Kaheawa Wind Power I Habitat Conservation Plan Maui, Hawaiʻi

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Final
December 2025

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1.0 Introduction

1.1 Overview and Background

The Kaheawa Wind Power I (KWP I or the Project) is an existing, operational wind energy facility located in the Kaheawa Pastures area of West Maui, Hawaiʻi, within the Ukumehame ahupuaʻa on land owned by the State of Hawaiʻi. The Project consists of 20 General Electric (GE) 1.5-megawatt (MW) wind turbine generators (turbine or WTG), with a total generation capacity of 30 MW. The Project has been operating since 2006, and is owned and operated by Kaheawa Wind Power, LLC (KWP; the Applicant). Figure 1 shows the Project's location and major components.

The Project began its initial 20-year operational period in 2006. The Project has been operating under the terms and conditions outlined in the Habitat Conservation Plan (HCP; KWP I 2006) and the associated federal Incidental Take Permit (ITP; TE72434A-1) and Incidental Take License (ITL; ITL-08, Amendment 2). The ITP authorizes incidental take of federally threatened and endangered species under Section 10(a)(1)(B) of the Endangered Species Act (ESA, as amended), while the ITL authorizes take of state threatened and endangered species under Hawaiʻi Revised Statutes (HRS) Section 195(d). Both permits expire on January 29, 2026, and cover incidental take of the following Covered Species:

- Nēnē or Hawaiian goose (*Branta sandvicensis*);
- ʻŌpeʻapeʻa or Hawaiian hoary bat (*Lasiurus semotus*);
- ʻUaʻu or Hawaiian petrel (*Pterodroma sandwichensis*); and
- ʻAʻo or Newellʻs shearwater (*Puffinus newelli*).

In 2023, the Hawaiian Electric Company (Hawaiian Electric) selected the Project for an extension of operations for an additional 20 years (KWP I Continued Use Project) through the Stage 3 Request for Proposals process. This HCP is intended to support issuance of a new ITP and new ITL, which would cover incidental take that is anticipated to occur due to an additional 20.5 years of Project operations (including approximately 6 months under the current power purchase agreement [PPA]). KWP I is requesting a new ITL and ITP that would be valid through January 2051.

1.2 Project History

The KWP I facility began commercial operations on June 22, 2006, and the existing 20-year PPA approved by the Public Utilities Commission (PUC) is currently planned to operate until June 21, 2026. KWP I was issued an ITP from the U.S. Fish and Wildlife Service (USFWS) and an ITL from the Hawaiʻi Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR/DOFAW) on January 30, 2006. The ITP and ITL each have a term of 20 years and were amended[1] in 2012 to reduce the permitted take of seabirds (from 40 of each species to 4-8 ʻaʻo and

[1] ITL amendments are dated April 11, 2012 (ITL-08, Amendment 1) and April 27, 2016 (ITL-08, Amendment 2). ITP amendments are dated April 30, 2012 (TE72434A-0) and October 19, 2015 (TE72434A-I).

25-38 ʻuaʻu, depending on "Baseline" or "Higher" tiers), and then again in 2015/2016 to increase the permitted take of ʻōpeʻapeʻa (from 20 ʻōpeʻapeʻa to 50 ʻōpeʻapeʻa, i.e., the "Higher Tier"). Note that all permitted take remained within the levels contemplated in the original HCP (KWP I 2006), which are shown in Section 4.0 of this HCP (see Table 2). The permits were amended due to the results of site-specific post-construction monitoring which showed lower-than-anticipated risk for the seabirds, and higher-than-baseline take for the ʻōpeʻapeʻa.

Since issuance of the ITP and ITL in January 2006, the Project has operated consistently within the terms of the HCP and associated permits. This has resulted in over 19 years of post-construction fatality monitoring for the four Covered Species, mitigation activities to offset the take for all Covered Species (including continuing efforts to fully mitigate for permitted take of nēnē to achieve a net conservation benefit for that species), as well as acoustic monitoring of ʻōpeʻapeʻa activity. This HCP also incorporates some relevant information from monitoring that has occurred at the adjacent KWP II facility. The KWP II facility is a separate project that operates under its own HCP and associated ITL and ITP.

The KWP I Continued Use Project was selected by Hawaiian Electric as part of the Maui Stage 3 Request for Proposals, a competitive bidding process developed by Hawaiian Electric in coordination with the PUC to procure renewable energy sources for Maui's electric grid in response to anticipated energy resource shortfalls that were identified by the PUC (PUC 2022). The KWP I Continued Use Project will deliver clean, locally generated energy at substantially less than the cost of fossil fuels, provide essential energy resource diversity, and establish a new community benefits program. The KWP I facility's 30-MW production capacity plays an important role in the existing renewable energy supply to the Maui grid not only by helping the state reach its Renewable Portfolio Standard goals but also in providing resource adequacy and affordable energy for the Maui Electric service territory. For example, in 2024, KWP I provided 79,792 MW, which was 6 percent of the total power generation supplied to the Maui grid and almost 36 percent of the total wind energy supplied on the Maui grid in 2024 (HECO 2025, EIA 2025a, EIA 2025b).

1.3 Permit Area

The Permit Area includes the following:

- The Project Area (Figure 1), which is approximately 217 acres around the existing 20 turbines, including the access roads, turbine pads, and the turbines themselves, as well as the main access road from the highway.
    - This includes the potential limits of disturbance (Figure 2).
    - Each turbine tower reaches a height of 180 feet (i.e. hub height), with rotor diameters of 231 feet, resulting in a total structural height of about 296 feet at the maximum blade tip and a rotor-swept area that begins at approximately 65 feet.
- Identified mitigation sites, including existing mitigation facilities at:
    - Makamaka'ole in West Maui (see Section 6.3.5 and 6.3.6)

  - Haleakalā Ranch on Maui (see Section 6.3.3.1)
  - Puʻu o Hōkū Ranch on Molokaʻi (see Section 6.3.3.2)
  - Greater Hi'i Area on Lānaʻi (see Section 6.3.5)
  - Alpine Wildlife Sanctuary (see Section 6.3.5)
- Future mitigation sites that have not yet been identified; all mitigation actions are currently anticipated to occur within the geographic region of Maui Nui which includes the islands of Maui, Molokaʻi, Lānaʻi, and Kahoʻolawe, though other locations within the Hawaiian Islands may be considered for certain seabird species if appropriate and consistent with conservation objectives. Considerations for different or additional mitigation locations, than those listed above, will are addressed further under Changed Circumstances in Section 9.1.2.

The Permit Area includes, but is not limited to, portions of the following Tax Map Keys (TMKs):

- Project Area: (2) 4-8-001:001 and (2) 3-6-001:014
- Haleakalā Ranch: (2) 1-9-001:001, (2) 1-9-001:003
- Puʻu o Hōkū Ranch: (2) 5-8-010:003, (2) 5-8-010:004, (2) 5-8-010:005, (2) 5-8-010:006, (2) 5-8-011:001, (2) 5-8-011:002, (2) 5-8-011:003, (2) 5-8-011:004, (2) 5-8-011:006, (2) 5-8-011:007, (2) 5-8-011:008, (2) 5-8-011:009, (2) 5-8-011:010, (2) 5-8-011:011, (2) 5-8-011:012, (2) 5-8-011:014, (2) 5-8-011:016, (2) 5-8-012:011, (2) 5-8-015:001, (2) 5-8-015:002, (2) 5-8-015:003, (2) 5-8-015:004, (2) 5-8-015:005, (2) 5-8-015:006, (2) 5-8-015:007, (2) 5-8-999:999, (2) 5-9-006:001
- Greater Hi'i Area on Lānaʻi: (2) 4-9-002:001
- Makamaka'ole: (2) 3-1-006:001, (2) 3-1-006:003, (2) 3-1-006:005

1.4 Covered Species

The potential impacts on listed species are expected to be the same as those that have been observed at the Project during its operational life to date. This includes incidental mortality of individuals from operating WTGs. The species proposed for coverage in this HCP include the following species that have been observed as fatalities:

- Nēnē;
- ʻŌpeʻapeʻa; and
- ʻUaʻu

In addition, due to known or suspected breeding populations on Maui and/or fatalities at other wind facilities, KWP is proposing to include the following species:

- ʻAʻo; and
- ʻAkēʻakē or band-rumped storm petrel (*Hydrobates castro*)

Finally, due to observations of nesting and foraging in and adjacent to the Project Area, and potential habitat impacts, KWP is proposing to include the following:

- Assimulans yellow-faced bee (*Hylaeus assimulans*)

1.5 Permit Duration and Structure

KWP is currently operating under the 20-year ITL and 20-year ITP that run from January 30, 2006 through January 29, 2026. KWP is requesting new permits to cover potential incidental take that may occur during the extended operations of the Project. Based on the anticipated length of the new land lease and new PPA, this would result in the Project operating through December 2046, with an additional two to four years for decommissioning and restoration of the facility. Therefore, KWP is requesting that the permit term of the ITP and ITL provide take coverage through January 2051, for approximately 25 years, though the Project would only be operational for approximately 20.5 years within that period[2].

The anticipated timeline for the Project is as follows:

- January 30, 2026, to June 22, 2026: normal operations under existing PPA, performing some maintenance activities that are compatible with operations.
- June 22, 2026, through December 2026: no operations, major maintenance activities would occur.
- December 17, 2026, through December 16, 2046: operations under new PPA.
- December 2046 through January 2051: decommissioning (some decommissioning activities may commence concurrent with the final months of operations).

Exact dates of maintenance and decommissioning may be influenced by supply availability, weather, contracting, and best management practices (BMPs) being implemented to avoid or minimize impacts to Covered Species (e.g., seasonal restrictions) during the process. This may also slightly alter the dates of operations.

1.6 Alternative to Take

The Endangered Species Act's (ESA) implementing regulation (50 Code of Federal Regulations (CFR) 17.22 (b)(1)(iii)(C)) states that an HCP submitted in support of an ITP application must describe "what alternative actions to such taking the Applicant considered, and the reasons why such alternatives are not proposed to be utilized." The HCP Handbook (USFWS and NMFS 2016) indicates that the Applicant "should focus on significant differences in project design that would avoid or reduce the take." Similarly, HRS Section 195(d) requires applicants to consider alternative actions to taking, and the rationale why the applicant was unable to adopt such alternatives.

[2] ~4.5 months (January 31, 2026 to June 22, 2026) under the existing PPA and then 20 years under a new PPA.

Completely avoiding take of listed species would likely require a shut-down of operations and decommissioning. Existing mitigation measures implemented under the current (2006-2026) permits would continue to be implemented for take already accrued.

Turbine shutdown of the existing Project would not fulfill the terms of the Hawaiian Electric PPA and is therefore not a viable alternative. An alternative where the Project was decommissioned and no PPA was negotiated with Hawaiian Electric is then the only remaining option. If the Project was decommissioned, there would be no ongoing take of listed species by operating WTGs, but the Project would also no longer generate electricity; therefore, it would not meet the stated objectives for the proposed Project.

1.7 Summary of Relevant Laws and/or Regulations

1.7.1 Federal Endangered Species Act

"*The purpose of the ESA is to provide a means whereby the ecosystems upon which threatened and endangered species depend may be conserved*…" (16 U.S. Code [USC] 1531(b)). Section 9(a)(1)(B) of the ESA prohibits the take of any fish or wildlife species listed as endangered. Under federal regulation, take of fish or wildlife species listed as threatened is also prohibited, unless a species-specific exemption is granted (50 CFR 17.31(a)) Take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Section 10(a) of the ESA allows, under certain terms and conditions, for the incidental take of species listed as threatened or endangered by non-federal entities that would otherwise be prohibited under Section 9 of the ESA. Incidental take is defined as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (16 USC 1539(a)(1)(B)). To obtain this incidental take authorization, the Applicant must develop, fund, and implement a USFWS-approved HCP to minimize and mitigate to the maximum extent practicable the impact of the proposed taking.

Incidental take may be permitted through the issuance of an ITP by the USFWS under ESA Section 10(a)(1)(B). Per 50 CFR 17.22(b)(1) and 50 CFR 17.32(b)(1), an ITP application must include the following components:

- ***Project description.*** *A complete description of the project, including purpose, location, timing, and proposed covered activities.*
- ***Covered species.*** *As defined in § 17.3, common and scientific names of species sought to be covered by the permit, as well as the number, age, and sex, if known.*
- ***Goals and objectives.*** *The measurable biological goals and objectives of the conservation plan.*
- ***Anticipated take.*** *Expected timing, geographic distribution, type and amount of take, and the likely impact of take on the species.*
- ***Conservation program:*** *That explains the:*

  - *Conservation measures that will be taken to minimize and mitigate the impacts of the incidental take for all covered species commensurate with the taking;*
  - *Roles and responsibilities of all entities involved in implementation of the conservation plan;*
  - *Changed circumstances and the planned responses in an adaptive management plan; and*
  - *Procedures for dealing with unforeseen circumstances.*
- ***Conservation timing.*** *The timing of mitigation relative to the incidental take of covered species.*
- ***Permit duration.*** *The rationale for the requested permit duration.*
- ***Monitoring.*** *Monitoring of the effectiveness of the mitigation and minimization measures, progress towards achieving the biological goals and objectives, and permit compliance. The scope of the monitoring program should be commensurate with the scope and duration of the conservation program and the project impacts.*
- ***Funding needs and sources.*** *An accounting of the costs for properly implementing the conservation plan and the sources and methods of funding.*
- ***Alternative actions.*** *The alternative actions to the taking the applicant considered and the reasons why such alternatives are not being used.*
- ***Additional actions.*** *Other measures that the Director requires as necessary or appropriate, including those necessary or appropriate to meet the issuance criteria or other statutory responsibilities of the Service.*

An ITP can be issued only if the HCP meets the following criteria listed in 50 CFR 17.22(b)(2), 50 CFR 17.32(b)(2), and 16 USC 1539:

- *The taking will be incidental, and not the purpose of, carrying out an otherwise lawful activity*
- *The Applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking*
- *The Applicant will ensure that adequate funding for the conservation plan implementation will be provided.*
- *The applicant has provided procedures to deal with unforeseen circumstances.*
- *The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild;*
- *The measures and conditions, if any, required under paragraph (b)(1)(xi) of this section will be met.*

- *The applicant has provided any other assurances the Director requires to ensure that the conservation plan will be implemented.*

The issuance of the ITP is a federal agency action that must also comply with Section 7 of the ESA (16 USC 1536). Section 7(a)(2) of the ESA requires federal agencies to consult with the USFWS to ensure that actions that the federal agencies authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in destruction or adverse modification of designated critical habitat of such species. In order to issue an ITP, the USFWS is required to conduct an internal formal consultation process, which includes preparation of a Biological Opinion that evaluates the impacts of the proposed. The resulting Biological Opinion will encompass issuance of the ITP and implementation of the HCP.

1.7.2 State Endangered Species Legislation - Hawai'i Revised Statutes Chapter 195D

HRS Chapter 195D states that any endangered or threatened species of fish or wildlife recognized by the ESA shall be so deemed by state statute. HRS Chapter 195D also authorizes the state to list species that are not also listed under the ESA. In many cases these species' listings are island-specific, rather than statewide. Like the ESA, the unauthorized "take" of such endangered or threatened species is prohibited (HRS Section 195D-4[e]).

Under HRS Section 195D-4(g), the Board of Land and Natural Resources (BLNR), after consultation with the State's Endangered Species Recovery Committee (ESRC), may issue a temporary license (an ITL) to allow a take otherwise prohibited if the take is incidental to the carrying out of an otherwise lawful activity:

To qualify for an ITL, the following must occur:

- *The applicant minimizes and mitigates the impacts of the take to the maximum extent practicable (i.e., implements an HCP);*
- *The applicant guarantees that adequate funding for the HCP will be provided;*
- *The applicant posts a bond, provides an irrevocable letter of credit, insurance, or surety bond, or provides other similar financial tools, including depositing a sum of money in the endangered species trust fund created by HRS 195D-31, or provides other means approved by BLNR, adequate to ensure monitoring of the species by the State and to ensure that the applicant takes all actions necessary to minimize and mitigate the impacts of the take;*
- *The plan increases the likelihood that the species will survive and recover;*
- *The plan takes into consideration the full range of the species on the island so that cumulative impacts associated with the take can be adequately assessed;*
- *The activity permitted and facilitated by the license to take a species does not involve the use of submerged lands, mining or blasting;*

- *The cumulative impact of the activity, which is permitted and facilitated by the license, provides net environmental benefits; and*
- *The take is not likely to cause the loss of genetic representation of an affected population of any endangered, threatened, proposed or candidate plant species.*

HRS Section 195D-4(i) directs DLNR to work cooperatively with federal agencies in concurrently processing HCPs, ITLs and ITPs. HRS 195D-21 deals specifically with HCPs and its provisions are similar to those in federal regulations. HCPs submitted in support of an ITL application must:

- Identify the geographic area encompassed by the plan; the ecosystems, natural communities, or habitat types within the plan area that are the focus of the plan; and the endangered, threatened, proposed and candidate species known or reasonably expected to be present in those ecosystems, natural communities or habitat types in the plan area;
- Describe the activities contemplated to be undertaken within the plan area with sufficient detail to allow DLNR to evaluate the impact of the activities on the particular ecosystems, natural communities or habitat types within the plan area that are the focus of the plan;
- Identify the steps that will be taken to minimize and mitigate all negative impacts, including without limitation the impact of any authorized incidental take, with consideration of the full range of the species on the island so that cumulative impacts associated with the take can be adequately assessed; and the funding that will be available to implement those steps;
- Identify the measures or actions to be undertaken; a schedule for implementation of the measures or actions; and an adequate funding source to ensure that the actions or measures are undertaken in accordance with the schedule;
- Be consistent with the goals and objectives of any approved recovery plan for any endangered species or threatened species known or reasonably expected to occur in the ecosystems, natural communities or habitat types in the plan area;
- Provide reasonable certainty that the ecosystems, natural communities or habitat types will be maintained in the plan area throughout the life of the plan;
- Contain objective, measurable goals; time frames within which the goals are to be achieved; provisions for monitoring; and provisions for evaluating progress in achieving the goals quantitatively and qualitatively;
- Include an agreement to enter into and maintain an annual service contract with a stand-by and response facility available to provide emergency medical and rehabilitation services to native wildlife affected by activities undertaken within the plan area; and
- Provide for an adaptive management strategy that specifies the actions to be taken periodically if the plan is not achieving its goals.

HRS 195D-25 provides for the creation of the ESRC, which is composed of biological experts, representatives of relevant federal and state agencies (i.e., USFWS, the U.S. Geological Survey, and

DLNR), and appropriate governmental and non-governmental members (e.g., University of Hawaiʻi) to serve as a consultant to the DLNR and the BLNR on matters relating to endangered, threatened, proposed, and candidate species. The duties of the ESRC include:

- Reviewing all applications for HCPs, Safe Harbor Agreements (SHAs), and ITLs, and making recommendations to the DLNR and the BLNR on whether they should be approved, amended, or rejected;
- Reviewing all existing HCPs, SHAs, and ITLs annually to ensure compliance, and making recommendations for any necessary changes; and
- Considering and recommending appropriate incentives to encourage landowners to voluntarily engage in efforts that restore and conserve endangered, threatened, proposed, and candidate species.

Hence, the ESRC plays a significant role in the HCP planning process. The Applicant presented the conceptual parameters of this HCP to the ESRC in September 2024, and plans to continue to engage with the ESRC throughout the finalization of the HCP.

1.7.3 National Environmental Policy Act

Section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA; 42 USC 4321, 4322(2)(c)), as amended, requires federal agencies to evaluate and disclose the effects of their proposed actions on the natural and human environment. The purpose of the NEPA process is to ensure that the potential environmental impacts of any proposed federal action are fully considered and made available for public review. The issuance of an ITP by the USFWS constitutes a federal action subject to NEPA compliance and review (42 USC 4321-4347, as amended). To comply with NEPA, the USFWS must conduct and publish an environmental review. This may consist of preparing an Environmental Impact Statement (EIS) or Environmental Assessment (EA) that includes a detailed analysis of all impacts to the human environment resulting from issuance of the ITP. In circumstances where issuance of the ITP falls under a Categorical Exclusion, a category of actions which do not individually or cumulatively have a significant effect on the human environment, the NEPA review may be concluded with a Categorical Exclusion determination rather than preparation of an EIS or EA.

1.7.4 Hawaiʻi Revised Statutes Chapter 343

HRS Chapter 343 establishes a system of environmental review at the state and county levels. The chapter authorizes the Environmental Council to establish procedures that allow agencies to exempt specific types of action from the need to prepare an environmental assessment. The chapter also establishes the procedures, content requirements, criteria, and definitions for applying HRS Chapter 343, the environmental impact statement law. HRS 343 is a state law designed to ensure that government actions, including projects and permits, undergo environmental review to assess their potential impacts on Hawaiʻi's natural, cultural, and historic resources. The procedures for this environmental review are codified in HRS Chapter 343 and its implementing rules, HAR Chapter

11-200.1. HRS 343 requires that projects with possible significant environmental effects prepare either an EA or, if necessary, a more detailed EIS to identify and mitigate adverse effects. This process allows for transparency, scientific evaluation, and public participation to ensure that decision-making aligns with Hawaiʻi's commitment to environmental protection and sustainability. The review process considers a range of factors, including impacts on native species, ecosystems, water resources, and cultural sites, helping to guide agencies in making informed decisions about project approvals.

The review process ensures that the HCP is thoroughly examined, allowing stakeholders to weigh in on whether the proposed conservation measures are sufficient to offset the anticipated harm. By integrating environmental review with the ITL process, the environmental review helps balance development needs with wildlife conservation, ensuring compliance with both state and federal endangered species protections.

2.0 Covered Activities

Per the HCP Handbook (USFWS and NMFS 2016), "covered activities must be: (1) otherwise lawful, (2) non-federal, and (3) under the first control of the permittee." In addition, "the permit also authorizes any take that may result from the HCP's required conservation and monitoring measures." Therefore, Covered Activities includes coverage for any monitoring or mitigation activities implemented under this HCP. Each of these activities is described below.

2.1 Operations and Maintenance

The Project involves continued operations of the existing wind generation facility for an additional 20.5-year period. This involves the presence of on-site maintenance staff, routine testing and maintenance activities, and occasional major maintenance activities (i.e., replacement of components). Typical operations activities include the use of vehicles for site access, and no significant ground disturbance is anticipated to occur during any of the maintenance activities. Vegetation maintenance occurs at the facility in order to keep roadways and WTG pads clear of vegetation to allow access for maintenance staff, to reduce fire risk, and to maintain highly visible fatality search areas. Vegetation maintenance will follow the Vegetation Management Plan (Appendix A).

In addition to standard operations, a period of major maintenance is anticipated early in the permit term. During this period turbines will not be operational and all turbines will be fully feathered to minimize rotation.

2.2 Mitigation Activities

HCP activities will include mitigation measures designed to fully offset take and provide a net conservation benefit (see Section 6.3 for mitigation details and Section 6.4.2 for associated monitoring). While actions may be adaptively managed or expanded over time, potential mitigation efforts include, but are not limited to:

- Construction and/or maintenance of predator or ungulate fencing.
- Removal of hazards as they relate to individual covered species (e.g., barbed wire).
- Social attraction using decoys and/or call playbacks.
- Predator trapping and removal.
- Vegetation management (e.g., invasive species removal, mowing, weed whacking, herbicide application, outplanting).
- Monitoring, including permitted handling of Covered Species, acoustic monitoring, and use of game cameras.

2.3 Compliance Monitoring

Compliance activities (Section 6.4.1) include:

- Post-Construction Fatality Monitoring: Weekly canine-assisted searches of graded turbine pads and access roads within 70 meters of turbines, protocol in place since April 2015.
- Scavenger Trapping/Predator Control: Quarterly intensive trapping followed by ongoing biweekly efforts targeting mongooses (*Herpestes auropunctatus*) and feral cats (*Felis catus*) to support high carcass detection rates and provide protection to nēnē utilizing the site. Current methods use DOC250 and live traps.
- Vegetation Management: Conducted on the graded turbine pads and access roads within 70 meters of turbines (search areas; Figure 3). Activities occur consistent with the Vegetation Management Plan (Appendix A).

2.4 Decommissioning and Restoration

Decommissioning and restoration of the facility would return the Project Area to pre-Project conditions as agreed upon with the DLNR and BLNR. This may involve the removal of infrastructure on site related solely to the KWP I facility, including the 20 WTG and pads. WTG pads would likely be revegetated to pre-Project conditions. The access road, operations and maintenance (O&M) building, warehouse, and substation may remain in place, because they also support the KWP II facility, which will likely still be in operation at that time. The access road also serves as maintenance access for Hawaiian Electric facilities and predated the KWP I facility.

Decommissioning activities would generally follow the reverse order of construction and include the following:

- WTG (turbine) Removal: Rotor blades would be removed from the nacelle using cranes or crane-less technology, disassembled on the ground, and prepared for transport. The nacelle and tower sections would be similarly removed and sized for off-site transport.
- Foundation Removal: Turbine foundations would be removed to the depth required by DLNR, potentially in full. Concrete and steel would be broken up and hauled offsite.

Excavated areas would be backfilled with on-site materials, or clean, weed-free native soils if additional fill is required.

- Electrical System: Above-ground components would be removed. Underground cables would be decommissioned in place unless otherwise required by DLNR.
- O&M Facilities and Roads: The O&M building and warehouse may be retained for KWP II. Roads not required for ongoing operations or easement use would be removed per the DLNR lease, with grading to restore original contours where feasible.
- Site Restoration: All disturbed areas would be graded to approximate preconstruction conditions unless doing so would increase erosion risk. Revegetation would use approved native or pasture species to reestablish natural cover. The Kaheawa Pastures access road may be left in place as DLNR and other parties have easement rights to this road.
- Material Disposal: All WTG components, hazardous materials, and wastes would be handled and disposed of in accordance with applicable laws and regulations.
- Visual and Ecological Restoration: The goal is to restore the site's ecological and visual character and eliminate ongoing impacts associated with facility operation. Hawaiian Electric's substation equipment may also be decommissioned based on future needs.
- Reclamation: Conducted as soon as practicable post-removal to reduce invasive species risk and promote vegetation recovery. Reclamation would include:
    - Earthworks: Recontouring, decompacting soil, and erosion control using standard equipment and methods.
    - Topsoil Replacement: Fertile topsoil would be preserved and reapplied without mixing with subsoil; no off-site soil is anticipated.
    - Seeding: Native or approved pasture species would be planted per DLNR-approved seed mixes.
    - Signage and Fencing: Temporary signs and fencing may be used to protect restoration areas from trampling, grazing, or off-trail use until vegetation is reestablished.

3.0 Environmental Setting and Land Use

3.1 Project Area

The Project Area is located in an area known locally as Kaheawa Pastures, on the southern slope of the mountains of West Maui, 0.4 miles inland from McGregor Point. This section generally discusses the location and environmental characteristics of the Project Area.

3.1.1 Land Use, Ownership, and Zoning

3.1.1.1 Land Ownership

The land within the Project Area is owned by the State of Hawaiʻi and administered by the DLNR. The use of the Project Area is secured through a long-term lease from the DLNR (General Lease No. S-5731). The lease was issued January 19, 2005, and expires (with the approved holdover lease) January 31, 2026. The lease also includes a non-exclusive access easement for the Kaheawa Pastures access road and is subject to perpetual non-exclusive easements for existing Hawaiian Electric transmission lines that cross through the lease area and non-exclusive easements associated with the adjacent KWP II facility.

KWP is currently negotiating a new land lease with the State of Hawaiʻi, which is anticipated to begin January 31, 2026.

3.1.1.2 Existing Land Uses

In addition to the KWP I wind farm facilities, a few low intensity uses are present near the area:

- The area mauka and west of the Project site is part of the West Maui Forest Reserve.
- The area makai and south of the Project site is the adjacent KWP II wind farm facility.
- The Lahaina Pali Trail traverses the hillside at an elevation of approximately 1,500 feet south of the Project Area. The trail passes through the upper portion of the adjacent KWP II facility. This trail is a part of the Na Ala Hele Statewide Trail and Access Program managed by DOFAW.
- Two Hawaiian Electric transmission line easements cross Kaheawa Pastures in a southwesterly direction from Māʻalaea. The first easement (with two power lines) crosses the existing KWP I facility at an elevation of approximately 2,300 feet; the second easement (with one power line) crosses about 1,900 feet makai of the Project site.

Māʻalaea is the closest town, located approximately 2.5 miles southeast of the Project Area, which encompasses a diverse mix of land uses, including residential, business, and resort. The Project Area is also located approximately 9 miles southwest of the Kahului International Airport and 12 miles southeast of Kapalua airport.

3.1.1.3 State Land Use District

The entire Project site is within the State Conservation District. HRS Chapter 205-5 specifies that conservation districts shall be governed by the State of Hawaiʻi DLNR pursuant to HRS Chapter 183C; uses in the Conservation District are regulated by the DLNR Office of Conservation and Coastal Lands under Hawaiʻi Administrative Rules (HAR) Title 13, Chapter 5.

HAR 13-5 classifies conservation lands into five subzones: protective, limited, resource, general, and special. HAR 13-5 identifies the land uses that are allowed in each of the subzones and the specific type of permit required for those land uses, per the following designations: (A) requires no permit from the department or board, (B) requires a site plan approval by the department, (C) requires a departmental permit, or (D) requires a board permit and where indicated, a management plan.

The criteria for issuance of a board permit are outlined in HAR 13-5-30(c) and include consistency with HRS Chapter 205A (Coastal Zone Management), impacts to surrounding areas, intensity of land use, natural beauty and open space characteristics, and public welfare. Application for a board permit requires public notification and a public hearing. Standard conditions which apply to any land use allowed in the conservation district are presented in HAR 13-5-42; additional project-specific conditions may be added through the permitting process.

The Project site is within the general and protective subzones. KWP I currently operates under the terms and conditions of Conservation District Use Permit (CDUP) No. MA-3103 as approved by the Board on January 24, 2003, and amended on June 24, 2005. This CDUP will remain in effect for the extended operational period, and does not have an expiration date.

The Project is defined as "power generation from renewable resource," which is a permitted use in all subzones with a board permit. Per HAR 13-5-22, P-12: Power Generation from Renewable Resources is defined to include:

> *(D-1) Hydroelectric, wind generation, ocean thermal energy conversion, wave, solar, geothermal, biomass, and other renewable power generation facilities from natural resources; includes generation, conversion, and transmission facilities and access roads. Renewable energy projects shall minimize impacts to natural, cultural, and recreational resources, and shall be expedited in the application review and decisions-making process. A management plan approved simultaneously with the permit, is also required.*

3.1.1.4 Maui County Zoning

Land use is also regulated by the county through zoning districts, within which district standards are specified according to different types of use. The County of Maui's Comprehensive Zoning Ordinance identifies the uses that are considered appropriate in each of the County's zoning districts and establishes the minimum standards and conditions that should be met if those uses are to be permitted.

The Project is located in County Zone (AG) Agriculture. As the Project is within the State Conservation District, pursuant to HRS 205-5, land use is governed by DLNR.

3.1.1.5 Maui County Special Management Area

The Special Management Area (SMA) is a designated area extending inland from the shoreline (ranging from 100 yards to several miles in width) and is regulated by the counties under the Hawai'i Coastal Zone Management program. Within the Project Area, the very lower portion of the access road (approx. 1,200 ft) and the parking lot/staging area are within the SMA. An SMA minor permit was issued by the Maui County in 2005 for construction of a driveway apron and parking lot improvements on Tax Map Key 3-6-001:014 within the SMA (near Hono-a-Pi'ilani Highway) for the KWP I access road. KWP intends to utilize existing roads and staging areas and avoid development in the SMA under the 20-year life extension. Therefore, no SMA assessment or permit will be required.

3.1.1.6 West Maui and Kihei-Makena Community Plans

The Project site is located on the boundary of the West Maui and Kihei-Makena Community Plans. The Community Plans are vision plans and are not regulatory; however, the West Maui and Kihei-Makena Community Plans include policies in support of alternative energy.

3.1.2 Climate

The Hawaiian Islands have a tropical climate with mild temperatures and moderate humidity year-round, except at high elevations. Persistent northeasterly trade winds, significant rainfall variations over short distances, and infrequent severe storms characterize the climate. There are two main seasons: a 5-month summer season (May through September) and a winter period (October through April) (Giambelluca and Schroeder 1998). Summers are typically warmer and drier with northeasterly trade winds and fewer storms, while winters have more cloud cover, rainfall, and southerly and westerly winds (Giambelluca and Schroeder 1998). The surrounding Pacific Ocean and the islands' low-latitude location result in minimal diurnal and seasonal temperature variations.

Local climate conditions in Hawaiʻi are influenced by its rugged, mountainous topography and the persistent trade winds (Giambelluca and Schroeder 1998). The Project is on the leeward side of Maui, where mean annual rainfall ranges from 14.23 inches at lower elevations near Hono-a-Piʻilani Highway to 71.91 inches at the uppermost areas (Giambelluca et al. 2014). Higher rainfall typically occurs in the winter months from November to March (Giambelluca et al. 2014).

Moisture zones in the Project Area range from arid at the lowest points to very dry, dry, and seasonal mesic as elevation increases (Price et al. 2012). Daytime temperatures average in the 70s to 80s Fahrenheit, while nighttime temperatures range from the 60s to 70s Fahrenheit (Giambelluca et al. 2014). The prevailing wind direction is from the east.

3.1.3 Topography and Geology

The Project Area is situated on the southwestern slope of the West Maui shield dome volcano, on the dry leeward side of Maui. This area is underlain by basaltic and silicious rocks from the Wailuku Volcanics (1.3 – 2.0 million years old) and Honolua Volcanics (1.1 – 1.3 million years old) (Stearns and Macdonald 1942). The Wailuku basalts are highly permeable, characterized by swarms of dikes that confine water at higher elevations, while the Honolua rocks are less porous and poor conductors of water (Stearns and Macdonald 1942).

The Project Area spans a narrow strip of land running mauka (mountainside) to makai (oceanside) between Manawainui Gulch and Papalaua Gulch, with the terrain sloping downward at an average of 8 percent towards the coastline (WSB-Hawaii 1999). Notable topographic features in the vicinity include Kealaloloa Ridge, Puʻuanu and Puʻumoe hills to the east, Puʻuluau and Pōhakuloa hills downslope, and the gulches and ridges of the West Maui Forest Reserve to the west (KWP I 2006).

The West Maui mountains, part of the Hawaiian Emperor volcanic chain, along with Haleakalā on East Maui, form the island of Maui (KWP I 2006). These volcanoes are separated by a flat isthmus composed of lava flows, covered by dune sand and alluvial deposits. The most common formations in West Maui are basaltic aa and pahoehoe lava flows of the Wailuku Volcanic Series, with selected cinder cones, friable vitric tuff, and weathered andesitic lava (KWP I 2006).

3.1.4 Biology

Biological surveys occur at the site weekly to monitor compliance with existing permits. Biological resources at the site, including vegetation and wildlife habitat, have remained relatively constant during the life of the operating wind facility. The primary habitat in the Project Area is non-native grassland and woody shrubs, with a mix of non-native grasslands and native shrublands in the uppermost elevations above 915 meters (KWP I 2006). The natural resources and ecosystems in the Project Area are mostly disturbed from past land use and, in part, due to the construction and operation of the existing wind facility. Wildfires, including a fire in 2019, have further transformed the habitats and ecosystems in the area. The Project Area does not support any perennial streams or wetlands (USFWS 2022a).

3.1.4.1 Vegetation

Vegetation in the Project Area is dominated by non-native species and consists of primarily non-native grasslands with mixed non-native and native dry shrublands in the mid- to lower elevation areas, and non-native grasslands and predominately native mesic shrublands in the uppermost elevations above 915 meters. Non-native grasslands across the Project Area are variously dominated by kikuyu (*Cenchrus clandestinus*), broomsedge (*Andropogon virginicus*), molasses grass (*Melinus minutiflora*), and buffelgrass (*Cenchrus ciliaris*). Native mesic shrubland vegetation in the uppermost elevations consists of low stature ʻōhiʻa lehua (*Metrosideros polymorpha*), ʻaʻaliʻi (*Dodonaea viscosa*), ʻulei (*Osteomeles anthyllidifolia*), and pūkiawe (*Leptecophylla tameiameiae*) with native ferns uluhe (*Dicranopteris linearis*) and kīlau (*Pteridium aquilinum* subsp. *decompositum*) and is primarily located near the four most mauka turbines (turbines 1-4). Patches of mixed non-native and native dry shrublands around the lower elevation turbines are comprised of non-native lantana (*Lantana camara*) and native ʻaʻaliʻi, ʻilima (*Sida fallax*), and ʻakia (*Wikstroemia oahuensis*). Scattered individuals and dense patches of longleaf ironwood (*Casuarina glauca*) are present throughout the mid- to lower elevation turbine areas and roads, and a few individuals of kiawe (*Neltuma pallida*) and koa haole (*Leucaena leucocephala* subsp. *leucocephala*) occur within the grasslands along the road corridor below 600 meters. Vegetation in the Project Area has been disturbed from historic grazing, particularly in the mid- to lower elevations of the Project Area, a recent wildfire in 2019 affecting the mid- to lower elevations of the Project Area, and construction and operation of the existing wind facility; vegetation is currently managed within the wind facility and along access roads using mechanical and chemical methods (Tetra Tech 2022). Native vegetation appears to become increasingly more dominant above the Project Area toward the summit of Mauna Kahālāwai (Jacobi et al. 2017).

3.1.4.1.1 Listed Plant Species

No listed or otherwise rare plant species have been recorded in the Project Area in previous or recent surveys for the existing wind farm (Medeiros 1996, Medeiros 1998, Hobdy 2004a, Hobdy 2004b, Tetra Tech 2025). Additionally, no listed plant species or rare plants have been observed at the existing wind farm during operations or post-construction monitoring over the last 19 years.

3.1.4.1.2 Critical Plant Habitat

Although no listed plant species are known to occur in the Project Area, USFWS has designated critical habitat for 28 listed plant species within a portion of the Project Area (Figure 4). Montane Mesic Unit 5 encompasses approximately 11 acres of the northernmost portion of the Project Area and is designated critical habitat for 10 listed plant species. The unit was only occupied by two of the species, *Remya mauiensis* and *Santalum haleakalae* var. *lanaiense*, at the time of designation (USFWS 2016a). None of the 10 listed species with critical habitat in Montane Mesic Unit 5 occur in the Project Area.

Lowland Dry Unit 5 encompasses approximately 98 acres of the Project Area (Figure 4) and is designated critical habitat for 18 listed species. At the time of designation, this unit was occupied by nine of the species: *Asplenium dielerectum*, *Bidens campylotheca* subsp. *pentamera*, *Cenchrus agrimonioides, Gouania hillebrandii, Kadua coriacea, Remya mauiensis, Santalum haleakalae* var. *lanaiense*, *Spermolepis hawaiiensis,* and *Tetramolopium capillare* (USFWS 2016a). However, none of the 18 listed species with critical habitat in Lowland Dry Unit 5 occur in the Project Area. The DOFAW Manawainui Plant Sanctuary, which is situated in Lowland Dry Unit 5 and located adjacent to the upper eastern boundary of the Project Area, harbored two listed plant species, *Remya mauiensis* and *Asplenium dielerectum*, at the time of critical habitat designation (USFWS 2016a).

3.1.4.2 Wildlife

The Project Area provides habitat for both native and introduced wildlife. On-site knowledge of these species is well-known given 19 years of post-construction monitoring and other HCP compliance activities in the vicinity of the Project Area (KWP I 2024), as well as pre-construction surveys that occurred prior to construction (KWP I 2006). The Project Area is an operating wind facility and much of the area around the turbine pads and the site access roads is disturbed (e.g., graded and graveled) from the ongoing use. Non-native species recorded are those common in lowland and mid-elevation environments, including avian species Eurasian skylark (*Alauda arvensis*), ring-necked pheasant (*Phasianus colchicus*), black francolin (*Francolinus francolinus*), gray francolin (*Ortygornis pondicerianus*), African silverbill (*Euodice cantans*), and house finch (*Carpodacus mexicanus*), and mammals such as mice (*Mus musculus*), rats (*Rattus* spp.), mongoose (*Herpestes javanicus*), feral cats (*Felis catus*), dogs (*Canus familiaris*), and axis deer (*Axis axis*) (DOFAW n.d., KWP I 2006, KWP I 2024). Terrestrial invertebrates such as Hawaiian yellow-faced bees (*Hylaeus* spp.) have also been documented.

Several indigenous birds protected by the Migratory Bird Treaty Act (MBTA) and by HAR § 13-124-3 are known to or have the potential to occur in or fly through the Project Area; these include (but are not limited to) the Pacific golden plover/kōlea (*Pluvialis fulva*), wandering tattler/ʻūlili

(*Heteroscelus incanus*), white-tailed tropicbird/koaʻe kea (*Phaethon lepturus*), sooty tern/ʻewaʻewa (*Sterna fuscata*), wedge-tailed shearwater/ʻuaʻu kani (*Puffinus pacificus*), and the endemic Hawaiian short-eared owl/pueo (*Asio flammeus sandwichensis*) (Nishibayashi 1997, Nishibayashi 1998, KWP I 2006, KWP I 2024). The pueo has the potential to forage in or traverse the Project Area; it is not a listed species on Maui (but is state listed as endangered on the island of Oʻahu) and has been found as a fatality at the Project. Additional MBTA-protected species that have been introduced to the Hawaiian Islands and are known to occur in the Project Area include (but are not limited to) the barn owl (*Tyto alba*) and northern mockingbird (*Mimus polyglottos*). Documented fatalities of avian species at the facility are summarized in Table 1. Additional species that may be impacted in the future, based on fatality records from the adjacent KWP II facility, include Hawaiian honeycreeper/ʻapapane (*Himatione sanguinea;* endemic and MBTA), great frigatebird/ʻiwa (*Fregata minor;* indigenous and MBTA), and cattle egret (*Bubulcus ibis;* non-native but MBTA).

Table 1. Summary of Fatalities Documented at KWP I through FY 2025 for Avian Species not Covered by the ITP or ITL

Common Name	Scientific Name	Species Status	Number Documented Fatalities over 19 Years
Ring-necked Pheasant	*Phasianus colchicus*		37
Gray Francolin	*Francolinus pondicerianus*		32
Black Francolin	*Francolinus francolinus*		27
Koaʻe kea or White-tailed Tropicbird	*Phaethon lepturus*	MBTA, indigenous	25
Pueo or Hawaiian Short-eared Owl	*Asio flammeus sandwichensis*	MBTA, endemic, indigenous	16
Japanese White-eye or Warbling White-eye	*Zosterops japonicus*		12
Eurasian Skylark	*Alauda arvensis*		11
Common Mynah	*Acridotheres tristis*		6
Kōlea or Pacific Golden Plover	*Pluvialis fulva*	MBTA, indigenous	4
Spotted Dove	*Spilopelia chinensis*		4
African Silverbill	*Lonchura cantans*		4
Barn Owl	*Tyto alba*	MBTA, non-native	2
House Finch	*Haemorhous mexicanus*		2
Nutmeg Manakin	*Lonchura punctulata*		2
Northern Mockingbird	*Mimus polyglottos*	MBTA, non-native	1
Rock Pigeon	*Columba livia*		1
ʻEwaʻewa or Sooty Tern	*Onychoprion fuscatus*	MBTA, indigenous	1
ʻUaʻu kani or Wedge-tailed Shearwater	*Ardenna pacifica*	MBTA, indigenous	1
House Sparrow	*Passer domesticus*		1
Zebra Dove	*Geopelia striata*		1

The Covered Species include six federally and state listed wildlife species which have the potential to occur or use habitat in the Project Area: the nēnē, ōpeʻapeʻa, ʻaʻo, ʻuaʻu, ʻakēʻakē, and assimulans yellow-faced bee. Take of these species may occur during the permit term, therefore these species are included as covered species in this HCP. The decision is based on technical feedback received from USFWS and DOFAW on covered species during HCP coordination and on feedback received by the ESRC during a meeting on September 27, 2024.

Other state or federally listed species that were considered but ultimately not included as covered species are discussed in Section 4.7.

3.2 Mitigation Sites

In addition to the Project Area described in Section 3.1, the Permit Area includes all current and future mitigation sites (see Section 6.3). Details related to the known mitigation sites are provided below.

3.2.1 Nēnē Mitigation

3.2.1.1 Haleakalā Ranch

The Haleakalā Ranch mitigation area includes an approximately 1.3-acre release pen located at an elevation of 2,550 ft (Figure 5) in an area that is also used for cattle grazing in the dry season. The pen was constructed by DOFAW in 2011 with funding from KWP. Within and in the vicinity of the Haleakalā Ranch mitigation area are managed populations of nēnē. Between 2011 and 2024, a total of 56 nēnē were translocated by DOFAW to Haleakalā Ranch (DLNR 2025a).

Roughly 0.5 acres within the western half of the Haleakalā Ranch mitigation area are designated critical habitat for the endangered Blackburn's sphinx moth (*Manduca blackburni*). This area represents 0.00004 percent of the total 11,858 acres that make up the Kahikinui – Unit 4 critical habitat area. Blackburn's sphinx moth were known to occur in this critical habitat unit (Unit 4: Kahikinui) during the time of designation (USFWS 2003); however, key habitat features such as tree tobacco (*Nicotiana glauca*) and other known food and nectar source plants are not present within the mitigation area limiting the opportunity of the species to be present.

The vegetation within the Haleakalā Ranch mitigation area includes non-native grass species maintained to be low and lush (KWP I 2024). Other non-native species including lantana (*Lantana camara*), strawberry guava (*Psidium cattleianum*), Bocconia (*Bocconia frutescens*), and fireweed (*Senecio madagascariensis*) are both present and managed within the release pen itself.

The western half of the mitigation area is within the Lowland Dry Unit 1 critical habitat area. Lowland Dry Unit 1 is designated critical habitat for 19 listed plant species. The unit was occupied by six of these species (*Bonamia menziesii, Cenchrus agrimonioides, Flueggea neowawraea, Melicope adscendens, Santalum haleakalae* var. *lanaiense,* and *Spermolepis hawaiiensis*) at the time of designation (USFWS 2016a). Vegetation management is conducted as part of ongoing mitigation efforts and includes weed whacking along the fence line to aid scavenger trapping and regular mowing to maintain a low and lush grass status as preferred by the nēnē, and periodic removal of invasive species (such as fireweed) (KWP I 2024).

3.2.1.2 Pu'u o Hōkū Ranch

The Puʻu o Hōkū Ranch mitigation area includes an approximately 2.8-acre release pen located at an elevation of 350-400 feet (Figure 5). The pen was originally constructed in 2001 and rebuilt during 2024-2025. Within and in the vicinity of the Puʻu o Hōkū Ranch mitigation area are managed populations of nēnē. Between 2002 and 2005, a total of 74 nēnē were translocated by DOFAW to Puʻu o Hōkū Ranch (DLNR 2025b). While the translocation was originally successful and the population grew, by 2024 the population had decreased to 6 known individuals (NRAG 2024). DOFAW reconstructed the release pen in 2024-2025, and in April 2025 an additional 24 birds were translocated from Kauaʻi to the Puʻu o Hōkū Ranch, bringing the total population on the ranch to 31 nēnē (24 translocated plus 4 remaining adults and 3 fledglings from the 2025 breeding season).

The vegetation within the Puʻu o Hōkū Ranch mitigation area is characterized as alien dry shrubland (Price et al. 2015). There is no designated critical plant habitat within this mitigation area.

3.2.2 ʻŌpeʻapeʻa Mitigation

Bat mitigation will occur within Maui Nui and will include a combination of mitigation projects on Maui, Molokaʻi, and Lānaʻi. A detailed mitigation plan is presented in this HCP for a project on Molokai, while potential projects on Lānaʻi and Maui are discussed more generally.

3.2.2.1 Pu'u O Hōkū Ranch

A roughly 800-acre mitigation area will be located on the eastern edge of Molokaʻi on an area used for a combination of grazing and fruit production, along with large tracts of forest. The mitigation area ranges in elevation from sea level to 1,460 ft, and will include a combination of forest management and outplanting to increase the quality and quantity of habitat.

3.2.2.2 ʻŌpeʻapeʻa Mitigation on Maui

KWP I will continue to pursue mitigation opportunities on Maui in order to place mitigation closer to where impacts are occurring. Mitigation on Maui will preferably be located in a location that is largely below 1,000 meters in elevation in order to increase the potential that the site could be used as a maternity roosting location. However, future mitigation sites will be considered on a case by case basis by DOFAW and USFWS and sites located higher in elevation may be considered, provided it is determined that the location and mitigation activities result in a net conservation benefit for the species. The details of future mitigation projects will be outlined in a site specific mitigation plan which will be reviewed and approved by DOFAW and USFWS.

3.2.2.3 ʻŌpeʻapeʻa Mitigation on Lānaʻi

KWP I may also pursue mitigation opportunities on Lānaʻi. Mitigation on Lānaʻi will preferably be located in a location that is below 1,000 meters in elevation in order to increase the potential that the site could be used as a maternity roosting location. However, future mitigation sites will be considered on a case by case basis by DOFAW and USFWS and sites located higher in elevation may be considered, provided it is determined that the location and mitigation activities result in a net conservation benefit for the species. The details of future mitigation projects will be outlined in a site specific mitigation plan which will be reviewed and approved by DOFAW and USFWS.

3.2.3 ʻUaʻu Mitigation

3.2.3.1 Alpine Wildlife Sanctuary

Within the Alpine Wildlife Sanctuary in East Maui (Figure 7a), breeding colonies of ʻuaʻu occur. This will be the location of mitigation activities designed to provide a net conservation benefit for the species. The majority of vegetation within the Alpine Wildlife Sanctuary mitigation area is characterized as very sparce vegetation to unvegetated (less than 5 percent plant cover) (Price et al. 2015). Throughout the area are pockets of native dry shrubland. There is no designated critical habitat within this mitigation area.

3.2.3.2 Greater Hiʻi area of Lānaʻi

Within the Pūlama Lānaʻi mitigation area in the Greater Hiʻi area of Lānaʻi (Figure 7b), breeding colonies of ʻuaʻu occur. This will be an alternative location of mitigation activities designed to provide a net conservation benefit for the species. The majority of vegetation within the Pūlama Lānaʻi mitigation area is characterized as low-stature ohia wet forest, which is dominated by native vegetation (Price et al. 2015). Throughout the area are pockets of native and alien mesic shrubland. There is no designated critical habitat within this mitigation area.

3.2.4 ʻAʻo Mitigation

The Makamakaʻole site currently consists of two 4.5-acre fenced enclosures (total of 9 acres; Figure 8). It is located at an elevation of approximately 1,850 to 2,050 ft, and construction was completed in 2013. The enclosures are located within the West Maui Natural Area Reserve and the West Maui Forest Reserve.

The Makamakaʻole area in West Maui is a managed seabird enclosure originally intended to promote breeding of two endangered seabird species: the ʻuaʻu and ʻaʻo. Although the ʻuaʻu has not been documented breeding within the enclosed mitigation area, breeding may occur in the vicinity. ʻAkēʻakē breeding is also suspected to occur in the vicinity of the Makamakaʻole mitigation area (Maui Nui Seabirds, pers comm., February 20, 2025). Therefore both species (ʻuaʻu and ʻakēʻakē), as well as the ʻaʻo which has been documented breeding within the fenced enclosure, may utilize the airspace above and within the Makamakaʻole mitigation site for transiting and may nest within the Makamakaʻole mitigation site at some point during the proposed mitigation activities.

Approximately 3.8 acres of the southern portion of the Makamakaʻole mitigation area is within Lowland Wet – Unit 4, designated critical habitat for ʻakohekohe and kiwikiu. Neither bird species was known to occur in the area at the time of designation (USFWS 2016a). Furthermore, this designation as critical habitat occurred after construction of the predator fencing and establishment of the artificial burrows.

The vegetation within the Makamakaʻole mitigation area is characterized as alien dry shrubland (Price et al. 2015). The southern portion of the mitigation area is within the Lowland Wet Unit 4 critical habitat area. Lowland Wet Unit 4 is designated critical habitat for 26 listed plant species. The unit was only occupied by two of these species, *Bidens conjuncta* and *Cyanea asplenifolia*, at the time of designation (USFWS 2016a). Vegetation management is conducted as part of ongoing mitigation efforts and includes weed whacking along the fence line to aid scavenger trapping.

3.2.5 ʻAkēʻakē Mitigation

The final location(s) for ʻakēʻakē is not yet known, yet will occur within the Hawaiian Islands. Known colonies on Kauaʻi occupy crevices in steep cliff faces, covered with patches of moss and lichen and dominated by native plant species (Wood et al. 2001, as cited in Slotterback 2024). On Maui and the island of Hawaiʻi, they are known to occur on high, barren lava flows, nesting in burrows or crevices in rock or lava (DLNR 2015d).

3.2.6 Assimulans Yellow-faced Bee Mitigation

Mitigation for the assimulans yellow-faced bee will take place within an approximately 18-acre section of the Project Area and adjacent lands within the same TMK (Figure 9). See Section 3.1 for additional details on the Project Area.

4.0 Covered Species

The current ITP and ITL for KWP I include coverage for four Covered Species, which are summarized in Table 2 and detailed in the following sections. Take coverage for two additional species, the ʻakēʻakē and the assimulans yellow-faced bee, is being sought based on discussions with DOFAW and USFWS. The list of Covered Species was developed based on 19 years of site-specific operational data, consultation with USFWS, DOFAW, and the ESRC, and a review using the USFWS Information for Planning and Consultation tool (Appendix B). Further details about species considered but not included for coverage are discussed in Section 4.6.

Table 2. Summary of Covered Species Take at KWP I through FY 2025

Covered Species	2006 HCP Tiers of Requested Take[1, 2]			Number Detected[3]	Total Adjusted Take through FY 2025 (80% UCL)[4]
	Baseline Tier (Tier 1)	Higher Tier (Tier 2)	Notably Higher Tier (Tier 3)		
Nēnē (Hawaiian goose; *Branta sandvicensis)*	60	80-100	100-200	35	≤56
ʻŌpeʻapeʻa (Hawaiian hoary bat; *Lasiurus semotus*)	20	50	100-200	13	≤32

Covered Species	2006 HCP Tiers of Requested Take[1, 2]			Number Detected[3]	Total Adjusted Take through FY 2025 (80% UCL)[4]
	Baseline Tier (Tier 1)	Higher Tier (Tier 2)	Notably Higher Tier (Tier 3)		
ʻUaʻu (Hawaiian petrel; *Pterodroma sandwichensis*)	25	38	n/a	8	≤24
ʻAʻo (Newell's shearwater; *Puffinus auricularis newelli*)	4	8	n/a	0	No take observed
ʻAkēʻakē (Band-rumped storm petrel; *Oceanodroma castro*)	n/a	n/a	n/a	0	No take observed
Nalo meli maoli (Assimulans yellow-faced bee; *Hylaeus assimulans*)	n/a	n/a	n/a	n/a	n/a

1. Or as amended in the ITL/ITP in 2012 or 2015/2016.
2. Tiers are not applicable to this HCP except to provide context.
3. Includes standardized finds and incidental finds.
4. Includes indirect take; based on preliminary data analysis to be updated as needed after annual reporting. UCL = Upper Credible Level

4.1 Nēnē (Hawaiian Goose)

Nēne are the state bird of Hawaiʻi. The nēnē is one of the most isolated, sedentary, and threatened waterfowl species, and evolved from Canada geese (*Branta canadensis*) that settled in Hawaiʻi over half a million years ago (DLNR 2020). Adult nēnē are predominantly dark brown or sepia, featuring a black face and crown, cream-colored cheeks, and a buff neck with black streaks. Females are smaller than males. Unlike other geese, nēnē are more terrestrial, with longer legs and reduced webbing between their toes, which likely aids in navigating the local terrain (i.e., the igneous rock from old lava flows). They graze and browse on the leaves, seeds, flowers, and fruits of at least 50 different native and nonnative grasses, sedges, composites, and shrubs (DLNR 2015a).

4.1.1 Status

Nēnē are listed as federally threatened under the ESA (32 FR 4001, 3/11/1967; 84 FR 69918, 12/19/2019) and state endangered under HRS Chapter 195D. The nēnē was originally listed in 1970 as federally endangered under the Endangered Species Conservation Act and then in 1973 under the ESA, which was the status when the original HCP was written. Since then, it has been downlisted from federally endangered to threatened due to the increase in population numbers based on the recovery plan (USFWS 2019). The state status remains endangered.

4.1.2 Range

The nēnē is found only in Hawai'i (Banko et al. 2020). While once widely distributed, today the species is primarily located on the islands of Hawai'i, Maui, and Kaua'i, with a small population on Moloka'i, and records of recent stopovers and one successful breeding attempt on O'ahu (DOFAW, pers. comm., October 29, 2024). However, within these four islands, the known range of the nēnē is more limited (Banko et al. 2020).

Habitat includes high-elevation lava flows, volcanic deserts, alpine grasslands, and shrublands. Their current populations are mainly determined by the locations where they were released from captivity. On Hawai'i, they range from sea level to 7,900 feet. In Kaua'i, they are found from sea level to 600 feet, with populations around Kipu Kai and Kapa'a. On Maui, they inhabit elevations of 5,500-8,000 feet on Haleakalā and 3,000-4,000 feet on the West Maui Mountains (NPS 2023). Nēnē often exploit highly altered habitats such as pastures and golf courses (Banko et al. 2020).

4.1.3 Population Status and Trend

The nēnē faced a severe population decline during the 19th and 20th centuries due to habitat loss, hunting, and the introduction of predators such as mongoose, rats, and cats. By the 1950s, fewer than 30 individuals remained in the wild (USFWS 2022b). However, extensive conservation efforts, including captive breeding programs and habitat restoration, began in the mid-20th century. This included release of over 2,000 nēnē between 1960 and 1997 (USFWS 2022b). These efforts led to the successful reintroduction of the nēnē to several Hawaiian Islands, including Hawai'i, Maui, and Kaua'i (USFWS 2022b). By 1997, there were an estimated 885 nēnē in Hawai'i (Banko et al. 2020). The population has since rebounded to around 3,862 individuals as of 2022 (USFWS 2022b). This includes growth from 236 nēnē on Maui in 1997 (Black et al. 1997) to 429 in 2023 (Nēnē Recovery Action Group 2024). The USFWS determined that populations on Maui are stable without external supplementation (84 Federal Register [FR] 69918-69947).

4.1.4 Life History and Threats to Species

Nēnē breed from August to April, nesting on the ground with one to six eggs and an average of approximately three eggs (Banko et al. 2020). Incubation lasts about 30 days, with both parents involved (Banko et al. 2020). Chicks are precocial, able to walk and feed shortly after hatching, and fledge at 10 to 14 weeks of age (Banko et al. 2020). They become independent of their parents around a year of age, reaching sexual maturity at 1 to 2 years, with median first breeding age of 3 years for females and 2 years for males (Banko et al. 2020, Hu 1998). The oldest wild nēnē on record was 28 years old, with records of breeding as old as 23 years, and with captive records as old as 42 years (Banko et al. 2020, Hu 1998). Survival and mortality rates are affected by year and age class (Black et al. 1997).

Nēnē are non-migratory but may move between elevations seasonally to access resources (USFWS 2022b). Seasonal movements are typically in response to seasonal changes in food availability, which is related to rainfall (Banko et al. 2020). On Maui today, nēnē movements are primarily within mid- and high-elevation habitats (Banko et al. 2020). Nēnē typically arrive on nesting grounds between August and September, remaining until April when they have molted and the young have fledged (Banko et al. 2020).

As summarized in Banko et al. (2020), nēnē pairs do not attempt to nest every year – on average, 58 percent of wild pairs nested on Hawaiʻi during the 1978-1981 breeding season, 46 percent nested on Maui in the 1979-1981 breeding periods, and 66 percent nested in Hawaiʻi Volcanoes National Park at elevations under 1,220 meters during 1995 and 1996 (Hu 1998, Banko 1992). Overall, this aligns well with the 60 percent chance of active breeding used in the KWP II HCP (KWP II 2019) for the peak breeding months of October through March, with an assumed lower percentage (25 percent) outside the peak season (April, August, and September). Males and females care for young fairly equally.

Most nesting failures are due to predation by mongoose, which were found to destroy 34 percent of clutches in one study. Other nest predators include rats, and goslings are occasionally taken by mongoose, barn owls, pueo, cats, and dogs (Banko 1992, Banko et al. 2020). Eggs and goslings are also at risk of exposure during storms (as cited in Banko et al. 2020). While goslings suffer high mortality, once fledged survival of juveniles (to age 1) and adults is high (Hu 1998). Specifically, Hu (1998) found that survival from laying to fledgling averages around 12 percent, but survival of fledglings averages 84 percent for females and 95 percent for males. Annual mortality of wild and captive-reared released birds in the first year (fledgling to 1 year) was 16.8 percent for females and 3.3 percent for males from data in Hawaiʻi Volcanoes National Park (Banko et al. 2020). Estimated annual mortality of adults has ranged from 0 to 87 percent (Black et al. 1997), with Hu (1998) estimating it at 13.22 percent for females and 11.33 percent for males. Table 3 summarizes the available data on annual survivorship for nēnē by age class.

Table 3. Summary of Annual Survivorship Data for Nēnē by Age Class

Age Class	Females	Males	Average	Source
Laying to fledgling	12%	12%	12.0%	Hu 1998
Fledgling – 1 year	83.2%	96.7%	90.0%	Banko et al. 2020
1 year – 2 years	97.2%	94.4%	95.8%	Hu 1998
2 years – 3 years	92.7%	n/a – adulthood reached at 2 years	n/a	Hu 1998
Adult (annual)	86.8%	88.7%	92.8%	Hu 1998

Based on the data presented in Table 3, survival of fledglings to breeding age is calculated as per sex follows:

$$Survival\ of\ females\ from\ fledging\ to\ breeding\ age = 0.832 * 0.972 * 0.927 = 0.75$$

$$Survival\ of\ males\ from\ fledging\ to\ breeding\ age = 0.967 * 0.944 = 0.91$$

Therefore, an estimated 75 percent of female fledglings and 91 percent of male fledglings survive to breeding age, or an average survival to breeding age of 0.83, assuming an equal sex ratio of fledglings[3]. Overall, the average number of fledglings produced by a pair of nēnē annually is estimated at 0.3 fledgling per pair (Hu 1998, KWP II 2019).

4.1.5 Occurrence in the Project Area

Beginning in 1994, DOFAW began establishing a population of nēnē in the West Maui mountains, specifically through release of 104 nēnē through 2006 at the Hanaula release pen (DOFAW 2009, as cited in KWP II 2019), located approximately 1,800 feet from the nearest KWP I turbine (Figure 10). The pen was managed through approximately 2018 (DOFAW HCP, pers. comm., February 13, 2025). Little is known about the exact distribution and movements of the birds released at Hanaula, although they have been recorded as far west as Lahaina and as far east as Haleakalā National Park, indicating that at least some birds from this release site move extensively around the island (KWP I 2006). As of 2015, the estimated West Maui population of nēnē was 169 birds (as cited in KWP II 2019). The Nēnē Recovery Action Group has stopped estimating a separate population for West Maui due to increased movements of many individuals across the island, and now only reports island-wide numbers (Nēnē Recovery Action Group 2024).

4.1.5.1 On-site Observations

At the time of construction, nēnē were not believed to be nesting within the Project Area (J. Medeiros, Maui DOFAW, pers. comm., as cited in KWP I 2006). A nesting survey was conducted prior to construction within the Project Area within a 100-meter buffer zone of turbine locations. A single active nest was found 500 meters downslope from WTG 20 and a family group with goslings were observed near Turbine 3 (KWP I 2007). Since construction, observations at KWP I and KWP II

[3] This assumption is based on the 12 percent survival from laying to fledgling of both sexes (Hu 1998).

confirm that nēnē are resident in and around the Project Area and are observed on the ground browsing, socializing, foraging and nesting, and using habitat and terrain features for cover. Nēnē fly at altitudes that are within the rotor swept area of the KWP I and KWP II WTGs, with most birds observed on the ground during daylight and crepuscular periods (KWP II 2019).

During routine post-construction monitoring surveys, nēnē are regularly seen on or near turbine pads and roads between October and May, and nēnē are also known to nest in the area (Figure 3). See Section 6.4 for details of KWP I's proposal to implement monitoring of nēnē observations under this HCP.

4.1.5.2 Fatalities

A total of 35 nēnē have been recorded as fatalities at the KWP I facility, including fatalities from 2007 through 2025 (Table 4). See Section 5.1.1.1 for the estimated number of fatalities to-date, which includes unobserved direct take and indirect take for an estimated take of ≤ 56 nēnē at the 80 percent upper credible level (UCL) over the first 19 years of operations.

Table 4. Nēnē Fatalities by Fiscal Year at KWP I

Fiscal Year	Nēnē Observed Direct Take[1]	Nēnē Incidental Fatality Observations	Total
2007	0	0	0
2008	2	0	2
2009	1	0	1
2010	1	0	1
2011	5	0	5
2012	1	0	1
2013	4	0	4
2014	3	0	3
2015	4	0	4
2016	1	0	1
2017	0	1	1
2018	1	0	1
2019	2	0	2
2020	0	0	0
2021	0	2[2]	2
2022	1	0	1
2023	1	2	3
2024	0	3	3
2025	0	0	0
Total	**27**	**8**	**35**

Fiscal Year	Nēnē Observed Direct Take[1]	Nēnē Incidental Fatality Observations	Total
1. Observed direct take includes fatalities used in fatality estimation (including fatalities coded as incidental that would likely have been found on the next search); incidental take includes fatalities found outside the search area. Gosling fatalities found on site that were not attributed to wind farm operations are not included. 2. Includes one juvenile fatality found outside of search area. Based on estimated age and carcass condition at discovery, it is unknown if carcass was attributed to Project operations or other circumstances.			

As shown in Exhibit 1, fatalities have been found from October through June. The majority (68.6 percent) of fatalities occur during the peak breeding season of October through March, with 11.4 percent occurring outside of peak breeding season (April, August, or September) and 20.0 percent occurring during the nonbreeding season (May through July).

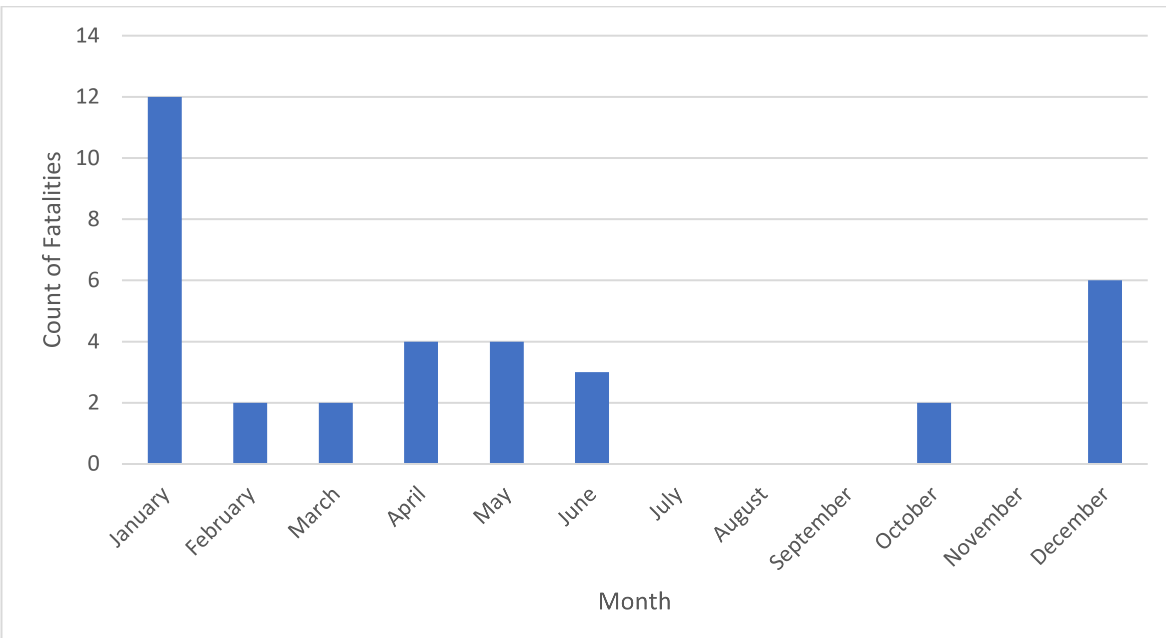

Exhibit 1. Nēnē Fatalities by Month for the KWP I Facility (Data through FY 2024)

Spatially, fatalities have been found at 15 of the 20 turbines on site, as shown in Exhibit 2. The majority (77.1 percent) have been found at the more makai turbines (turbines 11 through 20; Figure 1). Location information on live nēnē observations have been recorded during canine searches at the Project since 2020. This data was analyzed to determine areas of highest estimated nēnē use; subsequently, adaptively managed vegetation control occurred around Turbine 14 in FY 2023 to reduce nesting habitat (Tetra Tech 2021). This work occurred in Q1 of FY 2023 and target plant species for removal included ironwood (*Casuarina equisetifolia*), Christmas berry (*Schinus terebinthifolius)*, lantana, and koa haole using cut stump/basal treatment methods. Additionally, all debris piles were removed and scattered with the use of a woodchipper onsite (Tetra Tech 2023).

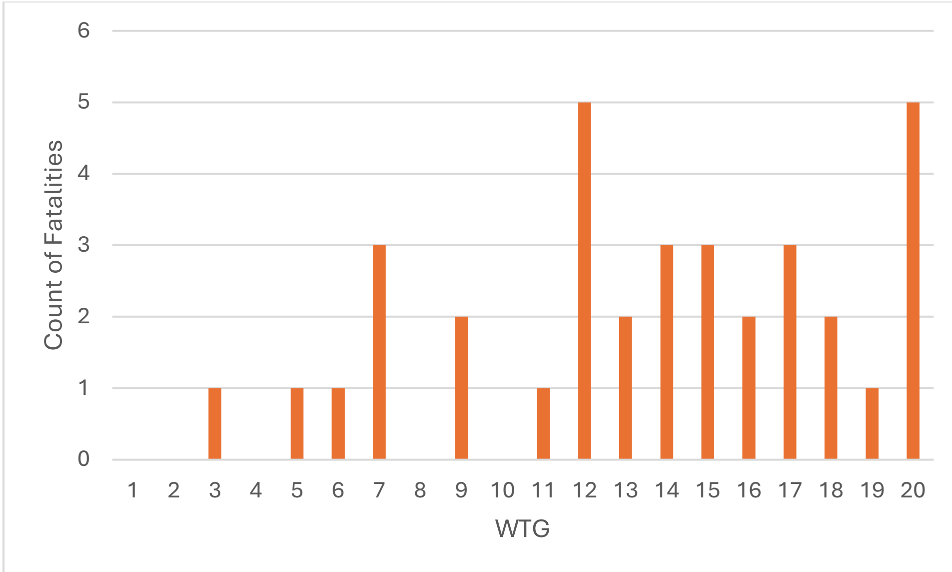

Exhibit 2. Nēnē Fatalities by Turbine (WTG) Number for the KWP I Facility (Data through FY 2024)

Note: This does not account for any difference in search area around each turbine.

4.2 ʻŌpeʻapeʻa (Hawaiian Hoary Bat)

ʻŌpeʻapeʻa are characterized by their fur which is a mix of dark brown or black at the base with gray or reddish lighter tips, giving it a frosted appearance. Adult bats typically weigh between 14 to 24 grams and have a wingspan of about 30 to 35 centimeters (Jacobs 1996).

4.2.1 Status

The ʻōpeʻapeʻa is listed as federally endangered in 1970 under the ESA (35 FR 16047) and as state endangered under HRS Chapter 195D (DLNR 2024a, USFWS 2024a). The federal and state listing of ʻōpeʻapeʻa as an endangered species was based on apparent habitat loss, a lack of knowledge regarding the species' life history requirements and threats to the species, and an inferred decline in the population without data directly supporting a decline in the population size (USFWS 1998).

4.2.2 Range

ʻŌpeʻapeʻa are endemic to the Hawaiian Islands, found on the islands of Hawaiʻi, Maui, Kauaʻi, Molokaʻi, Lānaʻi, and Oʻahu (Tomich 1986). Historical observations of bats have occurred at all elevations across the six major Hawaiian islands, including up to 13,200 feet (4,023 meters) on Hawaiʻi Island (Baldwin 1950, Hawaiʻi Heritage Program 1996). The movements of ʻōpeʻapeʻa across elevational gradients are influenced by seasonal variations in insect abundance, temperature, rainfall, and reproductive requirements (Menard 2001, Todd 2012, Gorresen et al. 2013).

Recent genetic analyses provide new insight into inter-island dispersal patterns of ʻōpeʻapeʻa across the Hawaiian archipelago. Using mitochondrial DNA and nuclear microsatellite markers, Pinzari et al. (2023) revealed significant genetic structure among island populations, with limited gene flow occurring between islands in recent generations. Historical migration modeling suggested that Maui may have served as a source population for both Hawaiʻi and Oʻahu, but contemporary migration rates were low and not significantly different from zero. Additionally, results indicated that male-biased dispersal may occur within island, particularly on Maui, but provided little evidence of recent female dispersal or widespread inter-island movement. These findings support the idea that while long-distance dispersal has occurred historically, present-day populations are largely isolated, reinforcing the importance of managing populations at the island level for conservation purposes. The ʻōpeʻapeʻa use a wide range of elevations, from 33 to 2,341 meters (Hoeh et al. 2023). The ʻōpeʻapeʻa breed below 1,000 meters in elevation (Menard 2001).

4.2.3 Population Status and Trend

The population status of the ʻōpeʻapeʻa is unknown, and it is not considered feasible to determine an actual population estimate for a single island at this time (ESRC and DOFAW 2024). Currently, the ESRC guidance suggests assuming that the population is not more than 1,500 individuals on Maui (ESRC and DOFAW 2024); however the accuracy of this population assessment is questionable as it is based on "extremely limited information" (ESRC and DOFAW 2024). When combined with the estimates from Oʻahu and Hawaiʻi Island, the statewide population is estimated at 6,600 individuals, though this does not include estimates from other islands (ESRC and DOFAW 2024). Population trends based on changes in estimates of annual rates of occupancy have been conducted on the islands of Hawaiʻi and Oʻahu and suggest that the populations of bats on these islands are stable to increasing (Gorresen at al. 2013, Thompson and Starcevich 2022). No island wide surveys have been conducted for the islands of Kauaʻi and Maui and estimates of population size and trends are unknown (USFWS 2021a). From the limited studies that have been conducted on Maui ʻōpeʻapeʻa appear to have a wide distribution and forage across the fragmented habitats on Maui (Todd et al. 2016, H.T. Harvey 2019, Thompson and Starcevich 2021).

Genetic analyses of ʻōpeʻapeʻa indicate that Maui harbors the highest per-island genetic diversity compared to the islands of Hawaiʻi, Oʻahu, and Kauaʻi, supporting the hypothesis that Maui may have been an original source population in the species' colonization history (Pinzari et al. 2023). Despite this relatively high genetic diversity, contemporary effective population estimates (N_{eC}) for Maui were among the lowest reported in the study (N_{eC} = 106; 95 percent confidence interval 55-344), after Oʻahu, and showed evidence of a historical population bottleneck and indicate that the population is susceptible to the erosion of genetic viability and adaptive potential. Additionally, while historical gene flow from Maui to other islands appears to have occurred, recent migration rates are extremely limited, suggesting that Maui's population is now largely genetically isolated (Pinzari et al. 2023).

4.2.4 Life History and Threats to Species

Research and monitoring surveys conducted over the past 20 years have significantly contributed to our understanding of the ʻōpeʻapeʻa including distribution, diet, habitat use, and movements. However, significant gaps remain in our knowledge of the species' life history, including reproductive rates, longevity, survival rates, and other key ecological factors essential for effective conservation efforts. Despite these knowledge gaps, studies conducted to date have revealed important insights into the species' ecological adaptability.

The ʻōpeʻapeʻa is regarded as a habitat generalist and demonstrates considerable flexibility in its use of native and non-native habitats for roosting and foraging. Radio telemetry studies on Hawaiʻi Island have documented the hoary bat traversing greater than 10.5 miles (17 kilometers) from its roost site to forage among a mosaic of habitat elements such as the edges of cluttered forests and within open spaces including forest gaps, gulches, windrows, roadways, open water, pastures, and above forest canopy (Bonaccorso et al. 2015, Whitaker and Tomich 1983, Belwood and Fullard 1984, Jacobs 1996 and 1999, H.T. Harvey 2019).

