STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

Division of Forestry and Wildlife

Honolulu, HI 96813

November 8, 2019

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

SUBJECT: REQUEST FOR APPROVAL OF THE SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE KAHEAWA WIND POWER II WIND ENERGY PROJECT ON THE ISLAND OF MAUI, HAWAI'I

APPLICANT:

Kaheawa Wind Power II, LLC

LEGAL REFERENCE:

Hawaii Revised Statutes (HRS) Section 343-5 and Hawaii Administrative Rules (HAR) Section 11-200-23

LOCATION:

Wind farm site: 2-4-8-001:001 (por.). Access road: 2-3-6-001:014

AREA:

Wind farm site (footprint of permanent facilities and wildlife search areas) - approximately 143 acres, including 135 acres of State Conservation Land. Overhead lines - approximately 0.24 miles.

CHARACTER OF USE:

Wind farm operation

PUBLIC NOTICES:

A Supplemental Environmental Impact Statement Preparation Notice was published in The Environmental Notice of the Office of Environmental Quality Control on February 23, 2017. Kaheawa Wind Power II, LLC published the Draft Supplemental Environmental Impact Statement (SEIS) in The Environmental Notice on August 8, 2019. Public comments on the Draft SEIS were accepted during the 45-day comment period and the responses included in the Final SEIS.

ITEM C- 2

DESCRIPTION OF PROJECT:

Kaheawa Wind Power II (KWP II), LLC operates a 14-turbine, 21-megawatt wind energy generation facility near Kaheawa Pastures above Mā'alaea on the southwestern portion of Maui. Approximately 143 acres of the site is State Conservation Lands. KWP II operates under a Habitat Conservation Plan (HCP) and associated Incidental Take License (ITL) which authorizes take of endangered species protected under HRS Chapter 195D. KWP II, LLC is pursuing a major amendment to the HCP to increase the amount of incidental Hawaiian Hoary Bat and Hawaiian Goose, or Nēnē, take authorized under the ITL.

Pursuant to HRS Chapter 343, an Environmental Impact Statement (EIS) was accepted by the Department of Land and Natural Resources, Office of Conservation and Coastal Lands (OCCL) in May 2010. KWP II was constructed in 2012 and has been in operation since that time.

Post-construction mortality monitoring data indicate that the wind turbines are causing a greater number of endangered Hawaiian Hoary Bat fatalities than anticipated in the approved Habitat Conservation Plan and authorized under the Incidental Take License. Incidental take of the Nēnē has not yet exceeded but is projected to exceed the authorized take during the term of the Incidental Take License. For these reasons KWP II, LLC is pursuing a major amendment to the HCP. In all other aspects there have been no substantive changes to the project; the size, scope, intensity, type of use, and location of the wind farm facilities are consistent with the description provided in the 2010 EIS. However, given the increase in intensity of impacts due to the increased take of the Hawaiian Hoary Bat and the higher than expected rate of take of the Nēnē this Supplemental EIS has been prepared.

The purpose of this SEIS is to disclose the increase in project-related impacts to the Hawaiian Hoary Bat and the Nēnē and the additional measures that will be implemented to avoid, minimize, and mitigate those impacts, within the context of the HRS Chapter 343 requirements. It is based on the information presented in the HCP Amendment, which was published for public review in October 2017, pursuant to the requirements of HRS Chapter 195D, and was subsequently revised in response to the comments received. This Final SEIS also reflects comments received on the Draft SEIS. A separate but parallel HCP Amendment and environmental review process was conducted in compliance with federal requirements, pursuant to the Endangered Species Act and National Environmental Policy Act.

PROPOSED ACTION:

To reduce impacts to the Hawaiian Hoary Bat low wind speed curtailment (LWSC) with a 5.5 m/s cut-in speed will continue to be implemented at the project year-round from sunset to sunrise. Mitigation for the Hawaiian Hoary Bat incidental take under newly added tier 3 consists of funding research to provide ecology and life history information for the species. Mitigation for tier 4 is proposed as funding land acquisition and protection.

Existing avoidance and minimization measures will be continued to reduce impacts to the Nēnē. Mitigation for the Nēnē under tier 3 will consist of funding predator control and vegetation management at either the Pi'iholo or Haleakalā Nēnē release pens.

ALTNERNATIVES TO THE PROPOSED ACTION:

One alternative and a no action alternative were briefly discussed but were not carried forward in the SEIS for detailed analysis. Reasons provided were lack of benefit to the species and fiscal feasibility.

FEIS ACCEPTABILITY EVALUATION:

Pursuant to HAR Section 11-200-23(b), a statement shall be deemed to be an acceptable document by the accepting authority or approving agency only if all of the following criteria are satisfied:

l) The procedures for assessment, consultation process, review and the preparation and submission of the statement, have all been completed satisfactorily as specified in this chapter;

2) The content requirements described in this chapter have been satisfied; and

3) Comments submitted during the review process have received responses satisfactory to the accepting authority, or approving agency, and have been incorporated in the statement.

The Final SEIS contains the applicant's responses to public comments received, some in opposition to the project. The primary issues of concern were the increased take of the Hawaiian Hoary Bat and the Nēnē. The applicant will address take issues related to impacts to the Hawaiian Hoary Bat and the Nēnē through Board approval of a Habitat Conservation Plan for issuance of an Incidental Take License as well as consultation with the U.S. Fish and Wildlife Service for issuance of a federal Incidental Take Permit (ITP).

The final SEIS for the Kaheawa Wind Power II wind farm is available in the November 8, 2019 Environmental Notice here: http://oeqc2.doh.hawaii.gov/_layouts/15/start.aspx#/The_Environmental_Notice/Forms/AllItems.aspx.

RECOMMENDATION:

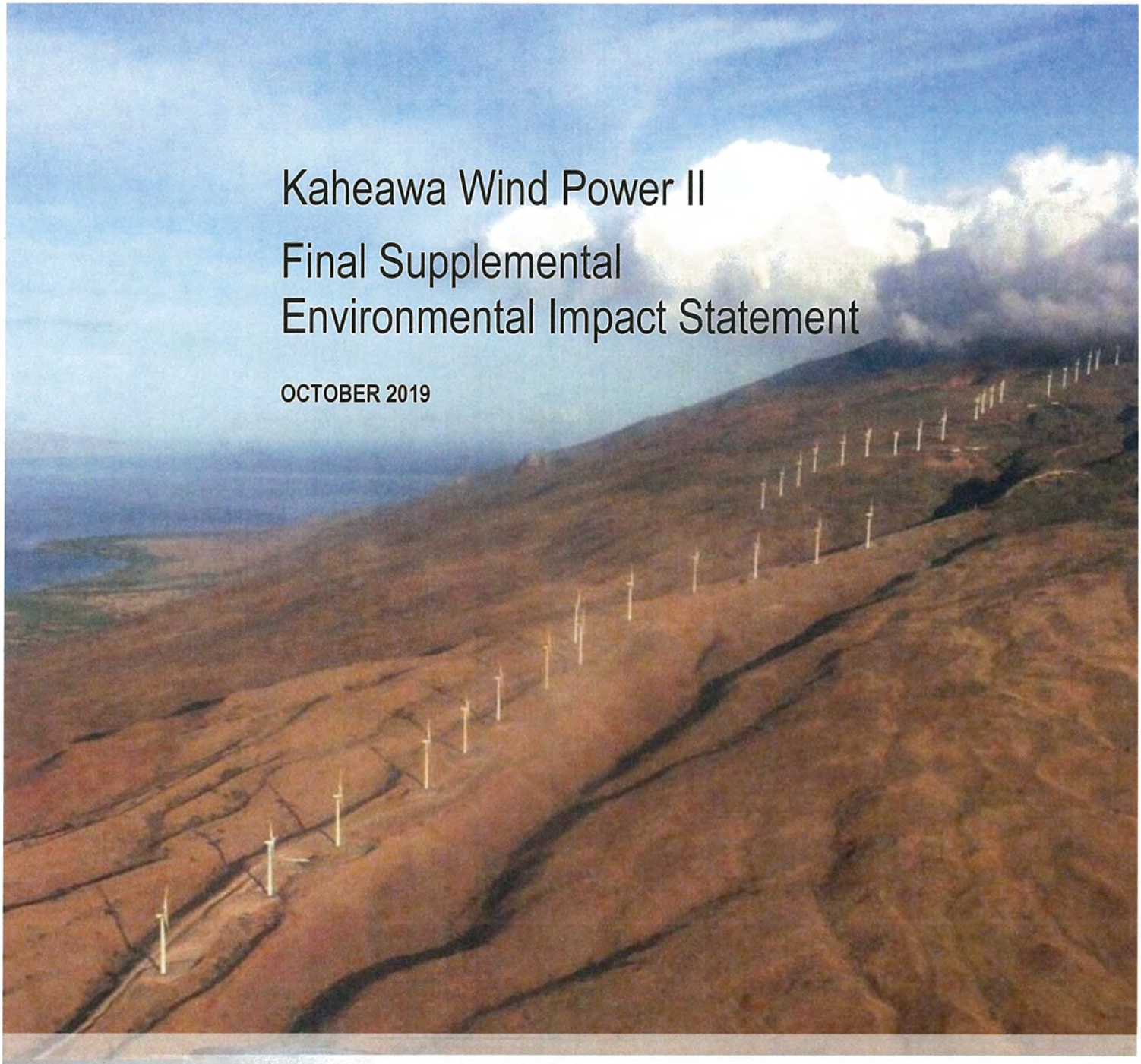
That the Board accept the Final Supplemental Environmental Impact Statement for the Kaheawa Wind Power II wind farm located on Maui, Hawai'i.

Respectfully submitted,

David G. Smith, Administrator
Division of Forestry and Wildlife

APPROVED FOR SUBMITTAL:

Suzanne D. Case, Chairperson
Board of Land and Natural Resources



Kaheawa Wind Power II

Final Supplemental Environmental Impact Statement

OCTOBER 2019

APPLICANT

Kaheawa Wind Power II, LLC
c/o TerraForm Power
200 Liberty Street, 14th Floor
New York, NY 10281

PREPARED BY

SWCA Environmental Consultants
307a Kamani St.
Honolulu, Hawai'i 96813

Final Supplemental Environmental Impact Statement

Kaheawa Wind Power II
Maui, Hawai'i

This Final Supplemental Environmental Impact Statement and all ancillary documents were prepared under my direction or supervision and the information submitted, to the best of my knowledge, fully addresses document content requirements as set forth in Section 11-200-17, Hawai'i Administrative Rules.

Kimball Osmars, Authorized Signatory
Kaheawa Wind Power II, LLC

October 16, 2019
Date

PROJECT SUMMARY

Project Name	Kaheawa Wind Power II
Applicant/Project Owner	Kaheawa Wind Power II, LLC
Project Summary	Kaheawa Wind Power II (KWP II) is a 21-megawatt wind farm located on state land above the town of Mā'alaea on the southwestern portion of the Island of Maui, Hawai'i (Project) owned and operated by Kaheawa Wind Power II, LLC (KWP II). Pursuant to Hawai'i Revised Statutes (HRS) 343, an environmental impact statement (EIS) was accepted by the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) in May 2010. The wind facility was subsequently constructed and began commercial operations in July 2012. The Project is operating under an approved Habitat Conservation Plan (HCP), a federal Incidental Take Permit (ITP), and a Hawaii Incidental Take License (ITL). The 2012 ITL authorized incidental take over the 20-year life of the Project for up to 11 adult Hawaiian hoary bats, or 'ōpe'ape'a (*Lasiurus cinereus semotus*), and 30 Hawaiian geese, or nēnē (*Branta sandvicensis*). Monitoring data gathered during the first four years of operation indicated that the level of incidental take of Hawaiian hoary bats and Hawaiian geese is higher than anticipated. Thus, KWP II is pursuing an amendment to its HCP, in accordance with the Endangered Species Act and HRS 195D, as part of the request to increase the amount of take authorized by the 2012 ITL to up to a total of 38 adult Hawaiian hoary bats and up to a total of 44 adult Hawaiian geese through permit end. KWP II will continue to implement avoidance and minimization measures, conduct monitoring and provide mitigation commensurate with the new take levels. No change to previously authorized take or mitigation efforts for the Hawaiian petrel (*Pterodroma sandwichensis*) or Newell's shearwater (*Puffinus auricularis newelli*) is proposed. The Project itself has not changed except for the need for an amended HCP and ITP/ITL. The scope, size, intensity, location, and use of the wind farm facilities are consistent with the 2010 EIS. Because the proposed ITP/ITL amendment would increase authorized incidental take analyzed in the original assessment, KWP II is preparing this supplemental EIS (SEIS) to assess the impacts that the Proposed Action and alternatives would have on the natural and human environment. This includes measures to avoid, minimize, and mitigate impacts within the context of HRS 343 requirements. The draft SEIS was submitted to the OEQC for publication in the August 8, 2019 edition of the Environmental Notice. After the 45-day public comment period, minimal comments were received, and no revisions were made for the final SEIS. After the final SEIS is approved by DLNR Division of Forestry and Wildlife (DOFAW), approval of the HCP amendment and ITL may occur. A parallel programmatic EIS for HCP and ITP amendments was conducted in compliance with federal Environmental Protection Agency/National Environmental Policy Act requirements.
Project Location	Kaheawa Pastures, Mā'alaea, Ukumehame Ahupua'a, Lahaina

	District, Island of Maui, Hawai'i
Land Ownership	State Conservation District
Tax Map Keys	(2) 4-8-01 (por.) (note: access road is in 3-6-001:014)
State Land Use District	Conservation
County Zoning	Not applicable (State Conservation District)
Required Permits / Approvals	Major amendment to HCP and Incidental Take License (ITL)
Actions Requiring Environmental Review under HRS Chapter 343	The Project required compliance with HRS 343 based on the provisions of HRS 201N as well as the use of lands within the conservation district.
Approving Agency	Department of Land and Natural Resources
Contact Information	Kaheawa Wind Power II, LLC c/o TerraForm Power 200 Liberty Street, 14th Floor New York, NY 10281 Contact: Lily Henning (646) 992-2486, lhenning@terraform.com SWCA Environmental Consultants 307a Kamani St. Honolulu, Hawai'i 96813 Contact: Amanda Ehrenkrantz (808) 892-3842, aehrenkrantz@swca.com

Kaheawa Wind Power II, LLC (KWP II, the Applicant) owns and operates a 21-megawatt wind energy generation facility (Project) on leased State of Hawai'i Conservation District lands near Mā'alaea on Maui, Hawai'i, supplying electricity to Maui Electric Company Ltd. The Project has an approved Habitat Conservation Plan (HCP) to monitor and mitigate for take of three bird species and one bat species protected under state and federal endangered species laws.

