e.g., nighttime football games).

The duration of an HCP should be commensurate with the biological and conservation needs of the Covered Species (USFWS and NMFS 2016) and one of the purposes is to provide long-term conservation for the affected species. The life history of the listed seabird species requires long-term conservation to realize benefits to the species; long-term funding has been shown to provide the most effective conservation for seabirds (Jones and Kress 2012). The listed seabirds are long-lived and individuals do not reach breeding age until year 6. A breeding pair produce only one chick in a breeding season and some seasons a breeding pair will not breed. These life history parameters mean that the seabird species do not reproduce quickly and therefore a short duration HCP would not enable conservation measures to achieve the conservation goals. In order for conservation measures to effectively mitigate for the effects of the take and benefit the species, those measures and activities should take place over a relatively long term. The HCP calculates that the cumulative fledglings produced by the mitigation efforts at Kahuama‘a Seabird Preserve will meet and exceed the total fledgling take and loss of productivity in year 27 of the 30-year term.

2.7.2. Different-Sized Fence Enclosure Alternative

The potential for a smaller or larger fence enclosure was considered to determine if a smaller or larger sized unit could achieve an appropriate mitigation offset more efficiently and at reduced cost. Biological considerations included the need to incorporate sloped terrain to encourage fledging take-off, the size needed to support artificial burrows, the need to incorporate a perimeter buffer to prevent predator incursion, and the desire to support natural growth if the colony is successful. Practical considerations included existing land uses, landowner permission, cost savings associated with different-sized fences.

After considering the above factors, it was determined that a smaller unit would not support the installation of artificial burrows and the habitat restoration required for potential natural burrows would have increased costs when considered on a per hectare basis, as the fencing costs are primarily related to labor and materials and the diameter of a fence enclosing a smaller area would not reduce costs significantly.

A larger enclosure would increase costs associated with fence materials and construction and with predator eradication (requiring more linear feet of fencing and additional bait boxes and traps) and would increase the complexity and potential time required to remove all predators. Landscape features in the surrounding area constrain feasible fence alignments and the future success of long-term management as a predator-free area. Nearby gulches increase the likelihood for potential failure to fence stability during rain events, making a larger fence enclosure infeasible.

3. Affected Environment

3.1. Location

The island of Kaua‘i is the northernmost and oldest of the eight Main Hawaiian Islands. Measuring 549 square miles, Kaua‘i is roughly circular in shape, running 32 miles east-to-west and 22 miles north-to-south. Kaua‘i is characterized by steep cliffs and deeply eroded canyons and valleys. The north and east coasts receive wind and moisture carried on the trade winds and support lush vegetation, streams, and waterfalls, while the south and west coasts receive minimal moisture and are typically hot and arid. The island supports unique natural plant and animal communities from montane bogs, montane wet forest, lowland mesic forest, lava tube caves, long stretches of sandy beach, and many streams and rivers. Because of the age of the island and its relative isolation, Kaua‘i contains higher levels of species endemism than elsewhere in the State (Mitchell et al. 2005).

Because the scope of the KSHCP covers impacts occurring island-wide, the affected environment encompasses the island of Kaua‘i. However, specific measures and activities of the KSHCP will take place at certain, identified locations on Kaua‘i. Avoidance and minimization actions will take place at the location of existing facilities, located primarily in populated and developed areas. Mitigation measures outlined in the preferred alternative (alternative B) are proposed in the northwest section of Kaua‘i along the Kalalau rim (“Kahuama‘a Seabird Preserve” and barn owl and feral cat control).

The proposed Kahuama‘a Seabird Preserve comprises about 2 hectares (5 acres) along the Nā Pali Coast of Kaua‘i with an elevation of about 1,200 meters (4,000 feet) above sea level (Figure 3.1). The site occupies a portion of an area known as “Kahuama‘a Flat,” on Conservation District land owned by the State of Hawai‘i and managed by DLNR Division of State Parks (por. 5-9-001:016 (Kōke‘e State Park (Resource subzone)) and por. 5-9-001:001 (Nāpali Coast State Wilderness Park (Protective subzone))).

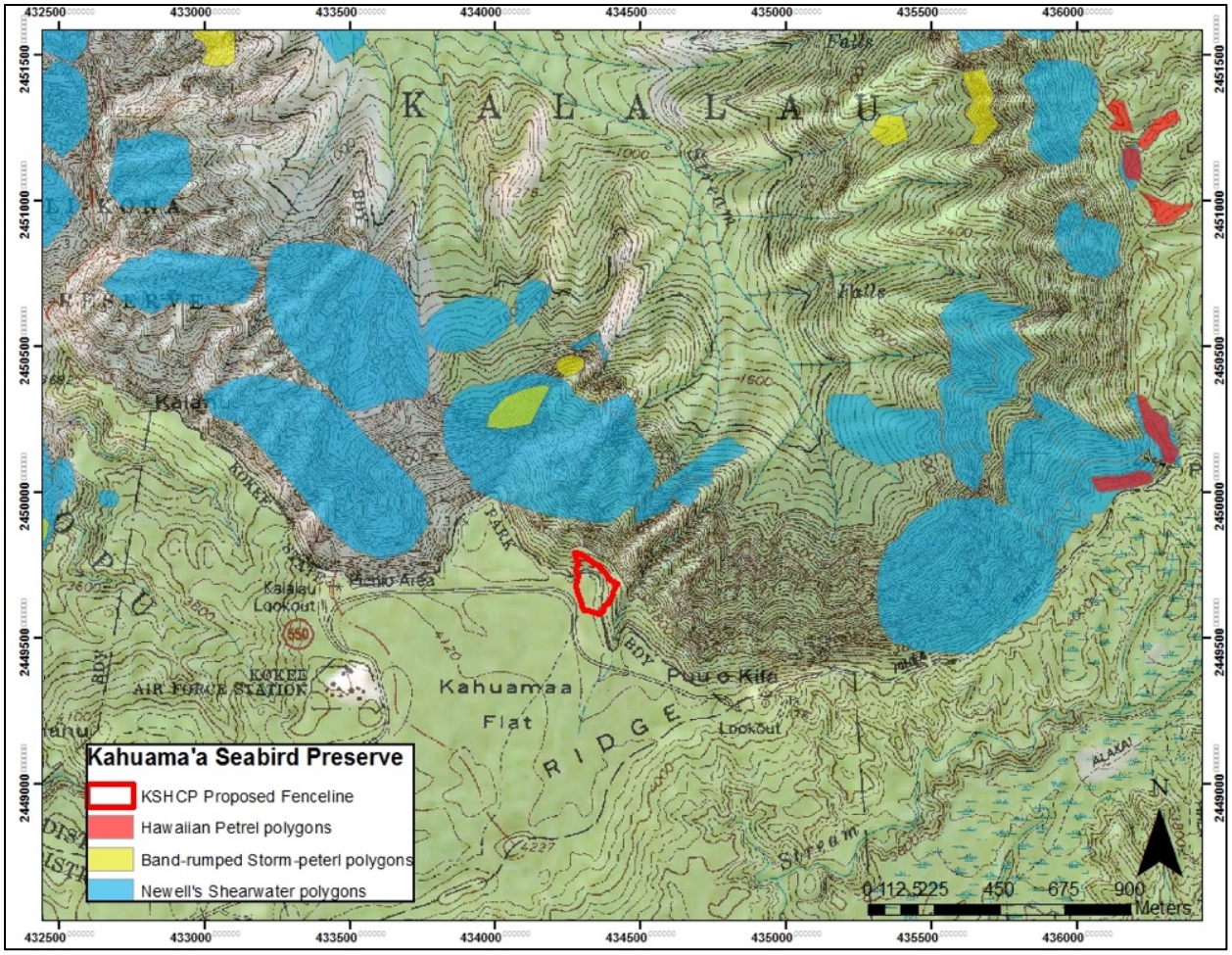

Figure 3.1. Area map of the proposed Kahuamaʻa Seabird Preserve.

3.2. Covered Species: ʻAʻo, ʻUaʻu, and ʻAkēʻakē

3.2.1. ʻAʻo, or Newell's Shearwater

The ʻaʻo is endemic to Hawaiʻi and most of the current-day breeding population breeds on the island of Kauaʻi. It is a small, black and white shearwater with a dark pointed tail and a dark narrow bill with a hooked tip. The species is listed as threatened under Federal and State endangered species laws and endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Birdlife International 2010b).

Kauaʻi supports the largest breeding population, estimated at 75 to 90% of the total population (USFWS 2011), while smaller populations are thought to breed on the islands of Molokaʻi, Hawaiʻi, and Maui. Oʻahu, Lānaʻi, and possibly Lehua Islet (Day and Cooper 1995, Day et al. 2003a, Onley and Scofield 2007, VanderWerf et al. 2007, Natividad Bailey 2009).

ʻAʻo breed in burrows among dense vegetation located in steep mountainous terrain and are active during periods of darkness, making breeding colonies difficult to locate and monitor. The KESRP has conducted auditory surveys to detect ʻaʻo breeding calls and track relative calling

densities indicating potential breeding locations. This information, in conjunction with identified breeding colonies, provides the currently known distribution of ‘a‘o on Kaua‘i. Currently, the ridges and slopes along the northwest coast of Kaua‘i display the highest levels of ‘a‘o breeding activity (Banfield et al. 2013, Raine and McFarland 2014b, a).

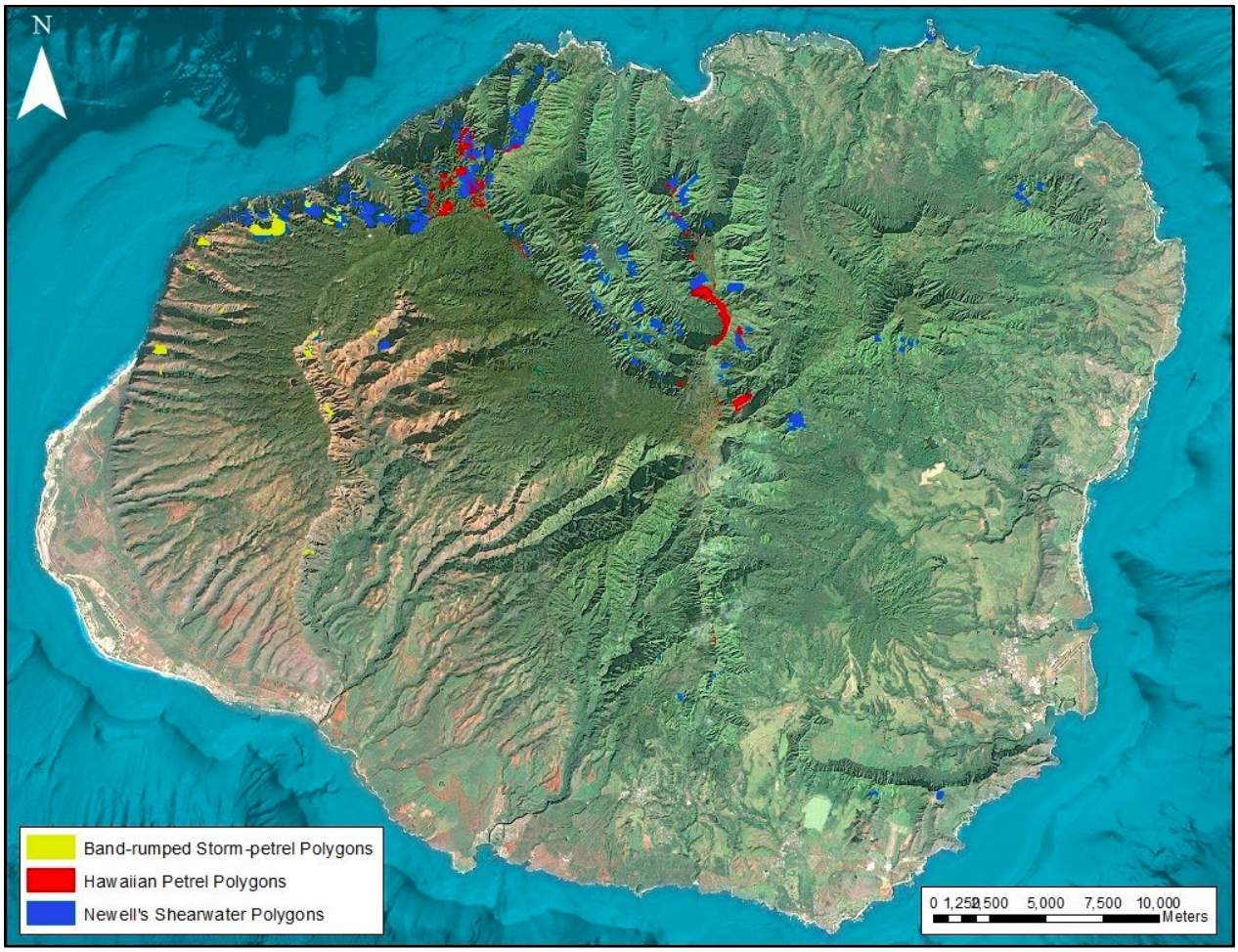

Figure 3.2. Map of seabird activity. Polygons refer to areas where seabird activity has been detected (high calling rates, suspected ground activity, or confirmation of breeding). Source: KESRP.

The species’ pelagic range is not fully understood. During the breeding season, the species is typically found foraging on the ocean a short distance to the west and north of the main Hawaiian Islands (Onley and Scofield 2007). It is observed at sea in warmer areas of the Tropical Pacific with a strong deep thermocline, more cloud cover, less mixing and where trade winds are less developed (Spear et al. 1995). They are typically found approximately 800 miles south and east from nesting colonies on Kaua‘i in the deep water regions of the Equatorial countercurrent, and more specifically, the Inter-tropical Convergence Zone, to the north (up to 25º N), and east (to about 120ºW) of the Hawaiian chain (Spear et al. 1995). Juvenile ‘a‘o have been tracked after fledging at over 1400 miles to the southwest of Kaua‘i with longer tracks extending to over 2,700 miles to the southwest. Adult ‘a‘o have been tracked taking differing routes from the fledglings after the breeding season, with one individual following the Northwest

Hawaiian Islands and another moving southeast of the main Hawaiian Islands (KESRP unpublished report).

At-sea surveys conducted in the central and eastern tropical Pacific between 1980 and 1994 (Spear et al. 1995) estimated the total Newell's Shearwater population at 84,000 (95% CI = 57,000-115,000) including juveniles and sub-adults. An updated assessment based on survey data collected by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA-NMFS) Southwest and Pacific Islands Fisheries Science Centers from 1998 to 2011, estimated the total ‘a‘o population at 27,011 (95% CI = 18,254- 37,125) including juveniles and sub-adults (Joyce 2013). With an approximate 90% of the total population based on Kaua‘i, this estimate can be adjusted to 24,310 individuals on Kaua‘i. This estimate is not representative of current abundance, rather, it estimates the average at-sea abundance during the entire sampling period. It is important to note that while the estimates from Joyce (2013) and Spear et al. (1995) are comparable in certain respects, they are not directly comparable due to differences in survey locations (i.e., longitudinal and latitudinal) and timing of survey (in regards to breeding phenology). Those studies consisted of different data sampling techniques and statistical analyses, however together the studies provide an estimate of the at-sea population of ‘a‘o at different time periods.

From 1993 to 2013, the ‘a‘o population on Kaua‘i declined by approximately 80% as measured by two independent population indices: ornithological radar and SOS data (Day et al. 2003b, Holmes et al. 2009, Raine et al. 2016). In line with these measurements, auditory surveys have confirmed a restriction of the species' breeding range. Surveys have shown significantly lower levels of breeding activity at three previously highly active colonies (Kalāheo, Anahola, and Makaleha), and the extirpation of others (e.g., Kaluahonu) (Ainley et al. 1995, Holmes and Troy 2008) (KESRP unpublished data). This is largely due to habitat loss, or degradation, high levels of depredation, and/or proximity to urbanized areas that radiate artificial light, as well as man-made structures such as power lines spanning their flight paths that impede their movement to and from montane breeding areas (Holmes et al. 2009). Reducing the population estimate based on a range of presumed depredation rates yields a current 2016 population estimate of 13,049-17,172 individuals. Assuming a stable age distribution (Ainley et al. 2001), the population size range presented above would include approximately 8,312-10,938 birds of breeding age.

The ‘a‘o breeding season begins in late March/early April, when birds return to search for nest sites (Ainley et al. 1997, Zaun 2007, Deringer and Holmes 2009). The ‘a‘o exhibits high site and mate fidelity. Higher rates of ‘a‘o calling are detected during this period when non-breeding individuals are also concentrating at breeding areas (Deringer 2009). Nests consist of a burrow that is dug into suitable soils. Both mates participate in digging, and nest excavation may take several years, but excavated burrows will be used multiple times.

A pre-laying exodus follows in late April, and highly synchronized egg-laying occurs in June (Zaun 2007). Pairs produce a single white egg, the average incubation period is between 53 and 55 days. After hatching, both parents participate in feeding their chick, with one adult making short foraging trips (every 1-3 days) while the other adult makes long trips (can be away up to 12 days) (Zaun 2007, KESRP unpublished data). Radar detections of adults moving between breeding areas and oceanic foraging sites peak during the first month following hatching, are

consistent with the high provisioning demands of early chick rearing and the presence of non-breeders (Deringer 2009). The fledging period ranges anywhere from 81 to 94 days after hatching (Zaun 2007). Fledging occurs between late September through early December with peak fledging levels in mid-October and November (Ainley et al. 1997). Fledglings depart nests from after sunset to before sunrise (KESRP unpublished data).

Similar to all pelagic seabirds given the difficulties in tracking individuals, little is known about the life history of ‘a‘o from fledging to breeding age. Long-term banding studies on the closely related Manx shearwater (*P. puffinus*) by Brooke (1990) help to clarify that period. Juveniles will spend the majority of time at sea for the next several years, returning to their natal areas only to prospect for mates and burrow sites in years two to five, and finally returning to begin breeding in years six and beyond (Brooke 1990, Ainley et al. 2001).

Shearwater reproductive success, measured as the percentage of successful fledglings per eggs laid, per year, ranges between 40-70% in similar species around the world (Brooke 2004). Griesemer and Holmes (2011) report that the mean reproductive success of burrowing Procellariformes for studies equal to or greater than three breeding seasons was 0.32 Å} 0.17SD (n=17) in areas where predators were present and was 0.62 Å} 0.08SD (n=9) for areas where predators were eradicated. Like other burrow nesting seabirds, the breeding probability of ‘a‘o is difficult to measure given the uncertainty in determining breeding success in deep burrows. In the modeling efforts of Ainley et al. (2001), a breeding probability of 54.7% was determined. This is low when compared to reported values for other Procellariformes and mortality from adult depredations and powerline collisions is thought to be a factor in this (Telfer 1986, Ainley et al. 2001). Survivorship of non-breeding and breeding age ‘a‘o is currently unknown, though long term studies on the Manx shearwater (Brooke 1990) have been used in population modeling (Ainley et al. 2001, Griesemer and Holmes 2011)(USFWS in prep 2016).

The primary threats to the ‘a‘o population include depredation at their breeding sites by introduced mammalian and avian predators, breeding habitat loss and alteration caused by invasive plants, public use, and urban development, light attraction, collisions with utility structures, at sea factors affecting their prey-base, global climate change, and stochastic events that are inherently a hazard to populations with a limited range.

3.2.2. **The ‘ua‘u, or Hawaiian petrel**

The ‘ua‘u is a stout, medium-sized petrel with light underparts, dark upperparts, and white feathers on the forehead, around the bill, lower cheeks, chin and throat. It is endemic to Hawai‘i, and is listed as endangered under Federal and State endangered species laws and is classified as “vulnerable” on the IUCN Red List of Threatened Species (Birdlife International 2010a). The ‘ua‘u was once considered a subspecies of the dark-rumped petrel (*Pterodroma phaeopygia*) but was split taxonomically based on morphology and breeding range (Brooke 2004, Onley and Scofield 2007). The dark-rumped petrel has since been renamed the Galapagos petrel (*Pterodroma phaeopygia*), a species endemic to the Galapagos Islands.

The ‘ua‘u only breeds in the main Hawaiian Islands. It is thought that the species once bred on all the main islands of Hawai‘i, except Ni‘ihau (Simons 1985, Mitchell et al. 2005). Current-day

breeding populations are primarily on the island of Maui, particularly in Haleakalā National Park, and on the island of Kaua‘i at high-elevation nesting colonies. Smaller populations breed on the islands of Hawai‘i and Moloka‘i. There is also a large breeding population on the island of Lāna‘i, of perhaps 1,000 breeding pairs (Day et al. 2003a, Onley and Scofield 2007, Tetra Tech 2008, Holmes and Joyce 2009b, Natividad Bailey 2009, Pyle and Pyle 2009).

Direct observations of breeding populations are difficult due to the remote and mountainous terrain in which ‘ua‘u breed, their nocturnal behavior, and the fact that they breed in underground burrows in dense vegetation. However, the KESRP has conducted auditory surveys on Kaua‘i which indicate calling concentrations and suspected breeding locations. This information, in conjunction with identified breeding colonies, provides the currently known distribution of ‘ua‘u on Kaua‘i. Currently, the ridges and slopes along the northwest coast of Kaua‘i display the highest levels of ‘ua‘u breeding activity.

Highly pelagic, the ‘ua‘u is known to travel over large areas of the northern Pacific Ocean to forage during the breeding season. Densities of Hawaiian birds appear to decrease with increased sea surface temperatures (ranging from 25 to 28 °C), increase with wind speeds (above 12.5-25 mph) and show a general preference for waters of the North Equatorial Current (Spear et al. 1995, Simons and Hodges 1998, Mitchell et al. 2005). Foraging ‘ua‘u have been observed in the MHI waters out to the French Frigate Shoals (FFS) within the Northwestern Hawaiian Islands (NWHI) (Onley and Scofield 2007). They have also been tracked well north of the Hawaiian Islands during the breeding season, on feeding routes that approach the Aleutian Islands off Alaska and west towards the Marianas Islands (KESRP, unpublished data). During the non-breeding season, the ‘ua‘u occur well away from land, dispersing out into the vast equatorial waters of the eastern tropical Pacific generally between 20 °N and 10 °S (Spear et al. 1995, Mitchell et al. 2005).

Total ‘ua‘u population estimates are based on at-sea counts. The Spear et al. (1995) at-sea count estimated a total ‘ua‘u population of 19,000 (10,600 – 34,400) individuals. Separated by spring and fall, Spear’s estimate includes 16,300 birds (95% Confidence Interval: 10,600 – 23,300) in spring and 22,700 birds (95% Confidence Interval: 13,500 – 34,400) in autumn. Population abundance equal to an average of 52,000 individuals was estimated based on at-sea surveys over the more recent sampling period of 1998-2011 (Joyce 2013). The estimates from Joyce (2013) and Spear et al. (1995) are not directly comparable due to difference in survey locations (i.e., longitudinal and latitudinal) and timing in regards to breeding phenology; however together, the studies provide an estimate of the at-sea population of ‘ua‘u at different time periods.

It is unknown what portion of the total ‘ua‘u population breeds on the island of Kaua‘i. Ainley et al. (1997a) estimated 1,600 breeding pairs on Kaua‘i. This estimate was updated to 1,200 breeding pairs by Pyle and Pyle (2009). Overall population estimates are currently being revised, but recent data suggests that Kaua‘i may contain a much more significant portion of the breeding population of the ‘ua‘u than predicted by earlier estimates (Raine et al. 2016).

Population trends of the ‘ua‘u on the island of Kaua‘i have been less studied than for the ‘a‘o, though Holmes and Joyce (2009b) note that the species face similar threats. Fallout recovery records of the ‘ua‘u from SOS since 1979 show very little change, averaging about 10 ‘ua‘u

birds recovered annually, although, it is thought that the species is not highly susceptible to light attraction (Ainley et al. 1995, Raine et al. 2016). Recent radar data analyses indicate a potential >75% decline in ʻuaʻu numbers during the period from 1993-2013 (Raine et al. 2016). Additionally, the KESRP reports that the species is impacted by habitat degradation and high levels of depredation at breeding colonies (Holmes and Joyce 2009b, Raine and Haber 2012, Raine and McFarland 2014b, a). ʻUaʻu also appear to suffer a higher rate of depredation by feral cats, black rats, and feral pigs than ʻaʻo (Raine and Banfield 2015).

The ʻuaʻu breeding season on Kauaʻi begins in April when birds return to the island to commence breeding. The ʻuaʻu, like many petrels, displays a high degree of site and mate fidelity; nesting pairs return to the same nesting burrow year after year, entering and exiting their burrows only under the cover of night as a defense against potential predators (Simons 1985). Most pairs visit burrows for just a few nights at the beginning of the season before going on exodus. After returning, they have been observed excavating the burrow and removing debris (Simons and Hodges 1998).

Prior to egg laying and incubation, adult ʻuaʻu depart the nest for approximately three weeks to build up fat and nutrient reserves prior to egg laying (females) and incubation (males) (Harris 1966, Perrins and De L. Brooke 1976). Parental care from both sexes is necessary to rear a single nestling. Egg-laying is synchronous within colonies (Simons and Hodges 1998). Breeding females lay a single white egg each year. Incubation typically begins immediately after laying and lasts 54-58 days (Simons and Hodges 1998) with both adults taking shifts lasting several days at a time, thus relieving the other adult to feed. Not all nesting pairs produce a chick. Pairs may "divorce" and seek a new partner, or breed at a new location if the egg is predated or infertile (Simons 1985, Mitchell et al. 2005). Once a chick hatches, in July or August, it remains in the nest and depends on parental care for approximately four months (Simons 1985, Simons and Hodges 1998, Mitchell et al. 2005). Fledgling occurs in the fall months; adults and juveniles depart the breeding colony in late November-mid December, remaining at sea for several months before adults and sub-adults return the following spring. ʻUaʻu breeding on the islands of Hawaiʻi, Maui, and Lānaʻi fledge young earlier (early November) than those breeding on Kauaʻi (late November, early December) (Simons and Hodges, 1998, Natividad Bailey 2009, KESRP Lānaʻi report, undated). Fledglings leaving the colony will not return to land for 2-5 years.

The primary threats to the ʻuaʻu population on Kauaʻi include depredation at breeding sites, breeding habitat loss and alteration, light attraction and power line collisions, disease, and at-sea factors affecting prey availability, global climate change, and stochastic events that are inherently a hazard to populations with a limited range.