Telemetry-based movement data further reveal that foraging activity is not evenly distributed within the bat's foraging range, but rather concentrated in several disjunct areas across their Foraging Ranges (FR) known as Core Use Areas (CUAs). Across 28 radio tracked individuals, the mean (FR) was 570 acres (230 hectares), with a median of 211 acres (85.7 hectares), while the CUAs (where approximately 50 percent of all foraging activity occurred) averaged 64 acres (25.5 hectares) with a median of 22.7 acres (9.2 hectares). FR and CUA were not found to vary significantly by sex or age. Notably, most individuals used multiple CUAs, with some bats utilizing up to eight spatially separated foraging areas, reflecting the patchy distribution of insect prey and habitat suitability. This spatial behavior underscores the importance of considering the bat's need for a network of high-quality foraging patches across a broader landscape matrix (Bonaccorso et al. 2015).

ʻŌpeʻapeʻa are a solitary, foliage roosting bat species that use both native and non-native tree species for roosting. At least 21 different roost trees species have been identified to date (Todd 2012, Montoya-Aiona et al. 2023). The diversity in roost trees used by the ōpeʻapeʻa is primarily among non-native species. Only three native tree species, ʻōhiʻa lehua (*Metrosideros polymorpha*), lama (*Diospyros sandwicensis*), and uluhe (*Dicranopteris linearis*), have been confirmed being used by ōpeʻapeʻa. Habitat use studies of radio telemetered bats indicate that ōpeʻapeʻa select roost trees with a mean height of 68 feet (21 meters), a mean diameter at breast height of 29 inches (75 centimeters), a mean canopy cover of 43 percent, and are a mean distance of 95 feet (29 meters) from the forest edge (Montoya-Aiona et al. 2023). These results suggest that vegetation structure, which provide protection and thermoregulatory benefits, and not tree species, are the deciding factors of roosting use by ōpeʻapeʻa.

The diet of ʻōpeʻapeʻa consists of a variety of insects encompassing 47 families from 9 different orders (Todd 2012, H.T. Harvey 2019, Pinzari et al. 2019). However, Lepidoptera (moths) represent the most abundant and diverse insect taxa in the diet of hoary bats, followed by Coleoptera (beetles) (Todd 2012, H.T. Harvey 2019, Pinzari et al. 2019). Following lactation, a period of high energetic demand, ōpeʻapeʻa have been shown to selectively forage on Coleoptera, which may be easier to catch and satisfy additional nutrient demands (Todd 2012). For many bat species, including ōpeʻapeʻa, increased rates in activity are associated with increased abundance of insect prey (Gorresen et al. 2018, Todd 2012, Haddad et al. 2001).

On Hawaiʻi Island, ōpeʻapeʻa have been shown to migrate along elevational gradients in response to changes in temperature, rainfall, and food resources (Menard 2001, Todd 2012, Bonaccorso et al. 2015). Similar patterns have been observed at several locations on Oʻahu (Thompson and Starcevich 2022, Gorresen et al. 2015), Maui (Todd et al. 2016, Tetra Tech 2020a, Tetra Tech 2020b, Thompson and Starcevich 2021), and Kauaʻi (Bonaccorso and Pinzari 2011, NAVFAC 2024). Generally, ōpeʻapeʻa are most active at lower elevations from late spring through summer and early fall, coinciding with the reproductive season. During the winter months which coincides with the non-breeding season, bats will occupy higher elevations (Menard 2001, Todd 2012, Gorresen et al. 2013). Some variations may exist on islands (i.e., Kauaʻi, Lānaʻi, Molokaʻi) where differences in elevation are not as pronounced. Hawaiian hoary bat breeding occurs at elevations below 1,000 meters in elevation (Menard 2001).

Although the ʻōpeʻapeʻa has shown remarkable flexibility its use of habitats, the species' adaptability does not make it immune to environmental pressures. Documented sources of direct mortality include wind energy infrastructure through collision with wind turbines and collision and impalement on barbed wire fences (Zimpfer and Bonaccorso 2010). Other threats or sources of pressure include food competition (Bernard et al. 2016) and the loss and degradation of habitat, particularly from development and agriculture, that contribute to the loss and availability of suitable foraging and roosting areas (USFWS 1998). Unfortunately, the full breadth of threats affecting the species are not well understood and require further investigation and study.

4.2.5 Occurrence in and near the Project Area

4.2.5.1 Acoustic Monitoring

Per ESRC and DOFAW (2021), bat acoustic monitoring at and in the vicinity of each wind facility is recommended. To document bat occurrence, acoustic monitoring for bat activity at the Project has been ongoing since August 2008 and conducted voluntarily after the initial 12-month 2006-HCP-required period. The objective of bat acoustic monitoring is to understand annual and seasonal variations in bat activity. Due to equipment changes and unequal sampling periods prior to FY 2014, only data from FY 2014/FY 2015 through FY 2024 are included in site activity analysis.

From FY 2014 to FY 2024, there were marginal fluctuations in interannual detection rates, and acoustic activity follows a general trend of peaking during the lactation and post-lactation periods (Exhibit 3). There has been a significant increasing trend in the annual detection rates between FY 2015 and FY 2024 (KWP I 2024; Exhibit 4).

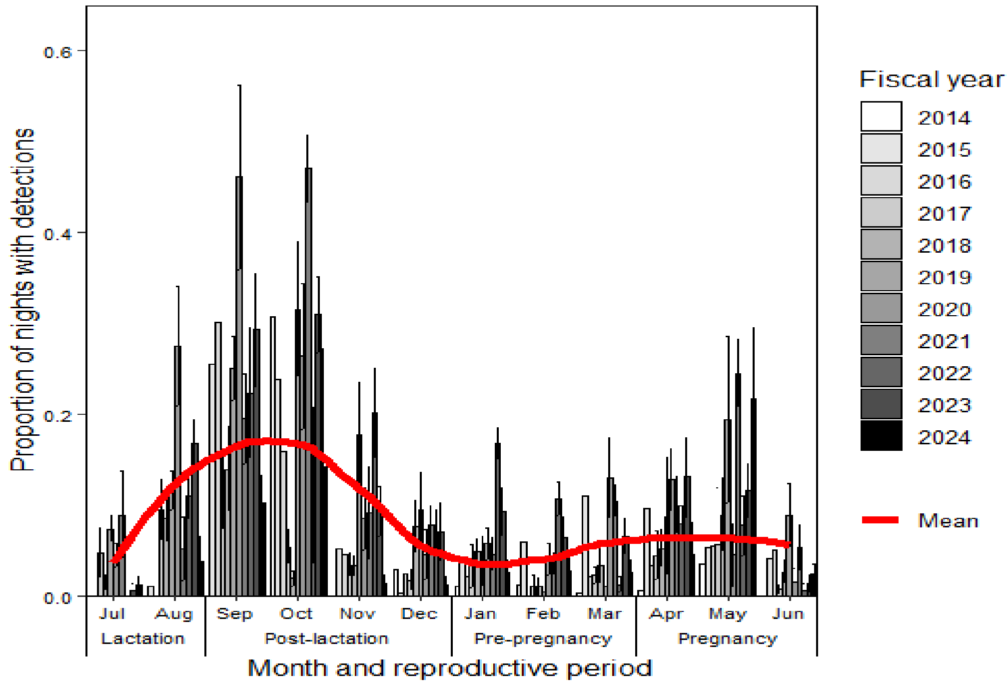

Exhibit 3. Monthly Bat Detection Rates, FY 2014 to FY 2024, with Monthly Mean, with Corresponding Reproductive Periods (KWP I 2024)

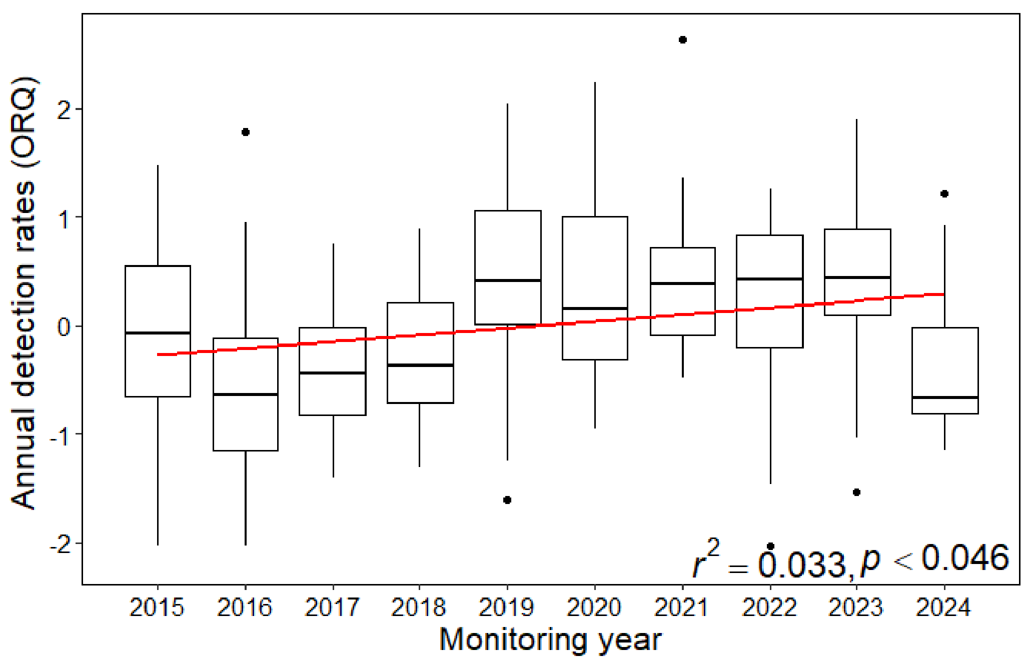

Exhibit 4. Box-plot with Linear Regression Showing the Increasing Trend in the Annual Detection Rate at the Project Between FY 2015 and FY 2024 (KWP I 2024)

*Note: Ordered Quantile normalization transformation (ORQ). All data were normalized using this transformation.

4.2.5.2 Fatalities

A total of 13 ʻōpeʻapeʻa have been found as fatalities at KWP I. The total estimated take, including observed, unobserved, and indirect take, is estimated at ≤32 ʻōpeʻapeʻa at the 80 percent UCL. Of the 12 bat fatalities with known sex there was an equal 50:50 sex ratio: six females and six males. Similarly, a study by Pinzari and Bonaccorso (2018) looked at 60 ʻōpeʻapeʻa fatalities from wind facilities on Maui (including those from the KWPs) up to May 2022 and also found an equal number of males and females. This consistent 50:50 sex ratio suggests a balanced sex ratio in the bat population affected by these wind facilities.

Wind related fatalities across all Maui wind farms have been discovered in every calendar month (Pinzari and Bonaccorso 2018). At KWP I, bat fatalities have been discovered in 8 of the 12 months (Table 5, Exhibit 5). Seven fatalities occurred prior to the implementation of low wind speed curtailment (LWSC), and 5 have occurred since implementation of LWSC in the months of August (n=2), November (n=2) and March (n=1). Spatially, fatalities have been documented at nine of the 20 turbines, with distribution appearing to be spatially random (Exhibit 6).

Table 5. Summary of ʻŌpeʻapeʻa Take at the KWP I Wind Facility To-Date

Date of Carcass Discovery	Month	Turbine ID	LWSC[1]	Sex[2]
9/26/2008	September	8	No	Unknown
4/26/2011	April	16	No	F
4/11/2013	April	8	No	M
4/17/2013	April	2	No	M
9/10/2013	September	10	No	F
12/14/2013	December	18	No	M
2/24/2014	February	16	No	M
5/7/2014	May	6	No	F
8/30/2016	August	9	Yes	M
11/21/2016	November	18	Yes	F
8/15/2017	August	14	Yes	F
11/8/2018	November	11	Yes	F
3/28/2023	March	16	Yes	M

1. Low wind speed curtailment (LWSC) was implemented at KWP I from April 10 to April 30, 2014 (5.0 m/s) and then again implemented on July 29, 2014. The cut-in speed was raised to 5.5 m/s on August 4, 2014. Curtailment at 5.5 m/s has been in effect from February 15 through December 15 since that time, originally based on 1900-0700 hours and more recently tied to sunset and sunrise.
2. Pinzari and Bonaccorso 2018.

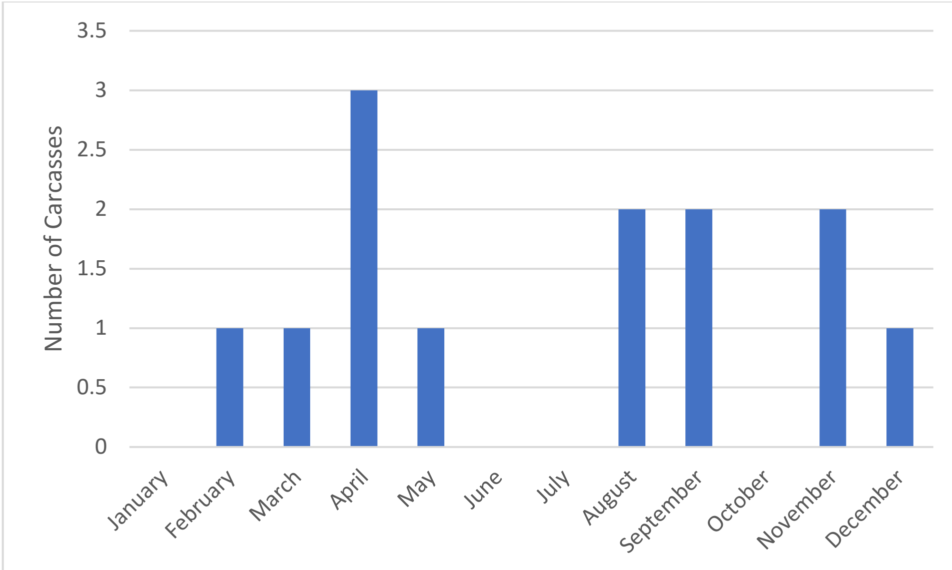

Exhibit 5. ʻŌpeʻapeʻa Fatalities by Month for the KWP I Facility

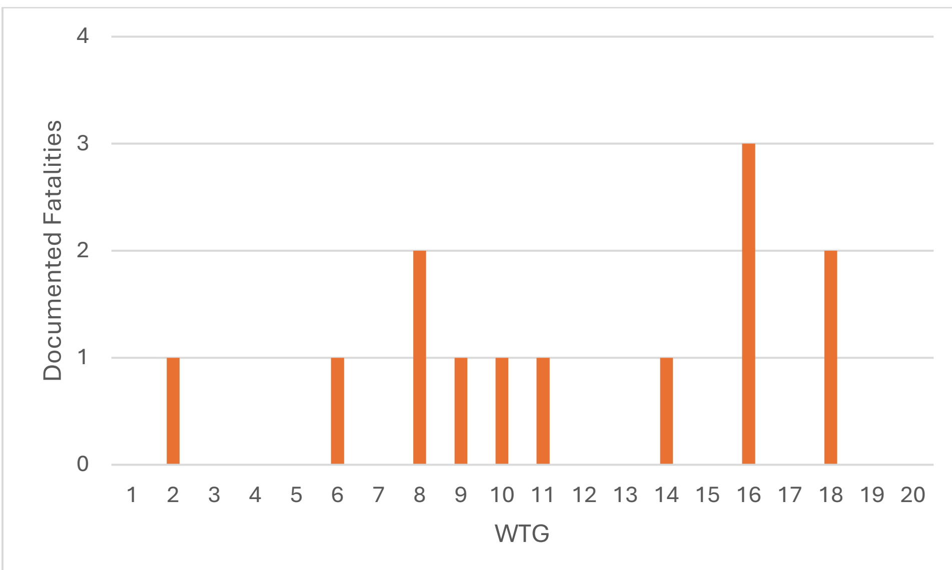

Exhibit 6. ʻŌpeʻapeʻa Fatalities by Turbine (WTG) for the KWP I Facility

4.3 ʻUaʻu (Hawaiian Petrel)

The ʻuaʻu is a medium-sized, nocturnal seabird; its name is derived from a common call heard at colonies. Adults are dark grayish-black above with a partial collar, contrasting with a white throat, forehead, and cheeks. They are entirely white below, except for a black tail and the edges of the underwings. The ʻW-patternʼ on the back and wings is not visible except in worn plumage. They have a black bill and mostly pink legs and feet (DLNR 2024b).

4.3.1 Status

The ʻuaʻu is currently listed as federally endangered under the ESA (32 FR 4001) and state-endangered under HRS Chapter 195D (DLNR 2024b).

4.3.2 Range

This seabird is endemic to the central Pacific, with a distribution encompassing both pelagic waters and select islands of the Hawaiian archipelago (DLNR 2024b). During the breeding season, it nests on the steep volcanic slopes and remote cliffs of islands such as Hawaiʻi, Maui, Lānaʻi, and Kauaʻi. Beyond the breeding period, the species exhibits a highly migratory behavior, spending the majority of its life over the vast expanses of the Pacific Ocean, with foraging ranges extending eastward toward the western coast of the Americas (DLNR 2024b). Despite their pelagic lifestyle, ʻuaʻu consistently return to their natal islands to reproduce (DLNR 2024b).

This seabird historically nested on all Hawaiian Islands and was a common breeding seabird (Simons and Bailey 2020). Today, it primarily breeds on the islands of Lanaʻi (2,500 pairs), Kauaʻi (1,500 pairs), and Maui (1600 pairs), with smaller populations on Hawaiʻi (300 pairs) and Molokaʻi (50 pairs; Pyle and Pyle 2017; Simons and Bailey 2020).

4.3.3 Population Status and Trend

In the early 1990s, the population of ʻuaʻu was estimated at approximately 19,000 individuals, with a breeding population consisting of about 4,500 to 5,000 pairs; however, the inaccessibility of nesting sites complicates efforts to obtain accurate counts (DLNR 2015b). At-sea surveys have shown general alignment with these island-based estimates (DLNR 2015b). From 1998 to 2011, the global population was estimated at around 52,000 birds, the population on Kauaʻi has declined 78 percent since 1993, or 6 percent annually (Raine et al. 2017).

Current estimates indicate that the global population of ʻuaʻu is now around 11,900 individuals, reflecting a concerning decreasing trend (Pyle and Pyle 2017). Key factors driving this decline include habitat loss, predation by introduced species and light pollution that can disorient birds and cause them to eventually fall to the ground exhausted or increasing their chance of colliding with artificial structures (i.e., fallout) such as powerlines (DLNR 2015b). Presently, more than 1,800 individuals reside in Haleakalā National Park on Maui, with a few hundred additional birds nesting in West Maui (DLNR 2015b). Approximately 150 pairs are found on Mauna Kea, Hawaiʻi; around 1,600 pairs inhabit Kauaʻi; several thousand individuals are located on Lānaʻi; and an estimated 50 pairs may nest on Molokaʻi (DLNR 2015b). They are also known to nest on Mauna Loa, Hawaiʻi, where they are found mauka of the Hilo-Kona Saddle Road and at up to 10,000 feet in elevation (DOFAW HCP, pers. comm.).

4.3.4 Life History and Threats to Species

The ʻuaʻu exhibits a life history typical of Procellariform seabirds, characterized by delayed sexual maturity, low reproductive output, and strong site fidelity. Simons (1984) reported that age at first breeding is likely 5 to 6 years, with 89 percent of the adult population breeding each year and a clutch size of one egg. Annual reproductive success averaged 63.4 percent, with 74 percent of eggs hatching into chicks and 84.8 percent of chicks fledging (as cited in Simons and Bailey 2020). After reaching sexual maturity, they return to the high-altitude nesting colonies on volcanic slopes or steep cliffs of the Hawaiian Islands (DLNR 2015b). ʻUaʻu are monogamous and form long-term pair bonds, typically laying a single egg per breeding season, which both parents incubate (DLNR 2024b).

The breeding season runs from late spring through early fall, with adults foraging far out to sea to provide food for the chick, which hatches after an incubation period of around 55 days (USFWS 2024b). Egg laying typically occurs in late April and early May, with incubation occurring during May and June followed by a nestling period from July through October (Simons and Bailey 2020). Outside of the breeding season, the ʻuaʻu spends its life at sea, foraging over vast areas of the Pacific Ocean, exhibiting a highly pelagic lifestyle (DLNR 2015b). Their life expectancy can exceed 30 years, though survival rates are impacted by predation, habitat destruction, and human-caused disturbances (USFWS 2024b). Adult annual survival is estimated at 93 percent (Simons and Bailey 2020).

Common threats include collisions with powerlines; attraction of fledglings to artificial lights, collisions with infrastructure, dehydration, and starvation; predation by introduced predators, particularly feral cats (*Felis cattus*), feral pigs (*Sus scrofa*), barn owls, black rats (*Rattus rattus*), and Polynesian rats (*Rattus exulans*). Additionally, threats while at sea exist that are poorly understood but are recognized to be important issues for similar species worldwide and could include the effects of climate change (Raine et al. 2017).

These seabirds undoubtedly face numerous threats at sea. Although not fully understood, these threats are recognized as significant issues for similar species globally. They include marine pollution, plastic ingestion, overfishing, and the impacts of climate change and fisheries bycatch (Raine et al. 2017).

Climate change is exerting significant pressures on seabird populations in Hawaiʻi through a variety of mechanisms. Nest building on low-lying islands is particularly vulnerable to rising sea levels and increased storm intensity (Runzel 2020). These climatic changes result in flooding of nesting areas, leading to the drowning of eggs and nestlings or their burial under sand deposits (Runzel 2020).

Furthermore, the warming of ocean temperatures is altering the distribution of prey species, such as small fish and squid, which are essential for the diet of seabirds like the ʻuaʻu and ʻaʻo. As these prey species migrate to cooler waters, seabirds are compelled to travel greater distances to forage, thereby increasing their energy expenditure and reducing reproductive success (Runzel 2020).

Additionally, climate change is facilitating the spread of diseases and the proliferation of invasive species. For instance, elevated temperatures are associated with more frequent and severe outbreaks of avian malaria, which has detrimental effects on native bird populations (Runzel 2020).

4.3.5 Occurrence in the Project Area

At the time of construction, ʻuaʻu were suspected of breeding in the West Maui mountains, specifically based on a call heard approximately 8 miles from the Project Area (KWP I 2006). Pre-construction radar surveys near the Project Area recorded low daily movement rates (1 target/hour in fall 2004 and 1.2 targets/hour in summer 1999), suggesting that the location of the wind farm represents some of the lowest passage rates on the island (as cited in KWP I 2006). Activity was higher during post-construction radar surveys, with an average of 0.5 to 3.6 per hour during the summer depending on the location (KWP I 2007).

A total of eight ʻuaʻu have been observed as fatalities at the Project, including one incidental find (Table 6, Exhibit 7). Estimated take, when accounting for direct observed, unobserved, and indirect take, is estimated at ≤24 ʻuaʻu at the 80 percent UCL after 19 years of operations (discussed in Section 5.1.3.1). All eight fatalities have been found between June and October (2 in June, 2 in July, 3 in August and 1 in October). There have been no other fatalities reported from other Maui wind farms, including the adjacent KWP II facility.

Table 6. ʻUaʻu Fatalities by Fiscal Year at KWP I

Fiscal Year	ʻUaʻu Observed Direct Take[1]	ʻUaʻu Incidental Fatality Observations	Total
2007	0	0	0
2008	1	0	1
2009	0	0	0
2010	0	0	0
2011	0	0	0
2012	2	0	2
2013	0	1	1
2014	1	0	1
2015	2	0	2
2016	0	0	0
2017	0	0	0
2018	0	0	0
2019	1	0	1
2020	0	0	0
2021	0	0	0
2022	0	0	0
2023	0	0	0
2024	0	0	0
2025	0	0	0
Total	**7**	**1**	**8**

1. Observed direct take includes fatalities used in fatality estimation; incidental take includes fatalities found outside the search area or not during a scheduled search.

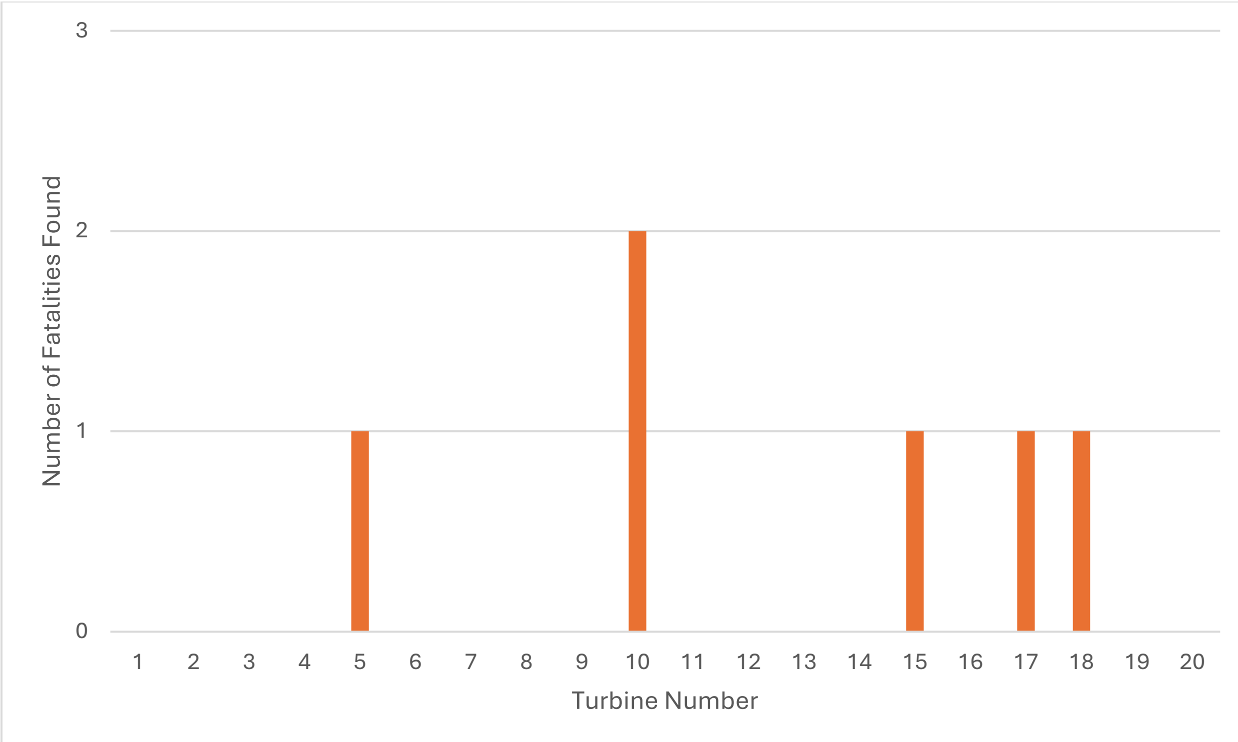

Exhibit 7. ʻUaʻu Fatalities by Turbine (WTG) for the KWP I Facility[4]

4.4 ʻAʻo (Newell's Shearwater)

The ʻaʻo is a medium-sized bird, measuring 12 to 14 inches in length with a wingspan of 30-35 inches. It features a dark black back, a contrasting white underside and underwings, and a sharply hooked black bill, its claws are well-suited for burrow excavation and climbing (USFWS 2024c). This shearwater is known for its rapid, almost frantic flapping with straight-held wings (USFWS 2024c). Its distinctive call, resembling a braying donkey, can seasonally be heard on Kauaʻi just after sunset (USFWS 2024c).

4.4.1 Status

The ʻaʻo is listed as federally threatened under the ESA (40 FR 44149) and as state threatened under HRS Chapter 195D (USFWS 2024c). The USFWS has recommended uplisting the species to endangered in the last three 5-year status reviews, as the information and analyses indicate that the species' status continues to be worse than previously understood when the species was listed as threatened in 1975 (USFWS 2024d).

[4] Note that one of the fatalities attributed to turbine 10 was found in 2013 in overlapping search plots between turbines 10 and 11 and the actual turbine is therefore unknown.

4.4.2 Range

This seabird endemic to the Hawaiian Islands, and historically nested on Hawaiʻi, Maui, Molokaʻi, Oʻahu, and Kauaʻi (Ainley et al. 2020). Today, that breeding range has been restricted to Kauaʻi, Hawaiʻi, and Maui (USFWS 2024d), though there is some evidence of breeding on Oʻahu (Pacific Rim Conservation 2023) favoring steep coastal cliffs and high-altitude forested areas, typically at elevations between 600 and 1,500 meters (DLNR 2024c). Breeding colonies are often located in remote areas to reduce predation risk. Outside the breeding season, ʻaʻo undertake extensive foraging trips, often traveling hundreds of kilometers from their nesting sites, primarily in the pelagic waters of the North Pacific (DLNR 2024c). Their range can extend from the Hawaiian Islands to the coasts of California and Mexico, depending on food availability (USFWS 2024c).

4.4.3 Population Status and Trend

On the island of Kauaʻi where 90 percent of the population remains (USFWS 2024c), ornithological radar surveys, combined with returns of downed birds to the Save Our Shearwaters program, show an apparent decline of 94 percent from 1993 to 2013 (Raine et al. 2017). The most recent population estimates indicate a population of approximately 20,550 individuals (Pyle and Pyle 2017), a significant decrease from previous estimated at 84,000 birds based on at-sea surveys in the 1990s (DLNR 2015c). State-wide there are an estimated 10,300 ʻaʻo breeding pairs, with 50 of those pairs residing on the island of Maui (Pyle and Pyle 2017). The species had not been reported from the island until the early 1980s, and a small colony was discovered in 2002-2004 near the headwaters of Piʻinaʻau Stream along the western walls of Ainahou Bowl and west Wailua Nui (as cited in Pyle and Pyle 2017). More recently, ʻaʻo have been documented in West Maui at the Makamakaʻole mitigation site that was part of the initial HCP for KWP I. Between 2016 and 2022, two fledglings were documented at the site, and in 2022 a total of 20 burrows were considered active with 34 adults documented. Additionally, based on recent correspondence with DOFAW, ʻaʻo at Makamakaʻole have successfully fledged one chick in 2023.

Key factors contributing to this decline include habitat loss driven by urban development and environmental degradation, predation by invasive species such as rats, cats, and mongoose, and light pollution, which disorients fledgling birds during their inaugural flights (USFWS 2024c).

Ongoing conservation initiatives aim to address these threats through habitat restoration, the implementation of predator control measures, and public education efforts. Despite these interventions, the overall population trajectory remains negative, underscoring the necessity for continued research and targeted conservation actions to enhance the species' viability and promote population recovery (USFWS 2024c).

Like the ʻuaʻu, many threats at sea are present for the ʻaʻo. Although not fully understood, these threats are recognized as significant issues for similar species globally. They include marine pollution, plastic ingestion, overfishing, and the impacts of climate change and fisheries bycatch (Raine et al 2017).

4.4.4 Life History and Threats to Species

Like the ʻuaʻu, the ʻaʻo is characterized by traits common to many Procellariform seabirds, including long lifespans, delayed sexual maturity, and low reproductive rates. Typically, these birds reach sexual maturity at about three to four years of age. Their annual adult survivorship is estimated at 90 percent (Ainley et al. 2020). They return to their natal breeding sites, which are primarily located on steep cliffs and high-elevation areas of Kauaʻi and Oʻahu, to form monogamous pairs.

Breeding occurs from March to November, during which each pair typically lays a single egg. Incubation lasts approximately 50 days, with both parents sharing the responsibility. Parents undertake long foraging trips at sea, often traveling long distances to locate food. The chick-rearing period lasts about 90 days, after which the fledgling departs for its pelagic lifestyle.

ʻAʻo are nocturnal fliers, returning to their colonies at night to avoid predation. They spend the majority of their lives at sea, foraging over the open ocean, and are known to migrate to areas off the coasts of California and Mexico during the non-breeding season (DLNR 2024c, USFWS 2024c).

The most significant sources of mortality for the ʻaʻo are introduced predators (e.g., mongoose, cats, dogs), and collisions with utility structures (Ainley et al. 2020). Artificial lighting, especially in coastal areas, can disorient birds and cause them to eventually fall to the ground exhausted or increasing their chance of colliding with artificial structures (i.e., fallout) such as powerlines (DLNR 2015c). Natural disasters such as lava flows on Hawaiʻi Island and hurricanes may also be sources of mortality and can also contribute to habitat loss (Ainley et al. 2020). Between approximately 1840 and 1990, 75 percent of the forest on the main Hawaiian Islands has been converted to agricultural, military, commercial, or residential land (as cited in Ainley et al. 2020).

Climate change is exerting significant pressures on seabird populations in Hawaiʻi through a variety of mechanisms. Nest building on low-lying islands is particularly vulnerable to rising sea levels and increased storm intensity (Runzel 2020). These climatic changes result in flooding of nesting areas, leading to the drowning of eggs and nestlings or their burial under sand deposits (Runzel 2020).

Furthermore, the warming of ocean temperatures is altering the distribution of prey species, such as small fish and squid, which are essential for the diet of seabirds like the ʻuaʻu and ʻaʻo. As these prey species migrate to cooler waters, seabirds are compelled to travel greater distances to forage, thereby increasing their energy expenditure and reducing reproductive success (Runzel 2020).

Additionally, climate change is facilitating the spread of diseases and the proliferation of invasive species. For instance, elevated temperatures are associated with more frequent and severe outbreaks of avian malaria, which has detrimental effects on native bird populations (Runzel 2020).

4.4.5 Occurrence in the Project Area

No ʻaʻo have been observed as fatalities at the Project, nor have there been any incidental observations during over 19 years of post-construction monitoring.

4.5 ʻAkēʻakē (Band-rumped Storm Petrel)

4.5.1 Status

The ʻakēʻakē is a medium sized storm-petrel, with overall blackish brown plumage and a sharply defined narrow white band across the "rump". Like other members of family Hydrobatidae (order Procellariiformes), they have a small size and dark plumage, attend their breeding colonies at night, nest in burrows, and seize prey from the ocean surface (Slotterback 2024). The ʻakēʻakē is the smallest and rarest seabird that breeds in Hawaiʻi (DLNR 2015d).

4.5.2 Range

While historically abundant throughout the main Hawaiian Islands, current nesting colonies are limited to on Lehua, on Kauaʻi at elevations around 600 meters, and on Maui (in Haleakalā National Park) and the island of Hawaiʻi (in Hawaiʻi Volcanoes National Park) at elevations greater than 1,200 meters (DLNR 2015d). There are an estimated 30 pairs of ʻakēʻakē on the island of Maui (Pyle and Pyle 2017). On Maui, colonies occur on high, barren lava flows (DLNR 2015d). A single ʻakēʻakē carcass was found at the Makamakaʻole site in West Maui in 2020 (J. Penniman, pers. comm., September 24, 2020), and social attraction has been implemented at the site starting in 2023 (Maui Nui Seabirds, pers. comm., May 24, 2024). Preliminary acoustic monitoring data indicate that colonies may be present near Makamakaʻole in addition to Haleakalā (DOFAW, pers. comm., Feb 13, 2025). A single ʻakēʻakē has been reported as a fatality at another wind facility on Maui (Auwahi Wind Farm 2020, Auwahi Wind Farm 2021).

4.5.3 Population Status and Trend

Worldwide, the population is unknown but likely less than 25,000 breeding pairs. In 2002, it was estimated that between 171 and 221 breeding pairs were present on Kauaʻi (DLNR 2015d). Pyle and Pyle (2017) estimated 250 pairs on Kauaʻi, 50 pairs on Hawaiʻi Island, and 30 pairs on Maui.

4.5.4 Life History and Threats to Species

Age at first breeding is between 5 and 7 years, with annual breeding occurring once sexual maturity is reached (Slotterback 2024). This species has one egg per clutch, and only lays one clutch per season. Hatching success ranges from 43.5 to 60 percent, with fledging success of 30 to 33 percent (Slotterback 2024). The ʻakēʻakē has a lifespan of 15 to 20 years, with annual mortality of 5 to 9 percent (Slotterback 2024).

The greatest source of mortality is predation on nests and young, primarily by mammals, though adults may also be susceptible to predation by owls or predatory fish at sea (Slotterback 2024). Other threats identified in Hawaiʻi include, but are not limited to, feral ungulates (e.g., pigs, goats, sheep) degrading nesting habitat, artificial lighting disorienting fledglings and causing fallout, and collisions with obstacles such as communication towers and utility lines (DLNR 2015d).

Similar to the other two seabird species, climate change may be exerting pressures on ʻakēʻakē populations in Hawaiʻi through a variety of mechanisms. With the potential to alter wind and sea currents, climate change may affect flight and foraging patterns of band-rumped storm petrels (USFWS 2021b). Climatic changes may also increase the intensity and frequency of stochastic events, which could directly lead to landslides that impact nesting sites and could kill or injure birds at all life stages (USFWS 2021b).

4.5.5 Occurrence in the Project Area

Pre-construction surveys (Nishibayashi 1997) did not detect ʻakēʻakē within the Project Area (KWP I 2006). Further analysis, conducted when the adjacent KWP II wind project was undergoing an HCP amendment in 2019, determined that while there is potential for the ʻakēʻakē to be present within the Project Area due to individual birds flying over, the risk of take was extremely low and the Project would likely cause incidental take (KWP II 2019).

Recent acoustic surveys detected ʻakēʻakē at a detector approximately 1.7 miles from the most mauka turbine (WTG 1, Figure 1). No ʻakēʻakē were detected at the eight acoustic detectors located within a mile of the turbines (J. Learned, pers. comm., March 24, 2025). Additionally, the one ʻakēʻakē detection at the detector 1.7 miles from WTG 1 was on a single night during an approximately six-week deployment. The next closest detections were approximately 4.2 to 4.5 miles away.

No ʻakēʻakē have been documented as fatalities at the wind farm or at the adjacent KWP II facility.

4.6 Assimulans Yellow-faced Bee

Nalo meli maoli roughly means "native honeybee" or "indigenous bee" — a term that can be used to distinguish native Hawaiian yellow-faced bees (*Hylaeus* species) from the introduced European honeybee (*Apis mellifera*). One species of state and federally endangered Hawaiian yellow-faced bee, *Hylaeus assimulans* (assimulans yellow-faced bee), has been documented within the Project Area.

4.6.1 Status

Assimulans yellow-faced bee is endemic to Hawaii, and is listed as endangered wherever found. Listed in 2016, it was one of the first bee species to be listed under the ESA (USFWS 2016b).

4.6.2 Range

Assimulans yellow-faced bee is currently known or historic populations were known to occur on the islands of Maui, Kaho'olawe, Lānaʻi[5], Molokaʻi, and Oʻahu. They occured in coastal and lowland dry forest habitats up to 2,000 ft in elevation[6] (USFWS 2016b). As of 2022 (USFWS 2022c), the species was known from 11 locations, including 2 coastal areas on Lānaʻi (lowland dry shrubland

[5] Historically known from this island but not observed in the 20 years prior to listing.
[6] Note that they also occur above 2,000 ft in elevation based on documented presence within the Project Area.

and forest), 8 areas (coastal shrubland and dry forest) on Maui, and 1 coastal shrubland area on Kahoʻolawe. The species is believed extirpated from Oʻahu.

On Maui, the species was historically collected in the Wailuku sand hills and Waiehu dunes area, though it was absent from both locations when surveyed in 1999 and 2001 (as cited in USFWS 2022c). More recently the species has been documented at several locations in west and east Maui, including on the southwest coast of east Maui near Makena, near the north coast of west Maui in the Kahakuloa area, in the Honolua area, and in the Papanalahoa Point area near Wailuku. Assimulans yeallow-faced bee was also found during surveys in West Maui in the Waikapū to Mā'alaea area and above the Olowalu area (as cited in USFWS 2022c). Populations have also been found on East Maui along the coast east of Maliko Gulch (DOFAW, pers. comm., December 9, 2025).

4.6.3 Population Status and Trend

In the early 1900s, yellow-faced bee species were found throughout the islands, with the assimulans yellow-faced bee considered widely distributed if not as abundant as other Hawaiian yellow-faced bee species (as cited in USFWS 2022c). The current abundance is unknown (DLNR 2015e, USFWS 2022d). However, after the original collections in the early 1900s, surveys in 1997 and 1998 found that the assimulans yellow-faced bee was absent from six historic locations and not observed at the 19 other sites with potentially suitable habitat (USFWS 2022c). The species is typically found as only a few individuals from scattered sites (Magnacca 2005).

4.6.4 Life History and Threats to Species

Assimulans yellow-faced bee is a ground nesting species found primarily on West Maui that utilizes the native ʻilima shrub (*Sida fallax*) as a food source. The assimulans yellow-faced bee is thought to be more common where ʻilima is abundant (as cited in USFWS 2022c). Other important plants visited for pollen and nectar include naupaka (*Scaevola taccada*), pāʻū o hiʻiaka (*Jacquemontia ovalifolia*), and nehe (*Lipochaeta spp.*) (DLNR 2015e).

This species nests on the ground in existing burrows or natural cavities under bark or rocks. Ground nesting female *Hylaeus* spp. typically rely on burrows made by other invertebrates because they lack the physical characteristics needed to dig their own nests (USFWS 2022c). However, recent documentation of newly excavated soil in front of assimulans yellow-faced bee nests on Maui suggest some capability of soil excavation (as cited in USFWS 2022c). Though solitary, assimulans yellow-faced bee tend to nest in aggregations (USFWS 2022c).

Threats to the species include the following (USFWS 2022c):

- Degradation and loss of its native habitats, nests, and foraging resources;
- Predation and nest raiding by nonnative ants; and
- Competition with other nonnative species for food resources.

While not identified as primary threats to the species, potential threats from wind turbines and herbicide use were also reviewed, in response to concerns raised by USFWS and DOFAW.

Herbicides generally have low acute toxicity to adult bees, but indirect and sublethal effects are increasingly documented (as cited in McKnight et al. 2018, Blackburn et al. 2021). Importantly, the more common impact of herbicides on bees is removal of the floral resources that pollinators depend on, effectively reducing the amount of plants they use (Blackburn et al. 2021). Four routes of pesticide exposure have been identified for solitary, cavity nesting bees, including larval ingestion, adult ingestion, contact, and transovarial transmission (Kopit and Pitts-Singer 2018).

Studies on the impacts of wind energy on assimulans yellow-faced bee have not been conducted, and the effect of wind energy on bees generally is not well understood. However, a case study in Wyoming documented that the abundance and richness of bees was not found to differ with proximity to turbines, indicating that there is neither attraction or avoidance due to the turbines on the landscape (Weschler and Tronstad 2024). A study focused on honeybee colonies similarly found no evidence of impacts from wind turbines on honeybee colonies (Fourrier et al. 2023).

Voigt (2020) reported that insects can be killed by operating turbines, as evidenced by organic detritus left on turbine blades. It is currently unknown whether certain insect taxa are more vulnerable to collisions. Weschler and Tronstad (2024) state that migrating insects may be most vulnerable, as those species may be evolved to travel at higher altitudes and across longer distances, as well as nocturnal or crepuscular species which have lower visual and spatial acuity. The assimulans yellow-faced bee is not migratory and is most active during mid-day.

The Hymenoptera order (bees) has been documented to fly at altitudes greater than 550 meters and some species are capable of flying in high wind speeds, potentially increasing their risk of collisions (Weschler and Tronstad 2024). However, while published literature on flight height of bees is lacking, one study documented *Hylaeus* species at altitudes below 7 meters (Dorey et al. 2024), which would be below the rotor-swept zone at KWP I. Pan and Wilson (2020) also documented flight behaviors of another Hylaeus species to be associated with the ground or vegetation. This aligns with the foraging behavior of the assimulans yellow-faced bee, which typically utilizes resources near the ground, potentially providing little incentive for the species to fly at higher altitudes. Conversely, Daly and Magnacca (2003) reported that Hylaeus are relatively strong fliers and tend to spend time at or above the forest canopy rather than below. Vegetation at KWP (see Section 3.1.4) is generally low in structure, and taller species (e.g., ironwood) are managed near the turbines. Some species of Hylaeus in Fiji have been documented above 7 meters in height (DOFAW, pers. comm., December 9, 2025).

Collisions from wind turbines is not listed as a threat for the assimulans yellow-faced bee in the listing decision (USFWS 2016b), recovery plan (USFWS 2022d), or species report (USFWS 2022c), though it is noted that the population at KWP I was discovered after the listing and the recovery plan and species report were drafted prior to current knowledge of the population on site.

4.6.5 Occurrence in the Project Area

The native shrub ʻilima has been documented in the Project Area, particularly in the mid- elevation area between approximately 2,000 to 3,000 feet in elevation (Tetra Tech 2025). Other species of plants observed within the Project Area, which may support foraging, include the native ʻuhaloa (moderately common) and ʻūlei (uncommon), and a few individuals of non-native koa haole and kiawe, which have been documented in the lower elevation areas below 2,000 feet along the access road (Tetra Tech 2025).

Surveys of assimulans yellow-faced bee in proximity to the Project Area were conducted by DOFAW between 2022 and 2025, documenting individuals, nesting locations, and individual nests. Observations included individuals at elevations up to approximately 2,600 feet, including areas in proximity to the lower 13 turbines in the Project Area.

Targeted surveys for assimulans yellow-faced bee and their nests will be conducted during the 2026 active season to further document the species' presence and distribution within suitable habitat (see Section 6.2.6.1). This will occur after finalization of the HCP but is part of the avoidance and minimization measures described in Section 6.2.6.

4.7 Species Considered but Excluded

Several federally listed species in Hawaiʻi have ranges that overlap the Project (Appendix B). For most of those species the Project Area does not contain any habitat, therefore removing the possibility that the species would be present in the Project Area or impacted by covered activities. Beyond the Covered Species, two other species were considered for coverage, but ultimately not selected: state and federally listed Blackburn's sphinx moth (*Manduca blackburni*), and the nonlisted pueo (Hawaiian short eared owl, *Asio flammeus sandwichensis*). Should a species become listed during the permit term, or risk to a listed species change, a changed circumstance may be triggered as outlined in Section 9.1 of this HCP.

4.7.1 Blackburn's Sphinx Moth

The Blackburn's sphinx moth relies on tree tobacco (*Nicotiana glauca*) in its larval form. Tree tobacco grows in open and disturbed areas, such as roadsides and abandoned fields (CABI 2024). Tree tobacco has not been documented in the Project Area. The Project biologist (trained in tree tobacco survey methods) has been onsite weekly over the course of the Project's operational life and continues this work presently. The biologist works along the highly disturbed areas of roads and turbine pads using a canine for fatality monitoring, often in the vegetation surrounding the disturbed areas. No tree tobacco has been documented at the Project, or along roads or within the Project Area leading to the Project (Spencer Engler, pers. comm., November 2024; Tetra Tech 2025). Additionally, vegetation management at the site includes the use of herbicides along roadways to minimize vegetation regrowth, and while vehicles may be a source of potential seed dispersal as they travel along the Honopiilani Highway, general vehicle movement through the site is restricted. Wind dispersal of seeds mauka to the highway is also unlikely, based on wind patterns. Because of the absence of tree tobacco, the potential for this species to occur in the Project Area is unlikely, therefore the Applicant is not requesting take authorization for this species.

As described in Appendix A, the following will be implemented to avoid impacts to the listed Blackburn's sphinx moth:

- Site staff will be trained to identify tree tobacco and will report any sighting of tree tobacco to the onsite biologist or site manager; signage will be added to the O&M building illustrating different stages of tree tobacco for identification.
    - If tree tobacco less than 3 feet in height is observed within areas with potential vegetation disturbance, remove the plants immediately to prevent attracting Blackburn's sphinx moth. DOFAW recommends this removal occur during the dry season (usually May to October).
    - If tree tobacco over 3 feet in height is observed in an area requiring disturbance, a qualified biologist should thoroughly search the plant(s) for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage). DOFAW and USFWS may be contacted for additional guidance.
- Should any major ground disturbance (e.g., decommissioning) occur within the Project Area, regular surveys for tree tobacco may occur in those areas to confirm tree tobacco is not present and there no impacts to the listed Blackburn's sphinx moth.

4.7.2 Pueo (Hawaiian Short-eared Owl)

Pueo does occur in the Project Area because past fatalities have occurred and pueo fatalities may continue to occur as a result of Project activities during the permit term. See Section 3.1.4.2 and Table 1 for a summary of past impacts on pueo. Because the pueo does not have threatened or endangered status on the island of Maui, and is not federally listed, the Applicant is not seeking incidental take authorization for pueo. However, the Applicant recognizes the ecological and cultural significance of the pueo, and will therefore provide voluntary mitigation (see Section 6.3.9).

In addition, as outlined in Appendix A, KWP will implement the following to avoid and minimize impacts to pueo:

- Before any ground disturbing activities that may disturb potential pueo nesting habitat, a qualified biologist will conduct surveys for pueo. Surveys should be done for 2-3 nights prior to ground disturbing activities during crepuscular hours from vantage points where the entire disturbance area can be observed. If any pueo breeding displays are observed, it is likely there could be a nest.
- If pueo nests are detected in the Project Area at any time, a 328-foot (100 meters) buffer should be established in which no activity occurs until the nesting cycle is complete and the chicks are capable of flight.
- As part of the Wildlife Education and Orientation Progam, all construction and regular on-site staff will be trained to identify pueo and if pueo or a pueo nest are observed, staff will stop work and coordinate with onsite biologist to determine appropriate steps.
- DOFAW staff should be notified of any nests or adult breeding behavior.
- The site-wide speed limit of 10 mph will be enforced.

5.0 Potential Biological Impacts and Take Assessment

5.1 Anticipated Take of Each Covered Species

The take estimation methods described in this Section apply to five of the six Covered Species. These species (nēnē, ʻōpeʻapeʻa, ʻuaʻu, ʻaʻo, and ʻakēʻakē) are at risk of collision with the operating turbines. To assess the anticipated level of take for each of these Covered Species, the Applicant used fatality data collected under the current ITP and ITL and modelled using the Evidence of Absence (EoA) program (Dalthorp et al. 2017) to project future take for an additional 20.5-year period at the 80 percent UCL. For species with previously observed fatalities at the site (nēnē, ʻōpeʻapeʻa, and ʻuaʻu), the 80 percent UCL was projected at the 75 percent quantile. For species without observed fatalities during the first 19 years (ʻaʻo and ʻakēʻakē), the projection was assessed at the 95 percent quantile. The 95 percent quantile was used for species without previous fatality data to represent a highly conservative scenario limiting uncertainty and avoid underestimating risk.

The modelling process uses the EoA projection tool with inputs identified below:

(1) To estimate take to-date for each species with at least one observed fatality, inputs of the post-construction monitoring data from FY 2006 through FY 2025 were used.

(2) To estimate take at the end of the future permit term, inputs of the post-construction monitoring data from FY 2006 through FY 2025 with an additional 20.5 years of operations utilizing FY 2025 detection probability and rho value throughout the projection timeframe. This was used to predict take for two time periods:

   a. Under the current 20-year ITL and ITP (expiring January 29, 2026)

   b. At the end of the 40-years of operations

The total anticipated take for each species under the new ITL and ITP is then calculated as:

$$total\ predicted\ take\ over\ 40\ years\ -\ predicted\ take\ at\ the\ end\ of\ the\ current\ permit\ term$$

This approach captures the anticipated direct observed and unobserved take. It assumes that current take rates will not change, that future monitoring effort and spatial adjustments to raw fatality counts based on site-specific data remains consistent with FY 2025 over a 40-year operational life. The direct observed and unobserved take is then used to estimate the indirect take; the total requested take for each species is the sum of the direct and indirect take.

Accounting for both direct and indirect take since facility operations began in 2006, when estimated at the 80 percent UCL, less than or equal to 56 nēnē, 32 ʻōpeʻapeʻa, and 23 ʻuaʻu have been taken due to Project operations. No fatalities of ʻaʻo or ʻakēʻakē have been detected, therefore no take estimate has been calculated.

The following sections outline the predicted take that may occur over the new permit term for each of the four avian and one bat Covered Species based on the process above. As previously described, take estimates rely on 19 years of post-construction monitoring at the facility and assume that similar levels of take per species will occur during the 20.5 years of operations under the new ITP and ITL. It is unusual, when predicting future take, to have 19 years of site-specific fatality data collected at a facility and to have operations of the facility continue in the same fashion. Documentation of fatalities at an operating facility is the best predictor of what could occur in the future when turbine models remain the same, as is the case with KWP I. DOFAW and ESRC (2024) recommend that existing sites use EoA modelling with historic fatality data to predict future take. Similar levels of take are also anticipated based on the following:

- No changes to the number or size of turbines, or operational parameters[7]
- No evidence of statistically significant changes in take rates for any Covered Species over the last 19 years (i.e., no increasing or decreasing trends)

For the sixth Covered Species, the assimulans yellow-faced bee, habitat is used as a surrogate for impact assessment, as described in Section 5.1.6.

5.1.1 Nēnē

5.1.1.1 Observed and Unobserved Direct Take

A total of 35 nēnē have been recorded as fatalities at KWP I from September to June and from 2007 through 2024, of which 27 have been detected during the standardized monitoring effort and 8 have been detected incidentally (see Section 4.1.5.2). The resulting projected take is shown in Table 7, calculated using the methods named above.

Table 7. Summary of Nēnē Fatality Estimates from EoA Based on Site-Specific KWP I Data from FY 2007 through FY 2025 (preliminary data for FY 2025)

Direct Fatalities Observed	Current M* (80% UCL)[1]	λ with 95% CI	Projection for End of Current 2006-2026 Permit (50% quantile)	40-year Projection (75% quantile)	Projected Direct Take[2] under New ITP and ITL
27	54	2.6 (1.7 – 3.7)	57	122	65

Analysis conducted at the 80% UCL
1. M* represents fatalities estimated using EoA software and is representative of direct take only.
2. 40-year projection minus projection for current permit term.

Based on the projection shown in Table 7, KWP predicts an estimated direct take of 65 nēnē.

[7] KWP is proposing to change the bat curtailment program by raising the cut in speed during the months of August, September, and October; however, only 4 percent of bat activity occurs between 5.5 and 6.5 m/s, and therefore this change is not anticipated to significantly change the take rate for the species over the permit term.

5.1.1.2 Indirect Take

Indirect take is estimated to account for the potential loss of individuals that may occur as the result of the loss of their parents. Both parents care for young post-fledging (Banko et al. 2020). The point during the breeding season when an adult is taken determines to what extent offspring may be affected. The indirect take multiplier ranges from 0.04 (April, August, and September) to 0.09 (October through March) as shown in Table 8 based on the product of:

1. The number of anticipated fledglings per pair;
2. The likelihood of the individual being in breeding condition; and
3. The assumed parental contribution.

Table 8. Calculation of Indirect Take of Nēnē

Nēnē	Season	Fledglings per pair (A)	Likelihood of breeding (B)	Parental Contribution (C)	Indirect (A*B*C)
Adult, any gender	October – March	0.3	0.6	0.5	0.09
Adult, any gender	April, August, September	0.3	0.25	0.5	0.04
Adult, any gender, with known nest or goslings	All Year	0.3	1.00	0.5	0.15
Adult, any gender	May - July	0	0	0	0
Immature	All Year	0	0	0	0

For unobserved direct take, the indirect take multiplier is calculated using fledglings per pair (0.3), the average likelihood of breeding across the 12 months (0.3625)[8] and the parental contribution (0.5), for an indirect take multiplier of 0.05.

For future observed direct take, if the take includes a known breeding adult (i.e., a banded adult with a known nest or goslings within the Project Area), then indirect take will be calculated as 0.3 fledglings per pair multiplied by the 0.5 parental contribution, for an indirect take multiplier of 0.15, unless monitoring is conducted to confirm fledgling success despite the loss of one parent. If there is fledging success, no indirect take will be applied.

The original HCP (KWP I 2006) assumed a survival rate of 90 percent from fledgling to breeding age for released birds, which was conservative based on a 97 percent survival of birds at the Hanaula Propagation Pen over a 9-year period. The KWP II HCP (KWP II 2019) utilized a 17 percent annual mortality rate from fledgling to maturity, rounded up to 20 percent and applied to age 3 across both sexes, which is equivalent to the 0.512 survival rate that has been used since FY 2017 (KWP I 2017). However, as shown in Section 4.1, the best available science on nēnē survival from fledgling

[8] Note that this value was published as 0.375 in the KWP II HCP; it has been corrected for this document based on published values, and changes the indirect take multiplier for unobserved take from 0.0563 to 0.05.

to adulthood is shown to be 0.75 for females and 0.91 for males, or an average of 0.83. Therefore, KWP proposes to use a juvenile survival rate of 0.83 to adulthood for fledglings.

The calculations for indirect take is thus the sum of the following:

$$Observed\ take\ in\ April, August\ or\ September * 0.04$$

$$Observed\ take\ in\ October\ through\ March * 0.09$$

$$Unobserved\ direct\ take * 0.05$$

Based on the take observed to-date (see Section 4.1.5.2), it is assumed that approximately 70 percent of fatalities occur between October and March, and 10 percent occur in April, August, or September, with the remaining 20 percent occurring between May and July when no indirect take would occur (i.e., the non-breeding season).

Therefore, KWP I proposes to predict indirect take calculated as:

$$(Direct\ Take * 0.7 * 0.09 * 0.83) + (Direct\ Take * 0.1 * 0.04 * 0.83)$$

Then, based on a predicted direct take of 65 nēnē, indirect take is calculated as:

$$(65 * 0.7 * 0.09 * 0.83) + (65 * 0.1 * 0.04 * 0.83) = 3.4 + 0.22 = 3.62$$

Therefore, the total indirect take at the Project is predicted to be the equivalent of up to 3.62 additional nēnē adult equivalents (rounded to the nearest whole nēnē; 4). This amount represents 5.3 percent of the total requested take.

5.1.1.3 Requested Take

The total requested take to be permitted is 69 nēnē. This request is based on a projected direct take of 65 nēnē and indirect take of 4 adult equivalent nēnē.

5.1.2 ʻŌpeʻapeʻa

5.1.2.1 Observed and Unobserved Direct Take

A total of 13 ʻōpeʻapeʻa have been found as fatalities at KWP I. Of the 13 fatalities at KWP I, five have occurred since implementation of low wind speed curtailment (LWSC), in August (n=2), November (n=2) and March (n=1). The resulting projected take is shown in Table 9, calculated using the methods named in Section 5.1.

Table 9. Summary of Fatality Estimates for ʻŌpeʻapeʻa from EoA Based on Site-Specific KWP I Data from FY2007 through FY 2025 (Preliminary Data)

Direct Fatalities Observed	Current M* (80% UCL)[1]	Λ with 95% CI	Projection for End of Current 2006-2026 Permit (50% quantile)	40-year Projection (75% Quantile)	Projected Direct Take under New ITP and ITL[2]
10	28	1.25 (0.61 – 2.12)	28	63	35

Analysis conducted at the 80% UCL.
1. M* represents fatalities estimated using EoA software and is representative of direct take only.
2. 40-year projection minus projection for current permit term

Based on the projection shown in Table 9, KWP predicts an estimated direct take of 35 ʻōpeʻapeʻa. This approach aligns with recommendations from ESRC and DOFAW (2021) to utilize site-specific post-construction data when available, as well as with how the potential for threshold exceedance is projected in the annual reports[9].

5.1.2.2 Indirect Take

Indirect take is estimated to account for the potential loss of offspring that may occur as the result of the loss of an adult female through direct take during the breeding period when females may be pregnant or supporting dependent young. Indirect take for the Project is calculated using the ESRC and DOFAW (2021) guidance as follows:

1. The average number of offspring (pups) per female that survive to weaning is assumed to be 1.8.
2. The sex ratio of the ʻōpeʻapeʻa taken is assumed to be 50 percent female unless there is evidence (10 or more ʻōpeʻapeʻa) to indicate a different sex ratio.
3. The assessment of indirect take accounts for the fact that it is not known when the unobserved fatality may have occurred. The period from pregnancy to end of pup dependency for any individual ʻōpeʻapeʻa female is estimated to be 3 months. Thus, the probability of taking a female bat that is pregnant or has dependent young is 25 percent.
4. The indirect take assessment uses a conversion of one juvenile ʻōpeʻapeʻa bat as equal to 0.3 adults.

Following the guidelines provided in Appendix 4 of ESRC and DOFAW Draft Guidance (2021), indirect take was predicted as follows:

- Predicted direct observed and unobserved take of 35 ʻōpeʻapeʻa;

[9] Note that the likelihood of threshold exceedance presented in the annual report is based on the median estimated take (80th UCL) rather than take at the 75th quantile (80% UCL), making this approach conservative.

- 50 percent of the take predicted to be female;
- 25 percent of the female take assumed to be pregnant or have dependent young;
- Average number of pups per female of 1.8; and
- Conversion of juveniles to adults of 0.3:

$$35 * 0.5 * 0.25 * 1.8 = 7.88\ juveniles\ * 0.3 = 2.4\ adult\ \text{‘ōpe‘ape‘a}$$

Therefore, the total indirect take at the Project is predicted to be the equivalent of up to 2.4 additional ‘ōpe‘ape‘a (rounded to the nearest whole ‘ōpe‘ape‘a; 3). This amount represents 7.9 percent of the total requested take.

5.1.2.3 Requested Take

The total requested take to be permitted is 38 ‘ōpe‘ape‘a. This request is based on a projected direct take of 35 ‘ōpe‘ape‘a and indirect take of 3 adult equivalent ‘ōpe‘ape‘a.

5.1.3 ‘Ua‘u

5.1.3.1 Observed and Unobserved Direct Take

A total of eight ‘ua‘u have been observed as fatalities at KWP I, including one incidental find. All eight have been found between June and October (June [2], July [2], August [3], October [1]; no ‘ua‘u fatalities have been observed at any of the other Maui wind farms). The resulting projected take is shown in Table 10, calculated using the methods named in Section 5.1.

Table 10. Summary of ‘Ua‘u Fatality Estimates from EoA based on Site-Specific KWP I Data from FY 2007 through FY 2025 (preliminary data)

Direct Fatalities Observed	Current M* (80% UCL)[1]	λ with 95% CI	Projection for End of Current 2006-2026 Permit (50% quantile)	40-year Projection (75% quantile)	Projected Direct Take[2] under New ITP and ITL
7	19	0.84 (0.35 – 1.53)	19	43	24

Analysis conducted at the 80% UCL.
1. M* represents fatalities estimated using EoA software and is representative of direct take only.
2. 40-year projection minus projection for current permit term

Based on the projections shown in Table 10, KWP I predicts an estimated direct take of 24 ‘ua‘u.

5.1.3.2 Indirect Take

Indirect take is estimated to account for the potential loss of individuals that may occur as the result of the loss of their parents (Table 11).

Table 11. Calculation of Indirect take of ‘Ua‘u

‘Ua‘u	Season	Eggs/Chicks per Pair (A)	Likelihood of Breeding (B)	Parental Contribution (C)	Indirect (A*B*C)	Probability of Hatching	Probability of Fledging	Indirect Take (fledglings)
Adult, any gender	Nov - April	0.0	0.0	0.0	0.00	0.00	0.00	0.00
Adult, any gender	May - July	1.0	0.89	1.0	0.89 eggs	0.74	0.848	0.56
Adult, any gender	August	1.0	0.66	1.0	0.66 chicks	1.00	0.848	0.56
Adult, any gender	September	1.0	1.00	1.0	1.00 chick	1.00	0.848	0.85
Adult, any gender	October	1.0	1.00	0.5	0.5 chicks	1.00	0.848	0.42
Immature	All Year	0.0	0.0	0.0	0.00	0.00	0.848	0.00

Adult and immature birds have potential to collide with turbines and associated structures while commuting between nesting and feeding grounds during the pre-laying period (March to April) and incubation or chick-feeding periods (May through October). Indirect take accounting for possible loss of eggs or chicks would be calculated in conjunction with direct take of an adult ʻuaʻu occurring during the breeding period (May through October); indirect take would not be assessed if direct take of this species occurs during the pre-laying period or at other times of year. The risk of collision outside the pre-laying period or breeding season is considered minimal as these birds do not return to land during that time. Of fatalities within the breeding season, 89 percent are assumed to be breeding adults (Simons and Bailey 2020). This number reduces to 66 percent in August as only 74 percent of the successfully breeding adults would have hatched eggs (0.89 * 0.74 = 0.66). However, because most nonbreeding birds and failed breeders leave the colony by mid-August, it is assumed that any fatality in September or October would have a 100 percent likelihood of breeding.

Potential for survival of offspring following a collision appears dependent upon the time at which the parent is lost. Both parents alternate incubating the egg (May-June), allowing one or the other to leave the colony to feed. Therefore, during the egg-laying/incubation period it is expected that both parents are essential for the successful hatching of the egg (Simons and Bailey 2020). Additionally, both parents contribute to the feeding of chicks. Chicks are fed 95 percent of the total food they will receive from their parents within 90 days of hatching (Simons and Bailey 2020). Because hatching generally occurs in late June, chicks should have received 95 percent of their food by the end of September. After this time, it is likely that many chicks could fledge successfully without further parental care; some chicks have been seen abandoned by their parents up to three weeks prior to fledging (Simons and Bailey 2020). Consequently, it is likely that after this time many chicks would also be capable of fledging if subsequent care was provided by only one parent. Therefore, for the purposes of this HCP and assessing indirect take, both parents are considered essential to the survival of a ʻuaʻu chick through September; it is assumed that a chick has at least a 50 percent chance of surviving successfully if adult take occurs in October.

Table 11 summarizes the determination of to what extent offspring may be affected by the point during the breeding season that an adult is taken. To convert all indirect take in the form of chicks and eggs into fledglings, indirect take of eggs is converted based on a 74 percent chance of hatching and 84.8 percent chance of fledging; chicks are converted based on the 84.8 percent chance of fledging (Simons and Bailey 2020). Fledglings are assumed to survive to adulthood at a rate of 0.328 (approximately 80 percent annual survival to age 5; Simons and Bailey 2020).

Of the eight fatalities that have occurred to-date, 50 percent occurred between May and July, 37.5 percent occurred in August, and 12.5 percent in October. Assuming future take will follow a similar temporal pattern, the weighted average of the indirect fledgling take is 0.54[10]. Therefore, indirect take is estimated based on the predicted direct observed and unobserved fatality estimate of 24 using the weighted average indirect take and fledgling to adult survival of 30 percent with the following equation:

[10] (0.5 * 0.56) + (0.375*0.56) + (0.125*0.42) = 0.54

$$24 * 0.54 * 0.328 = 4.25$$

Therefore, the total indirect take at the Project is predicted to be the equivalent of up to 4.25 additional ʻuaʻu adult equivalents (rounded to the nearest whole ʻuaʻu; 5).

5.1.3.3 Requested Take

The total requested take to be permitted is 29 ʻuaʻu. This request is based on a projected direct take of 24 ʻuaʻu and indirect take of 5 adult equivalent ʻuaʻu. this results in a requested take limit of 29 ʻuaʻu (rounded up to the nearest whole ʻuaʻu).

5.1.4 ʻAʻo

No ʻaʻo have been observed as fatalities at the Project. Given the documented breeding that has occurred on island at the Makamakaʻole mitigation site, KWP I determined, in coordination with DOFAW and USFWS, that risk may exist and will continue take coverage for the species.

5.1.4.1 Observed and Unobserved Direct Take

Using the methods discussed in Section 5.1, the projected take for the ʻaʻo based on no fatalities being observed between FY 2006 and FY 2025 is shown in Table 12.

Table 12. Summary of ʻAʻo Fatality Estimates from EoA Based on Site-Specific KWP I Data from FY2007 through FY2025 (preliminary data)

Direct Fatalities Observed	40-year Projection at the 95% Quantile
0	9
Analysis conducted at the 80% UCL	

Based on the projections shown in Table 12, KWP predicts an estimated direct take of up to nine ʻaʻo.

5.1.4.2 Indirect Take

As with ʻuaʻu, adult and immature ʻaʻo are most likely to collide with turbines or associated structures while commuting between nesting and feeding grounds during the pre- laying period (April to May), incubation and chick-feeding periods (June to October) and fledging period (October to November). ʻAʻo are not expected to fly across the Project Area at other times of year. Based on the above, an indirect take assessment would be applied to any adult ʻaʻo found directly taken from June through October. Indirect take would not be assessed to adult ʻaʻo found at other times of year or applied to immature ʻaʻo. As with ʻuaʻu, both ʻaʻo parents care for their eggs and chicks. As little information is available for ʻaʻo on nestling growth and development or adult visitation rates, it is conservatively assumed that both parents are necessary throughout the breeding season for successfully fledging a chick.

Ainley et al. (2020) estimated that only 46 percent of all active burrows produced an egg or chick. Therefore, KWP I considered a 46 percent chance that an adult ʻaʻo taken from June through August was actually breeding (Table 13). Most nonbreeding birds and failed breeders leave the colony for the season by August (Ainley et al. 2020), therefore there is nearly a 100 percent chance that birds taken in September or October would be tending to young. Among nests where eggs are laid, 66 percent fledge a chick (Ainley et al. 2020).

Fledglings are assumed to survive to adulthood at a rate of 32.8 percent, similar to ʻuaʻu (juvenile survival rates specific to ʻaʻo are not known; see Appendix C for past mitigation letters). No ʻaʻo have been documented as fatalities, so the annual average indirect take[11] was used (0.185 fledglings), and the indirect take is predicted as:

$$9 * 0.185 * 0.328 = 0.55$$

Therefore, the total indirect take at the Project is predicted to be the equivalent of 0.55 additional ʻaʻo adult equivalents (rounded to the nearest whole ʻaʻo; 1).

[11] (3 months * 0.3) + (2 months * 0.66) +(7 months * 0) = 2.22 / 12 months = 0.185 fledglings

Table 13. Calculation of Indirect Take of ‘A‘o

‘A‘o	Season	Eggs/Chicks per Pair (A)	Likelihood of Breeding (B)	Parental Contribution (C)	Indirect (A*B*C)	Probability of Fledging	Indirect Take (fledglings)
Adult, any gender	Nov-May	0.0	0.00	0.0	0.0	0.0	0.00
Adult, any gender	June-Aug	1.0	0.46	1.0	0.46 eggs	0.66	0.30
Adult, any gender	September-October	1.0	1.0	1.0	1.0 nestling	0.66	0.66
Immature	All year	0.00	0.00	0.00	0.00	0.00	0.00

5.1.4.3 Requested Take

The total requested take to be permitted is 10 ʻaʻo. This request is based on a projected direct take of nine ʻaʻo and indirect take of another one adult equivalent (rounded up to the nearest whole ʻaʻo).

5.1.5 ʻAkēʻakē

No ʻakēʻakē have been observed as fatalities at the Project. Breeding in the vicinity of the Makamakaʻole Mitigation Area is suspected (Maui Nui Seabirds, pers comm., February 20, 2025), therefore, KWP I determined in coordination with DOFAW and USFWS that risk may exist to this species in the future, and is seeking take coverage for the species.

5.1.5.1 Observed and unobserved direct take

Using the methods discussed in Section 5.1, the projected take for ʻakēʻakē is anticipated to be the same as that for ʻaʻo, or 9 ʻakēʻakē over the permit term (Table 12).

5.1.5.2 Indirect take

As with ʻuaʻu and ʻaʻo, adult and immature ʻakēʻakē are most likely to collide with turbines or associated structures during the breeding season. ʻAkēʻakē are not expected to be flying across the Project Area at other times of year. Based on the above, an indirect take assessment would be applied to any adult ʻakēʻakē found directly taken from May through October. Indirect take would not be assessed to adult ʻakēʻakē found at other times of year or applied to immature ʻakēʻakē. As with ʻuaʻu, both ʻakēʻakē parents care for their eggs and chicks. As little information is available for ʻakēʻakē on nestling growth and development or adult visitation rates, it is conservatively assumed that both parents are necessary throughout the breeding season for successfully fledging a chick.

Slotterback (2024) speculates that nest building in Hawaiʻi likely starts in April, with egg laying peak occurring in May to June. There is an incubation period of 39 to 51 days (42 days average), and nestlings leave the nest at 64 to 78 days after hatching (Slotterback 2024).

USFWS (2021b) reports that ʻakēʻakē may arrive in Hawaiʻi in mid-May, with egg laying in June and incubation until early August, and fledging in October. It is unknown what proportion of the adult population breeds within a given year (Slotterback 2024). Fledgling success, defined for this species as the percent of total eggs laid that produce young that leave the nest, has been reported as 30 percent in the Galapagos and 33 percent on Ascension Island (Slotterback 2024). Therefore, KWP I will use a rate of 31.5 percent. Lacking additional detail, it is assumed that adults taken between May and October may result in the loss of up to 0.315 fledglings on average, while adults taken outside this time period or immature birds would not result in any indirect take (Table 14).

Table 14. Calculation of Indirect Take of ʻAkēʻakē

ʻAkēʻakē	Season	Eggs/Chicks per Pair (A)	Likelihood of Breeding (B)	Parental Contribution (C)	Probability of Fledging	Indirect Take (fledglings)
Adult, any gender	Nov-April	0.0	0.00	0.0	0.0	0.00
Adult, any gender	May-October	1.0	1.0	1.0	0.315	0.315
Immature	All year	0.00	0.00	0.00	0.00	0.00

Fledglings are assumed to survive to adulthood at a rate of 32.8 percent, similar to the ʻuaʻu (juvenile survival rates specific to ʻakēʻakē are not known). No ʻakēʻakē have been documented as fatalities, so the annual average indirect take[12] was used (0.158 fledglings), and the indirect take is predicted as:

$$9 * 0.158 * 0.328 = 0.47$$

Therefore, the total indirect take at the Project is predicted to be the equivalent of 0.47 additional ʻakēʻakē adult equivalents (rounded to the nearest whole ʻakēʻakē; 1).

5.1.5.3 Requested Take

The total requested take to be permitted is 10 ʻakēʻakē. This request is based on a projected direct take 9 ʻakēʻakē and indirect take of another 1 adult equivalent (rounded up to the nearest whole ʻakēʻakē).

5.1.6 Assimulans Yellow-faced Bee

The use of acres of habitat as a surrogate for take is appropriate for the assimulans yellow-faced bee because direct detection and inventory of individuals is not practicable. This species is small, mobile, and difficult to reliably survey, with presence often confirmed only through visual observations at flowers or nest burrows. In contrast, the quality and extent of habitat, including key foraging and nesting resources, provide a biologically meaningful measure of the species' potential abundance and persistence. Because the viability of assimulans yellow-faced bee populations is intrinsically tied to the amount and condition of these habitats, quantifying impacts in acres of habitat provides a defensible, transparent, and monitorable surrogate for take. This ensures that mitigation actions, also measured in habitat acres, are directly linked to sustaining or improving ecological conditions necessary for the species' long-term conservation. Surveys for the species have seasonal restrictions, and cannot be conducted prior to anticipated permit issuance, but will be conducted prior to any ground disturbance.

In addition to habitat as a surrogate, KWP I is also including a requested number of nest burrows at the request of DOFAW to account for any nests that cannot be practicably avoided.

[12] (6 months * 0.315) + (6 months * 0) = 1.89 / 12 months = 0.158 fledglings

5.1.6.1 Direct and Indirect Take

Take of assimulans yellow-faced bee could occur in two forms during covered activities, both direct and indirect. While the operations of wind turbines could result in mortality of assimulans yellow-faced bee, the frequency of these events is unknown and there is not currently a valid way to quantify or predict this risk. However, based on studies on bees more generally, and Hylaeus species specifically, the risk of turbine strikes would be low (see Section 4.6.4). While assimulans yellow-faced bees are readily nesting and foraging within the Project and on adjacent lands, the duration of this coexistence during the 19 years of Project operation is unknown, as is what the population status would be in the absence of the Project. Assimulans yellow-faced bees use ʻilima for foraging and nest underground in proximity to these foraging resources (USFWS 2022c; Hawaiʻi Invertebrate Program [HIP] pers. comm. via DOFAW, July 15, 2025). Therefore, take could occur if activities occur within or otherwise impact nesting areas or foraging resources (ʻilima plants, or other species identified in Section 4.6). Should other plant species be identified in the future as important as a foraging resource, KWP will work with USFWS and DOFAW to adapt the minimization and avoidance measures accordingly.