The Applicant has requested that the Board of Land and Natural Resources issue an amended Incidental Take Permit and approve an amended HCP to increase incidental take for the Hawaiian hoary bat from a total of 11 to a total of 38 adults (or juveniles surviving to adulthood), and for the Hawaiian goose from a total of 30 to a total of 44 adults (or juveniles surviving to adulthood) during the remaining 20-year permit. KWP II would implement avoidance and minimization measures and monitoring and would provide mitigation commensurate with the new take levels. The Proposed Action would result in benefits at the local and state level by producing clean, renewable energy in line with Hawai'i's clean energy goals. Effects to Hawaiian hoary bat and Hawaiian goose would be mitigated by acquiring land for conservation, funding management of a Hawaiian goose breeding pen, and funding research critical to understanding Hawaiian hoary bat movements, roosting behavior, and diet. Through the mitigation proposed and the resulting net recovery benefit to the species, no significant impacts to the Hawaiian hoary bat and the Hawaiian goose populations are anticipated.

EXECUTIVE SUMMARY

Project Description

Kaheawa Wind Power II (KWP II) is a 21-megawatt (MW) wind farm located on state land above the town of Mā'alaea on the southwestern portion of the Island of Maui, Hawai'i owned and operated by Kaheawa Wind Power II, LLC (KWP II). Pursuant to Hawai'i Revised Statutes (HRS) 343, an environmental impact statement was accepted by the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) in May 2010 (Planning Solutions 2010). The wind facility was subsequently constructed and began commercial operations in July 2012.

The Project is operating under an approved Habitat Conservation Plan (approved HCP), Incidental Take Permit (ITP), and Incidental Take License (ITL). The 2012 ITL authorized incidental take over the 20-year life of the Project for up to 11 adult Hawaiian hoary bats, or 'ōpe'ape'a (*Lasiurus cinereus semotus*), and 30 Hawaiian geese, or nēnē (*Branta sandvicensis*). Monitoring data gathered during the first 4 years of operation indicated that the level of incidental take of Hawaiian hoary bats and Hawaiian geese is higher than anticipated. Thus, KWP II is pursuing an amendment to its HCP, in accordance with the Endangered Species Act (ESA) and HRS 195D, as part of the request to increase the amount of take authorized by the 2012 ITL to up to a total of 38 adult Hawaiian hoary bats and up to a total of 44 adult Hawaiian geese. KWP II would implement avoidance and minimization measures and monitoring and would provide mitigation commensurate with the new take levels. No change to previously authorized take or mitigation efforts for the Hawaiian petrel (*Pterodroma sandwichensis*) or Newell's shearwater (*Puffinus auricularis newelli*) is proposed. The Project itself has not changed except for the need for an amended HCP and ITP/ITL. The scope, size, intensity, location, and use of the wind farm facilities are consistent with the 2010 EIS. This supplemental EIS (SEIS) assesses the increase in intensity of impacts that the Proposed Action and alternatives would have on the natural and human environment. This includes measures to avoid, minimize, and mitigate impacts within the context of HRS 343 requirements.

The draft SEIS was submitted to the OEQC for publication in the August 8, 2019 edition of the Environmental Notice. After the 45-day public comment period, minimal comments were received, and no revisions were made for the final SEIS. After the final SEIS is approved by DOFAW, approval of the HCP amendment and ITL may occur. A parallel programmatic EIS for HCP and ITP amendments was conducted in compliance with federal Endangered Species Act (ESA) and National Environmental Policy Act (NEPA) requirements.

The purpose of this SEIS is to disclose the increase in intensity of Project-related impacts to the Hawaiian hoary bat and the Hawaiian goose and the additional measures that will be implemented to avoid, minimize and mitigate those impacts, within the context of the HRS Chapter 343 requirements. It is based on the information presented in the HCP Amendment, which was published for public review pursuant to the requirements of HRS Chapter 195D, and was subsequently revised in response to the comments received. This Final SEIS also reflects comments received on the Draft SEIS.

Alternatives

Alternative 1 (No Action): An ITL amendment would not be issued by the Board of Land and Natural Resources (BLNR), and KWP II's amended HCP would not be approved. An ITL amendment is not legally required for continued operation of the Project, but any incidental take occurring as a result of project operation that exceeds the existing ITL would not be authorized. Minimization, avoidance, and mitigations measures established in the approved HCP would continue to be implemented. Under the No Action alternative no net conservation benefit would be achieved, contribution to the state's renewable

energy targets would be reduced and financial impact of increased curtailment would imperil the project's continued operation.

Alternative 2 (Proposed Action): The BLNR would issue an amended ITL and approve an amended HCP for the remaining duration of the Project's 20-year operating life, authorizing an increase of incidental take for the Hawaiian hoary bat from 11 adults to 38 adult bats, and for the Hawaiian goose from 30 (adults, subadults, fledglings, goslings, and eggs) to 44 adult Hawaiian geese (or juveniles surviving to adulthood). KWP II would be responsible for implementing avoidance and minimization measures as well as provide mitigation commensurate with the level of take.

Alternative 3 (Increased Curtailment): In order to minimize take, KWP II would completely shut down turbine operations at night from April 15 through September 15. Low wind speed curtailment would be implemented at 5.5 meters/second (m/s) from February 15 through April 15 and September 15 through December 15 and would be extended if fatalities occur outside of the curtailment period. KWP II would continue to implement the avoidance and minimization measures established in the approved HCP, as applicable. Compensatory mitigation measures would be reduced commensurate with any reduction of incidental take of bats. This alternative would not be anticipated to decrease affect take rate of Hawaiian goose. Under Alternative 3, no net conservation benefit would be achieved, contribution to the state's renewable energy targets would be reduced and financial impact of increased curtailment would imperil the project's continued operation.

Potential Impacts

Besides the impacts to Hawaiian hoary bat; Hawaiian goose; cultural resources; and public infrastructure and services, project and mitigation-related impacts are commensurate with the assessment provided in the 2010 EIS. The discussion contained in the 2010 EIS is incorporated by reference for the following resource categories: climate; air quality; hydrology and water resources; geology, topography, and soils; historical and archeological resources; visual resources; noise; land use and socioeconomic resources; hazardous materials; and natural hazards. Impacts to these resources specific to the Proposed Action and associated mitigation measures are discussed, as applicable, in Chapter 4 of this final SEIS and briefly summarized below.

Under the Proposed Action, KWP II is requesting to increase its authorized take for the Hawaiian hoary bat from 11 to 38 individuals and for the Hawaiian goose from 30 to 44 individuals. The take of a bat during the breeding season may result in the indirect loss or take of a dependent offspring, and the bat population on Maui or statewide is not known. This change would have minor impacts to the Hawaiian goose population in the immediate area of the KWP II facility. Effects to the Hawaiian hoary bat and the Hawaiian goose would be mitigated by KWP II providing funding and restoration efforts to mitigate take of each species. Proposed mitigation for the Proposed Action includes the following:

- Funding bat research that would provide life history, occupancy, habitat usage, and/or foraging information, and aid in the recovery of the species
- Acquiring land for conservation purposes or contributing to an in-lieu fee program
- Continuing to provide additional funding at an existing pen or at a site where Hawaiian goose regularly forage or nest to increase survival rates and productivity and thereby mitigate take of Hawaiian goose

Through the mitigation proposed and resulting net benefit to the species, no significant impacts to either species is anticipated.

Operation, authorized take, and associated minimization and mitigation activities at KWP II would be as described in Section 2.2 of this final SEIS. The Proposed Action would result in benefits at the local and state level in the form of clean, renewable energy being produced in line with the State of Hawai'i's clean energy goals. The Hawaiian hoary bat is important to Hawai'i's heritage and culture and thus is considered a cultural resource and is discussed further in Section 3.6.

All alternatives evaluated in this final SEIS have the potential to reduce the amount of wind energy generated by KWP II. The loss of this portion of renewable energy would need to be made up by some additional source of energy production to meet the island-wide energy demand.

Compatibility with Land Use Plans and Policies

All alternatives are compatible with state and local land use plans and policies. Plans consulted to ensure compatibility include the Maui County General Plan, the Countywide Policy Plan, the Kihei-Makena and West Maui Community Plans, the Hawai'i State Plan, and the HRS related to land use. A detailed description can be found in Chapter 6 of the 2010 EIS.

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1 INTRODUCTION

Kaheawa Wind Power II (KWP II) is an approximately 21-megawatt (MW) wind farm located on state land above the town of Mā'alaea on the southwestern portion of the Island of Maui, Hawai'i, owned and operated by Kaheawa Wind Power II, LLC (KWP II, the Applicant). Pursuant to Hawai'i Revised Statutes (HRS) 343, an environmental impact statement was accepted by the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW) in May 2010 (Planning Solutions 2010). The wind facility was subsequently constructed and began commercial operations in July 2012.

The Project is operating under an approved Habitat Conservation Plan (approved HCP), Incidental Take Permit (ITP), and Incidental Take License (ITL). The 2012 ITL authorized incidental take over the 20-year life of the Project for up to 11 adult Hawaiian hoary bats, or 'ōpe'ape'a (*Lasiurus cinereus semotus*), and 30 Hawaiian geese, or nēnē (*Branta sandvicensis*) (the Covered Species). Monitoring data gathered during the first 4 years of operation indicated that the level of incidental take of Hawaiian hoary bats and Hawaiian geese is higher than anticipated. Thus, KWP II is pursuing an amendment to its HCP (amended HCP), in accordance with the Endangered Species Act (ESA) and HRS 195D, as part of the request to increase the amount of take authorized by the 2011 approved HCP.

The proposed ITL/HCP amendment evaluated in this final SEIS would increase total adjusted take (observed take[1] plus unobserved take[2] plus indirect take[3]) for the Hawaiian hoary bat to a total of 38 adult bats.[4] Total adjusted take for the Hawaiian goose would be increased to 44 adults.[5] The amendment would also increase mitigation efforts to offset the requested take. No change to previously authorized take or mitigation efforts for the Hawaiian petrel or the Newell's shearwater is proposed.

The project has not changed except for the need for an amended HCP and ITL. The scope, size, intensity, location, and use of the wind farm facilities are consistent with the 2010 EIS.

A parallel programmatic environmental impact statement (PEIS) for HCP and ITP amendments was conducted in compliance with federal Environmental Protection Agency/National Environmental Policy Act requirements. Because the PEIS has already been published for public review, some of the language in this SEIS is taken directly from the PEIS for consistency.

1.1 Project Location and Description

KWP II operates the 21-MW KWP II facility at Kaheawa Pastures above Mā'alaea in the southwestern portion of the Island of Maui, Hawai'i (Figures 1.1 and 1.2). The KWP II facility commenced operation on June 29, 2012.

[1] Dead individuals found attributable to the KWP II.

[2] Individuals that may have been killed but that were not found during the monitoring effort for various reasons, including heavy vegetation cover and scavenging.

[3] It is possible that an adult killed by collision could have been tending to dependent juveniles. The loss of these adults would then also lead to the loss of eggs or dependent young these adults attended at the time they were killed. Lost young would be considered indirect take attributable to the Project.

[4] Total take to date (October 17, 2019) of Hawaiian hoary bat attributable to KWP II is 13 adults.

[5] Total take to date (October 17, 2019) of Hawaiian goose attributable to KWP II is 15 adults.

1.1.1 *Project Location*

KWP II is situated southeast of the 30-MW Kaheawa Wind Power (KWP I) facility and consists of 58 hectares (ha) (143 acres), including approximately 55 ha (135 acres) of land owned by the State of Hawai'i and designated as State Conservation Land. The site is accessible from Honoapiilani Highway (State Highway 30) via an existing state-owned road that was improved during construction of the adjacent KWP I facility. Other surrounding communities include Lahaina, Waikapu, Kihei, Wailuku, and Kahului.

1.1.2 *Project Description*

Project components consist of 14 General Electric (GE) 1.5-MW wind turbine generators (WTGs), a maintenance building, an electrical substation, a battery energy storage system (BESS), an underground electrical collection system carrying electrical power from the individual WTGs to the electrical substation, a short overhead transmission line connecting the substation to the Maui Electric Company Ltd. (MECO) transmission system, a permanent un-guyed meteorological (met) tower, and short service roads to connect the WTGs and other facilities to the existing main access road serving the adjacent KWP I facility.

No new construction or modification of current project components and operations would occur under the proposed ITL amendment. KWP II would continue to implement Tier 1 and Tier 2 mitigation measures per requirements in the 2011 approved HCP; however, KWP II would implement additional Tier 3 and Tier 4 mitigation measures to further offset impacts of the Project on the Covered Species.

1.2 HCP and ITL

As described in the 2010 EIS, it was determined that implementation of the Project could result in incidental take of the following species, which are listed as endangered under both the federal ESA and the State of Hawai'i endangered species law (HRS 195D): the Hawaiian hoary bat, Hawaiian goose, Hawaiian petrel, and Newell's shearwater. To address the potential for incidental take of these species, KWP II sought an ITP from USFWS pursuant to ESA Section 10(1)(1)(B) and an ITL from DLNR pursuant to HRS Chapter 195D. Both of these permits require development and approval of an HCP prior to authorization. The purpose of an HCP is to describe the anticipated effects of a proposed taking, the measures that would be implemented to avoid, minimize and mitigate the effects, and the funding for those measures. Implementation of an HCP is intended to provide a net conservation benefit to the listed species. An HCP was prepared for the endangered species referenced above, as needed to meet both the federal and state requirements. The HCP for the project was approved, and the ITP and ITL were subsequently issued by USFWS and DLNR on February 24 and January 3 and January 5, 2012, respectively. The take limits that were authorized by the ITP/ITL for the covered species, as well as current take attributable to KWP II and total requested take, are summarized in Table 1-1.