3.2.3. **The ʻakēʻakē or band-rumped storm-petrel**

The ʻakēʻakē is a very small storm-petrel with blackish-brown plumage, a sharply defined narrow white band across the "rump," and a slightly notched tail. The species is listed as endangered under Federal and State endangered species laws and is considered the smallest and rarest seabird that breeds in Hawaiʻi (Mitchell et al. 2005, Swift and Burt-Toland 2009). The

Hawaiian population of the band-rumped storm-petrel (referred to in this document as ʻakēʻakē) was once recognized as a distinct subspecies; however, taxonomists now consider this population as sympatric with various other Pacific Ocean populations (Onley and Scofield 2007). In 2011, the USFWS as part of its review of the species for potential listing determined that the Hawaiian breeding population constitutes a DPS based on geographic and distributional isolation from other band-rumped storm-petrel breeding populations in Japan, the Galapagos Islands, and the Atlantic Ocean. In addition, USFWS found that the Hawaiian population is the only population within U.S. borders or under U.S. jurisdiction and considered "significant" in that its loss would constitute a significant gap in the range of the taxon (USFWS 2015).

Abundance estimates for the worldwide population of the band-rumped storm-petrel are unknown, as are estimates for the current ʻakēʻakē population in Hawaiʻi. Kauaʻi is currently thought to support most of the breeding population in Hawaiʻi with an estimated 171-221 breeding pairs on the island, although there is evidence of potential breeding also on Maui, Hawaiʻi, Lehua, and Kahoʻolawe (Johnston 1992a, b, Wood et al. 2002). Specimens of the ʻakēʻakē have been collected from Niʻihau and Lehua and small numbers of adults (less than 10) have been heard on or seen flying around Lehua in 2002, 2003, and 2004 (Slotterback 2002, VanderWerf et al. 2007). The small size of the birds and the cryptic nature of their burrows, assumed to be on steep rocky cliffs and within the crevices of old lava flows, makes burrow searching through the usual means difficult.

The ʻakēʻakē is thought to have been common on all of the Main Hawaiian Islands when Polynesians arrived about 1,600 years ago (Mitchell et al. 2005, Naughton et al. 2005, Spear and Ainley 2007). As evidenced by abundant ʻakēʻakē bones found in middens on the island of Hawaiʻi, and in excavation sites on Lehua, Oʻahu, and Molokaʻi, ʻakēʻakē once were numerous enough to be used as a source of food and possibly for feathers (Mitchell et al. 2005, VanderWerf et al. 2007). The arrival of humans in the islands likely contributed to the decline of ʻakēʻakē populations (Naughton et al. 2005).

Though no nest has yet been identified, human auditory surveys, automated acoustic surveys, and mist netting data were used by Raine et al. (2016) to create a predictive distribution model based on key habitat variables. Based on these and previous survey data, breeding is occurring primarily in the steep remote cliff areas of the Nā Pali coast in the northwest region of the island, Waimea Canyon, Hanapēpē Valley, rocky cliff faces of the vegetated valleys of Wainiha and Lumahaʻi, and Lehua Islet (Raine et al. 2016; Wood et al. 2002). The KESRP has captured multiple birds along the Nā Pali coast and Waimea Canyon in recent years with brood patches, strongly suggesting multiple breeding colonies on Kauaʻi. Additionally, retrieval of downed fledglings on Kauaʻi in the fall further points to local nesting locations (VanderWerf et al. 2007, Holmes and Joyce 2009a).

Information on the population trends of the species in Hawaiʻi and Kauaʻi is lacking, although its historical range is restricted from what it once was. As with many native seabird species, it is assumed that a major current threat includes the effects of non-native species on breeding areas, including habitat alteration and depredation on young and nesting adults. Similar to the ʻaʻo and ʻuaʻu, the ʻakēʻakē is adversely affected by light attraction. Between the years 2000-2015, 24 ʻakēʻakē were recovered on Kauaʻi by SOS, likely from the effects of light attraction. It is

possible that many more are affected since their small size may make them especially susceptible to scavenging and increasingly difficult to find and report after fallout events. The species may also be impacted by collisions with utility structures and lines; however, due to the bird's small size and the fact that many power lines are located away from human populations, it is possible that collisions occur but are not detected.

The breeding behaviors and nest phenology of the ʻakēʻakē are not well-known. Evidence of extant nesting populations on Kauaʻi and elsewhere in Hawaiʻi is indirect because occupied/active nests have not been found (Banko et al. 1991, VanderWerf et al. 2007). Based on the same data used to determine distribution, breeding birds return to nest sites in May and complete egg laying by mid-June. The incubation period averages 42 days and fledging occurs 70 to 78 days after hatching (Harris 1966). Fledglings typically depart the nest site between mid-September and late November, with peak fledging in October (Raine et al. 2016). ʻAkēʻakē reach breeding age in 3-7 years (Ainley 1984, Harrison 1990). Based on acoustic data, adults are believed to leave the nesting grounds in October as well (Raine et al. 2016).

During the non-breeding season, some birds apparently remain near their breeding islands, while others undertake long-distance movements of unknown extent. The band-rumped storm-petrel has been detected west of the Galapagos Islands during spring but not during autumn counts; >620 miles north of Hawaiian Islands during summer surveys; and >990 miles south of Hawaiʻi in the Phoenix Islands, as well as the entire distance from Hawaiian Islands to Japan (Slotterback 2002, Mitchell et al. 2005).

The primary threats to the ʻakēʻakē on Kauaʻi include depredation at breeding sites, breeding habitat loss and alteration, light attraction and power line collisions, disease, and at-sea factors affecting prey availability, global climate change, and stochastic events that are inherently a hazard to populations with a limited range.

3.3. Other Federally Listed Species & Critical Habitat

3.3.1. Designated Critical Habitat

Hawaiʻi is home to more threatened and endangered plants than any other state in the nation. Many of these species are found on Kauaʻi, often in the mountainous interior away from development pressures. Critical habitat to protect threatened and endangered species has been designated on Kauaʻi over the past two decades: 4,479 acres (1,812 ha) of riparian habitat and 12 miles (nearly 20 km) of stream channel in 2002 for Newcomb's snail (*Erinna newcombi*); 52,549 acres (21,266 ha) in 2003 for 83 plant species; 272 acres (110 ha) in 2003 for the Kauaʻi cave wolf spider (*Adelocosa anops*) and Kauaʻi cave amphipod (*Spelaeorchestia koloana*); 794 acres (321 ha) in 2008 for *Drosophila musaphila*; and 26,582 acres (10,757 ha) in 2010 for 44 plants, two birds (ʻakekeʻe (*Loxops caeruleirostris*) and ʻakikiki (*Oreomystis bairdi*)) and one fly (*D. sharpi*). Much of the acreage covered by later designations overlaps with acreage within earlier critical habitat designations. Nearly all of the designated critical habitat is in uninhabited, remote areas. Generally speaking, the Applicants own and operate facilities and will conduct minimization measures in areas of Kauaʻi that are not located within designated critical habitat; proposed mitigation measures are located in areas within existing designated critical habitat.

3.3.2. Listed Mammals

Only two mammals are known as native to Kaua‘i, the endemic Hawaiian monk seal (*Monachus schauinslandi,* Hawaiian name: ‘īlio-holo-i-kauaua) and the Hawaiian hoary bat (*Lasiurus cinereus semotus,* Hawaiian name: ‘ōpe‘ape‘a). Both species are state and federally listed as endangered.

The total worldwide monk seal population is estimated at fewer than 1,200 animals (NMFS 2007). The majority of the monk seal population resides in the Northwest Hawaiian Islands, but regular sightings occur in the main Hawaiian Islands. Although primarily ocean mammals, monk seals spend part of their life on land and can be seen hauled out on the beaches of Kaua‘i. Threats affecting this species include food limitation, entanglement, and shark depredation. Land-based threats to pup survival include attacks by dogs and disease.

The ‘ōpe‘ape‘a is considered the only native land mammal of Hawai‘i. There is limited data on the life cycle, distribution, or population estimates of the ‘ōpe‘ape‘a, but they have been observed island-wide on Kaua‘i, occurring seasonally from sea level to the summit of Mount Wai‘ale‘ale where they commonly roost alone in trees and leaf litter (Bonaccorso et al. 2005). Primarily a nocturnal species, they forage on flying insects using ultrasonic echolocation.

3.3.3 Listed Birds

Several species of threatened and endangered birds inhabit Kaua‘i. Listed forest birds include the endangered puaiohi (*Myadestes palmeri*), ‘akikiki, and ‘akeke‘e, and the threatened ‘i‘iwi (*Drepanis coccinea*), all of which are found in upland (above 3,500 ft elevation) in areas of intact native forest. These native forest bird species face threats of depredation from non-native animals, degradation and destruction of habitat by non-native species (both destruction by pigs uprooting or goats eating native vegetation or degradation of forest through spread of invasive plants displacing native flora), and disease (spread by non-native mosquitoes) (USFWS 1983).

Five species of endangered water birds inhabit Kaua‘i year-round: the nēnē (*Branta sandvicensis*, Hawaiian goose), the kōloa maoli (*Anas wyvilliana*, Hawaiian duck), the ‘alae ke‘oke‘o (*Fulica alai*, Hawaiian coot), the ‘alae ‘ula (*Gallinula chloropus sandvicensis*, Hawaiian moorhen), and the ae‘o (*Himantopus mexicanus knudseni*, Hawaiian stilt) (USFWS 1999).

The nēnē on Kaua‘i frequent scrubland, grassland, golf courses, sparsely vegetated slopes and open lowland country (including agricultural fields). The nēnē diet consists of seeds of grasses, herbs, as well as leaves, buds, flowers and fruits of various plants. The other water birds typically inhabit perennial and seasonal wetlands, ponds, and a variety of manmade landscapes including golf courses, landscape ponds and streams, reservoirs, aquaculture ponds, and agricultural areas. Major threats to water birds as a group include drainage of marshes and other wetlands, introduced predators and diseases, invasive plants, and environmental pollution (e.g. non-point sources, debris, toxic material spills, pesticides) (USFWS 1999). Water birds are active during the daytime and do not appear to be attracted by artificial lights.

3.3.4 Listed Invertebrates

Two endangered subterranean species inhabit the island, the Kaua‘i cave wolf spider and the Kaua‘i cave amphipod which inhabit mesocaverns and caves. Both species are thought to only inhabit the Po‘ipū and Kukui‘ula areas of the island (USFWS 2003), with approximately 110 hectares (272 acres) designated as critical habitat for these species. *Drosophila musaphilia* is an endangered picture wing fly endemic to Kaua‘i. It was historically known at three sites: Mt. Kāhili (Alexander Reservoir) in the south and two sites within Kōke‘e State Park. Occurring in mesic to wet forest, it breeds in fermenting sap fluxes of *Acacia koa*. *Drosophila sharpi* is an endangered large brown fly endemic to Kaua‘i. It was historically known from two sites, Mt. Kāhili in the south and Kōke‘e in the northwest. Occurring in mesic to wet forests, the breeding host is unknown but based on its close similarity to sister species *D. primaeva*, it is likely *D. sharpi* also breeds in species of *Cheirodendron* and *Tetraplasandra* (USFWS 2010).

The threatened Newcomb’s snail inhabits stream habitat of Kaua‘i. The current known range of Newcomb’s snail is limited to very small sites located within six stream systems in north-and east-facing drainages on Kaua‘i including: Kalalau Stream, Lumaha‘i River, Hanalei River, Waipahe‘e Stream (a tributary to Keālia Stream), Makaleha Stream (a tributary to Kapa‘a Stream), and the North Fork Wailua River (USFWS 2002).

3.3.5 Honu

The honu is listed as threatened under Federal and State law. Long-term monitoring of honu populations over nearly 40 years shows that the population in Hawai‘i has increased at a rate of approximately 5.7% annually since the harvest limits were imposed in 1974 (Chaloupka and Balazs 2007; Maison et al. 2010; Tiwari et al. 2010). Habitats needed for nesting, basking, underwater resting, and foraging are found along the shores of all the main Hawaiian Islands, with numerous basking and nesting beaches on Kaua‘i (Parker and Balazs 2015). Some of the known nest locations are near urbanized coastal areas along the east and south shores of Kaua‘i where coastal light pollution exists. Hatchlings typically emerge from the sand at night (Balazs 1980; NMFS and USFWS 1998). Newly emerged hatchlings are strongly photopositive and can be disoriented away from their path to the sea by artificial lighting (NMFS and USFWS 1998; Witherinton 1992).

3.3.6 Listed Plants

Multiple rare plant species occur on the island of Kaua‘i, with over 150 plants listed as threatened or endangered and critical habitat designated for over 128 (USFWS 2002, USFWS 2010). Many of these species are found in the mesic habitats of western Kaua‘i, in the Alaka‘i Swamp region, in the wet summit areas, and in other areas of intact native vegetation. Listed plants face threats from feral ungulates (hooved animals) that consume and trample native understory plants, create conditions favoring non-native plant infestation and establishment, prevent the establishment of ground-rooting native plants, and disrupt soil nutrient cycling; from introduced invertebrates that directly threaten native pollinators; from plant disease; from

competition from invasive habitat-modifying plants; and from seed-eating rodents and other omnivores.

A botanical survey was conducted for the Kahuamaʻa Seabird Preserve. At least eight rare and listed plants have been observed in or near the mitigation site (*Cryptocarya mannii*, *Euphorbia remyi* var. *remyi*, *Exocarpos luteolus*, *Lobelia yuccoides, Myrsine knudsenii*, *Polyscias flynnii*, *Pritchardia minor*, and *Zanthoxylum dipetalum* var. *dipetalum*).

3.4 Fauna

3.4.1 Native Animals

Kauaʻi hosts several State-endemic species of forest birds: the ʻaniauniau (*Hemignathus parvus*) (endemic to Kauaʻi), the Kauaʻi ʻelepaio (*Chasiempis sandwichensis sclateri*), the ʻapapane (*Hemignathus sanguinea*), and the Kauaʻi ʻamakihi (*Hemignathus kauaiensis)*. These birds are typically found in remnant montane mesic and wet native forest dominated by ʻōhiʻa (*Metrosideros polymorpha*) and koa (*Acacia koa*) and face the same threats as the listed forest birds (depredation, habitat degradation, and disease).

The native pueo occurs on all the main Hawaiian Islands and is listed by the State as endangered on Oʻahu only. The pueo is a ground-nester, found from sea level to high elevations across most habitats (including both forest and grasslands). Unlike the non-native barn owl (which is nocturnal) the pueo is active during the day and at dusk and dawn. Primary threats include depredation by introduced rodents and cats and habitat loss.

The indigenous ʻaukuʻu (*Nycticorax nycticorax*, black-crowned night heron) is relatively widespread and found throughout Kauaʻi.

Forty different seabird species have been observed in the Hawaiian Islands, with at least 20 known to breed in Hawaiʻi. Many of these are found on Kauaʻi, including the mōlī (*Phoebastria immutabilis*), ʻiwa (*Fregata minor*), brown booby (*Sula leucogaster)*, and red and white-tailed tropicbirds (*Phaethon rubricauda* and *P. lepturus*) (DLNR 2011). Primary threats to seabirds while on Kauaʻi include depredation by feral cats, rodents (*Rattus* spp. and *Mus musculus*.), dogs (*Canis lupus familiaris*), and pigs (*Sus scrofa*), loss or degradation of habitat due to habitat modifying invasive plants or animals, and human-caused disturbances (SWAP 2015).

Numerous migratory shorebird species seasonally inhabit wetlands and coastal areas of Kauaʻi. Of these, the kōlea (*Pluvialis fulva*, Pacific golden plover), the ʻakekeke (*Arenaria interpres*, ruddy turnstone), the ʻūlili (*Heteroscelus incanus*, wandering tattler), and the kioea (*Numenius tahitiensis*, bristle-thighed curlew) are regular migrants. They have been identified as important (by the U.S. Shorebird Conservation Plan) because populations in the State are hemispherically significant or relatively large (DLNR 2015b). Primary threats include loss or degradation of habitat and depredation by feral cats and dogs.

Hawaiʻi contains close to 8,000 species of insects including some 5,300 endemic species, 84 indigenous, and over 2,600 alien species (Mitchell et al. 2005). Kauaʻi contains a diverse

number of terrestrial invertebrates, most of which have been poorly studied. Notable invertebrates found in the montane wet forest of Nā Pali include endemic seed bugs in the genus *Nysius*, members of an endemic lineage of spiders in the genus *Tetranagtha,* native damselflies in the genus *Megalagrion*, and a new endemic species of long-legged fly *Sigmatineurum napali* (DLNR 2011, DLNR 2015b). Native insects evolved important ecological roles such as pollinating native plants, serving as food sources for native birds and other animals, and contributing to terrestrial nutrient cycles. Today, many native insect species are declining or have gone extinct due to the combined effects of invasive non-native organisms and human alteration of habitats.

3.4.2 Non-native Animals

Several introduced terrestrial mammals have become naturalized on Kaua‘i, including black-tailed deer (*Odocoileus hemiomus columbianus*), feral pig, goats (*Capra hircus*), dogs, cats, and rodents. Deer, pig and goats offer recreational hunting resource, but also eat, destroy, and trample native vegetation and facilitate weed invasion. Dogs, cats, and rodents are known predators of seabirds and other native fauna. Small Indian mongoose (*Herpestes javanicus*) is not established on Kaua‘i; however, credible mongoose sightings from 2012 to the present indicate that mongoose could eventually become established. To date, only 3 live mongoose have been reported captured on Kaua‘i, in 2012 (near Līhu‘e airport and near Nāwiliwili port) and in 2016 (Līhu‘e airport) (KISC 2017).

Numerous non-native birds are present on the island, including Japanese white-eye (*Zosterops japonicus*), hwamei or melodious laughing-thrush (*Garrulax canorus*), white rumped shama (*Copsychus malabaricus*), the common myna (*Acridotheres tristis*), northern cardinal (*Cardinalis cardinalis*), house finch (*Carpodacus mexicanus*), Japanese bush-warbler (*Cettia diphone*), feral fowl (*Gallus gallus*), zebra dove (*Geopelia striata*), nutmeg manikin (*Lonchura punctulata*), ring-necked pheasant (*Phasianus colchicus*), red-crested cardinal (*Paroaria coronata*), spotted dove (*Spilopelia chinensis*), and barn owl.

3.5 Flora

3.5.1 Native Plant Communities

As the oldest of the main Hawaiian Islands, the island of Kaua‘i developed the highest levels of floristic diversity and endemism in the Hawaiian archipelago. The remote, high elevation moist and wet ecosystems contain the majority of the remaining native forests and flora communities on Kaua‘i. Many native plant communities have been highly altered and modified as a result of past and present land uses and the introductions of non-native plants and animals. Today in most areas of Kaua‘i, non-native species of flora dominate the landscape, with upwards of 4,600 such species. While just over one-third of the island remains dominated by native vegetation, many native-dominated areas contain smaller pockets of non-native species that became established following Hurricanes ‘Iwa and ‘Iniki.

In addition to the threatened and endangered plants identified previously, another 56 rare plant taxa on Kaua‘i are targeted under the Plant Extinction Prevention Program (PEPP). PEPP was developed by DLNR and USFWS to protect Hawai‘i’s rarest native plants (species with fewer than 50 individuals remaining in the wild); the program is not regulatory in nature but focuses on active management (e.g., seed collection, monitoring, re-introductions) to prevent extinction.

Within the Kahuama‘a Seabird Preserve, vegetative land cover is classified as open ‘ōhi‘a lehua and ‘uluhe fern (*Dicranopteris linearis*) dominated forest with a predominance of introduced and native vegetation cover. The upper, flat portion is montane wet ecosystem which changes to dry cliff at the lower elevation portion, towards the Kalalau Valley. Native plants dominate (many endemic) interspersed with several invasive species (kāhili ginger (*Hedychium gardnerianum*), fire tree (*Morella faya*), banana poka (*Passiflora mollisima*), strawberry guava (*Psidium cattleyanum*), and sawtooth blackberry (*Rubus argutus*).

3.6 Hydrology and Water Resources

The hydrology of Kaua‘i is characterized by streams that radiate out from the Wai‘ale‘ale-Kawaikini massif in all directions. As the streams flow through intrusive dikes that retard the groundwater movement toward the ocean, they receive large influxes of groundwater and gain flow as they descend. Kaua‘i has 61 streams, 45 of which are perennial. Figure 3.3 illustrates perennial and non-perennial streams of Kaua‘i. All significant slopes on Kaua‘i, except the west slope, carry perennial streams.

3.7 Air Quality

Generally, the air quality on Kaua‘i is considered good because of the island’s isolated ocean location combined with persistent northeast trade winds and a lack of substantial industry. Winds from the south and east can bring periods of vog (volcanic smog) to Kaua‘i which can result in haze. One monitoring station on Kaua‘i located in Niumalu collects data and measures Sulfur Dioxide (SO_2), Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), and fine particulate matter ($PM_{2.5}$). This station is considered a “special purpose monitoring” location intended to monitor pollutants from ships located in the harbor. At no time in 2012 did the station measure fine particulate matter or pollutants exceeding Federal or state air quality standards and averages recorded were well below standards (State of Hawai‘i 2013).

3.8 Archaeological, Historic, and Cultural Resources

Avoidance and minimization measures identified in the KSHCP correspond to existing facilities, located in already developed areas. Mitigation measures identified in the KSHCP correspond to development of the Kahuama‘a Seabird Preserve, in an area of Kōke‘e State Park that was previously identified as a potential native plant sanctuary to be protected by ungulate-proof fencing. As part of the planning for the native plant sanctuary, State Parks Archaeologists Alan Carpenter and Martha Yent conducted an archaeological reconnaissance survey of the Kahuama‘a Flats area in 1994 (see Appendix B).

There are few archaeological sites recorded in the uplands of Kōke‘e, and the area is generally thought to have been a resource-gathering zone rather than an area of permanent habitation (Carpenter and Yent 1994). Only two properties listed on the National Register of Historic Places are currently documented in the Kōke‘e area: Camp Sloggett and the Civilian Conservation Corps Camp, and these are located some distance away from the Kahuama‘a Seabird Preserve. However, review of previous surveys and reports provide evidence that potentially significant sites, such as *heiau*, may be located in isolated upland areas where there was little or no permanent habitation (Carpenter and Yent 1994). No archaeological sites or features were encountered during the archaeological reconnaissance survey of Kahuama‘a Flats, supporting use of the general area as a resource gathering zone with no permanent habitation (Carpenter and Yent 1994). However, due to the dense vegetation growth, the survey could not conclude no sites were present.

3.9 Soils

The site consists of approximate 2 hectares of mostly sloping ground, interspersed with small hillocks. Carpenter and Yent (1994) describe the soils and topography as; “Kōke‘e silty clay loam on the upper flat (well-drained soils weathered from igneous rock, probably mixed with volcanic ash). There is rough, mountainous land on the valley wall (very steep land broken by numerous drainages, very thin soil mantle if any, much of surface is rock, rock outcrop, and eroded spots)”. Rough mountainous land-rough broken land-rock outcrop association characterized as well-drained to excessively drained, very steep to precipitous lands of mountains and gulches (Foote et al. 1972). Foote et al. (1972) describe the soil material as very shallow to deep over hard, weathered basic igneous rock; rock outcrop more than 90% bedrock; and occurring on very steep slopes or on steep cliffs. Kōke‘e series are used for water supply, wildlife habitat, and woodland with vegetation consisting of native ‘ōhi‘a-lehua (*Metrosideros polymorpha*), pūkiawe (*Leptecophylla tameiameiae*), koa (*Acacia koa*), ‘uki‘uki (*Dianella sandwicense*); nonnative blackberry (*Rubus* spp.), yellow foxtail (*Setaria pumila*), plantain (*Musa* spp.), redwood (*Sequoia* spp.); and associated plants (Foote et al. 1972).

4 Environmental Consequences and Mitigation

4.1 Overview of Effects Analysis

This chapter assesses the potential effects to the physical and biological environment and to cultural and socio-economic resources as a result of implementing each alternative. For the resources evaluated, effects to the resources are assessed in terms of intensity and duration within thresholds of potential impact to the resource (Table 4.1).

Table 4.1. Threshold of Impact (Effect).

Effect Threshold	Description of Threshold
No effect	Activity does not come into contact with or incur any change to the resource. If a resource is not discussed, activity is assumed to have no effect on that resource.
Negligible effect	Effects would be at or near the lowest level of detection. Resource impacts would be so slight there would not be any measureable or perceptible consequence to a population, wildlife or plant community, recreation opportunity, visitor experience, or cultural resource.
Minor effect	Effects would be detectable but localized, small and of little consequence to a population, wildlife or plant community, other natural resources, social and economic values, including recreational opportunity and visitor experience; or cultural resources. Mitigation, if needed to offset adverse effects, would be easily implemented and successful based on knowledge and experience.
Moderate effect	Effects would be readily detectable and localized with measurable consequences to a population, wildlife or plant community, or other natural resources, social and economic values, including recreational opportunity and visitor experience; or cultural resources. Mitigation measures would be needed to offset adverse effects and could be extensive, moderately complicated to implement, and probably successful based on knowledge and experience.
Major effect	Larger-scale effects would be obvious and would result in substantial consequences to a population, wildlife or plant community, or other natural resources; social and economic values, including recreational opportunity and visitor experience; or cultural resources. Extensive mitigating measures may be needed to offset adverse effects and would be large-scale in nature, possibly complicated to implement, and may not have a high probability of success. In some instances, major effects would include the irretrievable loss of the resource.

4.2 Effects on the Covered Seabirds

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. However, take of covered seabirds, particularly ‘a‘o, would continue as a result of attraction to artificial lighting, even with the implementation of reasonable take-avoidance measures.

Covered Species that are grounded due to light attraction are considered “take” under State and Federal law; however, not all grounded seabirds experience the same level of injury or mortality.

The conservation measure of recovering, evaluation, rehabilitating (if needed), and releasing Covered Species in adequate condition is anticipated to mitigate the injury or harm of the affected individual caused by light attraction when that individual is released within 48 hours (2 days). Seabirds that receive this treatment are considered to have been taken, but in a "non-lethal" manner. Grounded seabirds that are not recovered (i.e., undiscovered seabirds) would be considered to be taken in the form of harm, yet these seabirds are anticipated to eventually suffer mortality due to depredation, vehicle collision, or starvation and dehydration. Covered Species that are killed due to collisions and grounded seabirds that are not recovered are considered "lethal take." Covered Species that cannot be rehabilitated and released (e.g., due to severe injury or poor body condition) are euthanized. Those seabirds and those that die during rehabilitation are also considered to be taken in the form of harm, and considered "lethal take" due to their death.