As described in Section 2.0, covered activities that could result in take involve routine maintenance activities, occasional major maintenance activities (i.e., replacement of components), and eventual decommissioning of the Project. Minor grading or vegetation removal may be necessary to prepare the site for equipment transport and maintenance activities, to maintain the primary and secondary access roads for service vehicles, and to maintain vegetation free buffers to provide fire breaks and assist with HCP compliance monitoring. Any ground disturbance would fall within the limits of disturbance shown in Figure 2. Use of heavy machinery within the limits of disturbance (Figure 2) and off the existing roads and pads, if necessary, will be limited and infrequent. The areas of potential impact used to estimate take for assimulans yellow-faced bee are shown in Figure 9, and are essentially any areas between the existing roads and pads and the outer limits of disturbance (i.e., areas not currently graded that may have impacts). It is noted that take could occur outside of this area (e.g., along the edges of the access road), but that the total impact will remain at or below 5 acres.

Ground-disturbing activities or the use of heavy machinery off the roads and pads but within the limits of disturbance have the potential to impact foraging resources or cause soil compaction which may be linked to indirect take through the temporary loss of unoccupied suitable habitat, or result in direct take of nests and/or individuals if they are missed in surveys. As described in Section 6.2.6.1, nest surveys for assimulans yellow-faced bees will occur prior to periods of known heavy machinery or ground disturbance work (i.e., prior to the major maintenance in 2026 and prior to start of decommissioning in 2047/2048), and along roadsides on an annual basis, and nest areas will be flagged and avoided. Annual maintenance and operations of the wind turbines are restricted to the graveled roads and pads. These surveys will occur during the nest building period, roughly February through April. Direct take due to soil compaction of occupied nest areas is anticipated to be avoided to the maximum extent practicable through these methods, and would occur only if nests are missed during surveys or if impacts are unavoidable (i.e., road work needed for site access and safety). Any areas determined to be high-density nest areas near turbine pads or roads may be marked with permanent signage, in coordination with DOFAW entomologists.

Vegetation maintenance occurs at the facility in order to keep roadways and turbine pads clear of vegetation to allow access for maintenance staff, to reduce fire risk, and to maintain highly visible fatality monitoring search areas. Vegetation maintenance will follow the Vegetation Management Plan (Appendix A), and use of herbicides will be minimized through the use of manual/mechanical methods of vegetation management. Some manual /mechanical vegetation management activities could result in the modification or removal of ʻilima or other foraging resources. Furthermore, targeted herbicide applications may occur as part of vegetation management. Herbicide will not be directly applied to any native plants, but KWP recognizes that indirect effects may occur due to assimulans yellow-faced bee presence in the vicinity.

KWP anticipates that direct take of assimulans yellow-faced bee may be avoided through avoidance of documented nest locations and foraging resources (i.e., ʻilima) during the active season. Avoidance and minimization of impacts to foraging bees will be accomplished through seasonal timing restrictions on ʻilima (or other flowering plants of species identified in Section 4.6) removal (including avoidance of flowering ʻilima) and presence of a DOFAW entomologist or DOFAW-approved biological monitor if flowering plants are to be impacted. Avoidance and minimization of impacts to nest locations will be accomplished through the use of a DOFAW entomologist or approved biological monitor to identify nest locations within areas of disturbance, if they occur. While efforts will be made to avoid take of individuals and nests through seasonal work windows and surveys, some direct or indirect take of individuals may occur if nests are missed during the survey. Such take is thus not measurable; therefore, this HCP will use habitat impacts as a surrogate metric to both quantify take and the mitigation necessary to offset take and will then monitor vegetation and assimulans yellow-faced bee use to demonstrate that mitigation provides a net conservation benefit (see Section 6.3.8). Using habitat as a surrogate metric for take is a common practice for species that are elusive or otherwise hard to study based on their life histories and will also account for any indirect take occurring due to herbicide use or through the transplanting of foraging resources (ʻilima plants, or other species identified in Section 4.6) or direct take/impacts to nests.

Figure 9 shows the Limits of Disturbance. KWP determined that take of up to 5 acres of potential assimulans yellow-faced bee habitat could occur within the Limits of Disturbance. This is the equivalent of the portions of the Limits of Disturbance that are vegetated. The remainder of the Limits of Disturbance includes existing turbine pads or roads (i.e., non-habitat). Due to the compaction of gravel on the roads and pads, and the presence of a weed barrier under the gravel, this area is classified as non-habitat, though it will be surveyed during the 2026 active season.

In coordination with DOFAW entomologists, KWP I is estimating that up to 25 nest burrows could be inadvertently taken or may occur in locations where take is unavoidable. That estimate is derived from the requested 25-year permit term and the potential for this to occur on average once per year.

5.1.6.2 Requested Take

KWP I anticipates that most activities during the Permit Term will occur within non-habitat (i.e., on the existing roads and pads). Activities off the roads and pads will be avoided unless use of those areas are required for access or laydown of materials and there is no feasible way to avoid it.

The requested incidental take involves any indirect impact of take on the species at the Project site through the removal of vegetation that corresponds to bee foraging and nesting resources, as well as through a direct impact of take via assimulans yellow-faced bee nests. Removal of native plants will be avoided to the maximum extent practicable. Ground disturbance to nests will only occur under extreme circumstances, and otherwise all marked nests will be avoided during maintenance and other activities.

Therefore, KWP is requesting take for up to 5 acres of assimulans yellow-faced bee habitat disturbance, including take of foraging and nesting resources. In addition, KWP I is requesting take of up to 25 nest burrows to account for unavoidable nest impacts that may occur over the 25-year Permit Term.

5.2 Summary of Requested Take

In summary, the requested take is 69 nēnē, 38 ʻōpeʻapeʻa, 28 ʻuaʻu, 10 ʻaʻo, and 10 ʻakēʻakē (Table 15). In addition, the Project requests impacts of up to 5 acres of suitable habitat for assimulans yellow-faced bee.

Table 15. Summary of KWP I Requested Take by Covered Species (in adults/adult equivalents unless otherwise noted)

Covered Species	Requested Permitted Amount
Nēnē	69
ʻŌpeʻapeʻa	38
ʻUaʻu	29
ʻAʻo	10
ʻAkēʻakē	10
Yellow-faced bee	5 acres; 25 nest burrows

5.3 Other Covered Activities Not Anticipated to Result in Take of Covered Birds or Bats

While monitoring, mitigation, and decommissioning are classified as Covered Activities under this HCP, they are not expected to result in take for any Covered Species except for the assimulans yellow-faced bee as described in the following sections. Temporary or indirect impacts to assimulans yellow-faced bee may occur as described in Section 5.1.6.

5.3.1 Monitoring

Fatality monitoring is conducted weekly at the site, and is not anticipated to result in take of any Covered Species through the following BMPs:

- Observing the posted 10-mph speed limit;
- Vegetation management will implement the BMPs outlined in the Vegetation Management Plan (Appendix A), including the use of a biological monitor when warranted (e.g., if conducted during a time when a listed species may be present) and identified timing restrictions;
- Scavenger trapping will implement the use of a “gosling guard” to avoid impacts to nēnē; and
- Use of canines specifically trained to stand down when nēnē are present.

5.3.2 Mitigation

Mitigation projects include the start, continuation and/or expansion of existing projects at the following locations:

- Makamaka’ole in West Maui (see Section 6.3.6)
- Haleakalā Ranch on Maui (see Section 6.3.3.1)
- Pu’u O Hōkū Ranch on Molokaʻi (see Sections 6.3.3.2 and 6.3.4)
- Alpine Wildlife Sanctuary on Maui (see Section 6.3.5)
- Lānaʻi, including the Greater Hi’i Area (see Sections 6.3.5 and 6.3.4)
- Kaheawa Pastures on Maui (see Section 6.3.8)

Though the specific scopes of work may change over time in response to adaptive management or changing needs (see Appendices D-H), all mitigation activities will be designed and implemented to avoid any “take” of federally or state listed species. As part of project planning and prior to implementation, each mitigation action will undergo site-specific evaluations to assess the potential for listed species presence and habitat use. Avoidance and minimization measures, such as timing restrictions, spatial buffers, and best management practices, will be incorporated to prevent disturbance, injury, or harm to protected species or their habitats. Where necessary, coordination with USFWS and DOFAW will guide project design. This proactive and adaptive approach ensures that mitigation efforts contribute to a net conservation benefit without resulting in incidental take. Examples of existing measures that have been implemented to avoid take include:

- Alternatives to barbed wire in any mitigation fencing activities;
- Use of “gosling guards” when predator trapping near nesting nēnē;
- Tree trimming restriction for trees greater than 15 feet in height from June 1 through September 15; and
- Acquiring required permits for handling a Covered Species (e.g., USFWS ESA 10(a)(1)(A) Recovery Permit for ‘ua‘u as described in Appendix G).

While fatalities of Covered Species may occur at mitigation sites (e.g., disease, natural predation), all mitigation programs will be designed in a way to avoid incidental take, and incidental take is therefore not anticipated.

5.3.3 Decommissioning

During decommissioning, turbine blades will be locked in place until their removal, avoiding or minimizing the risk of collision by the Covered Species. Otherwise, all applicable measures described for operations and maintenance would be implemented.

5.4 Anticipated Impacts of the Taking

Per the HCP Handbook (USFWS and NMFS 2016):

> *The key to compliance with section 7(a)(2) for any proposed Federal action is ensuring that it is not likely to jeopardize the continued existence of the listed species or destroy or adversely modify designated critical habitat. Actions should be compatible with the survival and recovery needs of the affected listed species and the recovery function of any affected designated critical habitat. Characterizing those needs and the role of the area affected by the HCP in terms of conserving the affected listed species and any affected designated critical habitat is essential to making sure we have the best information for the assessment of anticipated impacts and the proposed mitigation.*

No critical habitat for any Covered Species is being impacted by the Proposed Action, and therefore our analysis focuses on impacts to the population of each Covered Species. The potential for take from the KWP I facility has occurred since 2006 when the project was built and began operations. Thus, the annual take from the project is expected to be the same as what has been occurring over the last 19 years, and similar population trajectories would be anticipated to occur over the next 20.5 years. However, future impacts will also be occurring to populations that have benefitted from the mitigation actions taken under the current ITP and ITL, which are thus described below for each species. It should also be noted that mitigation will be implemented under this HCP that is intended to fully offset the impact of the taking and provide a net conservation benefit (as required under HRS 195D-4(g)(8))) to each Covered Species. Mitigation that will be implemented is further described in Section 6.3, and would fully offset any anticipated impacts described below.

5.4.1 Nēnē

A total of 69 nēnē (at the upper 80 percent credible level) equates to an annual take of less than or equal to approximately 3.5 nēnē per year from the Maui population. This would impact less than 0.8 percent of the most recent population status on Maui of 429 nēnē (see Section 4.1). The USFWS (2019) determined that the population on Maui is stable, and this determination occurred while KWP I was operating with nēnē take. Therefore, on the continued trajectory of take at the Project, it is anticipated that the population of nēnē on Maui would remain stable. It should be noted that the Project, in conjunction with KWP II, was implementing mitigation for nēnē starting in 2012; this mitigation would continue and be expanded (see Section 6.3).

The current estimated population of nēnē on Maui already accounts for the impacts of past take and past mitigation of nēnē. The project also has existing mitigation projects for nēnē currently underway.

The Project has historically supported the translocation of 56 nēnē to the island of Maui through efforts at Haleakalā Ranch (DLNR 2025a). More recently, the Project has begun management of a pen on Molokaʻi following a translocation of 24 nēnē inclusive of 4 adult pairs and 16 subadult goslings. Through FY 2024, nēnē mitigation at Haleakalā Ranch had resulted in the production of over 81 nēnē fledglings and increased survival for 144 breeding adults[13], or the equivalent of adding 45.68 adult-equivalent nēnē to the population (Appendix C). Nēnē mitigation efforts on Molokaʻi just began following a translocation in April 2025, though the remaining resident nēnē produced two fledglings during the FY 2025 breeding season prior to the translocation. It is anticipated that continued mitigation efforts will lead to an increase in population on Molokaʻi.

5.4.2 ʻŌpeʻapeʻa

As discussed in Section 4.2, the population size of the ʻōpeʻapeʻa remains unknown, and at present, it is not considered feasible to determine a reliable population estimate for a single island (ESRC and DOFAW 2024). The ESRC's current bat guidance recommends assuming a maximum of 1,500 individuals on Maui; however, this figure is derived from "extremely limited information" (ESRC and DOFAW 2024) and should be interpreted with caution due to its unverified accuracy. Based on this working estimate, the requested permitted take of 38 ʻōpeʻapeʻa over the permit term (equivalent to approximately 1.9 ʻōpeʻapeʻa per year of operations) represents an estimated 0.13 percent of a population of 1,500 ʻōpeʻapeʻa per year. This rate of take has been occurring at the project site since operations began in 2006. Importantly, site-specific acoustic data, described below, provide an insight into how this level of take is unlikely to result in significant adverse

[13] Note that this may not represent 144 individuals, as each year is counted separately for the purposes of mitigation crediting, and therefore an individual nēnē may be counted more than once.

effects, continued monitoring and adaptive management remain critical to ensuring the long-term health and stability of the population.

Finally, it is worth noting that under the current Incidental Take License and Permit (2006–2026), the Applicant provided mitigation that was determined to offset take for up to 50 ʻōpeʻapeʻa. However, actual take under the current permits is projected to be significantly lower—estimated at 32 direct take plus 3.17 indirect take—resulting in a net conservation benefit as the Project transitions into the new permit term. Furthermore, the research and mitigation work conducted under the existing permits will directly inform and enhance the design of future mitigation strategies (see Section 6.3.4).

5.4.3 ʻUaʻu

If the maximum requested take of 29 adult equivalents ʻuaʻu occurs, it is not expected to impact the population significantly. The global population of ʻuaʻu is estimated at 11,900 (Pyle and Pyle 2017), with approximately 1,800 at Haleakalā National Park and a few hundred in West Maui (DLNR 2015b). Overall, the population on Maui is estimated at 1,600 pairs (3,200 individuals; Pyle and Pyle 2017). Take of 29 ʻuaʻu over 20.5 years of operations (1.4 per year on average) would not cause a significant impact on any of these populations. Additionally, the requested take is based on several conservative assumptions. The mitigation measures outlined for the project (Section 6.3.5) will provide a net benefit, offering further assurance that there will be no population-level effects from the project's operation during the permit term.

Additionally, historic mitigation efforts for this species at Makamakaʻole on Maui and at Pūlama Lānaʻi on the island of Lānaʻi for resulted in an offset of 89.72 ʻuaʻu when combined with KWP II efforts. This ʻuaʻu offset is greater than the required mitigation across both projects of 64.48 ʻuaʻu (with a net benefit of more than 25.24 ʻuaʻu). The Makamakaʻole Mitigation Area was selected for ʻuaʻu mitigation and began with the construction of two predator exclosures in September 2013. Efforts included predator monitoring and trapping, artificial burrow checks, game camera monitoring, seabird social attraction using decoys and sound systems, and ongoing maintenance, including vegetation management and were conducted through 2022. However, no ʻuaʻu activity had been detected at Makamakaʻole after 2017. Thus, starting in 2018, KWP I funded Pūlama Lānaʻi to support ʻuaʻu breeding colony protection on Lānaʻi as an adaptive management measure. These protections included predator control and burrow monitoring in the Greater Hiʻi area of Lānaʻi. The success of this mitigation allowed for continued support for the Lānaʻi ʻuaʻu breeding program through FY 2023.

The funding of Pūlama Lānaʻi mitigation resulted in 184 fledglings (Appendix C), of which 30 percent are anticipated to survive to adulthood (see Section 5.1.3). These individuals fledged in 2018, 2021, and 2022, and therefore will be reaching the breeding age of 5 (Simons and Bailey 2020) between 2023 and 2027. The addition of approximately 55 breeding adult ʻuaʻu during the start of this requested permit term suggests that the impact of the future take is occurring on a more robust population than historic take occurred (See Section 6.3.1).

5.4.4 ʻAʻo

If the maximum requested take of 10 ʻaʻo occurs, it is not expected to impact the population significantly. State-wide, an estimated 10,300 ʻaʻo breeding pairs (20,600 adults) exist, with 50 of those pairs (100 adults) residing on the island of Maui (Pyle and Pyle 2017); 34 adults were present at Makamakaʻole during the 2022 breeding season. Take of 10 individuals over 20.5 years of operations (average of 0.5 per year) would not have a significant impact on any of these populations.

Additionally, the requested take is based on several conservative assumptions, and actual take may be lower or not occur at all based on a lack of fatality records during the first 19 years of operations. In the case of no observed take, previously implemented mitigation would provide an even greater net conservation benefit.

Historic mitigation for take of ʻaʻo for KWP and the adjacent KWP II has already occurred and resulted in the production of two fledglings and increased adult survival for 148 ʻaʻo at the Makamakaʻole mitigation site (see Section 6.3.1). Combined, this offset is calculated to be the equivalent of 8.53 adult ʻaʻo. Because no ʻaʻo fatalities have been observed at either project, these mitigation efforts have already provided a net benefit, offering further assurance that there will be no population-level effects from the Project's future operation (see Section 6.3). This mitigation site is located in West Maui, approximately 9 miles from the KWP facility, and therefore has contributed directly to the population that would be anticipated to be impacted by any fatality at the site.

5.4.5 ʻAkēʻakē

If the maximum requested take of 10 ʻakēʻakē occurs, it is not expected to impact the population significantly. Pyle and Pyle (2017) estimated 250 pairs on Kauaʻi, 50 pairs on Hawaiʻi Island, and 30 pairs on Maui. An average take of 0.5 ʻakēʻakē per year is not anticipated to have a significant impact on any of these populations.

Additionally, the requested take is based on several conservative assumptions, and actual take may be lower or not occur at all based on a lack of fatality records during the first 19 years of operations. In the case of no observed take, any successfully implemented mitigation would provide an even greater net conservation benefit.

5.4.6 Assimulans Yellow-faced bee

Based on an assumed minimum foraging distance of 550 meters (Hawaiʻi Invertebrate Program [HIP] pers. comm. via DOFAW, July 15, 2025), each assimulans yellow-faced bee may use approximately 235 acres[14] depending on the distribution of food resources. Based on the amount of habitat that may be temporarily or indirectly impacted (5 acres), this impact would represent approximately 2 percent of the foraging area for a bee. It should be noted that not all 5 acres are located within the foraging distance of the known nest congregation (i.e., the limits of disturbance

[14] Area = π * radius^2 = π * 302,500 ≈ 950,332 square meters ≈ 235 acres

include areas > 550 meters from the core nest area and therefore not all 5 acres would be anticipated to impact this population) or within 550 meters of a known single nest. It is noted that additional nests will be found outside the core nest area when surveys are completed in 2026, and impacts may occur within 550 meters of nests. Overall, the impacts per turbine average 0.25 acre.

However, impacts will be avoided whenever possible, and will therefore occur only intermittently where habitat overlaps with unavoidable maintenance or decommissioning activities within the limits of disturbance, minimizing the impact to habitat at any given time or for any individual bees. Therefore, the temporary and indirect impact of up to 5 acres is not anticipated to have a significant impact on the local population of assimulans yellow-faced bee.

Based on the number of foraging and nesting resources available outside the limits of disturbance, and beyond the Project Area, suitable habitat is available in the vicinity. Mitigation efforts (see Section 6.3.8) will serve to both preserve and increase the quality and quantity of foraging and nesting resources in this broader area, providing a net conservation benefit to the local population of assimulans yellow-faced bee.

6.0 Conservation Strategy

The federal "maximum extent practicable" standard under the ESA requires that an HCP include measures to minimize and mitigate the impacts of incidental take as much as is reasonable and feasible, recognizing that complete avoidance is rarely possible. Hawaiʻi's companion statute, HRS Chapter 195D, builds on this framework by requiring that approved HCPs provide a net conservation benefit to the affected species. Together, these standards ensure that minimization is implemented to the greatest practicable degree, while compensatory mitigation offsets any remaining impacts and contributes to the species' overall recovery. In this context, the proposed conservation strategy is adequate because the avoidance and minimization measures meaningfully reduce take risk given project-specific constraints, and the proposed mitigation provides a net conservation benefit that more than compensates for residual effects. The combined measures fully satisfy both the federal and state standards for approval and are designed to meet permit issuance criteria.

6.1 Biological Goals and Objectives

Goal 1: Implement minimization measures for the Permit Term to operate, maintain, and decommission the facility within the authorized amount of take for each Covered Species.

> *Objective 1*: Implement facility maintenance activities in such a way that impacts to nēnē are minimized (e.g., speed limits, conducting maintenance during non-breeding season in locations where nests are known to occur) and to reduce attractiveness of site for nēnē, including removal of ironwood and other invasive woody species where appropriate.

> *Objective 2*: Implement curtailment of turbine operations during periods of time, seasonally or daily, that minimize the potential for ʻōpeʻapeʻa to be struck by operating turbine blades.

Objective 3: Implement minimization measures including best management practices regarding lighting, nighttime construction, and fencing, to minimize risk to seabirds.

Objective 4: Implement Covered Activities in such a way that impacts to assimulans yellow-faced bees are minimized (e.g., surveys prior to work occurring in potential habitat, off the graveled roads and pads).

Goal 2: Mitigate take at levels sufficient to fully offset take of and provide a net benefit to Covered Species in Maui Nui.

Objective 5: Support nēnē propagation efforts until such time that efforts result in a net benefit to the species within Maui Nui compared to the permitted amount of take.

Objective 6: Perform mitigation which will be sufficient to provide a net benefit to the ʻōpeʻapeʻa population in Maui Nui compared to the permitted amount of take.

Objective 7: Implement predator trapping and burrow monitoring at the ʻuaʻu mitigation site on an annual basis until mitigation offset has exceeded the permitted take

Objective 8: Support ʻaʻo mitigation until such time that mitigation provides a net benefit in Maui Nui.

Objective 9: Support ʻakēʻakē mitigation until such time that mitigation provides a net benefit in Maui Nui.

Objective 10: Perform mitigation which will be sufficient to provide a net benefit to the assimulans yellow-faced bee compared to the permitted amount of take.

Goal 3: Monitor take to inform whether adaptive management measures are needed to remain within permitted amounts of take for Covered Species.

Objective 11: Evaluate data from post-construction monitoring on an annual basis to evaluate take of Covered Species and analyze to determine risk of permit exceedance.

Objective 12: Report the amount (acres) of suitable habitat and number of nests impacted during vegetation management activities or other maintenance activities along with the number and locations of any native plants known as foraging resources for the assimulans yellow-faced bee that were transplanted or out planted.

6.2 Measures to Avoid and Minimize Take

Measures are currently being implemented at the facility and will continue to be implemented for the life of the facility, unless it becomes apparent through study, that these measures are no longer appreciably reducing take and it is agreed upon by the Permittee/Licensee, DOFAW, and the USFWS that the measures can be discontinued. Species-specific measures are outlined in the sections below.

In addition, the original project design and siting included minimization that remains in place today. These minimization measures include (KWP I 2006):

- Employing relatively few turbines situated in a single row, rather than a large number of turbines in multiple rows;
- Using “monopole” steel tubular towers, rather than lattice towers, to eliminate perching and nesting opportunities. The tubular towers may also reduce collision risk because they are considerably more visible;
- Using a smaller tower (55 meters) than is typically used with the GE 1.5 turbine (65 meters or greater), to potentially reduce the risk of collision for birds and bats, even though such risk is not demonstrably related to the tower height;
- Utilizing a rotor with a significantly slower rotational speed (11-20 rpm), which makes the rotor much more visible during operation (previous designs had 28.5 and 34 rpm rotors);
- Choosing a site in proximity to existing electrical transmission lines to eliminate the need for an overhead transmission line from the project to the interconnect location;
- Placement of all new power collection lines underground to eliminate the risk of collision with new wires;
- Designing and installing the site substation and interconnect to Maui Electric Company’s transmission lines using industry-standard measures to reduce the possibility of wildlife electrocutions; and
- Marking guy wires with high visibility bird diverters, such as reflectors, foam tubing, or other suitable marking devices designed to reduce bird strikes.

Furthermore, the continued operation of KWP eliminates the potential need for a new energy generation site on Maui, as well as enabling the conservation strategy for the existing site to be informed by 19 years of site-specific data.

6.2.1 Nēnē

6.2.1.1 Vegetation Management

To enhance fatality monitoring efficiency and minimize impacts on native plants without compromising soil stability, KWP I conducts vegetation management at the Project. These activities began in year 5 of operations, 2011, and have evolved over time, considering restrictions during the nēnē nesting season. The evolution includes:

- Initially, vegetation management within the search plots was limited to April 1 through October 31 to minimize risks during the nēnē nesting season.
- In November 2016, Stephanie Franklin of DOFAW-Maui verbally approved the use of hand management tools (spray packs and weed whackers) during the nēnē nesting season, provided the activity was within the current search area and did not disturb wildlife.

- In March 2017, Stephanie Franklin of DOFAW-Maui verbally approved the removal of Christmas berry within 70 meters of the WTGs to reduce potential nēnē nesting habitat nearby.
- In September 2021, Stephanie Franklin of DOFAW-Maui verbally approved the continuation of the quarterly management program and woody vegetation removal using hand and power tools, along with manual herbicide application on cut stumps as necessary, near select turbines. Additional woody vegetation removal was approved within a one-meter buffer of select turbine access roads, with all work completed between April 1 and October 31, in conjunction with a biological monitor.
- In FY 2023 in order to reduce the amount of herbicide used on site and based on the regrowth patterns on the cleared areas, KWP I reduced the frequency of the quarterly management program to occur twice a year. The program consists of regular vegetation management of cleared areas within each search plot, supplemented by weed whacking to maintain consistency of the extent of the cleared area within 70 meters of each turbine. This vegetation management practice occurs only on the cleared and graded areas and herbicide use is avoided on native plants, including ʻilima.

KWP I will continue to implement vegetation management in coordination with the agencies to reduce the amount of woody vegetation on site. The current Vegetation Management Plan is included in Appendix A, but is subject to change over time as additional data are collected. The goal is to minimize the attractiveness of onsite habitat to the nēnē. KWP I will continue to monitor nēnē activity on site to inform vegetation management success, and continue to work with USFWS, DOFAW, and technical experts to further reduce risk to the species and continue to improve this management towards nēnē success. It should be noted that KWP I has limited control over the activity of other vegetation management actions that may be taken in proximity to the turbines, including mandated work that may be needed (e.g., vegetation clearing conducted by Hawaiian Electric or DOFAW).

6.2.1.2 Vehicular Traffic

Because maintenance (and to a limited extent construction) vehicles have a regular occurrence on site, traffic control measures will continue to be practiced. Project personnel (and contractors) will continue to be trained to watch for wildlife, and speed limits (10 mph) will be enforced to minimize potential for vehicular strikes to result in death of wildlife. Traffic signage will be used in areas of higher nēnē use for general awareness, and the locations of this signage may be increased and/or updated over time in conjunction with the location(s) nēnē use observations.

6.2.1.3 Fatality Monitoring Activities

During fatality monitoring, precautions will continue to be taken to prevent potential canine interactions with the nēnē. If nēnē are present in a search area, the canine handler will immediately retrieve and restrain the dog, avoid disturbing the birds, and will postpone searching in the vicinity of the birds, worked on leash away from wildlife and/or temporarily skipping canine searches in the proximity of the nēnē. Any canine searcher-wildlife interactions will be reported in annual reports.

During scavenger trapping in the Project Area and during predator trapping at mitigation sites where nēnē are present, particularly during the nesting and gosling season, a metallic mesh cloth ("gosling guard") will be attached as needed to the entrance of any live traps and other selected traps to prevent nēnē, from entering. Over the course of the current ITL and ITP, no nēnē fatalities have been reported from any on-site scavenger trapping or mitigation predator trapping effort.

6.2.1.4 Decommissioning

During decommissioning, any necessary ground disturbing activities will either occur outside of the nēnē nesting season or will be conducted with a biological monitoring on site with the ability to stop or modify decommissioning activities to avoid impacts to the species.

6.2.2 ʻŌpeʻapeʻa

During operations, maintenance, mitigation activities, or decommissioning, any required tree clearing of trees greater than 15 feet in height would occur outside the pupping season or if needed during the pupping season (due to a conflict with nēnē breeding season or for a site safety issue) a biological monitor would evaluate the trees first for roosting bats. In addition, existing barbed wire within the Project Area will be removed (in coordination with Hawaiian Electric) and barbed wire will not be installed in the future.

6.2.2.1 Low-wind Speed Curtailment (LWSC)

The goal of LWSC is to minimize risk to bats while also continuing to optimize renewable energy generation for the island of Maui. The Project operated without any LWSC until FY 2015 (with the exception of April 2014). When the data were analyzed in EoA (Dalthorp et al. 2017), the estimated take of ʻōpeʻapeʻa during the FY 2006 to FY 2015 timeframe was 18 at the 80 percent UCL, with an average fatality rate (λ) of 1.83 ʻōpeʻapeʻa per year. Conversely, since FY 2015, the estimated take of ʻōpeʻapeʻa is 13 at the 80 percent UCL, with an average fatality rate (λ) of 1.05.

When the two time periods are compared in EoA[15], there is not statistical evidence to support a reduction in the underlying fatality rate at the Project post-implementation of LWSC[16]. Nonetheless, given the substantive research from the mainland on the effectiveness of LWSC (e.g., Baerwald et al. 2009, Good et al. 2011, Young et al. 2011, Hein et al. 2014), and the decrease in the annual take rate (even if not statistically significant), KWP I will continue to implement LWSC.

Since the post-construction monitoring data are limited based on low sample size of fatalities, site-specific analysis of LWSC needs to rely on alternative sources of data. One such data source is acoustic data, which have been collected annually at the site since 2006 and consistently, using the same methods, since 2015 (see Section 4.2.5.1). When paired with data from the turbine's

[15] 2015-2023: Ba=969.35 Bb=1239.4, fatalities=4, rho=9.75
2004-2014: Ba = 80.459, Bb = 98.985, fatalities = 6, rho=8.02

[16] Based on the test of assumed relative rates (rho) and potential bias tests in the multi-year module.

Supervisory Control and Data Acquisition (SCADA) system, acoustic exposure can indicate the proportion and rate of bat passes exposed to risk at different wind speeds, and has been found to correlate positively with bat fatality rates (Peterson et al. 2021, 2025). Essentially, if a bat pass is detected when the turbines are not curtailed (defined as a rotations-per-minute or RPM of greater than 1), that bat is potentially at risk of collision. Alternative LWSC regimes can then be modelled and compared.

KWP I analyzed seasonal and spatial patterns of bat activity based on acoustic data collected between 2019 and 2024 from 10 acoustic detectors; 5 within KWP I and 5 within the adjacent KWP II facility. The purpose of the analysis was to design alternative curtailment strategies to the existing blanket curtailment strategy, which consisted of a 5.5 m/s cut-in wind speed applied from February 15–December 15 from sunset to sunrise. In addition, based on feedback received on the Draft HCP, KWP I analyzed whether 6.5 m/s may be more effective, as recommended by ESRC and DOFAW (2024).

Approximately 71 percent of bat activity at the site occurs at wind speeds less than 5.5 m/s, with an additional 4 percent of activity occurring between 5.5 m/s and 6.5 m/s. Raising the cut-in speed to 6.5 m/s would therefore reduce exposure risk for bats by approximately 4 percent, however, this would come at a substantial lost annual energy production. Specifically, raising cut-in speeds from 5.5 m/s to 6.5 m/s over the entire bat curtailment season would result in an additional loss of 358 MWh of energy production, which, if replaced with traditional fossil fuels, would add an additional 268.5 tons of carbon into the environment each year, or 5,504 tons over the 20.5 years of operations (based on an assumed reduction of 0.75 tons of carbon per MWh of wind energy; AWEA 2014).

In order to optimize the minimization of risk to bats and also generating as much renewable energy as possible, KWP I is proposing to maintain LWSC cut in speeds of 5.5 m/s for the majority of the year but increase cut-in speeds to 6.5 m/s for the months of August through October. According to acoustic data collected at the project from 2019 – 2024, 50 percent of bat activity at occurs in September and October, with an additional 9 percent occurring in August. By increasing cut-in speeds during these three months, the Project would minimize risk to bats while continuing to operate with a 5.5 m/s cut-in speed for the majority of the rest of the year. The LWSC regime would therefore consist of:

- February 15 – July 31: 5.5 m/s from sunset to sunrise
- August 1 – October 31: 6.5 m/s from sunset to sunrise
- November 1 – December 15: 5.5 m/s from sunset to sunrise

This will be implemented at each turbine based on the 10-minute rolling average as measured at the turbine nacelle. KWP I anticipates that this LWSC regime is a more protective approach compared to the LWSC implemented from April 2015 through January 2026.

Note that KWP I is continuing to explore additional approaches to redistributing the curtailment throughout the night based on site-specific acoustic data (time of night, date, weather conditions, spatial aspects, etc.). If supported by the data and technically feasible using the SCADA software, an alternative LWSC regime may be proposed in the future if it is determined that exposure risk to bats could be reduced further. Any changes to the LWSC regime will only be implemented in coordination with USFWS and DOFAW.

6.2.3 ʻUaʻu

As described in Section 4.3.5 radar surveys conducted prior to construction of the facility determined that the Project Area represented some of the lowest passage rates for this species on the island. As such, siting of the facility in this location inherently minimized potential take of individuals. This has proven true during the last 19 years of operations, where mortality rates have been below what was estimated originally. At night, the auxiliary equipment and structures are minimally illuminated for operational safety and security, resulting in minimal light sources. The turbines are equipped with synchronized red lights that comply with FAA regulations[17].

All collector lines at KWP I are buried, and there are no overhead transmission lines directly associated with the Project. Overhead transmission lines do occur within the Project Area: three Hawaiian Electric Transmission lines (see Figure 1), and a line associated with the adjacent KWP II facility that crosses the Manawainui Gulch for approximately 1,225 ft (KWP II 2011). This line historically was marked with marker balls to reduce risk to seabirds; however, wind conditions removed the markers, and KWP II is in the process of replacing these markers.

The Applicant will continue to implement BMPs regarding lighting at facilities on Maui (both during operations as well as during maintenance and decommissioning), including the following:

- Fully shield all outdoor lights to the bulb can only be seen from below.
- Install automated motion sensor switched and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Outdoor light fixtures (unless otherwise exempt, such as FAA lighting) will limit short wavelength content to no more than 2 percent blue light content (the ratio of the amount of energy emitted by the outdoor light fixture between 400 and 500 nanometers divided by the amount of energy between 400 and 700 nanometers. If guywires are needed at night within the Project Area (e.g., for turbine maintenance activities), lines will be marked to minimize risk to seabirds.
- Where fences extend above the vegetation, KWP I will integrate three strands of polytape into the fence to increase visibility where feasible.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

[17] In March 2005 the FAA approved of lighting only six wind turbines (at intervals of 2,500 to 3,000 feet) with medium intensity, simultaneously flashing red lights, utilizing the minimum flash frequency.

If nighttime construction (i.e., for maintenance or for decommissioning) during this period is unavoidable, KWP I will utilize a biological monitor during nighttime activities. This monitor will observe construction activities between approximately 0.5 hour before sunset to 0.5 hour after sunrise (i.e., when lighting is used) to be on lookout for wildlife species that appear to be disoriented or attracted to the lighting, or grounded by lighting, and facilitate corrective actions to be taken with the construction crew so as to avoid or minimize potential issues. Examples of potential issues include birds flying around turbines or lights, or becoming disoriented and falling to the ground near light sources.

Monitoring will be conducted by scanning the sky surrounding the construction area with binoculars approximately every 5 minutes. Every hour, the biological monitor will conduct a walk around the perimeter of the construction area (or to the extent the conditions are safe) searching for downed wildlife. In the morning, the biological monitor will conduct a walk-through of any portion of the perimeter of the construction area that, due to safety issues, was not accessible during the night to check for downed wildlife.

If any Covered Species are observed being affected by the lighting, the biological monitor will immediately notify the construction manager that wildlife have been observed reacting to the lighting and that lighting may need to be reduced or turned off until the observed wildlife leave the area. If the individual(s) do not exit the construction area, the biological monitor will direct the construction manager to reduce lighting as soon as it is safe to do so. If the reduction in lighting does not appear to be sufficient (i.e., the individuals do not leave the area), lighting should be turned off as soon as it is safe to do so. If a Covered Species becomes injured or falls to the ground, the biological monitor will attempt to locate the individual(s) and protect them from predators and construction disturbance until the individual(s) can be collected and transported to state-authorized personnel or an agent of the state for assessment and determination of appropriate care and disposition. If any wildlife are found injured, the permitted wildlife rehabilitation center (see Section 6.4.1.2) will be contacted. If any wildlife are found deceased, a Fatality Report will be filled out and submitted to agencies.

6.2.4 ʻAʻo

No ʻaʻo have been observed as fatalities at the Project, nor have there been any incidental observations during over 19 years of post-construction monitoring. Despite the lack of observation, the Applicant will continue to implement BMPs regarding lighting at facilities on Maui. See Section 6.2.3 for the minimization measures applicable to all three seabirds.

6.2.5 ʻAkēʻakē

No ʻakēʻakē have been observed as fatalities at the Project, nor have there been any incidental observations during over 19 years of post-construction monitoring. Despite the lack of observation, the Applicant will continue to implement BMPs regarding lighting at facilities on Maui. See Section 6.2.3 for the minimization measures applicable to all three seabirds.

6.2.6 Assimulans Yellow-faced bee

KWP will continue to limit activities off the roads and pads whenever possible. The Wildlife Education and Observation Program (WEOP) (see Section 6.2.7) will include bee nest awareness and native plant (particularly known foraging resources) identification. Covered Activities will be conducted in accordance with the Vegetation Management Plan (Appendix A) and other measures that are expected to avoid and minimize impacts to the species. Key measures include:

- Foraging Resource Protection:
  - Avoid removal or disturbance of native plants that provide foraging resources, particularly ʻilima, ʻuhaloa, and ʻūlei to the maximum extent practicable.
  - If vegetation management affecting foraging resources must occur, schedule work between July and November, or when forage plants are confirmed to not be flowering, corresponding with a presumed period of dormancy for yellow-faced bees.
  - If work must occur during the active season (December–June) or when foraging plants are flowering, a qualified entomologist (or someone trained by an entomologist with yellow-faced bee experience) will conduct a pre-activity survey for listed yellow-faced bees in the impact area. Any surveyor will be approved by DOFAW HCP staff, and may be a DOFAW entomologist depending on availability.
  - Any native plants requiring removal will be translocated and replanted in accordance with CDUP[18] Condition #37, which requires protection of native plants through removal, relocation, and replanting (see Appendix A). Additional ʻilima may also be planted to supplement the translocated plant(s).
- Additional Measures:
  - Restrict vehicle use to existing roads, and enforce the posted speed limit of 10 mph.
  - Include assimulans yellow-faced bees (including nests) and their foraging plant resources in onsite environmental awareness training.
  - Limit herbicide use to periods between July and October, which is outside the active period for assimulans yellow-faced bees, and implement the following BMPs related to the use of herbicides (adapted from McKnight et al. 2018):
    - Conduct herbicide applications on calm days when wind speed is <10 mph (avoid applications during gusty or sustained high winds).
    - When available, use selective herbicides that are targeted to the species that need treating.

[18] CDUP No. MA-3103 as approved by the BLNR on January 24, 2003, and amended on June 24, 2005. The CDUP does not have an expiration and is anticipated to be in place for the life of the Project.

- Use targeted application techniques.
- Selectively control undesirable plants with spot treatments, frill treatment, weed wipe, or other well-targeted techniques to avoid non-target species.
- Avoid broadcast applications of herbicides.
- Keep applications on target and minimize drift.
    - Carefully choose and calibrate your spray nozzles to minimize drift, ensuring only target plants are treated.
    - When possible, utilize spatial or vegetative buffers around pollinator habitat.
- Apply herbicide during the plant life stage when a weed is most vulnerable.
    - Plants should not be sprayed when they are in flower or after they have gone to seed.
    - This practice alone can greatly reduce herbicide exposure for the local pollinator community.
- When possible, apply in the early morning or in the evening when pollinators are less active, and not during mid-day when bees and other pollinators are most active, especially if the optimal time to spray the target plant is when it is flowering.

6.2.6.1 Assimulans Yellow-faced Bee Surveys

Surveys for assimulans yellow-faced bees and their nests will be developed and conducted by a qualified entomologist (or someone trained by an entomologist with yellow-faced bee experience). Survey methods and surveyors will be approved by DOFAW, and may be conducted by DOFAW entomologists depending on availability. These surveys will occur during the 2026 active assimulans yellow-faced bee period, prior to major maintenance activities, and again at the end of the operational life prior to decommissioning. Surveys in the interim years will be conducted on an as-needed basis (i.e., if there is a need to disturb areas off the main roads and pads during the following year). It is anticipated that, based on the results of the 2026 survey, targeted surveys will likely be warranted annually, in locations where routine maintenance needs to occur (e.g., along roadsides) if nesting is documented in these areas.

KWP I operations staff will work closely with DOFAW to identify any locations where maintenance work may occur in a given year that might be near or encroach into potential yellow-faced bee habitat. Those activities and locations will be identified early enough in the year so that surveys for nest burrows can occur during the appropriate survey period. Any nest burrows found will be avoided to the maximum extent practicable during maintenance activities. It should be noted that work off the existing roads and pads is a rare event, and does not occur on an annual basis.

Following the guidelines in Blackburn et al. (2021), and adapted based on consultation with DOFAW entomologists, the surveys will be conducted by DOFAW (if available) or a DOFAW-approved surveyor during the following environmental conditions (if possible):

- Minimum temperature: Above 60° F (~15°C)
- Cloud cover: partly sunny or better. On cooler days the sun can play a very important role in bee activity
- Wind: less than 20 mph
- Precipitation: No rain and dry vegetation; wait three days after moderate to heavy rain which can remove nesting signs (e.g., expelled dirt)
- Time of day: target between 9:30 am and 2:30 pm
- Time of year: target the period of adult bee nest-building activity, roughly February through April

Surveyors will walk the limits of disturbance, marking on a Global Positioning System (GPS), any locations where assimulans yellow-faced bees are observed on flowers, around nest sites, or over the ground. Nests will also be physically marked for avoidance.

Upon completion of the 2026 assimulans yellow-faced bee surveys, a site visit will be conducted with DOFAW entomologists, KWP I staff, DOFAW, and USFWS to discuss the results of the survey and implementation of this HCP for the assimulans yellow-faced bee. This site visit will be documented/summarized in the FY 2026 annual report.

6.2.7 Wildlife Education and Observation Program

The WEOP will continue to be implemented for all regular on-site staff (including contractors during maintenance or decommissioning activities) to minimize Project-related impacts to listed species and other wildlife. The program is long-term, on-going, and updated as necessary. Staff will be trained to identify listed and non-listed species of birds and other wildlife that may be found on-site, to record observations of native species protected by the ESA and/or MBTA, and to take appropriate steps when and if dead or downed wildlife is found. Additionally, staff and contractors will be trained to identify specific plants (i.e., ʻilima, ʻōhiʻa lehua, tree tobacco) that are associated with vegetation management goals.

As part of their safety training, temporary employees, contractors, and any others that may drive project roads will be educated on speed limits, the possibility of downed wildlife being present on roads, and the possibility of nēnē presence on the ground or flying low across roads. Personnel will be instructed to contact the site's Environmental Compliance Officer immediately if they detect any downed wildlife on-site. Downed wildlife will then be handled in accordance with Section 6.4.1 (fatalities) and 6.4.1.2 (if injured).

The WEOP training document in support of implementation of this HCP has been included as Appendix J but may be changed and updated over time in coordination with DOFAW and USFWS.

KWP I has a non-exclusive lease of the Project Area, and therefore not all users of the access road or personnel on site are subject to the WEOP training. KWP I is open and willing to provide the training to any parties upon request (e.g., DLNR, DOFAW, Hawaiian Electric).

6.3 Measures to Mitigate Impacts from Unavoidable Take

This section focuses on compensatory mitigation, to fully offset impacts of the take described in Section 5.0 and provide a net conservation benefit for the species. Per the HCP Handbook (USFWS and NMFS 2016), mitigation measures typically found in HCPs can include the following (or a combination thereof):

- Restoration of habitat
- Preservation of land threatened by development
- Enhancement of habitat
- Creation of new habitat or populations
- Threat reduction or elimination
- Translocation of affected individuals or family groups to establish or augment existing populations
- Repatriation of species or important resources to formerly occupied and still suitable or enhanced habitat

6.3.1 Benefits of Past Mitigation/Lost Productivity

From the HCP Handbook:

> *The timing of implementing mitigation should prevent any lag time between the occurrence of the impacts of the taking and the realization of the mitigation benefits to offset the impacts. Otherwise, the lag time between impacts and offset can result in additional impacts to the species which can affect the amount of mitigation needed to fully offset impacts and may affect the survival of the species at the site.*

KWP I has calculated lost productivity in the case where take has outpaced mitigation which was outlined in the original HCP. Lost productivity was defined as follows: direct take may result in the loss of productivity of the individual that is taken between the time the take occurs and the time that mitigation is provided.

Because the full amount of authorized take was not realized under the permit, but mitigation was completed for that take, KWP I ultimately mitigated for greater than the take that occurred under the 2006-2026 ITP and ITL for ʻōpeʻapeʻa, ʻuaʻu, and ʻaʻo. As a result of this mitigation, and the fact the mitigation completed can no longer be applied to the permit, since it will be replaced by this HCP and new permits, the surplus benefits realized by populations of these species have created larger populations (e.g., an increased number of adult ʻuaʻu and ʻaʻo, in the breeding population due to past fledglings and increased adult survival, or an increased/healthier population of ʻōpeʻapeʻa due to the knowledge gained through research) ahead of any future take under a new permit.

Because the previous mitigation exceeded the compensation required to fully offset take and provide a net benefit to the species, the species' overall viability will not be jeopardized by any unanticipated short-term lag in mitigation under the new ITL and ITP (Table 16). The definition of "short-term" would vary by species and the net conservation benefit achieved under the original ITP and ITL; for ʻōpeʻapeʻa, past benefits would result in no lost productivity until at least 6 years of operations under the new permits (based on a net conservation benefit of at least 12 adults and a predicted future take of less than 2 per year); for ʻuaʻu past benefits will result in benefits for approximately the first 16-17 years of operations (based on a net conservation benefit of over 24 adults and a predicted future take of less than 1.5 per year); and for ʻaʻo, past benefits would last for at least 10 of the 20 years of operations under the new permit (based on a net conservation benefit of over 5 and a requested take of 10 over the 20.5 years of operations). Should mitigation for these three Covered Species lag beyond these time periods (e.g., 7 years for ʻōpeʻapeʻa, 17 years for ʻuaʻu or 11 years for ʻaʻo), mitigation obligations will be increased by 5 percent for each year of lag beyond that time period. Five percent is based on the 20.5 years of operations (one year is approximately 5 percent of the operational life).

Table 16 illustrates the net conservation benefit provided to four of the five Covered Species under the previous ITP/ITL. This net conservation benefit is an illustration of what could occur under the new ITP/ITL. It also assures that those four species are starting at a place of net gain, from mitigation actions under the original ITP/ITL and therefore provide a buffer against any take that may occur early in the new permit term before the full benefits of mitigation actions can be realized (i.e., outplanting activities for bats).

Table 16. Covered Species Mitigation Accounting

Covered Species	Permitted Take	Mitigation Offset under Previous 2006-2026 ITL and ITP	Projected Take at End of Current ITL and ITP + Lost Productivity[1]	Net Conservation Benefit Provided Under Previous Permits Compared to Impacts[2]
ʻŌpeʻapeʻa	50	50	32 + up to 6 indirect take ≤ 38 total	≥12
ʻUaʻu	38	59.22[3]	19 direct + up to 8 indirect take + 4.78 lost productivity ≤ 31.78 total	≥27.44
ʻAʻo	4	5.03[4]	No take observed	5.12
ʻAkēʻakē	n/a	n/a	No take observed	Unmeasured benefit
Assimulans yellow-faced bee	n/a	n/a	n/a	n/a

Covered Species	Permitted Take	Mitigation Offset under Previous 2006-2026 ITL and ITP	Projected Take at End of Current ITL and ITP + Lost Productivity[1]	Net Conservation Benefit Provided Under Previous Permits Compared to Impacts[2]

[1]Actual take is likely to be lower than this as this is based on conservative projections for both direct and indirect take.

[2]Note that KWP acknowledges that USFWS and DOFAW required mitigation under the 2006-2026 ITP and ITL to the fully permitted amount. This comparison between calculated take and mitigation offset is for illustrative purposes only.

[3]USFWS and DOFAW mitigation letters combined the mitigation offset for KWP I and KWP II, therefore, this number is based on the proportion of the permitted take attributed to KWP I (38 petrels + 4.78 lost productivity out of total obligation of 64.48 = 66 percent); 66 percent of the 89.72 total offset = 59.22.

[4]USFWS and DOFAW mitigation letters combined the mitigation offset for KWP I and KWP II, therefore, this number is based on the proportion of the permitter take attributed to KWP I (4 shearwater out of the total obligation of 6.681): 59 percent of the 8.53 total offset = 5.03.

The long-term benefits of each mitigation project are described by species below:

- **<u>ʻŌpeʻapeʻa</u>**: Research funded by KWP I resulted in the following five publications:
    - Montoya-Aiona, K., P. M. Gorresen, K. N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J. L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by ʻōpeʻapeʻa, the Hawaiian hoary bat (*Lasiurus semotus*). PLoS ONE 18:e0288280. Available: https://doi.org/10.1371/journal.pone.0288280
        - This research has been incorporated into this HCP.
    - Hoeh, J.P., Aguirre, A.A., Calderon, F.A., Casler, S.P., Ciarrachi, S.G., Courtot, K.N., Montoya-Aiona, K.M., Pinzari, C.A. and Gorresen, P.M. 2023. Seasonal and Elevational Differences by Sex in Capture Rate of ʻŌpe ʻape ʻa (*Lasiurus semotus*) on Hawai ʻi Island. Pacific Science, 77(1), pp.1-26.
        - This research has been incorporated into this HCP.
    - Pinzari, C.A., P. M. Gorresen, R.W. Peck, and K.N. Courtot. In review. Mixed plate: Dietary composition and diversity in an endemic island bat, the Hawaiian ʻōpeʻapeʻa.
        - includes analyses of barcoding of 141 fecal samples, modeling of bat diet in relation to sex, season, and habitat
    - Gorresen, P. M., K.M. Montoya-Aiona, and K.N. Courtot. In prep. Roost ecology of the ʻōpeʻapeʻa, the Hawaiian hoary bat (*Lasiurus semotus*).
        - includes analyses of roost fidelity and activity from radio-telemetry, visual checks, and thermal video
    - Gorresen, P. M., R.W. Peck, C. A. Pinzari, and K.N. Courtot. In prep. Prey availability and diet of the ʻōpeʻapeʻa, the Hawaiian hoary bat (*Lasiurus semotus*).
        - includes analyses of 2 years prey availability data

These projects have long-term benefits because the results contribute to the foundation of knowledge for ʻōpeʻapeʻa, allowing future research and mitigation to build upon these studies, such as:

- Creating a knowledge base: Each unique research project adds new insights, theories, or data to the existing body of knowledge. Future researchers use these findings as a starting point.
- Guiding future research: Research results often lead to new questions, hypotheses, and areas of exploration. Scientists and scholars can refine previous findings, test new variations, or apply them in different contexts.
- Shaping Policies and Practices: Research findings influence regulation, scientific or ecological practices among other things. Once new knowledge is established, it informs future decisions.

The long-term benefits have been realized through publication of the research, presentation of the research at conferences, and incorporation of the research into DOFAW and ESRC guidance (e.g., ESRC and DOFAW 2024), which will be used for future project siting and mitigation and is incorporated into this HCP.

- **ʻUaʻu:** a net increase of over 27.22 adult ʻuaʻu was achieved through past mitigation efforts between 2015 and 2022 (Appendix C). The juveniles that fledged in 2022 would reach breeding age at 5 to 6 years (2027/2028), and 89 percent are anticipated to breed in a given year, resulting in 21 to 22 breeding adults within a year or two of permit issuance. Some of the fledglings achieved through past mitigation efforts fledged as early as 2018, and are already breeding age, and some of the mitigation offset was through increased adult survival dating as far back as 2015. In sum, the benefits of this mitigation are ongoing and sufficient to offset any lost productivity that may occur due to a lag between mitigation offset and any take that occurs under the new ITL and ITP.
- **ʻAʻo**: a net increase of 5.03 adult ʻaʻo was achieved through past mitigation efforts between 2016 and 2022 (Appendix C). The majority of this mitigation was achieved through increased adult survival of existing adults, resulting in a breeding population that will be larger at the start of the new ITL and ITP than it would have been without past mitigation efforts. Furthermore, actions at Makamakaʻole are ongoing in 2025, providing additional benefit to the species even if not quantified for mitigation offsets. By continuing these measures upon permit issuance for the 2026 breeding season and beyond, the benefits to ʻaʻo will continue to accumulate, offsetting any lost productivity.
- **ʻAkēʻakē**: past mitigation efforts for ʻuaʻu and ʻaʻo resulted in the discovery of the Makamakʻole site and construction of the two predator exclusion fences for these species. This effort has resulted in an indirect benefit to the ʻakēʻakē, which was discovered at the site in 2020 when a carcass was found in one of the artificial burrows hosting breeding birds at the site. This spurred additional actions to socially attract the ʻakēʻakē to the site, including call playbacks, decoys, and artificial burrows. While these efforts were not funded

directly by KWP, they were made possible in part due to efforts that were funded by KWP, including the burrow monitoring that resulted in the carcass discovery and the construction and maintenance of the predator exclusion fences. Since discovery of ʻakēʻakē at Makamakaʻole, Maui Nui Seabirds has further documented evidence of ʻakēʻakē breeding in the vicinity during the 2024 breeding season based on acoustic data (Maui Nui Seabirds, pers. comm., February 20, 2025). ʻAkēʻakē have indirectly benefited from past actions implemented by KWP, and the benefits will continue to accrue over time, resulting in no lost productivity to this species.

Lost productivity is anticipated to occur for nēnē given that mitigation for the current (2006-2026) ITP and ITL is still ongoing. Lost productivity will be calculated for nēnē as described in Appendix H until such time that mitigation outpaces take.

6.3.2 Mitigation Overview

Since this HCP will support a new ITL and ITP, the mitigation proposed is for future efforts but builds off of historic and ongoing mitigation efforts. Mitigation for each Covered Species will occur until the impact of the permitted take for that species has been fully offset to a net benefit (offset > permitted take).

Generally, mitigation for nēnē, ʻuaʻu, and ʻaʻo are continuations of past or current mitigation efforts focused on protection of breeding areas and use of propagation facilities to increase population numbers. Mitigation for ʻōpeʻapeʻa includes new mitigation efforts, including land protection and enhancement focused on increasing breeding/reproductive potential, and will build off of research conducted. Mitigation for ʻakēʻakē may be conducted in conjunction with ʻuaʻu and/or ʻaʻo mitigation efforts or at a site specific to the ʻakēʻakē. Any of the mitigation measures described below may be adaptively managed in coordination with USFWS and DOFAW if needed, including utilizing new or novel mitigation opportunities that differ from those described here. Conservation banking or in-lieu fee programs may also be utilized if needed and if available during the Permit Term.

For mitigation activities, offsets will be allocated to KWP I in proportion to the share of the mitigation project that KWP I funds. When a mitigation project is jointly funded, KWP I's allocated offsets will either correspond to the portion of the project area supported by KWP I's funding (e.g., Makamakaʻole) or reflect the incremental conservation benefit ("lift") attributable to KWP I's contribution above the existing baseline (e.g., the Greater Hiʻi area with Pūlama Lānaʻi). If multiple funders support actions within the same area, offsets will be allocated proportionate to each funder's share of the total funding required, or as otherwise agreed to in writing by USFWS, DOFAW, and KWP I. Mitigation for each Covered Species is described in detail below and summarized in Table 17.

Table 17. Summary of Proposed KWP I Mitigation

Covered Species	Offset Requirement and Type	Mitigation Location	Mitigation Timing and Notes
Nēnē	> 69 adult equivalent nēnē, which will be offset through direct replacement at propogation pens through fledglings and increased adult survival through trapping efforts, maintenance of predator fencing, and other management efforts	Haleakalā Ranch Nēnē Pen (Maui) Puʻu O Hōkū Nēnē Pen (Molokaʻi)	Sites currently exist and are already being utilized to propagate nēnē; offsets for the new ITP and ITL will begin upon permit issuance concurrent with the current (2006-2026) ITP and ITL mitigation obligations. Mitigation actions will continue until the net benefit has been achieved relative to the permitted amount of take (and any accrued lost productivity).
ʻŌpeʻapeʻa	> 38 ʻōpeʻapeʻa, which will be offset through habitat restoration efforts or habitat protection or through removal of hazards (e.g., barbed wire)	TBD location(s) on Lanaʻi, Molokaʻi and/or Maui	A roughly 800-acre mitigation site will be protected and managed on private land on Molokaʻi. Mitigation actions will include forest management to increase the quality and quantity of foraging and roosting habitat, along with outplanting activities to increase prey resources. This will account for around 50 percent of the mitigation obligation needed to offset the requested take and provide a net conservation benefit to the species. The remainder of the mitigation will preferably occur on Maui. The applicant will continue to pursue mitigation on Maui in coordination with DOFAW and USFWS. Should it be determined that mitigation options on Maui have been exhausted, through coordination with DOFAW and USFWS, the Applicant will expand its search for mitigation to Lanaʻi or Molokaʻi.
ʻUaʻu	> 29 ʻuaʻu, which will be offset through direct replacement through fledglings and increased adult survival through trapping efforts,	Alpine Wildlife Sanctuary (Maui) or Greater Hiʻi area (Lanaʻi)	Mitigation would begin upon permit issuance for the following breeding season(s) and continue until the net benefit had been achieved.
ʻAʻo	> 10 ʻaʻo, which will be offset through direct replacement through fledglings and increased adult survival through trapping efforts, maintenance of predator fencing, and other management efforts	Makamakaʻole (Maui)	Mitigation would begin upon permit issuance for the following breeding season(s) and continue on an annual basis until the net benefit had been achieved.

Covered Species	Offset Requirement and Type	Mitigation Location	Mitigation Timing and Notes
ʻAkēʻakē	> 10 ʻakēʻakē, which will be offset through metrics determined by USFWS and DOFAW and funded through National Fish and Wildlife Foundation (NFWF).	TBD location(s)	Mitigation would be funded upon permit issuance or at a point in time agreed upon by DOFAW and USFWS.
Assimulans yellow-faced bee	Habitat mitigation to offset impacts on 5 acres and 25 nest burrows. Ungulate fencing around approximately 18 acres with ironwood removal plots and control plots established within and outside this fenced area. Ironwood removal and outplantings to promote nesting of bees.	Project Area and adjacent lands	Construction of fence, ironwood removal, and vegetation management would begin after a nest burrow survey is conducted to confirm that any existing nest burrows can be avoided during management activities. Anticipated to begin during 2026, and maintenance would continue throughout the 25-year Permit Term.

For each Covered Species, the following is described:

- Location of mitigation site(s),
- Timing of mitigation,
- Mitigation actions/activities,
- Calculation/quantification of mitigation offsets, and
- Success criteria for mitigation.

Monitoring for mitigation is provided in Section 6.4.2, and adaptive management is described in Section 7.0.

For all mitigation, it is noted that fatalities may occur within the mitigation sites, including from disease or predation, and that these fatalities do not fall under the HRS Chapter 195D or ESA definitions of “take”.

6.3.3 Nēnē

The USFWS had a recovery objective of restoring and maintaining a self-sustaining nēnē population in Maui Nui (USFWS 2004). Currently, the primary means of mitigation for take of nēnē is to invest in propagation projects (release pens or nēnē pens) that will increase the number of nēnē fledged in Maui Nui. Mitigation for nēnē will continue to utilize the nēnē pens as the method for offsetting nēnē take. Mitigation will include a combination of ongoing activities at existing nēnē pens and/or creation of new nēnē pens or new/expanded predator trapping programs to protect breeding nēnē. Current nēnē pens include one at Haleakalā Ranch on Maui and another at Puʻu O Hōkū Ranch on Molokaʻi (Figure 5; see Section 6.3.3.1 and 6.3.3.2 for more details). Both pens were originally constructed under Safe Harbor Agreements (SHAs). Neither landowner has indicated intention of returning to baseline, and both have shown their commitment to nēnē conservation through continued voluntary involvement in the respective release pens by entering into MOUs with DOFAW and KWP. Additionally, Puʻu O Hōkū Ranch supported the release of translocated individuals as recently as April 2025, and Haleakalā Ranch has entered into an annual right of entry agreement each year (most recently in December 2024).

While some of the mitigation will occur off the island of Maui, the mitigation site is still within Maui Nui, and DLNR (2025b) specifically translocated birds to Molokaʻi to help ensure that the Molokaʻi nēnē population persists. KWP I’s efforts will help by providing management and monitoring activities. The population of nēnē on the island of Maui is considered stable (see Section 4.1.3), and therefore, supplementing the population on Molokaʻi will likely provide a greater benefit to the species as a whole. Nonetheless, KWP I will also continue efforts at the Haleakalā Ranch release pen, further supplementing efforts on the island of Maui. Lastly, predator trapping at the wind farm itself is believed to further benefit the species through increased adult survivorship and fledging success, though this benefit is not currently quantified.

Due to the location of these facilities on private land and voluntary involvement in SHAs and Memorandums of Understanding (MOUs),[19] the location and design of nēnē mitigation may need to be adaptively managed over time in coordination with USFWS and DOFAW (i.e., the management of nēnē pens described here may end at some point, and additional pens or trapping efforts at alternate locations [e.g., construction and management of a pen at Kamehamenui has been identified as a potential future option] may be implemented).

KWP I will manage release pens and trapping programs within Maui Nui (or other identified mitigation projects, e.g., traffic control measures) immediately upon permit issuance and continue until mitigation offsets have exceeded the requested take of 69 nēnē (plus any lost productivity; see Appendix H) by at least 1 nēnē (i.e., >69 adult equivalent nēnē). At that time, KWP I will transfer pen management responsibilities to DOFAW, with at least 90 days' notice per the current MOUs. Current and planned nēnē release pens are described in detail below and shown in Figure 5.

Mitigation is already occurring at both sites, and any mitigation obligation remaining under the existing ITL and ITP will be fulfilled concurrent with the allocation of offsets to the new ITP and ITL, and lost productivity will be calculated if needed as described in Appendix H (e.g., in total the offset will include the 60 nēnē on the current (2006-2026) ITL and ITP, the 69 nēnē on the new ITL and ITP, and any lost productivity accrued under any permits).

Each year, unless otherwise agreed to by DOFAW and USFWS and KWP I, mitigation offsets will be calculated as the sum of the following:

$$\#\ \text{nēnē}\ goslings\ fledged * 0.83\ survival\ to\ adulthood$$

$$\#\ breeding\ adult\ \text{nēnē}\ * 0.031\ increased\ adult\ survivorship$$

The sum of mitigation offsets from the release pens will be reported annually, along with which ITL/ITP each credit is being allocated to. In sum, the offsets allocated to permits in a given year cannot be greater than the total offsets achieved at the mitigation site(s).

Further mitigation offsets based on additional actions (e.g., satellite tagging and associated actions such as predator trapping outside the release pens) may also be warranted. The calculation(s) for additional offsets may be developed in concurrence with USFWS and DOFAW at a later date. The current offset for adult survival (0.031) is based on actions occurring within and in the vicinity of the release pen. Expanding efforts to other areas of nēnē use may warrant further offsets, since additional mitigation efforts may provide protections year round protection for nēnē, including non-breeding adults or juveniles.

If mitigation projects are funded in conjunction with other projects (e.g., KWP II), KWP I will work with USFWS and DOFAW to appropriately allocate the offset to the appropriate permit(s).

[19] Current MOUs in place for existing release pens both require at least 90 days' notice of any party to withdraw.

6.3.3.1 Haleakalā Ranch Release Pen

KWP I will continue managing the Haleakalā Ranch release pen, calculating offsets annually based on the number of breeding adults using the pen and fledglings produced each season. The landowner at Haleakalā Ranch supports maintaining the existing pen size at the time of this HCP; as a result pen expansion, with the goal of an annual production increase, is not currently anticipated for this release pen. Pen expansion, however, may become an adaptive management option in the future. The pen infrastructure is under continual improvement, in discussion with DOFAW, to best support the population. Plans for additional water features and expanding the catchment system are in place. The current Scope of Work is provided in Appendix D and includes details on management, monitoring, and reporting. This Scope of Work is a living document and subject to change with written concurrence from DOFAW, USFWS, KWP I, and Haleakalā Ranch.

From 2012 to date, the Haleakalā Ranch release pen has produced an average 6.7 fledglings per year and provided an increased survival benefit to an average of 12 breeding adults per year. Based on fledgling survival of 0.83 to adulthood and increased adult survival of 0.031 for breeding adults, this results in an average offset of 5.9 nēnē per year (136 additional offsets over the 25-year permit term). This should allow mitigation offsets under the current (2006-2026) ITP and ITL to be fulfilled while also fulfilling the needs for offset under the new ITL and ITP. However, because this pen also provides offsets to the KWP II project and in an attempt to provide mitigation prior to take occurring, additional mitigation is also being implemented as described in the following section. As described above, the sum of mitigation offsets from each release pen will be reported annually, along with the specific ITL/ITP to which each offset is being allocated. In sum, the offset allocated to permits in a given year cannot be greater than the total offset achieved at the mitigation site(s).

6.3.3.2 Puʻu O Hōkū Ranch Release Pen

DOFAW and USFWS are planning a translocation of Kauaʻi -based nēnē to the existing Molokaʻi release pen at Puʻu O Hōkū (POH) Ranch, underway in 2025. As a second mitigation project, KWP is working with POH Ranch and DOFAW-Maui to manage the Molokaʻi nēnē pen following the planned translocation.

Mitigation offsets would accrue based on the number of documented fledgling and the number of breeding adults, utilizing the average rate of male and female fledgling survivorship (Hu 1998, Banko 2020) of 0.83 as the multiplier and the increased adult survival of 0.031 for breeding adults. Alterations to these calculations may be justified over time depending on adaptive management and potential further increases in either fledgling or adult survival.

KWP I will provide annual management, monitoring, and reporting for the nēnē pen until the mitigation obligations have been fulfilled. The current Scope of Work, date April 2025, is provided in Appendix E and includes details on management, monitoring, and reporting. This Scope of Work is a living document and subject to change with written concurrence from DOFAW, USFWS, KWP I, and POH Ranch. Appendix H outlines the projected credits from POH ranch over time.

6.3.4 ʻŌpeʻapeʻa

Mitigation for ʻōpeʻapeʻa is difficult given the challenges around surveying for bats and determining population changes. Thus, past mitigation for this species has included funding research to better inform future mitigation, and future mitigation includes habitat protection and/or restoration aimed at ecosystems that can provide needed resources for the ʻōpeʻapeʻa. Mitigation is intended to offset take of and provide a net benefit for 38 ʻōpeʻapeʻa.

As more information becomes available about ʻōpeʻapeʻa, and based on the agency preference of land-based mitigation, multiple mitigation opportunities have been and are being sought. In April 2025[20], KWP deployed eight acoustic bat detectors, four on the island of Lānaʻi and four on the island of Molokaʻi, to aid in identification of potential bat mitigation locations (Figure 6a). Preliminary data analysis has confirmed bat presence on both islands. Priority has been given to lower elevation sites below 1,000 meters based on the known elevation of breeding (Menard 2001).

KWP I continues to seek mitigation opportunities on Maui and will continue to do so during the early years of HCP implementation. However, in order to implement mitigation immediately upon permit issuance, KWP I proposes to begin mitigation on Molokaʻi with a subsequent project(s) to occur on Maui. Subsequent projects, if needed, will develop a Site-Specific Mitigation Implementation Plan (SSMIP) in coordination with DOFAW and the USFWS. The mitigation plan for Molokaʻi is described in this HCP.

The mitigation will meet the requirements of HRS 195D, including a measurable net conservation benefit and support species recovery through habitat improvement.

6.3.4.1 Overview of Mitigation Actions

The biological goal is to enhance or restore habitat in areas known or likely to support ʻōpeʻapeʻa use, contributing to improved foraging, roosting, and overall reproductive success. Key objectives include increasing native vegetation cover to support roosting, increasing insect prey availability, and implementing monitoring to assess the effectiveness of these mitigation actions. Additional objectives include reducing uncertainty about bat activity and habitat use on Molokaʻi to inform future conservation and management efforts.

Mitigation will focus primarily on habitat restoration and enhancement. Preferred sites will contain or have the potential to support native or mixed forest with vertical structure (e.g., trees exceeding 15 feet in height). Restoration actions may include, but are not limited to, the removal of invasive plant species, replanting or natural regeneration of native species such as ʻōhiʻa lehua, and/or measures to reduce ungulate impacts through fencing or other controls, depending on the needs of the final site(s) selected. Additionally, restoration efforts may include areas with existing or

[20] The timing of this deployment occurred approximately two months after a change in direction from USFWS and DOFAW on the permit structure, which impacted the ability of past mitigation accruals to offset the requested level of ʻōpeʻapeʻa take described in this HCP through amending/renewing existing permits versus issuing a new ITL and ITP.

restorable water sources (e.g., natural seeps or troughs), which can improve insect abundance and diversity.

To increase/improve foraging, KWP will plant known host plants for insects known to occur in the diet of the ʻōpeʻapeʻa. The diet of ʻōpeʻapeʻa consists primarily of nocturnal flying beetles and moths (as cited in DOFAW and ESRC 2024). Pinzari et al. (2025) found that Lepidoptera were present in all sampled bats and comprised 69 percent of the relative abundance of the diet. Based on the high prevalence of Lepidoptera in the diet of ʻōpeʻapeʻa, initial restoration efforts will focus on known host plants of Lepitoptera, particularly fast-growing and easy to rear host plants to create an understory. This includes māmaki (*Pipturus albidus*), which grows as a shrub or small tree and is known to host at 19 caterpillar species or subspecies in 9 families (as cited in Banko et al. 2022). Additional species known to host lepidoptera include ʻākala (*Rubus hawaiensis*), ʻōhelo (*Vaccinium calycinum*), kōlea (*Myrsine lessertiana*), ʻōlapa (*Cheirodendron trigynum*), and pūkiawe (*Leptecophylla tameiameiae*; Banko et al. 2022). Outplantings of ʻōhiʻa (*Metrosideros polymorpha*) and koa (*Acacia koa*) may also occur.

6.3.4.2 Determining Mitigation Need

The typical unit of ʻōpeʻapeʻa take is one adult bat, which is considered an appropriate offset target for mitigation purposes. While Bonaccorso et al. (2015) found that adult bats occupied a mean CUA of 48.5 acres, the same study also reported a median CUA of 8.3 hectares (approximately 20.5 acres). The use of the median helps avoid inflation from a small number of very large core areas and more accurately represents the typical space use for most individuals.

Bats are known to spend at least 50 percent of their time and exhibit concentrated foraging behavior within their CUAs. Following the methods outlined in ESRC and DOFAW (2024), restoring 20.5 acres of habitat could reasonably be considered sufficient to meet 50 percent of an adult bat's essential resource needs—specifically for roosting and concentrated foraging. To fully offset take of a single bat under this model and using the methods outlined in ESRC and DOFAW (2024), the CUA restoration area would be doubled to 41 acres, thereby addressing the full scope of the bat's resource use. As described in the guidance, while both native and non-native habitat cover types can provide some resources for Hawaiian hoary bats, native forest restoration will be prioritized because it offers net conservation benefit and supports the recovery of multiple native species.

Mitigation for 38 bats would therefore require the improvement of approximately 1,558 acres of suitable habitat (41 acres multiplied by 38 bats). KWP I proposes to begin mitigation actions on 819 acres on contiguous private land on Molokaʻi, with the balance (an additional 739 acres of mitigation to occur in the future at another location on Maui Nui) preferably on the island of Maui.

To ensure effectiveness, an adaptive management approach will be employed. If monitoring shows limited or no increase in bat activity or prey biomass following mitigation actions, mitigation measures will be re-evaluated and adjusted. Potential adjustments may include supplemental planting, modified maintenance practices, or expansion to additional areas. The goal is to ensure that mitigation sites not only sustain but demonstrably support increased bat activity and/or prey biomass over time.

All progress and results will be documented in annual reports, consistent with the template provided in Appendix 2 of the ESRC/DOFAW guidance. Reports will include:

- Status of habitat restoration activities,
- Results of acoustic and insect monitoring,
- Documentation of adaptive management actions,
- Evaluation of progress toward stated biological goals.

6.3.4.3 Rationale for Mitigation within Maui Nui

Understanding that take of ʻōpeʻapeʻa will occur on Maui, KWP I continues to explore mitigation options on Maui, including discussions with several organizations and landowners, but no particular parcels or potential projects had been identified at the time of the HCP finalization. Upon discussion with DOFAW and USFWS, it was agreed that mitigation for the ʻōpeʻapeʻa could occur on any of the islands within Maui Nui, particularly given existing relationships with landowners on Molokaʻi and Lānaʻi for other mitigation efforts. This also addresses a longstanding concern by DOFAW, USFWS, and ESRC that mitigation activities need to be underway prior to/concurrent with take occurring. Initiation of mitigation actions on Molokaʻi would begin immediately upon permit issuance. This also aligns with USFWS and DOFAW conservation goals, which include to protect existing populations, establish new populations to reduce the risk of extinction, and conserve known occupied habitat (USFWS 1998, DLNR 2015g).

Maui Nui refers to the prehistoric “super-island” that once connected Maui, Molokaʻi, Lānaʻi, and Kahoʻolawe during periods of lower sea level in the Pleistocene, forming a single landmass (Price and Elliott-Fisk 2004). As sea levels rose over the last 200,000 years, Maui Nui gradually fragmented into the four islands present today, but the shared geologic origin and relatively shallow channels between them continue to influence the region’s ecology and biogeography (Sherrod et al. 2007). Today, the islands of Molokaʻi, Lānaʻi, and Kahoʻolawe are located approximately 8, 9, and 6 miles from the coast of Maui, respectively. The ʻōpeʻapeʻa has been documented on all four islands of Maui Nui.

As cited in USFWS (1998), inter-island migrations may occur. While it is currently unknown how frequently ʻōpeʻapeʻa travel between or among the islands of Maui Nui, the ʻōpeʻapeʻa is known to forage over open ocean (Fraser et al. 2007, USFWS 1998), and data indicate that the species migrate between Kaho’olawe, Maui, and possibly Lānaʻi on a nightly basis (USFWS 2018). Given that Molokaʻi is closer to Maui than Lānaʻi (approximately 8 miles between Maui and Molokaʻi, compared to 9 miles between Lānaʻi and Maui), it is not unreasonable to assume this travel or migration may also occur between Molokaʻi and Maui. Both of these distances are within the known foraging distance of the species (Bonaccorso et al. 2015, H.T. Harvey 2019). Furthermore, hoary bats from the mainland have been observed approximately 30 miles off the shore of Northern California (Kennerly et al. 2024), and bat activity in general has been documented between 1.6 and 508 miles from the nearest land (Solick and Newman 2021). Hoary bats are believed to migrate along the Pacific Coast and use islands up to 20 miles offshore as stopovers (as cited in Solick and Newman 2021).

Given the weight of the evidence, mitigation efforts for the ʻōpeʻapeʻa on Molokaʻi and/or Lānaʻi would undoubtedly benefit the species as a whole, and likely benefit the Maui population itself, due to likely connectivity between the islands of Maui Nui.

6.3.4.4 Mitigation Locations

Molokaʻi (Puʻu O Hōkū Ranch)

The ʻōpeʻapeʻa is known to occur on the island of Molokaʻi, including records from Kalaupapa National Historical Park (Fraser et al. 2007, Hosten and Poland 2018). Recent studies of the ʻōpeʻapeʻa on Molokaʻi included acoustic monitoring of 146 locations between February 2016 and June 2018 (Hosten and Poland 2018). A study at the Kaunakakai Armory on Molokaʻi recorded activity, but did not record any feeding buzzes, and detected the species on only 3.4 percent of nights (Montoya-Aiona et al. 2020). In 2025 KWP I deployed four acoustic bat detectors (Wildlife Acoustic SM4 units), ranging from 610 feet to 1,458 feet in elevation, around Puʻu O Hōkū Ranch (Figure 6a). Acoustic activity was detected in all four locations, making Puʻu O Hōkū Ranch a suitable location to implement mitigation actions for the species. KWP I will complete mitigation activities on 819 acres of contiguous private land, described below.