Table 1.1. Permitted, Current and Requested Incidental Take

Species (Common Names)	Permitted Take	Current Take	Total Requested Take
Hawaiian hoary bat	11	13	38
Hawaiian goose	30	15	44
Newell's shearwater	6	0	No change
Hawaiian petrel	35	0	No change

The incidental take requested in the amended HCP has been informed by site-specific fatality monitoring results and reflects a refinement in take estimation and accountability for observed as well as unobserved take that was not available as part of the original HCP/ITL process for KWP II. The incidental take of Hawaiian hoary bats and Hawaiian geese has been higher than anticipated under the approved HCP, in part because the risk to these species associated with wind energy development in Hawai'i was largely unknown and underestimated at the time the ITLs were issued. Higher take estimates are also the result of significant changes required by DOFAW and USFWS to the way fatality rates are estimated to account for imperfect detection and unobserved fatalities.

1.2.1 *Operational Protocol*

As part of its HCP commitments, KWP II has implemented low wind speed curtailment (LWSC) from the start of Project operations in 2012 to reduce risk to Hawaiian hoary bats. This operational protocol involves restricting turbine operation by feathering the turbine blades during periods of low wind speed (i.e., below 5.5 meters per second [m/s]) between sunset and sunrise and during periods of the year. There have been incremental extensions to the LWSC period as an adaptive management response to the occurrence of bat fatalities outside the initial LWSC period and in December 2018, KWP II voluntarily began year round curtailment from sunset to sunrise until a wind speed of 5.5 m/s is reached. Additional information regarding avoidance and minimization measures, including LWSC, is provided in Sections 2.3 and 2.4. Further details on alternative operational protocols that were considered are referenced in the Draft HCP Amendment.

1.2.2 *Postconstruction Monitoring for Downed Wildlife*

KWP II conducts monitoring for downed wildlife in accordance with its postconstruction monitoring plan (PCMP) and associated adaptive management provisions (SWCA 2011b) as modified in coordination with the Service and DOFAW as part of their adaptive management procedures. The KWP II PCMP is conducted to monitor direct take of wildlife species to ensure compliance with the ITL and the approved HCP (SWCA 2011a). The KWP II PCMP includes searches of roads and graded pads that occur within a 70-meter (m) radius from each turbine every 7 days (Figure 2.1). Searches are primarily conducted by a canine search team, with visual searchers conducting up to 14% of searches per year in prior years. All searches in state fiscal year 2019 were conducted by canine searchers. Vegetation within the turbine search plots is suppressed using hand management tools (spray packs and "weed whackers") in order to improve monitoring efficiency. KWP II also conducts searcher efficiency (SEEF) and carcass retention (CARE) trials to obtain data that are used to estimate actual take levels of federally listed species throughout the life of the Project.

1.2.3 *Mitigation Activities*

KWP II engages in several previously authorized mitigation activities designed to provide conservation benefits to the following species: Newell's shearwater, Hawaiian petrel, Hawaiian goose, and Hawaiian hoary bat. The following management activities for Newell's shearwater and Hawaiian petrel occur within two 4.5-acre enclosures built by KWP II in Makamaka'ole, West Maui:

- Predator monitoring, trapping, and removal of rats, mice, and mongoose
- Maintaining culvert tubes and matting to prevent soil erosion immediately inside and outside enclosures

- Outplanting the following species to stabilize soil and provide seabird nesting habitat: ʻuki (*Machaerina augustifolia*), ʻōhiʻa, naupaka kuahiwi (*Scaveola gaudichaudii*), and manono (*Kadua affinis*)
- Manual herbicide and weeding to remove the following non-native species: *Clidemia hirta*, *Tibouchina* spp., *Melinus minutiflora*, and *Psidium* spp.
- Monitoring for seabird activity using game cameras and night surveys

KWP II provided 2 years of funding ($162,750) to DOFAW in fiscal year (FY) 2017 to begin predator control to protect Hawaiian goose breeding sites on Maui. Predator control is expected to continue until mitigation requirements for Hawaiian goose have been successfully completed. Management activities for Hawaiian hoary bat began in 2014 and consist of bat habitat management (reforestation and fence maintenance) within a 340-acre section of the Kahikinui Forest Reserve, Maui.

All mitigation activities, as described above, are expected to continue under the No Action Alternative in accordance with the terms and conditions of the approved HCP/ITL (SWCA 2011a).

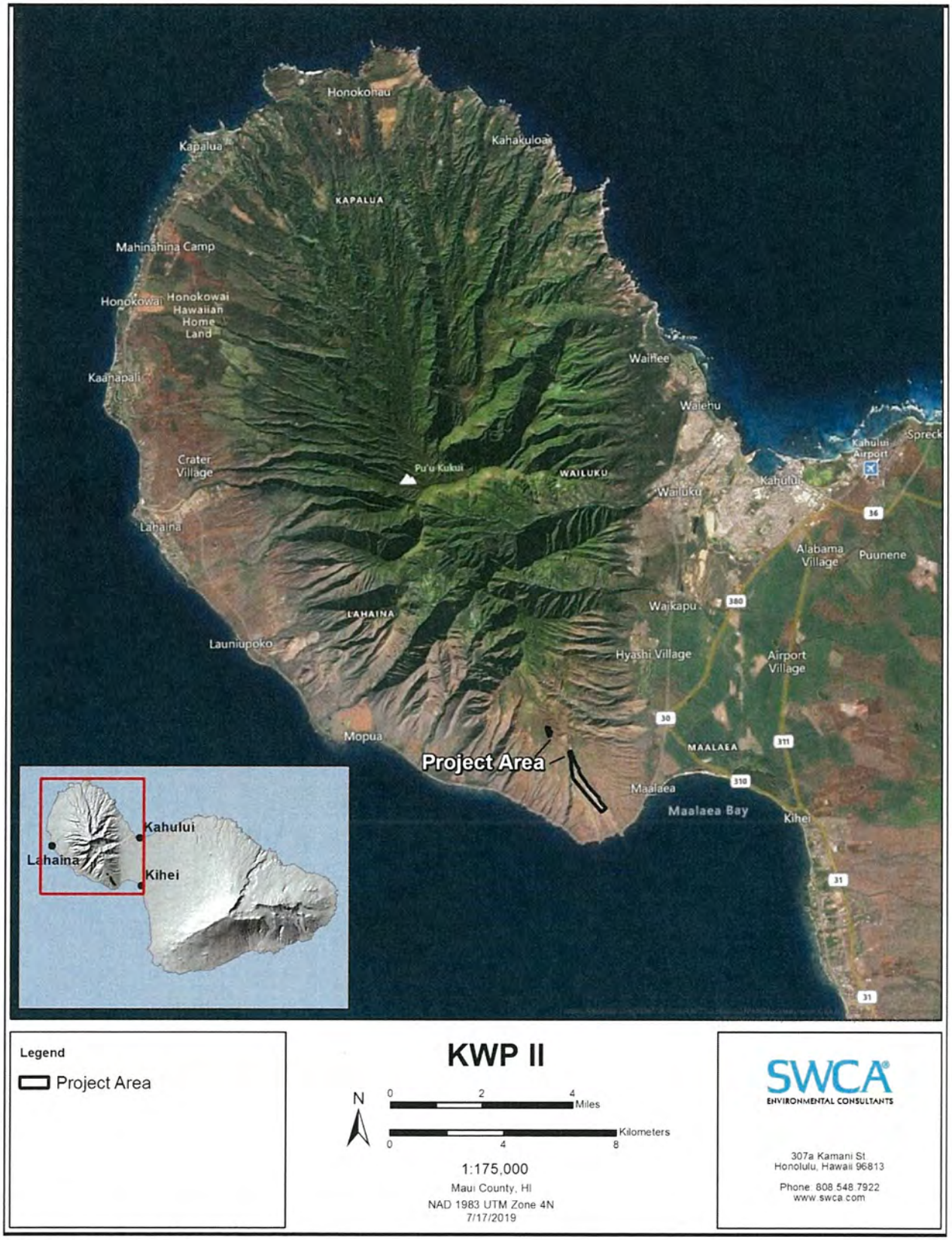

Figure 1.1. KWP II project area.

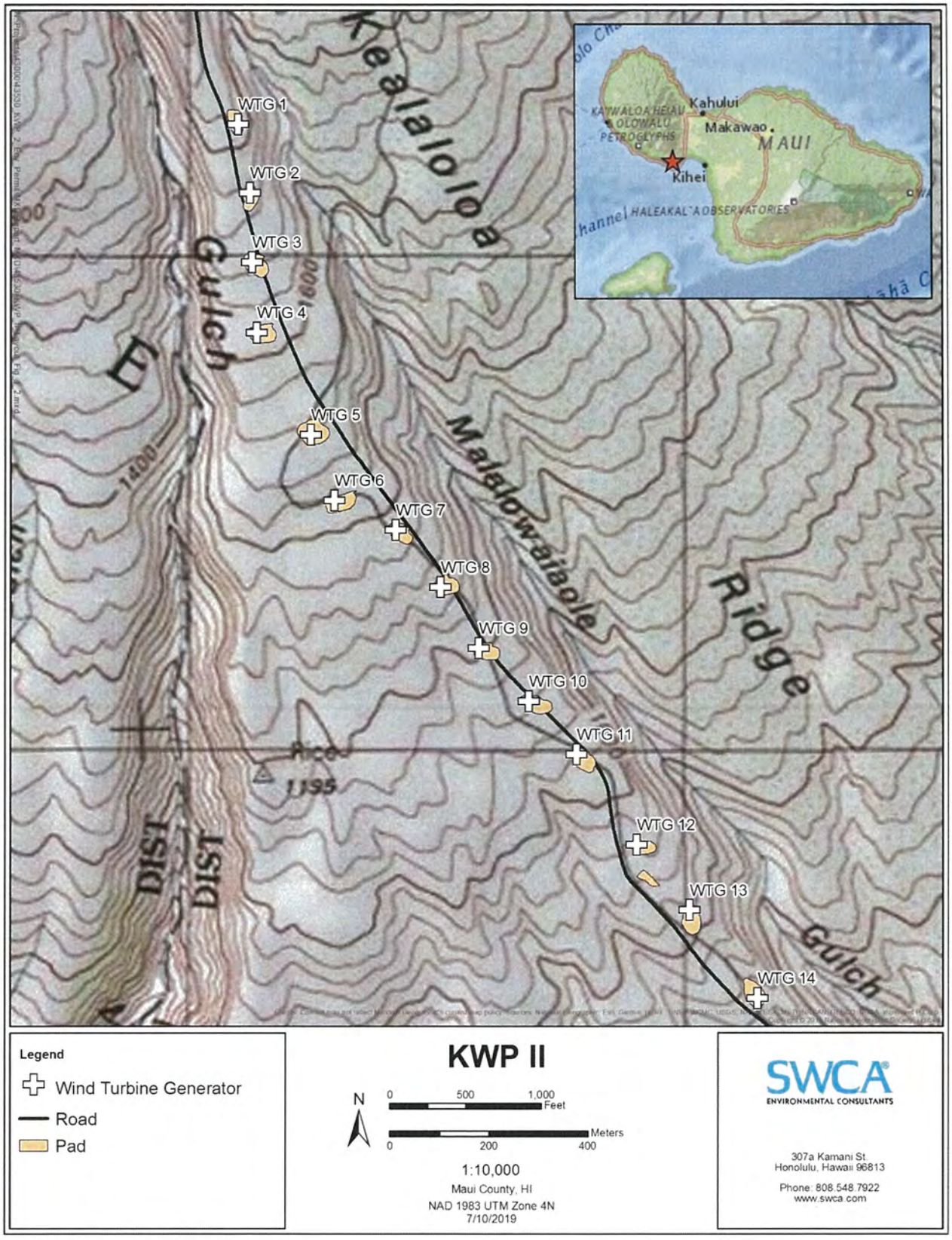

Figure 1.2. KWP II layout.

1.3 Purpose and Need for Action

A detailed statement of the purpose and need for the Project can be found in the 2010 EIS. The project need is based on regulations and initiatives, such as the State of Hawai'i's Renewable Portfolio Standard (HRS 269-92) and the Hawai'i Clean Energy Initiative (HCEI), which reflect the state's commitment to move away from petroleum-based energy generation and expand its renewable energy portfolio. KWP II Wind Farm fulfills the State of Hawai'i's statutory need for renewable energy projects, pursuant to 11 Hawai'i Administrative Rules (HAR) 200-17(e)(2).

This Project's purpose is to provide renewable, clean wind energy for the state. The Project began operations in 2012, and the purpose and need for the Project is unchanged from the 2010 EIS description. Section 1.2 of the 2010 EIS details the project purpose and need and is incorporated here by reference.
Scope of Analysis

The scope of the analysis in this final SEIS covers the direct, indirect, and cumulative effects of the proposed increased incidental take as well as the mitigation measures proposed in the amended HCP. This final SEIS is tiered to the 2010 EIS (Planning Solutions 2010). This document does not address issues beyond the anticipated project-related impacts and mitigation measures related to the take of the Hawaiian hoary bat and the Hawaiian goose. Updated relevant information is provided for individual sections of the final SEIS, as appropriate. For sections that do not require updated information based on additional impacts and mitigation for these species, information from the 2010 EIS is incorporated by reference.

Aside from the Covered Species for which amended take is being requested, two other federally listed species have the potential to fly over the KWP II project during their breeding seasons (Table 1.1). Impacts to the Newell's shearwater and Hawaiian petrel are not evaluated in this final SEIS because the Proposed Action is evaluating a request for increased take for the Hawaiian hoary bat and the Hawaiian goose only. Project effects to the Newell's shearwater and the Hawaiian petrel from implementation of the HCP can be found in Section 5 of the approved HCP (SWCA 2011a) as well as the 2010 EIS (Planning Solutions 2010) and the 2011 federal environmental assessment (EA) for the KWP II HCP (SWCA 2011b).