Of the ʻaʻo recovered by SOS in the ten-year period between 2006 to 2016, 88% were evaluated, deemed to be in good condition, and released back into the wild (SOS, unpublished data). This leaves a 12% mortality of downed ʻaʻo which includes seabirds that were turned in dead, those that died in care, and those deemed unfit for release back into the wild (i.e., euthanized).

This statistic is generalized for all birds turned in to SOS, and does not account for site-specific circumstances. It is anticipated that the annual take of Covered Species will remain constant based on recent trends of SOS recoveries island-wide on Kauaʻi. Between 1993 and 2013, the population of ʻaʻo is estimated to have declined by 94% and the population of ʻuaʻu is estimated to have declined by 78% (Raine et al. 2017). While this suggests the potential for a decline in fallout numbers, over the past five years (2011-2015), SOS recoveries of the ʻaʻo, island-wide, with the exception of one large fallout event in 2015 near Kōkeʻe Air Force Base, have been stable since 2000 (DLNR 2016). Considerably fewer ʻuaʻu and ʻakēʻakē are impacted by light attraction, based on SOS recovery records (DLNR 2016). Of the total SOS recoveries of the Covered Species between 2011 to 2015, approximately 5% of retrieved birds were ʻuaʻu and 0.6% of retrieved birds were ʻakēʻakē.

The majority of light attraction take involves fledgling seabirds. However, adults and sub-adults are occasionally found in association with bright lights. Table 4-2 presents the estimated island-wide take (both lethal and non-lethal) associated with light attraction, calculated from average SOS recoveries (2011-2015) and using a 50% searcher efficiency rate to account for grounded birds present but not found (Ainley et al. 1995). Table 4-3 presents the lethal and non-lethal take request by the Applicants over the permit term.

Under this Alternative, potential Participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. These measures would include actions to minimize light attraction (e.g., modify lighting or restrict nighttime activities during fallout season) and actions to convert potential lethal take of downed birds into non-lethal take (e.g., employee training, development of search protocols, participation in SOS, conduct predator control on-site under lighting facilities). Quantifying the exact species' benefit from light minimization actions is difficult in part due to year-to-year variation in fledgling fallout from light attraction evident from SOS recovery records (DLNR 2015a) and the ad-hoc manner in which minimization has and would take place. Few scientific studies provide measures of the effects of minimization

actions on the Covered Seabirds. One study conducted in the mid-1980s found that shielding reduces the effect of light attraction on seabirds substantially, by as much as 40%, with the results varying over the two-year study (Reed et al. 1985). However, without an approved HCP and subsequent ITP, mitigation measures described in the HCP would not occur and the anticipated benefits to the Covered Species would not be gained under the No-Action Alternative.

Table 4.2. Annual Island-wide Take (Lethal and Non-Lethal) Estimates due to Light Attraction.

‘A‘o	Annual	30-year		**‘Ua‘u**	Annual	30-year		**‘Akē‘akē**	Annual	30-year
Total island-wide take estimate	322	9,660		Total island-wide take estimate	17	516		Total island-wide take estimate	2	60
Take Amount requested by Applicants	58	1,738		Take Amount requested by Applicants	3	73		Take Amount requested by Applicants	1	26

Table 4.3. Total (30-year) Lethal and Non-Lethal Take Request by Applicants.

Species	Mortality (Lethal)	Injury (Non-Lethal)
‘A‘o fledgling adults or sub-adults eggs/chicks	 740 0 0	 998 0
‘Ua‘u fledglings, adults, or sub adults egg/chicks	 38 0	 35
‘Akē‘akē fledglings, adults, or sub-adults eggs/chicks	 16 0	 10

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under this Alternative, Applicants will identify specific avoidance and minimization measures that have been or will be implemented at their facility. Minimization measures to avoid or minimize take associated with light attraction would be anticipated to reduce the amount of lethal and non-lethal take associated with that structure.

The total amount of take (lethal and non-lethal) requested under the KSHCP and corresponding ITP/ITL (see Table 4.3) would be less than the total island-wide light attraction effects to the Covered Species (see Table 4-2). Of the total island-wide light attraction fallout of the Covered Seabirds, if the maximum take allowed under the KSHCP were authorized, the KSHCP would

address about 18% of existing ‘a‘o take, 16% of existing ‘ua‘u take, and 45% of existing ‘akē‘akē take. Under the Proposed Alternative, this portion of take would be legally permitted through the ITP/ITLs and mitigated for as provided in the KSHCP.

The KSHCP functions as a plan under which multiple entities may apply for incidental take authorization, but it has the potential to change based on an Applicant’s request for early withdrawal and discontinuance of permitted activity, revised incidental take request, and another potential Applicant’s late enrollment. Therefore, this EA analyzes the impact of the maximum amount of take of each species that could be permitted under the 30-year term of the KSHCP.

Table 4.4. Lethal Take Requested by Applicants for ITPs and ITLs.

Species	**Total (30-year) lethal take request by Initial Applicants**	**Maximum 30-year lethal take under KSHCP**	**Remaining “available” 30-year lethal take under KSHCP**
‘A‘o			
fledgling	740	900	160
adults or sub-adults	0	10	10
eggs/chicks	0	2	2
‘Ua‘u			
fledglings, adults, or sub adults	38	60	22
egg/chicks	0	10	10
‘Akē‘akē			
fledglings, adults, or sub-adults	16	30	14
eggs/chicks	0	3	3

The mitigation measures proposed under this Alternative (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) are expected to result in a positive ‘a‘o reproduction output trajectory (15 fledglings) relative to the take impacts in the first year of the KSHCP. Barn owl and feral cats predate on adults and chicks at their colonies. Control of these predators at the Kalalau Valley are anticipated to enhance adult survivorship by protection of adult birds that are already breeding in the affected area. The loss of a breeding adult also results in the loss of its egg or chick. In addition, feral cats have the ability to predate on multiple adults and chicks in a matter of days. Controlling feral cats is therefore important in providing a benefit to multiple adults and chicks.

The same immediate reproductive benefit is not anticipated in the social attraction scenario. Although the benefits from social attraction will benefit the Covered Species, the social attraction is expected to provide a delayed benefit due to a combination of factors. These primarily include: (1) the conservative estimate of the starting population within the fenced 2-hectare site (zero); (2) the several years to recruit breeding adults and increase breeding adult numbers at the social attraction site; and (3) the time delay to breeding age (6 years old) of fledgling birds that return to breed at the site. Due to this expected delay in successful initial

breeding of the Kaua‘i ‘a‘o population at Kahuama‘a Seabird Preserve, the mitigation would be estimated to be delayed in fledglings not being mitigated in the same year take occurs. This delay results in a projected productivity loss due to the loss of the fledglings that would have returned to breed as adults. This partial in-year offset of ‘a‘o take is anticipated in the first 12 years of the KSHCP implementation.

Under the KSHCP, the standard for mitigating take of the ‘a‘o resulting in mortality will be as follows: increasing ‘a‘o reproduction by one fledgling will be necessary to offset each fledgling or egg/chick mortality, and by 3 fledglings to offset the mortality of one adult, given an juvenile/sub-adult survivorship of 0.33 (Ainley et al. 2001). One out of the 15 ‘a‘o fledglings produced annually as a result of barn owl and feral cat control provides for a complete in-year offset for the adult ‘a‘o mortalities anticipated to be covered under the KSHCP (1 adult every 3 years or 0.33 annually). This means the reproductive benefits of the seabird social attraction project increases each year beginning in year 4 (*Appendix C: Social Attraction Benefit Estimator*). When these benefits are added to the remaining benefits of the barn owl and feral cat control (14 fledglings annually), there is a partial in-year offset of fledgling mortalities in years 1 through 12 of the KSHCP, a complete in-year offset in year 13, followed by a greater than in-year offset in years 14-30 (Figure 4.1).

The delay in achieving mitigation benefits for the ‘a‘o as a result of the seabird social attraction project (*Appendix C: Social Attraction Benefit Estimator*) and the partial in-year offset of ‘a‘o fledgling take in years 1 to 12 results in a loss of ‘a‘o productivity over the term of the KSHCP. Because of the delay, the Kaua‘i ‘a‘o population is likely to experience a loss in breeding productivity due to the mortality of fledglings that would have returned to breed as adults and the loss of productivity of their progeny and subsequent progeny. The number of ‘a‘o fledglings subject to take impacts that are not mitigated for in the same year as the take impact is shown in Figure 4.1, including 16 fledglings in year 1, with a decreasing, in-year mitigation deficit from years 4 until year 12.

The loss in ‘a‘o reproduction represented by these impacts that are not mitigated in-year, represents progeny that would have survived to breeding as well as the loss in reproduction of their progeny and subsequent progeny. These effects were calculated for each year of the 30-year KSHCP, based on an ‘a‘o juvenile to adult survival of 0.28, breeding probability of 70%, and reproductive success of 50% (*Appendix C: Social Attraction Benefit Estimator*; Griesemer and Holmes (2011) low depredation). The number of ‘a‘o fledglings that the surviving breeding adults, their progeny, would have produced is equal to 81 fledglings over 30 years.

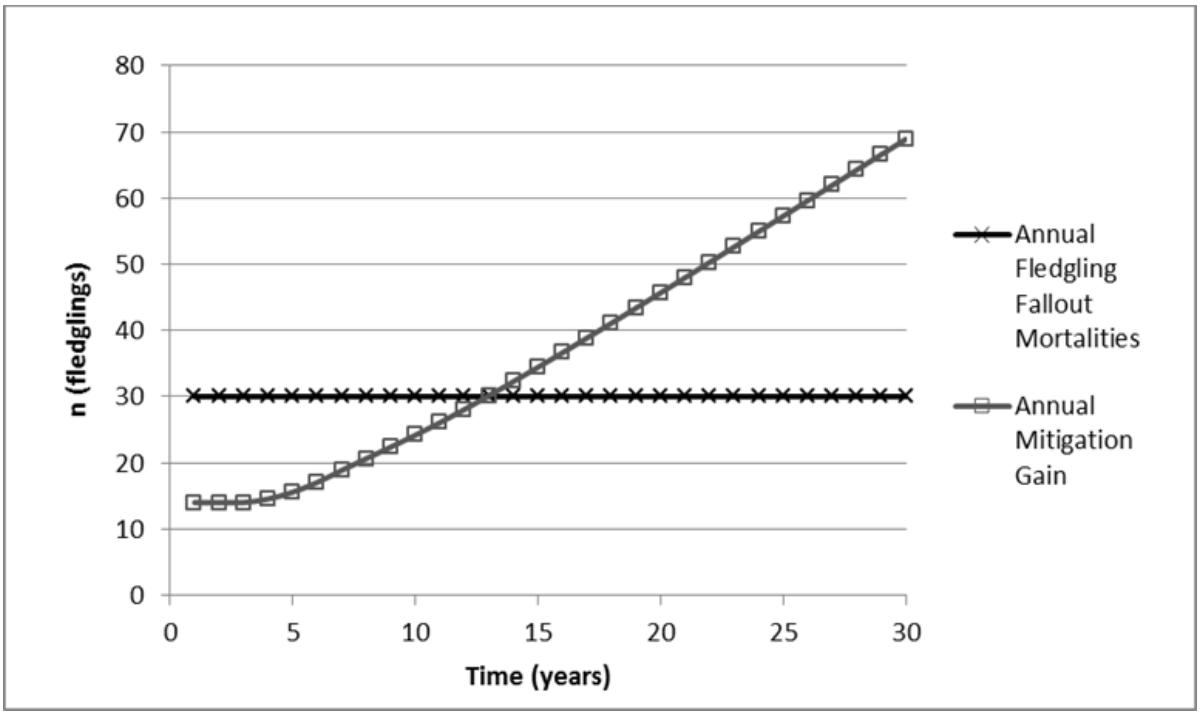

Figure 4.1. Annual take of fledgling ‘a‘o and annual increase in ‘a‘o fledglings (i.e. annual mitigation gain) likely to result from KSHCP conservation program*[#]

*Note: An annual increase of one out of the 15 fledgling ‘a‘o is not included in the annual mitigation gain, because the one ‘a‘o fledgling is anticipated to mitigate the proposed annual adult take of 0.33.
[#]This is a graph of a simplistic deterministic assessment to show the probable projected population increase in growth rate given the 5 year lag time that a protected fledgling reaches reproductive age.

The overall effects of the take and the conservation program on the ‘a‘o population would result in a total net benefit of 134 fledglings over the 30-year period. At year 30, it is anticipated that a population of approximately 372 ‘a‘o, growing at a rate of 8% per year, would reside within the predator-free fenced area. This represents approximately 6% of the projected island-wide Kaua‘i ‘a‘o population at year 30 (6,200 individuals) within the Kahuama‘a Preserve, including the colonies along the Kalalau rim. While the annual level of ‘a‘o take under the KSHCP represents 1.44% of the anticipated total fledgling production and less than 0.01% of the Kaua‘i adult population, the mitigation actions would result in the protection of approximately 6% of the Kaua‘i population by year 30.

In addition to the seabird social attraction project at the Preserve, this alternative would include predator control efforts included in the HCP. Depredation on seabirds has long been of concern. Barn owls have been depredating ‘a‘o and ‘ua‘u for many years. Barn owls have been documented on burrow cameras within breeding colonies on Kaua‘i (Raine et al. 2019). Studies have demonstrated how feral cats negatively affect the survival of shearwater chicks. A study by Smith, Polhemus, & VanderWerf (2002) examined wedge-tailed shearwater chicks on O‘ahu at three sites chosen along a distance gradient from a cat colony feeding area at Mālaekahana, and compared to a cat-free site on the isolated Moku‘auia Island. Nest survival among sites at Mālaekahana had a rate of 20%, compared to the cat-free Moku‘auia Island that had a survival

rate of 62%. Cats regularly show up in areas monitored by trail cameras within active ʻaʻo burrows, in breeding colonies on Kauaʻi where they have documented significant mortalities. Remote sensing collared cats in Hono O Nā Pali seabird colonies has revealed that cats have a depredation range of 1,300 hectares (13 km^2) (Dutcher 2017 in Pias & Dutcher 2018). Within Hono O Nā Pali at Hanakāpīʻai in 2015, prior to implementation of the predator control program, reproductive success of ʻuaʻu at the site was 51%. After the predator control program was initiated in 2016, reproductive success increased to 76 % in 2016 and 84% in 2017.

The barn owl and feral cat control in Kalalau Valley is anticipated to have a beneficial effect on the range-wide population of the ʻuaʻu and ʻakēʻakē, beginning in the first year of the KSHCP. The Kalalau Valley is a strategic location to control wide-ranging predators as it geographically positioned to provide protection to multiple known breeding colonies. ʻUaʻu and ʻakēʻakē mitigation activities is expected to provide benefits to the breeding colonies by reducing depredation of wide ranging cats and barn owls, minimizing depredation on sub adults, breeding adults and thereby increasing survival, increased nesting and fledging success. Thirty years of barn owl and feral cat control is estimated to provide a total net benefit to the Kauaʻi ʻuaʻu population of up to 82 individuals and a total net benefit to the Kauaʻi ʻakēʻakē of up to 44 individuals. The benefit is derived from increased breeding capacity and success within multiple colonies in Kalalau Valley as a result of these barn owl and cat control efforts. Although the magnitude of the range-wide beneficial effect of the mitigation on the ʻuaʻu and ʻakēʻakē is small, it is positive and commensurate with the impact of the issuance of ITPs and ITLs for these species.

Adaptive management measures specify that alternate mitigation would be implemented if the social attraction site fails to meet identified objectives that would lead to a breeding colony, or if results of monitoring indicate that initial predator control methods are not adequately controlling predators in the Kalalau area. Alternative mitigation would include, but is not limited to, expanded predator control or funding of other conservation efforts that provides a direct benefit to Covered Seabirds.

The minimization and mitigation measures included in the Proposed Alternative were developed to fully offset the maximum level of incidental take requested and are required to be implemented even if the actual level of incidental take requested by future Applicants is less than estimated in the HCP.

Alternative C: Implementation of Kauaʻi Seabird HCP and the additional action of translocation of chicks

Impacts would be similar to Alternative B. Social attraction is a long-term (5–10 year) management action that may require multiple years to attract enough prospecting subadult birds to begin breeding. However, when birds are within range, prospectors may respond within months or minutes (Sawyer and Fogle 2010), and these prospectors are subadults returning to land to breed. This technique is biologically non-invasive, and its cost is relatively low, consisting of the acquisition and maintenance of a solar-powered sound system and decoys (if used). Although the costs are approximately one-tenth that of chick translocation, "it may take longer to establish a breeding colony using these methods [acoustic attraction and provision of

artificial burrows]" (Sawyer and Fogle 2010). Buxton et al. (2014) suggests the most influential variable affecting recolonization is a source colony within a range of 25 km. Kalalau Valley is proximal to many breeding birds so it is anticipated that bird will be attracted to the site rather quickly after constructed. However, because translocated chicks that fledge from the mitigation site would be anticipated to return to the site to breed, the translocated chicks would supplement the potential breeders lured by social attraction methods. Over the long-term, this would be anticipated to result in a larger population breeding within the fenced unit, so under this Alternative, the overall cumulative benefit of the mitigation site would be anticipated to be larger, and offset of actual take could occur earlier (than year 27) if the social attraction does not occur right away. There would still be delay as result of the initial birds fledging and the delay to reach reproductive maturity. The return rate, the timing of return, and the future breeding success for translocated ʻaʻo is unknown, making the precise long-term benefit associated with this Alternative unquantifiable at this time. Based on location of mitigation site there is equal chance based on current knowledge of social attraction that the site could be occupied within the first year post construction of mitigation infrastructure.

Table 4.5. Summary of Anticipated Take and Benefits to Covered Species Under Each Alternative**

Alternative	**Species**	**Total 30-Year Take**	**Total 30-Year Anticipated Mitigation (Net Benefit)**
Alternative A: No-Action Alternative	**ʻAʻo**	912*	0
	ʻUaʻu	70*	0
	ʻAkēʻakē	33*	0
Alternative B: Proposed Alternative (Implementation of KSHCP)	**ʻAʻo**	912	1,046 (134)
	ʻUaʻu	70	120 (50)
	ʻAkēʻakē	33	60 (27)
Alternative C: Implementation of KSHCP and additional action of translocation of ʻaʻo chicks	**ʻAʻo**	912	1,046 (134)+
	ʻUaʻu	70	120 (50)
	ʻAkēʻakē	33	60 (27)

*Actual take could be less as Applicants would be expected take reasonable minimization measures to avoid legal liability to the extent feasible, but actual reduction from current take estimates is speculative and unquantifiable.
**Table only includes anticipated take incidental to Covered Activities and participating Applicants – not anticipated island-wide take (see Table 4.2).
+Under Alternative C, the anticipated benefit is expected to be higher based on supplementing additional birds.

4.3 Effects on Threatened and Endangered Species

Species listed as threatened or endangered by the State or Federal government require additional consideration whenever an activity permitted by USFWS or DLNR may have an effect on these

species or their habitats. Listed species found on the island of Kaua‘i include the ‘ōpe‘ape‘a, the ‘ilio-holo-i-ka-uaua, the nēnē, forest birds and water birds, the honu, listed invertebrates, and over 80 species of plants. This section addresses effects to listed species other than the Covered Species (‘a‘o, ‘ua‘u, and ‘akē‘akē) that are considered above.

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. These avoidance and minimization measures (e.g., modifying existing lighting, changing time of use, nighttime searches and predator control at Applicant facilities) are not anticipated to negatively impact listed species, because these facilities are located in already developed areas and minimization activities should not involve changes to existing habitat. These minimization measures would be anticipated to have a short and long-term positive impact on the honu. It is unknown how many turtle hatchlings are currently impacted by artificial light disorientation. The requirement that Applicants evaluate the potential for their facilities to impact honu and to identify and implement specific measures as necessary to prevent disorientation attributable to their facilities will provide a short and long-term benefit to this species in comparison to the existing condition. This planning step should prevent accidental but avoidable take relating to Applicant facilities.

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take.

Impacts to threatened and endangered species under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

The mitigation actions associated with the Proposed Alternative may impact other listed species as discussed below:

The ‘ōpe‘ape‘a has been observed in the general Kōke‘e area. At Kīlauea Point NWR, ‘ōpe‘ape‘a were observed at the Nihoku restoration site only after habitat restoration and predator removal, so they could potentially similarly benefit from the creation of the Kahuama‘a Seabird Preserve, removal of predators, and habitat enhancement. Activities associated with social attraction (playing of seabird calls, monitoring for birds) would not be expected to negatively impact ‘ōpe‘ape‘a, and negative interactions between ‘ōpe‘ape‘a and existing seabird colonies have not been reported. Biological monitoring of the mitigation site will include observation for ‘ōpe‘ape‘a to identify any unanticipated impacts.

Kaua‘i supports the largest concentration of nēnē in the State. Endangered nēnē do not currently breed at the Kahuama‘a Seabird Preserve, but could potentially in the future, especially if habitat

restoration and management enhance the area as nēnē habitat. Biological monitoring of the mitigation site will include observation for nēnē to identify their presence. Peak breeding occurs mainly October to March and molting March to June, when adults become flightless for four to six weeks while they grow new flight feathers. During this period, they become secretive and are extremely vulnerable to attacks by introduced predators. If nēnē do nest in the Kahuamaʻa Seabird Preserve, the mitigation site would provide a long-term benefit to the nēnē by providing protected predator-free breeding habitat. Activities associated with social attraction (playing of recorded calls) would overlap with peak nēnē breeding season (October – March); to minimize negative impacts to nēnē, all future nests and broods that occur would be mapped and monitored and any pairs or family groups in the area would be avoided during regular site management (predator control, fence inspection, etc.) and colony monitoring. With these measures in place, if nēnē settle at Kahuamaʻa, short-term negative impacts to the nēnē would be avoided and long-term positive impacts (associated with breeding in a predator-free area) would be expected.

Listed forest birds are not anticipated to be impacted by the proposed Kahuamaʻa Seabird Preserve, as it is outside the core habitat area for the puaiohi, ʻakikiki, akekeʻe, and ʻiʻiwi. Endangered water birds are not anticipated to be impacted by the proposed Kahuamaʻa Seabird Preserve, as they do not nest in mountainous regions.

None of the listed invertebrates (Kauaʻi Cave Amphipod, Kauaʻi Cave Spider, Newcomb's snail, *D. sharpi*, *D. musaphilia*) have been found at or near the Kahuamaʻa Seabird Preserve; thus, no negative impacts to these species are anticipated.

The Kahuamaʻa Seabird Preserve is within designated critical habitat for multiple species of plants (USFWS 2002, USFWS 2010), and listed plants have been observed in proximity to the Kahuamaʻa Seabird Preserve. During fence construction, predator removal, implementation of social attraction measures, and monitoring, the following best management practices will be incorporated to prevent unintentional damage or harm to these plants. Such practices are field surveys before finalizing fence alignments or locations for artificial burrows and before construction/installation to prevent damage or harm to rare plants, the incorporation of rare species protocols (e.g., flagging plants, identifying buffer zones), the avoidance where possible of the removal of large native plants and shrubs, the minimization of the overall removal of native vegetation, and the incorporation of invasive species prevention and biosecurity measures to reduce the potential for inadvertent introduction of non-native species to the Kahuamaʻa Seabird Preserve. To the greatest extent possible, the conservation fencing will include rare and listed plant species within the fenced area because this action will protect and enhance the plants' survival and propagation. With the incorporation of best management practices, it is anticipated that the short-term negative impact of fencing, predator and invasive plant species removal, and seabird habitat enhancement on rare plants and on plant critical habitat is minor. Over the long-term, minor positive impacts to rare plants and associated critical habitat would be anticipated because the fencing and predator removal would protect plants and critical habitat from depredation by rodents and degradation by ungulates.

Alternative C: Implementation of Kaua'i Seabird HCP and the additional action of translocation of chicks

Alternative C would be anticipated to have similar impact as Alternative B on threatened and endangered species because this alternative involves substantially the same activities as Alternative B. During translocation activities at existing seabird colonies located within critical habitat, the following best management practices for conservation field work will be incorporated to minimize negative impacts to rare plants and avoid adverse modification of critical habitat. These practices include existing trails for all surveys and monitoring, minimize removal of vegetation for installation of remote monitoring equipment, training to develop familiarity with native and non-native plant species, to avoid unintentional harm to rare plants; and the incorporation of invasive species prevention and biosecurity measures to reduce the potential for inadvertent introduction or movement of non-native species.

4.4 Effects on Fauna

Under all of the proposed alternatives, there would be no prolonged or intensive negative impact to the native fauna, including native migratory birds.

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. Although SOS operates for the purpose of assisting endangered seabirds, members of the public regularly turn in other downed bird species. For example, in 2015, 104 'ua'u kani (*Puffinus pacificus*, wedge-tailed shearwater) were impacted from the effects of light attraction according to the amount of birds recovered by SOS; typically, about 80% of those birds are released back into the wild. White-tailed tropicbirds are also regularly turned into SOS; an average of 25 birds of that species have been turned into SOS since 2008. Typically, about half of those birds are released back into the wild. In smaller numbers, other birds handled by SOS have included 'ā (red-footed booby, *Sula sula*), 'ā (brown booby), mōlī, black noddy (*Anous minutes*), and the 'iwa. Typically, a low percentage of these birds are released back into the wild; most have to be euthanized. In some years, unique species not usually encountered have been handled by SOS. For example, a Tahiti petrel (*Pseudobulweria rostrata*) and a Bulwer's petrel (*Bulweria bulwerii*) were recovered and released by SOS in 2012. Negative impacts to these native seabird species from light attraction would be reduced as Applicants implement reasonable minimization measures to reduce their liability for take of Covered Seabirds, which may result in a minor long-term benefit to other species of native seabirds.

Impacts to other native wildlife is anticipated to be negligible because minimization actions involve facilities located in already developed areas and should not involve interaction with wildlife or changes to existing habitat.

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take.

Impacts to threatened and endangered species under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

The mitigation site is located in habitat of mixed native and alien flora along the Nā Pali coast, an area which supports native fauna, including native migratory bird populations (forest birds, seabirds, pueo) and native invertebrates, as well as non-native wildlife, including barn owls and non-native invertebrates. No native birds are known to currently breed at the mitigation site, but additional surveys for breeding birds will be performed prior to the construction phase of the project.