Undetermined Location(s) on Maui

Mitigation for ʻōpeʻapeʻa on Maui is well established, though all of the land-based mitigation actions that have occurred are on east Maui, on a combination of state and private lands. KWP I has coordinated with DOFAW on the potential to conduct mitigation actions on state land, but no locations on state land have been identified. KWP I continues to coordinate with organizations that routinely protect land for conservation purposes (e.g., The Nature Conservancy, Hawaiʻi Land Trust) on Maui, in order to look for mitigation partnerships. Those efforts had not resulted in any confirmed mitigation opportunities at the time of the HCP finalization, though coordination continues with the aim to partner on mitigation on Maui in the future. In particular, KWP I is in discussions with Hawaiʻi Land Trust regarding a total of 358 acres of land, with 277 acres located in West Maui and 81 acres in East Maui. KWP I continues to seek another 381 acres on the island of Maui to fulfill the remainder. As these mitigation opportunities become a reality, an SSMIP will be developed in coordination with USFWS and DOFAW aligning with the biological goals and objectives of this HCP, and following past ESRC recommendations and current bat guidance (ESRC and DOFAW 2024).

The intended timeline for additional bat mitigation on Maui is:

- January 2026 – December 2026
    - Identify potential parcels and landowners/partners
    - Deploy bat monitoring (e.g., acoustics) as needed to verify presence
    - Begin developing SSMIP

- January 2027 (or earlier) – draft SSMIP submitted to USFWS and DOFAW for review
- January 2027 – December 2027
    - Supplemental baseline monitoring, as needed
    - Initial mitigation actions as appropriate (e.g., barbed wire removal and replacement)
    - ESRC review of SSMIP
- December 2027 – SSMIP finalized and approved by USFWS and DOFAW (with ESRC input)

A specific timeline for the implementation of management action(s) at each mitigation site will be developed as part of the SSMIP. The success criteria and adaptive management are anticipated to follow those outlined in Section 6.3.4.5 below.

<u>Lānaʻi</u>

While the ʻōpeʻapeʻa was not detected in a recent acoustic survey near the airport (Hoʻokuleana LLC 2020), several visual observations of ʻōpeʻapeʻa have been documented from Lānaʻi, including near the Garden of the Gods (n=1), at the summit of Lānaʻihale (n=4), and near a MET tower in western Lānaʻi (n=2; Tetra Tech 2008). Similar to Molokaʻi, due to the limited nature of data for Lānaʻi, KWP I deployed four acoustic bat detectors (Wildlife Acoustic SM4 units) in April 2025 (Figure 6a). The four detectors were located in locations typical of ʻōpeʻapeʻa use and ranged in elevations from 1,758 feet to 3,320 feet. There were detections of ʻōpeʻapeʻa at all four detectors. With presence of ʻōpeʻapeʻa at this location, it remains a viable option for future mitigation actions, should the need arise.

6.3.4.5 Puʻu O Hōkū Ranch Mitigation Plan

Based on the preliminary bat data collected, coordination with ranch staff, and a site visit that occurred with biologists in September 2025, there are ample opportunities to increase habitat quality and quantity for ʻōpeʻapeʻa. KWP I would begin mitigation actions in five management areas, across 819 acres, as shown on Figure 6b. Management actions, and their benefits to bats, are described for each management area below. The objective of the mitigation plan is to increase the quantity and quality of ʻōpeʻapeʻa roosting and foraging habitat within the mitigation area.

<u>Description of Management Units</u>

<u>Management Unit 1 - Kalepa Unit (216 acres)</u>

The Kalepa Unit is a 216-acre unit that, while previously used for pasture, is now dominated by dense stands of Formosa koa (*Acacia confuse*), which are inaccessible to bats for foraging and do not contain trees that are large enough to support roosting activity. The unit does contain gulches that mature trees that have been documented as roosting trees by ʻōpeʻapeʻa in other locations (e.g., mango). These trees are of suitable size, but due to the density of forest around them, including the understory immediately adjacent to them, are likely not currently being used by roosting bats.

Management actions - Thinning of Formosa koa from approximately 74 acres within the unit to make space to allow trees to grow larger faster. Thinning would generally be to 5-10 trees per acre.

Understory outplantings would include native shrubs and trees that produce flowers that will attract bat prey species.

Benefits to bats - Currently the growth is so dense that it is unusable by bats for foraging, so thinning would immediately increase available foraging habitat near likely roost sites. Thinning would also be completed in a way to create "foraging pockets" which are open areas within dense vegetation that are protected from wind, which allows bats to forage. Understory plantings will increase prey base which will in turn increase bat fitness overall, resulting in an increase in reproduction.

Management Unit 2 - Upper Lodge Unit (180 acres)

Management Actions – Selective thinning of trees surrounding tree species that are known to support roosting bats (e.g., mango). Along this gulch there are several large trees that could support roosting bats, but the tree growth around these locations is very dense, making the flight paths in and out of potential roost trees constrained. Thinning of thick stands of Formosa koa to create foraging pockets and reduce tree density to encourage growth of larger trees with canopy that could attract foraging and potentially roosting bats.

Benefits to bats – Enhance locations where potential roost trees exist. Targeted outplanting of understory species that would attract bat prey species would increase bat fitness in locations near potential roost sites and in turn would increase reproductive success.

Management Units 3 and 4 - Brandt Field and Lower Brandt Field (143 acres)

Management Actions – Install 4.2 miles of ungulate proof fencing around units, replacing existing barbed wire fencing and excluding ungulates from the degraded fields. Strategically plant dense stands of trees to create wind breaks along the makai side of the unit. Outplant silvopastoral style plantings throughout the unit with species known to support bat prey species and that will eventually become large enough to support bat roosting. Plantings will be 1-2 trees per acre and may be supplemented with shrubs that produce flowers that will support bat prey species.

Benefits to bats – Increase prey base through planting of shrubs and trees that support bat prey species. Increase foraging habitat by creating wind breaks that will attract bats for foraging activity. Fence area and remove deer to increase success of outplantings.

Management Unit 5 - Aloha Bowl (280 acres)

Management Actions – Selective thinning of trees surrounding trees species that are known to support roosting bats (e.g., mango). Along this gulch there are several large trees that could support roosting bats but the tree growth around these locations is very dense, making the flight paths in and out of potential roost trees constrained. Thinning of thick stands of Formosa koa to create foraging pockets and reduce tree density to encourage growth of larger trees with canopy that could attract foraging and potentially roosting bats.

Benefits to bats – Enhance locations where potential roost trees exist. Targeted outplanting of understory species that would attract bat prey species would increase bat fitness in locations near potential roost sites and in turn would increase reproductive success.

Mitigation Timeline by Management Unit

Table 18 summarizes management actions by management unit and outlines the timeline for when those actions are planned.

Table 18. Summary of Mitigation Timeline by Management Unit and Annual Monitoring

<table>
<tr><th>Year</th><th>Unit 1 - Kalepa Unit</th><th>Unit 2 - Upper Lodge Unit</th><th>Units 3 and 4 - Brandt Field and Lower Brandt Field</th><th>Unit 5 - Aloha Bowl</th><th>Overall</th><th>Monitoring (see Section 6.4.2.2 for additional details)</th></tr>
<tr><td>2026 (Year 0)</td><td>Begin thinning Formosa koa</td><td>Map and identify locations of known roost tree species</td><td>Remove barbed wire and replace with ungulate fencing</td><td>Map and identify known roost tree species</td><td>Identify barbed wire and begin removal

Begin preparing out planting species (e.g., seed collection and propagation)</td><td>Baseline (acoustics, vegetation, prey)</td></tr>
<tr><td>2027 (Year 1)</td><td>Continue thinning Formosa koa; mow previously thinned Formosa koa stands</td><td>Selective, targeted thinning near potential roosts</td><td>Outplantings</td><td>Selective, targeted thinning near potential roosts</td><td>Outplantings</td><td>Outplanting survival</td></tr>
<tr><td>2028 – 2030 (Year 2 – Year 4)</td><td rowspan="4">Mow previously thinned formosa koa stands</td><td rowspan="4">Continue thinning new growth as needed</td><td rowspan="4">Supplemental outplantings as needed</td><td rowspan="4">Continue thinning new growth as needed</td><td rowspan="4">Vegetation management as needed</td><td>Outplanting survival</td></tr>
<tr><td>2031 (Year 5)</td><td rowspan="2">Implementation monitoring (acoustics, vegetation, prey), out planting survival</td></tr>
<tr><td>2032 – 2035 (Year 6 – Year 9)</td></tr>
<tr><td>2036 (Year 10)</td><td>Implementation monitoring (acoustics, vegetation, prey)</td></tr>
<tr><td>2037 – 2050 (Year 11 – Year 25)</td><td></td><td></td><td></td><td></td><td>Vegetation management as needed</td><td></td></tr>
</table>

Success Criteria and Adaptive Management

Success of the mitigation will include stable or increasing bat activity across the mitigation area by year 10 of the mitigation project. Adaptive management will be triggered at year 5 if bat activity is not stable or increasing at that time. Metrics of bat use that would indicate increasing use may include, but are not limited to, one or more of the following (statistically significant):

- Overall increase in detection rate (percentage of nights with activity or activity within nights).
- Increase in bat use during the maternity period (June 1 – September 15).
- Increase in activity close to sunset indicative of nearby roosting.
- Increase in feeding buzzes indicative of increased foraging.

In addition, success of vegetation management will be monitored through:

- Decrease in density of Formosa koa and increased edge habitat.
- Increased accessibility of roost tree species.
- Survivorship of outplantings.
- Increase in prey species.

If bat activity is not stable or increasing after Year 5, KWP I will:

1. Determine whether the trend is site-wide or specific to certain management units.
2. Conduct a second year of acoustic monitoring (during Year 6) and rerun the analysis. Additional data collection strengthens regression models by enhancing their ability to detect significant effects.
3. Investigate trends in forest cover and insect biomass and their correlation with bat activity, and determine if any adaptive management actions shown below could be employed to increase the chance of meeting success criteria by Year 10. Deploy actions as needed.
    a. Install water feature(s).
    b. Complete supplemental outplantings of roost trees.
    c. Complete additional thinning of Formosa koa or other trees.
    d. Complete supplemental outplantings of species likely to attract bat prey species.

6.3.5 ʻUaʻu

Mitigation is intended to offset take of and provide a net benefit for 29 ʻuaʻu. Currently, the primary means of mitigation for ʻuaʻu is to invest in propagation projects and/or protections of existing breeding colonies that will increase the number of ʻuaʻu fledged in Maui Nui, though alternative options for offsets may be considered in the future if needed.

6.3.5.1 Mitigation History

KWP I contributed over $2.6 million towards seabird mitigation under the original HCP, the majority of which was spent at the Makamakaʻole Mitigation Project. The enclosures at Makamakaʻole were completed on September 5, 2013. Between 2015 and 2022, breeding of ʻuaʻu was only documented in two years, of which a single pair was observed in both 2016 and 2017, with no fledglings produced (see Appendix C). Spencer et al. (2024) suggested that it may be that ʻuaʻu and ʻaʻo breeding colonies are not compatible in such close proximity, or that the larger ʻuaʻu colonies in East Maui and on Lānaʻi provide a stronger pull on potential birds than the social attraction project. Furthermore, any ʻuaʻu breeding in West Maui likely interacts extensively at sea with birds from Lānaʻi and Haleakalā, forming evening assemblages between Maui and Lānaʻi prior to ascending to their breeding colonies (Spencer et al. 2024). By 2018, it was apparent that the mitigation project was not on track to meet the mitigation requirements for the ʻuaʻu. KWP I, in coordination with DOFAW and USFWS, adaptively managed the mitigation to expand to efforts in the Greater Hiʻi area of Lānaʻi (see Section 6.3.5.2 below).

6.3.5.2 Mitigation Location(s) and Quantification

Based on that past experience, and given the lack of success with prior ʻuaʻu mitigation efforts on West Maui, focusing mitigation on East Maui or Lānaʻi provides the best opportunity to achieve meaningful conservation outcomes.

Alpine Wildlife Sanctuary

KWP I proposes to conduct mitigation activities on east Maui, at the Alpine Wildlife Sanctuary (Figure 7a). This is an approximately 328-acre area surrounded by ungulate fencing that is adjacent to the Kula Forest Reserve, Kahikinui Forest Reserve, Kamehamenui Forest Reserve, Haleakalā National Park, and Department of Hawaiian Home Lands. The scope of work for this site would involve predator trapping and burrow monitoring. The site is owned by DLNR and managed by DOFAW. If mitigation activities at Alpine Wildlife Sanctuary cannot begin by the FY 2027-FY 2028 breeding season, KWP I proposes to adaptively manage mitigation activities to the previously used site on Lānaʻi to ensure that mitigation occurs ahead of take.

Greater Hiʻi area with Pūlama Lānaʻi

Established management infrastructure and demonstrated success of predator control and colony protection on Lānaʻi offer a proven framework that can deliver measurable benefits for the species. Focusing mitigation on Lānaʻi also ensures that actions can be implemented immediately following permit issuance, rather than delaying conservation gains while trying to establish a project on Maui. This approach provides greater certainty that required mitigation will be effective and timely, consistent with both the biological needs of the species and regulatory expectations.

Mitigation will build on previous efforts (see Section 6.3.1) by including predator control and burrow monitoring in an approximately 150-acre area within the Greater Hiʻi area with Pūlama Lānaʻi (Figure 7b). Without additional support, it is reasonably expected that nesting ʻuaʻu in the area will experience increasing predation pressure by feral cats and rodents, and that reproductive success will revert to baseline levels. The program Scope of Work is provided in Appendix G. This mitigation proved successful under the current (2006-2026) ITP and ITL.

Mitigation Quantification

Mitigation offset will be calculated using the burrow monitoring model created by Schuetz, Vilchis, and Swaisgood at the San Diego Zoo in 2020. This model estimates the number of burrows that exist, and the proportion are that successfully breeding based on a subsample. Adult survival based on predator control efforts will use a value of 0.05 (USFWS Letter, Appendix C). Predator control will focus on invasive feral cats (*Felis catus*) and rats (*Rattus spp*.). It is assumed that baseline success rate of nests without predator control is estimated at 0.382 for the Greater Hiʻi area (USFWS Letter, Appendix C), and will need to be determined for the Alpine Wildlife Sanctuary in consultation with DOFAW and USFWS. Fledglings will thus be calculated as:

$$(number\ of\ known\ burrows * proportion\ with\ confirmed\ breeding * success\ rate) - (number\ of\ known\ burrows * proportion\ confirmed\ breeding * baseline\ success\ rate) = net\ fledglings\ produced$$

The number of net fledglings will then be multiplied by 0.3 to account for survival to adulthood.

And adult survival will be calculated as:

$$(number\ of\ known\ burrows * 2\ petrels * 0.05) = annual\ adult\ survival\ mitigation\ benefit$$

The sum of the annual adult survival mitigation benefit and the net fledglings produced (converted to adult equivalents by multiplying by 0.3) will be the annual mitigation offset. Mitigation will continue until our calculated mitigation offsets exceed the permitted amount by at least one juvenile. This mitigation effort may include partnerships with different entities in which case the mitigation offsets each year will be divided between projects in agreement with USFWS and DOFAW.

$$Adult\ Survival\ Benefit = number\ benefiting\ adults * 0.053\ adult\ survival\ benefit$$

*Fledgling to adult equivalent = number fledglings * 0.323 likelihood of survival to adulthood*

6.3.6 ʻAʻo

Similar to the ʻuaʻu, the primary means of mitigation for ʻaʻo is to invest in propagation projects and/or protections of existing breeding colonies that will increase the number of ʻaʻo fledged on Maui. Mitigation will build off previous and ongoing efforts at Makamakaʻole (Figure 8).

Mitigation implementation includes funding the following:

- Inspections and maintenance (repair) of the fence to assure exclusion (to the extent possible) of ingress by small mammalian predators (i.e., mice, rats, mongoose and cats);
- Predator monitoring within the exclosure;

- Predator trapping around the perimeter and within the exclosure in vicinity to the known ‘a‘o colonies;
- Maintenance of bait boxes and assessment of rodent populations;
- Maintenance and deployment of social attraction playback system and decoys; and
- Burrow monitoring using game cameras, burrow scoping, and/or checking for evidence of visitation.

The detailed Scope of Work outlining these activities is included as Appendix F. It includes details on management, monitoring, and reporting. This Scope of Work is a living document and subject to change with written concurrence from DOFAW, USFWS, KWP I, and Maui Nui Seabirds (or other contractor).

Mitigation offsets are measured by the number of fledglings and adults benefiting from the management actions, though alternatives may be considered in the future if agreed to between DOFAW, USFWS, and KWP.

Mitigation offsets each year will be calculated as:

$$Adult\ Survival\ Benefit = number\ benefiting\ adults * 0.053\ adult\ survival\ benefit$$

$$Fledgling\ to\ adult\ equivalent = number\ fledglings * 0.323\ likelihood\ of\ survival\ to\ adulthood$$

6.3.7 Akē‘akē

While a specific ‘akē‘akē mitigation project similar to those described for the other seabirds may be considered, the USFWS has created a “Hawaiian Seabird Conservation Account” (Account) with the National Fish and Wildlife Foundation where funds for seabird mitigation can be deposited and then used according to an appropriate conservation plan. The overall intent is that pooled resources can be used to fund larger management projects with the opportunity to successfully support more individuals or to resolve larger research questions targeted at the recovery of seabirds than could have been supported through smaller-scale investments. This fund currently covers the following listed Hawaiian seabirds:

- ‘Ua‘u
- ‘A‘o
- ‘Akē‘akē

This account was developed for low impact and/or low-take projects, and provides a mitigation opportunity for species when there is not a readily accessible option for offsetting the take on the affected island(s). There are no known confirmed breeding colonies within Maui Nui, and of those suspected, they are located in inaccessible gulches. While social attraction projects for ‘akē‘akē have begun within Maui Nui, the timeline for colony establishment is not known or predictable.

Therefore, at this time, based on coordination with USFWS and DOFAW, KWP proposes to fund NFWF as the mitigation for the ʻakēʻakē.

Activities for which funds from the Account can be used include, but are not limited to the activities below:

- Management of known breeding colonies, including:
  - predator fencing and predator control, including potential barn owl removal,
  - social attraction and/or translocation of Hawaiian seabirds into protected areas,
  - removal of invasive plant species, and
  - seabird reproductive monitoring;
- Surveys to locate and protect new breeding colonies;
- Funding of programs that retrieve, rehabilitate, and release seabird fledglings disoriented by artificial lights; and
- Adaptive management designed to mitigate the impact of various activities on listed Hawaiian seabirds.

When funding is provided as a result of HCPs, USFWS coordinates with DOFAW regarding how the funds are spent and relevant success criteria and ensures that funds are spent per HCP instructions/guidance.

To mitigate the impacts of unavoidable ʻakēʻakē take, KWP I will provide designated mitigation funds to the NFWF dedicated account. The USFWS, DOFAW, and potentially other partner organizations will collaborate to create a conservation plan and implement the planned activities. The conservation plan funded in part by KWP I contributions will be developed in coordination with DOFAW, reviewed by appropriate species experts, and include appropriate biological measures of success which will be determined when the conservation plan is developed.

USFWS and DOFAW estimated that it takes $28,000 to mitigate for one ʻaʻo (Tetra Tech 2016). Adjusting for inflation,[21] that should be approximately $37,500 in 2025 dollars. Adding 20 percent for administrative costs results in an estimate of $45,000 per seabird. At the requested take of 10 ʻakēʻakē, this would require a total estimated contribution of $450,000.

Because the management of the species implemented from the funding will improve habitat used by the ʻakēʻakē, this mitigation will provide a net benefit to the species. Information developed through these efforts will fill in data gaps and contribute to the ability to adaptively manage mitigation efforts in the future. The mitigation resources from multiple sources will be pooled, thereby increasing the potential scope of research and management efforts and the value of the research or management to the species.

[21] https://www.usinflationcalculator.com/

The ʻakēʻakē mitigation project funded through NFWF will be developed in coordination with DOFAW and represents the most appropriate conservation project available at this time. Based on current estimates, USFWS anticipates the identification of an appropriate conservation project within one year of permit issuance. Furthermore, appropriate biological measures of success will be determined when the conservation plan is developed.

ʻAkēʻakē mitigation efforts will be considered successful and KWP will be deemed to have fulfilled its mitigation requirements for the species if:

- Funding to adequately cover the estimated take of up to 10 adults is provided to NFWF on a schedule to be determined; and
- Status and results of the research or management efforts are provided in the HCP annual compliance report submitted to the agencies. Results will include biological measures related to reductions in predators or other measures appropriate to the program that is funded, with results appropriately scaled to the relative proportion of the overall funds that were contributed by KWP.

6.3.8 Assimulans Yellow-faced Bee

As stated in USFWS (2022c), the primary means of conserving the assimulans yellow-faced bee is through protecting and restoring the bee's habitat, which must include nesting and diverse native pollen and nectar resources that are simultaneously available. Impacts of up to 5 acres of potential habitat may occur, which may include up to 25 nest burrows. Mitigation outlined here will provide a net conservation benefit by investing in habitat restoration, enhancement, and protection efforts in areas more likely to contribute meaningfully to long-term species viability for the local population.

6.3.8.1 Mitigation Location and Size

DOFAW entomologists have identified an approximately 18-acre area that includes a portion of the Project Area (Kaheawa Pastures) as well as a known nesting location for assimulans yellow-faced bee (which is located just outside the Project Area/leased lands).

6.3.8.2 Mitigation Methods and Timing

KWP I will continue to work with DOFAW entomologists and other experts to finalize the mitigation methods. The general approach is to develop new nesting habitat using the best available science, including research to determine if mitigation for incidental take of nests can be accomplished. All management actions will be conducted by DOFAW staff and/or qualified contractors approved by DOFAW. Management actions will include the following:

- Establishment of an approximately 18-acre area surrounding the core nesting aggregation adjacent to the Project Area. A 6-ft high deer exclusion fence will be established around this area.
- Establishment of a control plot outside of this 18-acre mitigation area.

- A nest survey for assimulans yellow-faced bee nests will be conducted prior to any management actions or fence construction, and any nests found will be individually tagged and geolocated.
- Microclimate instrumentation will be established in each removal and control plot prior to all management actions. This will measure at least soil moisture and soil temperature, with locations and density of instruments to be determined. Ideally, instruments will be installed early enough to obtain a good baseline prior to ironwood removal.
- Ironwood removal plots and control plots will be established within the 18-acre mitigation area as well as at the control site. Ideally, there will be no nests in the location of ironwood removal, and all ironwood will be removed from the ironwood removal plots. Control plots will be adjacent to the ironwood removal plots, and no management actions will be performed within the control plots.
    - There will be two ironwood removal plots within the mitigation area and one outside at the control site, with paired control plots adjacent to each ironwood removal plot. The plots will potentially evaluate the influence of distance from the nesting core on likelihood of colonization, as well as the importance of deer exclusion on outplant survival. The three removal plots will span a range of distances from locations of high nest densities/clusters: approximately <10 m, 90 m, and 300 m.
- ‘Ilima and/or other native flowering plants will subsequently be outplanted and maintained at densities and time frames determined by DOFAW staff within the ironwood removal plots.

Long-term control of ironwood requires an integrated management approach combining removal, herbicide treatment, and ecological restoration. Mature trees will be cut and immediately treated with an appropriate systemic herbicide to prevent resprouting. Follow-up control of seedlings and stump regrowth will occur for at least 5 years. Vegetation removal will occur using hand tools. This combination of mechanical, chemical, and vegetative management will ensure sustained suppression of ironwood and promote the long-term recovery of native habitat conditions.

The timeline for mitigation is anticipated as follows:

- FY 2026 – initial surveys for assimulans yellow-faced bee and baseline conditions. Finalization of mitigation plan.
- FY 2027 – ungulate fence construction, ironwood removal, and outplantings.
- FY 2028–FY 2032 – monitoring for assimulans yellow-faced bee nests and continued ironwood and weed management.
- FY 2033–FY 2051 – ironwood control and management within the ironwood removal sites. Additional as-needed monitoring and management if >25 nests have not been documented within the first five years

6.3.8.3 Success Criteria and Adaptive Management

Mitigation will be considered successful if the following occur:

- >25 nests are established within the experimental plots
- Ironwood and other invasive weeds remain controlled within the experimental plots through vegetation monitoring; and
- Foraging resources are increased by native flowering plant outplanting and maintenance.

Should >25 nests not be established within the experimental plots within the first 5 years, KWP I will:

- Continue annual monitoring until >25 nests have been established across the experimental plots.
- Consult with DOFAW on whether additional ironwood removal and additional outplantings and maintenance of native host plants should be conducted.

Other adaptive management actions may be implemented over time as the state of the science related to assimulans yellow-faced bee knowledge continues to improve.

6.3.9 Additional Benefits of Mitigation and Additional Voluntary Conservation

All of the mitigation measures described above will have a benefit to other native species beyond the Covered Species that they are designed to offset. Without active conservation efforts like predator control and species propagation, many native species could be lost, leading to further ecosystem collapse. By protecting and restoring these species, we help maintain the balance of the ecosystem, ensuring that future generations can continue to benefit from Hawaiʻi's natural heritage.

For example, past efforts at Makamakaʻole led to the discovery that ʻakēʻakē were also potentially using the area, which resulted in a social attraction study at the site outside of the current mitigation efforts. ʻOu (Bulwer's petrel) have also been documented at Makamakaʻole. Mitigation for ʻōpeʻapeʻa will benefit other native species through outplantings of native plants, removal of ungulates, or other such measures. Any removal of predators has benefits to other species that are threatened by the same introduced mammalian predators as the Covered Species. Mitigation for nēnē will help to restore a viable nēnē population on Molokaʻi, which benefits the overall ecosystem of the island. All of these actions, cumulatively, lead to a net environmental benefit and fulfillment of the requirements of HRS 195(D).

Beyond the mitigation that will be implemented through this HCP, KWP I will be voluntarily providing $11,000 in funding to the Hawaiʻi Wildlife Center to cover the remaining costs of an aviary rebuilt in 2024. This aviary is anticipated to last >10 years based on the lifespan of the last aviary, and may serve approximately 12 pueo patients per year.

6.4 HCP Compliance Monitoring

This section provides an overview of monitoring activities that will occur at the Project and at the mitigation projects described in Section 6.3. The monitoring proposed in this HCP represent the state of discussions with the USFWS and DOFAW, the state of post-construction mortality monitoring, and the state of the science related to documenting outcomes of mitigation for each of the Covered Species. However, during the course of the permit term it is likely that new monitoring techniques will emerge which will similarly be equipped to determine whether the biological objectives in Section 6.1 are being met. The monitoring program for this HCP will be driven by the need to determine whether the biological objectives are being met and as such, may be modified over time in order to do that in the most effective manner. Any changes to the monitoring program, including to data analysis and fatality estimation tools, will need to be agreed to by the Applicant, DOFAW, and the USFWS.

6.4.1 Post-construction Fatality Monitoring

The Project has implemented a year-round intensive fatality monitoring program to document downed (i.e., injured or dead) wildlife incidents involving Covered Species and other species since operations began in June 2006. In consultation with USFWS, DOFAW, and the ESRC, fatality search areas have evolved over time from the start of operations through the initiation of the current approach, established in April 2015. The last modifications were in response to the March 31, 2015, ESRC meeting, wherein members agreed to "encourage the applicant to work with the statistical experts and researchers to develop an alternative more efficient and focused monitoring strategy which still meets the committee's expressed preference for continuation of annual monitoring." The evolution of the searched areas in which fatality monitoring occurred (search plots) included:

- In June 2006, search plots were 180-meter by 200-meter rectangles centered on each of the Project's 20 turbines.
- On October 1, 2010, search plots were reduced to 73-meter radius circular plots centered on each WTG, except where steep slopes prohibited visual searching.
- Since April 2015, search plots were reduced to the graded, cleared and maintained turbine pads and access roads that fall within a 70-meter radius circle centered on each of the 20 turbines (i.e. roads and pads within 70 meters; Figure 3).

Since the Project already has data extending well beyond the 20 percent buffer recommended by ESRC and DOFAW (2024), KWP I is not proposing any changes to the current search area, as the DWP is already informed by data collected beyond the current search limits (see Appendix I for additional details). Therefore, an adjustment, based on the distribution of how birds and bats fall around turbines, is already included in the model used to determine the number of unobserved mortality events. This also accounts for variation in wind patterns over time, and any prevailing winds that occur at the Project, since the previous studies, upon which the assumptions are based, were conducted at the site itself, and are not reliant on more general models. Changes to the DWP may occur over time if new models or data indicate that the current DWP can be made more accurate, but would only occur with written concurrence from DOFAW, USFWS, and KWP I. It is noted, however, that should the graded pads expand during maintenance activities, any expanded area would be maintained for the life of the Project, and the DWP would be updated to account for the larger search area. See Figure 2 for potential areas of expansion within the Limits of Disturbance.

The Project will continue to implement year-round fatality monitoring when turbines are operational (i.e., not during periods of turbine shut-down such as decommissioning) to document downed (i.e., injured or dead) wildlife incidents involving Covered Species and other species at the Project. This effort has been ongoing since June 2006, with the current field practices named below established in April 2015. Changes to these methods (including to the frequency or duration) may occur over time only with written concurrence of USFWS, DOFAW, and KWP I and based on the best available science.

Post-construction fatality monitoring will continue using the same methods currently employed. This includes:

- With an approximately 7-day search interval (weekly), searching the graded, cleared and maintained turbine pads and access roads *that fall within* a 70-meter radius circle centered on each of the 20 turbines (i.e. roads and pads within 70 meters; Figure 3). Recent studies have shown that approximately 85 percent of bat carcasses, 100 percent of nēnē carcasses, and 100 percent of seabird carcasses are anticipated to persist for over 7 days (KWP I 2024), justifying a weekly search interval.
- Use of trained detector dogs and their handlers, with backup visual surveys by Project staff if needed (e.g., weather, injury, availability of canine search team).
- Quarterly carcass persistence and searcher efficiency trials using black rats as surrogates for the ʻōpeʻapeʻa, chickens (*Gallus gallus domesticus*) or other large, domestic game birds as surrogates for nēnē, and wedge-tailed shearwaters (*Ardenna pacifica*) as surrogates for ʻuaʻu, ʻaʻo, and ʻakēʻakē. All search methods (i.e., canine or visual) used in a given quarter will be searcher efficiency tested.
- Regular vegetation management of search areas (Figure 3) supplemented by weed whacking to maintain the extent of the graded and cleared areas within 70 meters of each turbine.
- Scavenger trapping/predator control to contribute to a high probability of a carcass persisting between fatality searches and to reduce the depredation risk to nēnē.
- Genetic sexing of bat carcasses with the Bishop Museum (or other partner approved by DOFAW and USFWS).

6.4.1.1 Data Analysis

Direct Observed and Unobserved Take

KWP I will continue to conduct data analysis of post-construction monitoring efforts within the EoA framework. To calculate take estimates, the number of observed fatalities is scaled to account for fatalities that are not detected (unobserved). Unobserved fatalities are the result of three primary factors:

- Carcasses may be scavenged before searchers can find them;
- Carcasses may be present, but not detected by searchers; and
- Carcasses may fall outside of the search area.

Carcass persistence and searcher efficiency measure the effect of the first two factors, in conjunction with the search interval. The third factor, the number of carcasses that fall outside of the search plot area, is dependent upon the proportion of the carcass distribution that is searched. Note that the density-weighted proportions (DWPs) at KWP I were developed using site-specific fatality distribution data. The search area for fatalities at the Project has evolved over time; therefore, the proportion of the carcass distribution searched has varied historically. As search plot dimensions have remained consistent since FY 2016, the estimate of the DWP of the carcass distribution searched has remained the same as described in the FY 2017 annual report (KWP I 2017). Based on carcasses detected at the Project between 2006 and 2017, the assessment determined that the cleared areas within 70 meters of the turbine base cover 57.3 percent of ʻōpeʻapeʻa, 35.5 percent of nēnē, and 24.6 percent of seabird fatality distributions based on site specific data. Methods used to calculate these DWP values are described in Appendix I.

KWP I re-evaluated the DWPs for each size class as part of HCP development to evaluate whether the adjustment factors were consistent with more recent fatality distribution models (Dalthorp et al. 2022, 2024). This is described in detail in Appendix I. Using carcasses found through 2025, it was determined that the cleared areas within 70 meters of the turbine base cover 49.4 percent of ʻōpeʻapeʻa, 37.6 percent of nēnē, and 22.8 percent of seabird fatality distributions based on site-specific data. These new DWP values will be used starting in FY 2026 under the new ITL and ITP. Updates to the DWP calculations may occur over time based on improvements to the best available science (e.g., updated models that may incorporate wind speed and direction) in coordination with DOFAW and USFWS and with the agreement of all parties.

Carcass persistence and searcher efficiency for each size class of Covered Species will be analyzed on an annual basis (with preliminary results being provided in each quarterly report).

The "Multiple Years Module" will be used to calculate the 80 percent UCL of take that has occurred for a given Covered Species. Because this model builds on each year of post-construction monitoring, the take under the new ITL and ITP will be calculated as:

$$M^*_{New\ Permits} = M^*_{Current\ Year} - M^*_{FY2026}$$

Essentially, this will allow EoA to continue to utilize the site-specific fatality data collected to-date, while subtracting out fatalities attributed to the current (2006-2026) ITL and ITP when evaluating compliance with the new ITP and ITL. Inputs for years 1-20 will utilize those reported in the FY 2026 annual report, and then each subsequent fiscal year will add to that dataset. KWP I is not proposing changes to the risk profile (rho) at this time, with the exception that rho may be altered for any fiscal year where operations do not occur for a period of time. For example, the current plan is that the Project will not be operational from June 2026 through December 2026. Therefore, for the FY 2027 analysis, the risk profile (rho) would be set to 0.5 to account for the lack of risk during half the year. At the end of the Permit Term the sum of the rho values should equate to 40 to illustrate 40 years of operations, unless subsequent edits to rho are warranted (e.g., installation of deterrents).

Indirect Take

Indirect take will be calculated by species using the direct observed and unobserved take ($M^*_{\text{New Permits}}$) and the methods described by Covered Species in Section 5.1 based on the time of year and/or sex of the fatalities.

Total Take

The total take will be the sum of the direct observed and unobserved take ($M^*_{\text{New Permits}}$) and the indirect take for a given Covered Species.

Projected Take

KWP will utilize the “Multiple Years Module” and the “Projection of future mortality and estimates” to determine likelihood of permitted take exceedance for any species for which a fatality has been observed. Inputs for the “Past monitoring and operations data” will follow the methods described above for a given year. Within the “Project Parameters” KWP will utilize 41 total years in project, with a rho value of 0.5 for year 21 and year 41 to account for the Project’s operational status in those years (note this may need to be altered based changes to the intended operations). The annual report will provide detection probability (g) and rho value (ρ) is used for the projections. The mortality threshold (T) will be calculated as the following:

$$(Permitted\ Take\ Under\ New\ Permits + M^*_{FY2026}) - \text{Indirect Take Under New Permits}$$

The following outputs from EoA will be reported in the annual report:

- Probability that take will not exceed permitted amount by the end of the permit term
- Mean and median years of operations without triggering

Lost Productivity

Lost productivity will be calculated for nēnē, and is described in detail in Appendix H. Lost productivity will only accrue during years where take has outpaced mitigation. Lost productivity for ʻōpeʻapeʻa, ʻuaʻu and ʻaʻo will be calculated as a 5 percent increase in mitigation obligations for each year of lag beyond prior mitigation benefits, as described in Section 6.3.1. This is 7 years for

ʻōpeʻapeʻa, 17 years for ʻuaʻu, or 11 years for ʻaʻo. For assimulans yellow-faced bee, the 5 percent lost productivity would be added in 2027 if mitigation has not begun. Five percent is based on the 20.5 years of operations (one year is approximately 5 percent of the operational life). No lost productivity is proposed for the ʻakēʻakē given that implementation of mitigation will be the responsibility of USFWS and DOFAW.

6.4.1.2 Injured Wildlife and Wildlife Rehabilitation Agreement

In the event that injured wildlife is found during monitoring, a Hawaiʻi -based licensed and permitted wildlife rehabilitation center will be contacted. Protected species will be reported to DOFAW and USFWS. KWP I staff will work with the rehabilitation center to collect and transport injured wildlife. As specified in HRS 195D-21, KWP I will enter into a sponsorship agreement with a Hawaiʻi -based licensed and permitted wildlife rehabilitation program to provide medical and rehabilitation services to native wildlife on an annual basis for the life of the Permit Term, which will cover transport, assessment, medical and rehabilitative care of animals found at the facility.

The current sample agreement provided by the Hawaiʻi Wildlife Center (HWC; USFWS Wildlife Rehabilitation Permit #: MB53007A, DLNR DOFAW Wildlife Rehabilitation Permit: 240503114849-OTH) would include the following:

- Access to HWC's team of professionals who are knowledgeable and experienced with Hawaiian birds and bats;
- Technical advice in wildlife evaluation, handling, stabilization, and transport;
- Annual refresher training on first response for 1-3 people each year. This would include a 1-day program held at the HWC facility to cover capture, handling, field stabilization, health evaluation, prep for transport and transport, forms, and notifications;
- Transportation, assessment, medical and rehabilitative care for up to eight native birds or bats per year. Additional individuals will be paid for as needed as an "additional service."

At this time, the Hawaiʻi Wildlife Center is the main licensed and permitted wildlife rehabber in Hawaiʻi; however, alternative rehabbers will be considered if available in the future, particularly if located on Maui. Any sponsorship agreement will only be made with a Hawaiʻi-based licensed and permitted wildlife rehabilitation program.

6.4.2 Mitigation Effectiveness Monitoring

6.4.2.1 Nēnē Mitigation Monitoring

Current monitoring of nēnē release pens includes monitoring of pen conditions as well as monitoring for nēnē activity. Monitoring of pen conditions includes regular visits to the facility to confirm that fences are secure, predator trapping is ongoing and sufficient, water and supplemental feed are available, and vegetation remains appropriate to the habitat needs. Monitoring of nēnē includes a census of individuals on site inside and outside of the release pen during each visit, including locations and status of any nests found. These monitoring visits occur weekly during the breeding season (November through April) and every other week during the non-breeding season (May through October), although there are times of year (e.g., after heavy rain or while cattle are in the area) when facilities are not accessible. Monitoring occurs at the same time as management activities in order to reduce the total number of trips to the site, to reduce impacts on nēnē and also to reduce impacts on access roads. In addition to the above monitoring conducted during site visits, game cameras may be utilized to monitor both predator and nēnē activity. The current Scopes of Work for nēnē monitoring are provided in Appendix D and Appendix E.

The monitoring regime may alter over time in response to site conditions and needs.

6.4.2.2 ʻŌpeʻapeʻa Mitigation Monitoring at Puʻu O Hōkū Ranch

The management activities planned across 819 acres at Puʻu O Hōkū Ranch are summarized in Section 6.3.4. In order to determine whether management activities result in an increase in habitat quality and quantity for ʻōpeʻapeʻa, the Applicant will complete monitoring activities outlined in Section 6.3.4. Monitoring will include both baseline monitoring, to determine existing conditions in the mitigation area, and implementation monitoring, which will determine whether the management actions are resulting in conditions that are beneficial to ʻōpeʻapeʻa.

Regardless of the combination of management actions that occur in each management unit, monitoring activities will fall into three categories:

- Vegetation monitoring;
- Acoustic monitoring; and
- Prey species monitoring.

Vegetation Monitoring

Vegetation monitoring will be conducted to ensure that the habitat management actions are creating conditions favorable to ʻōpeʻapeʻa roosting and foraging. Based on the baseline conditions of a given management unit, vegetation management activities may be necessary, including clearing or planting vegetation, depending on whether the appropriate vegetative structure and species composition is present at the mitigation site. Vegetation management will consist of either clearing of Formosa Koa to increase bat habitat quality, strategic clearing of understory vegetation around existing roost tree species in order to improve their quality for roosting bats, or outplanting of vegetation to create foraging structure and prey species in order to increase habitat quality. The type of vegetation management will dictate the required monitoring that will occur.

Monitoring of Formosa Koa Management

The purpose of Formosa koa management is to improve access to areas by ʻōpeʻapeʻa that are currently too dense for use as foraging or roosting. Ultimately the success of these management actions will be a documented increase in bat use of these areas, which is discussed below under acoustic monitoring. Formosa koa management is expected to result in an increase in forest edge initially, and an increase in trees large enough to support roosting eventually. Initially monitoring will consist of a demonstration of an increase in forest edge, gained through removal of stands of

Formosa koa or through strategic clearing of “foraging pockets” for bats. Also, when forest management activities are occurring, some trees will be left standing. These “leave trees” will then grow larger, faster, once the competition of surrounding trees has been removed, allowing them to reach a size that will at least attract foraging bats, if not roosting bats.

Baseline monitoring will consist of mapping the amount of forest edge available in the two management units where Formosa koa will be the primary management action. This will be accomplished with a combination of desktop aerial photo review and ground-based mapping to determine whether gaps in the forest observed on the desktop are suitable for foraging ʻōpeʻapeʻa. Implementation monitoring will be completed, using the same methods, once Formosa koa removal is complete in a management unit. Implementation monitoring will include updated mapping of forest edge every 5 years, to ensure that the amount of edge created during forest management actions is retained. Baseline data collection of leave trees will include photo documentation, estimates of height, and a measurement of diameter at breast height (dbh). These trees will also be revisited at least once every five years to collect data on tree height and dbh, as a way to demonstrate changes in available bat habitat, specifically related to forest structure.

Monitoring of Roost Tree Management

In many locations, particularly within Management Units 1, 2, and 5, there are existing mature trees that could support roosting bats, but the understory surrounding the trees is thick, and likely precludes access to the potential roost trees. In those instances, the understory will be cleared and maintained for the permit term. Implementation monitoring will involve follow up monitoring at least every five years to confirm that vegetation remains clear around the roost trees.

Monitoring of Outplantings

In Management Units 3 and 4, outplantings will occur once ungulate fencing is complete. The primary purpose for outplantings is to increase forest structure to attract bat use in locations where very little or no trees currently exist, and to increase bat prey. Bat acoustic monitoring and insect monitoring, described below, will be the primary means by which success will be determined. However, as a matter of compliance, the Applicant will conduct implementation monitoring of planted trees and shrubs in outplanting areas, to confirm that they survive and establish as a resource for bats. Once trees or shrubs are planted, monitoring will occur within the first six months to make sure the trees survive the initial outplanting, and then follow-up implementation monitoring will occur annually for the first 5 years to confirm survival of outplantings. No subsequent monitoring of outplanting survival is expected following the 5 years of monitoring, with the assumption that if a tree or shrub survives for 5 years it will persist into the future.

Bat Acoustic Monitoring

Acoustic monitoring will be used to determine whether an increase in bat activity has occurred following the implementation of management actions performed by KWP I. Acoustic monitoring will be conducted within each management unit for up to one year to establish a baseline of bat activity prior to any management action occurring. Baseline monitoring can occur while some actions begin, such as barbed wire removal, but in general will occur absent management actions, in order to determine the level and type of bat activity occurring in each management unit prior to management actions. These areas will then be resampled at regular intervals during implementation monitoring to track changes in bat activity over time, in response to management actions. Bat activity will be compared across years to determine if an increase in activity has occurred, along with information on the type of bat activity observed. Monitoring locations established during the baseline monitoring year will remain consistent throughout subsequent sampling years.

Changes in bat acoustic activity will be assessed using detection rate (the number of sampling nights with detections/the number of sampling nights). In addition, based on Teixeira et al. (2019) the following activity metrics will be used to evaluate changes in bat activity within and across mitigation site(s) over time. Teixeria et al. (2019) suggests that vocalizations can serve as indicators of behavioral states and contexts that provide insight into populations as it relates to their conservation. These data parameters will further aid in understanding the effects of the mitigations actions on habitat use by bats:

- **Bat Use During Maternity Period:** This includes monitoring of bat activity specifically during the maternity season (June – September). This time of year requires the highest energy demand for female bats and an increase in use of an area during this time provides an indication that the resources that bats rely on during this critical period are being provided by the mitigation site. A demonstrated change in use of an area during this time shows that if an area which was once not providing those resources during the critical time of year is now providing those resources as proven by an increase in use, then a net benefit is being provided to bats from the change in the unit from management actions. Data used to demonstrate baseline conditions and any change in use include number of nightly call files and type of call (i.e., passive or active search call, and feeding). This monitoring would occur across all management units, with an emphasis on Management Units 1 and 2 initially, due to the presence of potential roost trees currently.
- **Timing of Nightly Activity:** A reduction in the amount of time between sunset and first acoustic detection would be tracked across the year, in order to determine whether bats could be roosting nearby and would be indicative of whether the location has been determined to be a reliable and high-quality foraging location for roosting bats. The idea behind this metric is that if bats are detected in a location right after they emerge from roost sites, then either the roost site is very close by or bats made a direct flight to a location after leaving a roost site, because it is a known resource location. An increase in bat activity during the period of time right after sunset would indicate one of those scenarios. Data used to demonstrate baseline conditions and any change in activity during this window include number of nightly call files and type of call (i.e., passive or active search call, and feeding). This monitoring would be used across all management units.

  Targeted Monitoring Around Potential Roost Trees: In locations where understory vegetation is cleared around a potential roost tree in order to make it more accessible and attractive to roosting bats, acoustic detectors may be placed in order to determine if a higher concentration of bat use can be detected. If acoustic detections indicate that there is bat activity indicative of potential roosting activity, supplemental monitoring using thermal imaging may be used to better understand bat activity in that location, with the hopes of documenting bat roosting. This monitoring would be limited to Management Units 1 and 2 initially, but could be used in all units later in time, once trees grow to a size suitable to support roosting.

Prey Species Monitoring

Arthropod monitoring would be conducted to determine the response of bat prey communities, specifically biomass, to the implementation of management actions. Biomass was chosen as a response variable as it has shown to be a strong response variable when investigating trophic interactions and can provide a more accurate picture of the processes driving changes in community structure (Saint-Germain et al. 2007). Baseline prey species sampling would occur to determine the baseline levels of prey biomass in the mitigation site(s) so that it can later be determined if management activities result in an increase prey presence.

Arthropods sampling would include the use of malaise traps and may use UV light traps, if conditions warrant (e.g., accessibility of monitoring location). Data will include arthropods collected during each sampling period with a body length ≥ 5 millimeters identified to the most specific taxonomic level possible (Gorresen et al. 2018). These will be size classified into the categories of >10 to 20 millimeters and >20 millimeters.

Biomass of collected bat prey insects will be calculated using the weight-length relationship determined by Gruner (2003):

$$y = a(x)b$$

Where y = dry biomass, x = size measurement, either length or length * width; a and b are coefficients individually chosen for each taxon.

Sampling of arthropods would be conducted during baseline monitoring, and then at 3-year intervals following implementation of management actions. Timing of sampling will be consistent across all sampling years and align with bat reproductive periods as defined by Gorresen et al. (2013): lactation (mid-June to August), post-lactation (September to mid-December), pre-pregnancy (mid-December to March), and pregnancy (April to mid-June).

Monitoring will be conducted to determine whether changes in vegetation composition and species in each management unit result in a change in bat prey species. An indication of an increase in bat prey in locations where bat roosting is possible results in a net conservation benefit because roosting bats, particularly during the maternity period, do not have to travel as far from roost site for high quality prey resources. When that occurs it reduces the overall energy expenditure by bats and would likely increase overall fitness, resulting in a higher reproductive rate.

ʻŌpeʻapeʻa Mitigation Monitoring at Future Mitigation Sites

The Applicant will complete baseline monitoring at any proposed mitigation location to confirm presence of ʻōpeʻapeʻa. If any management actions are needed to reduce habitat degradation over time or improve habitat quality, a habitat management plan will be prepared and approved by USFWS and DOFAW. Any necessary site specific management actions will be outlined in the management plan along with success criteria, and a monitoring and adaptive management program. KWP I will monitor the response of ʻōpeʻapeʻa to the management actions implemented at the mitigation area(s). The actions needed at the mitigation site(s) will depend on the baseline condition of habitat and presence of ʻōpeʻapeʻa at the chosen mitigation site(s) prior to any management activities occurring, as described in Section 6.3.4. Monitoring activities may, depending on mitigation objectives and mitigation actions, include

- Vegetation monitoring;
- Prey species monitoring;
- Acoustic monitoring.

The level and type of monitoring that would be proposed at future mitigation sites would be very similar to the detailed monitoring approach presented earlier in this section for the Puʻu O Hōkū Ranch.

6.4.2.3 ʻUaʻu Mitigation Monitoring

Monitoring at the ʻuaʻu mitigation site will use an existing monitoring protocol with a standardized sampling design across the colony, developed from a power analysis and assessment completed in partnership with biologists and statisticians with the Zoological Society of San Diego (Schuetz et al. 2020, Sprague 2021). Monitoring will use motion-activated cameras to monitor a subset of burrows within the area. Burrows are selected from two panels: a set that remains relatively constant over time and a set that changes every year. All selected burrows are monitored with cameras consistently from before the start of the season until after fledging or failure. This sample of monitored burrows is then used to determine apparent reproductive success and relative proportions of inactive burrows, new prospecting pairs, non-breeding pairs, etc. for all known ʻuaʻu burrows in each monitoring area. The success rates from the monitored burrows (including proportion of inactive burrows, prospecting pairs, etc.) would be applied to all the known burrows in a given area. Any new burrows found are added to the pool of burrows to be potentially selected for monitoring the following year.

6.4.2.4 ʻAʻo Mitigation Monitoring

Because burrow occupancy, breeding attempts, and fledging success are determined by monitoring burrows, multiple methods will be used to determine burrow activity and fledgling success. Burrow occupancy is measured over the breeding season by evaluating signs of an active burrow, which include the following:

1. Regular visitation by potential breeders
    a. Feathers;
    b. Strong odor of seabird at the burrow;
    c. Toothpick displacement and movement;
    d. Guano droppings;
    e. Tracks;
    f. Game camera photographs;
    g. Duration of visitation; and
    h. End of season photos from within the burrow chamber showing presence of nesting materials, guano, and/or feathers etc.
2. Evidence of breeding:
    a. Eggs or egg fragments;
    b. Down (chick) feathers;
    c. Chick observations; and
    d. Evidence of parental feeding of chicks.

Statewide, the assessment of fledging success is determined by the number of burrows active during the fledging period of September and October where there are no indications of depredation. Due to the specific circumstances at Makamakaʻole (the presence of artificial burrows that can be opened at the end of the season), agencies have suggested the level of evidence for confirming the presence of a chick at an individual burrow is appropriately higher at this site than where natural burrows dominate, requiring game camera footage or physical evidence of a chick having occupied a burrow.

Given DOFAW's planned expansion of the Makamakaʻole site, it is possible that natural burrows may be included as part of the ʻaʻo mitigation in future years. In this case, KWP I will work with agencies to determine the appropriate level of evidence for calculating mitigation credits (e.g., development of a model-based approach like that described for ʻuaʻu in Section 6.4.2.3).

6.4.2.5 ʻAkēʻakē Mitigation Monitoring

Monitoring for ʻakēʻakē mitigation will be determined as part of the NFWF project, and will include both DOFAW and USFWS input. The results of that monitoring will be shared with KWP I by NFWF on an annual basis for inclusion in the annual reporting until such time that the mitigation obligation is deemed fulfilled.

6.4.2.6 Yellow-faced Bee Mitigation Monitoring

Vegetation Monitoring

Vegetation monitoring will occur to ensure that the habitat management actions are creating conditions favorable to assimulans yellow-faced bee nesting and/or foraging.

The ironwood removal sites will be surveyed to map ironwood and other invasives, as well as to map potential foraging resources (e.g., ʻilima) prior to conducting any mitigation activities. Following management of the ironwood, the ironwood removal sites will be monitored at least once annually for the life of the Permit to mark any ironwood encroachment and trigger additional ironwood management as needed.

In addition, outplanting survival will be tracked for a minimum of 2 years, with survival goals based on planting density and species in consultation with DOFAW and USFWS.

<u>Assimulans Yellow-faced Bee Surveys</u>

KWP I will fund DOFAW (assuming staff availability, otherwise a DOFAW-approved surveyor) to conduct a survey of the mitigation area prior to mitigation activities to document nest locations and foraging activity. Follow-up assimulans yellow-faced bee surveys will occur for a minimum of 5 years or until such time that 25 additional nests have been documented. See Section 6.2.6.1 for survey methods.

6.4.3 Voluntary ʻŌpeʻapeʻa Acoustic Monitoring

Current acoustic monitoring at the Project will continue, including the use of five ground-based operational bat detectors (Figure 3). In FY 2025, acoustic monitoring equipment was updated to more sensitive microphones and new detectors (Wildlife Acoustics SM4 units with SMM-U2 microphones), using a paired study to compare microphone sensitivity with the previously used SMX-U1 microphones and Wildlife Acoustics SM2 units. This study found that on average, SMM-U2 microphones detected nearly three times more echolocation pulses, generated over three times more call files, and documented more than twice as many detector nights with detections. Over the course of this study, bat activity detected by SMM-U2 microphones was significantly greater across all measured metrics compared to SMX-U1 microphones, underscoring the importance of accounting for microphone model when interpreting long-term acoustic datasets. A ratio estimator to adjust historical data sets was not supported by the data. The increased sensitivity with the newer SMM-U2 microphone provides a more accurate measure of bat activity at the Project.

Future equipment upgrades may be made over the course of the Permit Term. Dependent upon new technology, a similar paired study may be conducted for up to one calendar year after any equipment change to determine if there is need/ability to develop an adjustment factor in order to maintain a comparison of datasets collected as equipment is updated.

Acoustic data will be analyzed to determine which files represent ʻōpeʻapeʻa, and the following will be summarized in the annual report:

- Number of nightly detections;
- Monthly detection rates;

- Onsite activity trends.

Acoustic monitoring may be ended or replaced with alternative monitoring (e.g., thermal imaging) with written concurrence of USFWS, DOFAW, and KWP I.

6.4.4 On-site Nēnē Monitoring

KWP I has requested active engagement with DOFAW Maui to fund the banding (and possibly satellite tagging) of nēnē at the Project. KWP I would like to better understand the onsite population by standardizing the current observational monitoring program at the site. Banding would allow for the ability to track observations of distinct individual nēnē to better understand their movements around the site, nesting location fidelity, and provide potential insight to nēnē mortality at the Project.

6.4.5 On-site Assimulans Yellow-faced Bee Monitoring

During any covered activities that require vegetation management any ʻilima (or other known foraging resource identified in Section 4.6) that are modified or removed would be documented. The total number of foraging resources modified or removed in any given year will be reported in the annual report, along with efforts to outplant foraging resources to replace and offset any foraging resources that are impacted. Any acres of ground disturbance beyond the existing roads and pads will also be reported in the annual report, if applicable.

Additionally, surveys for yellow-faced bees and their nests will occur as needed as described in Section 6.2.6.1. Any known nests that are impacted will be reported in the annual report.

6.4.5.1 Environmental DNA Sampling or Alternative Potential Bee-Turbine Interaction Research

KWP I may conduct a one-time environmental DNA (eDNA) sampling on turbine blades, when they are accessible during initial maintenance activities, to help evaluate whether the assimulans yellow-faced bee DNA is present on them. Because eDNA can originate from sources other than direct blade strikes, the information will not allow KWP I to conclude the collisions with blades are occurring without additional supporting evidence (e.g., physical evidence). Despite the potential for inconclusive information, KWP I wanted to take advantage of the opportunity to conduct sampling during maintenance activities in a location in close proximity to a known yellow-faced bee nesting area. The specific sampling approach and interpretation framework will be refined in consultation with eDNA experts, species experts, DOFAW, and USFWS to ensure the results are scientifically meaningful and appropriately contextualized. Alternatively, KWP I will work with outside experts, DOFAW entomologists, DOFAW, and USFWS to determine if an alternative research method is more appropriate, such as lidar or aerial netting. Any bee carcasses found during post-construction monitoring will also be reported to DOFAW and USFWS.

6.5 Net Conservation Benefit

A net conservation benefit will be achieved under Hawai‘i law because the HCP provides compensatory mitigation for each Covered Species at a rate that exceeds the level of requested take (which includes indirect take). As shown in Table 17, the offset requirement for each species is greater than the requested take level. By offsetting anticipated impacts at a greater ratio than one-to-one, the plan ensures that mitigation actions such as habitat restoration, management, and protection will produce measurable gains in the species' overall population health and habitat quality that outweigh the incidental losses. This approach aligns with the intent of HAR 13-124, which requires that approved HCPs contribute to the recovery and long-term viability of the species in the wild, thereby ensuring that the implementation of the plan results in a net positive outcome for the conservation of each species. Furthermore, each mitigation activity is expected to provide additional ecological benefits beyond the target species, enhancing overall habitat quality and supporting other native species and ecosystem functions, thereby amplifying the conservation gains achieved under the plan.

7.0 Adaptive Management

Adaptive management is an integrated method for addressing biological uncertainty and devising alternative strategies for meeting biological goals and objectives. An adaptive management strategy is essential for HCPs that would otherwise pose a significant risk to the Covered Species due to significant information gaps. This may be necessary if the planned mitigation actions do not result in stated success criteria. As part of adaptive management, KWP I will analyze whether current take levels are occurring at a higher or lower rate than anticipated. Updated projections of mitigation offsets compared to predicted take levels will be included in annual HCP reports. Table 19 summarizes success criteria by biological objective and adaptive management triggers that could result in adaptive management measures.

Table 19. Summary of KWP I HCP Adaptive Management

Objectives	Success Criteria	Adaptive Management Trigger(s)	Adaptive Management Response
Objective 1: Implement facility maintenance activities is such a way that impacts to nēnē are minimized (e.g., speed limits, conducting maintenance during non-breeding season in locations where nests are known to occur) and to reduce attractiveness of site for nēnē, including removal of ironwood and other invasive woody vegetation where appropriate.	Number of fatalities remains within the authorized take level (≤69 nēnē).	The likelihood of not exceeding the amount of authorized take at the end of the Permit Term drops below 50 percent based on projections in EoA at the 80 percent UCL for more than one consecutive year.	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). During the following fiscal year, potential adaptive management responses include, but are not limited to, implementing one or more of the following: • Work with DOFAW and USFWS (or hire a third party) to implement a banding program to determine if the number of nēnē using the facility is changing over time and how the changes in use compare to the changes in take occurring. • Work with DOFAW and USFWS to identify and implement needed changes in vegetation management to dissuade use of the Project by nēnē. This could include, but is not limited to, more expansive vegetation control and removal of ironwood in coordination with DOFAW-Maui. • If incidental take is occurring that is not attributed to the turbines (e.g., from vehicles or maintenance activities), coordinate with DOFAW and USFWS to determine if an on-site biological monitor for certain activities is needed. If so, implement on-site biological monitoring. Actions taken in response to the adaptive management trigger will be reported in the following years' annual report.
Objective 2: Implement curtailment of turbine operations during periods of time, seasonally or daily, that minimize the potential for ʻōpeʻapeʻa to be struck by operating turbine blades.	Number of fatalities caused by turbine collisions remains within the authorized take level (≤38 ʻōpeʻapeʻa).	The likelihood of not exceeding the amount of authorized take at the end of the Permit Term drops below 50 percent based on projections in EoA at the 80 percent UCL for more than one consecutive year.	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Within the following fiscal year, potential adaptive management responses include, but are not limited to one or more of the following, to be chosen in discussion with USFWS and DOFAW and based on the best available science: (1) Reduce take by changing turbine operations using a smart curtailment approach (or modifying existing smart curtailment approach if already being implemented). A practical plan will be identified and implemented within 6 months of annual reporting. This may include targeting specific turbines, times of night, or times of year, etc. (2) Reduce take through the use of acoustic deterrents to minimize ʻōpeʻapeʻa interactions with turbines. (3) Use of other technology or method to reduce bat fatalities (e.g., acoustic-activated curtailment) Implementation of the adaptive management response will be reported in the following years annual report. Any adaptive management response will need to be monitored for effectiveness.

Objectives	Success Criteria	Adaptive Management Trigger(s)	Adaptive Management Response
Objective 3: Implement best management practices regarding lighting, nighttime construction, and fencing, to minimize risk to seabirds.	Number of fatalities of seabirds caused by turbine collisions remains within the authorized take level for each species (≤29 ʻuaʻu, ≤10 ʻaʻo, ≤10 ʻakēʻakē).	The likelihood of not exceeding the amount of authorized take at the end of the Permit Term drops below 50 percent based on projections in EoA at the 80 percent UCL for any seabird species for more than one consecutive year.	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). During the following fiscal year, potential adaptive management responses include, but are not limited to: • Work with USFWS and DOFAW to review current lighting BMPs and any updated guidance for changes. Determine whether implementing changes in lighting management is warranted, and if so, implement those changes if feasible. • Work with USFWS and DOFAW to determine whether other measures (e.g., operational curtailment during seabird transit times) could be implemented to reduce take of seabirds. Adaptive management response(s) will be reported in the annual report in the year following trigger exceedance.
Objective 4: Implement Covered Activities in such a way that impacts to assimulans yellow-faced bees are minimized (e.g., surveys prior to vegetation clearing, minimizing vegetation clearing, and minimize work that occurs off the graveled roads and pads).	Annual reporting confirms implementation of best management practices for assimulans yellow-faced bees and documents any surveys or biological monitoring conducted.	Direct observation of assimulans yellow-faced bee mortality or unplanned nest destruction attributed to Covered Activities.	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). During the following fiscal year, potential adaptive management responses include, but are not limited to the following, which will be chosen in discussion with USFWS and DOFAW and based on the best available science: • Conduct a formal review of activity implementation protocols with teams and contractors to identify root cause of failure. • Implement retraining of staff and contractors on yellow-faced bee avoidance protocols and species identification. • Increase survey frequency or scope during pre-activity assessments, especially during peak bee activity periods. • Establish or reinforce physical boundaries (e.g., flagging, signage) to limit access to undisturbed areas. • Modify the project's Vegetation Management Plan (Appendix A) to further reduce the potential for impact (e.g., seasonal work restrictions, added buffer zones). • Design and implement a study on assimulans yellow-faced bee in the vicinity to determine scope of impacts Adaptive management response(s) will be reported in the annual report in the year following trigger exceedance.

Objectives	Success Criteria	Adaptive Management Trigger(s)	Adaptive Management Response
	Impacts remain at or below 25 nest burrows.	Surveys document nesting assimulans yellow-faced bee on turbine roads or pads. Trajectory of impacts to nests or habitat predicts exceedance of take limits.	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). During the following fiscal year, potential adaptive management responses include, but are not limited to the following, which will be chosen in discussion with USFWS and DOFAW and based on the best available science: • Increase survey frequency or scope during pre-activity assessments, especially during peak bee activity periods. • Establish or reinforce physical boundaries (e.g., flagging, signage) to limit access to undisturbed areas. • Modify methods used for maintenance activities to further minimize impacts, including having a biological monitor present, using hand equipment instead of mechanical, changing the timing, or other practices developed through coordination with species experts. • Design and implement a study on assimulans yellow-faced bee in the vicinity to determine scope of impacts. Adaptive management response(s) will be reported in the annual report in the year following trigger exceedance.
Objective 5: Support nēnē propagation efforts until such time that efforts result in a net increase compared to the permitted amount of take and provides a net benefit to the species in Maui Nui.	Nēnē propagation efforts result in enough nēnē breeding success and increased adult survival to mitigate for take of nēnē at the KWP I facility and provide a net benefit to the species (i.e, >69 nēnē offset by end of permit term).	Trajectory of propagation efforts are not producing enough nēnē young to mitigate nēnē lost from take (direct, indirect, and lost productivity) at the KWP I facility after year 5 of operations under the new ITL and ITP (i.e., <17 nēnē have been offset by mitigation efforts at the end of FY 2031). Nēnē pen no longer available for mitigation (e.g., landowner withdraws from MOU).	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Within the following fiscal year (to be reported in the annual report following the report where the exceedance was first reported) one or more of the following will be chosen: (1) Work with USFWS and DOFAW to explore modifications to propagation efforts to increase nēnē production, including expansion of existing mitigation facilities and/or changes to predator control (e.g., expand or increase predator control effort). (2) Work with USFWS and DOFAW to explore new locations for nēnē propagation. Trajectories based on those new locations should include the time lag that may occur when establishing a new population (given the need for translocation). (3) Work with USFWS and DOFAW to explore other ways to offset take of nēnē through either propagation or through decreasing fatalities from another source (e.g., rehabilitation, traffic control, predator control). Create a plan to implement the chosen response for inclusion in the next year's annual report following trigger exceedance.

Objectives	Success Criteria	Adaptive Management Trigger(s)	Adaptive Management Response
Objective 6: Perform mitigation actions which will be sufficient to increase the ʻōpeʻapeʻa population in Maui Nui to a level that provides a net benefit to the species compared to the permitted amount of take.	Stable or increasing bat activity levels at mitigation site(s).	Decreasing bat activity levels at Year 5 of mitigation implementation.	Report adaptive management trigger in annual report. Request a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Once adaptive management has been triggered, KWP I will report on whether the trend is site-wide or specific to certain management units If bat activity is not stable or increasing after Year 5, KWP I will conduct the following during Year 6: 1. Conduct a second year of acoustic monitoring and rerun the analysis. Additional data collection strengthens regression models by enhancing their ability to detect significant effects. 2. Investigate trends in forest cover and insect biomass and their correlation with bat activity, and determine if any adaptive management actions shown below could be employed to increase the chance of meeting success criteria by Year 10. Deploy actions as needed. a. Install water feature(s) b. Complete supplemental outplantings of roost trees c. Complete additional thinning of Formosa koa or other trees d. Complete supplemental outplantings of species likely to attract bat prey species Create a plan to implement the chosen response for inclusion in the next year's annual report following trigger exceedance.
	Develop a Site-specific Mitigation Implementation Plan (SSMIP) for additional mitigation site(s) on Maui.	SSMIP and/or actions not initiated within 5 years of operations under the new ITL and ITP. Adaptive management triggers specific to a particular mitigation site will be included in any SSMIP to be approved by DOFAW and USFWS.	Report status of mitigation site selection, development of the SSMIP(s) and any mitigation activities implemented in the annual reports. If a suitable mitigation site(s) have not been located on Maui by FY 2029 (approximately 3 years into Permit Term), expand search to Maui Nui. Request (in writing) regular meetings with USFWS and DOFAW by January 31, 2031, if a final SSMIP has not been approved or if no mitigation site(s) have been identified by 2031. The goal of these meetings will be selecting a site(s), finalizing the SSMIP, and beginning implementation. If mitigation actions have not been initiated by January 2036, increase the acreage of mitigation by 5 percent to account for any temporal loss or expand mitigation actions by an equivalent amount (i.e., 5 percent increased benefit) as approved by USFWS and DOFAW. This penalty would apply each year until mitigation actions are initiated. The 5-percent penalty is based on the period of operations (20.5 years; each year is ~5 percent of the period). If monitoring results do not indicate success at a mitigation site, and site-specific adaptive management responses are not improving the success within the time period specified in the SSMIP, KWP will coordinate with USFWS and DOFAW on whether a new mitigation location is needed or if additional actions not in the SSMIP are warranted. This decision will be made within one year.

Objectives	Success Criteria	Adaptive Management Trigger(s)	Adaptive Management Response
Objective 7: Implement predator trapping and burrow monitoring at the ʻuaʻu mitigation site on an annual basis until mitigation offset has exceeded the permitted take.	ʻUaʻu propagation efforts result in enough ʻuaʻu breeding success and increased adult survival to mitigate for take of ʻuaʻu at the KWP I facility and provide a net benefit to the species (i.e., > 29 ʻuaʻu have been offset by the end of the permit term).	Trajectory of propagation efforts are not producing enough ʻuaʻu young to mitigate ʻuaʻu lost from take (direct, indirect, and lost productivity) at the KWP I facility by year 5 of operations under the new ITL and ITP (i.e., <7 ʻuaʻu offset by the end of FY 2031). ʻUaʻu mitigation site no longer available for mitigation or viable option in East Maui becomes available.	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Within the following fiscal year (to be reported in the annual report following the report where the exceedance was first reported) one or more of the following will be chosen: (1) Work with USFWS and DOFAW to explore modifications to propagation efforts to increase ʻuaʻu production, including expansion of existing mitigation facilities and/or changes to predator control (e.g., expand or increase predator control effort). (2) Work with USFWS and DOFAW to explore new locations for mitigation. (3) Work with USFWS and DOFAW to explore other ways to offset take of ʻuaʻu through either propagation or through decreasing fatalities from another source (e.g., rehabilitation, traffic control). (4) Fund NFWF at $45,000 per bird (adjusted for inflation) for any remaining mitigation obligation. Create a plan to implement the chosen response for inclusion in the next year's annual report following trigger exceedance.
Objective 8: Support ʻaʻo mitigation until such time that mitigation provides a net benefit to the species in Maui Nui.	ʻAʻo propagation efforts result in enough ʻaʻo breeding success and increased adult survival to mitigate for take of ʻaʻo and provide a net benefit to the species (i.e., > 10 ʻaʻo).	Trajectory of mitigation efforts are not producing enough ʻaʻo to mitigate ʻaʻo lost from take at the KWP I facility by year 5 of operations under the new ITL and ITP (i.e., <2.5 ʻaʻo offset by the end of FY 2031).	Report adaptive management trigger exceedance in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Within the following fiscal year (to be reported in the annual report following the report where the exceedance was first reported) one or more of the following will be chosen: (1) Work with USFWS and DOFAW to explore modifications to propagation efforts to increase ʻaʻo production, including expansion of existing mitigation facilities and/or changes to predator control (e.g., expand or increase predator control effort). (2) Work with USFWS and DOFAW to explore new locations for mitigation. (3) Work with USFWS and DOFAW to explore other ways to offset take of ʻaʻo through either propagation or through decreasing fatalities from another source (e.g., rehabilitation, traffic control). (4) Fund NFWF at $45,000 per bird (adjusted for inflation) for any remaining mitigation obligation. Create a plan to implement the chosen response for inclusion in the next year's annual report following trigger exceedance.
Objective 9: Support ʻakēʻakē mitigation until such time that mitigation provides a net benefit in Maui Nui.	ʻAkēʻakē propagation efforts result in enough ʻakēʻakē breeding success and increased adult survival to mitigate for take of ʻakēʻakē and provide a net benefit to the species (i.e., > 10 ʻakēʻakē).	Funding not provided to NFWF on the schedule determined between USFWS, DOFAW, and KWP. Results of NFWF funding not reported in annual report. NFWF funding mechanism no longer available for ʻakēʻakē mitigation.	Report adaptive management trigger in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Explore other ways to offset take of ʻakēʻakē through either propagation or through decreasing fatalities from another source.

Objectives	Success Criteria	Adaptive Management Trigger(s)	Adaptive Management Response
Objective 10: Perform mitigation which will be sufficient to provide a net benefit to the assimulans yellow-faced bee compared to the permitted amount of take.	More than 25 nest burrows established.	Less than 25 new nest burrows documented within mitigation area and control ironwood removal site by year 5 of mitigation.	Report adaptive management trigger in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). Should >25 nests not be established within the experimental plots within the first five years, KWP I will: • Continue annual monitoring until >25 nests have been established across the experimental plots. • Consult with DOFAW on whether additional ironwood removal and additional outplantings and maintenance of native host plants should be conducted. Other adaptive management actions may be implemented over time as the state of the science related to assimulans yellow-faced bee knowledge continues to improve.
Objective 11: Evaluate data from post-construction monitoring on an annual basis to evaluate take of Covered Species and analyze to determine risk of permit exceedance.	See Objectives 1-3.	See Objectives 1-3.	See Objectives 1-3.
Objective 12: Report the amount (acres) of suitable habitat and number of nests impacted during vegetation management activities or other maintenance activities along with the number and locations of any native plants known as foraging resources for the assimulans yellow-faced bee that were transplanted or out planted.	Suitable habitat impacts remain at or below permitted amount (i.e., < 5 acres) and impacted nests remains at or below permitted amount (i.e., < 25 nest burrows) Any native foraging resource impacted is translocated.	Suitable habitat impacts approach 80 percent (4 acres or 20 nest burrows) of permitted amount. Transplanted foraging resources failing to establish within 6 months due to site selection or inadequate maintenance.	Report adaptive management trigger in annual report, and request (in writing) a meeting with USFWS and DOFAW within 30 days of annual report submittal (i.e., by August 30 of the fiscal year immediately following trigger exceedance). During the following fiscal year, potential adaptive management responses include, but are not limited to the following, which will be chosen in discussion with USFWS and DOFAW and based on the best available science: • Coordinate with botanists or restoration ecologists to improve plant selection, propagation, and monitoring strategies. • Conduct a survey to document foraging resources and nesting habitat (see Section 6.2.6.1) to determine if the permitted amount of take is adequate.

8.0 Reporting

Any fatality of a Covered Species will be documented and reported to DOFAW and USFWS following the USFWS and DOFAW's joint Standard Protocol for Holders of a State of Hawai'i Incidental Take License and USFWS Incidental Take Permit (USFWS 2020).

The results of monitoring will be provided to the USFWS and DOFAW in the form of three quarterly (Q) reports (Q1-Q3) and an annual report. Annual reports and other specified deliverables are submitted to the USFWS and DOFAW to enable them to independently confirm that the Applicant has completed all required activities and tasks on schedule. Monitoring assesses the impacts of the authorized take and the effectiveness of the HCP's mitigation program. This involves conducting surveys to ensure that the authorized level of take is not exceeded and that the effects of take are minimized and mitigated to the greatest extent practicable, ensuring that minimization and mitigation measures are both adequate and successful.

8.1 Annual Report

Annual reports (July 1 – June 30) will be provided to DOFAW and the USFWS by August 1 following the end of each fiscal year, unless an alternative date is agreed to in writing by KWP I, DOFAW, and USFWS. Additionally, an annual report presentation will be provided to the ESRC, which summarizes activities that have occurred at the facility in the previous year. Annual reports will include:

- Minimization measures implemented;
- Documented fatalities of the Covered Species;
- Documented acres of assimulans yellow-faced bee habitat impacted;
- Documented assimulans yellow-faced bee nests impacted;
- Vegetation Management Plan (Appendix A) implementation, including a summary of actions taken related to the Covered Species during the fiscal year;
- Any native plants that have been transplanted, as required by the CDUP;
- Updated take estimates for the Covered Species for which take has been documented;
- Summary of mitigation accrual compared to estimated take for each of the Covered Species;
- Any notable mitigation milestones;
- Ongoing mitigation activities; and
- Challenges encountered and adaptive strategies used.

Appendices will include annual mitigation reports prepared by mitigation partners (e.g., DOFAW, Maui Nui Seabirds).

8.2 Quarterly Reports

Quarterly reports are short summaries of activities that have occurred over the previous three-month period. At a minimum the contents of quarterly reports will include:

- Changes to fatality monitoring that have occurred;
- Updates to the searcher efficiency and carcass persistence results;
- Documented fatalities of the Covered Species;
- Updated take estimates for the Covered Species for which take has occurred; and
- Any notable mitigation updates.

9.0 Changed and Unforeseen Circumstances

Implementing regulations for Section 10 of the ESA recognize that revisions to the original HCP may be required as circumstances and information may change.

9.1 Changed Circumstances

The HCP process allows for acknowledgment of, and planning for, reasonably anticipated changes in circumstances affecting the subject species, other species occurring in the Project Area, or in efforts expended toward mitigation. Changed circumstances are changes in circumstances affecting a species or geographic area covered by a conservation plan or agreement that can reasonably be anticipated by plan or agreement developers and the USFWS and that can be planned for (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events) (50 CFR 17.3). Changed circumstances are not unforeseen circumstances, as described below.

The Applicant will report such changes as they occur and the DLNR and the USFWS would work with the Applicant as soon as possible to discuss any necessary changes in the implementation of the HCP. The Applicant will implement changes determined to be necessary by the USFWS and the DLNR as soon as possible and will assist DLNR and USFWS in any related response or remediation efforts. Such changes are, therefore, provided for in this HCP and do not constitute unforeseen circumstances or require the amending of the ITP or ITL.

The Applicant will implement additional conservation and mitigation measures deemed necessary to respond to changed circumstances as provided for and specified in the HCP's adaptive management strategy (50 CFR 17.22(b)(5) and 50 CFR 17.32(b)(5). Changed circumstances that may affect the implementation of the HCP include, but are not limited to, the issues mentioned in the following sections.