Table 1.2. Covered Species in the KWP II Habitat Conservation Plan and Amendment Inclusion

Common, Hawaiian Name(s)	Scientific Name	Status	Evaluated for Amended Take?
Hawaiian hoary bat, ʻōpeʻapeʻa	*Lasiurus cinereus semotus*	Endangered	Yes
Hawaiian goose, nēnē	*Branta sandvicensis*	Endangered	Yes
Newell's shearwater, ʻao	*Puffinus newelli*	Threatened	No
Hawaiian petrel, ʻuaʻu	*Pterodroma sandwichensis*	Endangered	No

With the exception of the species listed above, no other federally or state-threatened or endangered species are likely to be present in the project area. Species proposed for listing that are potentially present were also reviewed in the approved HCP (Table 1.2). It has been determined that the species would not use resources on the site and project actions would not rise to the level of incidental take; therefore, these species are not carried forward for analysis.

Table 1.3. Species Proposed for Listing Evaluated for Potential to Occur in the KWP II Project Area

Common, Hawaiian Name(s)	Scientific Name	Presence in Project Area
Band-rumped storm-petrel, 'ake'ake	*Oceanodroma castro*	Potential; individual petrels could fly over the project area, but the risk of take is extremely low.
Orangeblack damselfly	*Megalagrion xanthomelas*	No; required slow or standing water sources are absent.
Yellow faced bees	*Hylaeus anthracinus, H. assimulans, H. facilis, H. hilaris, H. longiceps*	No; required host plants are absent.

The Proposed Action and alternatives would not change or modify the existing landscape within the project area. The effects of the construction and operation of KWP II on all environmental, cultural, and social resources can be found in the 2010 EIS (Planning Solutions 2010) and the 2011 final EA for the KWP II HCP (SWCA 2011b) and incorporated by reference in this final SEIS. The analysis contained in this final EIS will provide a summary of the effect findings from the 2010 EIS for effects from the construction and operation where there is no change.

1.4 Project Objectives

The project began operations in 2012, and the project objectives remain the same as described in the 2010 EIS; they are incorporated in the final SEIS by reference.

2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes the three alternatives (the No Action Alternative, the Proposed Action, and the Increased Curtailment Alternative) developed for consideration in this final SEIS.

2.1 Alternative 1 (No Action Alternative)

Evaluation of a "no action" alternative serves as a baseline for comparison of potential project effects. Under the No Action Alternative for the Project, an ITL amendment would not be issued by BLNR, and KWP II's amended HCP would not be approved. An ITL amendment is not legally required for continued operation of the Project, but any incidental take occurring as a result of project operation that exceeds the existing ITL would not be authorized. Under the No Action Alternative, the Project would continue operating KWP II, the 21-MW facility at Kaheawa Pastures above Mā'alaea in the southwestern portion of the Island of Maui, Hawai'i (see Figure 1.1). The following documents serve as a reference point and the basis for the KWP II No Action Alternative. These documents are incorporated by reference and cited in Chapter 9 (Literature Cited) of this final SEIS.

- The 2010 EIS (Planning Solutions 2010), accepted on May 19, 2010, addressing compliance with state laws for the construction and operation of the KWP II wind project
- The KWP II 2012 ITL (ITL #15), including the terms and conditions, which remain in effect
- The Service's finding of no significant impact, signed on January 3, 2012, and the final EA for the KWP II HCP (SWCA 2011b) addressing compliance with NEPA for the issuance of the KWP II 2011 ITP and HCP
- The KWP II Wind Energy Generation Facility HCP (SWCA 2011a)

Under this alternative, KWP II would not be issued a major amendment to its 2011 ITL to increase its authorized take level for the Hawaiian hoary bat and the Hawaiian goose. KWP II would continue

activities authorized under the 2012 ITL, including incidental take up to the following amounts: 11 Hawaiian hoary bats, 30 Hawaiian geese, eight Newell's shearwater, and 43 Hawaiian petrel. In order to maintain these take amounts, KWP II would institute a full nighttime shut down, and would only operate its fourteen 1.5-MW wind turbines during daylight hours. This action is irreversible and would result in the Project being heavily curtailed for the remainder of the permit term to avoid exceeding permitted take. It was not carried forward for further consideration because increased curtailment would reduce the amount of power produced by the Project, imperiling continued operation due to the financial impact, and would not be anticipated to have positive impacts to the Hawaiian goose. No net conservation benefit would be achieved under the No Action alternative.

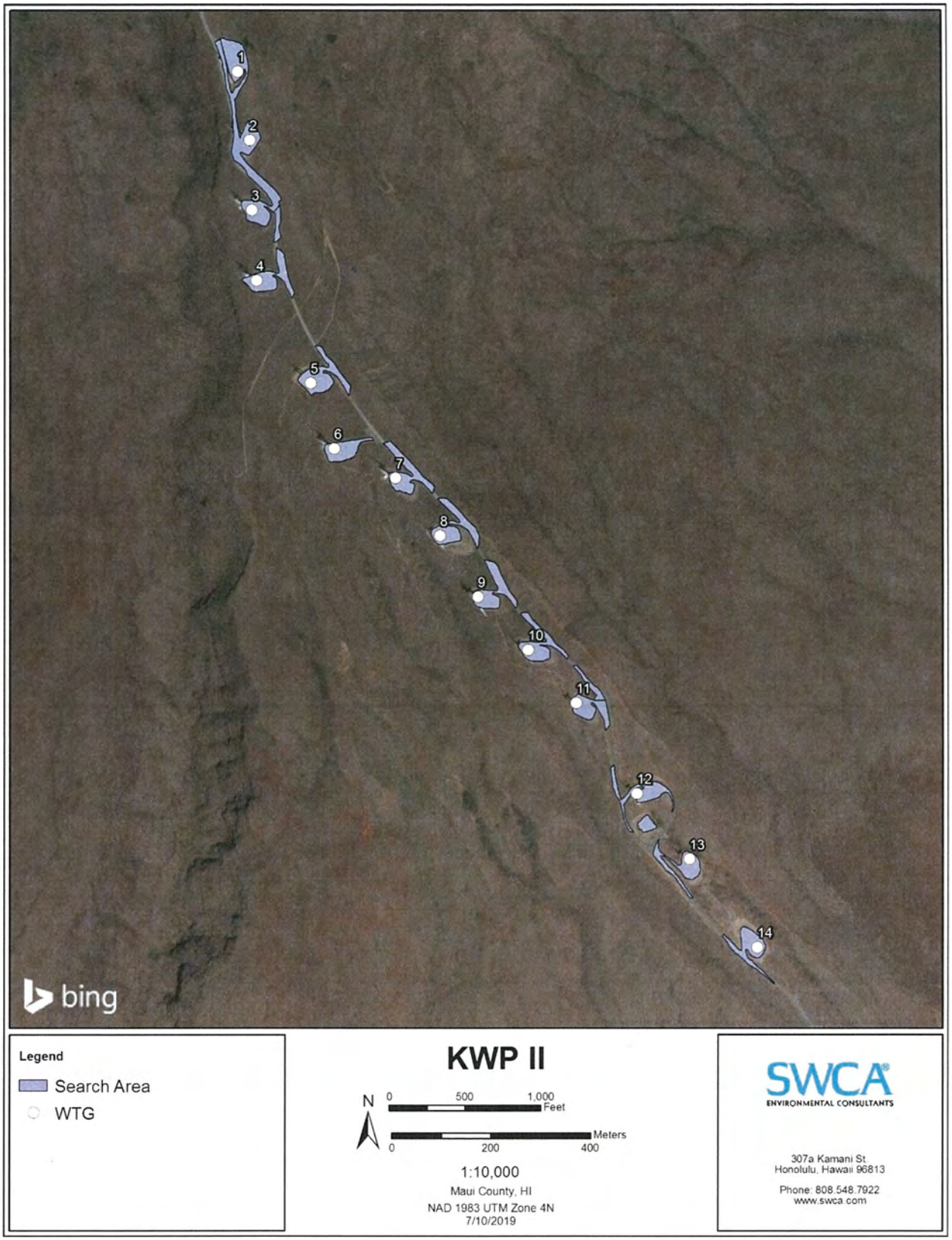

Figure 2.1. KWP II wind turbine generator locations and search areas.

2.2 Alternative 2 (Proposed Action)

Under Alternative 2 (Proposed Action), BLNR would issue an amendment to KWP II's ITL to increase authorized take up to an additional 27 Hawaiian hoary bats and an additional 14 Hawaiian geese, in the form of harm or lethal injury, over a 20-year term set to expire in January 2032. The configuration of the energy facility and duration of the original ITL would remain unchanged. Authorized incidental take would occur according to specific tiers of take, as defined in Table 2.1.

Table 2.1. Requested Take for KWP II at Tier 1, Tier 2, New Tier 3, and New Tier 4

Common Name	Scientific Name	Take	Annual Take Limit	5-Year Take Limit[1]	20-Year Take Limit
Hawaiian goose (nēnē)	*Branta sandvicensis*	Tier 1	4 adults/immatures and 1 fledgling	8 adults/immatures and 1 fledgling	Up to 21 total: 18 adults/immatures and 3 fledglings
		Tier 2	Up to 6 adults/immatures and 1 fledgling	Up to 12 adults/immatures and 3 fledglings	Up to 30 total: 27 adults/immatures and 3 fledglings
		New Tier 3	Not applicable (N/A)	N/A	up to 44 adults
Hawaiian hoary bat ('ōpe'ape'a)	*Lasiurus cinereus semotus*	Tier 1	5 adults[2]	7 adults[3]	up to 7 adults[3]
		Tier 2	11 adults[4]	11 adults[4]	up to 11 adults[4]
		New Tier 3	N/A	N/A	up to 30 adult bats
		New Tier 4	N/A	N/A	up to 38 adult bats

The 5-year take limits are included only in the state ITL; the federal ITP includes only 20-year limits.

[2] This was revised to be equivalent to 5 adult bats in a clarification letter from the USFWS and DOFAW (2014-TA0260), dated May 20, 2014.

[3] This was revised to be equivalent to 7 adult bats in a clarification letter from the USFWS and DOFAW (2014-TA0260), dated May 20, 2014.

[4] This was revised to be equivalent to 11 adult bats in a clarification letter from the USFWS and DOFAW (2014-TA0260), dated May 20, 2014.

KWP II is responsible for ensuring that incidental take of Covered Species is mitigated to the maximum extent practicable. Table 2.2 summarizes mitigation proposed in the HCP amendment. The proposed mitigation project or actions within could be modified by the USFWS or DOFAW based on new information. This change would take place under adaptive management and the "No Surprises" clause would not apply. Having flexibility to determine the final mitigation plan details allows the wildlife agencies and the Endangered Species Recovery Committee (ESRC) to determine the best mitigation project location and then tailor which activities would provide the best results for the specific location and species. The mitigation options available for the final plan are listed in Section 6.0 of the amended HCP.

Table 2.2. Summary of Proposed Tier 3 Mitigation for Hawaiian Goose and Tier 3 and Tier 4 Mitigation for Hawaiian Hoary Bat

Hawaiian Goose
New Tier 3
KWP II would mitigate the impacts of the take by • extending predator control and vegetation management for nesting and foraging at the Pi'iholo Ranch pen on Maui, the Haleakalā Ranch pen, or at a new pen, which would increase productivity and fledgling survival rates; and • providing status reports to the wildlife agencies.
Hawaiian Hoary Bat
New Tier 3
KWP II would mitigate the impacts of the take by • funding bat research on Hawai'i Island conducted by the U.S. Geological Survey Hawaiian Hoary Bat Research Group that would provide basic bat ecology and life history information, better inform future mitigation efforts, and aid in the recovery of the species; and • providing status reports to the wildlife agencies.
New Tier 4
KWP II would mitigate the impacts of the take by doing the following: • Purchasing land that is not already in conservation, where bats are present, and where the land parcel is in danger of being developed or compromised. The approximate acreage per bat would be 60 to 80 acres, or 480 to 640 acres total for eight bats. The specific parcel would be determined when funding and planning for Tier 4 take is required. • Providing status reports to the wildlife agencies. OR 1. Providing mitigation through an approved federal and state Hawaiian hoary bat in-lieu fee program.

The amended HCP includes a habitat conservation program with measures that KWP II undertakes to monitor, minimize, and mitigate the incidental take of each Covered Species, plus provide a net conservation benefit, as measured in biological terms. An estimate of the costs of funding the proposed conservation program is presented in Appendix 6 of the amended HCP. KWP II would provide the required conservation (monitoring, minimization, and mitigation) measures in full, even if the actual costs are greater than anticipated. Funding assurance of $1,000,000 was secured in a form approved by the USFWS and DOFAW within 30 days of the KWP II permit issuance and is renewed annually. An additional LOC was secured in March 2014 for $554,590. In March 2018 these two LOCs were combined into one LOC for $1,554,590. Unless negotiated otherwise, $132,748 in additional funding assurances would be implemented before amended ITL issuance.

2.2.1 *Avoidance and Minimization*

2.2.1.1 NEW SPECIES PROTECTION MEASURES FOR THE HAWAIIAN HOARY BAT

KWP II would implement the following baseline minimization measure to minimize the risk to the Hawaiian hoary bat:

- Low wind speed curtailment (LWSC) currently is implemented at night from February 15 through December 15 annually by raising the cut-in speed of the project's wind turbines to 5.5 m/s between sunset and sunrise. Curtailment would be extended if fatalities are found outside the

initial proposed curtailment period with approval of the Service and DOFAW. Curtailment may also be modified with the approval of DOFAW and the Service if site-specific data demonstrate a lack of bat activity during certain periods or if experimental trials are conducted that demonstrate that curtailment is not reducing collision risk at the Project during the entire curtailment period.

Avoidance and minimization measures for the Hawaiian goose would remain unchanged and are described in detail in Section 4.3 of the approved HCP (SWCA 2011a).

2.2.2 *Mitigation*

The following section describes in detail the proposed projects intended to offset or mitigate the requested take.

2.2.2.1 HAWAIIAN HOARY BAT

2.2.2.1.1 Tier 3 Mitigation: Research

There is a paucity of information regarding Hawaiian hoary bat population size, habitat use, and limiting factors. Because of this critical data gap, DOFAW and USFWS have recommended that some of the mitigation for this species consist of a research component and a habitat management component. The results of funding research are likely to contribute to reducing uncertainty in mitigation effectiveness and inform more consistent, scientifically justifiable and quantifiable mitigation practices for Hawaiian hoary bats in the future – both during and after the term of this HCP.