Best management practices for fence construction, predator removal, and habitat enhancement would be incorporated to avoid or minimize negative impacts on native animals, including migratory birds. Such practices would include surveys of the fence alignment for nests prior to construction, adjustments to alignments as necessary to minimize disturbance to nesting birds, timing construction outside the nesting season for native, trimming rather than removing native vegetation wherever possible, incorporating reflective tape and similar materials into the fence design to enhance visibility to transiting native animals and prevent collisions, following existing trails whenever possible, and using all pesticides in strict accordance with label instructions.

Barn owl control under Alternative B would be conducted consistent with the control order for barn owls, an invasive migratory bird species in Hawai‘i (USFWS 2017). Barn owls were intentionally introduced to Hawai‘i in the late 1950s, and depredation by barn owls is recognized as having a direct detrimental impact on numerous threatened and endangered species in the Hawaiian Islands (USFWS 2017). To avoid negative impacts to the pueo and other native migratory bird populations, the following practices will be implemented during all barn owl control actions: training of technicians to distinguish between pueo and barn owls; timing control activities to avoid periods of pueo activity (pueo are active during the day, while barn owls are nocturnal); regular monitoring of traps and leaving traps closed when not in active use; prompt release of non-target birds to prevent injury to unintentionally trapped birds; use of non-toxic shot or bullets; and prompt reporting of any non-target take. Any pueo accidentally trapped will be evaluated and released or rehabilitated as necessary.

The development and management of the Kahuama‘a Seabird Preserve and feral cat control activities may have a minor, long-term positive impact on native fauna, including native migratory bird populations. Other species of overflying native seabirds might colonize the Kahuama‘a Seabird Preserve on their own without species-specific management intervention (i.e., use of acoustic attraction) and would benefit from the eradication of predators from within the unit and the removal of cats from the general area. The native pueo, as a ground-nesting bird, could benefit from the existence of a predator-free fenced area in which to breed. Other

native species (e.g., native insects, forest birds) would be anticipated to benefit from the exclusion of feral ungulates that modify native habitats, the removal of rodents and cats that may predate on insects or on host plant species, and by the enhancement of native habitat.

Alternative C: Implementation of Kaua'i Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B, because this alternative involves substantially the same activities as Alternative B. During translocation activities at existing seabird colonies, the following best management practices for conservation field work will be incorporated to minimize negative impacts to native migratory bird populations: follow existing trails for all surveys and monitoring, minimize removal of vegetation for installation of remote monitoring equipment; and the incorporation of invasive species prevention and biosecurity measures to reduce the potential for inadvertent introduction or movement of non-native species.

4.5 Effects on Flora

Under all of the proposed alternatives, there would be no prolonged or intensive negative impact to the native vegetation.

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. For the most part, Applicant facilities are located in developed areas of Kaua'i that have been modified, landscaped, and generally dominated by non-native plant species. These areas do not typically contain rare and listed native plant species. Minimization measures which alter lights do not involve any actions with potential to affect native flora because the actions do not involve any interaction with native flora or involve ground disturbing activities or clearing of vegetation.

Alternative B: Proposed Alternative (Implementation of Kaua'i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama'a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take.

Impacts to threatened and endangered flora species under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

Mitigation measures, specifically the development and management of the Kahuama'a Seabird Preserve, may have a minor, short-term negative impact and a minor, long-term positive impact

on native vegetation. Fence construction and installation of artificial burrows will result in some disturbance to native flora. A corridor along the fence route will be cleared to allow the installation of the fence. The disturbance will be localized to the fence corridor and limited in duration to the construction period, about six months. Where possible workers will trim vegetation, rather than completely remove native plants within the corridor, to limit impacts to native flora. About 100 nest boxes will be placed about 15-30 centimeters (6-12 inches) in the ground, with a footprint of about 120 cm^2 (4 ft^2). Construction may also involve some trampling of native vegetation by workers. However, any effect will be short term and minor because workers will move from one area to the next, large areas will not be left bare, and areas disturbed (especially surrounding the artificial burrows) will be revegetated with appropriate native plants.

Fence maintenance, predator control and colony monitoring may cause limited damage to native vegetation from trampling by technicians evaluating the integrity of the fencing and pruning vegetation overhanging the fencing, checking traps bait stations, and monitoring burrows. Best management practices to minimize overall impact to native vegetation include use established trails where possible, cleaning gear of invasive plant seeds, and use of remote monitoring techniques where possible.

Technicians will implement actions to control the spread of non-native invasive plants to enhance the nesting habitat. Best management practices to prevent harm to native plants include training in native plant identification, invasive plant removal by hand and using hand tools, and use of herbicides only on specific individual plants, in accordance with the label, when required to strategically prevent spread of target invasive species on specific individual plants.

Over the long-term, the construction and maintenance of predator proof fencing would be anticipated to have a minor positive impact on native flora by excluding feral ungulates that dig up and trample native plants and spread invasive plants, by removing rodents that predate on seeds and other native plant parts, and by controlling non-native plants that outcompete native plants.

Alternative C: Implementation of Kaua'i Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B.

4.6 Effects on Soils

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. Light minimization measures do not involve any potential to impact topography or soils because the facilities are located in already developed areas and avoidance/minimization measures do not involve digging, grading, earth moving or similar activities. Some minimal trampling of soils could occur resulting from staff monitoring for fallout and conducting predator control at Applicant facilities. Based on observations from

similar activities occurring throughout the state, these impacts are extremely limited in area (near existing artificial lights), duration (during fallout season), and intensity (foot traffic, no use of heavy equipment).

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take.

Impacts to soils under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

Mitigation measures may impact soils as follows. Minor disturbance of soils would be anticipated related to the mitigation measure of creating and maintaining the Kahuama‘a Seabird Preserve. Fence construction would result in some minor soil disturbance, but the disturbance would be localized to the fence corridor and limited in duration to the construction period. The approximate length of the fence line is 579 meters (1900 feet). During construction, a corridor along the fence route, at maximum of 1.8 m (6 ft) wide, will be cleared to allow the installation of the fence. Limited digging will occur to sink fence posts and bury the protective mesh screen. Where possible the vegetation will be trimmed, rather than completely removed, to limit bare soil exposure and minimize potential for erosion. Constructing the fence will not involve large scale earth moving or soil disturbance and will utilize hand tools in areas of steep grades (>25%) for any digging and clearing rather than heavy machinery. Best management practices to be incorporated during construction include avoidance of vegetative clearing during rain events, timing vegetation clearance in close proximity with construction, the use of erosion control devices such as geotextiles, rubber matting, and water guides to restrict water runoff, and replanting disturbed areas within three months of construction. Maintaining fences, once constructed, will involve routinely walking the fence lines and checking for fence integrity. It is anticipated that overall effects to soils from fence construction would be minor, because of the limited scope of soils to be disturbed (< 1 acre) and the incorporation of best management practices. Effects would be temporary, as fence construction would only last two to four months. Over the long term, the fencing could have a minor positive impact on soils within the fenced unit by protecting the area from the digging and rooting associated with feral pigs.

Minor disturbance of soils would also be anticipated at the Kahuama‘a Seabird Preserve related to the removal of predators. Specific actions include placing, setting and checking traps and bait stations, noting patterns of animal movement, and monitoring and recording results, which could result in slight soil disturbance and soil compaction from staff movement. Traps and bait stations are placed on the ground and do not involve digging or other soil disturbance. The incorporation of automatic, self-setting traps where possible will reduce the number of trips required to check and replace traps. Once predators have been eradicated (estimated at 6 months’ time), trapping of non-native predators will cease unless it is found that predators have re-entered the site. Based on observations from similar activities occurring throughout the state,

these impacts are limited in area (within and directly adjacent to Kahuamaʻa Seabird Preserve), duration, and intensity (foot traffic, limited staff).

Minor disturbance of soils would be anticipated at the Kahuamaʻa Seabird Preserve related to removal of invasive plants to enhance the area as seabird breeding habitat. Minor soil disturbance may occur when non-native plants are removed and native plants reintroduced through activities such as uprooting and planting. Technicians will employ non-native plant control actions to remove invasive species through mechanical means (by hand and with hand tools) (preferred method) and through the application of herbicide to strategically control target species and prevent them from becoming further established. Herbicide would be used in low level amounts with medical bottle applicators following application directions for forestry management use, on specific individual plants (rather than broad application). Workers will use herbicide in dry weather conditions and not during periods of heavy rain. These measures will minimize the potential for herbicide to contact soils. In particularly sensitive areas, specific erosion control techniques such as staking down fence cloths or utilizing vegetative buffers (e.g., coconut coir or straw bales) may be used for soil stabilization after removal of invasive plants. Based on observations from similar activities occurring throughout the state, these impacts are limited in area (within the Kahuamaʻa Seabird Preserve), duration, and intensity (removal of individual plants, no exposure of bare soil). Over the long-term, habitat enhancement could have a minor positive impact on soils within the fenced unit, by reducing the volume of non-native plants which can reduce the stability of soils through weaker root structure.

Minor disturbance of soils would be anticipated at the Kahuamaʻa Seabird Preserve related to the monitoring and management of the area as a social attraction site. Installation of social attraction equipment entails placing artificial nest boxes and installing loudspeaker equipment. About 100 nest boxes will be placed approximately 15-30 cm (6-12 in) in the ground. Each nest box is about 60 cm (~20 in.) square and has a footprint of about 120 cm^2 (~4 ft^2) each. Loudspeakers will be placed on or above ground and would not involve soil disturbance. Long-term monitoring of the colony would employ non-disturbing remote techniques where possible. Tools for monitoring will include call, play-back response, thermal imaging and night vision, Passive Integrated Technology (PIT) tags to measure nest attendance, automated auditory monitoring to record bird calls, and use of trail cameras. None of these activities involves digging or soil disturbance. Based on observations from similar activities occurring throughout the state, these impacts are limited in area (within Kahuamaʻa Seabird Preserve), duration (one month for installation of nest boxes; monitoring during nesting season only), and intensity (limited footprint for nest boxes, limited repeat visits along established trails for monitoring).

Alternative C: Implementation of Kauaʻi Seabird HCP and the additional action of translocation of chicks

Alternative C would result in similar impacts to soils as Alternative B, with additional minor disturbance of soils related to activities required for chick translocation. This would include limited soil compaction related to foot traffic during site visits to existing colonies to identify, monitor, and remove eligible chicks for translocation, and soil compaction related to daily visitation to artificial nest boxes to feed and monitor the health of translocated chicks. Based on

observations from similar activities at Kīlauea Point NWR, these impacts are limited in area, duration (during nesting season only), and intensity (limited repeat visits along established trails).

4.7 Effects on Hydrology and Water Resources

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. Light minimization measures do not involve any potential to impact water quality or quantity because the actions are not anticipated to alter drainage, runoff, or result in any discharges into existing streams or the ocean because Applicant facilities are located in already developed areas and minimization actions do not involve digging, grading, earth moving or similar activities.

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take.

Impacts to hydrology and water resources under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

Mitigation measures may impact hydrology and water resources as follows. While short-term soil disturbance at the mitigation site would be unavoidable during site preparation, fence construction, removal of invasive plants, and installation of artificial nest boxes, the fencing will not cross any perennial or intermittent streams within Kahuama‘a Seabird Preserve and normal patterns in the area consist mainly of stormwater runoff and percolation. Best management practices would be incorporated into all aspects of the creation and maintenance of the Kahuama‘a Seabird Preserve to minimize the potential for erosion and to maintain normal runoff patterns, and these include phasing construction and invasive plant control to reduce exposed ground areas, avoiding earthwork during inclement weather, using herbicide on individual plants in dry weather conditions and not during periods of heavy rain, restricting activities near streams, and the use of vegetative buffers.

Given the distance (in elevation) of the project site from the ocean, the limited acreage (<1 ac) to be disturbed, the incorporation of best management practices, and the lack of streams in the project area, it is anticipated that effects to hydrology and water resources would be minor. No lasting changes to existing patterns of runoff or percolation are expected, and impacts to existing surface water features and on marine waters are expected to be negligible or minor. Over the long-term, the enhancement of the area through fencing, native plant restoration, and establishment of a breeding colony of Covered Species could contribute to improved soil

stability and reduce the potential for erosion and stream degradation in the general area resulting from ungulate activity.

Alternative C: Implementation of Kaua'i Seabird HCP and the additional action of translocation of chicks

Alternative C would be anticipated to result in similar impacts to hydrology and water resources as Alternative B. Additional activities related to chick translocation (site visits to existing colonies, additional visits to Kahuama'a Seabird Preserve for chick care) would not be anticipated to contribute noticeable impacts to hydrology and water resources, based on observations from similar activities at Kīlauea Point National Wildlife Refuge.

4.8 Effects on Air Quality

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. Light minimization measures do not involve any potential to impact air quality because the actions are located in already developed areas and do not involve emissions.

Alternative B: Proposed Alternative (Implementation of Kaua'i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama'a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take.

Impacts to air quality under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

Mitigation measures may impact air quality as follows. At the mitigation site, fence construction would require the use of heavy equipment and small power tools to prepare the site and install the fence. Transportation of personnel and materials to the site will result in minor emissions of greenhouse gases through the burning of fossil fuels from ground vehicles. Helicopters may be used but only to drop supplies at the site during construction, a total of approximately four trips. Ground vehicle use will be limited to routine vehicle use to visit and monitor the site with very few vehicles and therefore is not anticipated to alter air quality in any measureable way. It is anticipated that any use of herbicides would be directly applied to the target species (e.g., hand application or squirt bottles), and approved herbicides would be used in accordance with recommendations on the label attached to the product (e.g., applying large droplets for sufficient coverage or avoid application on windy days or certain times of day).

There is a lack of data on ambient air quality specific to the Kahuamaʻa Seabird Preserve mitigation site. Because use of heavy equipment and power tools would be temporary, because tradewinds dissipate any equipment emissions or spray, because protocols are in place regarding the use of herbicide spray, and given the narrow width and relatively short distance of the fence corridor, it is anticipated that the impact on air quality of implementing Alternative B would be negligible.

Alternative C: Implementation of Kauaʻi Seabird HCP and the additional action of translocation of chicks

Alternative C would be anticipated to result in similar impacts to air quality resources as Alternative B. Additional helicopter trips would be required for monitoring and retrieval of chicks as part of the translocation process. Because the use of helicopters would be localized, away from urban or residential areas, limited in number (no more than six additional trips per year), and of short-term duration, the anticipated impact on air quality of implementing Alternative C would be negligible.

4.9 Effects on Historic Properties

Alternative A: No Action Alternative

Actions to minimize light attraction by Applicants will not involve any potential to affect historic properties because none of the affected Applicant facilities are on or eligible for listing on the National Register of Historic Places.

Alternative B: Proposed Alternative (Implementation of Kauaʻi Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuamaʻa Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take. Impacts to historic resources under the Proposed Alternative related to minimization measures at Applicant facilities would be the same as Alternative A.

Historic properties either nominated or registered with the National Register of Historic Places (maintained by the National Park Service) are unlikely to be within the immediate vicinity of the mitigation site. Only two such properties are currently documented in the Kōkeʻe area: Camp Sloggett and the Civilian Conservation Corps Camp (NRHP 2017). Neither of those properties are in close proximity to the Kahuamaʻa Seabird Preserve and, therefore, those properties are unlikely to be considered within the Area of Potential Effect.

Although no archaeological sites or features were noted during the course of a 1993 survey of the mitigation site, the dense vegetation of the area hindered the ability to conclude definitively that no sites were present. Because of the inability to accurately survey the area and the slight

potential for unrecorded archaeological sites being encountered during installation of fencing, the 1993 survey recommended the following precautions below. If these recommendations are followed, the 1993 survey anticipated that implementation of conservation actions at the mitigation site would have no adverse effect on the cultural resources of the area.

1) All ground disturbing clearing efforts should be monitored by an archaeologist so that any potential surface archaeological sites are not disturbed, especially in the event that heavy equipment is used. Alternately, all clearing activities that do not disturb the ground surface should be inspected by an archaeologist immediately following the clearing to determine the presence or absence of sites;
2) The installation of fences should be monitored by an archaeologist to assure that potential surface features as well as potential subsurface cultural deposits are not disturbed by these activities;
3) If at any time during development of the mitigation site archaeological features are encountered, State Parks archaeologists should be notified. If activities could impact any archaeological feature, these activities would cease until such time as the feature is evaluated by a qualified archaeologist; and
4) The potential for encountering human remains is extremely slight. But if activities extend into the steep cliff portion of the project area, the potential for encountering rock shelters or caves (features known to be used by Hawaiians for interment of the dead) does exist. In the event that human remains are inadvertently discovered, those remains shall not be disturbed and the State Historic Preservation Division (SHPD) immediately notified in accordance with HRS Chapter 6E.

MaryJane Naʻone, Kauaʻi Lead Archaeologist for the State Historic Preservation Division (SHPD), and Victoria Wichman of Hawaiʻi Division of State Parks visited the APE in the late 2010s. While no record of their visit is available, the Service had individual phone conversations with each to discuss the undertaking and APE on February 24, 2020. Consistent with the findings of Carpenter and Yent (1994), both confirmed there were no cultural resource sites observed within the APE, although, dense vegetation obscured the surface. However, the Service is conducting Section 106 consultation with SHPD (pursuant to NHPA §106), the Office of Hawaiian Affairs, and the Kauaʻi Burial Council concurrently with this NEPA process.

Alternative C: Implementation of Kauaʻi Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B, as activities associated with translocation are not anticipated to involve or have additional impact on historic, archaeological, or cultural resources.

4.10 Cumulative Effects

The CEQ regulations for implementing the provisions of NEPA, and the State of Hawai‘i administrative rules (HAR § 11-200-17) both require a discussion of the cumulative effects of a proposed action. The CEQ regulations (at 40 CFR § 1508.7) provide the following definition of cumulative effects:

"The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions."

Cumulative effects are the overall, net effects on a resource within the affected environment that arise from multiple actions. Spatial and temporal boundaries are the two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial and temporal boundaries set the limits for selecting those actions that are most likely to contribute to a cumulative effect. Impacts can accumulate spatially, when different actions affect different areas of the same resources. They can also accumulate over the course of time, from actions in the past, the present and the future. The effects of those actions overlap in space and time with the effects of the issuance of the ITPs and implementation of the KSHCP for there to be potential cumulative effects. Occasionally, different actions counterbalance one another, partially cancelling out each other's effect on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource. In addition, sometimes the overall effect is greater than merely the sum of the individual effects, such as when one more reduction in a population crosses a threshold of reproductive sustainability, and threatens to extinguish the population.

In order to accurately assess cumulative effects, the effects of past, present, and reasonably foreseeable future actions that affect the same resources as the proposed action or alternatives need to be identified. Past, present, and reasonably foreseeable future actions are not limited to USFWS actions, but could be actions taken or proposed by any Federal, State, or local government or a private entity, and are actions that are not included in the proposal or alternatives under consideration. To be considered under the cumulative effects section of the EA, past actions should have ongoing impacts that are presently occurring. Reasonably foreseeable future actions include those Federal and non-Federal activities not yet undertaken, but are sufficiently likely to occur, that a decision-maker should take such activities into consideration in reaching a decision regarding the effects of the proposed Federal action on the human environment. This consideration includes, but is not limited to, activities for which there are existing decisions, funding, or proposals. Reasonably foreseeable actions do not include those actions that are highly speculative or indefinite (see 43 CFR 46.30).

For the purposes of this analysis, the temporal extent used to identify projects to be considered in the cumulative effects analysis is the proposed term of the KSHCP (30 years). The spatial extent used to identify projects to be considered in the cumulative effects analysis does not vary by resource, and is the same as the project area, the island of Kaua‘i. The analysis area is substantially larger than the footprint(s) of individual KSHCP Applicant facilities and mitigation areas in order to consider an area large enough to encompass likely effects from other projects on

the same resource. The analysis area is the geographic area occupied by the affected resources. Although the Covered Species nest on other islands, individuals of these species are impacted by actions occurring on the same island in which they nest and not actions on other islands. When attracted to artificial lights, fledgling seabirds originating from these nesting sites on Kaua‘i become confused and may suffer temporary night blindness. They often fly into utility wires, poles, trees, and buildings and fall to the ground. Adult seabirds can also be attracted to lights located near their breeding grounds on Kaua‘i and affected in a similar manner. Power lines and structures and communication towers create a potential for seabirds to collide with these structures while flying between their Kaua‘i nesting grounds and feeding grounds at sea.

4.10.1 Past, Present, and Reasonably Foreseeable Future Actions that Contribute to Cumulative Effects on the Covered Species

The primary threats to the populations of the Covered Species include depredation at their breeding sites by introduced mammalian and avian predators, breeding habitat loss and alteration caused by invasive plants, public use, and urban development, light attraction, collisions with utility structures, at sea factors affecting their prey-base, global climate change, and stochastic events that are inherently a hazard to populations with a limited range. The impacts of public use, urban development, at sea factors affecting their prey-base, global climate change, and stochastic events that are inherently a hazard to populations with a limited range threats will likely remain the same and continue to impact the species at similar extent under all the action alternatives.

Introduced Mammalian and Avian Predators. One of the most serious threats to the survival of the Covered Species is depredation of adults, eggs, and chicks by introduced predatory species, including rats, cats, mongoose, pigs, and the barn owl. Rats prey on seabird eggs and chicks. Feral cats, as well as barn owls, are known to kill adults and nestlings of the Covered Species. Colony monitoring data from several breeding seasons indicate concluded evidence that cats, rats, and owls were responsible for a decrease in adult and juvenile survival of the Covered Species. Evidence of seabird predation by rats, cats, barn owls, and pigs was documented at all sites monitored by KESRP from 2011 through 2016.

Seabird breeding burrows monitored by KESRP were commonly frequented by rats; in ULP, one seabird burrow was visited by a rat 490 times over the span of 5,015 hours of recording. Cats frequented seabird burrows to a lesser extent than rat visitations, though individual cats have been documented on cameras predating the adults and chicks from multiple nests in a matter of days. Depredation by feral cats at nesting sites on Kaua‘i has been heavily documented on camera by KESRP, with an individual predator able to decimate a nesting colony and lead to colony extirpation, particularly when adults are affected.

Ungulate species such as feral pigs, goats, and deer, roaming forests and mountain slopes, can destroy or damage burrows and the vegetation surrounding them. In addition, feral pigs also eat eggs, chicks, and adults, and destroy the entire burrow in the process of reaching the birds at the end. These feral species have played a significant role in modifying the breeding habitat of the Covered Species, and in exterminating seabird colonies in the Pacific and many locations worldwide.

Breeding Habitat Loss and Alteration by Invasive Plants. Seabird nesting habitats on Kaua‘i and the other main Hawaiian Islands have been severely degraded by the presence of invasive plants. Plants such as *Cyathea cooperi*, *Hedychium* spp., *Albizia falcataria*, *Psidium* spp., and *Rhodomyrtus tomentosa* continue to displace and out-compete native vegetation in some of Kaua‘i’s native mesic and wet forest areas. The presence of feral ungulates facilitates the spread and establishment of invasive plants, and accelerates soil erosion and habitat degradation which can destroy important breeding habitat. Grazing and trampling caused by pigs, goats, and deer both alter the vegetation structure and composition, which then can facilitate the dispersal of non-native predators into new areas following ungulate trails.

Many historic nest sites on Kaua‘i are no longer active due to both the presence of introduced predators and the alteration of native vegetation structure and composition. For example, the Kaluahonu seabird colony located in southeastern Kaua‘i once thrived but is now dominated by nearly pure and impenetrable stands of *Psidium* spp., *Hedychium* spp., and *Rhodomyrtus tomentosa*. In the early 1980’s this colony was found to be active and was monitored by biologists. However, a decade later biologists documented a significant drop in the number of breeding pairs at the Kaluahonu. Intensive surveys conducted by KESRP between 2006 and 2008 indicated that the colony has since been extirpated.

When habitat composed of native vegetation is invaded by non-native plant species, vegetation structure is often dramatically altered, and Covered Species cannot access the ground readily to undertake breeding activities (e.g., burrow excavation, mate attraction). Non-native vegetation may also be a proxy for higher abundance of pigs, cats, and rats. Invasive plants, such as Strawberry Guava (*Psidium cattleianum*), provide food that support higher numbers of seabird predators. Proximity to human disturbed areas is another factor that accelerates habitat degradation and loss by increasing both light levels and the relative abundance of invasive plants and predators.

Artificial nighttime lighting. Seabird attraction and fallout due to nighttime lighting is a long-standing threat to the Covered Species. Over a 37-year period (1979-2016), the SOS program documented a total of 30,552 ‘a‘o recovered, injured, or killed due to artificial nighttime lighting (DOFAW 2018). This represents the known number of birds that have been collected as a result of fallout, but likely only represents a portion of total fallout numbers due to eluding detection by seeking cover after being downed, or succumbing to depredation (Travers et al. 2018). In the 1980s through 1990s, an average of 1,200 ‘a‘o were processed by the SOS program each year, where carcasses were documented or injured birds were rehabilitated and released (DOFAW 2018). ‘A‘o and ‘ua‘u populations rapidly declined from 1993 to 2013 (94% for ‘a‘o and 78% for ‘ua‘u; Raine et al. 2017) to current extremely low populations.

The KSHCP was developed to address artificial nighttime lighting threats. The total amount of light attraction caused take of the Covered Species potentially covered under the KSHCP, however, will be less than the total island-wide light attraction take impacts to these species. Approximately 50% of the total downed birds recovered by SOS are not currently attributable to any specific, consistent, or known source of light attraction. For this portion of light attraction impact, there is currently no identifiable entity to apply for take authorization, though future efforts may be more successful in identifying such entities. Additionally, there are several

entities with identified ongoing take that will be mitigated through other means (e.g., KIUC, see below; and Federal agencies as described in the EA section on Federal actions). Finally, not all of the eligible entities identified by DLNR expressed interest in participating in the KSHCP. Of the total island-wide light attraction fallout of the Covered Seabirds, the following is expected to be covered and mitigated for directly by the KSHCP: about 18% of ʻaʻo fallout, 16% of ʻuaʻu fallout, and 45% of ʻakēʻakē petrel fallout (See Section 4.2).