9.1.1 New Technologies/Methods

Over the course of the Permit Term it is possible that new technology or information becomes available that improves monitoring, take estimation, or minimization measures. New methods and technologies will only be considered if the methods have been demonstrated to be at least as effective as the methods in this HCP, are considered the best available science, will not require an increase in the take authorization for the Project, and are approved by the USFWS and DOFAW. KWP will work with DOFAW and USFWS to ensure that any new methods or technologies are compatible with the biological goals and objectives, and the permitted levels of take in the ITP and ITL.

9.1.2 Reallocation of Mitigation Funds

Mitigation actions are outlined in Section 6.3 and funding required to effectively implement the mitigation actions is summarized in Section 10.0. The mitigation actions are described for particular locations, in most instances, and rely upon contractual agreements with landowners to host and in some cases implement the activities. If the circumstances change during the course of the permit term, and the landowner no longer is supportive of the mitigation actions, or something occurs that makes it otherwise untenable to continue implementing mitigation in that location (e.g., catastrophic event) the Project would implement similar conservation actions in a different location. For example, if it was no longer possible to operate a nēnē pen in a location, the Project would seek a new location, in coordination with the USFWS and DOFAW, to build and operate a nēnē pen. If the need arises, the Project will work closely with USFWS and DOFAW to determine whether continuing mitigation at the current location remains in the best interest of the species and the Project and continues to support the goals and objectives of the HCP, or if a new location must be sought. Locating mitigation actions in a new location would only occur if agreed to by all parties.

The intention would be to implement similar mitigation actions in the new location at a scale similar to what is contemplated in the HCP. This would be done with the intention of achieving the biological goals and objectives on the same time scale that is described in the HCP, so there would be no lag in mitigation. Therefore, generally the cost of mitigation will remain the same and this changed circumstance would not result in an additional funding need, beyond the administrative funding needed for ongoing coordination between the Project and the USFWS and DOFAW on site selection and approval. A catastrophic event at a mitigation site, and the funding required, is described in Section 9.15 and Section 10.0.

9.1.3 Newly Listed or Delisted Species

If notified by USFWS or DOFAW that a new species that occurs on the island of Maui is added to the federal or state endangered species list, the Applicant will evaluate the likelihood of incidental take of the species due to Project operation. If incidental take is determined to be likely to occur, the Applicant may seek coverage for the newly listed species under an amendment to the existing HCP and will avoid take of the newly listed species unless and until the permit is amended. Should any of the Covered Species become delisted over the permit term, these species would be considered a covered, unlisted species and the Applicant would continue to implement the HCP and conservation strategy as described here, unless the Applicant chooses to request an amendment to the HCP. For cost purposes it is assumed that the HCP and permits will need to be amended one time during the Permit Term. Costs are included in Section 10.0 for this purpose.

9.1.4 Designation of Critical Habitat

If the USFWS designates critical habitat, and such critical habitat may be adversely affected by the activities covered in the HCP, this will be considered a changed circumstance provided for in the plan. The Applicant, in coordination with the USFWS, will implement adjustments in covered activities in the area of designated critical habitat to ensure that project activities are not likely to result in the destruction or adverse modification of the critical habitat. If necessary to avoid destruction or adverse modification of critical habitat, KWP I will make adjustments in activities until KWP I has an approved amendment. Such adjustments may also require amendment of the ITP, in accordance with then applicable statutory and regulatory requirements, or until the USFWS notifies the Applicant that the adjustments are no longer necessary. No additional costs are assumed to result from this changed circumstance. Any administrative changes needed to account for the designation of critical habitat would be included in HCP Administration costs.

9.1.5 Catastrophic Events

Hurricanes and severe storms periodically strike or affect the Hawaiian Islands, and the likelihood of a hurricane causing severe damage on Hawaiʻi during the term of the HCP is high enough to merit treatment as a changed circumstance. Additionally, wildfires have the potential to occur in both the area of the Project as well as mitigation sites. Such storms or fires could affect the activities covered by the HCP in several ways: cause significant damage to or destruction of project facilities; pose a threat to the Covered Species by causing injury or death either directly, or indirectly through the destruction of habitat (including mitigation sites); or alter the natural and built environment in areas surrounding project facilities in ways that increase or decrease the potential effects of project facilities on the Covered Species.

Construction of the facilities at KWP I is consistent with applicable codes and industry standards, which are intended to avoid significant damage in severe weather conditions. Should a hurricane, severe storm, or fire cause significant damage to the Project during the term of the HCP or a mitigation site prior to mitigation obligations being met, any resulting effects on the Covered Species will be considered based on the best available information at the time. The HCP mitigation efforts will be modified to respond to impacts to the Covered Species from a fire or storm should the USFWS and DOFAW reasonably determine in coordination with the Applicant that such a response is necessary.

If a nēnē release pen or seabird mitigation location is damaged by a catastrophic event, KWP I will work with DOFAW and USFWS to temporarily house any animals that are in the facility, in order to minimize additional take from occurring. The facility will be rebuilt to the level that it was functioning before the event to the extent practicable. For purposes of costing and remedial measures this HCP assumes that one such facility will be damaged and need to be repaired during the permit term. Funding is described in Section 10.0 for this purpose.

9.1.6 Invasive Species

Introduced animal and plant species have had, and will continue to have, a detrimental effect on the Covered Species. The likelihood that the threat from this source will increase during the term of this HCP is sufficient to warrant treating this threat as a changed circumstance. The habitat enhancement and management measures to be implemented through this HCP could be compromised by new and/or increased populations of invasive species. Should these measures be compromised by invasive species during the term of this HCP, the HCP mitigation efforts will be modified in response to the invasive species should the USFWS and DOFAW reasonably determine after coordination with the Applicant that such a response is necessary. This modification will be addressed through the adaptive management process. Funding is provided in Section 10.0 for adaptive management.

9.1.7 Disease Outbreaks Affecting Covered Species

Should prevalence of disease increase substantially and become identified by the DLNR and the USFWS as a major threat to the survival of a Covered Species during the term of this HCP, this threat will be treated as a changed circumstance. The habitat enhancement and management measures to be implemented through this HCP could be compromised by new and/or prevalence of increased disease. Should these measures be compromised by disease during the term of the HCP, the HCP mitigation efforts will be modified to reflect disease parameters should the USFWS and the DLNR reasonably determine after coordination with the Applicant that such a response is necessary. This modification will be addressed through the adaptive management process. Funding is provided in Section 10.0 for adaptive management.

9.1.8 Changes in Known Risks to or Distribution of Currently Listed Species

New research could alter the understanding of the potential impacts to species listed at the time this HCP was prepared. The likelihood that our understanding of risks to species and/or the distribution of their populations would change in a manner that would alter the assessment made in preparing this HCP is sufficient to warrant treating this possibility as a changed circumstance. If, as a result of new information (e.g., a fatality, documented presence on site), incidental take of a non-Covered state or federally listed species appears possible, or if an increase in take of Covered Species is reasonably anticipated, the Applicant would seek coverage under an amendment to the existing HCP. As part of that process, the Applicant may discuss with the USFWS and DOFAW whether mitigation measures in place meet permit issuance criteria for the non-Covered Species or if additional measures are warranted. For cost purposes it is assumed that the HCP and permits will need to be amended one time during the Permit Term. Costs are included in Section 10.0 for this purpose.

9.2 Unforeseen Circumstances

Unforeseen circumstances are changes in circumstances affecting a species or geographic area covered by a conservation plan or agreement that could not reasonably have been anticipated by the plan or agreement developers and the USFWS at the time of the conservation plan's or agreement's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species (50 CFR 17.2).

In negotiating unforeseen circumstances, the USFWS will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed upon for the species covered by the HCP without the consent of the Applicant [50 CFR 17.22(b)(5)(iii) and 50 CFR 17.32(b)(5)(iii)]. If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, and the HCP is being properly implemented, the USFWS may require additional measures of the Applicant only if such measures are limited to modifications within conserved habitat areas, if any, or to the HCP’s operating conservation program for the affected species, and maintain the original terms of the HCP to the maximum extent possible. If unforeseen circumstances are found, Applicant is not required to come up with additional resources or funds to remedy unforeseen circumstances, but the USFWS, DOFAW, and Applicant shall work together to determine an appropriate response within the original resource commitments in the HCP.

Under Section 10 (a)(1)(b) of the ESA, the “No Surprises” policy also provides that “if additional mitigation measures are subsequently deemed necessary to provide for the conservation of a species that was otherwise adequately covered under the terms of a properly functioning HCP, the obligation for such measures shall not rest with the HCP Permittee.”

The USFWS and the DLNR will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. These findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species. The USFWS and the DLNR will notify the Applicant in writing should the USFWS or the DLNR believe that any unforeseen circumstance has arisen.

If unforeseen circumstances are identified KWP I will coordinate with DOFAW and USFWS, providing access to the facility or mitigation sites as needed, and collaborate on information gathering in order to better understand the root cause of the unforeseen circumstance. If portions of the outcomes of the unforeseen circumstance are already being addressed through remedial measures identified under changed circumstances or through adaptive management measures, those items will be noted as rectified. Determinations about how any remaining effects from unforeseen circumstances will be resolved, if possible, will be determined by DOFAW and USFWS.

10.0 Funding

Under Section 10(a)(2)(A)(ii) and Section 10(a)(2)(B)(iii) of the ESA, an HCP submitted in support of an ITP must establish “the funding that will be available to implement such steps the Applicant will take to monitor, minimize, and mitigate the impacts from the proposed taking” (16 USC 1531-1544, 1539 [1973], 50 CFR 17.22(b)(1) [1985], and 50 CFR 17.32(b)(1) [1985]). In order to issue an ITP, the USFWS must find that the applicant will ensure adequate funding for the HCP (50 CFR

17.22(b)(2), 17.32(b)(2)). The ITP is subject to full or partial suspension, or revocation, should the Applicant fail to ensure funding for mitigation and conservation measures, including Changed Circumstances and other measures, outlined in this HCP. The implementation of this HCP will be funded through the Applicant's annual budget. Costs to implement this HCP include the general ITP/HCP administration and management costs, mitigation, compliance and effectiveness monitoring, and the Changed Circumstances and Contingency Fund (Table 20).

Table 20. Estimated Costs of HCP Implementation

Cost Center	Cost Description	Estimated Average Annual Cost (based on 2025 dollars)[1]	Estimated Total Cost Over the Permit Term (assuming 3% annual inflation for annual costs)	Cost Basis/Assumptions
HCP Administration	HCP Management and Reporting	$75,000	$2,800,000	Based on FY 2024 costs and assuming 25% of the KWP I biologist's time; 25-year permit term
	DOFAW Technical Services/Compliance Monitoring	$10,000	$375,000	Based on feedback from DOFAW; provides $50/hour for 200 hours/year for 25 years. See HRS §195D-23 (c)(4)(d).
	HWC Annual Contract	$18,000	$675,000	Based on example agreement provided by HWC (pricing confirmed still valid in July 2025), includes annual wildlife training program and rehab for up to eight (8) animals a year for full 25-year permit term. Additional rehab will be paid for as needed.
Mitigation Actions, Monitoring, and Reporting	ʻŌpeʻapeʻa	n/a	$1,900,000 to $4,750,000	Based on the range of $50,000 per bat as used for previous mitigation efforts and the current guidance of $125,000 per bat.
	Nēnē	$150,000	$1,180,000	Based on FY 2024 costs from Haleakalā Ranch, doubled to account for second release pen; assume management needed for 7 years (based on average of 6.7 fledglings per release pen). *Additional costs associated with the mitigation still required under current permits are not included here and will be funded separately.
	ʻAʻo	$150,000	$816,000	Based on FY 2022 expenditures for Makamakaʻole; assume management for 5 years.

Cost Center	Cost Description	Estimated Average Annual Cost (based on 2025 dollars)[1]	Estimated Total Cost Over the Permit Term (assuming 3% annual inflation for annual costs)	Cost Basis/Assumptions
	ʻUaʻu	$266,000 (initial year) $92,500 annually	$665,000	Based on DOFAW estimates, with higher costs in year 1 due to purchase of supplies and assuming up to 5 years of management needed to offset take.
	ʻAkēʻakē	n/a	$450,000	Based on NFWF funding as described in Section 6.3.7.
	Assimulans yellow-faced bee	n/a	$890,000	Based on ~4,100 ft of 6-ft ungulate fencing at $70/ft, $30,000 for initial ironwood removal, $20,000 per year for 5 years for continued ironwood removal and weed management, $50,000 for outplantings, $10,000 for initial surveys, and $40,000 per year for 5 years for annual monitoring and study. $5,000 per year for ongoing maintenance of ironwood removal plots for the life of the Project.
Monitoring	Post-construction Fatality Monitoring	$88,000	$4,102,000	Based on costs reported in FY 2024, for 21 years.
	Acoustic Monitoring	$18,000		
	Vegetation management and scavenger control	$33,000		
	Assimulans yellow-faced bee surveys	$80,000 (initial) $2,200 (supplemental)	$300,800	Based on $2,000 an acre for the 40-acre Limits of Disturbance; conducted once in 2026 and again prior to decommissioning. Also including $2,200 per year for supplemental surveys as needed along the edges of roads and pads.
	Biological monitor	n/a	$154,000	Based on a 6-month period of maintenance in 2026 and up to two years of decommissioning activities that may require biological monitoring. Assume a

Cost Center	Cost Description	Estimated Average Annual Cost (based on 2025 dollars)[1]	Estimated Total Cost Over the Permit Term (assuming 3% annual inflation for annual costs)	Cost Basis/Assumptions
				biological monitor is needed 10% of days (~90 days total) at a rate of $1,000/day, adjusted for inflation since the majority would occur at decommissioning.
Adaptive Management		n/a	$875,100	10 percent of mitigation costs, using higher estimate for the ʻŌpeʻapeʻa.
Changed Circumstances	Catastrophic Event	n/a	$750,000	Based on 2024 costs to replace fencing at Makamakaʻole ($750K); costs for a nēnē pen would be lower.
	HCP Amendment	n/a	$250,000	Based on experience with HCP amendments, NEPA, and HEPA compliance.
Contingency Fund		n/a	$875,100	10 percent of mitigation costs
Total			$16,808,000 – $19,658,000	

10.1 Cost Basis

Costs are based on information obtained during 19 years of HCP implementation under the existing KWP I HCP and permit, and are detailed in Table 20 above. Administration, mitigation, monitoring, and reporting efforts described in this HCP are similar enough to those that have been implemented in the past that it allows for up-to-date estimates of costs. During the development of the HCP, KWP I was in close communication with DOFAW and the USFWS regarding the requirements and expectations during HCP implementation. KWP I was also actively discussing the mitigation options described in this HCP with local land managers and land owners, in order to provide a clear representation of how mitigation will be completed and how much it would cost.

10.2 Funding Assurance

Funding for the implementation of the HCP will be provided by KWP I LLC as an annual operating expense paid *pari passu* with other operating expenditures (operation and maintenance costs, insurance, payroll, lease payments to the State of Hawaiʻi, audit costs, and agency fee costs) and, most importantly, ahead of both debt service to lenders and dividends to equity investors. A variety of measures assure that the project will operate as a viable commercial entity, fully capable of meeting all HCP obligations for the life of the permit term. These include:

1. A 20-year Power PPA with Hawaiian Electric, with a set price structure. As a result the Project will not be subject to unforeseen swings in energy markets. As long as the Project is operating, it is assured to generate revenue within a predictable range. The PPA is anticipated to be under contract prior to ITL and ITP issuance.
2. The Project's financing will require that it meet all obligations, including HCP-related monitoring and mitigation. These costs are built into the Project's financial pro forma. Failure to fulfill permit obligations would constitute a material breach of financing terms, and would trigger remedial steps. Failure to remedy could lead to default and loss of ownership.
3. Revenue would be generated and the HCP activities would be funded regardless of who the owner/operator is. In the unlikely event that KWP I defaulted, the lender would assume ownership and presumably seek to sell the project to a new owner. In order to operate the Project, the lender or any new owner would be required to continue to fulfill the obligations under the HCP or would relinquish the permits and need to avoid take of any listed species.

Per HRS Ch195D-4(g)(3)KWP I shall post a bond, provide an irrevocable letter of credit, insurance, or surety bond, or provide other similar financial tools, including depositing a sum of money in the endangered species trust fund created by HRS Section 195D-31, or provide other means approved by the board, adequate to ensure monitoring of the species by the State and to ensure that the applicant takes all actions necessary to minimize and mitigate the impacts of the take. These items are summarized in Table 20, including annual payments for DOFAW Technical Services.

11.0 ITL/ITP/HCP Administration

Changes in implementation of the HCP may require amendments to the HCP, ITL, ITP, or other implementation-related documents. Any party may initiate amendments, but it is up to the USFWS and DOFAW to decide the level of review needed to satisfy the ESA, NEPA, and Chapter 195D statutory and regulatory requirements. Amendments may be approved by addenda to the HCP, revisions to the HCP, or permit amendments.

11.1 Administrative Changes/Administrative (minor) Amendments

Administrative changes are internal changes or corrections to the HCP, sometimes referred to as minor amendments. The USFWS, DOFAW, or the Applicant may propose administrative changes to the HCP by providing notice to the other parties. Such notice must include a statement of the reason for the proposed changes, as well as any supporting documentation. The USFWS, DOFAW, and the Applicant will use reasonable efforts to respond to proposed administrative changes within 30 days of receipt of such notice. Proposed administrative changes will become effective upon written approval of all parties. All parties will document approved changes in their respective Project files.

The parties will not propose or approve administrative changes to this HCP if any party determines that such modifications would:

- Result in effects to a Covered Species that are new or different than those analyzed in this HCP, HEPA review, NEPA review or the USFWS Biological Opinion;
- Result in take beyond that analyzed in this HCP;
- Negatively alter the effectiveness of the HCP; or
- Have consequences to aspects of the human environment that have not been evaluated.

Administrative changes to the HCP processed pursuant to this subsection may include, but are not limited to the following:

- Correction of typographic, grammatical and similar editing errors that do not change the intended meaning;
- Correction of any maps or exhibits to correct minor errors in mapping or to reflect previously approved changes in the ITP or HCP;
- Minor changes to survey, monitoring, or reporting protocols; or
- Minor changes in conservation measures (minimization, mitigation, monitoring, adaptive management or reporting) provided that the plan will still meet the same goals and objectives and not result in effects to covered species or the human environment that have not been evaluated.

Any administrative change must be approved in writing by USFWS and/or DOFAW, depending on the change and whether either or both agencies are party to the change. In the event that there are questions over interpretation of the HCP requirements during the implementation of the HCP, USFWS, DOFAW, and the Permit Holder shall memorialize any agreed-upon interpretations in writing and retain such in the administrative record. These clarifying documents may also be posted publicly to ensure the public is fully informed.

11.2 HCP, ITP, and/or ITL Amendment

An amendment to the HCP and/or permits may be required if one of the following occur (USFWS and NMFS 2016):

1. Addition of a new species, either listed or unlisted;
2. Increased level or different form of take for Covered Species,;
3. Changes to funding that affect the ability of the permittee to implement the HCP;
4. Changed to covered activities not previously addressed;
5. Changes to covered lands; and
6. Significant changes to the conservation strategy, including changes to the mitigation measures.

Should the need for an amendment arise, the Permit Holder will coordinate with DOFAW and USFWS to determine the scope of the amendment and any required supplemental NEPA or HEPA analysis needed to facilitate the amendment process. Amendments to the HCP will only be completed through the agreement of all parties. The Permit Holder will be responsible for creating a new or revised HCP, if needed, which will include a full analysis of changes. Those changes may not be confined to a single topic (e.g., covered activity) as a change in one element of the HCP may result in the need to address changes for other elements. Once a new or revised HCP is completed it will be reviewed by DOFAW and USFWS. DOFAW and USFWS will determine whether additional NEPA or HEPA analysis and/or public notice is needed to properly assess changes to impacts on the human environment that may result from the new or revised HCP. Once NEPA and HEPA reviews are completed and public comments have been addressed, the USFWS and DOFAW would make individual decisions on the amended permit.

11.3 Renewal

The ITP can be renewed, beyond its initial term with the approval of the USFWS, and the ITL can be renewed with the approval of the BLNR. The process for seeking renewal of the Federal permit shall be governed by the regulations in effect at the time (currently codified at 50 CFR & 13.22). The Applicant will submit a written application to both agencies, and will either certify that the original information and conditions are still correct or provide a description of relevant changes, and will provide specific information concerning the level of take that has occurred under the HCP's implementation. Such a request shall be made at least 180 days prior to the conclusion of the permit term.

11.4 Permit Transfers

If there is a change in ownership of Kaheawa Wind Power I (currently owned by Kaheawa Wind Power, LLC), the Applicant may seek to transfer the ITP in whole or in part through a joint submission of an Assumption Agreement to the USFWS and DOFAW. Any new owner of the Project that seeks to receive the benefits of the ITL/ITP shall assume the responsibilities associated with the HCP upon the completion and submission of an Assumption Agreement. The Assumption Agreement will outline the roles and responsibilities of all parties and address any outstanding obligations and how they will be completed. The Assumption Agreement shall be a joint submittal by the transferor and transferee entity, as prescribed by 50 CFR 13.25. Take authorization will not be extended to the new party unless and until a permit transfer has been completed. Any transfer of the ITP shall be governed by the USFWS's applicable laws and regulations at the time of transfer. Changes of ownership at other corporate levels will be communicated in writing to DOFAW and USFWS but will not require an Assumption Agreement, as the Permit Holder will remain the same.

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Figures

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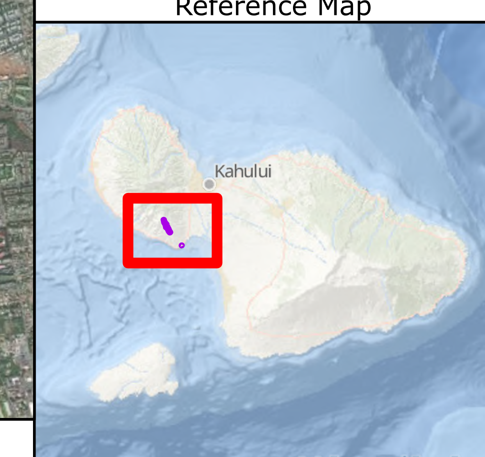
Kaheawa Wind Project I Habitat Conservation Plan

Figure 1
Project Vicinity

MAUI COUNTY, HI

Project Area
State Highway
City/Town
Project Area

Reference Map



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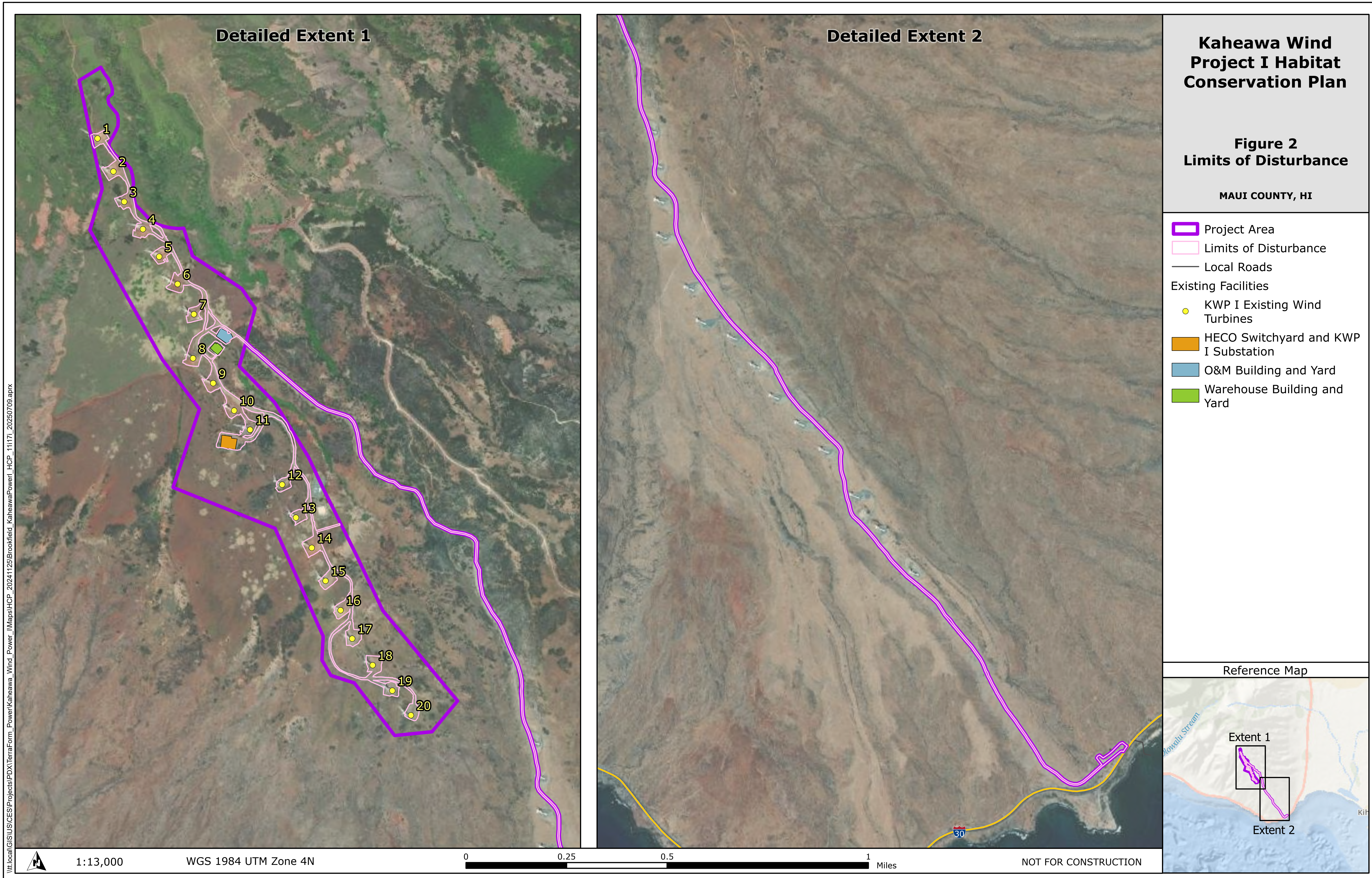

Detailed Extent 1
Detailed Extent 2
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Kaheawa Wind Project I Habitat Conservation Plan
Figure 2
Limits of Disturbance
MAUI COUNTY, HI
Project Area
Limits of Disturbance
Local Roads
Existing Facilities
KWP I Existing Wind Turbines
HECO Switchyard and KWP I Substation
O&M Building and Yard
Warehouse Building and Yard
Reference Map
Extent 1
Extent 2
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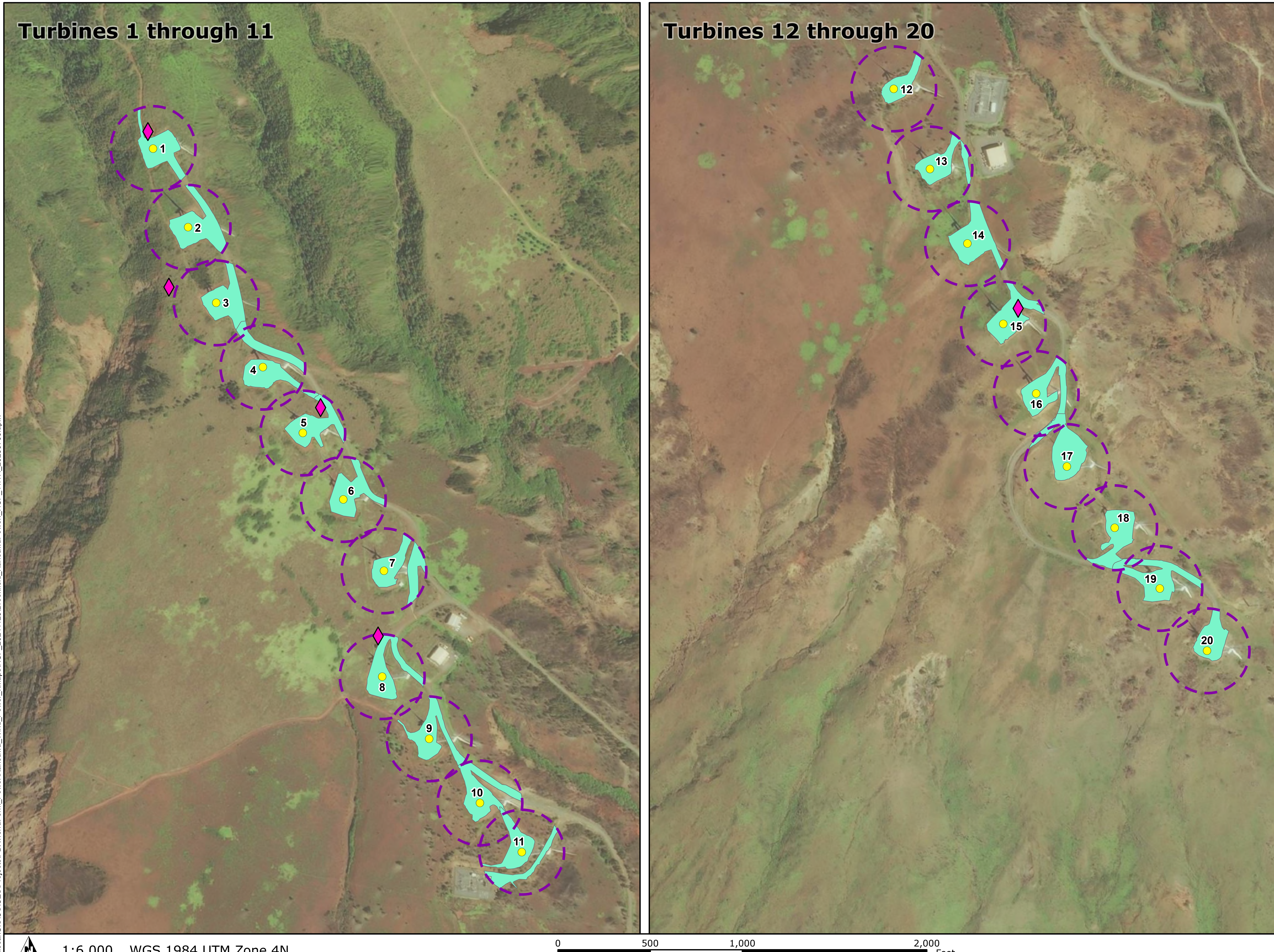
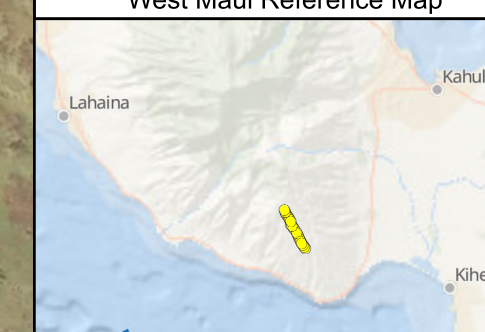
Kaheawa Wind Project I Habitat Conservation Plan

Figure 3
Post-construction Fatality Monitoring

MAUI COUNTY, HI



West Maui Reference Map



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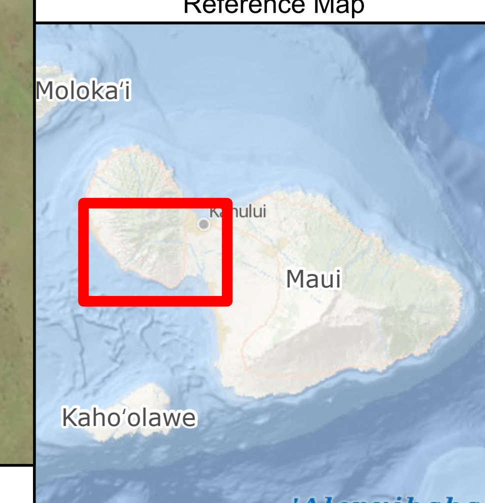
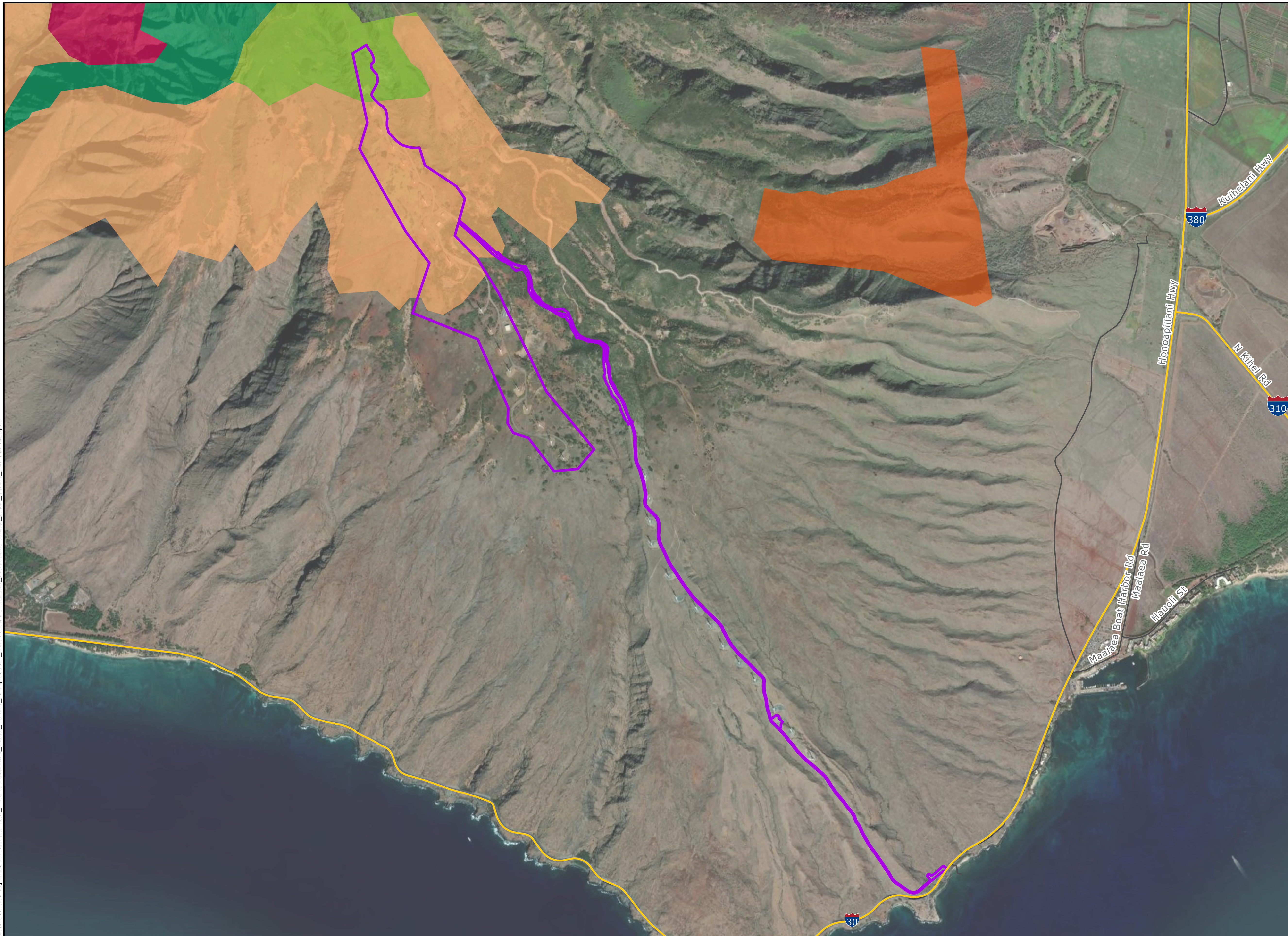




Kaheawa Wind Project I Habitat Conservation Plan

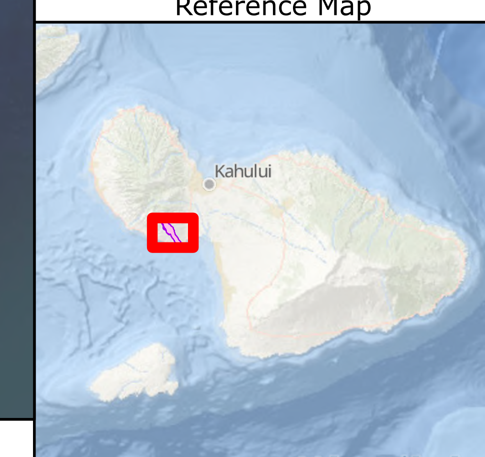
Figure 4
Critical Habitat in and near the Project Area

MAUI COUNTY, HI

- Permit Area
- State Highway
- Local Roads

Critical Habitat
- Dry Cliff 06
- Lowland Dry 05
- Lowland Dry 06
- Lowland Mesic 03
- Montane Mesic 05

Reference Map



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NOT FOR CONSTRUCTION

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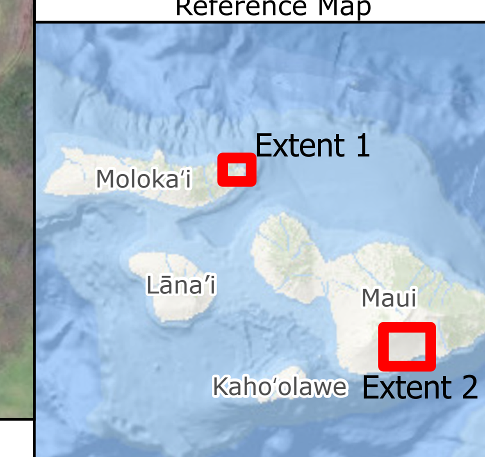
Kaheawa Wind Project I Habitat Conservation Plan

Figure 5
Nēnē Mitigation Sites

MOLOKA'I AND MAUI ISLANDS, HI

Haleakalā Ranch Pen
Pu'u O Hoku Ranch Pen
1,000-ft Contours
Roads

Reference Map



1:3,000 WGS 1984 UTM Zone 4N NOT FOR CONSTRUCTION

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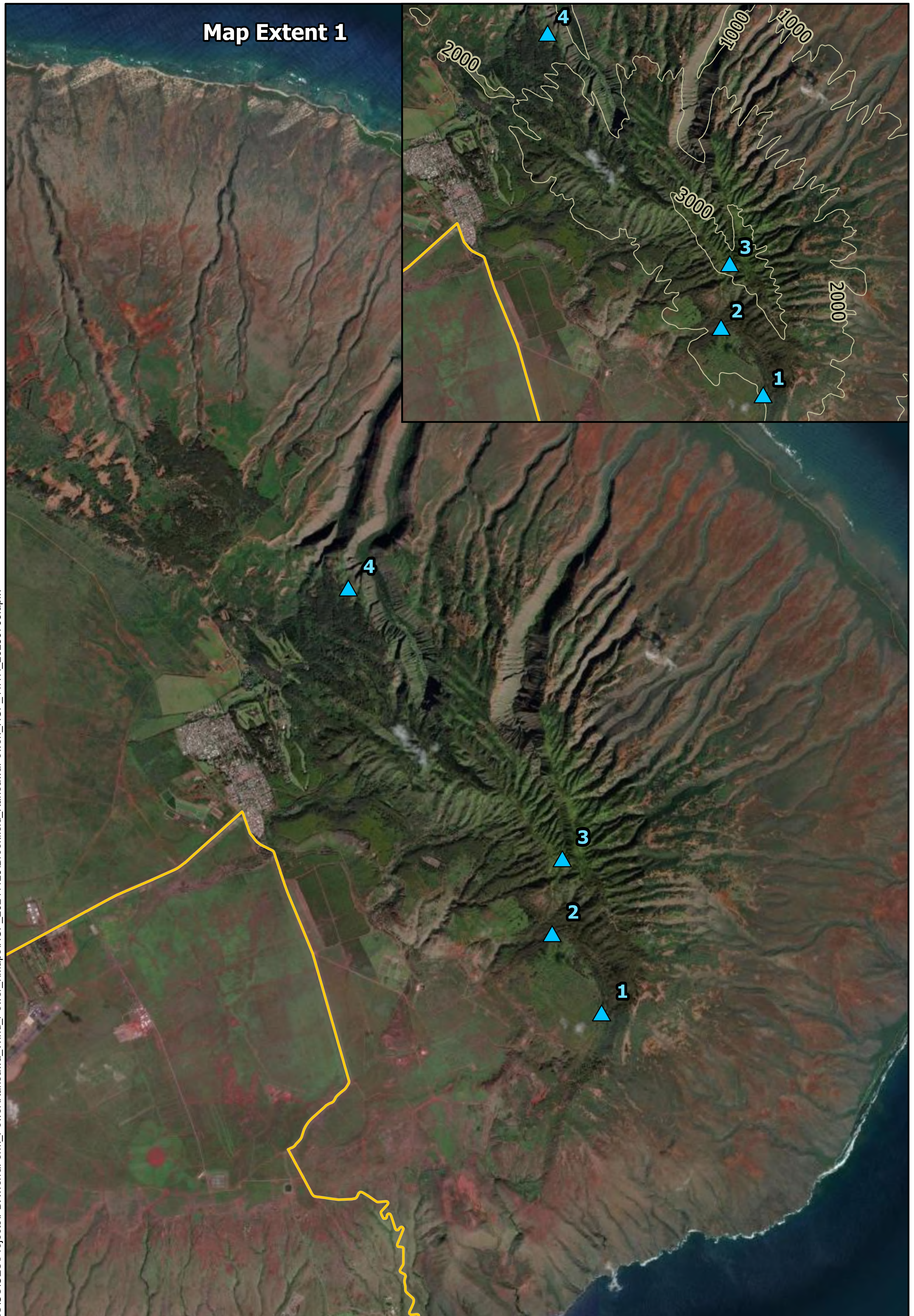
Kaheawa Wind Project I Habitat Conservation Plan

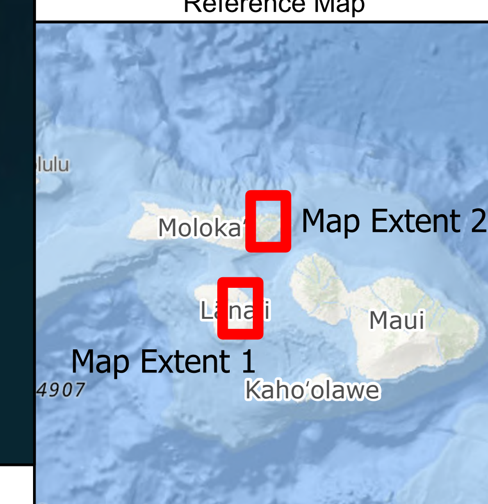
Figure 6a
ʻŌpeʻapeʻa Mitigation Study Area

LĀNAʻI AND MOLOKAʻI ISLANDS, HI



- Lānaʻi Acoustic Monitoing Location
- Molokaʻi Acoustic Monitoring Location
- State Highway
- 1,000-ft Contours

Reference Map



1:80,000 WGS 1984 UTM Zone 4N

0 1 2 4 Miles

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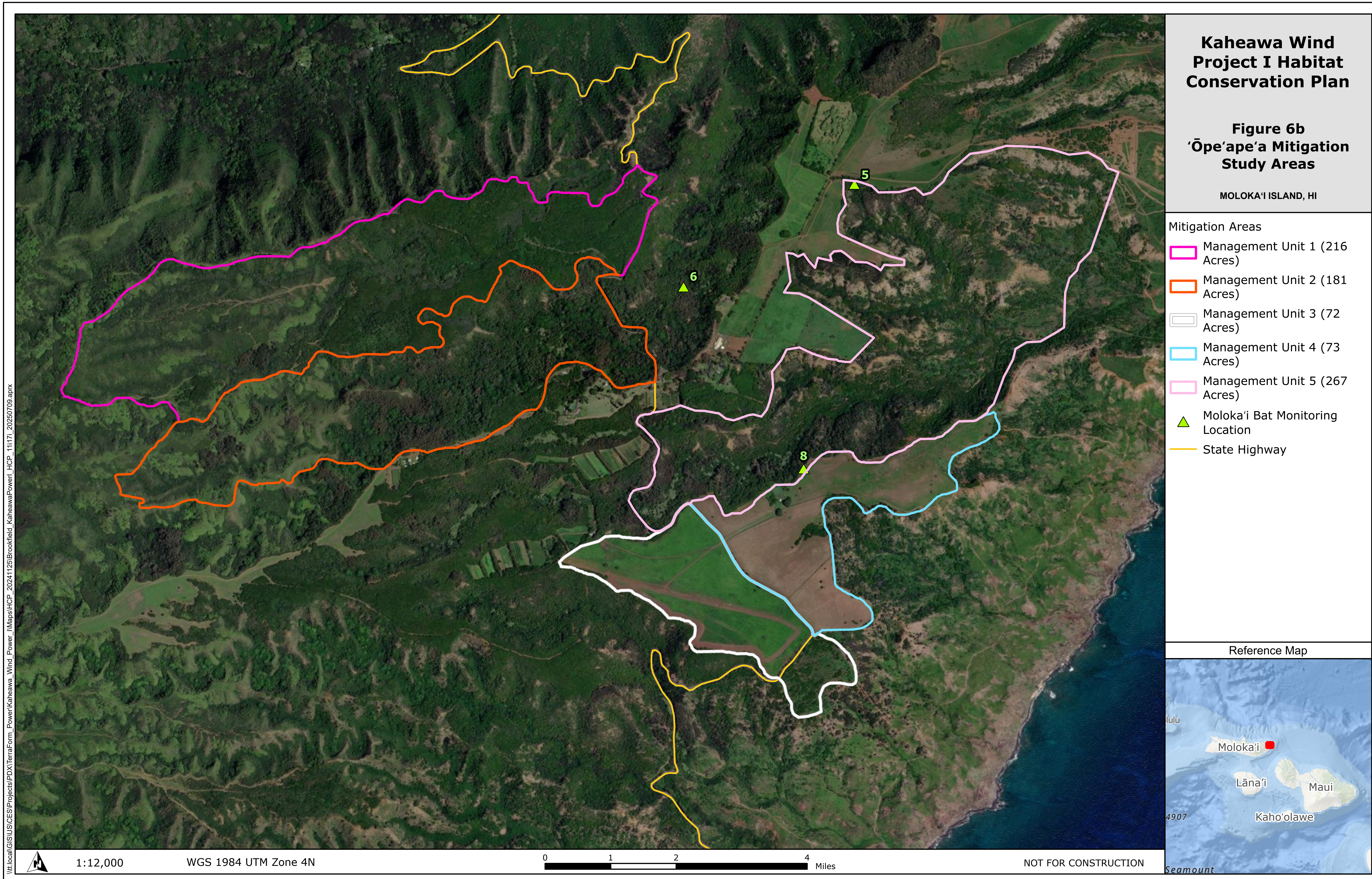

Kaheawa Wind Project I Habitat Conservation Plan
Figure 6b
ʻŌpeʻapeʻa Mitigation Study Areas
MOLOKAʻI ISLAND, HI
Mitigation Areas
Management Unit 1 (216 Acres)
Management Unit 2 (181 Acres)
Management Unit 3 (72 Acres)
Management Unit 4 (73 Acres)
Management Unit 5 (267 Acres)
Molokaʻi Bat Monitoring Location
State Highway
5
6
8
Reference Map
Molokaʻi
Lānaʻi
Maui
Kahoʻolawe
Seamount
1:12,000
WGS 1984 UTM Zone 4N
0
1
2
4
Miles
NOT FOR CONSTRUCTION
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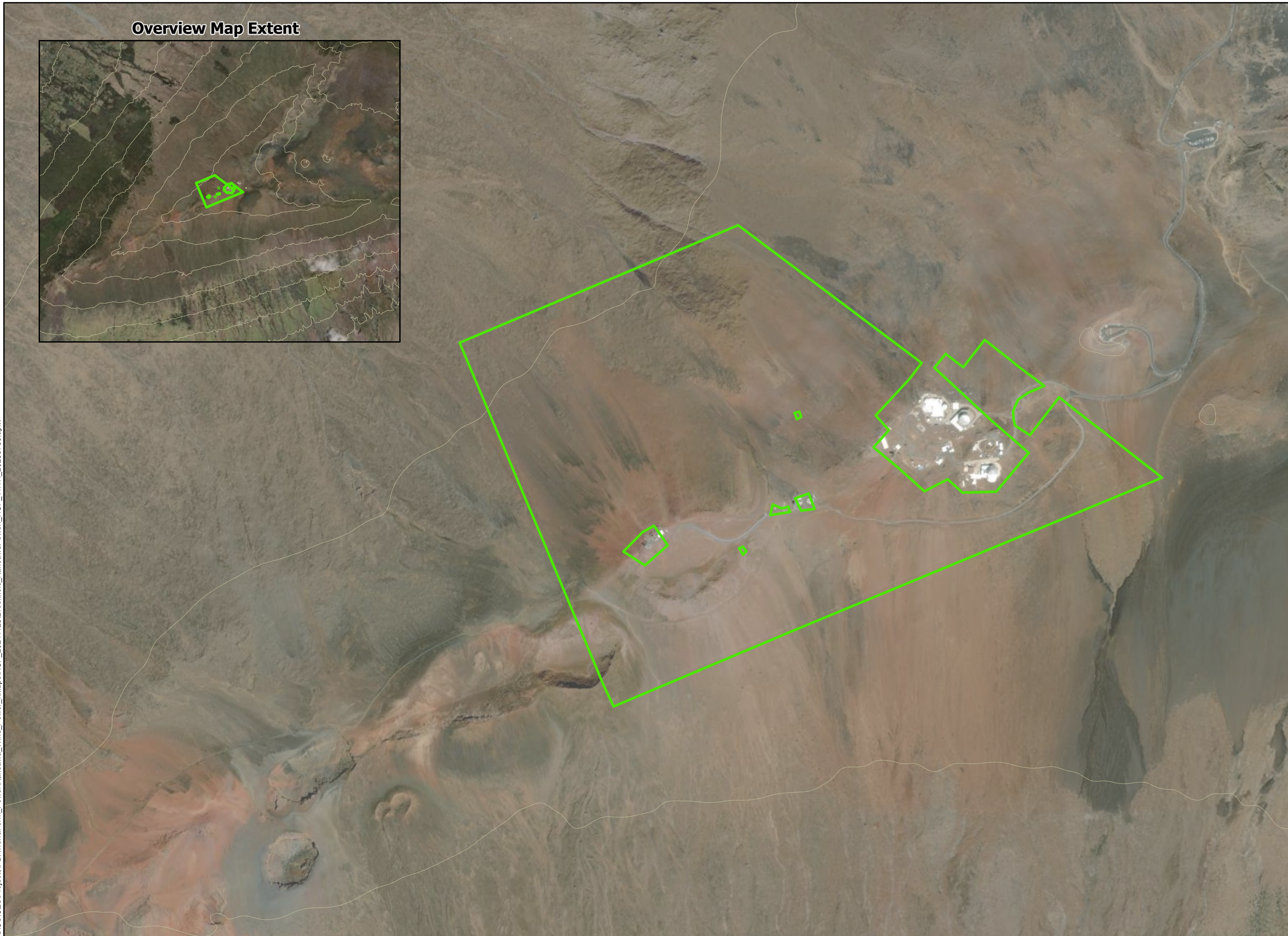


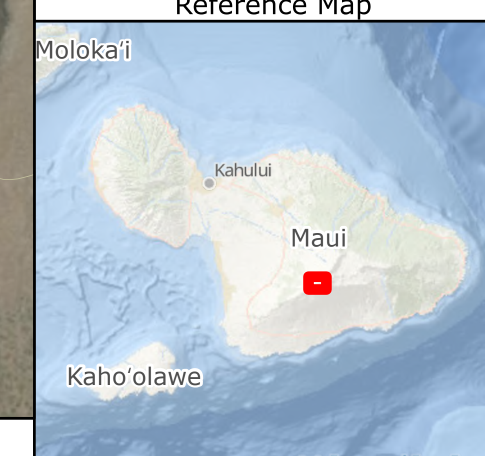
Kaheawa Wind Project I Habitat Conservation Plan

Figure 7a
ʻUaʻu Mitigation Site

MAUI ISLAND, HI

Alpine Wildlife Sanctuary
1,000-ft Contours

Reference Map



1:10,000 WGS 1984 UTM Zone 4N

0 500 1,000 2,000 3,000 Feet

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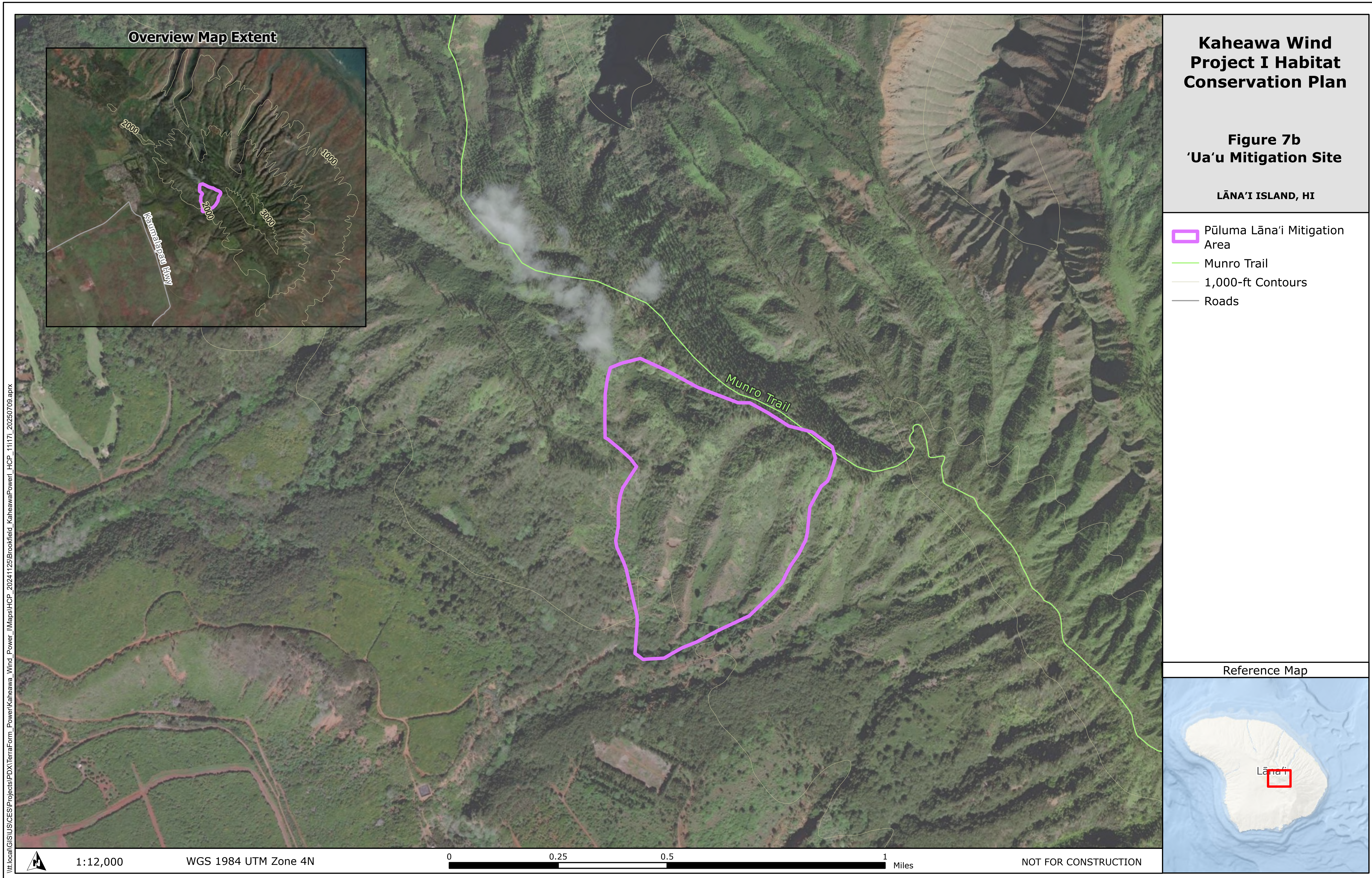
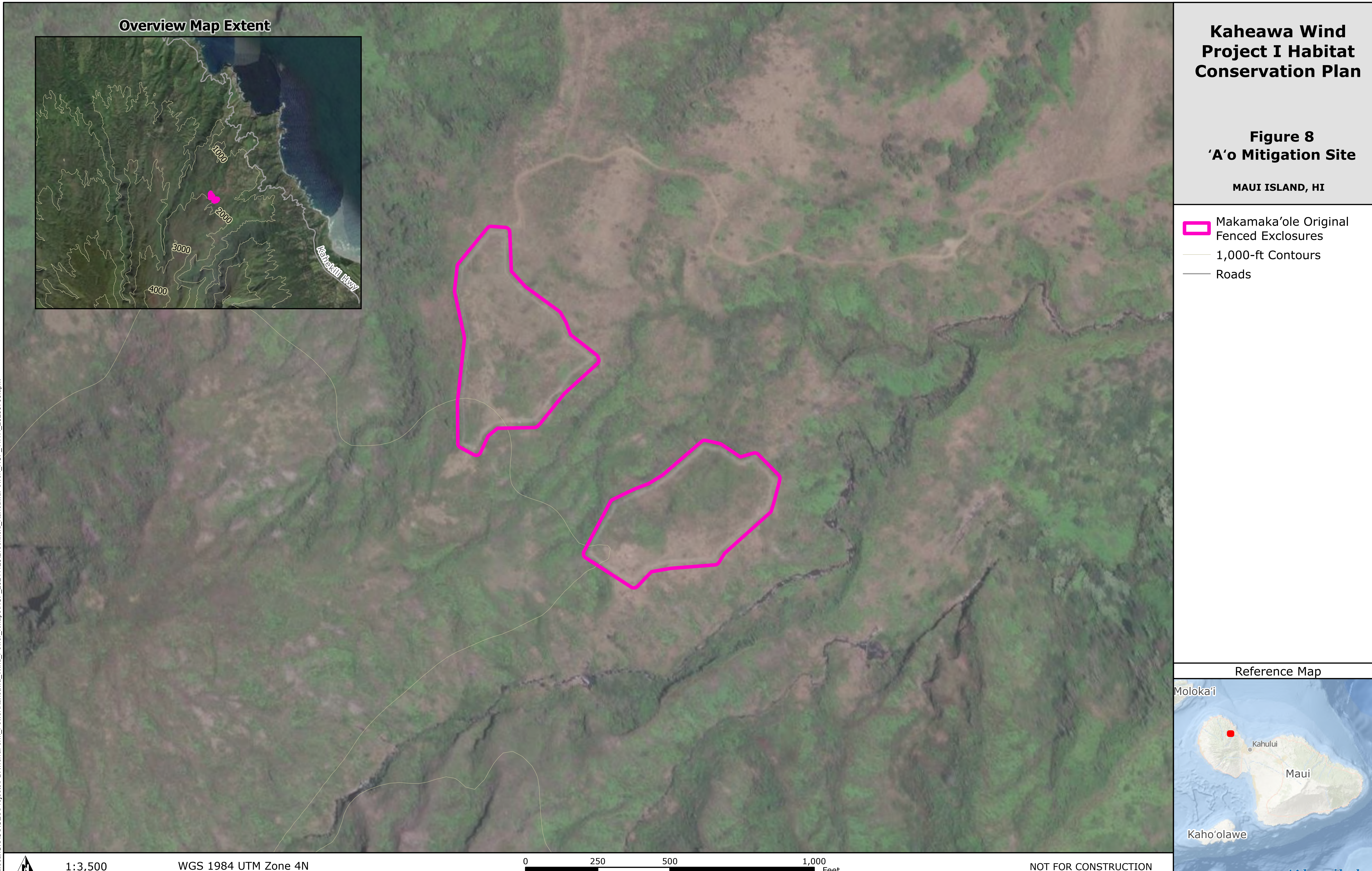


Kaheawa Wind Project I Habitat Conservation Plan

Figure 7b
ʻUaʻu Mitigation Site

LĀNAʻI ISLAND, HI



Kaheawa Wind Project I Habitat Conservation Plan

Figure 8
'A'o Mitigation Site

MAUI ISLAND, HI

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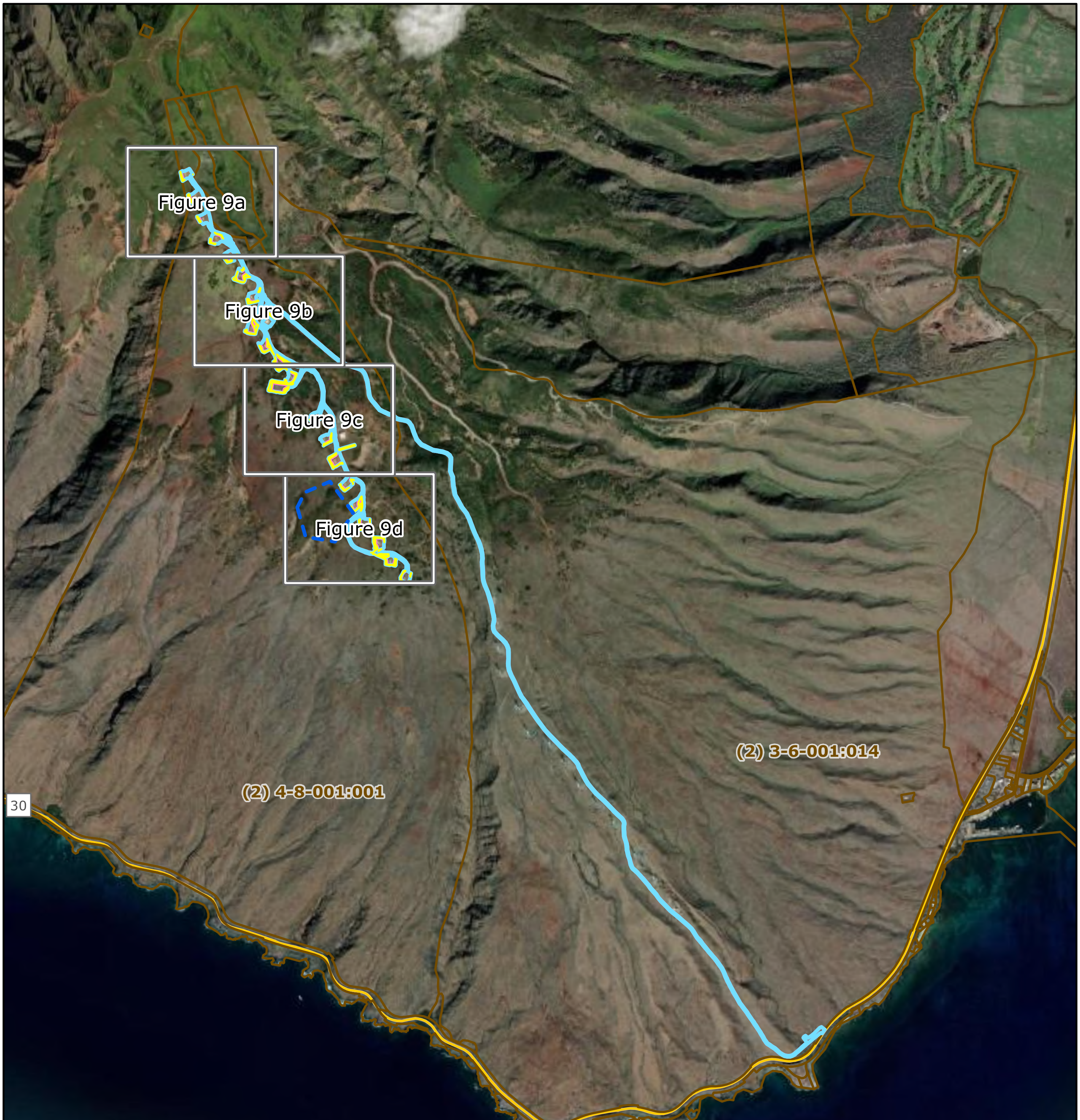


1:30,000 WGS 1984 UTM Zone 4N

0 0.25 0.5 1 Miles

NOT FOR CONSTRUCTION

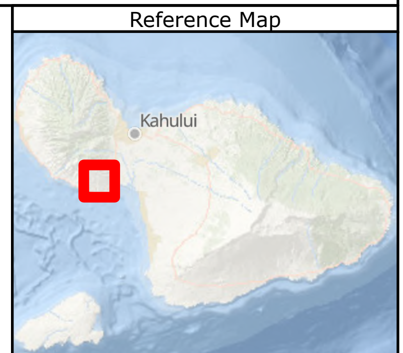
Kaheawa Wind Project I Habitat Conservation Plan

Figure 9
Potential Impact Area and Mitigation Site for Assimulans Yellow-faced Bee Index Map

MAUI COUNTY, HI

- TMK Boundary
- State Highway
- Existing Turbine Pads and Roads
- Limits of Disturbance
- Yellow-faced Bee Potential Impact Area
- Assimulans Yellow-faced Bee Mitigation Site
- Detail Map Grid

Reference Map



1:5,000 WGS 1984 UTM Zone 4N

0 250 500 1,000 US Feet

NOT FOR CONSTRUCTION

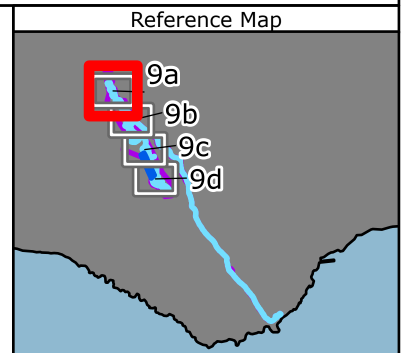
Kaheawa Wind Project I Habitat Conservation Plan

Figure 9a Potential Impact Area and Mitigation Site for Assimulans Yellow-faced Bee Detail Map

MAUI COUNTY, HI

- Existing Turbine Pads and Roads
- Limits of Disturbance
- Yellow-faced Bee Potential Impact Area
- KWP 1 Existing Wind Turbines

Reference Map



1:5,000 WGS 1984 UTM Zone 4N

0 250 500 1,000 US Feet

NOT FOR CONSTRUCTION

Kaheawa Wind Project I Habitat Conservation Plan

**Figure 9b
Potential Impact Area and Mitigation Site for Assimulans Yellow-faced Bee Detail Map**

MAUI COUNTY, HI

Existing Turbine Pads and Roads

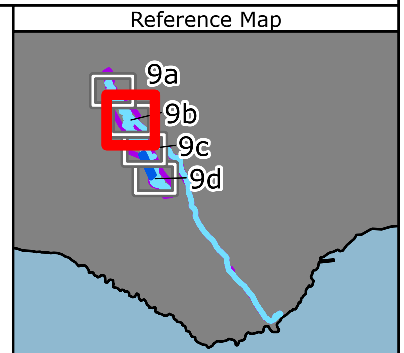
Limits of Disturbance

Yellow-faced Bee Potential Impact Area

O&M Building and Yard

KWP 1 Existing Wind Turbines

Reference Map



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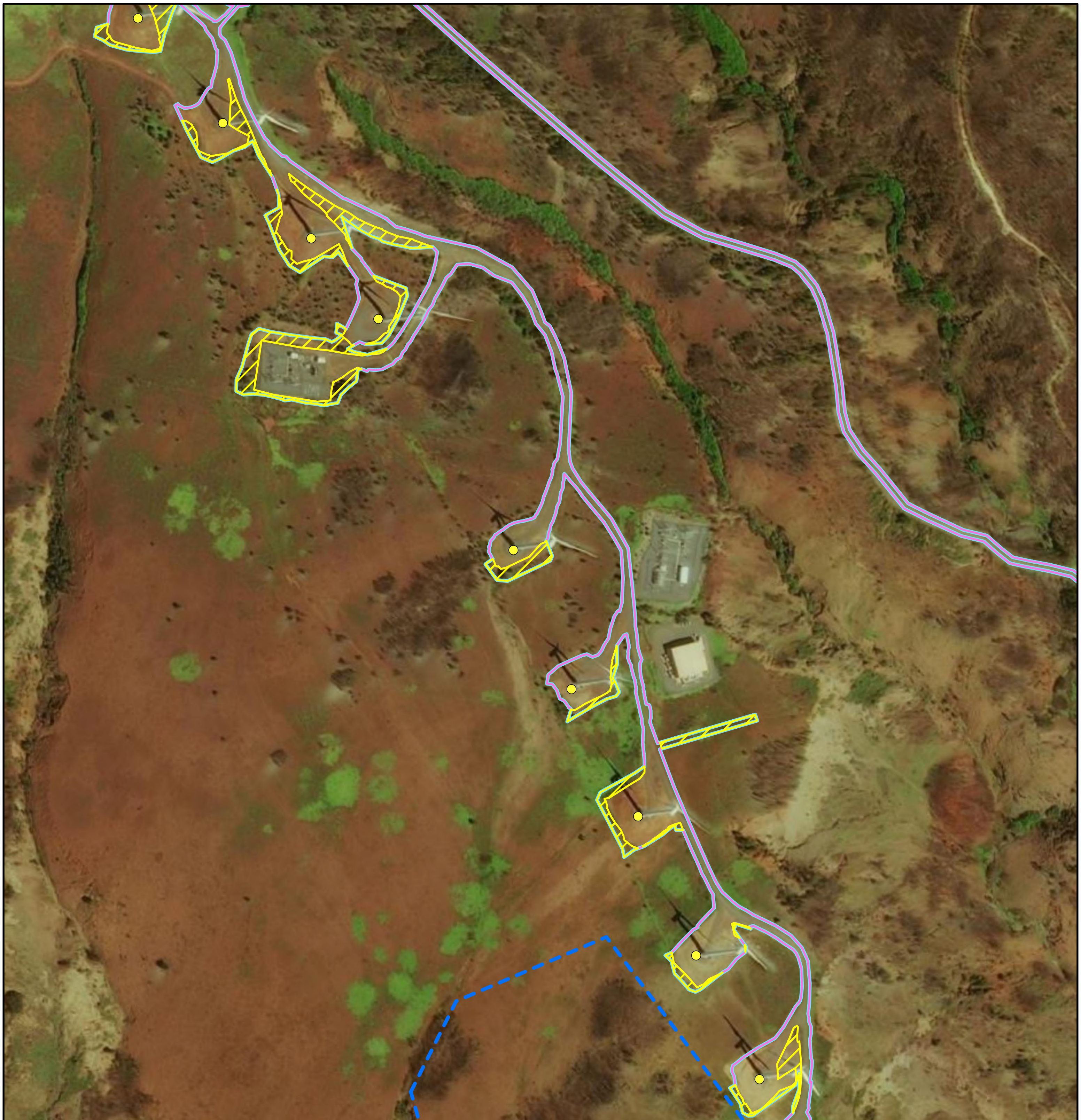


1:5,000 WGS 1984 UTM Zone 4N 0 250 500 1,000 US Feet NOT FOR CONSTRUCTION

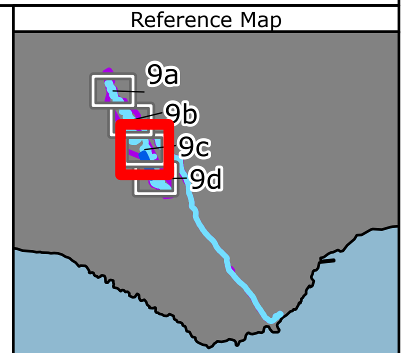
Kaheawa Wind Project I Habitat Conservation Plan

Figure 9c
Potential Impact Area and Mitigation Site for Assimulans Yellow-faced Bee Detail Map

MAUI COUNTY, HI

- Existing Turbine Pads and Roads
- Limits of Disturbance
- Yellow-faced Bee Potential Impact Area
- Assimulans Yellow-faced Bee Mitigation Site
- KWP 1 Existing Wind Turbines

Reference Map



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1:5,000 WGS 1984 UTM Zone 4N

0 250 500 1,000 US Feet

NOT FOR CONSTRUCTION

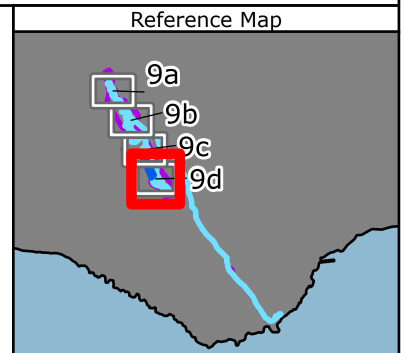
Kaheawa Wind Project I Habitat Conservation Plan

Figure 9d
Potential Impact Area and Mitigation Site for Assimulans Yellow-faced Bee Detail Map

MAUI COUNTY, HI

- Existing Turbine Pads and Roads
- Limits of Disturbance
- Yellow-faced Bee Potential Impact Area
- Assimulans Yellow-faced Bee Mitigation Site
- KWP 1 Existing Wind Turbines

Reference Map



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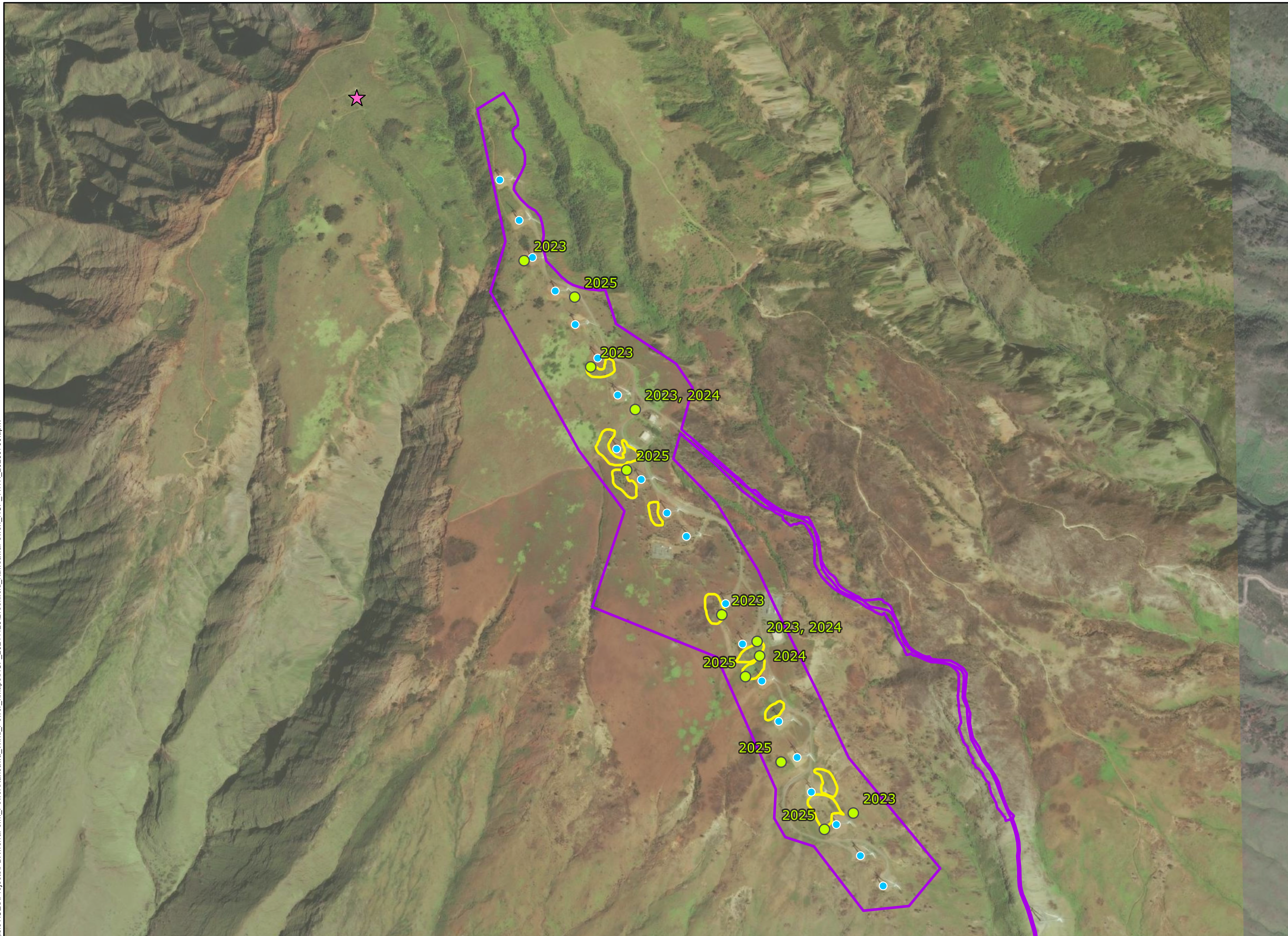
Kaheawa Wind Project I Habitat Conservation Plan

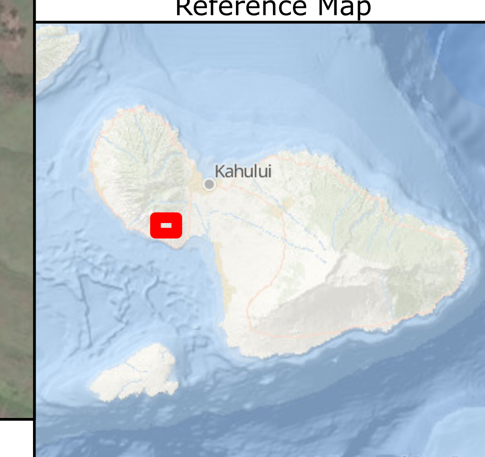
Figure 10
Nēnē High Occurrence Areas within Project Area

MAUI COUNTY, HI



Project Area
Areas Where Nēnē Are Regularly Observed
Turbine
Known Nesting Locations (Year Found)
Former Hanaula Release Pen Site

Reference Map



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0 0.25 0.5 1 Miles

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Appendix A. Vegetation Management Plan

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Kaheawa Wind 1 Continued Use Project Vegetation Management Plan

(Living Document – Subject to Change)

Prepared for

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November 2025

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Appendix A. Example Plant Photos

1.0 Introduction

Kaheawa Wind Power, LLC (KWP) owns and operates the Kaheawa Wind 1 (KWP 1) Project (Project), an existing 30-megawatt (MW) wind energy generation facility located on state-owned land in the Kaheawa Pastures area of West Maui, Hawaiʻi. The Project Area includes a 200-acre KWP 1 wind facility lease area located on tax map key (TMK) (2) 4-8-001:001 (por.) as well as the existing footprint of the primary access road and staging areas (approximately 17 acres) located on TMK (2) 3-6-001:014 (por.) (both TMKs owned by the State of Hawaiʻi). The location of the Project Area is shown in Figure 1. The Project's limits of disturbance (LOD), within which the Project's existing facilities are sited and maintained, is 40 acres and shown in Figure 2. The LOD includes an approximately 35-acre area associated with the wind turbines and turbine pads, an Operations & Maintenance (O&M) building, a warehouse storage facility, substation, switchyard and transmission interconnection, access roads, and crane paths and staging areas associated with original facility construction. The LOD also includes an approximately 17-acre corridor that includes the primary access road (i.e. the Kaheawa Pastures access road, an existing four-wheel-drive gravel roadway originating from Honoapiʻilani Highway), and a parking area at the entrance of the road along the highway.