Based on the understanding that basic research on Hawaiian hoary bat ecology is necessary to design successful mitigation measures for bat take through restoration, protection, or enhancement of this bat's preferred habitat, a final Tier 3 mitigation plan for research to better understand bat movements, roosting behavior, and diet was agreed to be appropriate by DOFAW, the USFWS, and the ESRC on September 28, 2016. KWP II contracted with and began funding the U.S. Geological Survey (USGS)/ Pacific Islands Ecosystems Research Center (PIERC) research in FY 2018. The total cost of the USGS/PIERC research project is $1,832,000. TerraForm Power holds a contract to fund the entirety of this project.

Success Criteria

Tier 3 mitigation would be considered successful if the approved research project, as described in Appendix 30 of the HCP amendment (SWCA 2019) has been funded at $50,000 per estimated bat take ($950,000 for 19 bats), and if

- the tasks and activities toward accomplishing the research goals and objectives have been completed as proposed or as modified with the approval of DOFAW and the USFWS (regardless of outcome or findings);
- a final report has been submitted and approved by DOFAW and the USFWS; and
- the specified raw data has been provided to the agencies.

KWP II would fund the following parts of the research plan ($950,000):

1. Capture and release of Hawaiian hoary bats
2. Radiotagging bats caught
3. Banding bats caught

4. Radiotracking tagged bats
5. Reporting

If the research project is not proceeding as expected according to quarterly and annual reviews, the principal investigator and the agencies would determine what steps would be required to accomplish the goals as expected. An additional cost could be required and would be expected to be paid by KWP II to fulfill the stated goals.

2.2.2.1.2 Tier 4 Mitigation: Restoring or Protecting Native Habitat

For the Tier 4 mitigation obligation, KWP II would contribute to protecting and/or restoring habitat considered favorable for roosting, pupping, and/or feeding and include monitoring efforts and providing status reports to wildlife agencies. Restoration or protection of habitat could include all or a combination of ungulate fencing, ungulate control, fire-fuel management, native tree outplanting, native plant seed dispersal, invasive species control, long-term maintenance and invasive species monitoring, or purchase of appropriate land for conservation. Any restoration would also include pre- and post-restoration bat monitoring with ultrasonic bat detectors with at least one detector for every 40 acres to be deployed from July through October. Any potential land purchase would also require a bat detection assessment to determine that bats are present in order for the purchase to be approved.

KWP II would commence and complete the following (based on a final mitigation plan to be approved by DOFAW, the USFWS, and the ESRC):

- Purchasing land on Maui that is not already in conservation, where bats are present, and where the land parcel is in danger of being developed or compromised. The approximate acreage per bat would be 60 to 80 acres, or 480 to 640 acres total for eight bats. The specific parcel would be determined when funding and planning for Tier 4 take is required. Prior to any planned land purchase, bat detectors would be deployed to ensure that bats are present on or near the parcel. At least 10 bat detectors would be deployed throughout the parcel for at least 3 months. Bat detection would have to occur on at least three detectors during the assessment period.

OR

- Mitigation through an approved federal and state Hawaiian hoary bat in-lieu fee program.

Success Criteria

Tier 4 mitigation would be considered successful when the preferred land parcel of between 480 and 640 acres in size has been purchased and documented to be dedicated to conservation in perpetuity. A preferred land parcel will have been proven to have bats occupying the land (through bat detector deployment), is not previously designated as "conservation zoned," and is at risk of deterioration by development or invasive species encroachment.

If mitigation is through an approved federal and state Hawaiian hoary bat in-lieu fee program, mitigation success would be determined by completed payment for the entire tier to the in-lieu fee program.

If these criteria for Tier 4 are not met as proposed, the Applicant, DOFAW, and the USFWS would review the implementation process and results, and determine what, if any, corrective actions are warranted.

The goal of the habitat conservation program (minimization, mitigation, and monitoring) is to compensate for the incidental take of each species authorized at each tier (take scenario) and provide a net conservation benefit, as measured in biological terms. KWP II would be expected to provide the required

conservation measures in full, even if the actual costs are greater than anticipated. One way of accomplishing this is that past, current, or future funds allocated to a specific Covered Species may be reallocated where necessary to provide for the cost of implementing conservation measures for another Covered Species, and funding for any individual Covered Species is not limited to those amounts estimated in Appendix 6 of the amended HCP. KWP II also recognizes that the cost of implementing habitat conservation measures in any one year may exceed that year's total budget allocation, even if the overall expenditure for the conservation program stays within the total amount budgeted over the life of the project. Accomplishing these measures may therefore require funds from future years to be expended or, likewise, unspent funds from previous years to be carried forward for later use. For practical and commercial reasons, such reallocation of funds among years may require up to 18 months' lead time to meet revenue and budgeting forecast requirements; however, if reallocation between species or budget years is not sufficient to provide the necessary conservation, KWP II would nonetheless be responsible for ensuring that the necessary conservation is provided.

2.2.2.2 HAWAIIAN GOOSE

2.2.2.2.1 Proposed Tier 3 Mitigation: Funding for Predator Control Measures

Proposed mitigation for the Tier 3 Hawaiian goose take level is presented in Table 2.1 and would be a continuation of the Tiers 1 and 2 mitigation underway. As an adaptive management trigger, if annual review of the results of ongoing mitigation indicates take offset is not accruing in advance of take, then the wildlife agencies may require additional predator control measures at any established release pens or implement predator control measures at additional popular nesting and foraging sites on Maui. A memorandum of understanding (MOU) and scope of work (SOW) for Tier 1 level take between the Applicant and DOFAW details the specific mitigation plan, responsibilities, and expectations for mitigation that is funded by the Applicant. This MOU is updated and extended when necessary to include Tier 2 and Tier 3 funding and goals, assuming the Tier 1 efforts are successful and the USFWS and DOFAW agree that predator control and fence maintenance at the Pi'iholo Ranch pen (or other pens) is still appropriate and the proposed Tier 3 mitigation is approved. Total mitigation for Tier 3 would be commensurate with the take of 14 additional adult Hawaiian geese. For Tier 3, an additional 22 fledglings would be required to be produced. Mitigation planning for take exceeding the Tier 2 level of take of 30 Hawaiian geese would commence when estimated take is approximately 27 Hawaiian geese and if take is projected to continue beyond 30 Hawaiian geese.

Funding would be provided to employ personnel and/or provide equipment to implement predator control measures, monitor efforts, and provide status reports to the wildlife agencies. Proposed predator removal measures may consist of deploying traps, leg holds, and/or snares or cattle egret control. These measures are expected to significantly improve adult and juvenile survival and increase productivity of Hawaiian goose pairs to fully offset the requested take and provide a net benefit to the species and increase the likelihood of recovery of the Hawaiian goose.

Monitoring would be conducted to document changes in the Hawaiian goose population and reproductive success at the mitigation site. The number of fledglings or adults accrued above the baseline productivity at the mitigation site would count toward the mitigation requirements of KWP II.

Should circumstances change regarding the status or health of the Hawaiian goose population, and other conservation or management practices are deemed more important or pressing to aid the recovery of the species, the USFWS and DOFAW would consult with the Applicant and determine alternative mitigation the Applicant would implement.

Success Criteria

Strictly speaking, mitigation is deemed to be successful if the mitigation efforts result in one more fledgling or adult than that required to compensate for the requested take of the required tier. In practice, however, mitigation measures are likely to provide much greater net benefits. This success is measured by an increase in adult or juvenile survival or increased productivity (average number of fledglings per pair) at the mitigation site over the baseline productivity level. A taken adult may be replaced through increased survival rates of adults in the area or adults may be replaced by fledglings.

The magnitude and scope of these measures would be determined in consultation with the wildlife agencies and would be based upon monitoring data recorded at the mitigation site and best available science at that point in time. Adaptive management measures must be approved by the wildlife agencies and may include increasing predator control efforts at the mitigation site, changing the mitigation site, or adding new mitigation sites.

Success Metrics/Adaptive Management Proposed:

1. Results of each year's efforts would be reviewed by the USFWS, DOFAW (O'ahu), and the ESRC at the annual HCP review.
2. Based on results and review, the agencies would provide suggested changes to the SOW (if warranted). These could include increasing trapping efforts, changing trap types, building an addition to the Pi'iholo Ranch pen (with a new SOW approved) or funding Hawaiian goose mitigation similar to the Hawaiian goose mitigation at Pi'iholo Ranch, at the Haleakalā Ranch pen, or a new pen.
3. If, after 2 years of effort at the Pi'iholo Ranch pen, less than an annual average of three fledglings are produced, this site may be abandoned, or an additional pen created at Pi'iholo Ranch, or funding Hawaiian goose mitigation similar to the Hawaiian goose mitigation at Pi'iholo Ranch would begin at the Haleakalā Ranch pen or at a new pen, or predator control would begin at nesting sites such as those historically near Olowalu and Lahainaluna on Maui.
4. Funding would be provided for whatever SOW is effective until all mitigation for Hawaiian goose fledglings required to be reproduced to replace adults, fledglings, or goslings is completed for the approved Tiers 1 and 2 and Tier 3 when the HCP amendment is approved.

These mitigation measures are designed to contribute to one or more of the already-established self-sustaining populations on Maui, in accordance with the recovery plan for the Hawaiian goose (USFWS 2004a).

2.2.3 *Monitoring and Reporting*

Monitoring and reporting by KWP II would address both compliance and effectiveness. Compliance monitoring verifies KWP II's implementation of the HCP terms and conditions. Annual reports and other deliverables, as described below, are provided to the USFWS and DOFAW to allow them to independently verify that KWP II has performed all of the required activities and tasks on schedule. Monitoring investigates the impacts of the authorized take and the success of the HCP's mitigation program. The monitoring involves surveys to make sure the authorized level of take is not exceeded and that the effects of take are minimized and mitigated to the maximum extent practicable (i.e., minimization and mitigation measures are sufficient and successful).

2.2.3.1 MONITORING

KWP II documents bird and bat injuries and fatalities, including Covered and non-Covered Species, following methods that have been used effectively at other wind energy generation facilities in Hawai'i and the continental United States. Another alternative is for KWP II to contribute to a cooperative monitoring program led by DOFAW (total costs estimated to be approximately $225,000 to $250,000 per year). In this program, DOFAW would establish the monitoring protocol and provide personnel to conduct the monitoring. If the program is established, KWP II would contribute to DOFAW an amount up to its budget allocation for self-performing the monitoring. Additional funding for the program may be provided by DOFAW or obtained by DOFAW through grants or other sources.

Details of the proposed monitoring protocol are provided in Appendix 2 of the HCP amendment (SWCA 2019). The actual monitoring protocol has been finalized with the approval from the agencies prior to the start of project operations. Key components include the following:

- Use of KWP II technical staff and/or third-party contractors who have been trained by experienced biologists having specialized expertise in conducting wind turbine/bird interaction studies. Criteria for selecting third-party contractors approved by the USFWS and DOFAW would be developed with approval of DOFAW and the USFWS. Additional funds are provided in the event a third-party contractor is required for monitoring and would only be used for this purpose.
- With agency concurrence, carcass removal (i.e., scavenging) and SEEF trials are conducted each season using carcasses of different size classes within different vegetation types. Two seasons are be addressed: the winter/spring season (December–May) and summer/fall (June–November). Three size classes have been chosen to represent the size classes of the Covered Species: bat-sized, medium birds, and large birds. The vegetation is classified according to structure (bare ground and mowed grass), and the vegetation types and their boundaries are mapped at KWP II after construction. Carcass removal and SEEF trials are conducted with sufficient replication to produce statistically reliable results. These results provide a basis for estimating unobserved take (see Appendix 2 of the amended HCP on the potential study design); KWP II covers all costs and responsibilities for acquiring carcasses for trials.
- Intensive searches were conducted for the first 3 years under the direction of a qualified biologist, after which the approach was reduced in total area searched to a sampling method based on the results obtained up to that point, subject to the approval of DOFAW and the USFWS. The long-term monitoring protocol for KWP II from Years 4 through 20 of the permit term includes a reduced search effort relative to the intensive monitoring protocol. It consists of searching roads and graded pads that occur within a 70-m radius from each turbine (Appendix 27 of the amended HCP). SEEF and CARE trials are conducted at least quarterly. The long-term monitoring protocol is detailed in Appendix 28 of the amended HCP (SWCA 2019).
- Incidental observations by on-site staff of bird use, injury, and mortality are documented in accordance with the Wildlife Education and Observation Program (WEOP) and the Downed Wildlife Protocol described in Sections 6.1 and 6.2 of the amended HCP (SWCA 2019).
- Annually, on the anniversary of the start of operations, the USFWS and DOFAW determine, in coordination with KWP II and based on the best available information, the Project's take tier, anticipated adequacy of ongoing mitigation, and the necessity for additional mitigation implementation. KWP II would ensure that projected 20-year benefits of mitigation remain at or above the anticipated 20-year mitigation requirements during years 6 through 20. Projected 20-year mitigation benefits may fall short of projected mitigation requirements for one period, not to exceed 365 days in length, during years 6 through 20.

2.2.3.2 REPORTING

Reporting protocols are not being updated or changed in the amended HCP.

2.3 Alternative 3 (Increased Curtailment)

Under this alternative, the BLNR would issue an amendment to KWP II's existing ITL to add take for an additional 15 Hawaiian hoary bats and 14 Hawaiian geese through the permit term ending in 2032. The amendment would add one additional tier (Tier 3) of mitigation to the existing permit. In order to minimize incidental take that is requested currently in the HCP amendment, KWP II would shut down turbine operations at night, from April 15 through September 15. This period is when Hawaiian hoary bats are most active and are breeding or raising juveniles. The configuration of the existing wind energy facility would remain unchanged. This alternative was not carried forward because increased curtailment would reduce the amount of power produced by the Project, imperiling continued operation due to the financial impact, and would have no net conservation benefit for the Hawaiian hoary bat.