KIUC nighttime lighting and collisions with power lines and structures. In addition to effects caused by attraction to artificial nighttime lighting, Covered Species are subject to collisions with power lines while flying between their nesting colonies and at-sea foraging areas (Cooper and Day 1998, p. 18; Podolsky *et al.* 1998, p. 21). Nestlings are indirectly affected as they rely on provisioning from both parents in order to survive, thus the loss of either parent due to collision results in nestling fatality. Based upon recent information collected from passive acoustic song meters by the Kauaʻi Endangered Seabirds Underline Monitoring Program, the Service has conducted modeling to extrapolate the amount of documented take (i.e., collisions with power lines) to the entire power system on Kauaʻi (USFWS 2017). As a result of covered activities under the KIUC STHCP, the Service estimates that approximately 1,875 ʻaʻo, 765 ʻuaʻu, and 26 ʻakēʻakē mortalities are occurring per year as a direct result of power line strikes under the KIUC STHCP and ITP, based on updated observational data proportions provided by KESRP in 2019 and USFWS 2016 strike projections from scenarios IV, VB, and VIA selected in the USFWS Newell's Shearwater Landscape Strategy, Appendix 2 (2017b).

KIUC has worked to address impacts to Covered Species caused by its streetlights, its other facilities with nighttime lighting, and collisions with power lines and structures under the KIUC Short-Term Habitat Conservation Plan (STHCP) and Incidental Take Permit (ITP). Under the KIUC STHCP, mitigation measures were designed to compensate for an impact to ʻaʻo, ʻuaʻu, and band-rumped storm petrels by replacing individuals or providing substitute resources or environments critical to the species' survival. The management under the HCP likely fully offsets the annual light attraction impacts to ʻaʻo (72 fledglings) and ʻuaʻu (2 fledglings), considering the predicted range of the numbers of nestlings that fledge from the Upper Limahuli breeding site alone (115-167 ʻaʻo and 27-46 ʻuaʻu fledglings; Raine et al. 2018); however, the management does not fully offset take impacts due to collisions with power lines and structures. The mitigation measures identified in the STHCP and required under the terms of the original ITP are summarized below.

• KIUC funded Covered Species colony monitoring, predator control, invasive plant control, and fence maintenance within the 148-hectare Upper Limahuli Preserve (ULP), owned and managed by the National Tropical Botanical Garden.

• KIUC funded Covered Species colony monitoring and predator control at known breeding colonies within the State's Hono O Nā Pali Natural Area Reserve (HNP NAR).

• KIUC is continuing to assess the suitability of nesting locations for conservation fencing for the Covered Species in the Upper Mānoa Valley (UMV) and ULP. Within the UMV, KIUC initiated interm predator and weed control.

• KIUC funded Covered Species colony monitoring and predator monitoring at UMV Mānoa Valley including biological and botanical surveys, social attraction, landing zones, and weatherports related to the proposed predator-proof fence for KIUC's Long-Term HCP.

• KIUC funded auditory surveys of the Covered Species in Hanalei Valley, Nā Pali Coast, Laʻau Ridge, Wainiha, and Lumahaʻi Valley since 2006, on an annual basis, in an effort to identify key breeding areas for the Covered Species. The objective of the surveys are to further establish the breeding range of the Covered Species with a purpose of identifying colonies suitable for predator control.

• KIUC funded DOFAW to continue its annual seabird radar monitoring efforts, including radar data analyses, at each of the 13 historical reference sites to continue seabird population monitoring.

KIUC submitted a permit renewal request to the Service for its STHCP and ITP to cover the period until Service renders a decision on their Long-Term HCP, which is currently under development. In the interm, KIUC continues to implement these conservation actions under the agreements of STHCP. The amount of take and minimization and mitigation measures that will be included under the KIUC Long-Term HCP is unknown as it continues to be under active development.

Federal actions– Several Federal actions involving artificial nighttime lighting, powerlines, and communication towers affects one or more of the Covered Seabirds:

Project	*Federal Entity*	*Covered Seabird Take*	*Duration*	*Mitigation to Offset Take?*
Pacific Missile Range Facility (PMRF) Base-wide Operations	Navy	ʻaʻo -3 juveniles per year; ʻuaʻu -1 juvenile every 10 years; ʻakēʻakē -2 juveniles every 10 years	2014-2015	No
Kōkeʻe Air Force Station	Air Force	ʻaʻo -2 adults/juveniles, 1 egg/chick per year; ʻuaʻu -1 adult/juvenile, 1 egg/chick per year; ʻakēʻakē -1 adult/juvenile, 1 egg/chick every 10 years	2017-foreseeable future	Yes-barn owl control in seabird colonies
Kalepa Comm. Tower	Coast Guard	ʻaʻo -4 adults, 2 eggs/chicks; ʻuaʻu -2 adults, 1 egg/chick	2013-2033	Yes- seabird colony mgmt.
Kalaheo Comm. Tower	FCC	ʻaʻo -3 adults, 2 eggs/chicks; ʻuaʻu -1 adult, 1 egg/chick	2013-2033	Yes-seabird colony mgmt.
PMRF Base-wide Reinitiation for effects on Newell's Shearwater	Navy	ʻaʻo -Total maximum of 63 fledglings, 450 adults, 63 chicks or eggs over 50 years	2018-2068	Yes-seabird colony mgmt.

Other management of seabird colonies - Management actions to benefit the species that have occurred in the last five years in addition to actions related to HCPs and ongoing Federal actions include:

• HNP NAR occupies 1,448 hectares on the northwest coast and was designated in 1983 and expanded in 2009 to preserve native natural communities in the Hanalei and Waimea Districts, including the Hanakāpīʻai, Hanakoa, and Waiahuakua ahupuaʻa. The remote mountains and steep slopes in the HNP NAR provide vital breeding sites for the Covered Species.

• A partnership and funding from the Service, Pacific Rim Conservation, the Kauaʻi Endangered Seabird Recovery Project (KESRP), American Bird Conservancy (ABC), NFWF, DLNR-DOFAW and Kauaʻi Natural Area Reserves System staff (with funding from KUIC), NTBG, and the David and Lucille Packard Foundation created the Nihoku Ecosystem Restoration Project. Completion of the 3-hectare predator exclusion fence occurred in 2014, at the Nihoku conservation unit within Kīlauea Point National Wildlife Refuge. ʻUaʻu nestling translocations began in 2015, and the first ʻaʻo nestling translocations began in 2016. Translocations will continue through the 2020 breeding season for each species with the goal of establishing a new ʻuaʻu and ʻaʻo breeding colony within a fully protected predator-free area on Kauaʻi.

• In 2014, the National Fish and Wildlife Foundation (NFWF) assisted the Service in funding the development and validation decision support tool to be used by conservation and exosystem managers for planning, threat mitigation and strategic habitat prioritization to help define conservation efforts for ʻaʻo and ʻuaʻu. This project will identify areas of conservation concern and will model the efficacy of threat management approaches to increase the long-term viability of the populations.

• In 2016, NFWF provided funds to the American Bird Conservancy (ABC) through the end of the 2019 breeding season to support predator control work to protect the Covored Species at newly identified sites, Hanakāpīʻai and Hanakoa, and to develop a "rapid response team" to target control efforts throughout the HNP NAR on Kauaʻi during the seabird breeding season where hot spots of predator activity were identified.

• In 2018, NFWF provided funding to Pacific Rim Conservation (PRC) to identify, visit and assess the conservation fencing potential adjacent to three nesting locations of ʻaʻo, and ʻuaʻu on Kaua'i and provide implementation plans for these fences to serve both as social attraction sites, and hopefully capture active burrows within. The project identified preferred fencing alignment, and assess the feasibility, cost and benefits of various fencing strategies for the preferred fencing alignment and the initiation of necessary compliance in anticipation of building the fence.

• As part of the Kawailoa Wind HCP and the Kahuku HCP mitigation funds were provided to the Kauaʻi Endangered Seabird Recovery Project (KESRP) to conduct auditory surveys ʻaʻo and ʻuaʻu nesting colonies in 2013 and 2014. Both HCPs funded KESRP for barn owl predator control throughout the 2014 through 2017 breeding seasons.

• The Kawailoa Wind HCP Amendment will provide mitigation funds for predator control and burrow monitoring at the Hanakāpīʻai and Hanakoa seabird colonies within the Hono O Nā Pali

NAR in 2020. This is anticipated to increase survival and successful fledgling for the population of ʻuaʻu within these colonies.

• A 5-year partnership (Honopū Seabird Conservation Initiative) supported with funding from the Department of Defense Readiness and Environmental Protection Integration (REPI) program began in 2019 to establish an effective predator control program in Honopū Valley on Kauaʻi. The purpose of the initiative is to construct a 3 acre predator-proof fence, within a 214 acre ungulate fence, to eradicate and control predators, to restore native habitat, to use social attraction with the goal of establishing and protecting a new breeding colony of ʻaʻo, ʻuaʻu, and ʻakēʻakē within a fully protected predator-free area on Kauaʻi.

4.10.1.1 Covered Species – No Action Alternative

Impacts from artificial lighting, when combined with other ongoing past, present, and reasonably foreseeable future actions would result in continuing major effects to the Covered Species. Under this Alternative, potential KSHCP Participants would take reasonable minimization measures where feasible to limit their legal liability of unauthorized take of listed species. These measures would include actions to minimize light attraction (e.g., modify lighting or restrict nighttime activities during fallout season) and actions to convert potential lethal take of downed birds into non-lethal take (e.g., employee training, development of search protocols, participation in SOS, conduct predator control on-site under lighting facilities). ITPs would not be issued and no off-site mitigation at the Kahuamaʻa Preserve and Kalalau Valley seabird colonies described in this EA would occur.

Depredation of adults, eggs, and chicks by rats, cats, mongoose, pigs, and barn owls are expected to continue. Feral pigs, goats, and deer, would continue roaming forests and mountain slopes, destroying or damaging burrows and the vegetation surrounding them. In addition, feral pigs could also continue to eat eggs, chicks, and adults, and destroy the entire burrow in the process of reaching the birds at the end. The spread and establishment and degredation of nesting habitats by invasive plants is expected to continue. It is expected that feral ungulates will continue to be present on the landscape, and thus soil erosion and destruction of important breeding habitat is expected to continue. Because it's expected that invasion by non-native plant species will continue, vegetation structure will also be altered and limit the ability for Covered Species to readily access their breeding habitats. Thus, breeding activities will continue to be impacted.

Under this Alternative, these serious threats would continue contributing to the existing degraded condition of the Covered Species. Cumulative impacts to the Covered Species would be expected from adding this unmitigated take of potential Participants to negative impacts of the past, present, and future actions. The unmitigated take impacts are likely to continue contributing to the existing degraded condition of the Covered Species.

Under the No Action Alternative, ITPs would not be issued for any of the potential Participants and the KSCHP would not be implemented. As such, the KSHCP would contribute to the cumulative negative effects on the Covered Species.

4.10.1.2 Covered Species – Proposed Action Alternative

As described in this EA, under the Proposed Action Alternative, qualified Participants in the KSHCP would implement facility-specific avoidance and minimization measures to reduce lighting impacts on the Covered Seabirds. In addition, nesting habitats of the Covered Species would be enhanced by implementing mitigation at the Kahuamaʻa Seabird Preserve. Vegetation work will include removing invasive plants that negatively affect the ability of seabirds to nest and impede breeding activities such as take-off and landing, prospecting, courtship and burrow excavation. Restoring native vegetation at the site is likely to offer suitable appropriate vegetative structure to facilitate breeding. For the 30-year duration of the KSHCP, habitat modifying plants will be removed from within the fence enclosure, with the goal of removal of habitat modifying invasive plants in Year 1 and annually throughout the 30-year duration of the KSHCP (ingress of these species will be ongoing due to the seedbank / seeds blowing in from outside the fence).

Furthermore, the mitigation under the KSHCP is likely to result in a positive impact on the range-wide population of the ʻaʻo by more than offsetting the adverse take impacts covered under the KSHCP. However, a delay in the mitigation for the loss of fledgling ʻaʻo is likely because: (1) the conservative estimate of the starting population within the fenced 2-hectare site is zero; (2) several years are needed to recruit breeding adults and increase breeding adult numbers at the social attraction site; and (3) there is a 6-year time delay between fledging and breeding by seabirds that return to breed at the site. This is not the case for anticipated reproductive benefits from barn owl and feral cat control in the Kalalau Valley, for which the increase in ʻaʻo reproduction (15 fledglings) begins in the first year of the KSHCP. Largely due to the biology of the ʻaʻo and the overall effects of the take, the conservation program would result in a total net benefit of 134 ʻaʻo fledglings over the 30-year period. The barn owl and feral cat control in Kalalau Valley is anticipated to have a positive impact on the range-wide population of the ʻuaʻu, ʻakēʻakē, and adult breeding ʻaʻo beginning in the first year of the KSHCP. Thirty years of barn owl and feral cat control is estimated to provide a total net benefit to the Kauaʻi ʻuaʻu population of up to 82 individuals, and a total net benefit to the Kauaʻi ʻakēʻakē of up to 44 individuals, which is 61% and 59% of a benefit to the Covered Species higher than the anticipated take requested. This, therefore, more than offsets the impacts from the requested take.

For the reasons discussed above, the Proposed Action Alternative will have a minor to moderate beneficial cumulative effect to the Covered Species given the mitigation of the KSCHP, as compared with the no Action Alternative.

4.10.1.3 Covered Species – Translocation Alternative

Under the Translocation Alternative, participants of KSHCP would implement facility-specific avoidance and minimization measures to reduce lighting impacts to Covered Seabirds, the same as under the Proposed Action Alternative. Also, mammalian and avian predator control and enhancement of breeding habitats is expected to provide a similar positive benefit to Covered Species as the Proposed Action Alternative. Under the Translocation Alternative, however, because translocated chicks that fledge from the mitigation site would be anticipated to return to

the site to breed, the translocated chicks would supplement the potential breeders lured by social attraction methods. Over the long-term, this would be anticipated to result in a larger population breeding within the fenced unit. Under this Alternative, the overall cumulative beneficial benefit of the mitigation site would be anticipated to be larger, and offset of actual take could occur earlier (than year 27) if social attraction is successful right away. There would still be a 6-year delay associated with maturation of translocated fledgling seabirds to breeding adults. The return rate, the timing of return, and the future breeding success for translocated ‘a‘o is unknown, making the precise long-term benefit associated with this Alternative unquantifiable at this time. However, considering the rarity of the ‘a‘o, the number of active and accessible source burrows is the primary limiting factor for translocation in any given year. Despite ongoing efforts to identify other breeding areas and locate active burrows, only five stable breeding colonies are considered appropriate as a source for chicks for translocation (due to existing predator control and colony monitoring) but, all available chicks from these colonies are already being considered for another existing long-term translocation effort. If, however, these source colonies become available, a large effort is required to ensure selection of appropriate source chicks. This includes extensive monitoring of remote colonies to locate nest sites that may be available for chick removal, predator control in these remote locations to offset human traffic during monitoring, and an extended period of care for translocated chicks. All of the above are costly, time intensive, and not likely necessary given the proximity of source seabird colonies to the Kahuama‘a Seabird Preserve. Finally, unlike other translocation sites, the Kahuama‘a site is located adjacent to the highest concentration of ‘a‘o nesting colonies on the island of Kaua‘i, thus providing high confidence that social attraction alone will attract birds to nest within the fence site. It is anticipated that social attraction at the Preserve will provide beneficial seabird production earlier than translocation would, because it attracts juvenile and breeding birds to the site immediately, instead of waiting five to seven years for the translocated chicks to return to begin prospecting and breeding. Mitigation action under this Alternative would be similar to the beneficial impacts as those described in the Propose Action Alternative (Section 4.10.1.2) but with more of a potential jump start. Cumulative impacts from the Translocation Alternative would also be similar to those described under the Proposed Action Alternative and would add minor to moderate beneficial effects to the past, present, or future cumulative effects of the Covered Species.

4.10.2 Past, Present, and Reasonable Foreseeable Future Actions that Contribute to Cumulative Effects of Listed Plants and Critical Habitat.

Primary past, current, and future actions that have impacted and continue to impact listed plants and critical habitat include feral ungulates (hooved animals) that consume and trample native understory plants, create conditions favoring non-native plant infestation and establishment, prevent the establishment of ground-rooting native plants, and disrupt soil nutrient cycling; introduced invertebrates that directly threaten native pollinators; plant disease; competition from invasive habitat-modifying plants; and seed-eating rodents and other omnivores.

4.10.2.1 ***Listed Plants and Critical Habitat – No Action***

The vegetation at the Kahuama‘a Preserve is a subtype of ‘Ōhi‘a Lowland Mesic Forest, with ‘uluhe fern (*Dicranopteris linearis*) and is habitat that is important for Listed Plants and Critical Habitat. A number of rare and endangered plant species have in fact been recorded within and around the site. Currently, there is degradation from the encroachment of invasive and non-native plants, particularly in the understory (see Appendix A). Many of these plant species pose threats to Listed Plants because of their ability to modify the habitat. In addition, feral pigs, black-tailed deer and feral goats inhabit the area and are having a negative impact upon the vegetation community.

Under the No Action Alternative, the KSHCP would not be expected to impact Listed Plants or Critical Habitat and would not contribute to the cumulative impacts associated with other past, present, and reasonable foreseeable future actions.

4.10.2.2 ***Listed Plants and Critical Habitat – Proposed Action Alternative***

During a preliminary site visit by botanists, several listed plants were observed within the boundaries of the site. Two federally Endangered Species and two species that are part of the Plant Extinction Prevention Program (PEPP), which indicates that there are less than 50 individuals left in the wild. This represents a very high concentration of rare and endangered plants (see Appendix A) and is important habitat for Listed Plants. Feral pigs (*Sus scrofa*), black-tailed deer (*Odocoileus hemionus columbianus*), and feral goats (*Capra hirca*) inhabit the area and are having a negative impact upon the vegetation community. It is anticipated that the Kahuama‘a fence will be of direct conservation benefit to Listed Plants because the fence will exclude feral ungulates that consume and trample native understory plants, create conditions favoring non-native plant infestation and establishment, prevent the establishment of ground-rooting native plants, and disrupt soil nutrient cycling within the 2 hectare fence.

The Kahuama‘a fence will also remove the black rat (*Rattus rattus*), Norway rat (*R. norvegicus*), and Polynesian rat (*R. exulans*) that are seed predators on native vegetation and Listed Plants inside the 2 hectare fence and will be controlled along a 50 meter zone outside the fence.

The site is currently dominated by native plants; the degradation from the encroachment of habitat modifying invasive and non-native plants, particularly in the understory (see Appendix A) will be removed directly within the 2 hectare fence. Additionally, vegetation control along a 50 meter zone outside the fence will help to prevent encroachment into the fenced area. Furthermore, monitoring at the mitigation site will provide early detection of any new invasive plants or animals that have the potential to impact Listed Plants and Critical Habitat.

Together, the removal of feral ungulates and habitat modifying invasive plants will create a montane ecological system that provides a benefit to Listed Plants and species that rely on the physical and biological features that are provided in designated Critical Habitat. Because of these reasons discussed above, under the Proposed Action Alternative, potential KSHCP applicants would implement the KSHCP and beneficial impacts to Listed Plants and Critical

Habitat would be expected. The proposed mitigation for the KSHCP under this Alternative is expected to have minor beneficial impacts to Listed Plants and Critical Habitat.

4.10.2.3 Listed Plants and Critical Habitat – Translocation Alternative

Under the Translocation Alternative, cumulative impacts would be similar to those described under the Proposed Action Alternative and will add minor beneficial effects to the past, present, or future cumulative effects of Listed Plants or Critical Habitat.

4.10.3 Past, Present, and Reasonable Foreseeable Future Actions that Contribute to Cumulative Effects of Demographics, Economics, Land Use, and Infrastructure

4.10.3.1 Demographics, Economics, Land Use, and Infrastructure – No Action

Negligible effects are anticipated; see Appendix C.

4.10.3.2 Demographics, Economics, Land Use, and Infrastructure – Proposed Action Alternative

Negligible to minor effects are anticipated; see Appendix C.

4.10.3.3 Demographics, Economics, Land Use, and Infrastructure – Translocation Alternative

Negligible to minor effects are anticipated; see Appendix C.

4.10.4 Past, Present, and Reasonable Foreseeable Future Actions that Contribute to Cumulative Effects of Recreational Activities

4.10.4.1 Recreation Activities – No Action Alternative

Negligible effects are anticipated; see Appendix C.

4.10.4.2 Recreational Activities – Proposed Alternative

Negligible to minor effects are anticipated; see Appendix C.

4.10.4.3 Recreational Activities – Translocation Alternative

Negligible to minor effects are anticipated; see Appendix C.

4.10.5 *Past, Present, and Reasonable Foreseeable Future Actions that Contribute to Cumulative Effects of Scenic Resources*

4.10.5.1 Scenic Resources – No Action

Minor beneficial effects are anticipated; see Appendix C.

4.10.5.2 Scenic Resources – Proposed Action Alternative

Negligible effects are anticipated; see Appendix C.

4.10.5.3 Scenic Resources – Translocation Alternative

Negligible effects are anticipated; see Appendix C.

4.10.6 Past, Present, and Reasonable Foreseeable Future Actions that Contribute to Cumulative Effects of Cultural and Archaeological Resources

4.10.6.1 Cultural and Archaeological Resources – No Action

No impacts are anticipated; see Appendix C.

4.10.6.2 Cultural and Archaeological Resources – Proposed Action Alternative

Negligible effects are anticipated; see Appendix C.

4.10.6.3 Cultural and Archaeological Resources – Translocation Alternative

Negligible effects are anticipated; see Appendix C.

4.10.7 Climate Change

Global climate change is supported by a continuously growing body of unequivocal scientific evidence. Global forecasting models offer a variety of predictions based on different emission scenarios. The U.S. Government agency Overseas Private Investment Corporation suggests that a further increase in greenhouse gas emissions could double atmospheric concentrations of CO2 by 2060 and subsequently increase temperatures by as much as 2-6.5°F over the next century. Recent model experiments by the IPCC show that if greenhouse gases and other emissions remain at 2000 levels, a further global average temperature warming of about 0.18°F per decade is expected. Sea level rise is expected to accelerate by two to five times the current rates due to both ocean thermal expansion and the melting of glaciers and polar ice caps. Recent modeling

projects sea level to rise 0.17 - 0.59m (0.6 – 1.9ft) by the end of the 21st century. These changes may lead to more severe weather, shifts in ocean circulation (currents, upwelling), as well as adverse impacts to economies and human health. The extent and ultimate impact these changes will have on Earth's environment remains under considerable debate (IPCC 2014).

Small island groups are particularly vulnerable to climate change. The following characteristics contribute to this vulnerability: (1) small emergent land area compared to the large expanses of surrounding ocean; (2) limited natural resources; (3) high susceptibility to natural disasters; and (4) inadequate funds to mitigate impacts (IPCC 2014). Thus, Hawai‘i is considered to have a limited capacity to adapt to future climate changes.

Though none of the management alternatives would contribute to climate change, the activities associated with them would provide enhanced protection for vulnerable species anticipated to be affected by climate change.

5 Required Approvals and Permits

Certain permits and approvals are required before implementation of the Proposed Alternative.

Table 5.1. Required Permits and Approvals for the Proposed Action

Permit or Approval	Issuing Agency	Notes
Endangered Species Act Section 10 Incidental Take Permit (ITP)	U. S. Fish & Wildlife Service	
State Endangered Species Incidental Take License (ITL)	Department of Land and Natural Resources	
Conservation District Use Permit	Department of Land and Natural Resources	For creation of Kahuamaʻa Seabird Preserve
Diphacinone use permit	Hawaiʻi Department of Agriculture	For rodent control
Endangered Species Recovery Permit for bird banding and monitoring	U. S. Fish & Wildlife Service	For monitoring of Covered Species attracted to Kahuamaʻa Seabird Preserve
Depredation permit	U. S. Fish & Wildlife Service	For barn owl control

6 List of Preparers

DLNR-DOFAW received grant funds from the Service through the Cooperative Endangered Species Program, which administers Habitat Conservation Planning (HCP) planning grants under Section 6 of the ESA, to develop the draft KSHCP and this draft EA. The USFWS and the DLNR-DOFAW subsequently completed this draft EA.

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8 Appendix A: List of Agencies and Persons Consulted

Governmental Agencies

U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. Department of Agriculture
National Oceanic and Atmospheric Administration
Hawai‘i Department of Transportation
Hawai‘i Division of State Parks
Hawai‘i Division of Forestry and Wildlife
County of Kaua‘i

Non-Governmental Organizations and Individuals

Alexander & Baldwin, LLC
Ali‘i Kai Resort and Condos
Anaina Hou, LLC
Beach House Restaurant
Bull Shed Restaurant
Chevron
DOW Agrosciences
Grand Hyatt
Hanalei Bay Resort, Scott Pacer, General Manager
Kamehameha Schools
Kaua‘i Beach Resort
Kaua‘i Coffee
Kaua‘i Island Utility Cooperative
Kaua‘i Marriott
Kaua‘i Sheraton
Kukui Grove Mall
McDonald, ‘Ele‘ele
National Tropical Botanical Garden
Norwegian Cruise Line
Oceanic Time Warner Cable
Pahio Development, Princeville
Pali Ke Kua
Pioneer Hi-Bred International
Princeville Shopping Center
Pu‘u Poa Association of Apartment Owners
Ric Berry, Landowner Upper Mānoa Valley
Save Our Shearwaters
The Cliffs at Princeville
The Nature Conservancy
Walmart Līhu‘e

Westin Princeville Resort
Wyndham Shearwater Resort

9 Appendix B: Archaeological Reconnaissance Survey of a Portion of Kahuama‘a Flat

ARCHAEOLOGICAL RECONNAISSANCE SURVEY OF A PORTION OF KAHUAMA‘A FLAT

KOKE‘E STATE PARK, HANALEI DISTRICT, ISLAND OF KAUA‘I
TMK: 5-9-01:1 (POR.) & 16 (POR.)

State of Hawaii
Department of Land and Natural Resources
DIVISION OF STATE PARKS

Archaeological Reconnaissance Survey of a Portion of Kahuama‘a Flat, Koke‘e State Park, Hanalei District, Island of Kaua‘i. TMK: 5-9-01:1 (por.) & 16 (por.).

Prepared By:

Alan Carpenter
and
Martha Yent, M.A.

ARCHAEOLOGY SECTION

State of Hawaii
Department of Land and Natural Resources
DIVISION OF STATE PARKS

February 1994

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COVER: Kalalau Valley from Pu'u o Kila Lookout. Project area is on upper slopes and top of ridge at left of photo.