Vegetation management (i.e., removing or maintaining plants) occurs at the facility as part of routine operations and maintenance. In addition, impacts to vegetation occasionally occur due to maintenance activities (e.g., when a crane pad is needed). Typically, vegetation management occurs within the LOD. However, as described in this Vegetation Management Plan (Plan), vegetation maintenance to address community and cultural concerns in coordination with Maui Cultural Lands (or an appropriate alternative cultural group/consultant) or in an effort to better manage the landscape for protected species may occasionally occur outside the LOD (but within the Project Area).

The purpose of this Plan is to provide guidance to on-site O&M managers and staff and contractors regarding:

- When and how vegetation management shall occur at the facility to ensure compliance with the various applicable permits and required Project commitments;
- Best management practices (BMPs) related to any activities that may involve impacts to vegetation; and
- Measures to minimize/mitigate potential impacts on the Habitat Conservation Plan's (HCP) Covered Species, and native plants and animals.

Section 2.0 provides an overview of existing conditions within the LOD and larger Project Area to provide context for vegetation management. Section 3.0 outlines the existing documents, permits, and Project commitments that influence vegetation management actions. Section 4.0 summarizes the routine vegetation management activities conducted under those documents and permits and outlines the BMPs and avoidance and minimization measures that are to be implemented when conducting routine vegetation management or when vegetation may be impacted due to operations and maintenance activities. These BMPs and avoidance/minimization measures are governed by the existing documents and permits, as well as input from community groups and relevant resource agencies and committees. This Plan does not specifically address measures and BMPs to prevent and minimize the introduction or spread of invasive species. A separate Invasive Species Prevention Plan has been prepared for the Project (Tetra Tech 2025a).

For more information on vegetation management procedures, practices, and requirements, please contact the KWP Senior Biologist:

Contact: Molly Stephenson

Phone: (612) 451-4175

Email: Molly.stephenson@terraformpower.com

2.0 Site Description

2.1 Existing Vegetation

Vegetation in the Project Area has been disturbed from historic grazing and wildfires, including a recent wildfire in 2019 which burned portions of the Project Area, and as a result of construction and operation of the existing KWP 1 and KWP 2 wind facilities. During construction of KWP 1, vegetation was cleared to construct the facility and the existing Kaheawa Pastures access road was widened. Since operations began in 2006, vegetation has been continually maintained within portions of the LOD to support compliance with the Project's HCP (KWP LLC 2006). Vegetation-free areas are maintained within the graded and graveled areas of the turbine pads located within 230 feet of the base of the wind turbines, within a 30-foot buffer of the substation, switchyard, O&M building, and warehouse storage facility, and within the access roads (including a 3-foot buffer area on each side of the access roads). These vegetation-free buffers are managed to provide fire breaks, minimize attractiveness of onsite habitat to the HCP's Covered Species (specifically, nēnē) , and increase searchability of turbine pads for downed wildlife as part of post-construction mortality monitoring (PCMM). Thus, the majority of the LOD, roughly 87.5 percent, is unvegetated or vegetation is regularly managed to remain clear of vegetation for fatality monitoring in compliance with the Project HCP[1].

Vegetation present within the LOD occurs along the edges of access roads and the turbine pads, and within areas that were previously disturbed during KWP 1 construction (e.g., temporary laydown areas and crane pads) where vegetation has regrown naturally or established through post-construction revegetation measures. Between 2007-2009, KWP outplanted nearly 23,500 native plants within the KWP area (Planning Solutions 2010), many of which were propagated from the site-specific seed bank. Overall, vegetation in the LOD is dominated by non-native species and consists of primarily non-native

[1] While it is not anticipated that these graveled areas will host ‘ilima encroachment or assimulans yellow-faced bee nesting sites to their previously disturbed condition, to the extent practicable within these areas, vegetation management that would involve the removal of ‘ilima or ground disturbance that could affect this species will be avoided during regular maintenance and decommissioning.

grassland in the lower elevation areas (below 2,000 feet [609 meters (m)]), non-native grassland with patches of mixed non-native and native dry shrublands in the mid-elevation areas (2,000 to 3,000 feet [609 to 914 m]), and non-native grasslands with patches of predominately native mesic shrublands in the uppermost elevations (3,000 to 3,200 feet [914 to 975 m]). In the mid-elevation areas, patches of dense trees and individual trees are also scattered within the grassland vegetation (Tetra Tech 2025b).

Eighteen plant species that are native to the Hawaiian Islands were observed during the April 2025 botanical survey of the LOD (Tetra Tech 2025b), including 7 species which are endemic to and found only in the Hawaiian Islands (Table 1). Native plant species increase in dominance toward the uppermost turbine and are more prevalent on the eastern side of the access road. All native plant species observed within the LOD are considered common species throughout the Hawaiian Islands, and some of these native plant species serve as a foraging resource for the protected assimulans yellow-faced bee (ʻilima, ʻūlei, ʻuhaloa [USFWS 2022]; see Section 4.3.3). The Project Area contains critical plant habitat for 28 species of listed plants; however, no listed plant species have been documented within the Project Area throughout the life of KWP 1. Various non-native plant species, including some considered invasive, have been recorded in the LOD and Project Area (KWP LLC 2006, Tetra Tech 2025b). Two of these species, koa haole (*Leucaena leucocephala*) and kiawe (*Prosopis pallida*), may have potential as assimulans yellow-faced bee forage (USFWS 2022; see Section 4.3.3).

Table 1. Native Plant Species Recorded Within the Project Limits of Disturbance in 2025

Scientific Name	Hawaiian/ Common Name(s)	Status	Location in LOD		
			Upper Elevation Non-native Grassland and Native Mesic Shrubland	Mid-Elevation Non-native Grassland and Dry Shrubland	Low-Elevation Buffelgrass Grassland
Bidens micrantha subsp. *micrantha*	koʻokoʻolau	E	X		
Dicranopteris linearis linearis	uluhe	I	X		
Dodonaea viscosa	ʻaʻaliʻi	I	X	X	
Eragrostis variabilis	kawelu	E	X		
Heteropogon contortus	pili	I		X	
Ipomoea indica	koali ʻawa	I	X		
Koeleria inaequalis	no common name	E		X	
Leptecophylla tameiameiae	pūkiawe	I	X	X	
Metrosideros polymorpha [1]	ʻōhiʻa lehua	E	X	X	
Nephroia orbiculata	no common name	I	X		
Morelotia gahniiformis	no common name	E	X		
Odontosoria chinensis	palaʻā	I	X		
Osteomeles anthyllidifolia	ʻūlei	I	X	X	
Pteridium aquilinum subsp. *decompositum*	kīlau	I	X	X	
Santalum ellipticum	ʻiliahialoʻe	E		X	
Sida fallax	ʻilima	I	X	X	X

Scientific Name	Hawaiian/ Common Name(s)	Status	Location in LOD		
			Upper Elevation Non-native Grassland and Native Mesic Shrubland	Mid-Elevation Non-native Grassland and Dry Shrubland	Low-Elevation Buffelgrass Grassland
Waltheria indica	ʻuhaloa	I	X	X	X
Wikstroemia oahuensis var. *oahuensis*	ʻākia	E	X		

Status: E = Endemic (native only to the Hawaiian Islands); I = Indigenous (native to the Hawaiian Islands and elsewhere).
1. Represented by two varieties.

2.2 Existing Wildlife

The grasslands and shrublands within the Project Area provide habitat for both native and non-native wildlife. While the majority of the birds, mammals, and invertebrates present in the Project Area are common, non-native species, the Project has the potential to impact several state or federally listed threatened or endangered species. These listed species include:

- ʻōpeʻapeʻa (Hawaiian hoary bat; *Lasiurus semotus*)
- nēnē (Hawaiian goose; *Branta sandvicensis*)
- ʻuaʻu (Hawaiian petrel; *Pterodroma sandwichensis*)
- ʻaʻo (Newell's shearwater; *Puffinus newelli*)
- 'akē'akē (Band-rumped storm petrel; *Oceanodroma castro*)
- assimulans yellow-faced bee (*Hylaeus assimulans)*.

In addition to the species listed above, an additional endangered species has the potential to occur in or transit the Project Area or its vicinity: Blackburn's sphinx moth (*Manduca blackburni*). This invertebrate species is an obligate of specific host plants. The native ʻilima (*Sida fallax*), which is considered the primary host plant for the assimulans yellow-faced bee, occurs in the Project Area (Tetra Tech 2025b). Tree tobacco (*Nicotiana glauca),* a larval host plant for Blackburn's sphinx moth, has not been documented in the Project Area. However, tree tobacco is common on Maui, and the plant is known to readily colonize disturbed areas. Impacts to the two invertebrate listed species can be avoided through proper vegetation management. Additional vegetation management measures can minimize impacts to the ʻōpeʻapeʻa and nēnē.

The endemic pueo (Hawaiian short-eared owl; *Asio flammeus sandwichensis*) is not state or federally listed on the island of Maui, but is a culturally significant bird and is protected under the Migratory Bird Treaty Act (MBTA). Pueo have the potential to forage or nest in the Project Area. Impacts to this MBTA-protected species from vegetation management activities can be avoided through adhering to monitoring requirements and clearing restrictions.

3.0 Project Documents or Permits Influencing Vegetation Management

3.1 Habitat Conservation Plan and Associated Permits

As stated above, the Project has the potential to impact species listed under the federal Endangered Species Act (ESA) and protected under the State of Hawaiʻi's endangered species law under Hawaii Revised Statutes (HRS) Chapter 195D. Since 2006, KWP has operated under a joint Federal and State HCP (KWP LLC 2006), an Incidental Take Permit (ITP) from the U.S. Fish and Wildlife Service (USFWS), and an Incidental Take License (ITL) from the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW)/Board of Land and Natural Resources (BLNR). Additionally, KWP is in the process of developing a new HCP for 20 more years of continued operations (Tetra Tech 2025c) in order to obtain a new ITP and ITL. It is anticipated that the permits will cover the incidental take of six federally and state listed threatened and endangered species, collectively referred to as the Covered Species. The Covered Species include the ʻōpeʻapeʻa (Hawaiian hoary bat), nēnē (Hawaiian goose), ʻuaʻu (Hawaiian petrel), ʻaʻo (Newell's shearwater), the ʻakēʻakē (band-rumped storm petrel), and the assimulans yellow-faced bee. All of these species, with the exception of the band-rumped storm petrel and assimulans yellow-faced bee, are included on the current ITP and ITL.

In addition to the Covered Species, there is the potential for the Blackburn's sphinx moth to occur in or transit the LOD. The vegetation management measures outlined in the HCP and this Plan with regards to ʻilima and tree tobacco will be implemented to avoid take of these listed species.

3.2 Conservation District Use Permit (MA-3103)

The entire Project Area is within the State Conservation District. HRS Chapter 205-5 specifies that conservation districts shall be governed by the State of Hawaiʻi DLNR pursuant to HRS Chapter 183C; uses in the Conservation District are regulated by the DLNR Office of Conservation and Coastal Lands under Hawaiʻi Administrative Rules (HAR) Title 13, Chapter 5.

HAR 13-5 classifies conservation lands into five subzones: protective, limited, resource, general, and special. The Project Area is within the general and protective subzones. KWP I currently operates under the terms and conditions of a Conservation District Use Permit (CDUP) which was approved by DLNR on January 24, 2003. On June 24, 2005, a modification to CDUP MA-3103 was approved by the BLNR to include conditions related to the draft HCP. This CDUP will remain in effect for the extended operational period (anticipated to be through 2046).

There are 44 conditions outlined in the CDUP, of which the following pertain to vegetation management during operations:

- Condition #3: *All mitigative measures proposed in the final Environmental Impact Statement for the project shall be implemented*. Relevant measures from the Final EIS (Zond Pacific 1999) referenced in the CDUP include:
    - Work with DLNR/DOFAW and local plant experts to plan a native plant propagation and restoration program;
    - Continue coordination with DLNR/DOFAW on a native plant propagation and restoration program; and
    - Implement the native plant propagation and recovery program with assistance from local experts.
- Condition #20: *All cleared areas shall be revegetated in a manner consistent with other permit conditions, with specific consideration given to the fire contingency plan and the Habitat Conservation Plan. Any necessary revegetation shall be completed within thirty days of the completion of specific project components that resulted in ground clearing, using native species found in the area.*
    - As stated in the KWP 2 Final EIS (Planning Solutions 2010), establishing vegetation within 30 days by seeding with native species was determined to be infeasible due to the insufficient commercial quantities of native seed and limitations with native hydroseeding. In the *Response to October 27, 2005 Letter Regarding the Establishment of Stabilizing Vegetation Cover for Erosion and Sediment Control Related to Wind Farm Access Road Construction*, DLNR authorized KWP's request to apply commercially available annual ryegrass (*Lolium multiflorum*) in order to comply with permit conditions of the CDUP and the NPDES permit, given the following conditions:

      1. "The permittee shall acquire commercial quantities of native pili grass bundles or other native species as soon as possible to substitute the annual rye; and

      2. The permittee is responsible for controlling the annual rye if it starts invading adjacent State lands."
    - Based on the October 2005 DLNR letter (referenced above), revegetation may include use of annual ryegrass subject to conditions 1 and 2 referenced above.
- Condition #25: *The applicant shall work closely with DLNR, Division of Forestry and Wildlife staff to manage the wildlife habitat. This will include periodic removal of rubbish. If necessary, this will include trapping to control the number of unwanted mammals, e.g., rats, mongoose, feral cats and dogs. The applicant shall implement additional mitigation measures to protect native habitat as suggested on page 11 of this staff report.* Mitigation measures to protect native habitat include:
    - Revegetate areas that have been temporarily cleared of vegetation to facilitate O&M activities in conformance with Condition #20 (as referenced above);
    - To the extent practicable, propagate native plants from on site to avoid genetic contamination to the existing plant populations; and

    - Non-native plants will also be considered for revegetation activities in consultation with botanists and DOFAW.
- Condition #37: *The applicant shall ensure that operations and maintenance staff do not damage native plants. If construction or operation required the removal of native plants, the plants will be removed, relocated and replanted. The applicant shall pay for the cost of this effort.*
- Condition #38: *The applicant shall work with plant experts to introduce appropriate native plant species back into the Kaheawa Pastures.*

3.3 Wildfire Prevention Plan

KWP implements a Wildfire Prevention Plan (Terraform 2025) focusing on fuel reduction, building resilience, regular inspections, vegetation management, and emergency communications protocols. The Wildfire Prevention Plan (Terraform 2025) outlines the following vegetation management activities to reduce fuel for wildfires within approximately 30 feet of buildings:

- Regularly maintain and clear vegetation, creating defensible space;
- Remove flammable materials like dry leaves, grass, and underbrush; and
- Maintain a well-maintained landscape, ensuring that trees and shrubs are pruned and not overly dense.

These activities will be performed in coordination with DOFAW Maui and species experts to minimize impacts to listed species that may use or transit through the site.

3.4 Commitments Made During the Development of the Environmental Impact Statement

The 2025 Final Environmental Impact Statement (EIS; Tetra Tech 2025d) for the continued use of KWP 1 contains various resource-specific avoidance and minimization measures, some of which relate to vegetation management. For example, based on interviews conducted during the Cultural Impact Assessment (CIA), concerns were brought up with respect to impacts on native and invasive plants (ASM 2025). Invasive plants of particular concern identified during the CIA process include fireweed (*Senecio madagascariensis*) and ironwood (*Casuarina* spp.). During the EIS process, KWP 1 committed to various measures to reduce or minimize impacts to resources. The measures related to vegetation management are listed in this Plan.

4.0 Vegetation Management Requirements and Best Management Practices (BMPs)

Routine vegetation management activities occur as part of operations and maintenance activities at the facility and include actions to mitigate the risk of wildfire, to clear vegetation for post-construction monitoring activities, to minimize attraction of Covered Species near operating facility infrastructure, and to avoid impact on other Covered and listed species. These activities must adhere to the requirements listed in the permits and documents listed in Section 3.0. In addition to regular vegetation management, some actions to control select invasive species and preserve native plant communities may occur at irregular intervals within the LOD or larger Project Area. This section lists the methods, limitations, and BMPs for vegetation management based on the various permits and Project documents. Figure 3 shows the timing restrictions for various protected species.

4.1 Education and Training

- Prior to commencement of ground disturbing activities, all on-site Project staff and contractors will be provided the Wildlife Education and Orientation Progam training. The training should include information on the sensitive native botanical resources and listed wildlife in the area, the BMPs and protocols outlined in this Plan, and invasive species prevention measures outlined in the Invasive Species Prevention Plan (Tetra Tech 2025a).
- Vegetation removal/management will be completed by a qualified vegetation management company. In addition to the training mentioned above, Project staff and contractors conducting vegetation management will receive training for health and safety covering personal protective equipment, proper use of tools and equipment, and herbicide application and decontamination protocols.

4.2 Wildfire Prevention

The following vegetation management activities will be implemented to reduce the risk of wildfires:

- Keep vegetation cleared or limited within 30 feet (9 m) of buildings and structures to create a defensible area for wildfire prevention. Should native plants encroach within 30 feet, remove and replant individual plants as needed in coordination with a botanist (see Section 4.5).
- Continue to maintain cleared (unvegetated) areas on the graded roads and pads within 230 feet (70 m) of each turbine on a regular basis. This is also a requirement for PCMM (see Section 4.3.1).
- Remove flammable materials like dry leaves, grass and underbrush near buildings. This should include removal of any material created during other vegetation management activities (e.g., tree trimming). Creation of large dense piles of mulching from chipped vegetation should be avoided as those materials could attract nēnē (see Section 4.3.2).
- Maintain a well-maintained landscape, ensuring that trees and shrubs near buildings are pruned and not overly dense.
- Any cut woody vegetation will be mulched/chipped onsite and distributed or removed from the site to limit fuel load for wildfires. Decisions about whether mulch or chipped material will distributed on site or removed from the site will be informed by the need to prevent inadvertently creating attractive habitat for nēnē, impacting locations where assimulans yellow-

faced bee may be nesting by covering bare ground (see Section 4.3.2), and to limit breeding habitat for coconut rhinoceros beetles (CRB).

4.3 HCP, ITL, ITP Compliance

This section identifies requirements related to the HCP, ITL, and ITP.

4.3.1 PCMM Search Areas and Access Roads

The following vegetation management activities will be implemented to support the PCMM program and HCP compliance:

- Maintain the graded vegetation-free roads and pads out to 230 feet (70 m) of each turbine including a 3-foot buffer area on each side of access roads, with the goal of maximizing searcher efficiency for finding any potential downed wildlife and minimizing the potential for nēnē to seek cover in roadside vegetation[2].
    - Vegetation management will occur through a combination of mechanical, chemical, and manual methods, including but not limited to spot herbicide use and periodic weed whacking.
        - Timing restrictions must be adhered to including:
            - During the October 1 – April 30 nēne peak nesting season, or when nēnē are first documented nesting on site in any given year, this activity is limited to hand management tools (i.e., spray packs and weed whackers) within the vicinity of nēnē use areas. See nēnē restrictions in Section 4.3.2.
            - Between June 1 and September 15, no woody vegetation greater than 15 feet in height should be cut, removed, or trimmed to avoid potential impacts to ʻōpeʻapeʻa. See ʻōpeʻapeʻa restrictions in Section 4.3.3.
        - Chemical (herbicide) use will adhere to the following BMPs for pollinators as adapted from the Xerces Society 2018, including:
            - Avoid broadcast applications of herbicides.
            - Conduct herbicide applications on calm days when wind speed is <10 mph (avoid applications during gusty or sustained high winds).
            - Avoid spraying immediately before forecasted heavy rain. To the extent practicable, apply during a window that allows for a minimum of 24 hours without heavy rain after application.
            - When available, use selective herbicides that are targeted to the species that need treating.
            - Use targeted application techniques (e.g., stem injection, drip application).

[2] This action is intended to limit the potential for vehicular strike if nēnē were to flush from roadside vegetation, and will avoid ʻilima removal to the extent practicable.

        - Selectively control undesirable plants with spot treatments, frill treatment, weed wipe, or other well-targeted techniques to avoid non-target species.
        - Keep applications on target and minimize drift:
            - Carefully choose and calibrate your spray nozzles to minimize drift, ensuring only target plants are treated;
            - When possible, utilize spatial or vegetative buffers around pollinator habitat.
        - Apply herbicide during the plant life stage when a weed is most vulnerable:
            - Plants should not be sprayed when they are in flower or after they have gone to seed;
            - This practice alone can greatly reduce herbicide exposure for the local pollinator community.
        - To the extent practicable, apply in the early morning or in the evening when pollinators are less active, and not during mid-day when bees and other pollinators are most active, especially if the optimal time to spray the target plant is when it is flowering.
- Should ʻilima encroach into the maintained cleared areas, avoid removing to the maximum extent practicable to avoid and minimize potential impacts to listed assimulans yellow-faced bee. See restrictions in Section 4.3.4.
- Any herbicide application will be logged with the herbicide composition and concentration and application dates.

4.3.2 Nēnē

Vegetation management for nēnē is conducted to increase the visibility of nēnē for staff driving along access roads and edges, while also decreasing the attractiveness of habitat within the Project Area for nēnē. The following will be implemented for nēnē:

- Targeted management of vegetation will occur to remove woody vegetation, lush grass, and other forage vegetation along roads and in the vicinity of turbine pads that may attract nēnē or decrease visibility of nēnē along roads. This vegetation management will occur through a combination of mechanical, chemical, and/or manual methods.
- This vegetation management should be limited to May 1 to September 30 to avoid the nēnē nesting season (October 1 – April 30). See Figure 3.
- If vegetation management needs to occur during the nēnē nesting season (October 1 – April 30), the following will be implemented:
    - A biological monitor will first assess nēnē use within the vegetation management areas prior to commencing work. If nēnē are determined to be present, vegetation management will be limited or halted.
    - Vegetation management will be limited to hand management tools (i.e., spray packs and weed whackers) from October 1 through April 30, in conjunction with use of a biological

monitor, within the vicinity of nēnē use areas. Nēnē use areas will be determined in conjunction with observational data collected over previous operational years and in conjunction with a biological monitor.

- Creation of large dense piles of mulching from chipped vegetation should be avoided as those materials could attract nēnē.

4.3.3 Assimulans Yellow-Faced Bee

The following will be implemented to avoid impacts to assimulans yellow-faced bees:

- Avoid removing/maintaining ʻilima to the maximum extent practicable. See example ʻilima photos in Appendix A.
- If ʻilima is present in a location where vegetation will be removed/maintained, this work should occur between July and November when yellow-faced bees are expected to be inactive (or when ʻilima is confirmed to not be flowering and therefore would not be utilized for foraging by assimulans yellow-faced bee) (see Figure 3).
- If removal/maintenance must occur within the bee active period (generally December to June), a DOFAW-approved entomologist or a biologist directly trained by a qualified entomologist to conduct a survey for assimulans yellow-faced bees in the location where the ʻilima will be removed/maintained.

Other native foraging resources exist for this species within the LOD, including ʻuhaloa and ʻūlei. Impact avoidance measures for these species include:

- Avoid removal of the native ʻuhaloa and ʻūlei to the maximum extent practicable.
- If vegetation management of these species must occur, schedule work when the species are not flowering or have a DOFAW entomologist (or DOFAW-approved surveyor if DOFAW entomologists are not available) conduct a pre-activity survey for assimulans yellow-faced bees in the impact area.
- Any native plants requiring removal will be translocated and replanted in accordance with CDUP Condition #37, which requires protection of native plants through removal, relocation, and replanting. Additional outplantings may also be used to supplement the translocated plant(s).
- Other foraging resources (non-natives: kiawe and koa haole)
    - Vegetation management of these species would be scheduled for when the species are not flowering or a qualified entomologist (or someone trained by an entomologist with yellow-faced bee experience) would conduct a pre-activity survey for assimulans yellow-faced bees in the impact area.

4.3.4 Woody Plants > 15 Feet (ʻŌpeʻapeʻa)

The following will be implemented to avoid impacts to the endangered ʻōpeʻapeʻa:

- Do not cut, remove, or trim woody vegetation greater than 15 feet in height during the bat pupping season (June 1 – September 15). Any woody plants over 15 feet should be cut or trimmed between September 16 and May 31.
- Should cutting or trimming of woody vegetation over 15 feet in height be needed during the bat pupping season, a biological monitor will assess the tree(s) for bat activity prior to removal in conjunction with agency coordination.

4.3.5 Tree Tobacco (Blackburn's Sphinx Moth)

The following will be implemented to avoid impacts to the listed Blackburn's sphinx moth:

- Site staff will be trained to identify tree tobacco and will report any sighting of tree tobacco to the onsite biologist or site manager, and signage will be added to the O&M building illustrating different stages of tree tobacco for identification. According to USFWS, monitoring for tree tobacco can be completed by any staff, such as groundskeepers or regular maintenance crew, provided with picture placards of tree tobacco at different life stages (USFWS 2023). See example tree tobacco photos in Appendix A.
    - If tree tobacco less than 3 feet in height is observed in the LOD, remove the plants immediately to prevent attracting Blackburn's sphinx moth. DOFAW recommends this removal occur during the dry season (usually May to October).
    - If tree tobacco over 3 feet in height is observed in the LOD, a qualified biologist should thoroughly search the plant(s) for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage). DOFAW and USFWS may be contacted for additional guidance.
- Should any major ground disturbance occur within the Project Area, regular surveys for tree tobacco may occur in those areas to confirm tree tobacco is not present and there are no impacts to the listed Blackburn's sphinx moth.

4.3.6 Pueo

The following will be implemented to avoid impacts to the pueo:

- Before any ground disturbing activities that may disturb potential pueo nesting habitat (e.g., vegetation clearing during the 6-month initial maintenance period), a qualified biologist will conduct surveys for pueo. Surveys should be done for 2-3 nights prior to ground disturbing activities during crepuscular hours from vantage points where the entire disturbance area can be observed. If any pueo breeding displays are observed, it is likely there could be a nest.
- If pueo nests are detected in the Project Area at any time, a 328-foot (100 m) buffer should be established in which no activity occurs until the nesting cycle is complete and the chicks are capable of flight.

- As part of the Wildlife Education and Orientation Progam, all construction and regular on-site staff will be trained to identify pueo and if pueo or a pueo nest are observed, staff will stop work and coordinate with onsite biologist to determine appropriate steps.
- DOFAW staff should be notified of any nests or adult breeding behavior.

4.4 Targeted Control of Select Invasive Plant Species

The Project's Invasive Species Prevention Plan outlines protocols and measures that will be implemented prior to and during operations and maintenance to prevent or minimize the introduction or spread of invasive species (Tetra Tech 2025a). In addition to these measures, KWP has committed to the following with regards to select invasive plants:

- Work with local experts and community and cultural groups (e.g., Maui Cultural Lands) to remove/control invasive species of concern, including ironwood and fireweed, within the graded vegetation-free roads and pads located within 230 feet (70 m) of the turbines for HCP compliance (see Section 4.3.1). Because these two species are relatively common throughout the LOD, it is unlikely that complete removal of these species will be possible. See example photos of ironwood and fireweed in Appendix A.
    - Because the assimulans yellow-faced bee may nest within and in proximity to ironwood when favorable bare ground and friable soil exist, before any removal activities a clearance survey should be conducted by a qualified entomologist or a biologist directly trained by a qualified entomologist to survey for assimulans yellow-faced bee nests. The detection of nests will preclude removal of the invasive species.
- Work with local experts and community group (e.g., Maui Cultural Lands) to remove/control invasive species of concern, including ironwood and fireweed, in select areas outside of the LOD. For example, the heiau along the western perimeter of the KWP I Project Area (Site 50-50-09-05232) should be kept clear of invasive vegetation, in consultation with the DLNR-SHPD and Maui Cultural Lands and under the supervision of an archaeological monitor. Other target areas of invasive plant control will be determined in consultation with Maui Cultural Lands. Because assimulans yellow-faced bee are known to nest in ironwood patches in the Project's vicinity when soil conditions are favorable, a clearance survey by a qualified biologist should be conducted first as outlined above. Additionally, because nēnē are known to nest under ironwood, the qualified biologist should assess nēnē use as well.

4.5 Native Plant Preservation

- If vegetation removal is needed in areas outside of the existing maintained areas (i.e., graded roads and pads), hire a plant expert/botanist to determine if any areas with native plants should be avoided. Any areas to be avoided should be flagged with highly visible tape or temporary perimeter fencing should be installed to prevent disturbance. The plant expert/botanist may also supervise removal work if needed.

- Should native plant species (e.g., ʻōhiʻa) encroach into the maintained cleared areas on graded roads and pads, avoid removal if possible. If native plant density prevents successful fatality monitoring, work with DOFAW and USFWS to adjust fatality search areas as needed or remove natives. If the native plants need to be removed, translocate or replace plants in coordination with a botanist and entomologist with assimulans yellow-faced bee expertise. See restrictions for ʻilima in Section 4.3.4.
- Should native plant species (e.g., ʻōhiʻa) encroach within 30 feet of buildings and structures, translocate or replace plants as needed in coordination with a botanist. See restrictions for ʻilima in Section 4.3.3.
- Any cutting or trimming of ʻōhiʻa should be conducted by qualified personnel to ensure measures to reduce the risk of introducing the Rapid ʻŌhiʻa Death (ROD) fungus (see the Invasive Species Prevention Plan). See example ʻōhiʻa photos in Appendix A.

4.6 Revegetation/ Restoration

- Continue to coordinate with DLNR/DOFAW and local experts to implement the native plant propagation and restoration program at the site. This may include collecting native seeds and cuttings in the area, propagating native plants at local nurseries, and subsequently outplanting native plants at select locations within the site. As practicable, native plants should be propagated from existing plants on site to ensure no genetic contamination to the existing plant populations.
    - Site selection for outplanting native plants will incorporate clearance surveys conducted by a qualified entomologist or a biologist directly trained by a qualified entomologist to survey for assimulans yellow-faced bee nests. The detection of nests will preclude using the location for outplantings.
- Revegetation should occur within 30 days of completion of activities that require ground disturbance (i.e. temporary clearing to facilitate equipment delivery, crane pads/paths, turbine blade or nacelle maintenance).
    - Native species found in the area should be used for revegetation to the maximum extent practicable (e.g., pili grass, ʻaʻaliʻi).
    - If it is not feasible to revegetate with native species, use non-native plants chosen in coordination with botanists and DOFAW.

5.0 References

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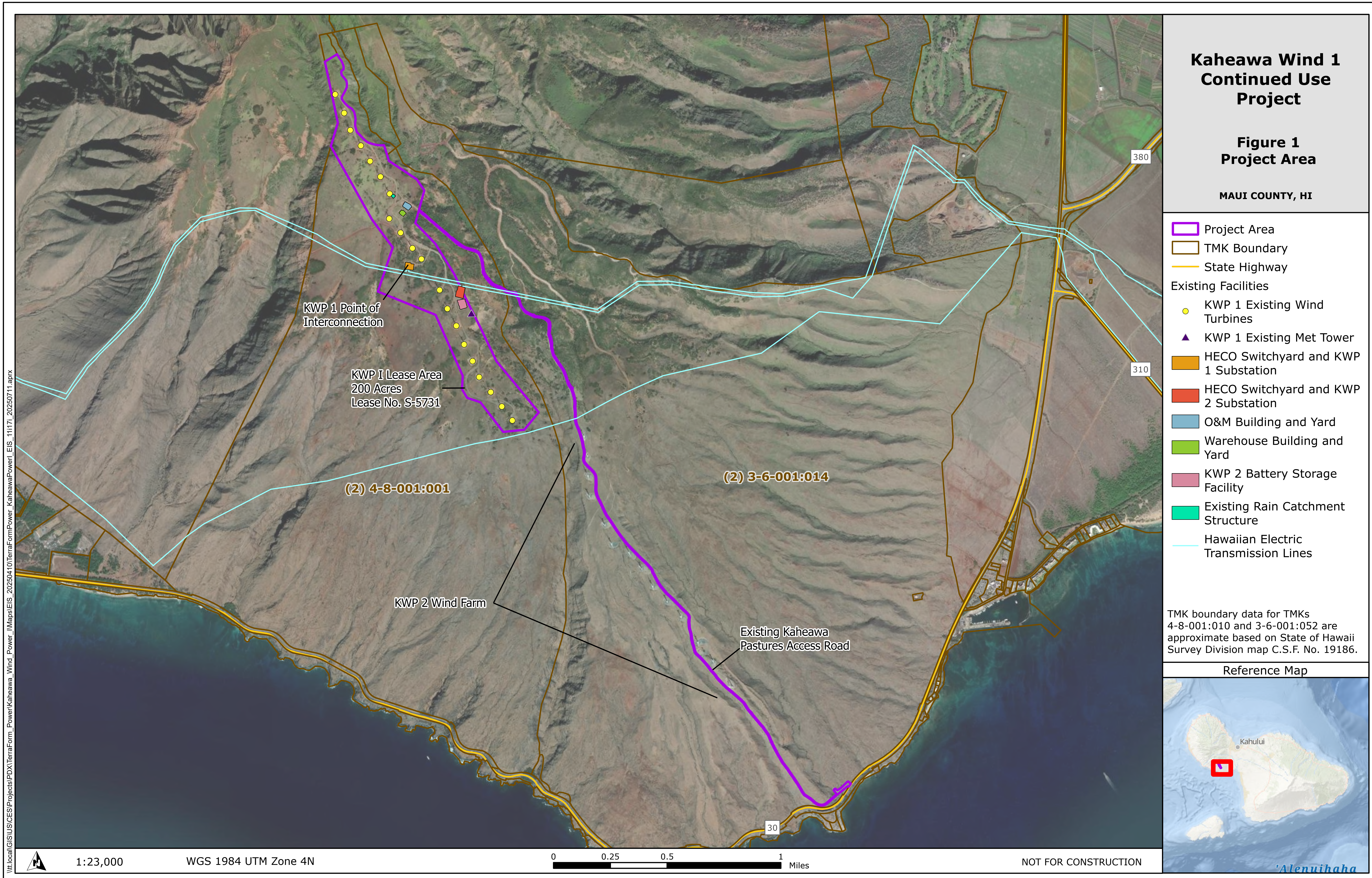
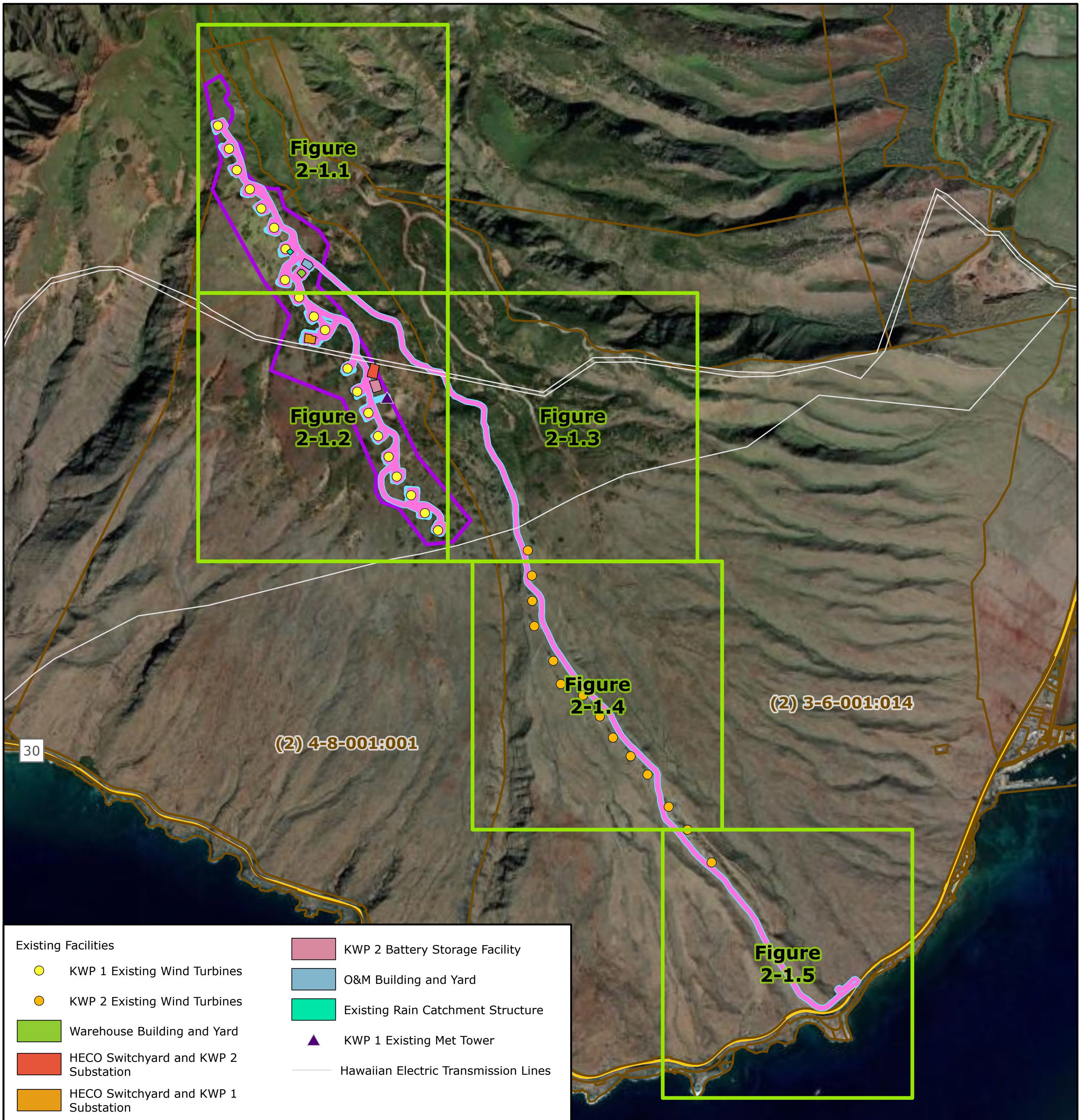
Figures

Figure 1



Kaheawa Wind 1 Continued Use Project
Figure 1
Project Area
MAUI COUNTY, HI
Project Area
TMK Boundary
State Highway
Existing Facilities
KWP 1 Existing Wind Turbines
KWP 1 Existing Met Tower
HECO Switchyard and KWP 1 Substation
HECO Switchyard and KWP 2 Substation
O&M Building and Yard
Warehouse Building and Yard
KWP 2 Battery Storage Facility
Existing Rain Catchment Structure
Hawaiian Electric Transmission Lines
TMK boundary data for TMKs 4-8-001:010 and 3-6-001:052 are approximate based on State of Hawaii Survey Division map C.S.F. No. 19186.
Reference Map
Kahului
'Alenuihaha
KWP 1 Point of Interconnection
KWP I Lease Area
200 Acres
Lease No. S-5731
(2) 4-8-001:001
(2) 3-6-001:014
KWP 2 Wind Farm
Existing Kaheawa Pastures Access Road
380
310
30
1:23,000
WGS 1984 UTM Zone 4N
0
0.25
0.5
1
Miles
NOT FOR CONSTRUCTION

Figure 2



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0 0.25 0.5 1 Miles

NOT FOR CONSTRUCTION

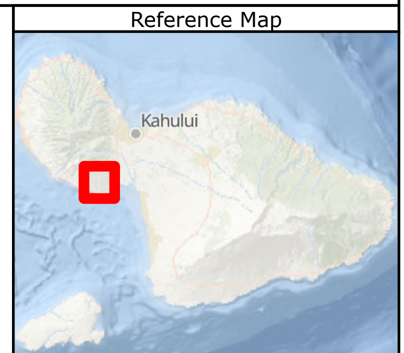
Kaheawa Wind 1 Continued Use Project

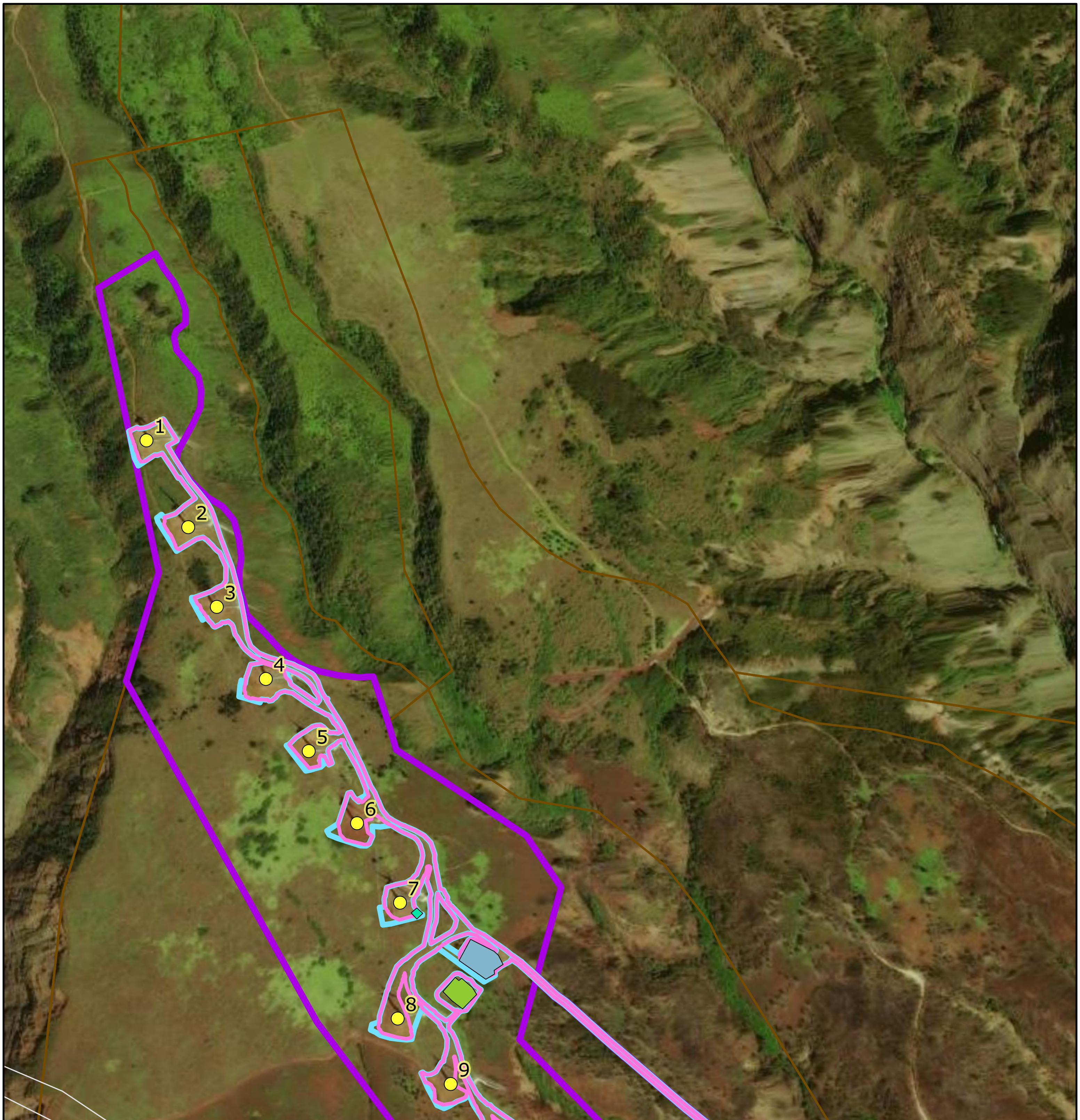
Figure 2-1 Limits of Disturbance Index Map

MAUI COUNTY, HI

Detail Map Grid
Project Area
Existing Turbine Pads and Roads
Limits of Disturbance
TMK Boundary
State Highway

Reference Map





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Kaheawa Wind 1 Continued Use Project

Figure 2-1.1
Limits of Disturbance Detail Map

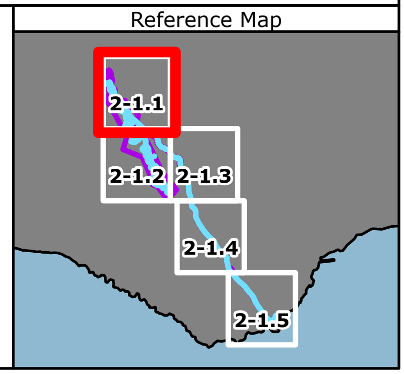
MAUI COUNTY, HI

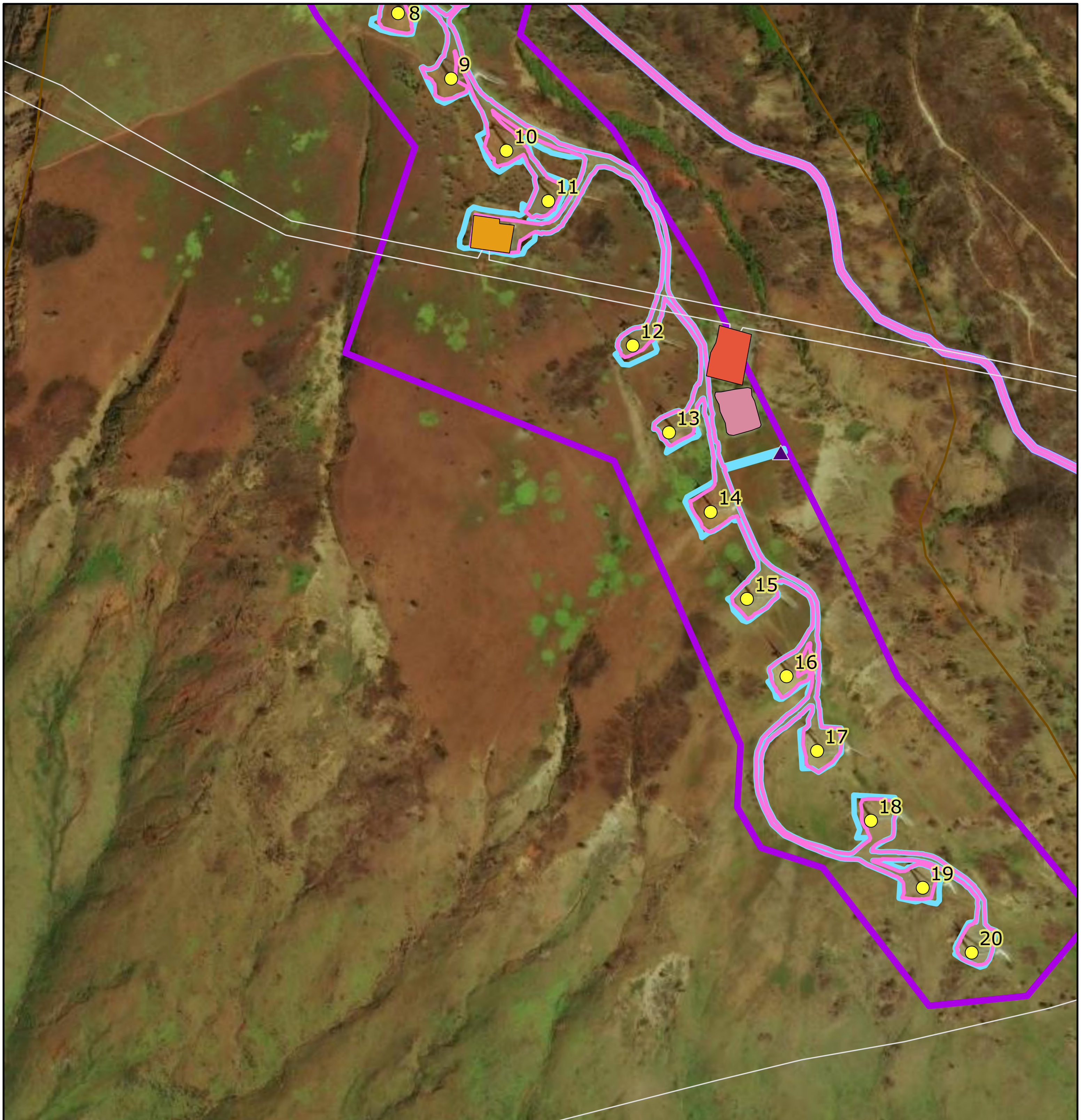
- Project Area
- Existing Turbine Pads and Roads
- Limits of Disturbance
- TMK Boundary

Existing Facilities

- KWP 1 Existing Wind Turbines
- Warehouse Building and Yard
- O&M Building and Yard
- Existing Rain Catchment Structure

Reference Map





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0 250 500 1,000 US Feet

NOT FOR CONSTRUCTION

Kaheawa Wind 1 Continued Use Project

Figure 2-1.2
Limits of Disturbance Detail Map

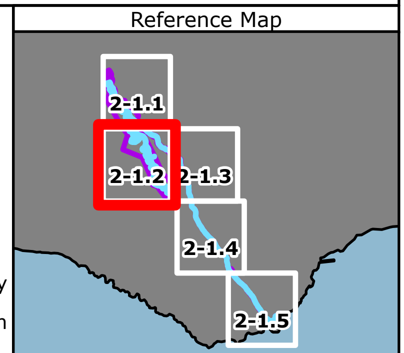
MAUI COUNTY, HI

- Project Area
- Existing Turbine Pads and Roads
- Limits of Disturbance
- TMK Boundary

Existing Facilities

- KWP 1 Existing Wind Turbines
- KWP 1 Existing Met Tower
- HECO Switchyard and KWP 2 Substation
- HECO Switchyard and KWP 1 Substation
- KWP 2 Battery Storage Facility
- Hawaiian Electric Transmission Lines

Reference Map



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WGS 1984 UTM Zone 4N

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Kaheawa Wind 1 Continued Use Project

Figure 2-1.3
Limits of Disturbance Detail Map

MAUI COUNTY, HI

Project Area

Existing Turbine Pads and Roads

Limits of Disturbance

TMK Boundary

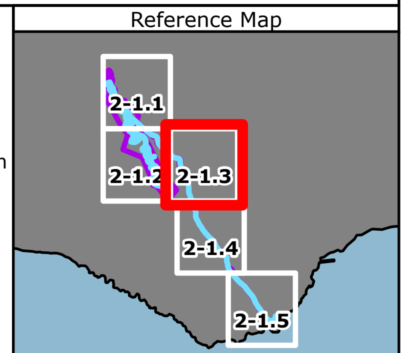
Existing Facilities

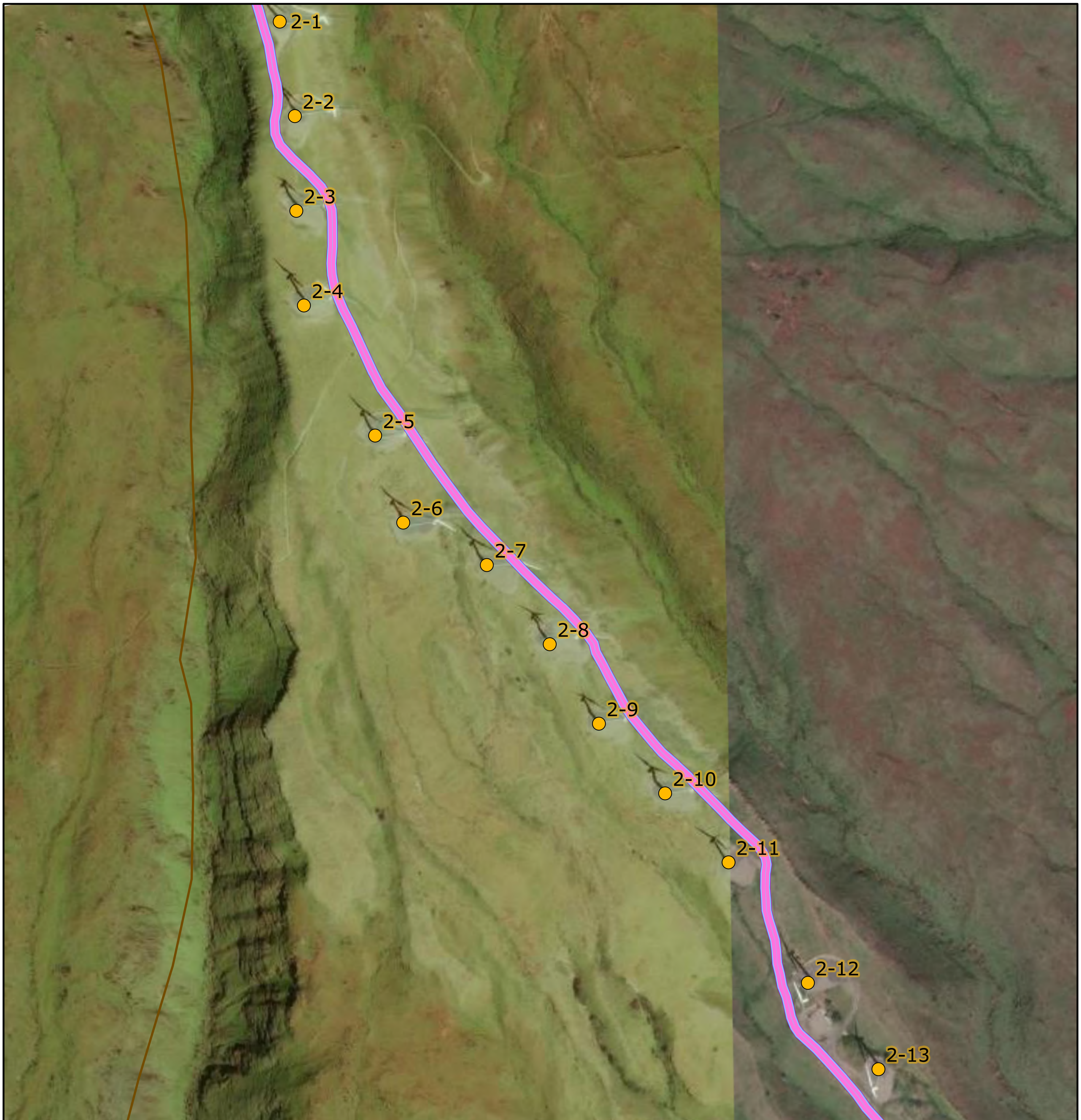
KWP 1 Existing Wind Turbines

KWP 2 Existing Wind Turbines

Hawaiian Electric Transmission Lines

Reference Map





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0 250 500 1,000 US Feet

NOT FOR CONSTRUCTION

Kaheawa Wind 1 Continued Use Project

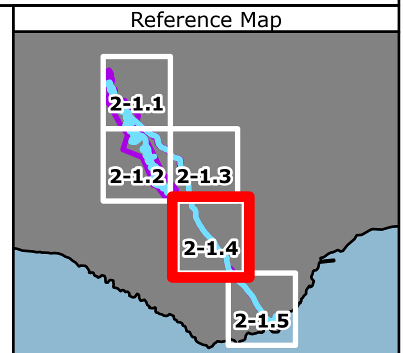
Figure 2-1.4
Limits of Disturbance Detail Map

MAUI COUNTY, HI

Project Area
Existing Turbine Pads and Roads
Limits of Disturbance
TMK Boundary

Existing Facilities
KWP 2 Existing Wind Turbines

Reference Map



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Kaheawa Wind 1 Continued Use Project

Figure 2-1.5
Limits of Disturbance Detail Map

MAUI COUNTY, HI

- Project Area
- Existing Turbine Pads and Roads
- Limits of Disturbance
- TMK Boundary
- State Highway
- Local Roads

Existing Facilities

- KWP 2 Existing Wind Turbines

Reference Map

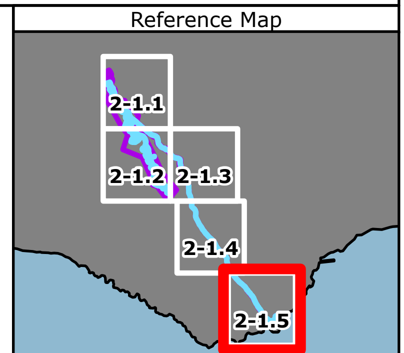

Figure 3. Annual Vegetation Management Timing Restrictions for Protected Species

Protected/Culturally Important Species	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
Nēnē Breeding[1]												
ʻŌpeʻapeʻa Pupping Season[2]												
Yellow-faced bee Nesting and Active Period[3]												
Pueo Nesting [4]												

[1] Vegetation management is limited to hand management tools within the vicinity of nēnē use areas.
[2] Tree trimming/removal limited to trees < 15 feet in height between June 1 and September 15 to avoid potential impacts to the Hawaiian hoary bat too young to fly.
[3] If ʻilima is present in a location where vegetation will be removed/maintained, conduct activities between July and November when yellow-faced bees are in a period of dormancy, or when the ʻilima plants are not flowering.
[4] If pueo nests, adult breeding displays, or other indications of nesting are seen or heard, suspend all work within 328 ft (100 m) of the nest.

Appendix A. Example Plant Photos

‘Ilima (*Sida fallax*) – Host Plant for Listed Assimulans Yellow-Faced Bee




Tree Tobacco (*Nicotiana glauca*) – Host Plant for Blackburn's Sphinx Moth

NOTE: Tree Tobacco does not currently occur at KWP I; photos from elsewhere.

<u>Fireweed (*Senecio madagascariensis*) – Invasive Plant</u>

Ironwood (*Casuarina* spp.) – Invasive Plant

‘Ōhi‘a (*Metrosideros polymorpha*) – Native Hawaiian Plant

Appendix B. Information for Planning and Consultation (IPaC)

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IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Maui County, Hawaii

Local office

Pacific Islands Fish And Wildlife Office

(808) 792-9400
(808) 792-9580

MAILING ADDRESS
300 Ala Moana Boulevard, Box 50088
Honolulu, HI 96850-5000

PHYSICAL ADDRESS
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850-0056

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Hawaiian Hoary Bat Lasiurus cinereus semotus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/770	Endangered

Birds

NAME	STATUS
Band-rumped Storm-petrel Hydrobates castro No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1226	Endangered
Hawaiian Coot (alae Ke\`oke\`o) Fulica alai Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7233	Endangered
Hawaiian Duck Anas wyvilliana Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7712	Endangered
Hawaiian Goose Branta (=Nesochen) sandvicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1627	Threatened
Hawaiian Petrel Pterodroma sandwichensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6746	Endangered

Hawaiian Stilt Himantopus mexicanus knudseni | Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2082

Newell''s Shearwater Puffinus newelli | Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2048

Reptiles

NAME	STATUS
Hawksbill Sea Turtle Eretmochelys imbricata Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3656	Endangered

Insects

NAME	STATUS
Blackburn's Sphinx Moth Manduca blackburni Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4528	Endangered

Flowering Plants

NAME	STATUS
(=native Yellow Hibiscus) Ma`o Hau Hele Hibiscus brackenridgei Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4075	Endangered
`aiea Nothocestrum latifolium Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1061	Endangered

`ena`ena Pseudognaphalium sandwicensium var. molokaiense — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5993

A`e Zanthoxylum hawaiiense — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/4645

Bonamia menziesii — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2503

Carter's Panicgrass Panicum fauriei var. carteri — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/5578

Delissea undulata — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/1565

Gouania hillebrandii — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3464

Gouania vitifolia — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/6347

Haha Cyanea obtusa Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/2907

Hesperomannia arborescens Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/6004

Hesperomannia arbuscula Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/5297

Ihi Portulaca villosa Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4886

Kauila Colubrina oppositifolia Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/850

Kio`ele Kadua coriacea Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/5504

Ko`oko`olau Bidens campylotheca ssp. pentamera Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/1897

Ko`oko`olau Bidens campylotheca ssp. waihoiensis — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/6450

Ko`oko`olau Bidens micrantha ssp. kalealaha — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7697

Kuahiwi Laukahi Plantago princeps — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/4926

Lanai Sandalwood (=`iliahi) Santalum haleakalae var. lanaiense — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3282

Loulu Pritchardia munroi — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/8525

Ma`oli`oli Schiedea pubescens — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4030

Mahoe Alectryon macrococcus — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2446

Makou Peucedanum sandwicense — Threatened

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/5579

Maui Remya Remya mauiensis — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/6689

Na`ena`e Dubautia plantaginea ssp. humilis — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/5833

Neraudia sericea — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/2237

Ohai Sesbania tomentosa — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/8453

Pamakani Tetramolopium capillare — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/4584

Phyllostegia haliakalae — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/9245

Phyllostegia parviflora — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/255

Phyllostegia pilosa — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/9246

Popolo Ku Mai Solanum incompletum — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/3199

Round-leaved Chaff-flower Achyranthes splendens var. rotundata — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/4709

Schiedea salicaria — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3354

Spermolepis hawaiiensis — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/1670

Stenogyne angustifolia var. angustifolia — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1591

Stenogyne kauaulaensis Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/9249	Endangered
Uhiuhi Mezoneuron kavaiense Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7129	Endangered
Vigna o-wahuensis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8445	Endangered

Ferns and Allies

NAME	STATUS
Asplenium dielerectum Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7361	Endangered
Diplazium molokaiense Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/2168	Endangered
Microlepia strigosa var. mauiensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4737	Endangered
Pauoa Ctenitis squamigera Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/289	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
(=native Yellow Hibiscus) Ma`o Hau Hele Hibiscus brackenridgei https://ecos.fws.gov/ecp/species/4075#crithab	Final
`akohekohe (crested Honeycreeper) Palmeria dolei For information on why this critical habitat appears for your project, even though `akohekohe (crested Honeycreeper) is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/3089#crithab	Final
A`e Zanthoxylum hawaiiense https://ecos.fws.gov/ecp/species/4645#crithab	Final
Asplenium dielerectum https://ecos.fws.gov/ecp/species/7361#crithab	Final
Diplazium molokaiense https://ecos.fws.gov/ecp/species/2168#crithab	Final
Gouania hillebrandii https://ecos.fws.gov/ecp/species/3464#crithab	Final
Haha Cyanea magnicalyx For information on why this critical habitat appears for your project, even though Haha is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/9239#crithab	Final
Haha Cyanea obtusa https://ecos.fws.gov/ecp/species/2907#crithab	Final
Hesperomannia arbuscula https://ecos.fws.gov/ecp/species/5297#crithab	Final

Kamanomano Cenchrus agrimonioides Final

For information on why this critical habitat appears for your project, even though Kamanomano is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/2928#crithab

Kio`ele Kadua coriacea Final

https://ecos.fws.gov/ecp/species/5504#crithab

Ko`oko`olau Bidens campylotheca ssp. pentamera Final

https://ecos.fws.gov/ecp/species/1897#crithab

Lanai Sandalwood (=`iliahi) Santalum haleakalae var. lanaiense Final

https://ecos.fws.gov/ecp/species/3282#crithab

Lysimachia lydgatei Final

For information on why this critical habitat appears for your project, even though Lysimachia lydgatei is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/4684#crithab

Maui Parrotbill (kiwikiu) Pseudonestor xanthophrys Final

For information on why this critical habitat appears for your project, even though Maui Parrotbill (kiwikiu) is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/7952#crithab

Maui Remya Remya mauiensis Final

https://ecos.fws.gov/ecp/species/6689#crithab

Neraudia sericea Final

https://ecos.fws.gov/ecp/species/2237#crithab

Nohoanu Geranium hillebrandii Final

For information on why this critical habitat appears for your project, even though Nohoanu is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/1673#crithab

Ohai Sesbania tomentosa https://ecos.fws.gov/ecp/species/8453#crithab	Final
Pamakani Tetramolopium capillare https://ecos.fws.gov/ecp/species/4584#crithab	Final
Pauoa Ctenitis squamigera https://ecos.fws.gov/ecp/species/289#crithab	Final
Schiedea salicaria https://ecos.fws.gov/ecp/species/3354#crithab	Final
Spermolepis hawaiiensis https://ecos.fws.gov/ecp/species/1670#crithab	Final
Stenogyne kauaulaensis https://ecos.fws.gov/ecp/species/9249#crithab	Final
Tetramolopium remyi For information on why this critical habitat appears for your project, even though Tetramolopium remyi is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/1173#crithab	Final
Wawae`iole Phlegmariurus mannii For information on why this critical habitat appears for your project, even though Wawae`iole is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/1215#crithab	Final

Bald & Golden Eagles

There are no documented cases of eagles being present at this location. However, if you believe eagles may be using your site, please reach out to the local Fish and Wildlife Service office.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management

- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bulwer's Petrel *Bulweria bulwerii* This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.	Breeds May 1 to Sep 30

Wandering Tattler Tringa incana — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

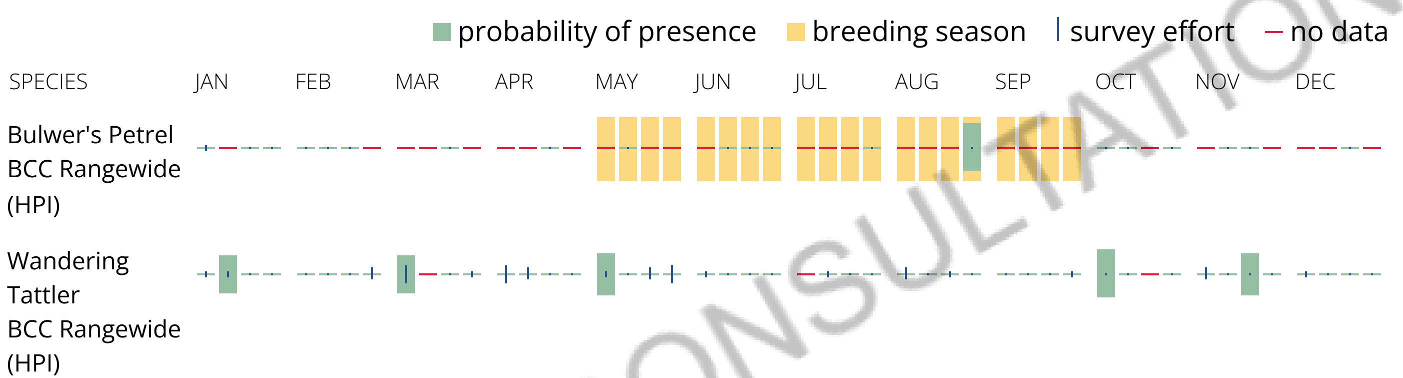
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix C. Mitigation Letters Received through FY 2025

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JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RYAN K.P. KANAKAʻOLE
FIRST DEPUTY

CIARA W.K. KAHAHANE
DEPUTY DIRECTOR - WATER

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

February 27th, 2025

Molly Stephenson
TerraForm
200 Liberty Street, 14th Floor
New York, NY 10281

Dear Ms. Stephenson:

This letter serves as the decision of the Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) regarding the status of TerraForm Power (TerraForm) mitigation credit for Hawaiian Petrels (*Pterodroma sandwichensis*) necessary to fulfill the mitigation requirements of the Habitat Conservation Plans (HCP) for both the Kaheawa Pastures (KWP I) (ITL-08) and Kaheawa Wind Power II (KWP II) (ITL-15) Wind Energy Projects. Mitigation for Hawaiian Petrels for these projects was initiated at the Makamakaʻole Seabird Restoration / Mitigation Site on Maui in 2013. Owing to limited nesting by the species at the site, however, DOFAW approved Brookfield's funding of mitigation-related efforts executed by Pūlama Lānaʻi at the Lānaʻihale mitigation site on the island of Lānaʻi in 2018, 2021, and 2022. A memorandum (Correspondence # TTCES-PTLD-2023-015) and e-mail were submitted to DOFAW by Tetra Tech on behalf of Brookfield Renewable Partners (Brookfield), now TerraForm, on February 28, 2023. The memorandum summarized the final results of the 2022 Lānaʻihale Hawaiian petrel breeding season (i.e., production of creditable chicks). It estimated the mitigation credits associated with increased survival of potential breeding birds occupying the protected burrows at the site. Here, we deliver our final credit assessment for 2015 through 2022, for which we incorporate our analysis from prior years and clarify mitigation obligations as it pertains to both mitigation sites.

Please note that DOFAW previously agreed to the application of a burrow monitoring model developed by Schuetz et al. (2020)[1] of the San Diego Zoo to estimate the number of burrows that exist at Lānaʻihale and the proportion of these burrows in which birds were successfully breeding (based on a random sample of total burrows).

[1]Schuetz, J.G., L.I. Vilches, and R.R. Swaisgood. 2020. Monitoring reproductive success of Hawaiian petrels on Lānaʻi: Optimizing strategies and methods. Prepared for: National Fish and Wildlife Foundation – Kuahiwi a Kai: Lānaʻi Watershed Conservation Program (Grant 66864). Zoological Society of San Diego, San Diego, CA. 28 pp.

Hawaiian Petrel Credit Determination

During the 2022 breeding season, Pūlama Lānaʻi identified 224 known Hawaiian Petrel burrows in the mitigation site, of which 64 were randomly selected for monitoring. Petrels at 49 of these 64 burrows were confirmed to be active breeding, yielding a proportion of 0.766 monitored burrows that supported active breeding and for which outcomes were known. Based on Schuetz et al. (2020), TerraForm, previously known as Brookfield, used this proportion to estimate that 172 of the 224 known Hawaiian Petrel burrows were occupied by active breeding pairs (i.e., two birds). Multiplying these 172 burrows by two, therefore, yields 344 individual adult Hawaiian Petrels that are assumed to have benefited from the reduction in predation at Lānaʻihale through 2022 and produces an annual adult survival benefit of 17.2 credits (Table 1). A total of 78 Hawaiian Petrel chicks were estimated to have fledged from breeding burrows, equating to 23.5 adult equivalents, yielding a combined mitigation credit of 40.6 adult petrels (Annual Adult Survival + Adult Equivalents Fledged; Table 1) in 2022.

On March 28, 2023, USFWS issued a decision letter (Reference # 022-0025703, 2022-0054750) about the credit accrued by TerraForm, formerly Brookfield, for mitigating Hawaiian Petrels. In concurrence with this letter, we agree with the total combined mitigation credit of **89.72** adult Hawaiian Petrels for Makamakaʻole and Lānaʻihale from 2015 to 2022, as indicated by the calculations in Table 1.

Table 1. Combined mitigation credit calculation for Hawaiian Petrels at Makamakaʻole and Lānaʻihale, 2015 through 2022

Site-Year	Hawaiian Petrels[1]	Annual Increased Adult Survival[2]	Annual Adult Survival Mitigation Benefit	Hawaiian Petrel Fledglings	Probability of Fledgling Survival[2]	Adult Equivalents of Fledgling Mitigation Benefit	Combined Mitigation Benefit
Makamakaʻole 2015	0	0.13	0	0	0.3	0	0
Makamakaʻole 2016	2	0.13	0.26	0	0.3	0	0.26
Makamakaʻole 2017	2	0.13	0.26	0	0.3	0	0.26
Lānaʻihale 2018	204	0[3]	0	36	0.3	10.8	10.80
Lānaʻihale 2021	336[4]	0.05	16.8	70[4]	0.3	21.0	37.80
Lānaʻihale 2022	344[5]	0.05	17.2	78	0.3	23.4	40.60
						Total Estimated Benefit =	**89.72**

1. Petrels identified at Makamakaʻole 2015 – 2017 represent a sum of individual single birds identified as having consistently occupied protected burrows at the mitigation site during a breeding season. Individuals at Lāna'ihale in 2018 represent two birds for each confirmed breeding pair with a known outcome. Individuals at Lāna'ihale in 2021 represent two birds for each estimated breeding pair.
2. Sources for adult survival: SWCA 2011 for Makamakaʻole, this memo for Lāna'ihale. Source for fledgling survival to adult: SWCA 2011.
3. Mitigation plan in 2018 included estimated benefits to be calculated solely based on increases in fledglings above baseline.
4. Estimated breeding individuals (168 burrows * 2 = 336) and fledglings (70) above baseline for 2021 breeding season from FY 2021 report.
5. Estimated breeding individuals (172 burrows * 2 = 344) and fledglings (78) above baseline for 2022 breeding season from final report.

Please direct any questions or concerns to DOFAW Wildlife Program Manager Jason D. Omick at jason.d.omick@hawaii.gov.

Sincerely,

DAVID G. SMITH
Administrator

cc:
Lorena Wada, U.S. Fish and Wildlife Service
Jessi Hallman, U.S. Fish and Wildlife Service
Jonah Dedrick, U.S. Fish and Wildlife Service
Jenny Taylor, Tetra Tech
Troy Rahmig, Tetra Tech

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To: 2022-0025703
2022-0054750

March 27, 2023

Mr. Scott Rotman
Senior Manager, Environment and Permitting
Brookfield Renewable Partners
200 Liberty Street, Floor 14
New York, New York 10281

Subject: Kaheawa Wind Power Hawaiian Petrel Mitigation Credit for 2022 Breeding Season at Lānaʻihale, Lānaʻi Incidental Take Permits TE27260A-1 and TE118901-0

Dear Mr. Rotman:

The purpose of this letter is to address mitigation credit for the 2022 Hawaiian petrel breeding season at Lānaʻihale on the island of Lānaʻi. The Service approved Brookfield Renewable Partners (Brookfield) funding of mitigation programs on Lānaʻi for the 2018, 2021 and 2022 breeding seasons to fulfill the Hawaiian petrel mitigation requirements of Kaheawa Wind Power I (KWP I) and Kaheawa Wind Power II (KWP II)'s Incidental Take Permits (TE27260A-1 and TE118901-0). We received your December 7, 2022 memorandum and updated Februrary 28, 2023 memorandum requesting concurrence that Brookfield has fulfilled its mitigation obligation for Hawaiian petrel following the 2022 breeding season. We understand that your December 2022 memorandum compiled a preliminary summary of the results of the 2022 Lānaʻihale breeding season, and your updated February 2023 version reflects the final fledling results of the season.

The Service previously agreed to Brookfield Renewable Partners' application of a burrow monitoring model created by Schuetz, Vilchis, and Swaisgood at the San Diego Zoo in 2020 at the Lānaʻihale mitigation site. This model estimates the number of burrows that exist, and the proportion are that successfully breeding based on a subsample. In addition, the Service approved Brookfield's proposed quantification of benefits to calculate an increased adult survival benefit associated with predator control efforts at at Lānaʻihale using the value of 0.05. Brookfield contracted Pūlama Lānaʻi to carry out predator control of invasive feral cats (*Felis catus*) and rats (*Rattus spp.*) and implemented a monitoring program to document the benefits to the Hawaiian petrel population within the managed areas during the 2018, 2021, and 2022 Hawaiian petrel breeding seasons.