2.3.1 *Species Protection Measures for the Hawaiian Hoary Bat*

KWP II would implement the following baseline minimization measure to minimize the risk to the Hawaiian hoary bat:

- In addition to shutting down turbine operations at night between April 15 and September 15, LWSC would be implemented at night from February 15 through April 15 and September 15 through December 15 annually by raising the cut-in speed of the Project's wind turbines to 5.5 m/s between sunset and sunrise. Curtailment would be extended from December 15 to February 15 if fatalities occur outside the proposed curtailment period, with approval of the Service and DOFAW. Curtailment may also be modified with the approval of DOFAW and the Service if site-specific data demonstrate a lack of bat activity during certain periods or if experimental trials are conducted that demonstrate that curtailment is not reducing collision risk at the Project during the entire curtailment period.

Avoidance and minimization measures for the Hawaiian goose would remain unchanged and are described in detail in Section 4.3 of the approved HCP (SWCA 2011a).

2.3.1.1 MITIGATION

2.3.1.1.1 Tier 3 Mitigation Actions for the Hawaiian Goose

Mitigation actions for the Hawaiian goose would include continuing to fund predator control and fence maintenance at the Pi'iholo Ranch pen, the Haleakalā Ranch pen, or a new pen on Maui. As an adaptive management provision, if annual review of the results of ongoing mitigation indicates take offset is not accruing in advance of take, then the wildlife agencies may require additional predator control measures at established sites or implement predator control measures at additional popular nesting and foraging sites on Maui. Funding would be provided to employ personnel and/or provide equipment to implement predator control measures, monitor efforts, and provide status reports to the Service and DOFAW. Proposed predator removal measures may consist of deploying traps, leg holds and/or snares, or cattle egret control.

Success Criteria

Proposed Success Metrics/Specific Adaptive Management

1. Results of each year's efforts would be reviewed by the Service and DOFAW.
2. Based on the annual review, the agencies would provide suggested changes to the scope of work (if warranted). These could include increasing trapping efforts, changing trap types, finding a new area to manage and protect, or build an addition to the Pi'iholo Ranch pen.
3. If, after 2 years of effort at the Pi'iholo Ranch pen, less than an annual average of three fledglings are produced, this site may be abandoned or an additional pen created at Pi'iholo Ranch or predator control planned at nesting sites such as those historically near Olowalu and Lahainaluna on Maui.
4. Funding would be provided for an effective SOW until all Hawaiian goose mitigation is complete for Tier 3.

2.3.1.1.2 Tier 3 Mitigation Actions for the Hawaiian Hoary Bat

Tier 3 mitigation for the Hawaiian hoary bat would consist of targeted research to reduce uncertainty in mitigation effectiveness and improve the ability to develop quantifiable mitigation practices for the Hawaiian hoary bat. The 3-year research project, being conducted by the USGS and PIERC, would help determine the Hawaiian hoary bats' average home range size, habitat use, diet composition, and mother-pup demographics at roosting sites on Hawai'i Island, at an approximate cost of $950,000. In order to avoid further delays, KWP II began voluntarily working with the Service and DOFAW in 2015 to develop a mitigation plan for research to better understand bat movements, roosting behavior, and diet. Although research is an uncommon form of compensatory mitigation under Section 10 of the ESA, DOFAW and the ESRC, in cooperation with the Service, identified that research that informed on-the-ground management actions and life history parameters necessary to recover Hawaiian hoary bats was one of the highest priorities for the species and an appropriate form of compensatory mitigation (as described in Amlin and Siddiqi 2015). Refer to the amended HCP (SWCA 2019) for a detailed SOW and research plan being conducted by the USGS and PIERC. Although this plan has not been formally approved by the Service and DOFAW, KWP II has contracted with and begun funding the USGS/PIERC research in FY 2018. If the research project is not proceeding as intended, according to quarterly and annual reviews, the principal investigator, the Service, and DOFAW would determine what steps would be required to accomplish the goals as expected. Additional costs may be required and would be expected to be paid by KWP II to fulfill the stated goals.

2.4 Common Elements of Alternatives 2 and 3

The following sections provide an overview of features common among the action alternatives: changed or unforeseen circumstances, adaptive management, and take tiering.

2.4.1 *Changed or Unforeseen Circumstances*

In concurrence with Section 10 of the ESA and HRS 195-D, changed circumstances are those changes affecting a species or geographic area covered by the amended HCP that can reasonably be anticipated and planned for by KWP II and DOFAW at the time of the amended HCP's preparation. Examples of changed circumstances include the listing of a new species or a fire or other natural catastrophic event in

areas prone to such events. General foreseeable conditions that could result in changed circumstances are identified below.

- Effective bat deterrent devices become commercially available. Considerable progress has been made over the years in developing new technology to discourage or deter bats from entering the rotor-swept zone (RSZ) of the turbine blades.
- New scientific information demonstrates a need for a new mitigation activity (e.g., selecting mitigation sites in areas with reduced nighttime lighting; removing certain invasive species that directly threaten bat reproductive success) that would address life history requirements for the bat in a manner not previously identified.
- Listing of species that are currently unlisted but occur within the project area.
- A change in the listing status (including de-listing) of a covered species.
- Introduction or invasion by an exotic plant or animal species that affect covered species or their habitat.

The potential for each of these circumstances is reasonably foreseeable. Additional detailed changed circumstances have been identified in the previously approved HCP that remain in effect. If additional conservation and mitigation measures are necessary to respond to the unforeseen circumstances and the amended HCP is being properly implemented, the additional measures required would be, to the maximum extent practicable, as close as possible to the terms of the amended HCP and must be limited to modifications within any conserved habitat area or adjustments within lands or waters that are already set aside in the amended HCP's operating conservation program. Additional conservation and mitigation measures shall not involve the commitment of additional land or financial compensation, or restrictions on the use of land or other natural resources otherwise available for development, without the consent of KWP II (the permit holder).

2.4.2 *Adaptive Management*

Adaptive management is a strategy for addressing uncertainty, including changed circumstances associated with an HCP's conservation program, particularly where it poses a significant risk to the Covered Species. This includes, but is not limited to, uncertainty related to the Covered Species status or trend; uncertainty related to the effects of a proposed covered activity on a proposed Covered Species; and uncertainty related to the effectiveness of an applicant's proposed minimization and mitigation measures. Through assumption-based learning and robust monitoring, adjustments can be made to the HCP's conservation program in response to what is learned. Adaptive management is essential for HCPs that were developed despite information and data gaps that pose a significant risk to a species at the time the permit is issued.

The adaptive management program for KWP II is described in detail in the amended HCP. Due to the limited amount of biological information available on the Hawaiian hoary bat, adaptive management programs predominantly focus on this species. Adaptive management programs address the following types of uncertainty related to the Hawaiian hoary bat: uncertainty in amount of take, uncertainty in mitigation effectiveness, and uncertainty in minimization effectiveness.

2.4.3 *Take Tiering*

Tier take requests have been used to address the considerable uncertainty in estimating expected levels of species take. Tiers were built to capture this uncertainty and have been used in Hawai'i for the Hawaiian goose and the Hawaiian hoary bat. Even as the level of uncertainty decreases based on new monitoring

data and other information, KWP II is requesting tiered take to help plan for the highest estimated take levels without requiring further HCP amendments or committing to more mitigation than may be required if take is lower. Thus, the value of using the tier system also includes phasing mitigation . Take tiering, along with adequate adaptive management measures, allows an applicant to effectively plan for mitigation projects when it is apparent that the next tier would be triggered. Under the ITL, the take authorization for the next tier is not provided until funding assurances for the next tier have been provided.

2.5 Comparison of Alternatives

Table 2.3 shows the total authorized take of Hawaiian hoary bat and Hawaiian goose under the No Action and Action Alternatives. Shaded numbers indicate take that was previously authorized under existing permits. Amounts shown in the Action Alternatives include the amount previously authorized under the No Action Alternative.

Table 2.3. Authorized Take Under the No Action and Action Alternatives

	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3 (Increased Curtailment)
Hawaiian hoary bat	11	38	26
Hawaiian goose	30	44	44

2.6 Alternatives Considered but Not Analyzed

During the development of this final SEIS, one other alternative was considered in addition to the alternatives described above. This other alternative is described in this section, along with a brief discussion of why it is not being carried forward for detailed analysis.

2.6.1 *Additional Low Wind Speed Curtailment to 6.5 Meters/Second*

Under this alternative, the direct and indirect effects associated with general project operation, decommissioning, and implemented avoidance and minimization measures from the approved HCP would generally be as described for Alternative 2; however, all KWP II facility turbines would be curtailed up to 6.5 m/s from sunset to sunrise year-round. This change in the curtailment regime (i.e., curtailment in addition to what the Project has already committed to, which is 5.5 m/s) may positively affect bats but not geese.

Compensatory mitigation measures could be reduced commensurate with the reduction in the amount of incidental take of bats that may result from increased curtailment.

This alternative assumes that there would be a significant and measurable reduction in take compared to the status quo. Although existing research (Arnett et al. 2009, 2010, 2013; Baerwald et al. 2009; SWCA 2019) indicates that when increases in curtailment (from "no curtailment") reduces take, there is insufficient research evidence to conclude that there is a reliable additional benefit when increasing curtailment above 5.5 m/s. Only three studies have been designed to specifically test statistical significance between the two experimental treatments of adding LWSC to 5.0 m/s and increasing LWSC to 6.5 m/s (SWCA 2019). One of these three studies, at Fowler Ridge Wind in 2010, showed a statistically significant decrease in fatality rates when LWSC is between 5.0 m/s and 6.5 m/s (Figure 2.2). There are no studies to date that test whether mortality rates decrease significantly when LWSC is raised

from 5.5 m/s to 6.5 m/s. Given the scarcity of studies showing further fatality rate reductions when increasing LWSC further to 6.5 m/s, for KWP II to increase the LWSC from 5.5 m/s to 6.5 m/s to produce a measurable additional reduction in fatality rates is not sufficiently supported. The recent decision by the BLNR to approve the Na Pua Makani Wind Power HCP did not include increasing LWSC above 5.5 m/s to minimize potential bat take expected at that wind site (SWCA 2019).

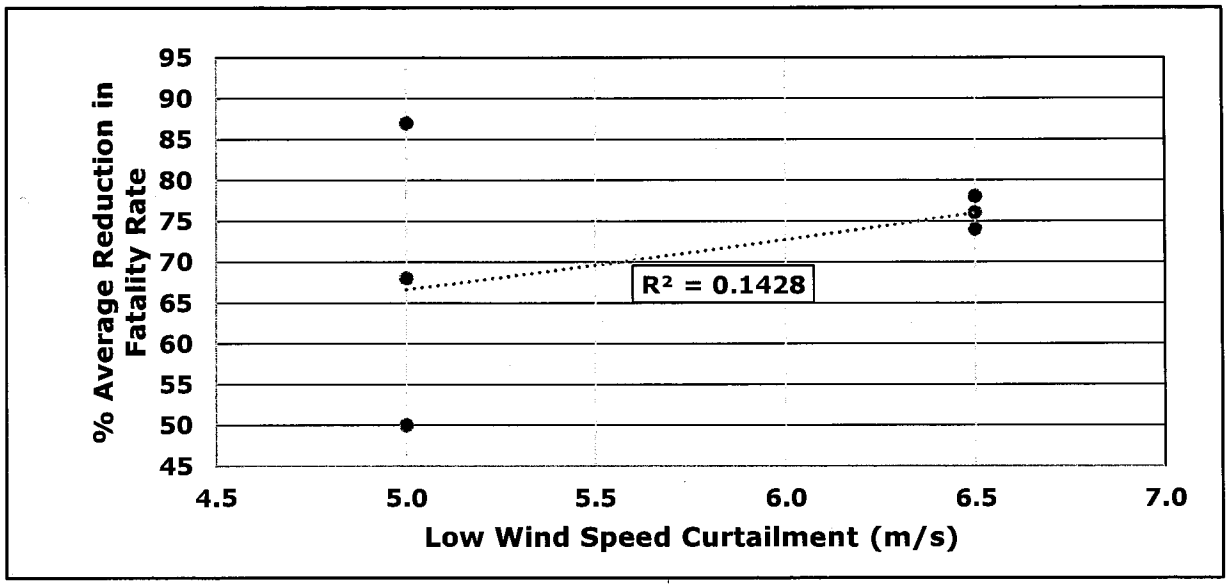

Figure 2.2. The average reduction in fatality rate between 5.0 meters/second and 6.5 meters/second for three studies.

Research investigating the relationship between wind speed and bat activity does suggest that, generally, bats are detected much less frequently as wind speed increases and that a majority of bat fatalities are recorded only when wind speeds are less than 6.0 m/s (Arnett et al. 2008). In an analysis of ultrasonic bat detections at nacelle height (100 m) at all turbines at a wind generation site on O'ahu, 100% of detections occurred at less than or equal to 8.0 m/s wind speeds and 95% of detections occurred at less than or equal to 6.0 m/s (SWCA 2019). This analysis also showed that at ground level detectors (6.7 m) no bats were detected at wind speeds greater than 11 m/s while 65% of detections near the ground occurred when wind speeds were less than 6.0 m/s; it also suggested that activity rates at the ground detectors was higher than at the nacelle detectors. Gorresen et al. (2015) also show that bat activity decreases with higher wind speeds: 84% and 92% of bat activity was recorded when wind speeds were less than 5.5 m/s and 6.5 m/s, respectively (USFWS 2019). Considering just the Gorresen et al. (2015) study could suggest that increasing LWSC to 6.5 m/s might decrease bat take by 8%. If direct take is estimated to be 35.2 adult bats, then increasing the LWSC to 6.5 m/s might decrease estimated direct take by three bats over the life of the permit (USFWS 2019). Increasing LWSC to 6.5 m/s, even if effective, may still not substantially decrease the take projected or the take request.

A general analysis of generation and income lost for KWP II for different LWSC regimes suggests that increasing the LWSC from 5.5 m/s to 6.0 or 6.5 m/s (year-round) would not entirely jeopardize the Project financially (although it would be harmed), *assuming* wind resources are sufficient to meet minimum expectations of the Power Purchase Agreement between MECO and KWP II and the MECO priority position for KWP II on Maui that determines which wind site's power generation MECO accepts first, second, and third does not change. If observed take continues to be zero, as it has been since LWSC was increased to 5.5 m/s in August 2014, it would be very difficult to show any decrease in the fatality rate from any additional change in LWSC regime.