PHOTO 1: Typical Project Area Vegetation of *Ohia* and Fern 3

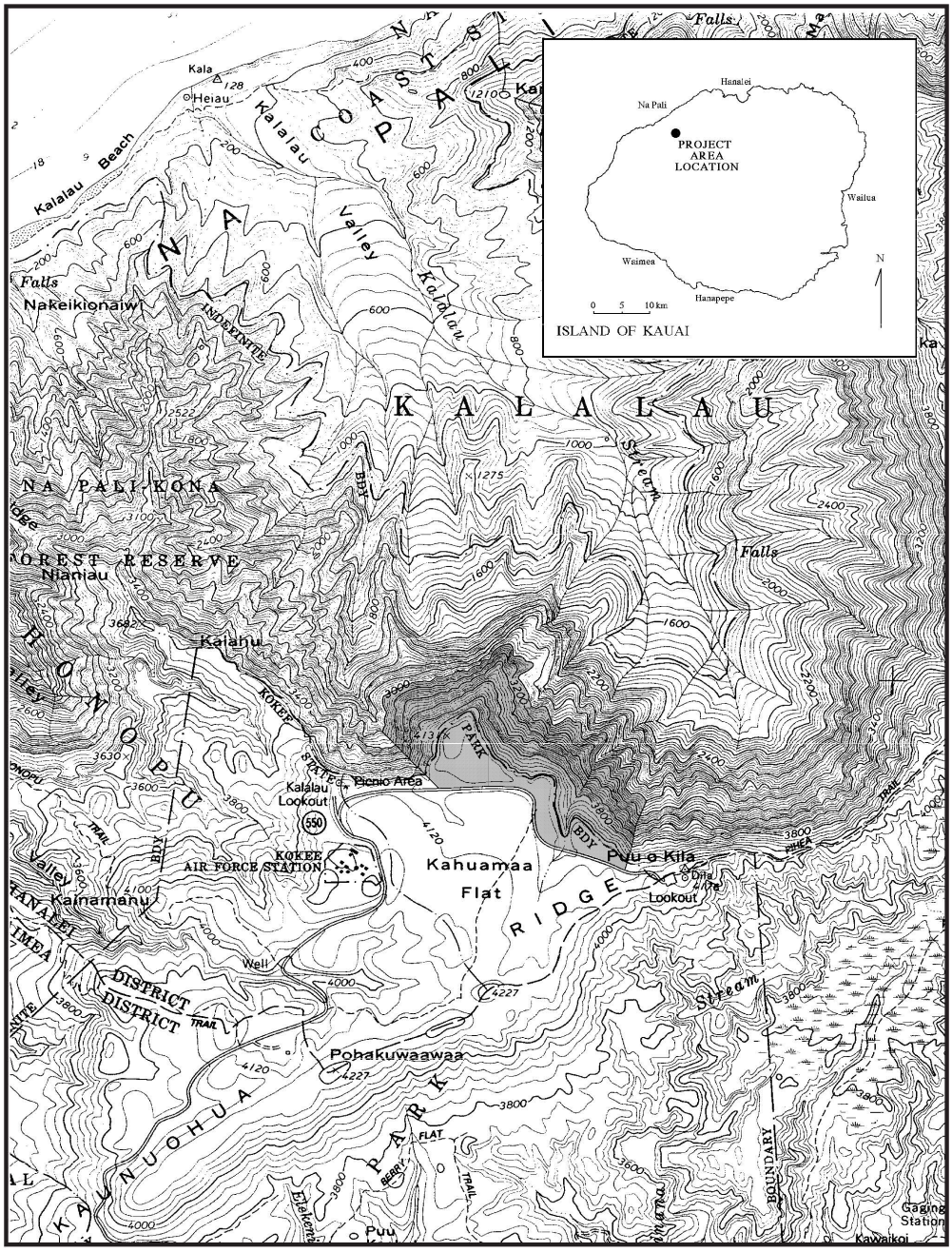
INTRODUCTION

At the request of the Division of Forestry and Wildlife (DOFAW), State Parks Archaeologists Alan Carpenter and Martha Yent conducted an archaeological reconnaissance survey of a parcel of land located within Koke'e and Na Pali Coast State Parks, Hanalei District, Kaua'i. This area is being considered for the creation of a native plant sanctuary which will encompass a portion of these two State Park areas. The portion of the project area located within Na Pali Coast State Park is at the upper rim of Kalalau Valley. This proposed "Kalalau Rim Plant Sanctuary" will set aside approximately 115 acres of land for a plant sanctuary to be developed, maintained, and managed by the Division of Forestry and Wildlife through a Memorandum of Agreement with the Division of State Parks (Telfer 1993). The survey was conducted on December 8 and 9, 1993. Proposed developments for the area consist of the installation of fences to deter feral pig and goat traffic through the area and manual weeding out of non-native plant species. An additional long-term goal of the project is to construct a boardwalk or fenced walkway to guide visitors through the area on an interpretive nature trail. While no archaeological sites were known to exist in this area, the installation of fences could potentially impact sites if they did exist. Koke'e is rather poorly understood archaeologically, and essentially all areas of the Hawaiian Islands were visited and utilized, if not inhabited, by Hawaiians in prehistory and therefore potentially contain evidence of this use in the form of archaeological sites.

PROJECT LOCATION AND DESCRIPTION

The project area is located at the extreme northern extent of Koke'e State Park in an area known as Kahuama'a Flat, which extends to the upper rim of Kalalau Valley, and continues down the steep side of the valley to the 3000 foot contour. This steep portion of the project area is located within the Na Pali Coast State Park (Figure 1). This area is located between the Kalalau Lookout and the Pu'u o Kila Lookout on the north side of Pu'u o Kila Road, specifically extending from a drainage located .3 mile east of the Kalalau Lookout to a drainage located .15 mile west of the Pu'u o Kila Lookout. The southern boundary of the project area is defined by the road and

FIGURE 1: Survey Project Area on Upper Edge of Kalalau Valley (USGS 7.5 minute series, Waimea Canyon Quad, 1"=2000').



the northern boundary is defined by the 3000 foot contour. This comprises an area approximately 115 acres in size. The upper, flat portion of the project area is at an elevation of approximately 4100 feet above sea level.

Vegetation in the project area is characterized as Lowland Mesic Forest (Wagner et. al. 1990), dominated by a canopy of *Ohia* (*Metrosideros polymorpha* var. *dieteri*), and an understory of dense *Uluhe* fern (*Dicranopteris linearis*), which can reach heights of five feet, making survey extremely difficult (Photo 1). Additional vegetation consists of introduced blackberry (*Rubus* sp.), Daisy fleabane (*Erigeron karvinskianus*) which grows in low dense mats, and a variety of other native and introduced ferns, shrubs, and low-growing trees.

Soil for this area is classified as Koke'e silty clay loam on the upper flat (well-drained soils weathered from igneous rock, probably mixed with volcanic ash), and rough,

PHOTO 1: Typical Project Area Vegetation of *Ohia* and Fern

mountainous land on the valley wall (very steep land broken by numerous drainages, very thin soil mantle if any, much of surface is rock, rock outcrop, and eroded spots). Rainfall averages 60-70 inches annually (Foote et. al. 1972).

The extremely steep nature of the slope of the valley wall prevented survey of that portion of the project area, therefore the survey encompassed only the upper flat area, which coincides to the Koke'e State Park portion of the project area. Due to the steepness of the slope, the likelihood of finding archaeological sites in the Na Pali (Kalalau) portion of the project area is very small.

PREVIOUS ARCHAEOLOGY

There are few archaeological sites recorded in the uplands of Koke'e. This area is generally thought to have been a resource-gathering zone rather than an area of permanent habitation. The nearest recorded archaeological sites are in the valleys of the Na Pali coast, most notably Kalalau. While these areas are spatially very near to each other, they are isolated from each other by 3000 or more feet of sheer cliffs.

Thomas Thrum conducted an island-wide survey of *heiau* sites in 1906, and recorded the following sites in the Koke'e area:

Ahuloulu Heiau:

> At the foot of the crater cone of Puukapele is a series of three platforms. On account of the conformation of the mountain these are irregular in shape. The lower platform is of earth. It seems to have had no regular sides or edges, the ground being simply leveled off to give a place to stand on. The longest axis is about 60 feet. The longest at right angle to this is about 50 feet. Rising four feet above this is a walled enclosure 12x30, but not exactly rectangular. The stone walls are about three feet high, and badly dilapidated. The third platform is a small niche in the mountain side about 8x10, evidently only a house floor. No special significance seems to be attached to this so-called heiau.

Ka-unu-aiea Shrine:

> Ka-unu-aiea is a small shrine in the dense koa forest of Milolii. It was only an "unu", or shrine, for the shifting population of the forest belt. There is no platform left to indicate its existence (Thrum 1906).

Thrum described the location of this site as Kaunuohua Ridge, in the forest of Miloli'i. The exact location is not known, but it would seem from this description that it was situated relatively near our present project area. Kaunuohua Ridge runs roughly northeast to southwest immediately south of the project area (see Figure 1). The site may have been located approximately where the NASA tracking station is presently, as indicated by the forest name of Miloli'i.

Wendell Bennett, in his 1928-29 survey of Kauai archaeological sites, further described this site, calling it a *heiau*, and giving its name as Kaumuaiea. Bennett claims the name applies to a small clearing containing a line of stones forming no outline or platform. He also describes its location as being "in the forest above Halemanu" (Bennett 1931).

These sites are of special interest in that they provide evidence that potentially significant sites can be located in isolated upland areas where there was little or no permanent habitation.

Bennett did not record any additional sites in Koke'e, although he did record two house site complexes on or near Pu'u Ka Pele crater in addition to Ahuloulu Heiau. The nearest sites to the project area recorded by Bennett are in Kalalau Valley, which was extensively terraced for agriculture and contained numerous habitation sites and two *heiau*. However, the upland portion of our project area and the valley floor of Kalalau are separated by three to four thousand feet of steep cliffs, and the amount of contact between the two areas is unclear.

An archaeological reconnaissance survey along ridge roads in the Koke'e uplands was conducted by Nancy McMahon of the State Historic Preservation Division in 1993 (McMahon 1993). This included the ridges of Lapa, Ha'ele'ele, Polihale, Ka'aweiki, Kuaaho, Makaha, Miloli'i, and Pu'u Opae. A single archaeological site (State site # 50-30-05-499) was found at the end of Polihale Ridge Road. It consisted of a 5 meter long stone alignment one to two courses high interpreted to be a sweet potato planting area because of the soil fill behind the facing. No other sites were found, although the possible locations of several plantation camps and house sites associated with the

development of sugarcane cultivation in the late 1800's were recorded. No surface remains were noted at these camp locations. A great deal of ground disturbance has taken place in this century due to the the cane plantation and the military, which may have destroyed evidence of archaeological sites in the survey area.

A single archaeological site (State site # 50-30-06-707) was recorded in the area of the Waimea Canyon Lookout by State Parks archaeologists in 1993 (Carpenter 1993). This site, located about 80 meters southwest of the men's restroom at the lookout, consists of a clear, level area atop a ridge outlined by a single row of stones on three sides. This site was likely a temporary habitation site, possibly even a shelter related to the sandalwood trade. It could also represent a canoe making site, as the uplands in this area were known for logging and working of canoe wood (Handy and Handy 1972).

Brief reconnaissance surveys by Ching (1978a, b), Kikuchi (1982), Yent (1982), Walker and Rosendahl (1990), and Chaffee and Spear (1993) recorded no new archaeological sites.

HISTORICAL BACKGROUND

As previously conjectured, the upland area of Koke'e and the Alakai Swamp were likely utilized in prehistory as resource gathering zones, as opposed to areas of permanent habitation or agriculture. Several legends refer to this area to suggest this use. One attributes the road of sticks through the Alakai Swamp to the *menehune* (Rice 1923). Another refers to Lahi (or Lauhaka), a young man who would eat only birds, and traveled to the top of Kilohana (a lookout at the edge of the Alakai Swamp) where the *Uwa'u* bird nested to satisfy his hunger (ibid). Pu'u ka Pele is referred to as an area for gathering *koa* canoe logs and other building materials:

> At one time the Menehune built two canoes of koa in the mountains near Puu-ka-Pele. As they were dragging them down to the lowlands, they were caught by a heavy rain-storm, and were forced to leave the canoes across the little valley. the storm covered the canoes with debris, and later, a road was built across them, over which all the materials to build the village of Waimea were hauled (ibid).

Further evidence for the gathering of canoe logs from the uplands comes from the narrative of the Dutch merchant Captain Jacobus Boelen, who visited Waimea in 1828. While his ship was being loaded with sandalwood, he spent some time exploring the region and included the following observation:

> On that day we visited Quequaheva's [Kaikio'ewa's] shipyard, which consisted of large sheds where the largest and most beautiful canoes that can be found in the islands were made. We were assured that the island of Atooi [Kauai] had always been the principal workshop of the islands in these matters. Under one very neatly made roof I saw two of the largest double canoes I have ever seen . . . Long, narrow, and lightly built, although of a strong and heavy type of wood [*koa*], they have only a shallow draught. . . some of these vessels - especially those double canoes of the largest sort, which the highest chiefs use - are up to seventy or eighty feet long . . . (Broeze 1988).

It is obvious from this description that *koa* trees of exceptional size were being harvested in the uplands, where they were undoubtedly being partially worked to lessen their weight prior to transport to the coast.

Handy (1940) does not specifically mention Koke'e with respect to Hawaiian agriculture, although he does state that "the upper gulches and forests in and above Waimea Canyon should be favorable localities for yams" (p. 171) He also mentions that boggy areas in the uplands were utilized for the cultivation of *olona*.

There are trails recorded which ran from the Na Pali valleys to Koke'e and Waimea Canyon. Bennett (1931) recounted several trails connecting different areas of the Na Pali coast with the uplands. Handy and Handy (1972) recount the following:

> More anciently the old Hawaiians used a number of overland trails. The Kamaile trail descended into Nu'ulolo [Nualolo] Valley inland. There was a trail connecting Nu'ulolo with Honopu. A good trail overland connects Kalalau with Ha'ena. There is a trail from Koke'e in the mountains above Kekaha down into Kalalau. From Polihale travelers could go on foot, with a little swimming, to Miloli'i, and a trail connected Miloli'i with Nu'ulolo flats. Another trail connects Miloli'i with Koke'e. And there was the path (*ala*), said to have been built by King 'Ola, that led from Waimea Delta up the canyon to Koke'e, over the Alaka'i Swamp, where it was said to have been paved with sticks (*kipapa*), and thence down Maunahina ridge into Wainiha by way of Koke'e [Handy and Handy 1972]

This trail system suggests a connection between the north and south sides of the island, although whether the trails facilitated trade or simply travel between the two areas is not known. It can be assumed that the upland forests were utilized as resource gathering zones for such items as hardwoods, bird feathers, and medicinal plants, as well as freshwater resources such as *o'opu* and *opae.* Undoubtedly a substantial trail existed between the upper Waimea Canyon and Waimea Village to facilitate the transport of large canoe logs.

The Reverend Hiram Bingham traveled from Waimea to Hanalei in 1821 along the old established route passing through Koke'e. The trail consisted of a "narrow, winding, slippery foot-path, sometimes on sharp ridges, here ascending and there descending rugged steeps". He described the uplands as being uninhabited, but mentioned several temporary shelters along the way which he attributed to sandalwood cutters, and reported abundant sandalwood forests still in existence at that time (Bingham 1981).

Queen Emma, in 1871, made a trek from Waimea to the "Kilohana of Hanalei", at the edge of Wainiha Valley. A party of about one hundred people accompanied the queen, along a route which again likely followed the old trail. At that time the trail was very overgrown but still recognizable. Among the more interesting anecdotes of the trip was a stop the party made on the edge of Kauaikinana Valley where Queen Emma, overcome by the beauty of the spot, insisted upon a hula performance. The trip then continued through the Alakaʻi Swamp where the party spent the night. The trail through the swamp was described as a "corduroy road", built of tree-fern logs placed side by side. They reached the Kilohana the next morning and then retraced their steps to Waimea (Knudsen 1940).

The sandalwood trade dominated the Kauaʻi economy in the early nineteenth century. Beginning in 1810 and reaching a peak in 1821-22, commoners were forced to leave their taro fields and head into the mountains to cut the precious wood. The resource was controlled by King Kaumualiʻi, who exchanged the commodity for ships and other western luxuries. Unfortunately, this took a great toll upon the people as well as the sandalwood forests, which were all but depleted by the mid-1830's. Waimea was the sole port of export on Kauaʻi for the wood, which came almost exclusively from the upland gulches of Waimea Canyon and Kokeʻe (Joesting 1984).

Valdemar Knudsen obtained a lease to much of the present day Kokeʻe State Park in the mid-1800's. He used the land to run cattle, which provided beef to provision the whaling vessels. The cattle industry on Kauaʻi diminished greatly by 1900 due to the decline of the whaling business (Joesting 1984).

The decline of cattle overlapped with the onset of the sugar industry. Beginning in the late 1800's and continuing into early this century, an irrigation system tapping the uplands (the Waimea Canyon-Kekaha ditch) was constructed to irrigate the cane lands of Kauaʻi's west side. In conjunction with this development, plantation camps were constructed in the uplands to house the mainly Chinese workers who built and maintained the ditch ststem.

Land use in Koke‘e during this century consists mainly of recreational and military activities (Heathcote 1993). Wealthy sugar plantation owners built vacation cabins in Koke‘e to escape the summer heat of the lowland plains. Hunters traveled on horseback to the uplands in search of pigs and goats. A large network of trails was built and existing trails were refurbished by the Civilian Conservation Corps following the Great Depression. During World War II, the Army laid a telephone line through the Alaka‘i Swamp and down to Hanalei, as well as establishing a radar station in Koke‘e. In the 1940's, the road to Koke‘e was improved, and the lookouts at Waimea Canyon and Kalalau were constructed. The Koke‘e Museum and Lodge were established in the 1950's. The last major developments in Koke‘e were in the 1960's with the establishment of a Hawai‘i Air National Guard installation and a NASA tracking station constructed as part of the National Space Program.

SURVEY RESULTS

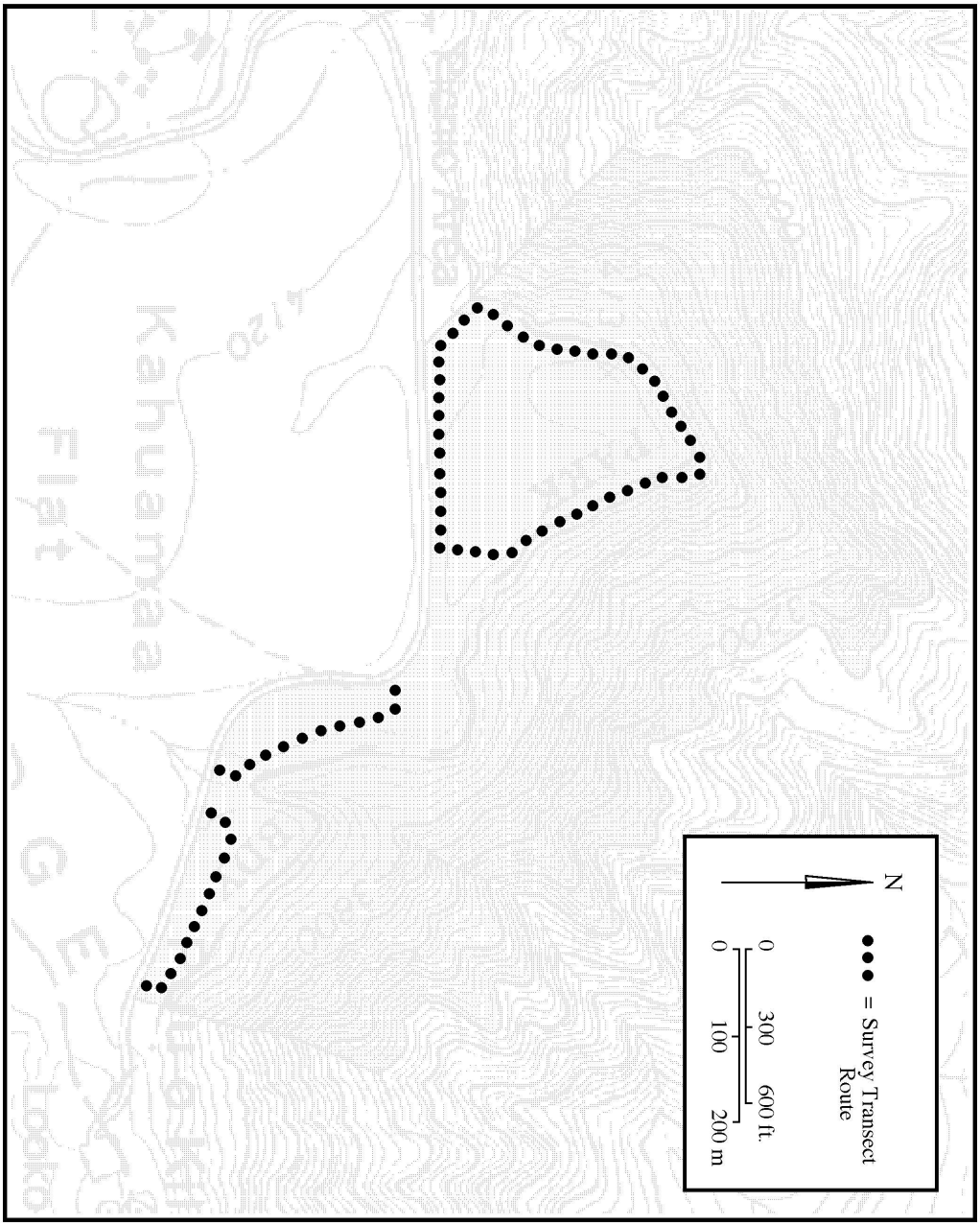
Methodology

The survey area consists in great part of extremely steep cliffs on the southwest side of Kalalau Valley. These cliffs, as previously mentioned, precluded survey of that portion of the project area. The remainder of the project area consists of the upper flat on the rim of the valley, representing perhaps one third (roughly 40 acres) of the project area. This upper area was divided into three sections, defined by two drainages which were too steep to be passable. Each was surveyed in a separate transect, aimed at covering a cross-section of each area (Figure 2). In addition to State Parks archaeologists Alan Carpenter and Martha Yent, Nevin Reinard, a volunteer from the Koke'e Museum assisted in the two-day field survey. As previously mentioned, the dense vegetation was a prohibiting factor in terms of locating sites. While we did not expect to find sites in the area, if they were present we would have had to literally walk over them to locate them in most areas. Special attention was paid to a 100 foot wide corridor to the immediate north of the Pu'u o Kila Road, as that is where a proposed fence would be installed as the first measure to attempt to control feral pig access to the sanctuary area. A more intensive survey would not likely have produced any more accurate results due to the aforementioned dense vegetation (see Photo 1).

Findings

No archaeological sites or features were encountered during the survey, which supports use of this area by Hawaiians as a resource gathering zone, with no permanent habitation. Evidence for this type of use could include trails and small temporary habitation features, which would easily be deteriorated by the ravages of time, especially in an area of such high rainfall and dense vegetation growth. The upper edge of the valley rim was traversed in several places, and the relatively barren steep slopes also showed no evidence of use. No caves or rockshelters were noted on the cliffs. Once again, the nature of the vegetation would likely have prevented us from seeing all but the most impressive of sites, and we cannot

FIGURE 2: Survey Transect Routes.



unequivocally state that there are no archaeological sites located within the project area.

Additionally, large trees unearthed during Hurricane Iniki provided an opportunity to examine the upper layer of the soil stratigraphy throughout the area. Nothing other than natural reddish brown clay deposits were noted, and no cultural materials were observed within this matrix.

RECOMMENDATIONS

Although no archaeological sites or features were noted during the course of this survey, the potential for significant sites in this area has been documented (Thrum 1906, Bennett 1931 - see *Previous Archaeology* above). As previously outlined, the dense vegetation in this area greatly hindered adequate survey of this parcel. Although the likelihood of encountering sites appears to be very small, nonetheless the possibility does exist. Because of the inability to accurately survey the area and the slight potential of unrecorded archaeological sites being encountered during development of the plant sanctuary, the following precautions should be adhered to:

-All ground disturbing clearing efforts should be monitored by an archaeologist so that any potential surface archaeological sites are not disturbed, especially in the event that heavy equipment is utilized. Alternately, all clearing activities that do not disturb the ground surface should be inspected by an archaeologist immediately following the clearing to determine the presence or absence of sites.

-The installation of fences for feral animal control should be monitored by an archaeologist to assure that potential surface features as well as potential subsurface cultural deposits are not disturbed by these activities.

-If at any time during the development of the plant sanctuary archaeological features are encountered, DOFAW will notify the Division of State Parks archaeologists. Additionally, if DOFAW activities could impact any archaeological feature, those activities will cease until such time as the feature is evaluated by an a qualified archaeologist.

-The potential for encountering human remains is judged to be extremely slight. However, if activities extend into the steep cliff portion of the project area which was not surveyed, the potential for encountering rockshelters or caves (features known to be used by Hawaiians for interment of the dead) does exist. In the advent that human remains are inadvertently discovered, those remains shall not be disturbed and the Burials Program of the State Historic Preservation Division shall be immediately notified in accordance with Hawaii Revised Statutes, Chapter 6E.

SUMMARY

State Parks archaeologists conducted a reconnaissance survey in the area of Kahuama'a Flat in Koke'e State Park, Kaua'i at the request of the State Division of Forestry and Wildlife. This area is being considered for the creation of a native plant sanctuary to be developed and maintained by DOFAW. No archaeological sites or features were encountered during this survey. However, due to the dense vegetation and steep slopes found in the project area, a complete evaluation of the area was not possible. While it is unlikely that any significant archaeological sites exist in this area, it is nonetheless possible. Therefore, recommendations were made to assure that any potential sites are not impacted by the minimal construction proposed in conjunction with the development of this preserve. If these recommendations are adhered to, we feel that the project will have no adverse effect on the cultural resources of the area. Furthermore, we feel that the development of such a sanctuary will add to the interpretive resources of Koke'e State Park, and the long term goal of establishing a nature trail through the sanctuary for educational purposes (Telfer 1993:2) would heighten the public's awareness of Hawai'i's unique botanical resources.