Brookfield is obligated to mitigate for 25 petrels in Tier 1 at KWP I and up to 38 petrels in Tier 2, and for 19 adults and 9 fledglings (or 21.7 adult equivalents) in Tier 1 of KWP II. Therefore, Brookfield must mitigate for 59.7 adult Hawaiian petrel to account for direct and indirect take. Additionally, to account for accrued lost productivity, an additional 4.78 adult equivalents are required for a total of 64.48 adult Hawaiian petrel. The Service can provide mitigation credit for increased adult survival benefit for the active, confirmed breeding burrows reported by Pūlama Lānaʻi in the mitigation area.

Brookfield used the final estimate of breeding burrows within the mitigation area during the 2022 breeding season as multiplied by two (representing a pair of birds for each breeding burrow), as the number of adults benefiting from the reduction in predation. Using the information provided to the Service from Brookfield, there are an estimated 344 breeding individuals, based on multiplying the 172 estimated breeding burrows by two to represent the pair of birds for each burrow. The Service understands that Pūlama Lānaʻi has identified 224 known burrows in the mitigation area with 64 selected for active monitoring. Of the 64 burrows monitored, 83.7% sucessfully fledged a chick (n = 49), of the 76.6%.of burrows monitored with breeding attempts.

The estimated number of fledglings produced during the 2022 breeding season from the known burrows minus the calculated baseline determines the net fledglings produced as a result of Pūlama Lānaʻi's mitigation actions. This is calculated for the 2022 breeding season below:

$$(number\ of\ known\ burrows\ \times proportion\ with\ confirmed\ breeding\ \times 2022\ sucess\ rate) - (number\ of\ known\ burrows\ \times proportion\ with\ confirmed\ breeding\ \times baseline\ success\ rate) = net\ fledglings\ produced$$

$$(224\ \times 0.766\ \times 0.837) - (224\ \times\ 0.776\ \times 0.382) = 78\ fledglings$$

Based on the information provided, the total combined mitigation benefit at Makamakaʻole and Lānaʻihale from 2015 to 2022 is 89.72 adult Hawaiian petrel exceeding the required mitigation of 64.48 adult Hawaiian petrel for KWP I and KWP II. Please see the table in Enclosure 1 for further credit calculations in 2022.

If you have any questions, please contact Emma Gosliner, Fish and Wildlife Biologist, at emma_gosliner@fws.gov or by telephone at 808-792-9400. When referring to this project, please include reference numbers: 2022-0025703 and 2022-0054750.

Sincerely,

LORENA WADA

Digitally signed by LORENA WADA
Date: 2023.03.27 15:54:42 -10'00'

Lorena Wada
Planning and Consultation Team Manager

cc: Myrna Girald-Perez, Hawai'i Division of Forestry and Wildlife
Jennifer Taylor, Tetra Tech, Inc.
Tom Snetsinger, Tetra Tech, Inc.

Enclosure 1

Table 1. KWP Hawaiian Petrel Mitigation Credit Calculation (2015-2022) Breeding Seasons

Site Year	**Hawaiian Petrels**	**Annual Increased Adult Survival**	**Annual Adult Survival Mitigation benefit**	**Hawaiian Petrel Fledglings**	**Probability of Fledgling Survival**	**Adult Equivalents of Fledgling Mitigation Benefit**	**Combined Mitigation Benefit**
Makamakaʻole 2015	0	0.13	0	0	0.3	0	0
Makamakaʻole 2016	2	0.13	(2 × 0.13) 0.26	0	0.3	0	0.26
Makamakaʻole 2017	2	0.13	(2 × 0.13) 0.26	0	0.3	0	0.26
Lānaʻihale 2018	204	0	0	36	0.3	(36 × 0.3) 10.8	10.80
Lānaʻihale 2021	336	0.05	(336 × 0.05) 16.8	70	0.3	(70 × 0.3) 21.0	37.80
Lānaʻihale 2022	344	0.05	(342 × 0.05) 17.2	78	0.3	(78 × 0.3) 23.4	40.60
Total Estimated Benefit (Adult Hawaiian Petrels)							89.72

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
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COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 12, 2024

Molly Stephenson,
Kaheawa Wind Power, LLC
TerraForm Renewable Energy
200 Liberty Street
14th Floor
New York, NY 10281

Subject: Mitigation Credit Quantification for the Nēnē Management Work for Kaheawa Wind I for FY 2024 and Reimbursement of Hawai'i Department of Transportation Management Funds in 2012-2018 at Haleakalā Ranch

Dear Ms. Stephenson:

The Division of Forestry and Wildlife (DOFAW) would like to address the nēnē credits allocated for the management and maintenance activities performed by TerraForm at Haleakalā Ranch in FY 2024 as well as part of the Hawai'i Department of Transportation (HDOT) translocation management efforts. This concerns the mitigation credit obligation for Kaheawa Wind Power I (KWP I) Habitat Conservation Plan. In this letter, we focus on the quantification of credit for Haleakalā Ranch's adult survival and fledgling production for Fiscal Year (FY) 2024, as well as the repayment of HDOT funds for the management of nēnē at Haleakalā Ranch in the years 2012-2018.

Tables 1 and 2 indicate the corresponding credits for 2024 nēnē breeding seasons and HDOT 2012-2018 management work at Haleakalā Ranch. Table 3 summarizes the total mitigation credits KWP I has accrued for nēnē mitigation to this date.

For Fiscal Year 2024, KWP I supported 18 breeding adults' survival, providing KWP I with 0.56 adult survival credits. KWP I produced six fledglings at Haleakalā Ranch. Once the six fledglings are converted to adult credits by assuming an 80% survival for 3 years, the credit is 3.07. The total credits combined are 3.63 and are indicated in Table 1. In September 2024, TerraForm made a $228,585 payment to the Hawai'i Department of Transportation to cover the nēnē management 100% at Haleakalā Ranch for the years 2012-2018. This provides KWP I with an additional 13.05 credits for nēnē mitigation (Table 2).

Table 1. DOFAW updated nēnē mitigation credits for KWP I from FY 2024 at Haleakalā Ranch

Year	Fledglings (Fledglings)	Adult Survival (Adults)	Combined Mitigation (Adults)[1]
2024	6	3.07	3.63

[1] = Combined Mitigation = (Adult Survival) + (Fledglings × 0.8^3); fledglings converted to adults based on 80% annual survival for 3 years

Table 2. Haleakalā Ranch Additional Management Credits for KWP I from HDOT Reimbursement

Year	Haleakalā Ranch Additional Nēnē Management Credits from HDOT Reimbursement
2012	0.80
2013	1.98
2014	2.05
2015	1.49
2016	2.76
2017	3.50
2018	0.47
Total	**13.05**

Table 3. Total Nēnē Mitigation Credits to date for KWP I

Mitigation Type	Combined Mitigation (Adults)
2011-2023*	29
FY 2024	3.63
HDOT	13.05
Total:	**45.68**

*total credits from DOFAW letter dated on July 12th, 2024

Thus, this memo reflects a total of 16.68 additional credits allocated to KWP I, bringing their total credit for nēnē mitigation as of the date of this letter to **45.68** (Table 3). Please direct any questions or concerns to the DOFAW Habitat Conservation Plan Associate Kinsley McEachern at Laurinda.k.mceachern.researcher@hawaii.gov.

Sincerely,

DGS

David G. Smith
Administrator

Cc: Tetra Tech, Troy Rahmig, Troy.rahmig@tetratech.com
Tetra Tech, Jennifer Taylor, jennifer.taylor@tetratech.com
USFWS, Deena Gary, Deena_gary@fws.gov

From: Gary, Deena T
To: Stephenson, Molly; jennifer.taylor@tetratech.com; Rahmig, Troy; Kawal, Tony
Cc: Wada, Lorena; Nadig, Aaron; Behnke, Jessica L; Dedrick, Jonah G
Subject: KWP I & II Nene Mitigation Calculations
Date: Tuesday, December 10, 2024 8:24:53 PM

Hi Molly,

On March 29, 2022 the Service issued a letter to Mr. Jonathan Kirby recognizing the nene mitigation status of both KWP I and KWP II. The letter assessed mitigation work between 2009-2020 at the Haleakala Ranch nene pen and the Piʻiholo nene pen. The Service acknowledged that as of March 29, 2022 KWP I had met 21.46 birds of their required nene obligation while KWP II had met 9.09 of its required nene obligation. Between the years of 2009-2018, KWP I funded a proportion of the work completed at the Haleakala pen and therefore was recognized for their proportion of the success of the population at the pen.

In a memo dated June 27, 2024 Terraform proposed a reimbursement of funding provided by HDOT for management of the Haleakala Ranch nene pen for the years 2008-2018. In this proposal, upon reimbursement to HDOT, KWP I would then be accredited for the full success of the Haleakala Ranch nene pen for the years 2008-2018.

This email updates the 2008-2018 nene calculations for Haleakala Ranch pen as well as calculates the efforts of the 2021-2024 breeding seasons for both KWP I and KWP II. Based on the information provided to the Service by Terraform and DOFAW, to date KWP I has met 45.65 nene of their required mitigation and KWP II has met 12.59 nene of their required mitigation. At this time, mitigation has not been completed and is still ongoing for KWP I and KWP II.

We are committed to working with you in partnership and appreciate your efforts to conserve protected species. Please let me know if you have any questions.

Deena Gary
Fish and Wildlife Biologist
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaiʻi 96850
Phone: 808-460-7709
Email: Deena_Gary@fws.gov

DAVID Y. IGE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

December 5, 2022

Mr. Miguel Rosales
Kaheawa Wind Power II, LLC
200 Liberty Street, 14th Floor
New York, NY 10281

Dear Mr. Rosales:

This letter details the Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) credit determination for Newell's Shearwater (*Puffinus newelli*) necessary to fulfill the mitigation requirements for the Habitat Conservation Plans (HCP) of both the Kaheawa Pastures (KWP I) and Kaheawa Wind Power II (KWP II) Wind Energy Projects. Our assessment and credit calculations for the 2022 seabird season at the Makamakaʻole Seabird Restoration / Mitigation Site on Maui are based on a) the September 1 – October 10 monthly update report of the "Makamakaʻole Threatened and Endangered Seabird Mitigation Project" and b) an Excel spreadsheet of preliminary burrow occupancy data from this project for the period April 5 to October 18, 2022. Both the report and data were provided by Tetra Tech. Here, however, we deliver our final credit assessment for the years 2016 through 2022 and therefore incorporate our analysis from prior years as detailed and discussed in our letter to you dated March 4, 2022.

Brookfield's total combined mitigation offset required for Newell's Shearwaters under the KWP I and KWP II HCPs was 6.358 credits. Mitigation credit accrued by Brookfield at completion of the 2021 seabird nesting season was calculated as 6.418 for the protection of 115 adult and success of one fledgling Newell's Shearwaters. Based on the language in section 6.3.6 ("Measures of Success") of the KWP II final HCP, however, "mitigation will be deemed to be successful if mitigation efforts result in one more fledgling or adult than that required to compensate for the requested take". Entering the 2022 breeding season, therefore, Brookfield was required to achieve a total of 6.358 credits plus one additional fledgling (i.e., 6.681 credits total) or one adult equivalent (i.e., 7.358 credits total) to reach their mitigation target.

After review of the provided report and burrow occupancy data, we determined that 33 adult Newell's Shearwaters are creditable in 2022 for calculation of adult survival. Adding these results to the previous credit determination for 2016 through 2021 (n = 115 adults) yields a total to date of 148 adults creditable for the Adult Survival Benefit (Table 1). We were also informed via email from Tetra Tech that a chick produced in 2022 fledged on or around 27 October, resulting in a total of two fledged young for the project (Table 1).

Table 1. Creditable Newell's Shearwaters at Makamakaʻole Seabird Restoration / Mitigation Site, Maui, as determined by DOFAW for 2016 through 2022.

Credit Period		Determination of Creditable Adults
2016 - 2021		115 Adults + 1 fledgling
2022		33 adults + 1 fledgling
	Total	148 adults + 2 fledglings

Combining the Adult Survival Benefit credit for 148 adult shearwaters (7.884) and the credit for two successfully fledged chicks (0.646), DOFAW has determined that Brookfield achieved a total credit of 8.530 as a result of their mitigation efforts at Makamakaʻole (Table 2) and has completed their mitigation obligations for NESH under the KWPI and KWPII HCPs.

Table 2. DOFAW total credit determination for mitigation work at Makamakaʻole, Maui, from 2016 through 2022.

Category	Credit
Adult Survival Benefit (based on 148 adults × 0.053 [*Adult Survival Credit*])	7.884
Fledgling to Adult Equivalent (based on 2 fledglings × 0.323 [*Likelihood of Survival to Adult*])	0.646
Total Mitigation Credit to Date	8.530

We appreciate your continued efforts to work with our office towards completion of Brookfield's mitigation requirements as put forth in the KWP I and KWP II HCPs for the conservation of and net benefit to our native species. If you have any questions or concerns, please direct them to Paul Radley at (808) 295-1123 or paul.m.radley@hawaii.gov.

Sincerely,

Lainie Berry

LAINIE BERRY
Wildlife Program Manager

cc: Tetra Tech, Jennifer Taylor, jennifer.taylor@tetratech.com
U.S. Fish and Wildlife Service, Emma Gosliner, emma_gosliner@fws.gov

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To: 2022-0025703
2022-0054750

December 8, 2022

Mr. Jonathan Kirby
Compliance Manager
Brookfield Renewable Partners
200 Liberty Street, Floor 14
New York, New York 10281

Subject: Kaheawa Wind Power Newell's Shearwater Mitigation Credit at Makamakaʻole, Maui Incidental Take Permits TE27260A-1 and TE118901-0

Dear Mr. Kirby:

The purpose of this letter is to address mitigation credit for Newell's shearwater at the Makamakaʻole Seabird Mitigation Site (Makamakaʻole) on the island of Maui. The Service approved Brookfield Renewable Partners (Brookfield) use of this seabird mitigation site in January 2012 to fulfill the Newell's shearwater mitigation requirements of their Kaheawa Wind Power I (KWP I) and Kaheawa Wind Power II (KWP II) Incidental Take Permits (TE27260A-1 and TE118901-0). The site has been successfully attracting Newell's shearwater since 2014 and produced its first fledging in 2021. We received your November 12, 2022 memorandum and request for concurrence of the fulfillment of mitigation benefits for Newell's shearwater based on the 2022 breeding season.

Newell's shearwater mitigation creditable through 2021 was calculated at 6.418 adult equivalents, with 115 potentially breeding birds consistently occupying burrows, as well as one fledgling as documented in the Service's May 23, 2022 letter. To meet the mitigation requirement based on the take authorization, KWP I and KWP II need a total of 6.358 adult credits plus one additional fledgling or adult for the 2022 breeding season. The 2022 breeding season documented adult occupancy of 34 birds with an additional calculated credit of 1.802 (See Table 1).

Table 1. Newell's shearwater credit for KWP I and KWP II achieved at the Makamaka'ole site during 2022 breeding season.

Burrow Number	Year	Brookfield's Credit Request	Service's Credit Determination	Fledgling Credit	Justification
A8	2022	0.106	0.106	-	Consistently active May through end of September. Pair documented in box.
A9	2022	0.053	0.053	-	Consistently active through end of September. Game camera footage of 1 bird.
A12	2022	0.106	0.106	-	Consistently active June through end of September. Egg produced.
A14	2022	0.106	0.106	-	Consistently active April through end of September. Game camera footage of two birds and pair documented in box.
A20	2022	0.106	0.106	-	Consistently active April through end of September. Game camera footage of two birds and egg produced.
A21	2022	0.106	0.106	-	Consistently active April through end of September. Game camera footage of two birds. Nest cup in box.
A22	2022	0.106	0.106	-	Consistently active April through the end of September. Pair documented in box.
A24	2022	0.106	0.106	-	Consistently active April through the end of September. Game camera footage of two birds and egg produced.
A25	2022	0.106	0.106	1(0.323)	Consistently active April through October. Game camera footage of two birds, chick produced, and fledged in October.
A26	2022	0.106	0.106	-	Consistently active April through the end of September. Game camera footage and egg produced.
A29	2022	0.053	0.053	-	Consistently active July through late September. Nest cup.
A32	2022	0.106	0.106	-	Consistently active April through August; Game camera footage and egg produced.
A39	2022	N/A[1]	N/A[1]	-	Active July 20, August 8, September 9. Game camera footage of two birds on September 9. Two birds in the nest box on August 4.
A43	2022	0.106	0.106	-	Consistently active April through the end of September and egg produced.

A44	2022	0.106	0.106	-	Consistently active May through the end of September. Egg produced. Two birds observed in box.
A48	2022	0.106	0.106	-	Consistently active March through the end of September. Egg produced. Two birds observed in box.
A-51	2022	0.106	0.106	-	Consistently active May through end of September. Natural burrow explored with burrow scope. Egg produced.
B-22	2022	0.106	0.106	-	Consistently active April through the end of September. Egg produced.
B-24	2022	0.053	0.053	-	Active June through Sept. Nest cup.
B-38	2022	0.053	0.053	-	Consistently active June through September. Nest cup.
Total 2022 Credit:		1.802	1.802	0.323	2.125

[1] No credit claimed based on preliminary conservative assessment.

Brookfield and the Service have agreed on the following formulas to determine adult survival benefit and fledgling to adult equivalent:

Adult survival benefit: (# of benefiting adults) × (0.053 [adult survival credit])
Fledgling to adult equivalent: (# of fledglings) × (0.323 [likelihood of survival to adulthood])

Using values provided by Tetra Tech and the Service's credit assessment, the following equations were used:

2016 - 2021 Adult survival benefit: (115 adults) × (0.053) = 6.095 credit
2022 Adult survival benefit: (34 adults) × (0.053) = 1.802 credit
Total adult survival benefit: 6.095 + 1.802 = 7.897

2016 – 2021 Fledgling to adult equivalent: (1 fledgling) × (0.323) = 0.323 credit
2022 Fledgling to adult equivalent: (1 fledgling) × (0.323) = 0.323 credit
Total fledgling to adult equivalent: (0.323) × (0.323) = 0.646 credit

Based on these determinations (Table 1), 7.897 adult occupants and 0.646 fledgling equivalents are credited to KWP I and KWP II from 2016-2022 breeding seasons. The total combined mitigation credit at Makamaka‘ole to date is 8.543. To date, Brookfield has fulfilled their mitigation credit requirement for Newell's shearwater.

We are committed to working with you in partnership and appreciate your efforts to conserve protected species. If you have any questions, please contact Emma Gosliner, Fish and Wildlife Biologist, at emma_gosliner@fws.gov or by telephone at 808-792-9400. When referring to this project, please include reference numbers: 2022-0025703 and 2022-0054750.

Sincerely,

LORENA WADA

Digitally signed by LORENA WADA
Date: 2022.12.08 11:01:52 -10'00'

Lorena Wada
Planning and Consultation Team Manager

cc: Paul Radley, Hawai‘i Division of Forestry and Wildlife
Jennifer Taylor, Tetra Tech, Inc.
Tom Snetsinger, Tetra Tech, Inc.

Appendix D. Scope of Work (SOW) for Haleakalā Ranch Nēnē Pen

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Haleakala Ranch Nēnē Release Pen
Management Scope of Work

1.0 Project Description and History

The Haleakala Ranch Nēnē Release Pen, located on private ranchland (Haleakala Ranch; the Ranch) on the south flank of Haleakala on the Island of Maui, is a 23-acre maintained breeding area for the Hawaiian goose or nēnē, a species afforded regulatory protection under the U.S. Fish and Wildlife Service (USFWS) via the Endangered Species Act (designated Threatened 4(d)) and listed as endangered by the State of Hawaiʻi. Development of the release pen was funded by the Kaheawa Wind Project I (KWP I) as a component of its Habitat Conservation Plan (HCP) designated mitigation program for the nēnē. Pen construction was completed by the State of Hawaii's Department of Land Management's Division of Forestry and Wildlife, Maui branch office (DOFAW Maui) in 2011, and a joint federal and state Safe Harbor Agreement (SHA) was developed in conjunction with the landowner in 2019 to benefit the recovery of the species on 3,056 acres of privately-owned ranchland. The SHA conservation measures on Haleakala Ranch include nēnē habitat improvement and maintenance, establishment and maintenance of the nēnē release pen, and control of predators. KWP I historically provided funding to DOFAW Maui to carry out the scope of work as outlined in the SHA. Additionally, due to the sale of Pi`iholo Ranch, Kaheawa Wind Project II's (KWP II) original nēnē mitigation program site, KWP II's nēnē mitigation program was adaptively managed, in conjunction with DOFAW HCP staff, to be relocated to Haleakala Ranch. In August 2021, DOFAW HCP staff requested that KWP I and KWP II directly manage the maintenance and upkeep of the Haleakala Ranch release pen as a part of the KWP I and KWP II nēnē mitigation program, rather than funding DOFAW Maui to complete the work.

This document is intended to provide the specific scope of work guiding KWP I and KWP II's management actions. KWP I and KWP II anticipates the division of pen management and oversight responsibilities with DOFAW Maui as outlined in Table 1. Items identified as the responsibility of KWP I and KWP II are further described in Section 2.

Tetra Tech, Inc.
737 Bishop St., Suite 2340, Mauka Tower, Honolulu, HI 96813
Tel 808.441.6655 www.tetratech.com

Table 1. Responsibilities by Party

Task	DOFAW Maui	KWP I and KWP II
Fencing and Water System		
Provide materials for and complete maintenance of release pen and water source (catchment system) and related structures, including, but not limited to fencing and storage shed	No	Yes (See Task 3 and Task 4)
Pen expansion plans	Advise on expansion plans already in existence	Execute pen expansion plans with DOFAW guidance
Provide adequate supply of supplemental feed and water within the release pen, consistent with SHA Appendix III and in consideration of DOFAW recommendations.	No	Yes (See Task 3 and Task 4)
Vegetation Management		
Maintain appropriate habitat conditions through routine vegetation management activities including: • Mowing • Weed whacking along fence lines • Non-native and/or invasive vegetation removal (i.e., mechanical or targeted herbicide application) • Maintaining low shrubs for suitable nesting habitat	No	Yes (See Task 2)
Predator Control		
Ongoing predator control including the use of DOC200s, A24s, and minimal Tomahawk traps. Additional trap types may be added over time in consultation with DOFAW Maui.	No	Yes (See Task 1)
General Compliance		
Identification and funding of material resources (e.g., vehicles, mowers, sprayers) and facility repairs (e.g., roads, fences, gates, storage facilities, water source infrastructure) needed to execute all management and monitoring activities	No	Yes (See Task 3)
Care and Release of Nēnē (subject to funding and personnel limits)		
Provide physical examinations and necessary medical care for nēnē	Yes	No
Prior to release, band all nēnē with aluminum USFWS bands and uniquely coded color plastic bands as appropriate.	Yes	No
Injury handling and mortality salvaging of nēnē	Yes	No
Nēnē Monitoring		
Monitor nēnē through weekly census of individuals on site inside of and outside of the release pen areas during breeding season and biweekly census pre- and post- breeding season.	No	Provide annual summary to DOFAW Maui of incidental sightings of banded and unbanded individuals, including band numbers as possible.

Task	DOFAW Maui	KWP I and KWP II
Conduct annual survey (approximately July – August) on maintained nēnē habitat to determine population estimates, nest success, and distribution	Yes	Provide annual summary to DOFAW Maui of incidental sightings of banded and unbanded individuals, including band numbers as possible.
Will conduct fall nest survey and provide Ranch with GPS locations of all nest and gosling locations that fall outside of the pen boundaries.	Yes	Provide annual summary to DOFAW Maui of incidental sightings of banded and unbanded individuals, including band numbers as possible.
Maintain representative photo plots to illustrate habitat condition	No	Yes, supplemental (See Task 5)
Annual fledging assessment from the Haleakala Ranch release pen	Yes	Will provide incidental sightings
Regular communication between DOFAW Maui, Ranch, and KWP I and KWP II	Yes	Yes
Reporting		
KWP I and KWP II annual report to DOFAW Maui to be shared with DOFAW HCP which provides predator control data, summary-level data on incidental observations inclusive of game camera footage review and annual maintenance actions and expenditures. Due to DOFAW Maui August 1 after each breeding season (October–April) and to cover work for the previous fiscal year (July 1 – June 30).	No	Yes
DOFAW Maui annual report to KWP I and KWP II which tabulates the number of sightings, nesting attempts by category including number of eggs, and total number of goslings and fledglings. Due to KWP I and KWP II by the end of August after the breeding season (October – April) in each year.	Yes	No

2.0 Scope of Work

Below are the tasks to be conducted by KWP I and KWP II. Work is anticipated to occur year-round, both during the generalized breeding season of October – April and generalized non-breeding season of May – October at the Haleakala nēnē release pen. Task descriptions, frequency, and equipment needed to perform tasks are included. Any contractors utilized to complete tasks will be vetted by the Halealaka Ranch management team. Note: equipment not listed in Table 2 below include a 4x4 Utility Terrain Vehicle (UTV) with at least 12 inches of ground clearance and a trailer to haul said UTV to the job site, to be provided by KWP I and KWP II or contractor. Additionally, the frequency of site visits is dependent on conditions of the access road and approval by the Ranch per KWP I and KWP II's right-of-entry agreement.

2.1 Task 1: Predator Control

KWP I and KWP II will continue ongoing predator control efforts, including maintaining a trapline equivalent of the 30 Tomahawk live traps and 10 A24 rat traps inherited from DOFAW Maui in December 2022, at all times. Traps will be set once-per-week during the breeding season and twice monthly during the non-breeding season, both inside and outside of the pen, however limited trapping will occur outside of the pen when cattle are present in the vicinity. KWP I and KWP II understand that wild dogs are of concern at the site; if wild dogs are observed, KWP I and KWP II will work with DOFAW Maui on how to approach the situation in accordance with the Ranch.

A summary of trapping effort and results will be provided to DOFAW Maui from KWP I and KWP II and included in the annual report. The number of traps may be increased as need demonstrates. Additionally, KWP I and KWP II will consider using tracking tunnels as an adaptive management action should game cameras demonstrate need. KWP I and KWP II will work in conjunction with DOFAW to develop a protocol, as needed.

Table 2. Trapping

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: One time per week Non-Breeding Season: Twice per month
Supplies	• Minimum of ~40 predator control traps (combination of DOC200s, A24s, Tomahawk, AT220) • Trap bait • Nitrile gloves • Cell phone or tablet for data collection • 0.22 pellet rifle for predator dispatch
Description	Place and maintain a trapping network around the perimeter of the Release Pen; maintain log of removed predators by species and trap type. A metallic mesh cloth ("gosling guard") will be attached to the entrance of all live traps and other selected traps to prevent nēnē, from entering.
Notes	KWP I and KWP II understand that the 30 tomahawk live traps and 10 A24 traps used by DOFAW prior to our involvement may be replaced by KWP I and KWP II with trap equivalents. Replacement traps, provided by KWP I and KWP II, may be needed to ensure full coverage in the future and/or additional traps would be added if expansion of trapping activities occurs.

2.2 Task 2. Vegetation Management

This task includes three separate activities: mowing, weed whacking and non-native vegetation removal. Vegetation management will be conducted by KWP I and KWP II. The overall goal of these activities is to provide an attractive habitat feature to encourage return of breeding nēnē. Tables 3 through 5 summarize the frequency with which the activities will occur.

Table 3. Mowing

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: One time per week Non-Breeding Season: Twice per month
Supplies	• Honda HRX hand push lawn mower and drive mower • Weed whacker • Gasoline • PPE (ear protection, safety glasses)
Description	Weekly mowing of areas within fencing using a combination of push and drive mowers. A 100-meter buffer will be applied to active nēnē nests, with no vegetation management activity occurring within the buffered zone.
Notes	KWP I and KWP II will provide a hand mower and drive mower for use at the site.

Table 4. Weed Whacking

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: Twice per month Non-Breeding Season: Once per month
Supplies	• Weed whacker • Gasoline/oil mix • Personal Protective Equipment (PPE; ear protection, safety glasses)
Description	Weed whacking of fence line in locations where mower cannot reach.
Notes	KWP I and KWP II, through their contractor, will supply materials.

Table 5. Non-native/Invasive Vegetation Removal

Responsible Party	KWP I and KWP II
Frequency	Twice yearly
Supplies	• Chainsaw • Gasoline/oil mix • Targeted herbicide application • PPE (ear protection, safety glasses, gloves)
Description	Non-native vegetation removal (specifically: lantana, guava, tomato, Bocconia, fireweed, and bur) and targeted herbicide application, as necessary, to occur inside the release pen fence.

	Non-native vegetation removal will occur in instances where the invasion of such vegetation is changing the intended habitat quality for nēnē and possibly compromising the success of the program.
Notes	Contractor will supply tools for this job.

2.3 Task 3. Facility Maintenance

The goal of this task is to provide a secured area with appropriate habitat in which adults may attempt to breed and the facilities and infrastructure to maintain that area. The existence of secured, predator deterrent fencing ensures increased survival of adults using the pen. Table 6 includes the level of maintenance required to keep the fence functional, while Table 7 addresses road facilities necessary to facilitate implementation of the program.

Table 6. Predator Deterrent Fence Maintenance

Responsible Party	KWP I and KWP II
Frequency	Weekly monitoring during the breeding season, twice monthly during the non-breeding season. Fence maintenance/repair as needed.
Supplies	Various fence supplies including but not limited to wire fencing of sufficient gauge, posts, gates, electric wire, energizer, and various hardware.
Description	Continue to monitor, repair/maintain fences around enclosures including maintenance of electrified portion.
Notes	KWP I and KWP II will fund and complete all predator deterrent fence repair supply needs.

Table 7. Road System Maintenance

Responsible Party	KWP I and KWP II will provide $10,000/year for road repair directly to Ranch Ranch will complete road repairs, including major repairs
Frequency	Ongoing monitoring of road system and coordination with Ranch regarding repairs.
Supplies	As determined by Ranch input. Potentially, various levels of maintenance utilizing small handheld equipment up to large road work machinery.
Description	Ranch, KWP I, and KWP II will create an annual road repair plan to outline anticipated repair and maintenance needs on an annual basis. KWP I and KWP II will monitor (and potentially repair/maintain) roads leading to and around enclosures in coordination with Ranch, allowing all management and monitoring activities to occur uninterrupted.
Notes	KWP I and KWP II will fund road repair supply needs for roads needed solely for the nēnē release pen program. Ranch will be responsible for completing road repairs, unless otherwise agreed to in the road repair plan. The financial responsibility for road repairs beyond the annual $10,000 contribution will be determined in a cost-share agreement between the Ranch and KWP I and KWP II depending on frequency of use between all parties. The annual road repair plan will be created each year during the completion of the annual report and will prioritize which road repair projects shall be completed the following year. During the completion of the annual road repair plan, it will be determined whether larger repair projects

	are needed that would require funding beyond $10,000, and what the cost share will be between the Ranch and KWP I and KWP II.

2.4 Task 4. Watering System Maintenance and On-site Feeders

KWP I and KWP II understand that key habitat features of the release pens are access to water and supplemental feed. KWP I and KWP II will maintain the watering system currently in place at the pens including the catchment system, will maintain appropriate levels of water within watering bins, and provide feed within on-site galvanized feeding bins. KWP I and KWP II will supply supplemental water to the two water tanks onsite at times when tanks are dry, and will procure and supply feed, in consideration of brand/store input from DOFAW Maui. KWP I and KWP II plan to provide supplemental feed during the nesting season when goslings in the pen are too young to fly out to forage elsewhere. Table 8 summarizes how these activities will occur.

Table 8. Watering System Maintenance and Feeding Program

Responsible Party	KWP I and KWP II
Frequency	Varies by task component (see Description below)
Supplies	• Various irrigation supplies, including but not limited to, pump, piping connecting source to pools and watering holes, hoses, spigots, watering bins, patches and sealant • Supplemental feed (chick crumble may be used) • Water as necessary; note water supply is self-contained and does not rely on Ranch water supplies or equipment
Description	• Allow collected water to fill watering holes (weekly during breeding season), check hoses for leaks/air, remove air from system as needed, ensure system working properly (monthly) • Procure supplemental feed during nesting season • Refill galvanized feeding bins as needed, replace as determined by significant rusting. • Transport feed and water to site as needed • Regular cleaning of watering bins and feeders during breeding season
Notes	KWP I and KWP II will fund and complete all watering system repairs and provide supplemental water as environmental conditions dictate. No Ranch water will be needed to fulfill this program.

2.5 Task 5. Data Collection and Reporting

The data collection described below will provide information to DOFAW Maui's current data collection program, summarized in Table 1, which is focused on assessing the number of successfully fledged nēnē during any given breeding season (October – April). KWP I and KWP II will collect observation data with each site visit. Observation data will include date of visit, number of observed adults (with band numbers as possible), number/age of fledglings, number and status of nests (number and condition of eggs as possible without nest disturbance) inside the pen, family size and pairs associated with nest location), number and status of nests outside of the pen (number and condition of eggs as possible without nest disturbance). Additionally, and while not analyzed, standard weather data will also be recorded during each visit.

KWP I and KWP II will report nēnē observation data to DOFAW Maui and will include focused effort inside the fence to determine the outcomes of nesting activity. KWP I and KWP II anticipate utilizing a minimum of three game cameras at various locations inside the release pens to provide further context for visual observations and gosling assessment.

By the end of August after each annual breeding season, DOFAW Maui will provide a single annual report to KWP I and KWP II which tabulates the number of sightings, nesting attempts by category including number of eggs, and total number of goslings and fledglings based on data provided by KWP I and KWP II. This report is required for submission with the KWP I and KWP II HCP implementation annual reports. Details regarding data collection are summarized in Table 9.

Table 9. Data Collection

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: One time per week Non-Breeding Season: Twice per month
Supplies	• Cell phone or tablet for data collection • Access to Iform (or similar electronic data collection framework) database • Game cameras • Batteries and SD cards for game cameras
Description	KWP I and KWP II will record incidental nēnē observations, collect game camera footage, collect trapping data, track maintenance and repairs performed per above tasks (including vegetation management activities), record general habitat conditions, record nest locations and record the activities completed during each site visit.
Notes	KWP I and KWP II will utilize its Iform database for all data collection. KWP I and KWP II will provide up to 3 game cameras in order to provide additional information regarding nēnē utilization of the release pen; cameras may be fixed or moved to locations of interest. KWP I and KWP II will track habitat conditions recorded at habitat points of interest.

General Reporting and Communication

There will be regular and informal communication via phone call or email between KWP I and KWP II and DOFAW Maui regarding site visits. KWP I and KWP II will immediately report to DOFAW Maui unusual observations, concerns about the site and/or injured or deceased individual nēnē. KWP I and KWP II will provide scope of work updates, monthly, which will provide a high-level summary of actions and observations during the month. KWP I and KWP II will also communicate all nest locations to DOFAW via written communication using Google Earth maps and UTMs as the metric of location data.

DOFAW Maui will communicate with KWP I and KWP II or its contractor any incidents or information that will impact KWP I and KWP II's work or success of the release pens.

Annual Reports

Two annual reports will be developed as a result of this scope of work.

1. KWP I and KWP II will prepare a single annual report for submission to DOFAW Maui which will be shared with DOFAW HCP staff. This report will include nesting data inclusive of egg production (to the extent this data is collectable), nēnē observations summary-level data inclusive of game camera footage, summaries of predator trapping by trap type and species contextualized by number of trap nights, and annual maintenance actions and expenditures. KWP I and KWP II will also include any notable findings that are telling, regarding the success or failure of the program. KWP I and KWP II will provide this report to DOFAW Maui by August 1, after each breeding season.
2. DOFAW Maui will prepare a single annual report for submission to KWP I and KWP II. The report will tabulate the number of sightings, nesting attempts by outcome: successful, abandoned, depredated, failed and renest; number of eggs observed and their outcome, and total number of goslings and fledglings. DOFAW Maui will provide this report to by the end of August, after the breeding season in each year.

3.0 Mitigation Credit Allocation

KWP I and KWP II will share in the financial, oversight, management, and monitoring responsibilities for the work described herein, separately and in equal proportions. The completion of the tasks described Table 1 are intended to provide benefits to nēnē and thus satisfy mitigation requirements set forth in the KWP I and KWP II HCPs, ITPs, and ITLs. The information in Table 1 is drawn largely from the SHA and supplemented with standards of practice that have been established since the release pen was established.

Mitigation credits achieved through management of the at the Haleakalā Ranch release pen will be allocated per project will be based upon individual project mitigation needs discussed annually and determined appropriate in consultation with DOFAW, USFWS, and KWP I and KWP II. In a given year, KWP I or KWP II may have a greater or lesser mitigation need depending on take, lost productivity, permit term, and other considerations. The specific apportionment of credit will be based on these considerations and developed in consultation with DOFAW, USFWS, and KWP I and KWP II.

4.0 Assumptions

KWP I and KWP II's ability to implement this Scope of Work is dependent upon the existence of the SHA. Therefore, KWP I and KWP II has made the following assumptions regarding SHA compliance.

As changing conditions around the SHA may have implications for mitigation, KWP I and KWP II anticipate the following:

- The Haleakala Ranch is in compliance with all requirements outlined in the SHA at all times.
- KWP I and KWP II will be notified by DOFAW Maui within 48 hours of any information they receive from the Haleakala Ranch pursuant to Section 7 of the SHA.
- Responsibilities outlined for DOFAW Maui in Section 7B of the SHA are divided between DOFAW Maui and KWP I and KWP II as summarized in Table 1 of this document and will be adhered to by both parties.
- When KWP I and KWP II assume responsibility for the items summarized Table 1, the management and condition of the site will be "in compliance" with the terms of the SHA. Any variance in site conditions relative to the terms of the SHA, when KWP I and KWP II assume responsibility of the site, will be disclosed in the next available Annual Reports prepared by each party.

Appendix E. Draft Scope of Work (SOW) for Pu‘u O Hōkū Ranch Nēnē Pen

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ATTACHMENT 1

Puʻu O Hōkū Ranch Nēnē Pen Management
DRAFT Scope of Work

This document is intended to provide the specific scope of work guiding KWP I and KWP II's management actions at the Puʻu O Hōkū Ranch nēnē pen. KWP I and KWP II anticipate the division of pen management and oversight responsibilities with DOFAW Maui as outlined in Table 1. The actions in this scope of work are considered supplemental to the Moloka'i Supplemental Nene Translocation Plan (DOFAW 2025[1]). The activities within the translocation plan are the responsibility of DOFAW; activities related to that plan are therefore not included in this scope of work. Items identified as the responsibility of KWP I and KWP II are further described in Section 2.

Table 1. Responsibilities by Party

Task	DOFAW Maui	KWP I and KWP II
Fencing and Water System		
Replace/repair pen prior to initial translocation,	Yes	No
Maintain interior holding pens for future translocations.	Yes	No
Provide materials for and complete maintenance of pen and water source and related structures, including, but not limited to fencing and storage shed	No	Yes (See Task 3 and Task 4)
Provide adequate supply of supplemental feed and water within the pen, in consideration of DOFAW recommendations.	No	Yes (See Task 3 and Task 4)
Vegetation Management		
Maintain appropriate habitat conditions through routine vegetation management activities including: • Mowing • Weed whacking along fence lines • Non-native and/or invasive vegetation removal as appropriate (i.e., mechanical or steam treatment) • Maintaining low shrubs for suitable nesting habitat	No	Yes (See Task 2)
Predator Control		
Ongoing predator control including the use of AT220s, DOC200s, A24s, and minimal Tomahawk traps. Additional trap types may be added over time based on site needs.	No	Yes (See Task 1)
Barn owl control as needed.	No	Yes (See Task 1)
General Compliance		
Identification and funding of material resources (e.g., vehicles, mowers, sprayers) and facility repairs (e.g., fences, gates, storage facilities, water source infrastructure) needed to execute all management and monitoring activities	No	Yes (See Task 3)
Care and Release of Nēnē (subject to funding and personnel limits); following the procedures outlined in the Molokai Supplemental Translocation Plan (DOFAW 2025)		

[1] State of Hawaiʻi Department of Land and Natural Resources Division of Forestry and Wildlife. 2025. Molokaʻi Supplemental Nēnē Relocation Plan. March 2025.

Task	DOFAW Maui	KWP I and KWP II
Release cohorts of banded nene in numbers necessary to establish a viable population in the area	Yes	No
Provide physical examinations and necessary medical care for nēnē	Yes	No
Prior to release, band all nēnē with aluminum USFWS bands and uniquely coded color plastic bands as appropriate. Add satellite tags to nēnē as appropriate.	Yes	No
Injury handling and mortality salvaging of nēnē, including coordination of necropsies if warranted	Yes	No
Nēnē Monitoring		
Band juveniles annually prior to fledging with unique tags and provide tag details to KWP I and KWP II.	Yes	No
Provide satellite tags, attach tags to select nēnē, and provide KWP I and KWP II with access to satellite tag data.	Yes	No
Collect and analyze satellite tag data.	No	Yes
Monitor nēnē through weekly census of individuals on site inside of and outside of the pen areas during breeding season and biweekly census pre- and post- breeding season, including locations and status of nests	No	Yes. Provide annual summary to DOFAW Maui of incidental sightings of banded and unbanded individuals, including band numbers as possible. Collect nest locations and monitor nests for status. Provide DOFAW Maui with annual summary of nest locations and outcomes.
Conduct annual survey (approximately July – May) on maintained nēnē habitat to determine population estimates, nest success, and distribution	Yes	Provide annual summary to DOFAW Maui of incidental sightings of banded and unbanded individuals, including band numbers as possible.
Maintain representative photo plots to illustrate habitat condition	No	Yes, supplemental (See Task 5)
Annual fledging assessment from the Puʻu O Hoku Ranch pen	Yes	Will provide sightings
Regular communication between DOFAW Maui, Ranch, and KWP I and KWP II	Yes	Yes
Reporting		
Report any observed mortalities, injuries, or disease.	Yes	Yes
KWP I and KWP II annual report to DOFAW Maui to be shared with DOFAW HCP which provides predator control data, summary-level data on incidental observations inclusive of game camera footage review and annual maintenance actions and expenditures. Due to DOFAW Maui August 1st after each breeding season (October – April) and to cover work for the previous fiscal year (July 1 – June 30).	No	Yes
DOFAW Maui annual report to KWP I, KWP II, and USFWS which tabulates the number of sightings, nesting attempts by category including number of eggs, and total number of goslings and fledglings. Due to	Yes	No

Task	DOFAW Maui	KWP I and KWP II
KWP I, KWP II, and USFWS August 1st after the breeding season (October – April) in each year.		

Scope of Work

Below are the tasks to be conducted by KWP I and KWP II. Work is anticipated to occur year-round, both during the generalized breeding season of October – April and generalized non-breeding season of May – September at the Puʻu O Hoku Ranch nēnē pen. Task descriptions, frequency, and equipment needed to perform tasks are included. Any contractors utilized to complete tasks will be vetted by the Puʻu O Hoku Ranch management team. Note: equipment not listed in Table 2 below include a 4x4 Utility Terrain Vehicle (UTV) with at least 12 inches of ground clearance, to be provided by KWP I and KWP II or contractor.

Task 1: Predator Control

KWP I and KWP II will implement an ongoing predator control effort, including maintaining a trapline, at the Puʻu O Hōkū nēnē pen. The exact layout of the trapline, including the number and type of traps, will be determined in coordination with DOFAW Maui prior to the translocation and will be adaptively managed over time based on results. Traps will be set once-per-week during the nēnē breeding season and twice monthly during the non-breeding season, both inside and outside of the pen, however trapping may occur outside of the pen. KWP I and KWP II understand that night hunting of cats is a current practice at the Ranch and will work with both the Ranch and DOFAW Maui on supporting the practice as practicable.
A summary of trapping effort and results will be provided to DOFAW Maui from KWP I and KWP II and included in the annual report. The number of traps may be altered as need demonstrates and the types of traps may be adaptively managed over time. KWP I and KWP II will work in conjunction with DOFAW to develop a protocol, as needed.

For purposes of this SOW, as stated above, the nēnē breeding season is generally considered October through April and the non-breeding season is May through September.

Table 2. Trapping

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: One time per week Non-Breeding Season: Twice per month
Supplies	• Minimum of ~40 predator control traps (combination of DOC200s, A24s, Tomahawk, AT220) • Trap bait • Nitrile gloves • Cell phone or tablet for data collection • 0.22 pellet rifle for predator dispatch
Description	Place and maintain a trapping network around the perimeter of the pen; maintain log of removed predators by species and trap type. A metallic mesh cloth (“gosling guard”) will be attached as needed to the entrance of any live traps and other selected traps to prevent nēnē, from entering.

Notes	Trapping approach and network may evolve over time; ie, trapping may be initiated throughout ranch property, as a result of adaptive management.

Table 3. Barn Owl Control, if Present and Warranted

Responsible Party	KWP I and KWP II
Frequency	As needed based on barn owl presence and impacts to the nēnē population
Supplies	To be determined, but may include: • Shotgun • Night vision goggles • Audio and/or visual attraction cues (e.g., small rodent distress calls, battery-operated lures, caged mice on T posts)
Description	Will develop a plan in consultation with USFWS and DOFAW if needed.
Notes	If barn owl control is determined to be necessary, KWP I and KWP II would acquire the necessary USFWS depredation permit and a DOFAW wildlife control permit.

Task 2. Vegetation Management

This task includes three separate activities: mowing, weed whacking and non-native vegetation removal. Vegetation management will be conducted by KWP I and KWP II. The overall goal of these activities is to provide an attractive habitat feature to encourage return of breeding nēnē. Tables 4 through 6 summarize the frequency with which the activities will occur.

Table 4. Mowing

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: One time per week, if needed Non-Breeding Season: Twice per month, as needed
Supplies	• Hand push lawn mower and drive mower • Weed whacker • Gasoline • PPE (ear protection, safety glasses)
Description	Weekly mowing of areas within fencing using a combination of push and drive mowers. A 100-meter buffer will be applied to active nēnē nests, with no vegetation management activity occurring within the buffered zone.
Notes	KWP I and KWP II will provide a hand mower and drive mower for use at the site.

Table 5. Weed Whacking

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: Twice per month Non-Breeding Season: Once per month
Supplies	• Weed whacker • Gasoline/oil mix • Personal Protective Equipment (PPE; ear protection, safety glasses)
Description	Weed whacking of fence line in locations where mower cannot reach.
Notes	KWP I and KWP II, through their contractor, will supply materials.

Table 6. Non-native/Invasive Vegetation Removal

Responsible Party	KWP I and KWP II
Frequency	Twice yearly , will adjust frequency as needed
Supplies	• Chainsaw • Gasoline/oil mix • Targeted steam application • PPE (ear protection, safety glasses, gloves)
Description	Non-native vegetation removal (specifically: lantana, guava, tomato, Bocconia, fireweed, and bur) and targeted steam application, as necessary, to occur inside the pen fence. Non-native vegetation removal will occur in instances where the invasion of such vegetation is changing the intended habitat quality for nēnē and possibly compromising the success of the program.
Notes	Contractor will supply tools for this job.

Task 3. Facility Maintenance

The goal of this task is to provide a secured area with appropriate habitat in which adult nēnē may attempt to breed and the facilities to maintain that area. The existence of secure, predator resistant fencing ensures increased survival of adult nēnē and goslings using the pen. Table 7 includes the level of maintenance required to keep the fence functional and secure from predators.

Table 7. Predator Resistant Fence Maintenance

Responsible Party	KWP I and KWP II
Frequency	Weekly monitoring during the breeding season, twice monthly during the non-breeding season. Fence maintenance/repair as needed.
Supplies	Various fence supplies including but not limited to wire fencing of sufficient gauge, posts, gates, electric wire, energizer, and various hardware.
Description	Continue to monitor, repair/maintain fences around enclosures including maintenance of electrified portion.
Notes	KWP I and KWP II will fund and complete all predator resistant fence repair supply needs.

Task 4. Watering System Maintenance and On-site Feeders

KWP I and KWP II understand that key habitat features of the pens are access to water and supplemental feed. KWP I and KWP II will utilize the watering system currently in place at POH Ranch (well water), maintain appropriate levels of water within watering bins, and provide feed within on-site galvanized feeding bins. KWP I and KWP II will procure and supply feed. KWP I and KWP II will provide supplemental feed during the nesting season when goslings in the pen are too young to fly out to forage elsewhere, as well as during any time when translocated birds are unable to leave the pen. Table 8 summarizes how these activities will occur.

Table 8. Watering System Maintenance and Feeding Program

Responsible Party	KWP I and KWP II
Frequency	Varies by task component (see Description below)
Supplies	• Supplemental feed (chick crumble may be used)
Description	• Fill watering holes with water from spigots as needed • Procure supplemental feed during nesting season • Refill galvanized feeding bins as needed, replace as determined by significant rusting. • Transport feed to site as needed • Regular cleaning of watering bins and feeders during breeding season • Repair and maintenance of waterlines
Notes	Additional water sources may be added for adaptive management.

Task 5. Data Collection and Reporting

The data collection described below will provide information to DOFAW Maui's current data collection program, summarized in Table 1, which is focused on assessing the number of successfully fledged nēnē during any given breeding season (October – April). KWP I and KWP II will collect observation data with each site visit. Observation data will include date of visit, number of observed adults (with band numbers as possible), number/age of fledglings, number and status of nests (number and condition of eggs as possible without nest disturbance)

inside the pen, family size and pairs associated with nest location), number and status of nests outside of the pen (number and condition of eggs as possible without nest disturbance).
KWP I and KWP II will report nēnē observation data to DOFAW Maui and will include focused effort inside the fence to determine the outcomes of nesting activity. KWP I and KWP II anticipate utilizing a minimum of three game cameras at various locations inside the pen to provide further context for visual observations and gosling assessment.

Furthermore, KWP will fund the analysis of cell or satellite tracker data on tagged nēnē for FY 2026. The analysis will include assessing the range of individual birds and determination of any consistent areas that the nēnē are going to and spending their time, including identifying potential nesting areas around the ranch. KWP will notify DOFAW of any potential fatality, and DOFAW will attempt to recover the carcass and have a necropsy performed if needed to determine the cause of death. Results of the data analysis will be included in the annual report, including any adaptive management measures that were taken during that year or proposed for following years to improve monitoring or management (e.g., placement of traps, traffic control, etc.). After the first year, KWP will evaluate the data and, in coordination with USFWS and DOFAW, conduct a cost-benefit analysis to determine whether the potential value of additional cellular/satellite tagging data justifies the investment as part of the mitigation effort.

By August 1st after each annual breeding season, DOFAW Maui will provide a single annual report to KWP I, KWP II, and USFWS which tabulates the number of sightings, nesting attempts including number of eggs observed, and total number of goslings and fledglings with support from data provided by KWP I and KWP II. This report is required for submission with the KWP I and KWP II HCP implementation annual reports. Details regarding data collection are summarized in Table 9.

Table 9. Data Collection

Responsible Party	KWP I and KWP II
Frequency	Breeding Season: One time per week Non-Breeding Season: Twice per month
Supplies	• Cell phone or tablet for data collection • Access to electronic data collection framework • Game cameras • Batteries and SD cards for game cameras
Description	KWP I and KWP II will record nēnē observations, collect game camera footage, collect trapping data, track maintenance and repairs performed per above tasks (including vegetation management activities), record general habitat conditions, record nest locations and record the activities completed during each site visit.
Notes	KWP I and KWP II will utilize an electronic data collection framework for all data collection. KWP I and KWP II will provide up to 3 game cameras in order to provide additional information regarding nēnē utilization of the pen; cameras may be fixed or moved to locations of interest. KWP I and KWP II will track habitat conditions recorded at habitat points of interest.

General Reporting and Communication

There will be regular and informal communication via phone call or email between KWP I and KWP II and DOFAW Maui regarding site visits. KWP I and KWP II will immediately report to

DOFAW Maui unusual observations, concerns about the site and/or injured or deceased individual nēnē. KWP I and KWP II will provide monthly scope of work updates, which will provide a high-level summary of actions and observations during the month. KWP I and KWP II will also communicate all nest locations to DOFAW via written communication using Google Earth maps and UTMs as the metric of location data.

DOFAW Maui will communicate with KWP I and KWP II or its contractor any incidents or information that will impact KWP I and KWP II's work or success of the pen.

Annual Reports

Two annual reports will be developed as a result of this scope of work.

1. KWP I and KWP II will prepare a single annual report for submission to DOFAW Maui which will be shared with DOFAW HCP staff. This report will include nesting data inclusive of egg production (to the extent this data is collectable), nēnē observations, summary-level data inclusive of game camera footage, summaries of predator trapping by trap type and species contextualized by number of trap nights, and annual maintenance actions and expenditures. KWP I and KWP II will also include any notable findings that are telling, regarding the success or failure of the program. KWP I and KWP II will provide this report to DOFAW Maui by August 1st , after each breeding season.
2. DOFAW Maui will prepare a single annual report for submission to KWP I and KWP II. The report will tabulate the number of sightings, nesting attempts by outcome: successful, abandoned, depredated, failed and renest; number of eggs observed and their outcome, and total number of goslings and fledglings. DOFAW Maui will provide this report to by August 1st after the breeding season in each year.

Allocation of Mitigation Offsets

KWP I and KWP II will share in the financial, oversight, management, and monitoring responsibilities for the work described herein. The completion of the tasks described Table 1 are intended to provide benefits to nēnē and thus satisfy mitigation requirements set forth in the KWP I and KWP II HCPs, ITPs, and ITLs.

Offset for nēnē mitigation will be calculated per nesting season based on counting the breeding adults and utilizing an increased adult survival rate as well as counting the fledglings produced and converting them to adults using a conversion rate of survival from fledgling to adulthood. The combined credits measured in adult equivalents is the total offset per season KWP earns. Each year, unless otherwise specified by the agencies' utilization of the best available science, mitigation offsets will be calculated as the sum of the following:

$$\#\ \text{nēnē}\ goslings\ fledged * 0.83\ survival\ to\ adulthood$$
$$\#\ breeding\ adult\ \text{nēnē} * 0.031\ increased\ adult\ survivorship$$

Additional offsets may also be determined to be warranted in coordination with DOFAW and USFWS if actions are undertaken that further increase probability or survival or propagation.

Appendix F. Scope of Work (SOW) for Makamakaʻole Mitigation Site

(This SOW is provided directly by Maui Nui Seabird)

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Maui Nui Seabird Recovery Project

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21 October 2024

Proposal for TerraForm Power
Molly Stephenson

The scope will include the following tasks:

- Inspections and maintenance (repair) of the fence to assure exclusion of ingress by small mammalian predators – mice, rats, mongoose & cats
- Predator monitoring within the exclosures
- Predator trapping around perimeter and within the existing 9-acre exclosures
- Maintain bait boxes and assessment of rodent populations
- Maintain and maximize effectiveness of social attraction playback systems and decoys

Inspections of the fence to assure exclusion of ingress by small mammalian predators – mice, rats, mongoose & cats

Scheduled inspections every two weeks to include walking the inside and outside perimeters of the exclosures observing:

Condition of the ground within 2 meters of the fence – flag any erosion and erosion control infrastructure requiring attention
Condition of the skirting – if not intact, flag gaps, mesh voids and eroded ground
Condition of the culvert expanded metal mesh and ground to culvert connection – flag any voids
Condition of the ½” X ½” mesh – flag any voids
Condition of the horizontal 2” X 6” – flag any rotted sections and failing of mesh to board connection
Condition of line posts – flag any hogged out holes, rotted posts and component to post connection failures

Condition of hood – flag any failures of brackets to hood, flag any tares in hood, flag any mesh to hood connection failures

Condition of bracing – flag any bracing that is failing in supporting posts

Staff time required: One person day per exclosure = **four person days per month**. Walking, flagging & recording each point to be addressed on tablet. ½ person day per each bi-weekly inspection for compiling maintenance/repair needs and scheduling action = **one person day per month**

Maintenance/repair of the fence to assure exclusion of ingress by small mammalian predators – mice, rats, mongoose & cats

Staff time required: Two person days per week = **Four person days per month.**

Predator monitoring within the exclosures

Operate existing track tunnel transects

Ink cards & bait for rodents once per quarter
24 hours later check and record cards for rodent activity

Ink cards & bait for mongoose once per quarter
3 days later check and record cards for mongoose activity

Compile and enter data

Staff time required: Three person days per quarter = **1 person day per month.**

Predator trapping around perimeter and within the existing 9-acre exclosures

Operate existing and additional traps for small mammalian predators

Traps in use include: live capture cage traps, AT220, Doc 200, Rat and mouse snap traps, Timms, GoodNature A24.

As new traps become available, they will be added to the mix

Baits are changed every two weeks, baits used include; eggs, sausage, cat food, squid, Vienna sausage, peanut butter, wax bait, etc.

Trap box replacement, repair and construction is ongoing

Staff time required: One person days per week = **Four person days per month**

Maintain bait boxes and assessment of rodent populations

Continue baiting for rodents and assessing rodent condition to determine effectiveness of Evolve baits to control and minimize/eliminate rodent populations

Maintain field cameras on bait boxes, record data from cards to document rodent activity at boxes

Open, record amount of bait consumed and rebait bait boxes every two weeks

Bait Sherman traps every two weeks, allow 24 hours for capture; weigh, age, sex, mark and release captured rodents

Staff time required: Two person days per two weeks = **Four person days per month**

Maintain and maximize effectiveness of social attraction playback systems and decoys

Continue to operate social attraction playbacks and decoys to attract ‘a‘o, ‘ua‘u and ‘akē‘akē to both exclosures

Turn system on in early March each year, assess battery condition, replace components (Speakers, brackets, batteries, posts, solar panel structures, electronics action packers, wires) as necessary.

Continue to collect from PAM deployments and partner recordings, new playback recordings and add to or reconstruct, audio files

Repaint and re-deploy decoys as necessary

Perform monthly system checks throughout the breeding season (March – October)

Staff time required: **Three person days per month**

Data management, summary and reporting

Staff time required: **2 person days per month**

Summary

- Inspections and maintenance (repair) of the fence to assure exclusion of ingress by small mammalian predators – mice, rats, mongoose & cats
  Four person days per month + one person day per month
- Maintenance/repair
  Four person days per month
- Predator monitoring within the exclosures
  One person day per month.
- Predator trapping around perimeter and within the existing 9-acre exclosures
  Four person days per month

- Maintain bait boxes and assessment of rodent populations
  Four person days per month
- Maintain and maximize effectiveness of social attraction playback systems and decoys
  Three person days per month
- Data management, summary and reporting
  Two person days per month

Total = 23 person days per month

Project Manager	2 person days per month	24 pd/yr
Operations/GIS Specialist	3 person days per month	36 pd/yr
Field Biology Technician	9 person days per month	108 pd/yr
Field Biology Associate and Seabird Protection Associate	9 person days per month	108 pd/yr

Based on Performance period November 2024 through December 2025 = 1.167 years

Payment to DOFAW Endangered Species Trust Fund, DOFAW to contract work to MNSRP

Appendix G. Example Scope of Work (SOW) for Greater Hiʻi area with Pūlama Lānaʻi

(Note: This SOW is from previous mitigation efforts, and is an example of what the actual scope of work would look like.)

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Lānaʻi Hawaiian Petrel Mitigation
Scope of Work - 2022

Prepared for Brookfield Renewable Partners

Dr. Rachel Sprague
Director of Conservation

Pūlama Lānaʻi
Preservation. Progress. Sustainability.

April 2022

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Objective

Improve reproductive success of Hawaiian petrels (*Pterodroma sandwichensis*), in a high-priority colony area on Lānaʻi, where maintenance of previous mitigation work is at risk. Without additional support, we can reasonably expect that nesting petrels in the area will experience increasing predation pressure by feral cats and rodents, and that reproductive success will revert to baseline levels.

Project Background

In 2018, TerraForm Power provided support to Pūlama Lānaʻi to partially meet the regulatory requirements of Kaheawa Wind Power's Habitat Conservation Plan (HCP). With that mitigation project, predator control and monitoring were extended to protect the endangered Hawaiian petrel colony beyond the scope of the work the Pūlama Lānaʻi Conservation Department was conducting at the time.

In 2019, Pūlama Lānaʻi was able to maintain the predator control and monitoring with internal funding. In 2020, the COVID-19 pandemic caused the Pūlama Lānaʻi Conservation Department to constrict and focus on triage of priority activities. Some cat and rodent control was continued, but our team struggled to complete the work with fewer staff, and our department's other endangered species efforts were completely sidelined during that time. Without additional support, we would not have been able to sustain predator control and monitoring at the 2018 levels in 2021 and this trend continues in 2022.

Mitigation Actions

The area supported by mitigation funding from Brookfield Renewable Partners consists of 4 distinct ridges, East Puʻu Aliʻi, Kanalo, West Hiʻi, and Hiʻi Center Ridge, totaling approximately 150 acres (~60 ha). The density of birds in this area is also extremely high, and more than 190 burrows have since been found across these ridges (Figure 1).

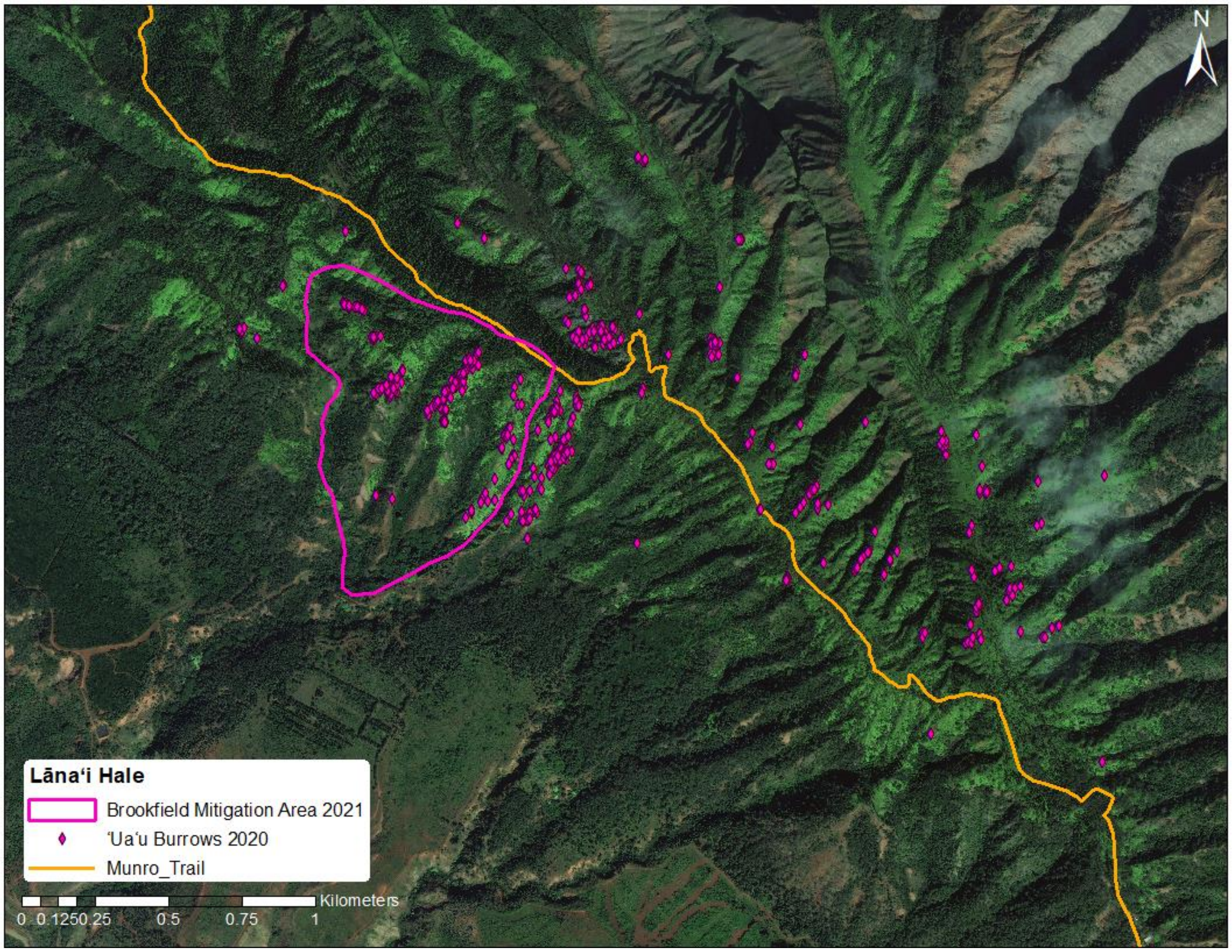

Figure 1. Map of area protected with continued support from Brookfield Renewable Partners mitigation funding in 2022, relative to the known Hawaiian petrel burrows on Lānaʻi Hale. The area is approximately 150 acres, and encompasses approximately 33% of the known Hawaiian petrel burrows on Lānaʻi.

Predator Control

Predator control for cats and rats was expanded through (and around) this area in 2018 as part of the mitigation for Kaheawa Wind Power I (TerraForm Power). Today, those cat trap locations remain above these ridges on the Munro Trail, and below on the lower Kapano and Kōʻele trap lines (behind Lānaʻi City) (Figure 2).

Across the 150 acre-area surrounding the burrows and native habitat on these 4 ridges, there are 190 A24 self-resetting rat traps down the ridges and through challenging canyon drainages (Figure 3). These traps are part of a nearly 800-trap A24 grid on Lānaʻi Hale – the Greater Hiʻi area is fully 25% of the traps on the Hale and is the most technical terrain to traverse.

Recent publications from seabird colonies on Kauaʻi highlight the value of consistent predator control for native seabird breeding success (Raine et al. 2020b). Mitigation funding support from Brookfield Renewable Partners provides the support necessary to maintain predator control for cats and rodents at the 2018 levels across this important Hawaiian petrel nesting area, and avoid reproductive success in the area potentially returning to baseline.

Cat Trapping Cost Attribution

Successful cat trapping occurs at a landscape scale, given the large home ranges of these mesocarnivores. All of Lānaʻi Hale's Hawaiian petrel colony is protected by a grid of cat traps spanning more than 10 miles of trails and roads. The grid is not currently in full operation because of staffing constraints. Staff time and resources needed to protect various parts of the petrel colony can be thought of as a percentage of the total effort. The area supported by Brookfield Renewable Partners mitigation funding is home to 33% of the known petrel burrows, and is thus the beneficiary of 33% of the cat control effort (and 33% of the control program costs).

Note re: Hiʻi Predator-proof Fence

A ~80-acre predator-proof fence is under construction in the Hiʻi area. The western fenceline bisects the middle of the Greater Hiʻi area, meaning that at least 90 of the known Greater Hiʻi burrows will be inside a predator-protected enclosure once it is completed in early 2023 (Figure 6).

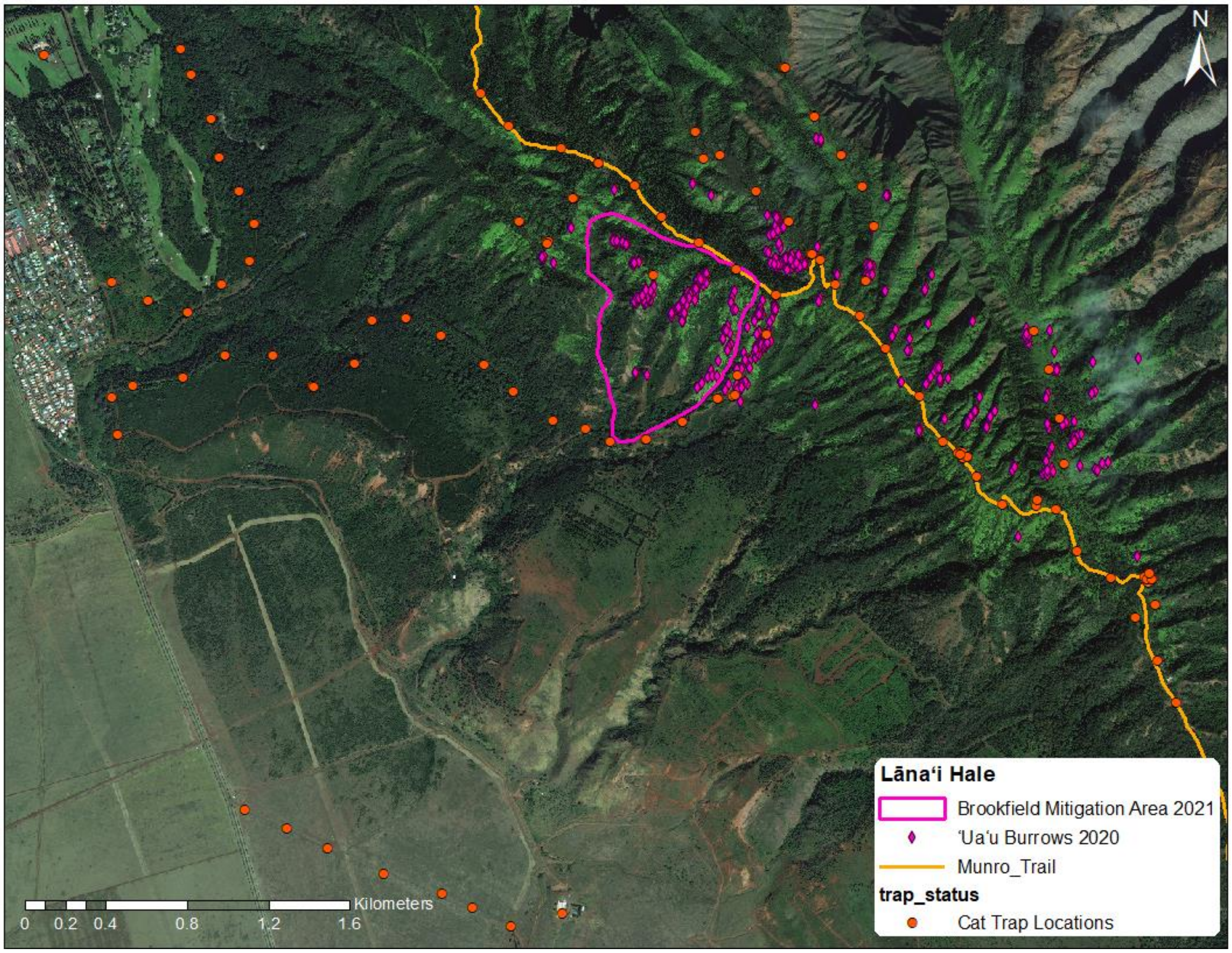

Figure 2. Locations of the landscape-level cat trap stations in the grid protecting the Hawaiian petrel colony on Lānaʻi Hale.

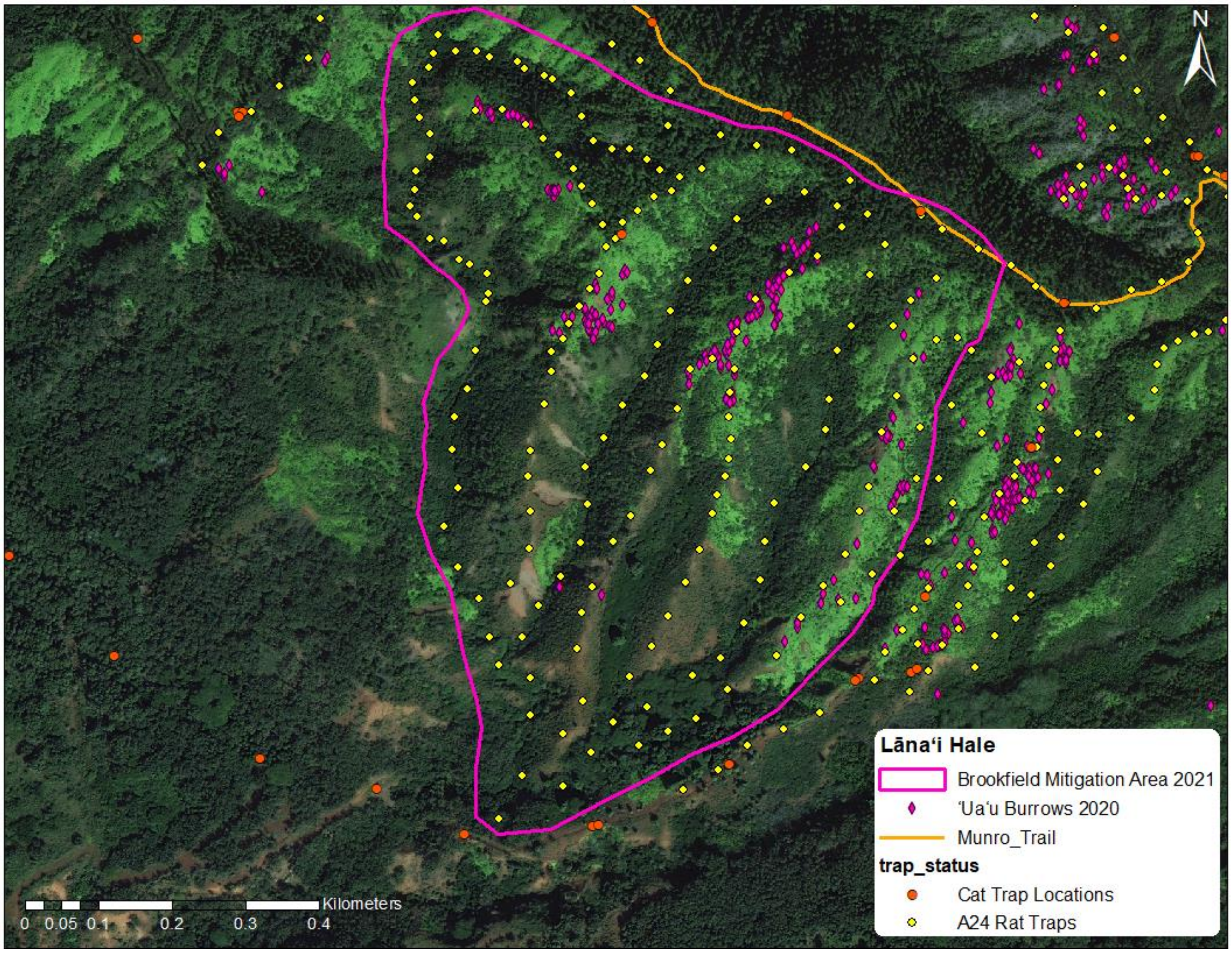

Figure 3. Locations of A24 self-resetting rat traps in the area supported by Brookfield Renewable Partners mitigation funding.

Monitoring/Evaluation

Burrow Monitoring

Pūlama Lānaʻi uses a monitoring protocol with a standardized sampling design across the colony, developed from a power analysis and assessment completed in partnership with biologists and statisticians with the Zoological Society of San Diego (Schuetz et al. 2020, Pūlama Lānaʻi Conservation Department 2021). We use 60+ motion-activated cameras to monitor a subset of burrows within the area supported by Brookfield Renewable Partners mitigation funding (and approximately 180 cameras colony-wide). Burrows are selected from 2 panels, a set that remains relatively constant over time and a set that changes every year. All selected burrows are monitored with cameras consistently from before the start of the season until after fledging or failure. This sample of monitored burrows is then used to determine apparent reproductive success and relative proportions of inactive burrows, new prospecting pairs, non-breeding pairs, etc. for all known Hawaiian petrel burrows in each monitoring area (Table 1). Any new burrows found are added to the pool of burrows to be potentially selected for monitoring the following year.

Table 1. Number of known burrows and monitoring outcomes in the Greater Hiʻi area from 2017 to 2021.

	2017	2018	2019	2020	2021
Known Burrows	59	124	189	193	196
Monitored Burrows	59	121	176	50	64
*Monitored with Cameras**	18	56	52	50	64
Monitored without Cameras	41	65	124	0	0
Inactive	2	3	2	3	3
Active, unknown status	14	17	33	4	5
Active, non-breeding	7	14	13	4	1
Active, breeding confirmed	36	87	129	39	55
unknown outcome	*14*	*4*	*10*	*0*	*0*
fledged	*13*	*59*	*110*	*32*	*44*
failed	*9*	*24*	*18*	*7*	*11*
Chicks produced per pair (w/known outcome)	**0.59**	**0.71**	**0.86**	**0.82**	**0.80**
Proportion of monitored burrows with known status and outcome	0.53	0.83	0.81	0.92	0.92
Proportion of monitored burrows with breeding and outcome confirmed	0.37	0.69	0.73	0.78	0.86

**Note that from 2017-2019, cameras were moved around between burrows during the season, and burrows with likely breeding or activity were prioritized, so they were not unbiased samples.*

Baseline Reproductive Success

The baseline success rate without predator control on Lānaʻi was calculated at 38.2% in communication with USFWS and Hawaiʻi DOFAW. In short, we averaged the 2016 and 2017 reproductive success estimates in colony areas with limited or no predator control.