Compared to maintaining the status quo, increasing curtailment from 5.5 m/s to 6.5 m/s would reduce renewable energy generation from the Project by approximately 328 megawatt hours (MWh) annually (or 0.47% of 70,000 MWh assumed to be produced annually) and would increase energy production from fossil fuels and increase greenhouse gas (GHG) emissions. AWS Truepower, LLC determined the generation losses based on the wind resource study conducted prior to operations (SWCA 2019). Emissions from fossil fuel generation of 328 MWh generation annually from petroleum-based fuels would add 500,499 pounds of carbon dioxide, 3,508 pounds sulfur dioxide, and 913 pounds of nitrogen oxides to the atmosphere. In order to produce approximately 328 MWh annually from burning fossil fuels, the National Renewable Energy Laboratory (NREL) indicates approximately 154,160 gallons of water (470 gallons/MWh) would be evaporated in the cooling process (NREL 2003).

Based on research at mainland U.S. wind farms and in Hawai'i at this time, the benefit of increasing LWSC from 5.5 m/s to 6.5 m/s is not sufficiently supported to be a reliable source of bat take minimization. Therefore, at this time, the alternative to increase LWSC to 6.5 m/s is not considered a reliable method to decrease take and therefore is not carried forward for further analysis.

3 AFFECTED ENVIRONMENT AND IMPACTS

This chapter describes and analyzes the resources that would be affected under the No Action Alternative, the Proposed Action, and the Increased Curtailment Alternative. Only those resources raised as issues of concern are considered below. A detailed description of KWP II's environmental, cultural, and social setting can be found in the 2010 EIS (Planning Solutions 2010) and the final EA for the KWP II HCP (SWCA 2011b).

3.1 Climate

The 2010 EIS provides an overview of the existing climate of the Hawaiian Islands and Maui, including temperature, rainfall, wind patterns, hurricanes, and tropical storms, and assesses the potential impacts that construction and operation of the Project could have on climate. The causes and magnitude of global climate change and the Project-related benefits of reduced GHG emissions are also discussed. No change to climate impacts (including cumulative impacts) beyond what is described in the 2010 EIS are anticipated as a result of proposed increased take or mitigation measures under any alternative.

3.2 Air Quality

The 2010 EIS provides an overview of both federal and state existing air quality standards and nearby air quality measurements via monitoring stations. Vehicle exhaust, dust from agricultural cultivation and construction, and smoke from wildfires are sources of air pollutants near the Project. Construction-period impacts and mitigation measures, operational period impacts, and indirect effects on ambient air quality are addressed in the 2010 EIS. No change to air quality impacts (including cumulative impacts) beyond what is described in the 2010 EIS are anticipated as a result of proposed increased take or mitigation measures under any alternative.

3.3 Hydrology and Water Resources

The 2010 EIS describes existing hydrology and water resources, project components with potential impacts on hydrology, effects on volume and routing of stormwater runoff, and effects on stormwater runoff quality. No change to hydrology and water resources impacts (including cumulative impacts)

beyond what is described in the 2010 EIS are anticipated as a result of proposed increased take or mitigation measures under any alternative.

3.4 Geology, Topography, and Soils

The 2010 EIS provides an overview of existing physiography, topography, geology, and soil resources. Potential project impacts such as ground disturbance, agricultural productivity, and soil loss via erosion are analyzed, and BMPs to minimize impacts are provided. No change in project impacts, including cumulative impacts, are anticipated for geology, topography, or soils (beyond what is described in the 2010 EIS) as a result of increased take of the Hawaiian goose or the Hawaiian hoary bat under any alternative. The new mitigation measures may result in minor soil compaction or disturbance associated with foot or vehicle access to research sites. Predator control and fence maintenance at the Pi'iholo Ranch pen, the Haleakalā Ranch pen, or a new pen have the potential for some limited soil disturbance and soil compaction due to foot traffic associated with access to the areas; however, these impacts are expected to be negligible because the foot traffic is short term, distributed over a large area, and involves light compaction of affected soils.

3.5 Biological Resources

3.5.1 *Historical Conditions*

As described in the 2010 EIS, the area on which KWP II was constructed is believed to have been entirely covered with native vegetation during pre-contact times. The vegetation is thought to have been of low stature, with dry grass and shrublands below and mesic to wet windblown forests above. The Hawaiians made some use of forest resources here and used a cross-island trail cresting the ridge at 1,600 feet in elevation. This trail was upgraded during the mid-1800s and used as a horse trail to Lahaina. It was reopened in recent years and is the present Lahaina Pali Trail.

Cattle ranching in the area began in the late 1800s and continued for over 100 years. During this time, the grazing animals consumed most of the native vegetation, which was gradually replaced by hardy weed species. During the 1950s, MECO installed high-voltage transmission lines and maintenance roads through this area. Increased traffic brought more disturbances and weeds. Fires became more frequent, further eliminating remnant native vegetation (Hobdy 2006).

With the cessation of cattle grazing, several grass and weed species have proliferated, creating a heightened fire hazard. A large fire swept across the mountain in 1999, consuming more than 2,500 acres, including most of the project area. In September 2006, another fire burned the same area, scorching about 80% of the project area.

3.5.2 *Existing Conditions*

3.5.2.1 FLORA

The 2010 EIS provides an overview of existing flora resources. No change in project impacts, including cumulative impacts, are anticipated for existing vegetation (beyond what is described in the 2010 EIS) as a result of increased take of the Hawaiian goose or the Hawaiian hoary bat under any alternative. New mitigation measures under the amended HCP include LWSC of the wind turbines and the USGS research study being implemented for Hawaiian hoary bat mitigation. These mitigation measures would have no impact on vegetation. Predator control and fence maintenance at the Pi'iholo Ranch Hawaiian goose pen or at Haleakalā Ranch on Maui are also not expected to impact vegetation resources.

3.5.2.2 FAUNA

The mixed grassland/shrubland vegetation on the project site is habitat for several mammals as well as endemic, indigenous, and migratory birds. The mammals include mice (*Mus musculus*), rats (*Rattus* sp.), mongooses (*Herpestes auropunctatus*), feral cats (*Felis silvestris*), axis deer (*Cervus axis*), and feral dogs (*Canis lupus*). No change in project impacts (including cumulative impacts) are anticipated for these species (beyond what is described in the 2010 EIS) as a result of increased take of the Hawaiian goose or the Hawaiian hoary bat under any alternative.

3.5.2.3 COVERED SPECIES

3.5.2.3.1 Hawaiian Hoary Bat

The Hawaiian hoary bat is an endangered, endemic subspecies of the hoary bat found across North and South America. The only land mammal native to Hawai'i, the bat roosts as a solitary individual or with its dependent young. The Hawaiian hoary bat was listed statewide in 1970 based on perceived habitat loss and limited knowledge of its distribution and life history requirements (USFWS 1970, 1998). There was no population estimate at the time of listing and no documentation of a population decline; however, over the past 50 years, and especially in the last 10 years, research has informed our understanding of the species' distribution, life history, and threats, although tools to monitor for bats are still limited.

Over the last decade, acoustic detectors have been the most widely deployed tool for bat detection, but this technology has limitations. Acoustic detectors would record a sound bite if a bat is within the detector microphone's range and the bat is echolocating. Acoustic detectors cannot differentiate between the absence of a bat or presence of a bat that is not echolocating or out of the limited range and directionality of the microphone. Acoustic detectors are also not quantitative. Acoustic detectors cannot distinguish if it is one bat making multiple echolocating passes or multiple bats. A recent comparison between acoustic detectors and newer thermal video imaging shows that acoustic detectors were only detecting about 8% of the bats that the thermal imaging was capturing (USFWS 2019). Recently, Corcoran and Weller (2018) demonstrated that hoary bats on the mainland use a novel call type, micro calls, that uses less sound energy than other bat calls and can easily go undetected with acoustic detectors. In light of this information, thermal videography is being deployed more frequently in conjunction with acoustic detectors. Thermal videography has its own limitations in the amount of area covered and, like acoustic detection, the technology is not quantitative beyond confirming the number of bats present at one time in a particular video frame.

Presently, there is no population estimate for the Hawaiian hoary bat nor are the technology and resources that would allow for the development of a reliable statewide population estimate available at this time. The tools currently available do not directly quantify the number of bats, but the acoustic detectors can be used for assessing occupancy. Occupancy studies are long-term studies (typically 5 to 10 years) that can provide population trend data. To date, only one 5-year occupancy study, conducted from 2006 to 2011 on a portion of Hawai'i Island, has been completed (Gorresen et al. 2013). The results of that study suggested the bat population trend on Hawai'i Island was stable to increasing at that time (Gorresen et al. 2013). A power analysis conducted with that same acoustic data gathered by Gorresen et al. (2013) suggests it could take approximately 5 to 10 years of acoustic monitoring at hundreds of sites per island to determine a population trend with a reasonable level of confidence on each island (Western Ecosystems Technology, Inc. 2015). In response to this, a study was initiated on O'ahu in 2018 to look at distribution across the island and possibly determine a population trend if enough years of data could be collected.

Despite the limitation of acoustic detection technology and radiotracking, studies have shown the Hawaiian hoary bat to be much more wide ranging than believed at the time of listing in 1970 (USFWS 1970, 1998, 2019). The Hawaiian hoary bat occurs across Kaua'i, O'ahu, Moloka'i, Maui, Lāna'i, and

Hawai'i (Hosten and Poland 2018; Tetra Tech, Inc. [Tetra Tech] 2008; USFWS 1998, 2019), and recently, this species has been observed visiting Kaho'olawe (Kaho'olawe Island Reserve Commission [KIRC] 2017). While systematic acoustic monitoring does not occur throughout the islands, nearly everywhere monitoring does occur, bat presence has been documented. No population estimates exist for this subspecies, although breeding has been documented on the major islands. Movement of bats between the major islands is thought to be infrequent (USFWS 2019).

On Kaua'i, several studies have been conducted on the species' distribution (Bonaccorso and Pinzari 2011; Wolfe 2018). They found bats occur across the island in the lowlands, with some indication that they move seasonally into higher elevation areas. No specific studies have been conducted at the Hanakāpī'ai site, but bats have been observed by scientists within the Hono O Nā Pali Natural Area Reserve and adjacent areas (DOFAW 2011).

On O'ahu, monitoring for bats has been conducted primarily at wind facilities, military lands in the Ko'olau and Wai'anae Mountains, Waikīkī, Ford Island, the North Shore, and the National Wildlife Refuge (NWR) complex comprised of the James Campbell NWR, the Kalaeloa Unit of the Pearl Harbor NWR, and the O'ahu Forest NWR (O'ahu Army Natural Resource Program 2016; Pinzari 2014; Wolfe 2018). An intensive, multiyear study is currently ongoing on O'ahu to look at year-round distribution and occupancy of the Hawaiian hoary bat across the island. Preliminary results showed bat activity at 61% of 87 randomly selected sites across all types of landscapes on O'ahu (Starcevich et al. 2019). Although Kawailoa has not published survey results, Hawaiian hoary bats are known from areas monitoring has occurred at the Kawailoa Wind project site since 2012. Between 2012 and 2015, 72 detectors were deployed with one at each turbine on the ground (30) and at each nacelle (30), and 12 deployed near gulches in the Kawailoa project area. During this time, Hawaiian hoary bats were detected on 8.5% of detector nights with a seasonal peak between April and October (Tetra Tech 2016). In 2016, monitoring was reduced to four detectors (all ground-based), and Hawaiian hoary bats were detected on 12.6 and 19.4% of detector-nights in FYs 2017 and 2018, respectively. A similar seasonal peak between April and October was observed (Tetra Tech 2018). The seasonal peak based on acoustic detections may be related to life history parameters.

As of 2018, the Hawaiian hoary bat is known from all islands of Maui Nui (i.e., Maui, Moloka'i, Lāna'i, and Kaho'olawe), with bats likely breeding throughout the island complex (Hosten and Poland 2018; Tetra Tech 2011; USFWS 1998). Current information indicates the species occurs seasonally on Kaho'olawe (KIRC 2017). Research on the Hawaiian hoary bat has been conducted on the south slope of Haleakalā (Todd et al. 2016), and additional research is ongoing on the west slope (H.T. Harvey and Associates 2016; Johnston et al. 2018, 2019). Monitoring of Hawaiian hoary bats has occurred at all wind facilities on Maui since they began operations. At KWP II, bats have been detected in every month of the year, with increased detection levels in the late summer to early fall months, with a high of 58% of total detector nights in September 2015 (SWCA 2019). At the Auwahi wind facility, detectors found Hawaiian hoary bats occurring throughout the year, with a peak between August and October. From 2013 to 2015, detections occurred on 31% of nights (Kawailoa Wind 2014, 2015; Tetra Tech 2016, 2019). Hawaiian hoary bats are also known from the Waihou mitigation area based on previous mitigation and research work that has been undertaken in the vicinity (Auwahi Wind and Tetra Tech 2017; USGS-PIERC 2017).

Much of the research on the Hawaiian hoary bat has been conducted on Hawai'i Island (Bonaccorso et al. 2015; Gorresen et al. 2013; Menard 2001; Todd 2012). Gorresen et al. (2013) documented hoary bat occurrences over most of the island, including seasonal movements between lower elevation pupping areas and upper elevation wintering areas. Menard (2001) and Bonaccorso et al. (2015) found that hoary bats pupped in elevations typically below 3,280 feet and then moved seasonally to higher elevations in winter, presumably to take advantage of better foraging conditions. The study does not exclude the possibility of pupping at higher elevations. A pregnant female has been observed at 5,413 feet in

elevation, although it is unknown if she was roosting. Based on a 5-year study from 2006 to 2011, the Hawaiian hoary bat showed a stable to increasing trend in occupancy during the breeding season on the island (Gorresen et al. 2013). Recent observations have been made of the Hawaiian hoary bat foraging in caves up to 11,800 feet above sea level on Mauna Loa (Bonaccorso et al. 2016). In addition to seasonal movements, the Hawaiian hoary bat has also been documented moving over distances up to 6.8 miles one way nightly in search of the best foraging areas (Bonaccorso et al. 2015). The Hawaiian hoary bat is likely present at all mitigation sites on Hawai'i Island at some point during the year and has been documented at the Pakini Nui Wind facility (SWCA 2018).