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10 Appendix C: Additional Information and Analysis Required for State Environmental Assessment Under HRS Chapter 343

This section provides further analysis of the environmental effects associated with use of Conservation District land for the proposed mitigation site and with use of State and County lands and funds during implementation of the KSHCP.

10.1 Supplemental Information: Affected Environment

10.1.1 Demographics, Economics, Land Use, and Infrastructure

The 2010 Census counted the Kaua‘i total population at 67,091 persons. This represents an increase of almost 15% from the year 2000 Census count of 58,463. In addition to the resident population, on any given day about 20,000 visitors are on the island, making the “de-facto” population upwards of 87,000. Most residents live in towns around the perimeter of the island, primarily along the east and south sides of Kaua‘i, with smaller populations living in towns on the north shore. Visitor accommodations are located throughout the island, but are primarily at Poipu, Princeville, and Waimea/Kapa‘a.

Historically the principal economic driving forces on Kaua‘i have shifted dramatically. Prior to western contact, the economy of Kaua‘i consisted of subsistence agriculture and fishing. Taro, sweet potato, and breadfruit were among the important agriculture staples augmented by fish ponds and marine resource gathering. With the onset of western contact, trade of market goods was initiated. Trade in sandalwood dominated in the early 19th century which on Kaua‘i came almost exclusively from the upland gulches of Waimea Canyon and Kōke‘e and were largely depleted by the mid-1830s. Kaua‘i also became a trading stop for whaling ships, supporting cattle ranching, but the cattle industry declined as whaling declined.

The “Great Mahele of 1848” created fee-simple ownership of land; by the end of the 19th century most lands were under the control of non-Hawaiians (Garavoy 2005). Pineapple as a cash crop began in the early 20th century, but the sugar industry had the greatest influence, economically, politically, and socially, on Kaua‘i until at least the middle part of the 20th century. Beginning in the late 1800s, the upland streams were tapped to irrigate the sugarcane fields on the west side. Sugar on Kaua‘i peaked in production in the 1960s and then began fading; many mills closed in the 1970s and 1980s. This shift coincided with the emerging visitor industry; the Kaua‘i Surf opened in 1960, and others soon followed. By the 1970s people working in the tourism sector outnumbered those in the sugar industry (Cook 2000). As tourism increased, Kaua‘i experienced a boom in construction and development.

Today, tourism and the visitor industry remains the dominant economic factor for the island of Kaua‘i. Since the late 1990s, the annual number of visitors to Kaua‘i has been about 1 million. The service sectors (many supporting tourism), diversified agriculture, government and military are the main source of jobs on the island. Most of the labor force on Kaua‘i works in the service-oriented fields. The number of people in the workforce for the year 2014 was 34,600 (not including military) with an unemployment rate of 4.9%, the lowest since 2008 (DBEDT 2015).

Agriculture on Kaua‘i has shifted from large single-crop plantations (e.g., sugar) to diversified agricultural industries. Several agribusiness companies have established research and development facilities on the west side of the island, typically growing non-food crops for seed (e.g. bio-fuel corn). From 1990 to 2008, total farm acreage fell and the total number of agriculture workers hired decreased. During roughly the same period, the number of individual "farms" increased, suggesting perhaps diversification and the establishment of smaller farms with a movement away from a concentration of agriculture business (DBEDT 2012). Agriculture products produced on Kaua'i include coffee, fruits, flowers and nursery products, and vegetables for local markets, stores, and restaurants.

Land use development patterns have potential to influence the scale and degree of future additional impacts to the Covered Species during the term of the KSHCP. Land development typically includes artificial outdoor lighting. The degree and type of lighting depends on the needs of the development; generally, but not always, more intensive development requires a higher amount of lighting. Over the next 10 years, the County of Kaua‘i Planning Department expects most of the growth on the island to be located in Kukui‘ula and Po‘ipū along the south shore, Līhu‘e, Wailua, and Kapa‘a on the windward east side, the Princeville area on the island's north shore, other existing urban centers, and some agricultural subdivisions. The County anticipates little or no growth in the mountainous interior of the island (County of Kaua‘i 2000).

10.1.2 Recreational Activities

The island of Kaua‘i contains several park and recreation sites at multiple locations on the island, encompassing 400 acres of parklands with 67 individual parks (County of Kaua‘i 2000). These facilities accommodate diverse activities and users and vary greatly in the facilities available (from passive undeveloped parks with limited amenities to lighted fields and courts with restrooms and community centers). Nighttime sports and recreation use at parks can be described as two general types: organized with teams and schedules, and casual use, including tennis courts and basketball courts.

The State DLNR operates and maintains 10 parks on the island, totaling 13,727 acres (130 developed). These facilities are typically more remote and used to support activities such as hiking, hunting, horseback riding, mountain biking, nature study and quiet contemplation. DLNR also manages 20 designated public hunting areas for game mammal and game bird hunting on Kaua‘i (DBEDT 2015). All hunting in the State requires a hunting license; 11,958 hunting licenses were sold statewide in 2015 (DBEDT 2015).

The Kahuama‘a Seabird Preserve (mitigation site) is located on State Park land within Kaua‘i Hunting Unit K. Hunting Unit K allows hunting by archery only July through December on weekends and State holidays. A goat archery permit or deer archery permit is required depending on the season, and firearms are not permitted. Unit K is not open for hunting from January to June (HAR Chapter 13-123).

10.1.3 Scenic Resources

The Kaua‘i County General Plan notes that the island is known for the beauty and the great variety of its landscape. It further notes that these land features, some of which can be seen from many places around the island, attract visitors to Kaua‘i and therefore have substantial economic value (County of Kaua‘i 2000). In addition to views of the ocean available from multiple locations around the island, the island has several scenic "destinations." Waimea Canyon is a major visual attraction, with dramatic cliffs and vegetation, and numerous waterfalls and hints of streams many of which can be seen from different vantage points. The view of Kalalau Valley and the Nā Pali Coast, as seen from the top of Kōke‘e State Park, from the ocean, and from the air (by helicopter) is another rich scenic landscape. The lush greenery and changeable cloud cover of the Alaka‘i Plateau are yet another important visual seen from multiple different vantage points. The Kahuama‘a Seabird Preserve (mitigation site) is located within Kōke‘e State Park, within this rich scenic landscape.

10.1.4 Cultural and Archaeological Resources

The following section utilizes information gathered from (1) review of the Archaeological Reconnaissance Survey (Carpenter and Yent 1994) conducted of the area of the proposed mitigation site, (2) review of previous assessments, including review of the Cultural Impact Assessments included in the 2013 Final EA for the Hono O Nā Pali NAR Management Plan and in the 2014 Kōke‘e and Waimea Canyon State Parks Master Plan and review of information contained in EAs for previous ‘a‘o and ‘ua‘u conservation work on Kaua‘i; and (3) informal consultation with organizations and individuals with additional information or insight.

10.1.4.1 Cultural Significance of Covered Species

"In Hawaiian culture, natural and cultural resources are one and the same. Native traditions describe the formation (literally the birth) of the Hawaiian Islands and the presence of life on and around them, in the context of genealogical accounts. All forms of the natural environment, from the skies and mountain peaks, to the plateau lands, watered valleys and lava plains, and to the shoreline and ocean depths are believed to be embodiments of Hawaiian gods and deities" (Maly and Maly 2006).

Native seabirds have value in traditional Hawaiian culture and practice. Some families consider the seabirds as their ancestors or guardians, called the ‘aumākua in Hawaiian language. This is particularly true of families that engage in fishing and have ties to the ocean. More broadly native seabirds are important symbols in Hawaiian culture and are considered special because they inhabit all three realms: land (because they nest in burrows), air, and sea. Seabirds were also of practical value to Native Hawaiians for feathers and food (Rose et al. 1993; Boynton 2004; Xamanek Researches 1989). Seabirds that feed at sea and return to shore at night were used to navigate back to land from fishing or trading voyages. Hawaiians observed seabird behavior to indicate changing weather patterns (KESRP 2016).

Hawaiian proverbs also reflect the role of seabirds and finding fish: "Ka iʻa ʻimi i ka moana, na ka manu e haʻi mai," or "The fish sought for in the ocean, whose presence is revealed by birds" and "Pōhai ke manu maluna, he iʻa ko lalo" or "When the birds circle above, there are fish below" (Pukui 1983). In modern times, seabirds continue to play a role for aku (skipjack tuna) fishermen, as the behavior of seabirds at sea tells what is happening in the ocean miles away, providing valuable information for a successful fishing trip (Boynton 2004).

Native Hawaiian culture is intimately linked to physical places, many of which have a special significance in relation to a particular god, legend, song, or historical occurrence.

10.1.4.2 Archaeological and Cultural Significance of Kahuamaʻa Seabird Preserve (Mitigation Site)

Human settlement of Hawaiʻi by Polynesians dates back to as early as the fourth to fifth centuries based on archaeological evidence, and by 800 A.D. settlements were established and expanded in location, including evidence of agricultural activity on Kauaʻi. The Polynesians that first settled Hawaiʻi most likely came from the Marquesas Islands or the Society Islands (or both), about 4,400 and 3,800km to the south, respectively (Kirch 2000; 1985). The older islands of Kauaʻi and Oʻahu likely supported the initial extensive Hawaiian settlements because they provided a greater variety of resources than the younger islands of the chain: abundant freshwater streams, fertile valleys and slopes to support crops, and coral reefs along the coastlines which provided marine food resources (Kirch 2012).

Pre-contact Native Hawaiians inhabited the island of Kauaʻi and established a successful culture and society that persisted for hundreds of years. The island of Kauaʻi was unique among the Main Hawaiian Islands in that the culture developed distinctive features found in artifacts based on archaeological findings, perhaps due to geographic isolation of Kauaʻi compared to the other islands (Joestring 1984). Archaeology from Kauaʻi demonstrates unique local development characteristics such as the shaping of stone, stone grinders of unknown purpose, uniquely shaped poi pounders, and distinctive fish hook designs (Kirchh 1985).

Early Hawaiian communities settled in small villages at zones with favorable conditions, typically coastal areas with plentiful water and close to ocean resources (Kirch 2000). Upper elevation zones consisted of cloud forest and forest zones. In these high-elevation, cooler and typical wet areas Hawaiians accessed timber for construction, firewood, canoes, tools and other wooden objects, hunted birds and gathered plants. Village settlements typically did not occur in these mountainous areas. In the lower-elevation zones crops were cultivated including terraced taro (*Colocasia esculenta*) patches irrigated by ditches as well as tree crops of breadfruit (*Artocarpus altilis*), bananas (*Musa acuminate*), and coconut (*Cocos nucifera)*. Plant resources were gathered and cultivated for use not only for food, but also for healing, decoration and tools, building and construction, and cultural practices (Abbott 1992). Hawaiian habitation settlements occurred in these lowland zones which extended to coastal areas. Coastal sites provided ready access to reef resources and near-shore and off-shore fishing, and aquaculture fish ponds (Mueller-Dombois 2007; Kirch and Sahlins 1992).

Ritual-spiritual practices involved temple or shrine structures, or the Hawaiian term *heiau*, of varying sizes and compositions comprised of placed stones often at locations with good vantage points of the surrounding area. These were considered places of offerings and sacrifices of a variety of types (e.g. agricultural, fertility) in Hawaiian spiritual-religious practice. The most elaborate heiau were constructed over long periods of time, perhaps over centuries, developed in stages upon prior efforts, increasing in size and complexity (Kirch 1985).

Hawaiian settlement and land use consisted of tiered land divisions which were overseen as chiefdoms. Large sections of islands constituted districts, or moku, and were ruled by high chiefs. The island of Kaua‘i contained five historic moku (Kirch 1985). Moku were divided into smaller land management divisions, or ahupua‘a, which were overseen by lesser chiefs. The ahupua‘a formed the functional, traditional Hawaiian pattern of land use and settlement of land. In the ahupua‘a land was divided and land use was allocated along resource zones extending from the upper mountainous regions down in elevation to the coastal areas, including near-shore ocean resources and fringing reefs. Residents and families of the ahupua‘a worked the land according to a set of protocols and practices. Boundaries commonly consisted of watersheds (Kaneshiro et al. 2005). Ahupua‘a provided food and materials to support life in a communal, structured sharing of rights to upland and coastal production as well as establishing dwellings. Hawaiian beliefs also connoted a spiritual connection and obligation to care for the ahupua‘a lands and Hawai‘i law grants Hawaiians with ancestral links to ahupua‘a lands certain rights, including access for gathering and cultural and religious practice associated with the land (Kirch 1985; Garovoy 2005).

This traditional system of land tenure and management of old Hawai‘i was formally abolished with the establishment of the Land Commission in 1845 and division of lands as fee-simple parcels. Native Hawaiians that worked and lived on the land could receive a title to their land under the Kuleana Act (1850), referred to as Kuleana lands; however, very few Hawaiians actually claimed land. The subsequent passing of laws and auctioning off of large tracts of lands meant that by the end of the 19th century, most lands were in the possession of non-Hawaiians (Garavoy 2005).

Kōke‘e and Waimea Canyon State Parks contain a diversity of archaeological, historical and cultural resources from both pre-contact (1778) and post-contact (1778 to present) periods. There are a number of overland trails connecting the uplands of Kōke‘e with the Nā Pali valleys (RM Towill 2014). Archival research and archaeological surveys to date, including the 1994 survey of Kahuama‘a Flat, indicates that the uplands, e.g., the Kahuama‘a Seabird Preserve, the locations of existing seabird colonies, and surrounding area, were used largely as a resource gathering zone with limited habitation (RM Towill 2014, DLNR 2005).

10.2 Supplemental Analysis: Environmental Consequences and Mitigation

10.2.1 Effects on Demographics, Economics, Land Use, and Infrastructure

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. The economic impact associated with voluntary light minimization measures, including the potential exposure to fines or penalties associated with unauthorized take of Covered Species, is difficult to quantify, but would be anticipated to remain similar to current conditions.

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take. Impacts related to minimization measures at existing Applicant facilities would be similar to Alternative A.

Mitigation measures may impact economic resources as follows. The total 30-year cost associated with the development and management of Kahuama‘a Seabird Preserve as a mitigation site, the implementation and maintenance of barn owl and feral cat control, and compliance monitoring of the HCP is approximately $14 million dollars. This cost would be shared among the proposed permit recipients, based on their proportion of estimated annual take. It is estimated that the cost for individual entities would range from approximately $23,000 to $230,000 in the first year (reflecting a take request of between 1 and 10 birds) and $10,000 to $220,000 per year in later years (again, a range, reflecting a take request between 1 and 10 birds and 3% inflation over the 30-year HCP).

The ultimate funding source depends upon the specific Applicant: the funding source for the County of Kaua‘i would be county taxpayers, while the funding source for condo associations and private businesses would be property owners, who could in some cases pass the expense on in the form of higher rents or increased prices.

A portion of the spending to implement this Alternative would remain on-island, in the form of labor needed to construct the fencing, remove predators, and continued biological monitoring. In addition, this Alternative could generate secondary benefits by providing jobs in other industries where monies are spent. Successful implementation could encourage additional related conservation spending – such as related conservation actions within the fenced unit (e.g., restoration of rare plant taxa). However, given the size of the project relative to the overall State budget or to other economic inputs into the local economy, impacts on economic resources under this Alternative would be expected to be minor.

The development and management of Kahuama‘a Seabird Preserve as a mitigation site does not change the existing land use or require improvements to existing infrastructure. The Preserve is located on land in the Conservation District, owned and managed by the State of Hawai‘i, DLNR

Division of State Parks. One portion of the site is located in Kōkeʻe State Park (Resource subzone) and the other portion is in the Nāpali Coast State Wilderness Park (Protective subzone). The proposed use of the site for seabird conservation is consistent with both subzone designations for the parcels; which encourage the protection and conservation of natural resources. It is located off the roadway in Kōkeʻe State Park, such that construction and management of the Kahuamaʻa Seabird Preserve is not anticipated to impact traffic or access to Kōkeʻe State Park.

Alternative C: Implementation of Kauaʻi Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B. While translocation requires additional expenditures associated with the monitoring of nests for potential donor chicks and chick care after translocation, these additional expenditures would only occur during years in which translocation would occur. The additional cost associated with translocation (approximately $100,000 per year) is relatively minor in relation to the overall State budget or to other economic inputs into the local economy.

10.2.2 Effects on Recreational Activities

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. Recreational activities could be impacted by voluntary light minimization measures that restrict timing and usage of nighttime lights at park, sports, and recreation facilities, condominium complexes, and hotels. Light minimization measures that deactivate the nighttime lighting or restrict the schedule of use (to avoid fallout season or specific moon phases) would reduce or eliminate opportunities for sporting events or exercise. Examples of restrictions include no nighttime fall football games, no evening tennis at County facilities or hotels, no nighttime baseball games, etc. The impact to recreational resources is difficult to quantify, but would be anticipated to remain similar to current conditions.

Alternative B: Proposed Alternative (Implementation of Kauaʻi Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility as identified in their PIP and jointly implement mitigation measures (the seabird social attraction project at Kahuamaʻa Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take. Specific Applicants may seek take authorization associated with nighttime use of lighting of recreational facilities (e.g., tennis courts, sports stadiums) instead of deactivating lights or restricting nighttime usage of facilities. As a result, there may be a reduced impact on recreational activities under Alternative B.

The development and management of the Kahuamaʻa Seabird Preserve seabird social attraction project is not likely to impact hiking and naturalist activities. While the fencing will limit public access into the fenced unit, the site is not located along an existing hiking trail and is not known to be currently used for recreation or nature-watching. The proposed Seabird Preserve is located

with Kaua‘i Hunting Unit K and the creation of the predator-free fenced unit would necessarily remove some acreage from public hunting. Detailed hunter use or success in the area immediately surrounding the proposed Seabird Preserve is not available, and it is not known how many individual hunters regularly visit this area. Because of the small size of the fenced unit (2 ha), the ability for feral pigs, goats, and deer to continue to move around in the general area outside the fenced unit, and the continued availability of the surrounding acreage for public hunting, the negative impact on hunting is anticipated to be minor.

Alternative C: Implementation of Kaua‘i Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B, as activities associated with translocation are not anticipated to involve or have additional impact on recreational activities.

10.2.3 Effects on Scenic Resources

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. The night sky is valued as a scenic resource that the public enjoys, in ways similar to ocean and mountain vistas. In addition, a dark sky has scientific benefits to both amateur and professional astronomers (e.g., International Dark-Sky Association www.darksky.org). A dark night has societal value, and lighting has benefits as well as detrimental consequences (Klinkenborg 2008). Light minimization measures to reduce or eliminate the effects of artificial lights would also have the result of reducing the amount of up-lighting, commonly referred to as “light pollution,” considered perhaps the easiest form of pollution to remedy (Klinkenborg 2008). With less light directed upward, the night time sky will become more visible and potentially more visible as a resource. The impact to scenic resources in the form of improved nighttime aesthetics associated with darker skies is difficult to quantify, but would be anticipated to remain similar to current conditions.

Alternative B: Proposed Alternative (Implementation of Kaua‘i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility as identified in their PIP and jointly implement mitigation measures (the seabird social attraction project at Kahuama‘a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take. Impacts related to minimization measures at existing Applicant facilities would be similar to Alternative A.

Potential impacts to scenic resources associated with the proposed mitigation site is as follows. The Kahuama‘a Seabird Preserve is situated along the Kalalau rim and a portion of the proposed conservation fencing could be visible from a popular lookout point in Kōke‘e State Park called the Pu‘u O Kila Lookout. Pu‘u O Kila looks out onto the Kalalau Valley, approximately 3 kilometers wide. From the lookout, a viewer would have to look to the farthest western part of the viewshed (to the left) for the site to be viewable. The fencing would be located

approximately 2,200 ft away (670m) and partially be obscured by surrounding trees and other vegetation. To mitigate any visual impact of the fence, the fence will be colored to blend into the hillside and reduce any reflective impact of metal surfaces. Because the fence would not be located within the primary view, would consist of a small portion of the 3-kilometer viewshed, and would be obscured by vegetation and painted to blend into the background, the degree of visual impact to the scenic resources is anticipated to be minor. If necessary, interpretive signage could be incorporated into the lookout to turn any remaining visual impact into a learning experience for visitors, to increase understanding and support for conservation efforts.

Alternative C: Implementation of Kaua'i Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B, as activities associated with translocation are not anticipated to involve or have additional impact on scenic resources.

10.2.4 Effects on Cultural and Archaeological Resources

Alternative A: No Action Alternative

Under Alternative A, potential participants would take all reasonable minimization measures to avoid legal liability to the extent feasible. Actions to minimize light attraction by Applicants will not involve any potential to affect archaeological and cultural resources because of the limited nature of such actions and because these actions only involve above-ground work on existing light fixtures and foundations. No impacts to cultural and archaeological resources are expected.

Alternative B: Proposed Alternative (Implementation of Kaua'i Seabird HCP)

Under Alternative B, Applicants will implement specific avoidance and minimization measures to avoid or minimize take associated with light attraction at their facility and jointly implement mitigation measures (the seabird social attraction project at Kahuama'a Seabird Preserve, the barn owl control, and feral cat control) to mitigate for unavoidable take. Impacts to archaeological and cultural resources under the Proposed Alternative related to minimization measures at Applicant facilities would be similar to Alternative A.

As discussed previously (section 4.9), certain precautions will be followed during implementation of mitigation measures at Kahuama'a Seabird Preserve to avoid impacts to historic properties, which would also avoid or minimize harm to extant archaeological or cultural features.

The Hawaiian ecosystem and the native species found therein are an essential part of the overall cultural landscape. For many indigenous communities, natural resources are cultural resources. Seabirds, and in particular the 'a'o, have cultural importance to Native Hawaiians and fishermen. The goal of the KSHCP is to address and mitigate for ongoing take of these species and provide an overall net benefit to these species over the term of the KSHCP and associated ITP/ITLs. By benefitting native species, the KSHCP would benefit cultural resources.

No specific cultural practices have been identified during development of the KSHCP that may be impacted by the development and maintenance of the Kahuamaʻa Seabird Preserve. Conservation fieldwork will not impact materials used for traditional gathering purposes. Plants and other natural resources used for traditional cultural gathering would be conserved through habitat protection activities thereby providing a benefit to those resources. For cultural practices such as gathering, the applicable State Park rules and procedures would remain as currently applied (HAR Chapter 13-146); the permit process is not intended to restrict constitutionally protected cultural practices, but is in place to ensure protection of unique natural resources and avoid overcollection of a particular resource, minimize the potential for user conflict, and to provide safety or resource information.

Alternative C: Implementation of Kauaʻi Seabird HCP and the additional action of translocation of chicks

Impacts of Alternative C would be similar in scale and intensity as Alternative B, as activities associated with translocation are not anticipated to involve or have additional impact on historic, archaeological, or cultural resources.

10.3 Relationship to Land Use Plans, Policies and Controls

Consistency with applicable Federal, State of Hawaiʻi, and County of Kauaʻi planning and land use objectives, policies, principles and guidelines is discussed below.

10.3.1 Consistency with Existing Plans Relating to Covered Species

The KSHCP and associated issuance of ITP/ITLs is consistent with published planning documents specific to the Covered Seabirds:

Table 10-1. Consistency of KSHCP with Existing Species-Specific Planning Documents

Planning Document	Comment
Hawaiian Dark-Rumped Petrel and Newell's Manx Shearwater Recovery Plan (USFWS 1983)	30+ year-old Recovery Plan for the ʻuaʻu and ʻaʻo (using the previously recognized names for these species) provides specific recovery objectives and identifies the need for additional nesting colonies, translocation of chicks, and the development of additional colony establishment techniques (like acoustic attraction or use of decoys) as recovery objectives.
Newell's Shearwater, Hawaiian Petrel, and Band-Rumped Storm-Petrel Recovery: Five-Year Action Plan (Bailey et al. 2015)	Action plan to guide research and management and develop funding for a unified and standardized approach to the recovery of ʻaʻo, ʻuaʻu, and ʻakēʻakē. Objective #2 is "Re-establish/expand distribution through social attraction and/or translocation."
KIUC STHCP (Planning Solutions et al. 2011)	Short-Term HCP (STHCP), approved by USFWS in 2011, in conjunction with incidental take authorization for the continued operation and maintenance of all KIUC facilities for a period of up to five years for ʻuaʻu, ʻaʻo, and ʻakēʻakē. Much of the current data about the Covered Seabirds' population and status has been gathered under this HCP. KSHCP is designed to build on and complement the actions undertaken by KIUC.
Regional Seabird Conservation Plan, Pacific Region (USFWS 2005)	Region-wide plan to identify USFWS priorities for seabird management, monitoring, research, outreach, planning and coordination.
Hawaiʻi Statewide Wildlife Action Plan (DLNR 2015b), updating the Hawaiʻi Comprehensive Wildlife Conservation Strategy (Mitchell et al. 2005)	Statewide strategy for the conservation of native wildlife and plants. Identifies species of greatest conservation need, which includes the ʻaʻo, ʻuaʻu, and ʻakēʻakē and outlines priority actions.

10.3.2 Hawaiʻi State Plan (HRS Chapter 226)

The Hawaiʻi State Plan (HRS Chapter 226) establishes a statewide planning system that sets forth goals, objectives, policies and priority directions to provide for the wise use of Hawaii's resources and guide he future long-range development of the State.

The goal of the State is to achieve the following:

- A strong, viable economy, characterized by stability, diversity and growth, that enables the fulfillment of the needs and expectations of Hawaiʻi's present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.