Potential Impact

Expected Burrow Monitoring

There are currently more than 190 known burrows on the 4 ridges in the Greater Hiʻi area (East Puʻu Aliʻi, Kanalo, West Hiʻi and Hiʻi Center Ridge), and at least 60 burrows that will be monitored on those ridges as part of our 2022 monitoring plan. Even with monthly burrow checks using an endoscope, and cameras on all monitored burrows, not all burrows are active, and it is still not possible to determine the status and outcome of every burrow. But with our monitoring plan first implemented in 2020, we are seeing an improvement in our confidence regarding assignment of burrow status and outcome, even though fewer burrows are monitored overall. We expect that we will be able to determine the outcome for over 90% of the monitored burrows, and that 75-80% of the monitored burrows will likely be active breeding attempts (Table 1). Based on our monitoring program, the success rates from these monitored burrows (including proportion of inactive burrows, prospecting pairs, etc.) would be applied to all the known burrows in a given area.

Expected Outcomes

The mitigation proposed here is intended to support predator control and monitoring efforts to prevent Hawaiian petrel reproductive success in this important area from returning to baseline. Calculation of the net benefit of this work will use the monitored set of burrows in 2022 to determine 1) the proportion of burrows that have confirmed breeding (i.e., estimated active nests), and 2) the apparent reproductive success rate for burrows in the Greater Hiʻi area. The estimated number of fledglings produced from the known burrows minus the calculated baseline determines the net fledglings produced as a result of the mitigation actions:

*(# known burrows * proportion with confirmed breeding * 2021 success rate)*

– *(# known burrows * proportion with confirmed breeding * baseline success rate)*

= *net fledglings produced*

In 2021, the calculated benefit of predator control in the Greater Hiʻi area was 70 Hawaiian petrel chicks above baseline, given the currently known number of burrows (Table 2). With the mitigation work described here, we expect similar outcomes in 2022.

Table 2. Calculated increase in 2021 Hawaiian petrel fledgling production in response to predator control in the proposed mitigation area.

	2021
# Known Burrows	196
Estimated proportion of burrows w/breeding attempts *(based on 0.86 proportion of burrows monitored with breeding attempts; Table 1)*	168
Apparent Reproductive Success Rate	0.80
Benefit of predator control above 0.382 baseline (net fledglings produced)	70

Reduction of predators, particularly cats, in the mitigation area should be expected to increase adult survival as well as that of fledglings. In 2016 with very limited cat control, we found dozens of cat-depredated adults across the colony throughout the breeding season. Monitoring on other islands also demonstrates significant depredation of adult seabirds by cats (Raine et al.

2020b). Tetra Tech and Brookfield Renewable Partners will work with DOFAW and the USFWS during the 2022 breeding season to determine if this benefit can be reasonably estimated.

Permits

Permit Type	Permit #	Expiration Date	Description
USFWS ESA 10(a)(1)(A) Recovery Permit	TE35731D	16-Jul-22	Monitoring of Hawaiian petrels, predator control. Salvage of HAPE, response, transport, and stabilization of HAPE and bats. Covers up to 1 HAPE injured/killed as result of actions.
USFWS Migratory Bird Salvage Permit	MB46114D	31-Mar-25	Salvage of any non-endangered dead or injured birds (or parts).
DOFAW State Protected Wildlife Permit	WL19-32	21-Mar-22	Monitoring of Hawaiian petrels, wedge-tailed shearwaters, and Bulwer's petrels, predator control. Salvage, transport, and stabilization of any native birds.
DOFAW Rehabilitation Permit	WPRM-19	31-Mar-22	Stabilization, rehabilitation, and release of native birds (subpermittee under Hawaiʻi Wildlife Center).
USFWS Rehabilitation Permit	MB53007A-1	31-Mar-22	Stabilization, rehabilitation, and release of native birds (subpermittee under Hawaiʻi Wildlife Center).

Budget

The proposed budget covers the entirety of predator control and monitoring costs for the 4 ridges in the Greater Hiʻi area for the 2022 breeding season (East Puʻu Aliʻi, Kanalo, West Hiʻi, and Hiʻi Center Ridge).

Supplies costs include annual replacement and repairs of burrow monitoring cameras, which have an approximately 5 year depreciation cycle (resulting in ~20% replacement annually), as well as associated accessories including SD cards, mounts, and lithium batteries to run the cameras for the entire season (usually ~35-40 batteries per camera per year). Predator control costs are similar – we have found that we need to replace approximately 20% of the A24s annually, along with the purchase of bait and CO2 for at least 2 checks/rebaits per year. Cat traps do not need replacement at quite the same rate, but still get damaged or need replacement due to age.

Contracted services includes the portion of our database support and data management dedicated to this section of the petrel colony, a portion of the annual subscriptions for cat trapline cell camera monitoring, songmeter analysis to compare adult activity with previous years, and specialist field support for A24 rebaiting.

Pūlama Lānaʻi's labor costs include increasing staff capacity in order to fully maintain the cat trapping grid, monitoring the burrows and burrow cameras monthly, analyzing/digitizing the photos to determine burrow outcomes, and QA/QC, data analysis, and reporting. The overhead costs support program operation directly related to this work such as office costs (electricity, water, etc.), field vehicles (4wd trucks, UTVs, ATVs), vehicle maintenance and repair, gas, computers, iPads for data collection, burrow scopes, other field equipment (backpacks, spiked boots, etc.).

[COSTS REDACTED]

Reporting

A final report will be prepared by March 30, 2023 to summarize the predator control and reproductive success results for Hawaiian petrels in this mitigation project area for the 2022 breeding season.

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Appendix H. Nēnē Mitigation Historic Summary and Projections and Lost Productivity

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Appendix H.

Nēnē:

Historic Mitigation Summary,

Future Offset Projections,

and

Calculations in Support of Lost Productivity Assessment

1.0 Introduction and History

The Kaheawa Wind Project I (KWP I or the Project) is an existing, operational wind energy facility located in the Kaheawa Pastures area of West Maui operating under the terms and conditions outlined in the Habitat Conservation Plan (HCP; KWP 2006). This Appendix is intended to provide supplemental details in support of the 2025 HCP's nēnē mitigation plan and calculation of lost productivity (as originally developed in the 2006 HCP).

1.1 History and Current Status of Mitigation for Nēnē

As written in the 2006 HCP, the original intent of the nēnē mitigation program was to fund construction of a pen and management for 5 years, during which 50 chicks would be released within the pen to offset that take of 45 nēnē adult equivalents (which takes into consideration the 90 percent survival to breeding age). Funding for the nēnē pen was provided to DOFAW in December 2007, with additional management payments occurring in 2009, 2010 (double payment), and 2011, which completed the baseline mitigation as outlined in the HCP. DOFAW completed construction and released the first individuals in May 2011, followed by additional releases in September 2011 and April 2012.

In practice, offset allocation (measured in adult-equivalent nēnē) has been based on two factors, 1) the number of fledglings produced, multiplied by 0.512 to convert to adult equivalents, and 2) the number of breeding adults (inside and outside the pen) multiplied by 0.031 to account for increased annual survival due to protections offered by the pen. Those numbers are added together to determine the offset allocation, and was put into practice with the first fledglings produced in the pen in FY 2012 and applied to all years to current. On an annual basis, the offset allotment was adjusted based on the percentage of funding that KWP I provided (i.e., offsets were split with KWP II for the FY 2019 and FY 2023). As of December 2024, DOFAW and USFWS have both allocated a total of 45.68 offsets to KWP I. The offset of an additional 4.6 adult-equivalent nēnē is anticipated for KWP I from the FY 2025 breeding season in which eight goslings fledged and 16 adult breeding nēnē were documented. Therefore, as of the end of FY 2025, the total mitigation offset is anticipated to be 50.3 adult-equivalent nēnē.

A brief summary of nēnē mitigation as reported in the annual reports is provided below, with additional details available in the annual reports:

- FY 2007- FY 2010 Delays and Challenges in Implementation:
    - DLNR encountered delays in securing a location and constructing the release pen.
    - KWP requested alternative or interim mitigation options due to the lag in implementation, such as predator control and translocation. These alternatives were proposed in multiple annual reports during this period but not implemented.
    - KWP began dispersing funding to DLNR as early as 2007, even though physical mitigation (e.g., captive propagation or pen construction) had not yet started. This

included $100,000 in December 2007, $41,000 in February 2009, and $82,000 in February 2010.

- FY 2011 – FY 2013 Initial Success and Fulfillment of Baseline Mitigation:
  - Construction of the release pen was completed in 2011 and initial bird releases began the same year.
  - By FY 2013 KWP reported fulfillment of its baseline obligation[1] through funding, which included an additional $ 41,000 in February 2011 for a total of $264,000 between December 2007 and February 2011.
- FY 2014 – FY 2018 Monitoring and Productivity Tracking:
  - KWP began tracking fledgling production and using ratios[2] to convert fledglings to adult mitigation credits.
  - Annual reporting continued throughout this time, with fledgling numbers fluctuating annually but steadily increasing to 47 fledglings by FY 2018.
- FY 2019 – FY 2025 Ongoing Credit Deficit and Adaptive Management:
  - Despite continued fledgling production, mitigation credits lagged behind expectations, prompting discussions with USFWS and DOFAW about how credits should be calculated.
  - KWP I provided DOFAW with annual reporting tools for tracking use of funds and management/monitoring activities due to previous communication issues on these topics.
  - KWP assumed direct management of the Haleakalā Ranch release pen in late 2022, at the request of DOFAW.
  - Previous funding shortfalls were revealed by DOFAW and addressed by KWP.
  - Adaptive management was implemented, resulting in changes to management at Haleakalā Ranch and a planned expansion of the mitigation program to Pu'u O Hōkū Ranch.

1.2 History Behind Lagging Mitigation

Ideally, mitigation for take incurred at the Project would occur in advance of the take occurring, and therefore impacts would be mitigated prior to the impact of take being realized. For nēnē, this has proven challenging for a variety of reasons, including:

- The difference between how mitigation was planned for in the 2006 HCP and how it has been implemented in practice, including how offsets are allocated (see Section 1.1 above)
  - The 2006 HCP anticipated the ability to offset 9 nēnē per year through the release of 10 captive bred goslings; in practice, offset of 9 nēnē would require the fledging of over 17 nēnē goslings in a year, and is dependent on propagation of wild/translocated adult nēnē rather than controlled captive breeding programs.

[1] See Appendix 10 of the 2006 HCP; the original HCP does not consider fledgling success as a criteria for mitigation offsets, but rather outlined obligations in terms of funding.

[2] Note that the ratio outlined in the 2006 HCP, 0.9, was not used, but rather 09^2 or 0.8^3 was used

- The lag between the beginning of project operations, in FY 2007 (and take of nēnē), the initial mitigation funding from the project in FY 2008, the construction of the release pen and introduction of nēnē by DOFAW in FY 2010, and the realization of mitigation offsets with the production of fledglings in FY 2011.
    - Take of nēnē occurred for five years prior to mitigation, resulting in a need for mitigation to produce a rate of offset higher than the rate of take, and resulting in lost productivity accruing beginning in FY 2012.
    - Cumulative take was already at 14 nēnē when mitigation began, which would require fledging of over 27 nēnē goslings to offset. This level of gosling production did not occur until FY 2016, and thus mitigation has remained at an approximately 4-to-5-year lag that matches the lag between permit issuance and start of mitigation.
- The number and type of translocation/release events and offsets anticipated as outlined in the original HCP did not occur.
    - In total, 56 nēnē have been released at the pen, but no offsets were attributed to these releases, compared to the anticipated release of 10 nēnē fledglings per year with an offset of 9 nēnē for every 10 fledglings (KWP 2006).
- Interannual variation in reproductive success at the Haleakalā Ranch release pen.
    - Numbers of fledged nēnē have ranged between 1 –14 fledglings from FY 2012 to FY 2025 with multiple years having only one fledgling.
    - Interannual variation was not contemplated in the 2006 HCP since captive bred releases were planned.
    - Part of this variation may be due to suspected predation of goslings by pueo (native species that holds cultural significance) as pueo were captured on game cameras starting in 2024 within the pen and on the ground with similar timing as previously recorded goslings were notably missing. There are limited options for predator control of pueo given its cultural importance.
- Due to limited agency-approved nēnē mitigation opportunities, KWP II adaptive management following change of ownership at Pi'iholo Ranch resulted in the need to share the Haleakala Ranch mitigation project.
    - This resulted in a mitigation offset of approximately 3.3 nēnē being attributed to KWP II from Haleakala Ranch.

This Appendix is intended to demonstrate that while mitigation (through FY 2025) under the Project's current permits is lagging, KWP anticipates that ongoing mitigation efforts will allow KWP I to fulfill its current nēnē mitigation obligation, and will begin to outpace nēnē take authorized under future permits, and result in fulfillment of the mitigation obligation prior to expiration of the next permits.

1.3 Mitigation Obligations Past Permit Expiration

The current permits expire January 29, 2026. It is currently not anticipated that the nēnē mitigation obligation will have been fulfilled by that time, particularly because the permits expire in the middle of the 2025/2026 breeding season, prior to when offsets would be calculated and accrued.

However, the possibility of outstanding mitigation at the end of the permit term was explicitly considered during the development and issuance of the permits, as reflected in the following documents:

- In the original 2006 HCP (KWP I 2006), it is stated "*If at the end of the 20-year period, mitigation implemented is not commensurate with take, any remaining funds will be used to continue to implement mitigation measures.*"
- In the Biological Opinion (USFWS 2006), it is stated "*If at the end of the 20-year period, the mitigation implemented is not commensurate with take, any remaining funds will be used to continue to implement additional mitigation measures*" and specific to nēnē it is stated that "*A contingency fund would provide for construction, management, and the required number of goslings should any unmitigated take remain at the end of the project period.*"
- In the Implementing Agreement (IA), it is stated that "*Permittee will be required to provide post-relinquishment mitigation for any take of Covered Species that FWS/DLNR determine will not have been fully mitigated under the HCP by the time of relinquishment. Permittee's obligations under the HCP and this agreement will continue until FWS/DLNR notify Permittee that no post-relinquishment mitigation is required, or that all post-relinquishment mitigation required by FWS/DLNR is completed.*"

These provisions demonstrate that the potential for lagging mitigation was anticipated and addressed in the original project documents[3]. Combined with KWP I's history of nēnē mitigation and KWP I's repeated efforts to resolve outstanding mitigation requirements, there is both a documented legal obligation to continue mitigation (as established in the HCP and IA) and a demonstrated commitment by KWP I to fulfill that obligation.

Lost productivity was described in the original 2006 HCP (KWP I 2006) to account for a situation in which mitigation lags take, and is currently accrued at the Project due to the challenges encountered for successful nēnē mitigation as described above. This document also describes the calculations used to assess current (and future) lost productivity, and the underlying biological justifications.

2.0 Future Offset Projections

To demonstrate the anticipated timeline for fully offsetting the take of nēnē currently permitted and the future permitted amount requested in the HCP, we have modeled the cumulative take at KWP I against the cumulative nēnē mitigation achieved, and projected forward both take and mitigation (Figure 1). Projection modelling is based on the following assumptions:

[3] KWP I's 2006 HCP names that "To further ensure the success of the mitigation effort, Kaheawa Wind Power will establish a $264,000 Nene Contingency Fund prior to construction of the proposed turbines. The value of the fund will be adjusted at 2.5% over the life of the project. This results in a total maximum of $432,594 (estimated 2025 dollars) over the 20- year term of the HCP.

- Take of three nēnē per year[4];
- Production of 6.7 fledglings per year at Haleakalā Ranch (based on the average number of fledglings from FY 2012 through FY 2025);
- A range of 2.16 to 10.8 fledglings per year at Pu'u O Hoku (POH) Ranch, which is based on:
  - The number of breeding pairs[5];
  - Approximately 60 percent of pairs breed per year[6] (Banko et al. 2020);
  - Average of 3 eggs/nest (Banko et al. 2020);
  - Starting with an assumed 12 percent survival from laying to fledgling (Hu 1998), doubled to 24 percent to account for predator control and supplemental feed[7];
- An adjustment of 0.83 for all fledglings to account for survival to adulthood[8]; and
- To ensure mitigation is accruing under KWP I's current obligation until it has been met (including lost productivity), and that mitigation will begin to accrue upon issuance of new permits, it is assumed that 33 percent of mitigation is allocated to KWP I's current permits and 33 percent of mitigation will be allocated to KWP I's obligation under the new permits (until KWP I's current mitigation obligation has been met), starting in FY 2026. After the obligation under the current permits has been met, KWP I assumed that 50 percent of mitigation would be allocated annually to the new KWP I permits[9].

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[4] 56 nēnē through FY 2025 divided by 19 years of operations = 2.94 nēnē per year, rounded up; this value includes indirect take.

[5] Currently there are five breeding pairs utilizing the release pen as of FY 2025. Per the Translocation Plan (DOFAW 2025), an additional five pairs will be added in FY 2026 – FY 2029, for a total of 25 breeding pairs by FY 2030. Therefore, we assumed five breeding pairs for the FY 2026 breeding season, 10 for the FY 2027 breeding season, etc. (i.e., a lag of one 1 year before goslings may be produced).

[6] As summarized in Banko et al. (2020), nēnē pairs do not attempt to nest every year; on average, 58 percent of wild pairs nested on Hawaiʻi island during the 1978-1981 breeding seasons, 46 percent nested on Maui in the 1979-1981 breeding season, and 66 percent nested in Hawaiʻi Volcanoes National Park (at elevations under 1,220 meters) during 1995 and 1996 (Hu 1998, Banko 1992). Overall, this aligns well with the 60 percent chance of active breeding used in the KWP II HCP (KWP II 2019) for the peak breeding months of October through March.

[7] From 2021-2025, monitoring at the Haleakalā Ranch nēnē pen documented 95 eggs that resulted in 39 fledglings (41 percent survival from laying to fledgling). Additionally, Hu (1998) observed a 12 percent survival rate of unprotected nēnē. We conservatively assumed a 24 percent survival rate for the POH ranch release pen based on both lines of evidence.

[8] Note that an adjustment of 0.512 is used through FY 2025 to align with current methods. Starting with FY 2026, and adjustment of 0.83 was applied, per Section 4.1.4 of the HCP.

[9] Both 33 and 50 percent are assumed since mitigation efforts may be shared with other projects; offsets will be allocated such that the sum of the offsets allocated equal the offsets achieved at a mitigation site and in proportion to the funding provided by project. It is also possible that there will be years where 100 percent of offsets are allocated to the Project, but the conservative assumption of 50 percent was used in projections.

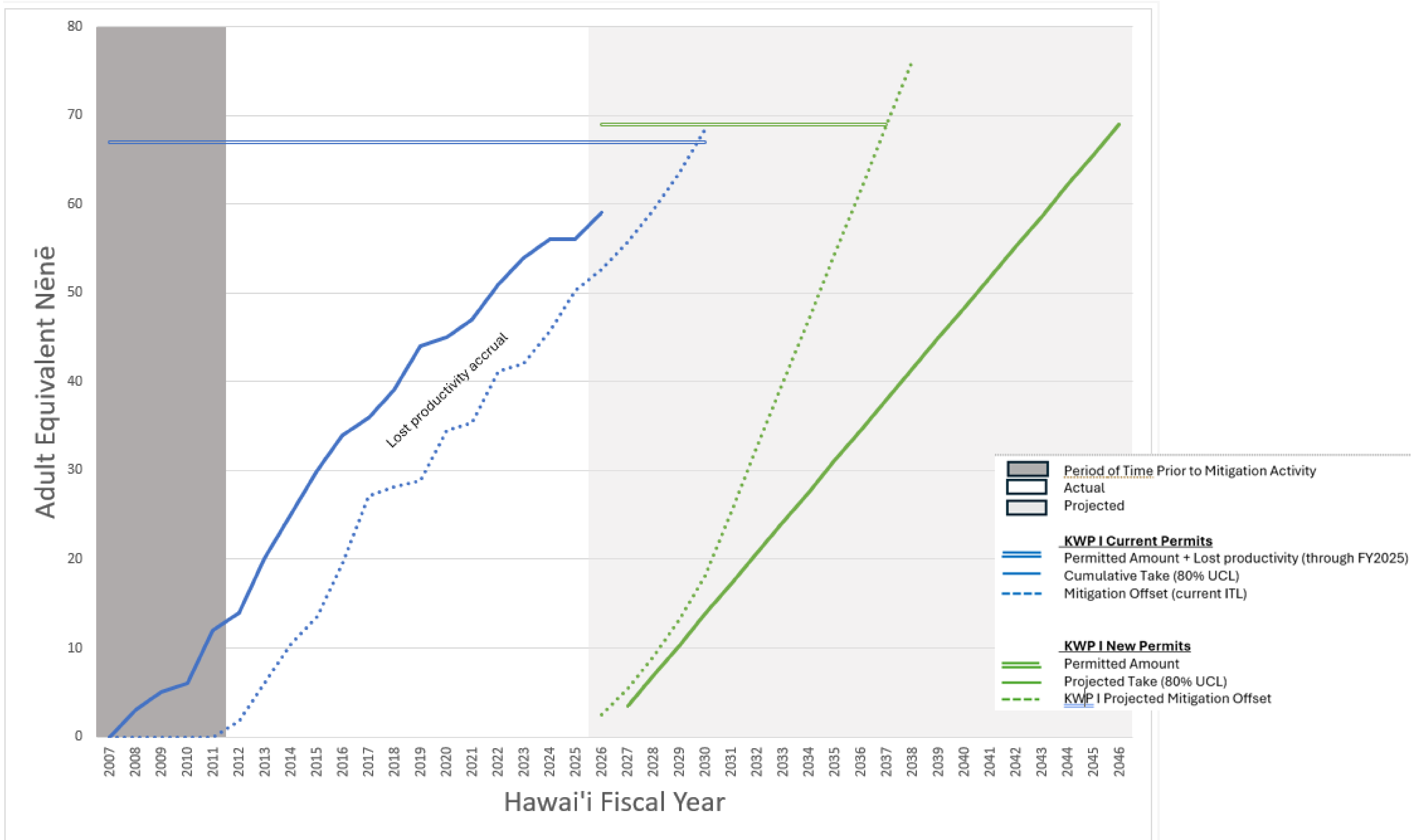

Figure 1. Nēnē Mitigation Obligations and Projected Timeline to Completion

Because the increased adult survival calculation is dependent upon several assumptions, it was not included in the projections and would be additional mitigation to what is shown here. Based on these projections, mitigation for nēnē will meet the obligations under the current ITL and ITP (including lost productivity that has accrued) in FY 2030 (Figure 1). Mitigation achieved under the new ITL and ITP is projected to begin accruing in FY 2026 and is projected to meet the mitigation obligation of greater than 69 nēnē in FY 2038 (Figure 1). Additionally, it is anticipated that mitigation will outpace projected take under the new permits. It is important to note that actual productivity at both Haleakalā Ranch and POH Ranch release pens is subject to annual variation, and these values are projections with conservative assumptions applied. Nonetheless, KWP I is committed to achieving a net conservation benefit for nēnē, and is committed to mitigation activities until such time as the calculated mitigation meets the permitted obligation. Similar to the current practice, all future evaluations of mitigation versus impacts timing will consider lost productivity as described below. Once the mitigation obligation has been met in full, KWP I will work with DOFAW to transfer nēnē pen management responsibilities to an appropriate entity that can carry management forward into the future, as needed, per existing MOUs and their appended scopes of work.

3.0 Nēnē Lost Productivity

Lost productivity was defined as follows in the original 2006 HCP:

> *Direct take may result in the loss of productivity of the individual that is taken between the time the take occurs and the time that mitigation is provided.*

KWP I proposes to continue calculating lost productivity as is currently implemented based on analysis presented in the 2006 HCP and has been communicated in annual compliance reporting. This calculation assumes a loss of 10 percent productivity per year for any direct take of an adult that hasn't already been replaced by mitigation, compounded annually, to account for productivity of offspring. In practice, calculating the accrued lost productivity in any given fiscal year is dependent upon cumulative calculations of direct and indirect take, and mitigation achieved. Table 1 identifies the parameters currently used for calculating unobserved direct take, indirect take from estimated take, mitigation parameters and subsequent lost productivity. It also provides the actual calculations based on data collected through FY 2025 (complete tables showing annual data and calculations starting from FY 2007 can be found as an appendix to the annual HCP Compliance reports (FY 2019 to current). Additionally, Table 1 identifies where the best available science has resulted in an updated approach, as described in the new 2025 HCP. Sections 4.1 to 4.6 in the 2025 HCP provide descriptive biological justification for the calculations presented in Table 1.

The example provided in Table 1 includes the indirect take multiplier (0.375[10]) and fledgling survival (0.512[11]) values used historically; as previously mentioned and identified in bold text, these multipliers will be updated starting in FY 2026 based on biological justification provided in Section 4.1.4 of the HCP.

Table 1. Indirect Take and Lost Productivity Calculations for Nēnē at the Project through FY 2025

Parameter[1]	Description	Example (data comprehensive through FY 2025[2])		
A1	Observed Adult Take	34		
A2	Observed Juvenile Take	1		
B	Estimated Take Multiplier Total Estimated Take for the Project from EoA/ total observed fatalities ***This value changes yearly based on the number of observed fatalities and resulting estimated direct take (EoA output). It is then retroactively recalculated for all years.**	54/35= 1.59		
C	Estimated Adult Direct Take (A1+ A2) * B	35*1.59 = 54		
D	Observed Indirect Take Multiplier (Season Defined)	0.09 (Adult, October – March)	0.04 (Adult, April, August, Sept)	0.00 (Adult, May to July)
E	Observed Indirect Take (D * A1)	∑ (D*A1) across all years = 2.41		
F	Unobserved Direct Take (C – A1)	54 -34 = 20		
G	Unobserved Indirect Take (F x 0.3*0.375*0.5) ***For FY 2007-FY 2025 this parameter uses a likelihood of breeding of 0.375; this HCP proposes using 0.365 going forward based on best available science.**	20*0.3*0.375*0.5 = 1.125		
H	Accrued Adult Take ([Previous Year's estimated direct take or "C"] – current year N – current year L) (beginning 1/1/2011)[3]	4.76 +7.77 - 0.56 – 4.71 = 7.32		
I	Lost Productivity from accrued adult take (current year's H * 0.1, summed across years) (fledglings)	0.3+0.44+1.04+1.38+1.62+1.40 +1.29+0.97+0.6+0.59+0.68+0.35+ 0.78+0.73=		

[10]Because nēnē could be flying through the Project Area at any time of year, the likelihood of an "unobserved take" of nēnē being in breeding condition is 37.5%, based on a breeding period of 4.5 months (a 1-month incubation period followed by parental care for 0.5 months; 4.5/12 = 0.375).

[11] Female nēnē mature at age 3, with an annual survival rate of 80 percent, 0.8^3 = 0.512.

Parameter[1]	Description	Example (data comprehensive through FY 2025[2])
		12.15
J	Lost fledglings (∑[Observed Indirect Take "E"+ Unobserved Indirect Take "G"] + Lost Productivity "I" + Observed Take Goslings)	0.42+0.93+1.32+1.82+1.74+1.47+ 1.22+0.6+0.71+0.8+0.67+1.10+0.73= 14.93
K	Mitigation fledglings produced (Sum of fledglings produced at Mitigation Projects, adjusted for weighting factors[4], across years)	89.13
L	Mitigation increased adult survival (adults)[4] (Sum of Increased adult survival credit [0.031* annual breeding occupancy] across years of release pen occupancy)	4.37
M	Net fledglings remain (Current Year K- J)	8.00 – 0.73 = 7.27
N	Net adults 3 yrs. later (M from 3 Years' Previous *0.512) ***For FY 2007- FY 2025 this uses a survival of 0.512; this HCP uses 0.83 going forward based on the best available science.** [5]	9.20 * 0.8^3 = 4.71
Total Direct Take from Collisions with WTGs (adults; C)		**54.00**
Total Indirect Take (fledglings; E + G)		**3.53**
Total Indirect Take (adults; [E + G] x 0.512) *note proposed change to 0.83 going forward		**1.81**
Total Lost Productivity (fledglings; I)		**12.15**
Total Lost Productivity (adults; I x 0.512) *note proposed change to 0.83 going forward		**6.22**

1. Parameter aligns with the Indirect Take and Lost Productivity for nēnē Appendix provided with HCP Compliance annual reporting, starting in FY 2019.
2. Data used can be found in the FY 2025 annual HCP Compliance Report submitted to agencies August 1, 2025
3. If no lost productivity is accrued, 2006 HCP provision of "Replacements that occur in advance of take may offset adjustments for lagging replacements on a one-for-one basis" applies.
4. Based on Haleakalā Ranch annual outcomes; FY 2019 and FY 2023 are adjusted to account for partial crediting due to sharing of credits with KWP II, all other years are allocated 100 percent to KWP I.
5. See Section 4.1.4 of HCP for justification.

3.1 Summary of Calculations to Determine Lost Productivity and Biological Justification

The lost productivity calculation uses five summary statistics as presented in Table 1. This section provides an explanation for these, which include: total direct take from collisions, total indirect take as a result of collisions, total indirect take as a result of fledglings that would have become adults, total lost productivity of calculated fledglings, and total lost productivity of fledglings that would have become adults.

3.2 Total Direct Take from Collisions

Total direct take from collisions is calculated as the sum of Estimated Adult Direct Take (Table 1, Parameter C) for all years of operation. This calculation is the same as the EoA output of cumulative direct mortality.

$$\textbf{Total Direct Take from Collisions} = \sum_{i}^{n} Estimated\ Adult\ Direct\ Take$$

*where *i* represents 1 year out of *n* years of project operation out of the current 20-year permit term

3.3 Total Indirect Take (future fledglings) as a Result of Collisions

Total indirect take resulting from collisions calculates future fledglings lost when adults are taken. It requires two calculated parameters: observed indirect take (Table 1, Parameter E) and unobserved indirect take (Table 1, Parameter G).

$$\textbf{Observed Indirect Take}_{\boldsymbol{i}} = Observed\ Indirect\ Take\ Seasonal\ Multiplier\ x\ Observed\ Adult\ Take_i$$

*Where *i* is the year of interest

The point during the breeding season when an adult is taken determines to what extent offspring may be affected. The indirect take seasonally- based multiplier ranges from 0 (May, June, July) to 0.04 (April, August, and September) to 0.09 (October through March), is based on the number of anticipated fledglings per pair in a given seasonal timeframe, the likelihood of an individual being in breeding condition and the assumed parental contribution as shown in Table 8 of HCP Section 5.1.1.2.

$$\boldsymbol{Un}\textbf{observed Indirect Take}_{\boldsymbol{i}} = \ Unobserved\ Direct\ Take_i\ x\ 03 * 0.375 * 0.5$$

*Where *i* is the year of interest

For calculating unobserved direct take, it is assumed that there are 0.3 fledglings per breeding pair. Therefore, to get an estimate of an unobserved take of birds that would have produced fledglings, the average likelihood of breeding across 12 months is multiplied by the number of fledglings per breeding pair. This value is then multiplied by 0.5 representing the parental contribution, since 0.3 references a breeding pair of birds.

Note that the value of 0.375 for the average likelihood of breeding was published in the KWP II HCP Amendment (KWP II 2019) and incorporated into KWP I annual calculations for the current permit term. However, based on the best available science, the average likelihood of breeding across the 12 months is 0.3625 (Banko 2020). This HCP proposes using the 0.3625 value going forward which calculates to a 0.05 unobserved indirect take multiplier (see HCP Section 5.1.1.2).

Finally, total indirect take of future fledglings is calculated as the sum of all years of observed indirect take (Table 1, Parameter E) added to the sum of all years of unobserved indirect take (Table 1, Parameter G).

$$\boldsymbol{Total\ Indirect\ Take} = \sum_i^n Observed\ Indirect\ Take + \sum_i^n Unobserved\ Indirect\ Take$$

*where *i* represents 1 year out of *n* possible years of operation

3.4 Total Indirect Take of Fledglings That Would Have Become Adults

The total indirect take of fledglings that would have become adults uses the total indirect take as a result of collisions calculation and the average survival to breeding age (assuming an equal sex ratio of fledglings; Section 4.1.4 of the HCP). These values are multiplied together to calculate how many indirectly taken fledglings could have survived to adulthood.

$$\textbf{Total Indirect Take of Fledglings to Become Adults} = Total\ Indirect\ Take\ of\ Fledglings\ x\ probability\ of\ surviving\ to\ breeding\ age$$

Note that the value of 0.512 (0.8^3; or an 80 percent probability of survival to a breeding age of 3) has been used for this calculation for the current permit term. However, based on the best available science and assuming an equal sex ratio of fledglings, nēnē survival from fledgling to adulthood is shown to be 0.75 for females and 0.91 for males, or an average of 0.83 and (HCP Section 4.1.4). This HCP proposes using the 0.83 value going forward.

3.5 Total Lost Productivity of Calculated Fledglings

Total lost productivity of fledglings is the sum of Lost Productivity from Accrued Adult Take (Table 1, Parameter I) for all years of operation. Accrued adult take (Table 1, Parameter H) is the level of observed adult take adjusted for adult survival and fledglings expected to survive to adulthood achieved as a result of mitigation. The resulting accrued adult take is then multiplied by 0.10, or the fledgling success that would have been expected from by taken females (KWP 2006), to calculate lost productivity from accrued adult take.

$$\textbf{Lost Productivity from Accrued Adult Take}_{\mathbf{i}} = Accrued\ Adult\ Take_i\ x\ 0.10$$

*Where *i* is the year of interest

$$\textbf{Total Lost Productivity of Fledglings} = \sum_i^n Lost\ Productivity\ from\ Accrued\ Adult\ Take$$

*where *i* represents 1 year out of *n* years of operation

3.6 Total Lost Productivity

The total lost productivity (of fledglings that would have become adults) uses the Total Lost Productivity of Fledglings from Accrued Adult Take (prior calculation in Section 3.5) for all years of operation and the average probability of surviving from fledgling to adulthood across both sexes. These values are multiplied together to calculate overall lost productivity due to nēnē take at the Project based on how many fledglings could have survived to adulthood.

$$\textbf{Total Lost Productivity of Fledglings to Become Adults} = Total\ Lost\ Productivity\ of\ Fledglings\ x\ 0.83\ probability\ of\ surviving\ to\ breeding\ age$$

Similar to Section 3.4, the value of 0.512 (0.8^3; or an 80 percent probability of survival to a breeding age of 3) has been used for this calculation for the current permit term. However, based on the best available science and assuming an equal sex ratio of fledglings, nēnē survival from fledgling to adulthood is shown to be 0.75 for females and 0.91 for males, or an average of 0.83 and (HCP Section 4.1.4). This HCP proposes using the 0.83 value going forward.

4.0 Summary

As previously identified, mitigation under the Project's current permits is lagging. However, the combined additional nēnē mitigation project at the POH Ranch release pen (anticipated to start in FY 2026) and future mitigation at the Haleakalā Ranch release pen will account for the lag under the current permits, as well as begin to outpace take under future permits. Additionally, lost productivity is calculated to account for a situation in which mitigation lags take and adjusts the mitigation obligation accordingly. With the anticipated offsets from future nēnē mitigation programs, KWP I anticipates that mitigation will outpace predicted take at the Project and would accrue a lost productivity obligation if the outpacing is not achieved. The means by which mitigation offsets for nēnē are calculated in this HCP include the same factors that have been used in the existing HCP and permits since its approval in 2006. Many of the assumptions behind these factors remain the same, while some are proposed to be updated, based on evolving science.

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Appendix I. KWP I Wind Facility – Density Weighted Proportion of the Carcass Distribution Searched

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Kaheawa Wind Power I (KWP I) Wind Facility – Density Weighted Proportion of the Carcass Distribution Searched

Kaheawa Wind Power I (KWP I or the Project) has had take of ʻōpeʻapeʻa, ʻuaʻu, and nēnē, with each species representing a taxonomic class with a unique carcass distribution. Starting in FY 2015, Kaheawa Wind Power, LLC (KWP) compiled site-specific fatality data to determine site-specific carcass distributions for each taxonomic group and calculate an area correction based on these distributions. The distributions and resulting area correction were refined in subsequent years, and in FY 2018, the final area correction was presented in the annual report (KWP I 2018), including the methods used to calculate the carcass distributions and the distributions used per size class as Appendix 1. KWP I has been utilizing these density weighted proportions (DWPs) for permit compliance fatality estimation generated by Evidence of Absence fatality models, with agency concurrence, since 2018.

The DWPs are specific to the size of the Covered Species and are as follows:

- Bat: 0.573
- Medium bird (seabirds): 0.246
- Large bird (nēnē): 0.35

Dalthorp et al. (2024), "Accounting for the Fraction of Carcasses outside the Searched Area and the Estimation of Bird and Bat Fatalities at Wind Energy Facilities," describes a package in R called 'dwp' which contains functions to fit models of carcass density distributions based on field data of carcass distances from turbines and search areas. Multiple models based on distance from turbines are tested, and the user can use the best-fitting model to identify the probability of carcasses falling within various distances of turbines. Dalthorp et al. (2024) provides detailed outlines of methods and R code so users can easily follow their approach and apply it to their own data. Using a variety of data sources, Tetra Tech evaluated the package's use, challenges, and benefits alongside several other methods for evaluating carcass distribution. Based on this evaluation, Tetra Tech determined that the package was the best available science for estimating a carcass distribution through FY 2025 for KWP I, given the data attributes, sample size of carcasses between KWP I and the KWP II wind facilities, and the distribution of carcass distances. Therefore, in FY 2026, Tetra Tech used the dwp package to reanalyze fatality data collected through FY 2025 and update carcass distributions used as a basis for fatality estimation adjustment under the new Habitat Conservation Plan (HCP).

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1.0 DWP Analysis with Carcasses through FY 2025

Over the 19-year span of fatality data at KWP I, various search areas were utilized, including the original 180 meter x 200 meter rectangle search area centered on each turbine, with the additional 20 meters of the rectangle added to the downwind slope. Searches within this configuration were conducted for approximately four years. In November 2010, with Hawai‘i Department of Land and Natural Resources – Division of Forestry and Wildlife (DOFAW) approval, the search area was reduced to a 73-meter radius centered on the turbine, and in April 2015, the search area was reduced to the cleared and maintained areas within 70 meters of the turbine base. The various search area configurations over time provided the opportunity to detect carcasses at distances greater than the current search area boundary, which in turn, are used to determine the correction factor for the current search area.

This package is designed to extrapolate beyond the search radius, which is particularly useful in addressing agency concerns about missing carcasses that fall beyond the current search radius. For example, the package tests distributions that do not require assumptions that the carcass distribution ends at some distance. If the current carcass distances suggest that carcasses are falling longer distances from the turbine, this pattern will be reflected in the distributions suggested by the package and the resulting proportion of the carcass distribution covered by searches. The final distribution informs the adjustment for the search area that affects the detection probability used to estimate the true number of carcasses.

1.1 Nēnē

The sample size of carcasses used to calculate the carcass distribution in FY 2018 included 32 observed carcasses with an added six theoretical carcasses randomly assigned to distances between 70 meters and 100 meters from the turbine base. The analysis using Dalthorp et al. (2024) used 41 carcasses detected through FY 2025. The carcass distances used to fit the model are shown in Figure 1, and the best-fitting distribution is shown in Figure 2 below. Figure 2 plots the cumulative density function (CDF), which describes the cumulative probabilities of finding a carcass at each 1-meter increase in distance. The top model’s CDF was used to identify the predicted proportion of carcasses at specific distance bands out to 70 meters, which represents the current search radius from the turbine (Table 1).

The cumulative probabilities per band output is reported in Table 1. Table 1 describes how much of the carcass distribution is added as additional distance bands are searched. These probabilities do not yet represent the site-specific DWP for the species, as the proportion of the carcass distribution covered in each band still needs to be adjusted for the actual search area at KWP I.

Figure 1. Histogram of Carcass Distances for Nēnē (n=41)

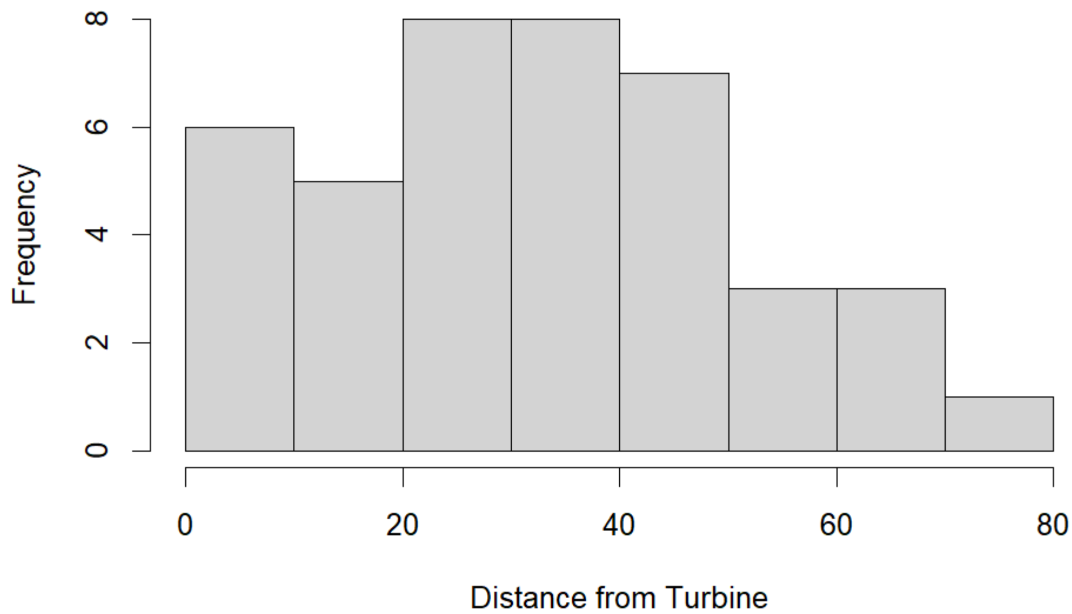

Figure 2. Cumulative Density Distribution of Best-Fitting Model for Nēnē

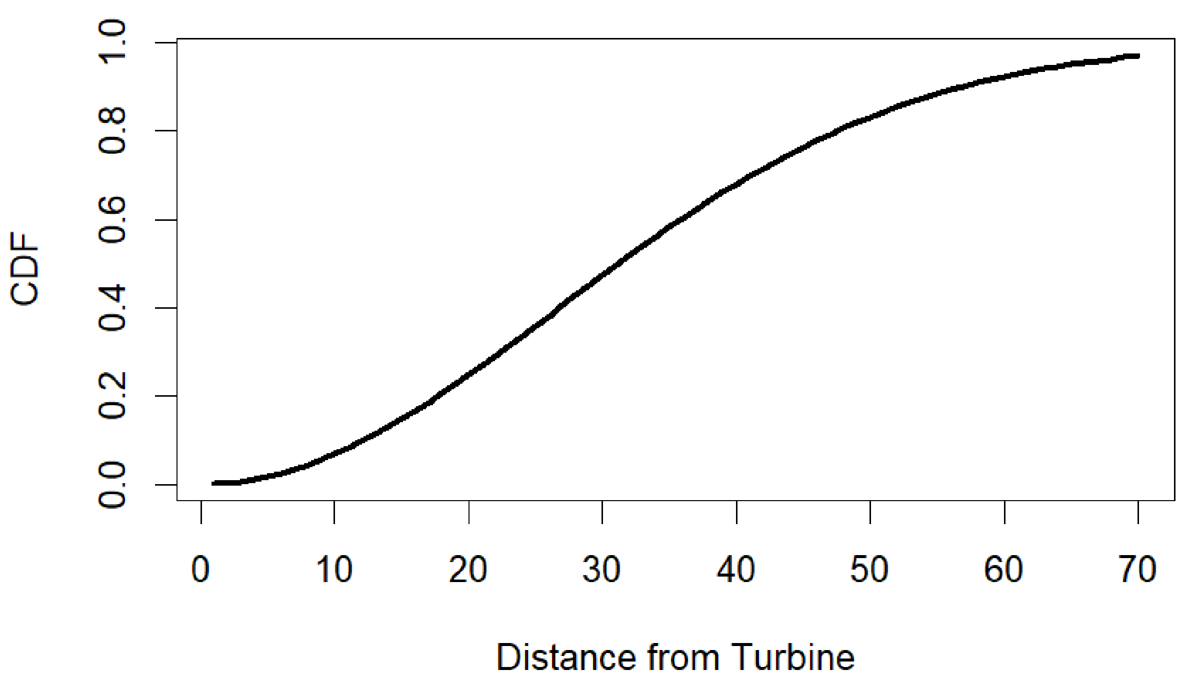

Table 1. Nēnē Cumulative Distribution Probabilities per Distance Band

Distance Bands	FY 2018 Calculation "Large Size" Distribution Cumulative Probabilities[1]	dwp Package Distribution Cumulative Probabilities for Nēnē Carcasses through FY 2025
0 – 20m	0.139	0.094
30m	0.333	0.371
40m	0.611	0.590
50m	0.667	0.768
60m	0.750	0.886
70m	0.833	0.951

[1] See KWP I (2018), Appendix 1 for methods

An annulus analysis using the current search areas was used to identify the proportion of the distance bands reported in Table 1 that were covered by searchers at each turbine; the proportion of each band was then averaged across turbines. The average proportion of the band searched was multiplied by the predicted proportion of the carcass distribution for that band to get an adjusted version of the carcass distribution covered by searchers across turbines. The per-band proportions of carcass distribution searched are then added to get a cumulative DWP out to 70 meters.

The final percentage of the nēnē carcass distribution searched at 70 meters using the Dalthorp et al. (2024) package was 37.6 percent. This percentage represents site-specific DWP for the species and is a slight increase from the FY 2018 proportion of the large bird distribution searched (35 percent). In the fatality estimation process, this site-specific DWP is used to adjust (in the case of any proportion less than 1, penalize and lower) the detection probability used to predict the true number of carcasses at the site.

1.2 ʻAʻo and ʻUaʻu

The same process was then used to determine the DWP for seabirds (ʻaʻo and ʻuaʻu). The sample size of carcasses used to calculate the carcass distribution in FY 2018 included 27 observed seabird carcasses. The analysis using Dalthorp et al. (2024) used 39 carcasses detected through FY 2025, and included ʻuaʻu, koaʻe kea (*Phaethon lepturus*, white-tailed tropic bird), ʻuaʻu kani (*Ardenna pacifica*, wedge-tailed shearwater), and 'iwa (*Fregata minor,* great frigate bird). The carcass distances used to fit the model are shown in Figure 3, and the best-fitting distribution is shown in Figure 4 below. Figure 4 plots the CDF, which describes the cumulative probabilities of finding a carcass at each 1-meter increase in distance. The top model's CDF was used to identify the predicted proportion of carcasses at specific distance bands out to 70 meters, which represents the current search area (Table 2).

The cumulative probabilities per band reported in Table 2 describe how much of the carcass distribution is added as additional distance bands are searched. These probabilities do not yet represent the site-specific DWP for the species, as the proportion of the carcass distribution covered in each band still needs to be adjusted for the actual search area at KWP I.

Figure 3. Histogram of Carcass Distances for Seabirds (n=39)

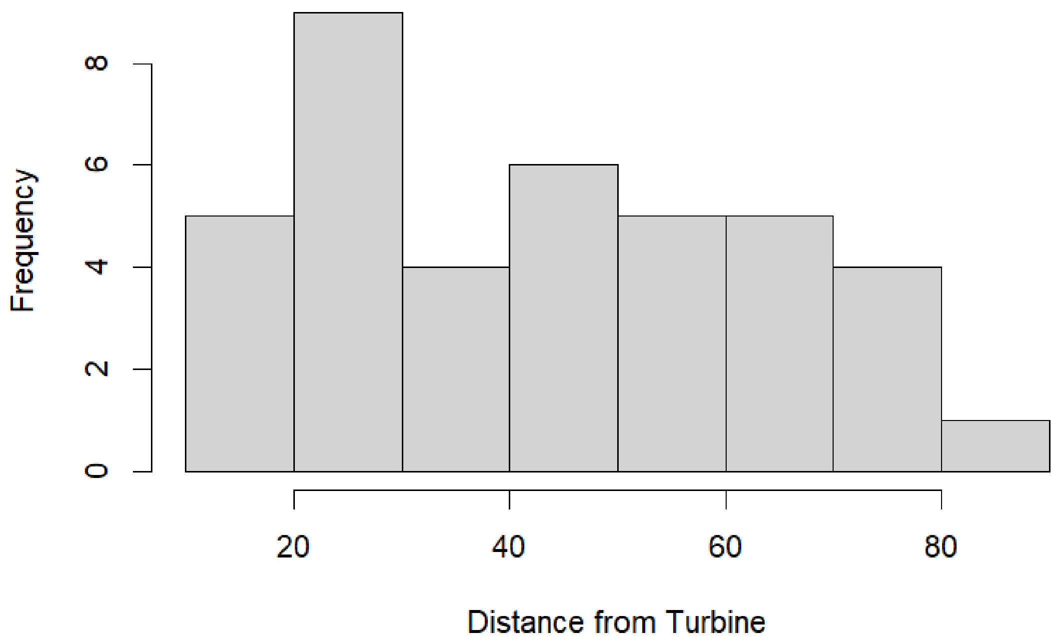

Figure 4. Cumulative Density Distribution of Best-Fitting Model for Seabirds

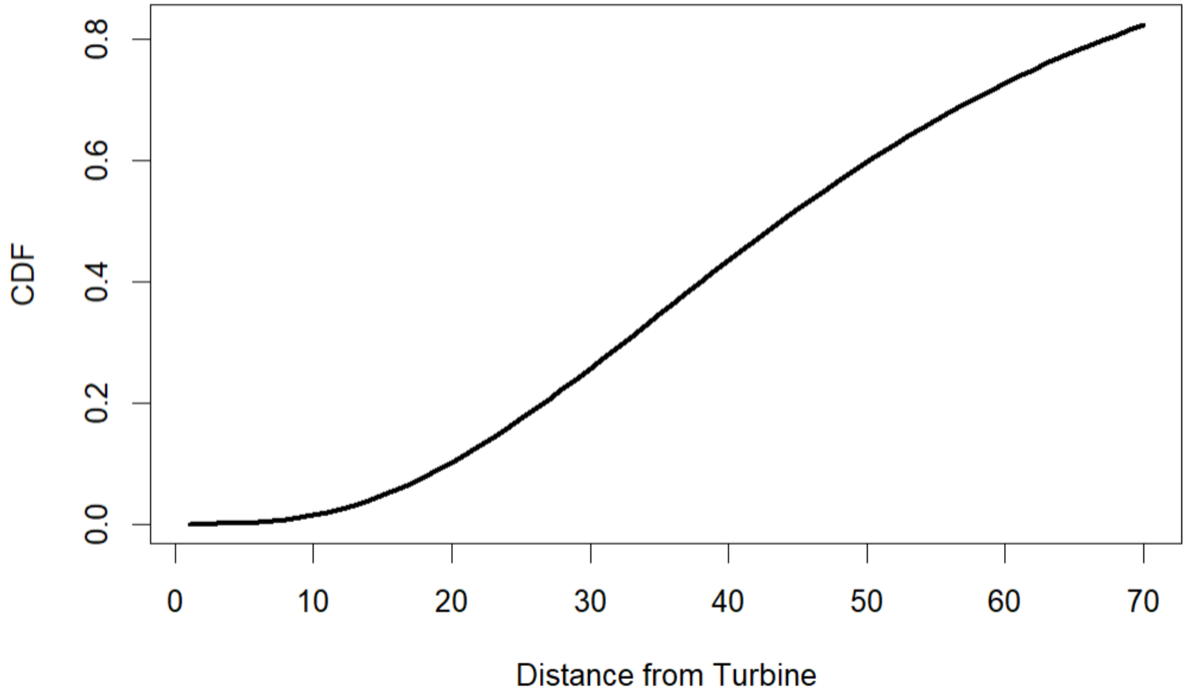

Table 2. Seabird Cumulative Distribution Probabilities per Distance Band

Distance Bands	FY 2018 Calculation "Medium Size" Distribution Cumulative Probabilities[1]	dwp Package Distribution Cumulative Probabilities for Seabird Carcasses through FY 2025[2]
0 – 20m	0.091	0.03
30m	0.182	0.18
40m	0.303	0.35
50m	0.485	0.53
60m	0.637	0.67
70m	0.817	0.78

[1] See KWP I (2018), Appendix 1 for methods

[2] Seabird cumulative probabilities available to the nearest hundredth.

Similar to the approach used for nēnē, an annulus analysis using the current search areas out to 70 meters was used to identify the proportion of the bands reported above that were covered by searchers at each turbine, and then the proportion of each band searched was averaged across turbines (these values are identical across carcass classes). Then, the average proportion of the band searched is applied to the predicted proportion of the carcass distribution for that band to get an adjusted version of the carcass distribution covered by searchers across turbines. The per-band proportions of carcass distribution searched are then added to get a cumulative DWP out to 70 meters.

The final percent of the seabird carcass distribution searched at 70 meters using the Dalthorp et al. (2024) package was 22.8 percent, representing the site-specific DWP for this taxonomic group. This percentage is a slight decrease from the FY 2018 proportion of the medium bird distribution searched (24.6 percent). In the fatality estimation process, this site-specific DWP is used to adjust the detection probability used to predict the true number of carcasses at the site.

1.3 ‘Ōpe’ape’a

The sample size of carcasses used to calculate the carcass distribution in FY 2018 included 14 observed carcasses. The analysis using Dalthorp et al. (2024) used 17 carcasses through FY 2025. The carcass distances used to fit the model are shown in Figure 5, and the best-fitting distribution is shown in Figure 6 below. Figure 6 plots the CDF, which describes the cumulative probabilities of finding a carcass at each 1-meter increase in distance. The top model’s CDF was used to identify the predicted proportion of carcasses at specific distance bands out to 70 meters, which represents the current search area (Table 3).

The cumulative probabilities per band reported in Table 3 describe how much of the carcass distribution is added as additional distance bands are searched. These probabilities do not yet represent the site-specific DWP for the species, as the proportion of the carcass distribution covered in each band still needs to be adjusted for the actual search area at KWP I.

Figure 5. Histogram of Carcass Distances for 'Ōpe'ape'a (n=17)

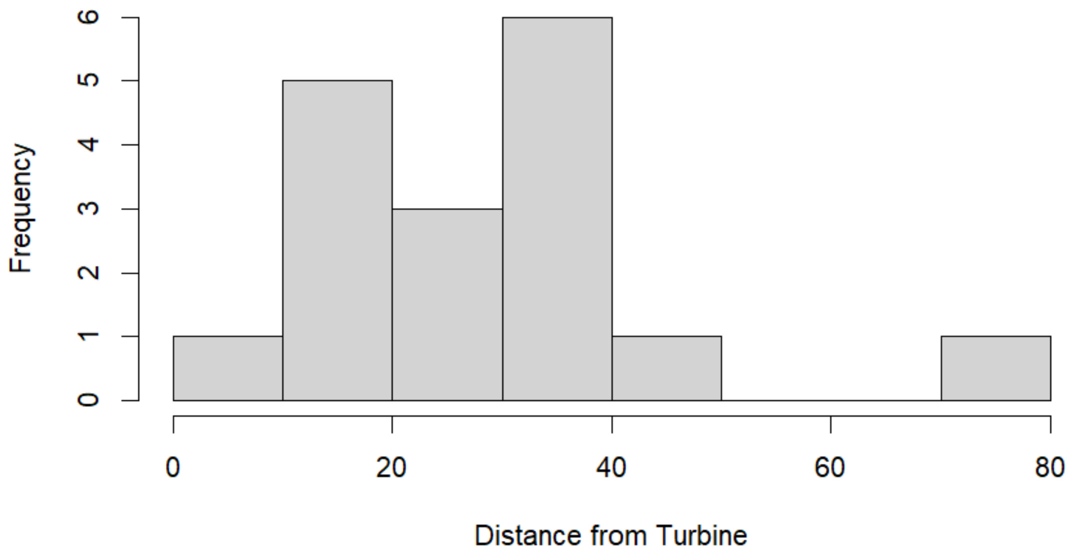

Figure 6. Cumulative Density Distribution of Best-Fitting Model for 'Ōpe'ape'a

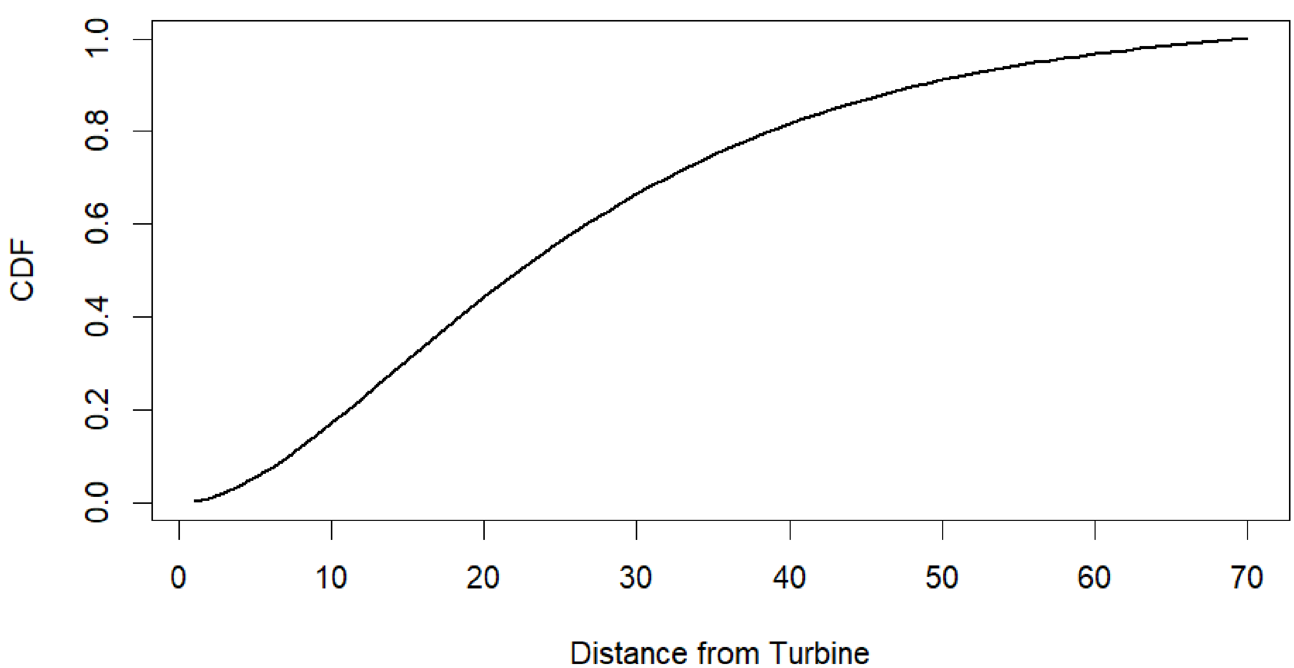

Table 3. ʻŌpe'ape'a Cumulative Distribution Probabilities per Distance Band

Distance Bands	FY 2018 Calculation "Small Size" Distribution Cumulative Probabilities[1]	dwp Package Distribution Cumulative Probabilities for Bat Carcasses through FY 2025
0 – 20m	0.357	0.180
30m	0.571	0.536
40m	0.928	0.723
50m	0.999	0.851
60m	1	0.933
70m	1	0.984

[1] See KWP I (2018), Appendix 1 for methods

An annulus analysis using the current search areas out to 70 meters was used to identify proportion of the bands reported above that were covered by searchers at each turbine, and then the proportion of each band searched was averaged across turbines (these values are identical across carcass classes). Then, the average proportion of the band searched is applied to the predicted proportion of the carcass distribution for that band to get an adjusted version of the carcass distribution covered by searchers across turbines. The per-band proportions of carcass distribution searched are then added to get a cumulative DWP out to 70 meters.

The final percent of the small carcass distribution searched at 70 meters using the Dalthorp et al. (2024) package was 49.4 percent, representing the site-specific DWP for the ʻōpeʻapeʻa which is a decrease from the FY 2018 proportion of the bat distribution searched (53.3 percent). In the fatality estimation process, this site-specific DWP is used to adjust the detection probability used to predict the true number of carcasses at the site.

2.0 Conclusion

Tetra Tech's FY 2026 carcass distribution analysis using the Dalthorp (2024) dwp package analyzed fatality data collected through FY 2025 in order to update carcass distributions. The analysis presented above uses an inclusive, large sample along with recently published methods to update the FY 2018 carcass distribution calculated with a smaller sample size. For comparison, the site-specific DWPs calculated in FY 2018 for each species as well as the new DWP calculated using Dalthorp et al. (2024) in combination with an annulus analysis are shown in Table 4. The site-specific DWPs calculated are the proposed area correction factors for fatality estimation under the new HCP, which represent the proportion of the carcass distribution for each species covered when searching cleared and maintained areas within 70 meters of the turbine base. The purpose of the DWPs is to adjust (penalize) the detection probability to reflect the interaction between the search area and site-specific carcass distribution, and subsequently adjust the annual estimate of mortality to assess permit compliance.

Table 4. Comparison of DWP Values

Species	Site-Specific DWP Through FY 2026 (Calculated in FY 2018)	Site-Specific DWP Based on Dalthorp et al. (2024) Code
Nēnē	0.35	0.376
Seabird	0.246	0.228
ʻŌpeʻapeʻa	0.573	0.494

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Appendix J. Kaheawa Wind Power I Wildlife Education and Observation Program (WEOP)

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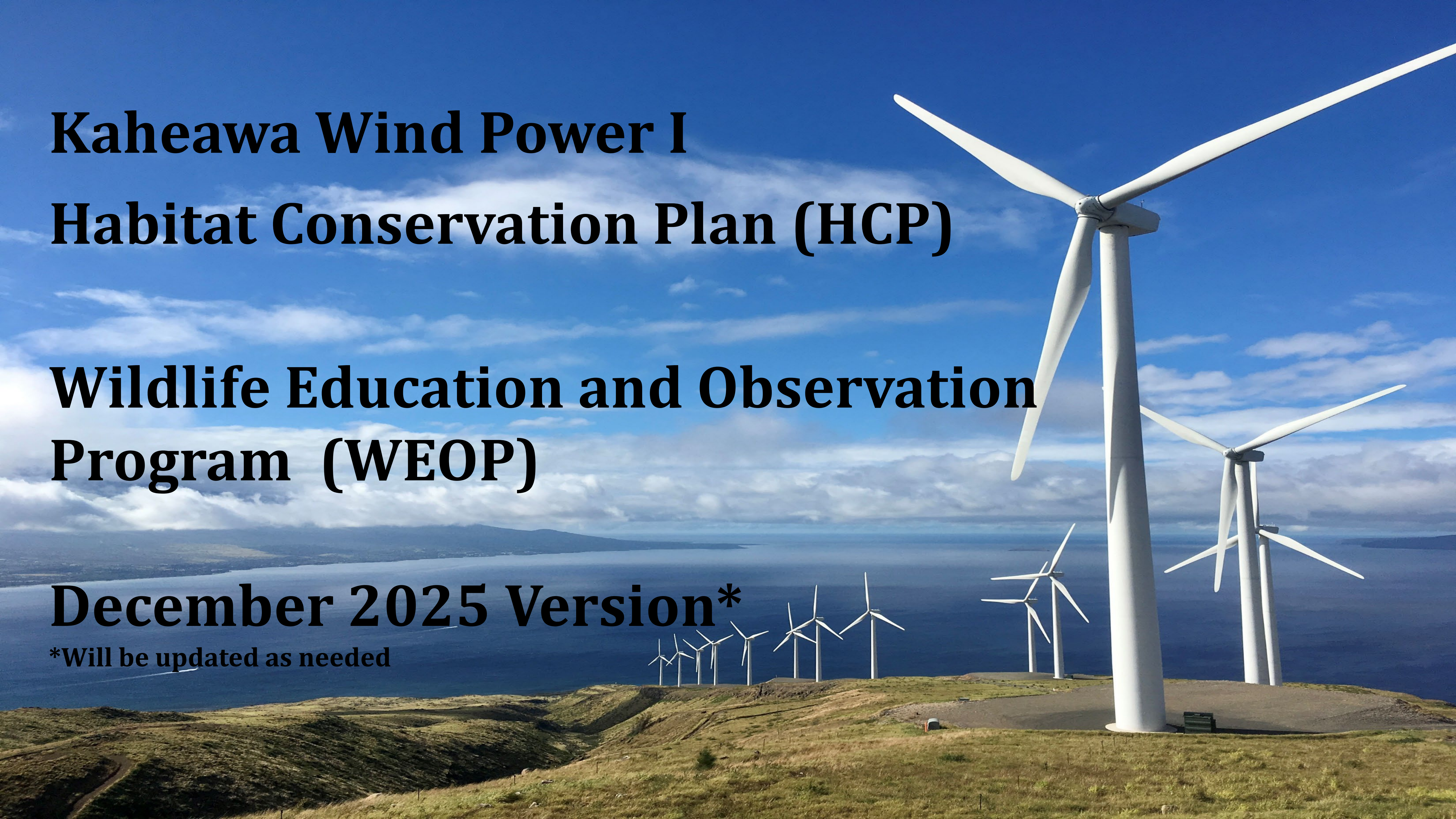


Kaheawa Wind Power I
Habitat Conservation Plan (HCP)

Wildlife Education and Observation Program (WEOP)

December 2025 Version*

***Will be updated as needed**

HCP Overview

- Regulatory Protections for Wildlife:
  - Hawaii Endangered Species Law
  - USFWS Endangered Species Act
  - Migratory Bird Treaty Act

- Original HCP approved in January 2006 inclusive of KWP I's 20-year compliance obligations under Project's state Incidental Take License (ITL-08) and federal Incidental Take Permit (TE72434A-1)
- New HCP developed in 2025 to support issuance of new ITL and ITP through 2046 and the resulting compliance.

HCP Covered Species

- Nēnē (Hawaiian goose)
- ʻŌpeʻapeʻa (Hawaiian hoary bat)
- ʻUaʻu (Hawaiian petrel)
- ʻAʻo (Newell's shearwater)
- ʻAkēʻakē (band-rumped storm petrel)
- Assimulans yellow-faced bee (YFB)

WEOP Overview

Goals of WEOP

- To avoid and minimize impacts to protected wildlife
- Inform on proper wildlife etiquette onsite
- Identify protected wildlife
- Train on reporting protocol
  - Observed wildlife
  - Native/Invasive plant species
- Actions to take if downed wildlife is observed
- Comply with the commitments of the HCP
- WHO: All on-site staff, contractors and visitors

Potential Wildlife Issues

- Fatalities of wildlife have the potential to occur during facility operations
  - Attraction of seabirds to nighttime lighting
  - Collision of birds and bats with infrastructure
    - Turbines
    - Construction Equipment
    - Vehicles
- Impacts to habitat (YFB) have the potential to occur if activities occur off the existing roads and pads

Nēnē

- Nēnē actively breed within the Project Area
- Breeding Season (nēnē ON-site)
  - Late September-April
  - Potential to display aggressive behavior
- Non-breeding Season (nēnē generally OFF-site)
  - May-August
- Risk Minimization
  - Site-wide speed limit 10 MPH
  - Targeted vegetation management
  - Transformer catchment ramps/ limit water catch

What To Do IF

- Nene in the middle of road or work area
  - Stop and wait for birds to move on their own
  - Move equipment slowly but limiting opportunity for flushing from vegetation and flying toward vehicle
- Nest/egg discovered or newly hatched goslings seen
  - Contact On-Site Biologist or Environmental Compliance Officer

Identification

- Medium-sized goose with small head, short bill, long legs
- Upper parts dark brown, under parts light brown with dark barring
- Black head with cream-colored cheek patch
- Young goslings attain adult plumage after 5 months

‘Ōpe‘ape‘a (Hawaiian Hoary Bat)

Identification

- Black, yellow, and reddish-brown fur with frosted tips
- Length: 3.5 inches
- Wingspan: 11 - 14 inches
- Pupping Season
    - June 1st- September 15th

Behavior: Roost solitarily in tree foliage in day; generally most active during late summer – fall

Risk Minimization

- Turbine curtailment (5.5 m/s November through July, 6.5 m/s August through October)
- Tree cutting and trimming timing restrictions (see Vegetation Management Plan

What To Do IF

- A fatality is observed along the road or turbine pad
    - Document precise location
    - Contact On-site Biologist or Environmental Compliance Officer

SEABIRDS - ‘Ua‘u (Hawaiian petrel), ‘A‘o (Newell’s shearwater) and ‘Akē‘akē (Band-rumped storm petrel)

Biology

- Return to land to nest/breed (April – November)
- Mostly likely observed at sunset or sunrise as they fly from sea to burrow to forage: may fly through Project Area during breeding
- Seabird fallout: attracted to artificial lights causing disorientation, grounded by collision or exhaustion

Risk Minimization

- Turn off Lights! (Offices, interior turbine lights)
- Minimize any night work on-site
- Biological Monitor if night work must occur

What To Do IF

- A fatality is observed along the road or turbine pad
  - Document precise location
  - Contact On-site Biologist or Environmental Compliance Officer

SEABIRDS - ‘Ua‘u (Hawaiian petrel), ‘A‘o (Newell’s shearwater) and ‘Akē‘akē (Band-rumped storm petrel)

‘Ua‘u

- Black and white plumage, white underparts
- Black crown and black hooked bill
- Wingspan: 32-42 inches

‘A‘o

- Glossy dark black back, white underneath
- Black bill, sharply hooked at tip
- Wingspan: 30-35 inches

‘Akē‘akē

- Primarily blackish-brown
- A sharply defined narrow white band across rump area

Assimulans Yellow-faced Bee (YFB)

Identification

- Assimulans YFB is a small- to medium-sized bee with forewing lengths of about 0.12 to 0.31 inches
- Slender bodies that are usually black
- Roughly resemble wasps in appearance

On-site Occurrence

- Native plants which support Assimulans YFB foraging:
    - ʻilima (mid-elevation, 2,000 to 3,000 ft)
    - Native flowering plants within the Project Area which may support foraging, including but not limited to:
        - ʻuhaloa (moderately common)
        - ʻūlei (uncommon)
- Nest surveys to occur in 2026 (and annually) and nests will be marked for avoidance

Avoidance and Minimization

- Vehicle use restricted to existing roads and turbine pads
- Adhere to site-wide speed limit of 10 mph
- Adhere to Vegetation Management Plan including limiting herbicide use to periods between July and October and avoiding impacts to native plants whenever possible
- Avoid any areas where nests have been marked by entomologists
- Contact Environmental Compliance Officer if any work off roads and pads is needed; do not complete until approved
- Additional training materials will be developed in conjunction with DOFAW entomologists following the site survey

Cover. The assimulans yellow-faced bee (*Hylaeus assimulans*) (male) visiting *Sida fallax* (ʻilima) flower, Makena, Maui. Photo provided by John Kenolio, Lahaina Photography. Identification confirmed by Dr. Karl Magnacca.

Plant Species of Note: ‘ilima, ‘ōhi‘a lehua, tree tobacco (see Vegetation Management Plan for further detail)

‘ilima (native)

- Foraging resource to YFB
- **Avoid removal or disturbance**
- Pre-work survey by an entomologist may need to be completed if ‘ilima disturbance is suspected
- Distributed primarily in mid-elevation areas

‘ōhi‘a lehua (native)

- Important native species
- **Avoid removal or disturbance**
- Distributed primarily in upper elevations

tree tobacco (non- native)

- Provides habitat to the endangered Blackburn’s sphinx moth
- If observed in LOD:
  - If tree tobacco less than 3 feet in height, remove the plants immediately to prevent attracting Blackburn’s sphinx moth during the dry season (usually May to October).
  - If tree tobacco over 3 feet in height, engage a qualified biologist (see Vegetation Management Plan)

Pueo

Identification

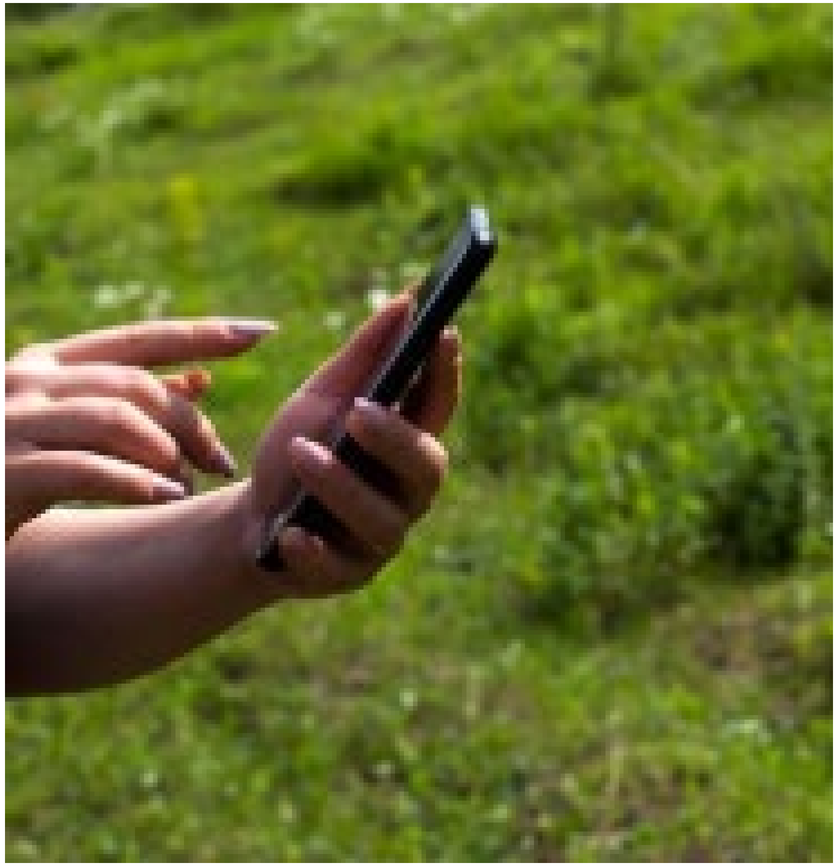
- Mottled pale brown underparts with upper breast streaked dark brown
- Rounded brown face and yellow eyes
  - Active during day
  - Usually seen just after sunset (prey availability)
  - May forage in or fly over Project Area
  - Nests on ground

Risk Minimization

- Contact the Environmental Compliance Officer prior to any ground disturbing activities to determine if a nest survey needs to be completed.
- If pueo nests are detected in the Project Area at any time, a 328-foot (100-meter) buffer should be established in which no activity occurs until the nesting cycle is complete and the chicks are capable of flight.

Observations and Reporting Downed Wildlife

- If an **HCP Covered Species** is observed while on-site, contact the on-site biologist or the Environmental Compliance Officer
  - Provide detailed location of observation, number of individuals
  - Date and time of observation
- If **Downed Wildlife of <u>any species</u>** is observed while on-site, immediately contact the On-site Biologist or the Environmental Compliance Officer
  - Document precise location, date and time, and condition
  - Take photo with item for scale



Ongoing and Future KWP I HCP-related Wildlife Monitoring

- **Weekly downed wildlife searches**
- **Quarterly carcass persistence trials**
- **Weekly predator trapping**
- **Year-round bat acoustic monitoring**
- **Vegetation management (1-2 times per year)**
- **Annual YFB surveys**

Downed Wildlife Monitoring

- Canine assisted
- Weekly searches (Tuesday)
- Searcher efficiency trials
- Carcass Retention trials
- Observe the 10 MPH site specific speed limit!
- Do not leave food trash anywhere within the Project Area

Carcass Persistence Trials

- Trials to determine average time carcasses persist in environment before scavenged or blown away
- Quarterly trials
- Use data to determine search intervals.
- Three size classes:
    - Small (rat)
    - Medium (Wedge-tailed shearwater)
    - Large (Chicken)
- **Leave carcass as is;** no need to call Environmental Compliance Office if you find a flagged carcass while working.

Predator Trapping

- Aides in lengthening carcass persistence
- Weekly
- Allows downed wildlife to persist longer in environment, giving search dog more opportunities to discover
- May also increase nēnē nest survival
- How can you help?
    - Do not touch traps!
    - Call On-site Biologist if you come across a cage trap with a live animal inside
    - Notify On-site Biologist of any mongoose or cat sightings with general or specific location(s)

Contacts

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Questions?

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