- Physical, social, and economic well-being, for individuals and families in Hawai‘i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

The KSHCP and associated issuance of ITP/ITLs is consistent with the Hawai‘i State Plan as outlined below:

Table 10-2. Consistency of KSHCP with Hawai‘i State Plan

HRS Section	Objective and Policies	Discussion
226-5	Population	Not applicable. The KSHCP is not anticipated to increase the State's overall population.
226-6	Economy – in general	The KSHCP is consistent with the State's objective of increased and diversified employement opportunities to achieve full employment, increased income and job choice, and improved living standards, while also stimulating the development of economic activities captializing on defense, dual-use, and science and technology assets, particularly on the Neighbor Islands. The KSHCP will support limited continued employment on Kaua‘i associated with developing and maintaining the Kahuama‘a Seabird Preserve, providing ongoing barn owl and feral cat control along Kalalau Valley, and monitoring over the duration of the KSHCP.
226-7	Economy – agriculture	Not applicable. The KSHCP is not anticipated to affect the viability of Hawaii's sugar and pineapple industries, the growth and development of diversified agriculture in the State, or the continuation of a dynamic agriculture industry.
226-8	Economy – visitor industry	The KSHCP is consistent with the State's objective of a visitory industry that constitutes a major component of steady growth for Hawaii‘s economy. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime lighting in areas used or frequented by visitors and residents.
226-9	Economy – Federal expenditures	The KSHCP is consistent with the State's objective of a stable Federal investment base as an integral component of Hawaii's economy. The KSHCP is a jointly developed document involving both USFWS and DLNR, and implements the policy of

		strengthening "Federal-state-county communication and coordination in all Federal activities that affect Hawai'i."
226-10	Economy – potential growth and innovative activities	Not applicable. The KSHCP is not anticipated to contribute to the development or expansion of potential growth and innovative activities that serve to increase and diversity Hawaii's economic base.
226-10.5	Economy – information industry	Not applicable. The KSHCP is not anticipated to affect broadband and wireless communication capability and infrastructure.
226-11	Physical environment – land-based, shoreline and marine resources	The KSHCP is consistent with the State's objective of the prudent use of Hawaii's land-based, shoreline, and marine resources and effective protection of Hawaii's unique and fragile environmental resources. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime lighting in areas used or frequented by visitors and residents. The light minimization measures outlined in the KSHCP are designed to avoid or reduce incidental take of Covered Seabirds, and the Kahuama'a Seabird Preserve and barn owl and feral cat control are designed to mitigate for unavoidable take and provide a benefit to Covered Species by creating a new protected nesting area and reducing depredation in existing colonies. Overall, the KSHCP seeks to pursue compatible relationships among activities, facilities, and natural resources.
226-12	Physical environment - scenic, natural beauty, and historic resources	The KSHCP is consistent with the State's objective to enhance Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources. The light minimization measures outlined in the KSHCP are designed to avoid or reduce incidental take of Covered Species and will have an additional benefit of reducing light pollution impacting views of night skies. The Kahuama'a Seabird Preserve is designed to mitigate for unavoidable take and will provide a new protected nesting area for Covered Seabirds; siting and design of the fencing was developed to minimize impacts to viewplanes and scenic assets within Kōke'e State Park.
226-13	Physical environment - land, air and water quality	The KSHCP is consistent with the State's objective of maintenance and pursuit of improved quality in Hawaii's

		land, air and water resources, and greater public awareness and appreciation of Hawaii's environmental resources. The light minimization measures outlined in the KSHCP are designed to avoid or reduce incidental take of Covered Species and will have an additional benefit of reducing light pollution impacting views of night skies. The conservation mitigation action establishing the Kahuama'a Seabird Preserve involves the removal of non-native mammalian predators and restoration of native species. Over time, outreach associated with the KSHCP and the success of the conservation mitigation action is anticipated to increase public awareness and appreciation for Hawaii's environmental resources.
226-14	Facility systems – in general	The KSHCP is consistent with the State's objective of water, transportation, waste disposal, and energy and telcommunication systems that support statewide social, economic, and physical objectives. The KSHCP encourages flexibility in the design and development of facility systems (specifically nighttime lighting) to promote prudent use of resources and accommodate changing public demands and priorities, while minimizing impact on Covered Species.
226-15	Facility systems – solid and liquid wastes	Not applicable. The KSHCP does not involve basic public health and sanitation standards or the provision of adequate sewerage facilities.
226-16	Facility systems – water	Not applicable. The KSHCP does not involve and is not anticipated to impact the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resources capacities.

226-17	Facility systems – transportation	The KSHCP is consistent with the State's objectives of an integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe and convenient movement of people and goods, and a statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime lighting in areas used for transportation of people and goods. The light minimization measures outlined in the KSHCP are designed to avoid or reduce incidental take of Covered Seabirds, and the Kahuamaʻa Seabird Preserve and barn owl and feral cat control are designed to mitigate for unavoidable take.
226-18	Facility systems – energy	Not applicable. The KSHCP is not anticipated to affect the State's objectives of 1) dependable, efficient and economical statewide energy systems capable of supporting the needs of the people, 2) increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaiʻi's dependence on imported fuels for electrical generation and ground transportation, 3) greater diversification of energy generation in the face of threats to Hawaiʻi's energy supplies and systems, 4) reduction, avoidance or sequestration of greenhouse gas emissions for energy supply and use, and 5) utility models that make the social and financial interests of Hawaiʻi's utility customers a priority.
226-18.5	Facility systems – telecommunications	Not applicable. The KSHCP is not anticipated to affect the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.
226-19	Socio-cultural advancement - housing	Not applicable. The KSHCP is not anticipated to affect the State's objectives of 1) greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary and livable homes, 2) the orderly development of residential areas sensitive to community needs and other land uses, or 3) the development and provision of affordable rental housing by the State.
226-20	Socio-cultural advancement - health	Not applicable.

		The KSHCP is not anticipated to impact the State's objectives of 1) fulfillment of basic individual health needs of the general public, 2) maintenance of sanitary and environmentally healthful conditions in Hawaii's communities, or 3) elimination of health disparities by identifying and addressing social determinants of health.
226-21	Socio-cultural advancement – education	Not applicable. The KSHCP is not anticipated to impact the State's objective of providing a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.
226-22	Socio-cultural advancement – social services	Not applicable. The KSHCP is not anticipated to impact the State's objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.
226-23	Socio-cultural advancement – leisure	The KSHCP is consistent with the State's objective of the adequate provision of resources to accomodate diverse cultural, artistic, and recreational needs for present and future generations. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime lighting in areas used for cultural, artistic and recreational activities. The light minimization measures outlined in the KSHCP are designed to avoid or reduce incidental take of Covered Species associated with nightime use of recreational facilities such as stadiums or tennis courts and the development and maintenance of the Kahuama'a Seabird Preserve and barn owl and feral cat control are designed to mitigate for unavoidable take associated with these facilities, so that nightime use of these facilities may continue.
226-24	Socio-cultural advancement – individual rights and personal well-being	Not applicable. The KSHCP is not anticipated to impact the State's objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.
226-25	Socio-cultural advancement – culture	The KSHCP is consistent with the State's objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime

		lighting. The light minimization measures and conservation mitigation actions outlined in the KSHCP are designed to support the long-term protection of Covered Seabirds, native species with cultural significance.
226-26	Socio-cultural advancement – public safety	The KSHCP is consistent with the State's objectives of 1) assurance of public safety and adequate protection of life and property for all people, 2) optimum organizational readiness and capability in all phases of emergency management, and 3) promotion of a sense of community responsibility for the welfare and safety of Hawaii's people. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime lighting associated with the security and safety of people and structures. The light minimization measures and conservation mitigation actions outlined in the KSHCP are designed to support the long-term protection of Covered Seabirds.
226-27	Socio-cultural advancement – government	The KSHCP is consistent with the State's objectives of 1) efficient, effective, and responsive government services at all levels in the State or 2) fiscal integrity, responsibility, and efficiency in the state and county governments. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of nighttime lighting. The light minimization measures and conservation mitigation actions outlined in the KSHCP are designed to support the long-term protection of Covered Seabirds, utilitizing a fiscally responsible approach and avoiding exposure to future financial risk associated with fines and penalties for unpermitted take.

10.4 Consistency of KSHCP with Hawai‘i Coastal Zone Management

10.4.1 Hawai‘i Coastal Zone Management Program (HRS Chapter 205A)

The Coastal Zone Management (CZM) Program is a comprehensive nationwide program that establishes and enforces standards and policies to guide the development of public and private lands within the coastal areas. HRS Chapter 205A, the Hawai‘i Coastal Zone Management Act, outlines State CZM objectives and policies for ten subject areas: recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources. All state and county agencies are directed to enforce the coastal zone management objectives and policies.

The KSHCP and associated issuance of ITP/ITLs is consistent with the CZM objectives and its supporting policies set forth in HRS §205A-2 as follows:

Table 10-3. Consistency of KSHCP with Hawai‘i CZM.

Subject Area	Objective	Discussion
Recreational resources	Provide coastal recreational opportunities accessible to the public	Not applicable. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Implementation of the KSHCP does not involve new development adjacent to the shoreline or beach and is not anticipated to change existing conditions at an ocean recreation area, swimming area, surf site, fishing area or boating area.
Historic resources	Protect, preserve, and, where desirable, restore those natural manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture	Consistent. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Implementation of the KSHCP does not involve new actions within a designated historic or cultural district, in areas listed or nominated to the Hawai‘i or National Register of Historic Places, or within or adjacent to a Hawaiian fishpond or historic settlement area. Implementation of the KSHCP does have the goal of enhancing long-term protection of native seabird species – animals with cultural value and significance.
Scenic and	Protect, preserve, and, where	Consistent.

open space resources	desirable, restore or improve the quality of coastal scenic and open space resources	The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Implementation of the KSHCP will not alter any natural landforms or existing public views and does not involve the construction of a multi-story structure, a structure visible from the nearest coastal roadway, or a structure in waters seaward of the shoreline. It does involve undeveloped land (e.g., the Kahuama‘a Seabird Preserve), but the KSHCP is specifically directed at the long-term protection of the Covered Species and enhancing the natural open character of their coastal habitat, to maintain its suitability as future breeding habitat.
Coastal ecosystems	Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems	Consistent. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Actions implemented under the KSHCP do not involve dredge and fill activities, the discharge or placement of material into a body of water or wetland, earthwork, grading, or grubbing, or the construction of waste treatment facilities. While some existing lighting facilities are located in the Special Management Area or the Shoreline Setback Area, light minimization measures are proposed to reduce the adverse impact of artificial lighting on the coastal ecosystem. Implementation of the HCP is specifically directed at the long-term preservation of the Covered Species.
Economic uses	Provide public or private facilities and improvements important to the State's economy in suitable locations	Consistent. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Implementation of the KSHCP seeks to minimize the impact that artificial lighting at harbors, ports, recreational facilities, and other facilities used by residents and visitors at night have on Covered Species and

		mitigating for unavoidable take. This HCP does not relate to commercial fishing or seafood production, energy production or transmission, or seabed mining and is not anticipated to affect agricultural lands or lands designated for such use.
Coastal hazards	Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution	Not applicable. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Implementation of the KSHCP is not anticipated to change existing conditions relating to hazards associated with tsunami, storm waves, stream flooding, erosion, subsidence, or pollution. The proposed Kahuama‘a Seabird Preserve is not on or abutting a sandy beach, is not located within a potential tsunami inundation area, is not within a flood hazard area according to FEMA Flood Insurance Rate Maps, and is not within a subsidence hazard area.
Managing development	Improve the development review process, communication, and public participation in the management of coastal resources and hazards	Consistent. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. The proposed KSHCP will undergo a public review process, under both HRS Chapter 195D and HRS Chapter 343. In addition, the HCP will be reviewed by the Endangered Species Recovery Committee and the Board of Land and Natural Resources, with opportunities for public participation at both stages. The public has been notified: the HCP has been developed over the past decade in consultation with potential Applicants, a website informs on the substance and process, and public meetings have been held discussing draft plan content.
Public participation	Stimulate public awareness, education, and participation in coastal management	Consistent. As noted above, information about the KSHCP has been disseminated to the public, and the public has been provided an

		opportunity to comment during the development and approval process of the KSHCP.
Beach protection	Protect the beaches for public use and recreation	Consistent. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. The KSHCP incorporates both light minimization actions to reduce the impact of artificial lighting on Covered Species and conservation mitigation actions to mitigate for unavoidable take. Implementation of the KSHCP is not anticipated to affect natural shoreline processes or public access to and along the shoreline.
Marine resources	Promote the protection, use, and development of marine and coastal resources to assure their sustainability.	Consistent. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. The KSHCP incorporates both light minimization actions to reduce the impact of artificial lighting on Covered Species and conservation mitigation actions to mitigate for unavoidable take. Implementation of the KSHCP is not anticipated to involve or affect the development of marine or coastal resources and does not involve research of ocean processes or resources.

10.4.2 Hawai‘i 2050 Sustainability Plan

Act 8 of the 2005 Hawai‘i State Legislature established the Hawai‘i 2050 Sustainability Task Force to develop a statewide sustainability plan for the 21st century – the Hawai‘i 2050 Sustainability Plan. The long-term strategy of the Hawai‘i 2050 Sustainability Plan is supported by its main goals and objectives of respect for culture, character, beauty, and history of the State’s island communities; balance among economic, community, and environmental priorities; and an effort to meet the needs of the present without compromising the ability of future generations to meet their own needs.

The 2050 Plan outlines five goals towards a sustainable Hawai‘i accompanied by strategic actions for implementation and indicators to measure success or failure. The KSHCP and associated issuance of ITP/ITLs is consistent with the 2050 Sustainability Plan, in that the KSHCP proposes actions designed to reduce impacts to Covered Species, mitigate for

unavoidable take, and support the long-term protection of the Covered Species over the next thirty years. Specifically, the KSHCP is consistent with the goals of the 2050 Plan as follows:

Goal One: *Living sustainably is part of our daily practice in Hawai'i.*

Discussion: Implementation of the KSHCP contributes to more sustainable living by reducing the negative impact of artificial lights on Covered Species and the coastal environment and by collecting information that can be used to monitor trends and conditions in Hawaii's economy, society and natural systems.

Goal Two: *Our diversified and globally competitive economy enables us to meaningfully live, work, and play in Hawai'i.*

Discussion*:* Implementation of the KSHCP facilitates the continuation of existing economic activities in coastal areas by reducing the negative impact of artificial lights on Covered Species and supporting the building blocks for economic stability and sustainability.

Goal Three: *Our natural resources are responsibly and respectfully used, replenished, and preserved for future generations*.

Discussion: Implementation of the KSHCP provides greater protection for air, and land-fresh water- and ocean-based habitats and by seeking to ensure that the Covered Species are preserved for future generations.

Goal Four: *Our community is strong, healthy, vibrant and nurturing, providing safety nets for those in need.*

Discussion*:* Not applicable. The KSHCP does not affect social safety nets, public transportation infrastructure and alternatives, public education, or access to diverse recreational facilities and opportunities.

Goal Five: *Our Kanaka Maoli and island cultures and values are thriving and perpetuated.*

Discussion*:* Implementation of the KSHCP honors Kanaka Maoli culture and heritage by proposing measures to reduce harm to endangered native seabirds, species of cultural significance.

10.4.3 Hawai'i Conservation District Use (HRS Chapter 183C)

The Kahuama'a Seabird Preserve is located within the State Conservation District, Resource and Protective Subzones. Land uses in the Conservation District are regulated by the DLNR pursuant to HRS Chapter 183C and HAR §13-5-30. It is anticipated that a Conservation District Use Departmental permit will be required for this project as identified land uses associated with Land and Resource Management, category P-13 (installation of a new fence) and Removal of Invasive Species, category P-4 (removal of invasive species in an area of greater than one acre)

(HAR §13-5-22). In evaluating the merits of a proposed land use, DLNR considers the following criteria, as provided in HAR §13-5-30.

1. *The proposed use is consistent with the purpose of the conservation district.*

The purpose of the Conservation District is to conserve, protect and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare. The creation and maintenance of the Kahuamaʻa Seabird Preserve as a mitigation site is for the direct benefit of Covered Species. The primary anticipated benefit is for ʻaʻo, but other native species, including native plants, other native seabirds, and native invertebrates, would also be anticipated to benefit from the creation and management of a predator-free fenced unit.

2. *The proposed use is consistent with the objectives of the subzone of the land on which the use will occur.*

The Kahuamaʻa Seabird Preserve is located partially within the Protective subzone and partially within the Resource Subzone. The objective of the Protective subzone is "to protect valuable natural and cultural resources in designated areas such as restricted watersheds, marine, plant, and wildlife sanctuaries, significant historic, archaeological, geological, and volcanological features and sites, and other designated unique areas" (HAR §13-5-11). The objective of the Resource subzone is "to ensure, with proper management, the sustainable use of the natural resources of those areas" (HAR § 13-5-13). The creation and maintenance of the Kahuamaʻa Seabird Preserve as an area protected from the damaging impacts of introduced predators such as rodents, cats, dogs, and pigs, is for the direct benefit of natural resources. As such, the proposed use is consistent with the objective of both subzones.

3. *The proposed use complies with the provisions and guidelines contained in HRS Chapter 205A, where applicable.*

As discussed in detail in Section 7.3 above, the KSHCP and the creation and maintenance of the Kahuamaʻa Seabird Preserve complies with and is consistent with the provisions and guidelines of HRS Chapter 205A.

4. *The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region.*

The KSHCP and the creation of the Kahuamaʻa Seabird Preserve is not anticipated to cause substantial adverse impact to existing natural resources within the surrounding area, community, or region. Instead, the goal is to protect and enhance the existing natural resources and support the development of a new protected breeding colony of ʻaʻo, an endangered native seabird.

5. *The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

The KSHCP and the creation of the Kahuamaʻa Seabird Preserve is compatible with the locality and surrounding area. The Preserve is entirely consistent with the surrounding character of the area as State Park. The siting and design of the fencing was specifically planned to limit its visibility by visitors of Kōkeʻe State Park. The fencing will not be visible from roadways and will not block viewplanes or scenic vistas or seem obtrusive; however, it may be visible at times from scenic lookouts, by those looking back along the cliff face. It is anticipated that the predator-proof fencing can provide an educational opportunity to deepen the appreciation of visitors for actions that conserve native species.

6. *The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, which is applicable.*

The KSHCP and the creation of the Kahuamaʻa Seabird Preserve is anticipated to preserve or improve upon the existing physical and environmental aspects of the land by supporting the use of the area as a new protected breeding site for ʻaʻo, through the removal of introduced predatory mammals, the removal of invasive plants, the restoration of native vegetation, and the playing of bird calls to lure prospecting birds to the site.

7. *Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district.*

Subdivision of land is not proposed.

8. *The proposed land use will not be materially detrimental to the public health, safety, and welfare.*

The KSHCP and the creation of the Kahuamaʻa Seabird Preserve is not anticipated to be materially detrimental to the public health, safety or welfare.

10.4.4 County of Kauaʻi General Plan

The *Kauaʻi General Plan* provides the long range planning direction for development of the County. An update to the 2000 General Plan received Planning Commission approval in June 2017 and was transmitted to the County Council for its deliberation in August 2017 (County of Kauaʻi 2017, plankauai.com). Based on public input gathered during an 18-month public involvement process, the Departmental Draft of the General Plan adopts the theme of "Kauaʻi Kākou", recognizing that everyone must work together to define and implement a shared vision for the island. The General Plan establishes priorities for managing growth and community development over a 20-year planning timeframe, and guides County decision-making by mapping land use patterns, describing what type of development is desirable, and by setting high-level priorities for infrastructure and programs.

The 2017 Plan outlines 19 policies to articulate the County's path forward toward meeting the community's vision and goals of sustainability, unique character, resilience, and equity. In addition, the Plan outlines actions, organized by ten sectors (watershed, housing, transportation, critical infrastructure, shared spaces, heritage resources, energy sustainability, public safety and

hazards resiliency, and opportunity and health for all), to represent what is needed to move policy forward. Under the Watershed Sector, the Plan specifically recognizes the importance of Kaua‘i as a “global hotspot for biodiversity” and sets forth an objective “to protect the flora and fauna unique to Kaua‘i and Hawai‘i and to mitigate the impact of invasive species.” The ‘ua‘u and ‘a‘o are specifically mentioned in the Plan, and “Complete and implement native species Habitat Conservation Plans, such as the Kaua‘i Seabird Habitat Conservation Plan and the Kaua‘i Nēnē Habitat Conservation Plan, which address legal issues regarding human-wildlife interaction while allowing for economic development” is included as an identified Action for the Watershed. As such, the KSHCP and subsequent issuance of an ITL/ITP is entirely consistent with the pending 2017 update to the Kaua‘i General Plan.

10.5 Anticipated Determination under HRS Chapter 343 and Supporting Findings and Recommendations

A **Finding of No Significant Impact** (FONSI) declaration pursuant to HRS Chapter 343 is anticipated. A final determination will be made by DLNR after consideration of the comments on the Draft EA and finalization of the KSHCP. The Anticipated Determination is made strictly for State of Hawai‘i purposes. USFWS will make its own determination as to whether a FONSI is appropriate under NEPA after considering public comments on the draft EA and the analysis and conclusions in the Final EA.

In determining whether the proposed action will have a significant impact on the environment, DLNR considers the phases of the proposed action, the expected consequences, and the cumulative as well as the short and long-term effects of the action, specifically considering the following 13 significance criteria, as provided in HAR §11-200-12:

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

Implementation of the KSHCP does not involve an irrevocable commitment to loss or destruction of any natural or cultural resources. Instead, the KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Nighttime lighting is an essential activity in many homes, businesses, and industry centers, and the KSHCP is an umbrella programmatic habitat conservation plan developed to ensure that entities that have the potential for causing unavoidable injury or harm to Kauai’s seabirds minimize that harm and mitigate for any harm that cannot be avoided. Maintaining and potentially increasing the overall populations of the Covered Species is the goal of the KSHCP.

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

Implementation of the KSHCP is not anticipated to curtail the range of beneficial uses of the environment. The KSHCP outlines measures to minimize the effects of artificial lighting and proposes the creation and maintenance of the Kahuama‘a Seabird Preserve and barn and feral cat control around Kalalau Valley to mitigate for unavoidable take. The KSHCP will enable the continuation of existing nighttime opportunities that require artificial lighting.

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

The KSHCP is consistent with the environmental policies and guidelines established in HRS Chapter 344 and contributes to the conservation of threatened and endangered species, pursuant to HRS Chapter 195D. HRS § 344-3 provides that it shall be the policy of the State to "conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai'i". HRS § 344-4(3)(A) further provides that all agencies shall consider the following guidelines: "protect endangered species of indigenous plants and animals."

The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Nighttime lighting is an essential activity in many homes, businesses, and industry centers, and the KSHCP is an umbrella programmatic habitat conservation plan developed to ensure that entities that have the potential for causing unavoidable injury or harm to Kauai's seabirds minimize that harm and mitigate for any harm that cannot be avoided. Maintaining and potentially increasing the overall populations of the Covered Species is the goal of the KSHCP.

4. *Substantially affects the economic welfare, social welfare, or cultural practices of the community or State.*

The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Nighttime lighting is an essential activity in many homes, businesses, and industry centers, and the KSHCP is an umbrella programmatic habitat conservation plan developed to ensure that entities that have the potential for causing unavoidable injury or harm to Kauai's seabirds minimize that harm and mitigate for any harm that cannot be avoided. Maintaining and potentially increasing the overall populations of the Covered Species, native seabirds with cultural significance, is the goal of the KSHCP.

Implementation of the KSHCP is not anticipated to negatively affect the economic welfare, social welfare or cultural practices of the community or State. While the economic and social welfare of the community and state will be positively impacted by the implementation of the KSHCP through continuation of existing legitimate activities, through expenditures associated with the implementation of light minimization measures, and through expenditures and jobs associated with the creation and maintenance of the Kahuama'a Seabird Preserve, the impact is anticipated to be minor in the context of the State economy.

5. *Substantially affects public health.*

Implementation of the KSHCP Plan is not anticipated to substantially affect public health in any adverse way.

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

Implementation of the KSHCP is not anticipated to involve substantial secondary impacts (such as population changes or effects on public facilities).

7. *Involves a substantial degradation of environmental quality.*

Implementation of the KSHCP is not anticipated to involve a substantial degradation of environmental quality. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Nighttime lighting is an essential activity in many homes, businesses, and industry centers, and the KSHCP is an umbrella programmatic habitat conservation plan developed to ensure that entities that have the potential for causing unavoidable injury or harm to Kauai's seabirds minimize that harm and mitigate for any harm that cannot be avoided. Maintaining and potentially increasing the overall populations of the Covered Species is the goal of the KSHCP.

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

The duration of the KSHCP is 30 years. In and of itself, it does not involve a cumulative adverse effect upon the environment or a commitment for larger actions.

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

Implementation of the KSHCP is not anticipated to negatively affect a rare, threatened or endangered species, or its habitat. The KSHCP provides a mechanism to permit unavoidable incidental take associated with the lawful use of existing nighttime lighting. Nighttime lighting is an essential activity in many homes, businesses, and industry centers, and the KSHCP is an umbrella programmatic habitat conservation plan developed to ensure that entities that have the potential for causing unavoidable injury or harm to Kauai's seabirds minimize that harm and mitigate for any harm that cannot be avoided. Maintaining and potentially increasing the overall populations of the Covered Species is the goal of the KSHCP.

Implementation of the KSHCP provides for the long-term protection of endangered seabirds from the negative impacts of light attraction. Best management practices associated with the installation of light shielding devices and with the creation and maintenance of the Kahuamaʻa Seabird Preserve will minimize negative short-term impacts to listed species and habitat (e.g., botanical and wildlife surveys along fence or trail corridors to identify rare plants, host plants for rare invertebrates, or roosting or nesting sites for native birds or the ʻōpeʻapeʻa for protection). Rare species protocols (e.g., flagging plants, identifying buffer zones, etc.) would be

implemented to avoid negative impacts to any rare plant species at the Kahuamaʻa Seabird Preserve site. This protected area of native habitat would be anticipated to benefit Covered Species as available predator-free breeding habitat, while also benefitting other rare species such rare plants, native forest birds, and native invertebrates.

10. *Detrimentally affects air or water quality or ambient noise levels.*

Implementation of the KSHCP is not anticipated to detrimentally affect air or water quality or ambient noise levels.

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

Implementation of the KSHCP does not affect nor is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

12. *Substantially affects scenic vistas and view planes identified in county or State plans or studies.*

Implementation of the KSHCP does not substantially affect scenic vistas or viewplanes identified in county or State plans or studies. Modifications to existing lighting facilities is not anticipated to impact scenic vistas or view planes. The siting and design of the Kahuamaʻa Seabird Preserve predator-proof fencing was specifically planned to limit its visibility by visitors of Kōkeʻe State Park. The fencing will not be visible from roadways and will not block viewplanes or scenic vistas or seem obtrusive; however, it may be visible at times from scenic lookouts, by those looking back along the cliff-face.

13. *Requires substantial energy consumption.*

Implementation of the KSHCP is not anticipated to require substantial energy consumption. Petroleum fuels would be used by equipment utilized for fence construction but this energy consumption is not anticipated to be substantial, especially in comparison to island-wide energy consumption.