Existing data indicates the Hawaiian hoary bat is a habitat generalist that is capable of utilizing highly fragmented habitats (Johnston et al. 2019). The physical structure of the spaces in which the Hawaiian hoary bat forages are also extremely varied, including forest gaps and clearings, forest edges along planted windrows of trees, above forest canopies, and along roads (USFWS 1998). These areas can occur in a range of habitats, including undisturbed native forest, mature eucalyptus plantations having a mixed understory of trees and shrubs, lowland forest dominated by introduced trees, developed areas, suburban and urban areas planted with ornamental trees, grasslands/pastures, river gorges, arboretums, macadamia nut orchards, and coastal bays (Bonaccorso et al. 2015; Gorresen et al. 2013; Johnston et al. 2019).

The Hawaiian hoary bat primarily feeds on nocturnal moths and beetles, which it hunts in flight across a wide array of habitat types and plant communities, from sea level to at least 11,800 feet above sea level (Bonaccorso et al. 2015; Bonaccorso et al. 2016; Jacobs 1999; Todd 2012; Whitaker and Tomich 1983). Bonaccorso et al. (2015) found a mean foraging range of 570 acres ± 178.6 acres for 28 bats, although mean and median core use areas for adult bats of both sexes were 48.5 acres and 20.5 acres, respectively. Core use areas were those that the adult bats frequented nightly and did not typically overlap, although forage ranges did. Core use areas ranged from 6 acres to more than 100 acres and appear to be driven by resource availability. Johnston et al. (2018, 2019) found that foraging areas for 20 bats in East Maui ranged from 3,000 to 64,000 acres, with the average foraging range covering about 2,967 acres. Bats can demonstrate territoriality, but female bats can and do share roosting trees when they have young.

Bats are able to utilize widely dispersed resources and move away from poor foraging conditions, such as heavy rain. Overall, bat activity and movements on the landscape are not determined by one variable but are an interaction of a complex array of environmental factors. Seasonal changes in temperature, rainfall, wind, insect abundance, and energetic costs associated with reproduction of the Hawaiian hoary bat all play important roles in its movements and habitat use (e.g., Bonaccorso et al. 2015; Bonaccorso et al. 2016; Gorresen et al. 2013; Todd 2012; Todd et al. 2016; USFWS 2019).

Day roost habitat requirements for the Hawaiian hoary bat are tall (greater than a 5-m [15-foot] crown height), shady trees, frequently including mature native 'ōhi'a, but also including a wide variety of introduced species such as lychee (*Litchi chinensis*), various species of eucalyptus, mango (*Mangifera indica*), and numerous other tree species (Bonaccorso et al. 2015). Roost trees noted from radiotracked bats on Maui include blue gum eucalyptus (*Eucalyptus globulus*), African tulip tree (*Spathodea campanulata*), and Monterey cypress (*Cupressus macrocarpa*) (Johnston et al. 2018) but is not limited to those species.

An estimated 1.475 million acres of forest habitat occurs across the major Hawaiian Islands (Reeves and Amidon 2018). About 50%, or 700,000 acres, of dry, mesic, and wet forest habitat is owned by county, state, or federal agencies. On O'ahu, Maui, and Hawai'i, the three islands where wind facilities are located and where almost all of the cumulative effects to the Hawaiian hoary bat are occurring, about 1,163,000 acres of forested habitat currently exists. Of that, about 630,000 acres are owned by government agencies and about 200,000 acres are currently designated as conservation lands. Additional privately held acreage is protected by conservation easements throughout the state and is occupied by Hawaiian hoary bats.

Threats

Threats to bats include habitat loss; tree trimming and cutting during the time period when pups are non-volant; entanglement on barbed wire fences; pesticides and rodenticides; competition from invasive species, such as coqui frogs; and, potentially, predation from native and non-native owls and hawks as well as non-native rats and cats (USFWS 1998). Bat fatalities associated with these threats are largely unquantified due to the lack of systematic monitoring tools and resources.

The quantification of bat fatalities is largely limited to wind energy projects because they conduct systematic and rigorous compliance monitoring. Based on fatality monitoring, the land-based wind energy facilities are presently the greatest known source of Hawaiian hoary bat fatalities that is being quantified. As of September 2018, there have been 81 observed Hawaiian hoary bat fatalities at the six facilities that are conducting systematic monitoring. This observed fatality data, along with the Evidence of Absence model calculations of unobserved take and indirect take, result in a total fatality estimate of between 90 to 164 bats for the six operating wind facilities with permits. On the Island of Maui, incidental take for all existing commercial wind projects is estimated to be no more than 11.4 bats per year. On O'ahu, incidental take for all existing O'ahu wind projects is estimated to be no more than 15.1 bats per year. On Hawai'i Island, incidental take for all existing Hawai'i wind projects is estimated to be no more than 2.9 bats per year. The numbers provided for the annual estimations do not represent actual observed fatalities; rather, the numbers represent what the Service is confident has not been exceeded per year because of imperfect detection.

Occurrences in and Near the Project Area

On Maui, the Hawaiian hoary bat is believed to occur primarily in moist, forested areas, although little is known about its exact distribution and habitat use on the island, especially in the West Maui Mountains. No Hawaiian hoary bats were recorded in the area of the proposed wind turbines during nighttime visual studies using night vision equipment conducted in summer 1999 (Day and Cooper 1999) or fall 2004 (Cooper and Day 2004).

KWP I and KWP II have carried out regular bat monitoring using ultrasonic bat detectors in accordance with the provisions of their HCPs and confirmed that the species is present in low numbers in the KWP I and KWP II project areas. As of June 2018, three Hawaiian hoary bat fatalities have been documented within the search area at KWP II.

From October 2013 to the present, 17 Wildlife Acoustic bat detectors (SM2BAT+™) were deployed at KWP I and KWP II at ground level. Due to differences in the sensitivity of the acoustic detectors and microphones used for the different equipment, the data from October 2013 to the present cannot be directly compared with the data collected using up to eight Titley Anabat SD2™ detectors from 2008 to 2012. Wildlife Acoustics detectors are more sensitive than the older Titley detectors and detect relatively more bats.

Bat activity collected at KWP II using Wildlife Acoustics SM2BAT+ from October 2013 through June 2017 indicate Hawaiian hoary bats are present at KWP II in relatively low numbers year-round, with a peak presence in early fall (Figure 3.1). Detections were recorded in every month, and the highest rate occurred in September 2015, with 58% of total detector nights having bat activity.

In general, bats have been detected at KWP II at every turbine either on the ground or at nacelle height, and bats have been detected in every month of the year (KWP II 2013, 2014, 2015, 2016, 2017, 2018). The three observed bat takes at KWP II were found in the upper half of the 14 turbines (turbines 2, 6, and 7). In FY 2017 at KWP II, 8.3% and 8.4% of nights with detections occurred at ground detectors at turbines 1–7 and 8–14, respectively, suggesting turbine-specific bat detection rates generally do not predict where

fatalities are likely to occur. There is a higher level of bat detections at KWP II in the late summer to early fall months, but the three bat fatalities observed at KWP II did not occur during these months with relatively higher detection rates.

Acoustic monitoring would continue throughout the 20-year permit period.

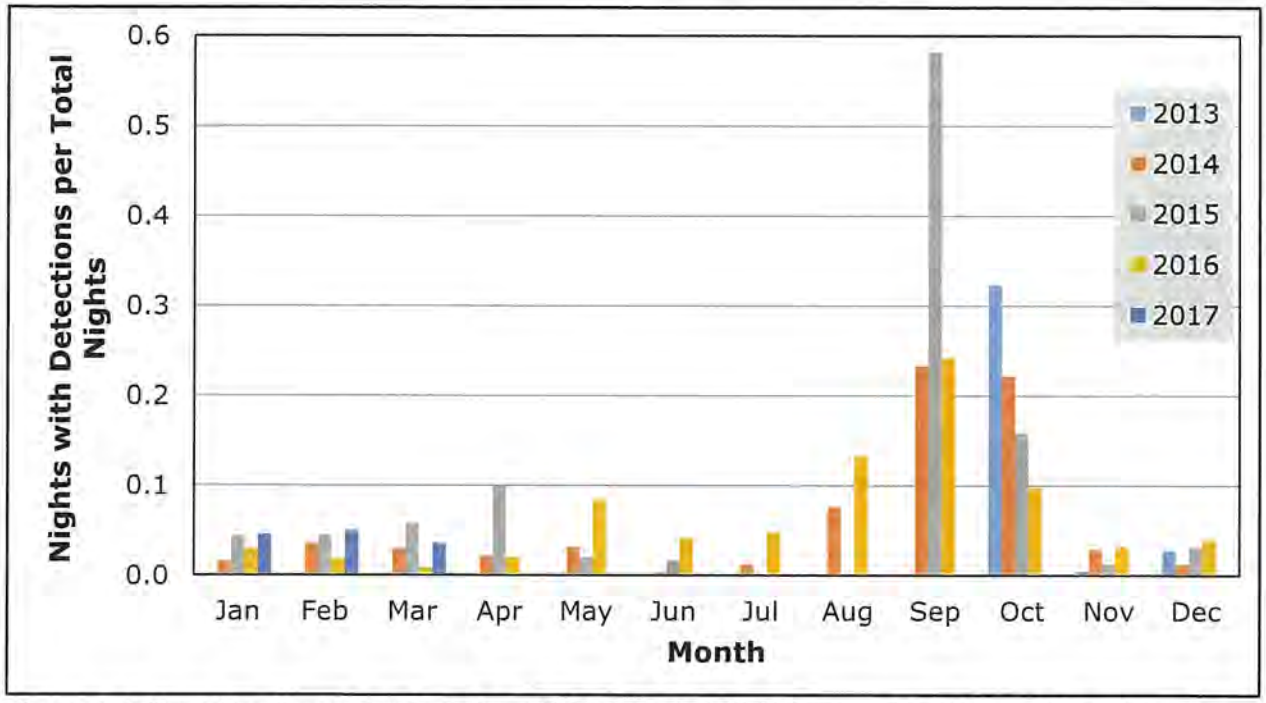

Figure 3.1. Hawaiian Hoary Bat Activity at KWP II, Only Wildlife Acoustics Ground Detectors, by Month, from October 2013 through June 2017 (no data for January–September 2013, July–August 2015, and July–December 2017).

3.5.2.3.2 Hawaiian Goose

The Hawaiian goose is a medium-sized waterfowl with an overall length of approximately 25 to 27 inches (63 to 65 centimeters) (Banko et al. 1999). The plumage of both sexes is similar (Banko et al. 1999). This species is adapted to a terrestrial and largely nonmigratory lifestyle in the Hawaiian Islands, with limited freshwater habitat (Banko et al. 1999). Adaptations to a terrestrial lifestyle include increased hind limb size, decreased fore limb size, more upright posture, and reduced webbing between the toes compared to other species of *Branta* (Banko et al. 1999; Olson and James 1991). Compared to the related Canada goose (*Branta canadensis*), Hawaiian goose wings are about 16% smaller in size and their flight is not as strong (Banko et al. 1999). Hawaiian geese are capable of inter-island and high altitude flight, but they do not migrate out of the Hawaiian archipelago (Banko et al. 1999).

Hawaiian geese currently use shrublands, grasslands, sparsely vegetated lava flows, and human-altered habitats ranging from coastal to alpine environments (Banko et al. 1999; Munro 1944; Scott et al. 1986; Wilson and Evans 1893). In the grassy shrublands and sparsely vegetated lava flows on the Islands of Hawai'i and Maui, Hawaiian geese nest, raise their young, forage, and molt (Banko et al. 1999). Some Hawaiian goose populations on these islands move seasonally, from montane foraging grounds to lowland or midelevation nesting areas (Banko et al. 1999). On the Island of Kaua'i, Hawaiian geese are primarily found using lowland habitats such as coastal wetlands at Hanalei NWR, with the exception of the Na Pali Coast (USFWS 2004b).

Hawaiian geese are currently known to occupy various habitat and vegetation community types ranging from coastal dune vegetation and nonnative grasslands (such as golf courses, pastures, and rural areas) to sparsely vegetated low- and high-elevation lava flows, midelevation native and non-native shrubland, cinder deserts, native alpine grasslands and shrublands, and open and non-native alpine shrubland-woodland community interfaces (Banko et al. 1999). Hawaiian geese are browsing-grazers; the composition of their diet depends largely on the vegetative composition of their surrounding habitats, and they appear to be opportunistic in their choice of food plants, as long as they meet nutritional demands (Banko et al. 1999; Woog and Black 2001). Hawaiian geese may exhibit seasonal movements to grasslands in periods of low berry production and wet conditions that produce grass with a high water content and resultant higher protein content. The sites currently used by Hawaiian geese for nesting range from coastal lowland to subalpine zones and demonstrate considerable variability in features (Banko et al. 1999). The current distribution of Hawaiian geese nesting sites has been influenced by the location of release sites of captive-bred individuals (DOFAW 2012). Historical reports from the Island of Hawai'i indicate that Hawaiian geese bred and molted primarily in the lowlands during winter months and moved upslope in the hotter and drier summer months (Banko 1988; Henshaw 1902; Munro 1944). Reproductive success is relatively low in upland habitats on the Islands of Hawai'i and Maui and higher in lowland habitat on Kaua'i (Banko et al. 1999).

Hawaiian geese have an extended breeding season, with eggs laid from August to April (Banko et al. 1999). Nesting peaks in December, and most goslings hatch from December to January (Banko et al. 1999). Hawaiian geese nest on the ground, in a shallow scrape in the dense shade of a shrub or other vegetation. A clutch typically contains three to five eggs, and incubation lasts for 29 to 32 days (Banko et al. 1999). Once hatched, the young may remain in the nest for 1 to 2 days; all hatchlings depart the nest after the last egg is hatched (Banko et al. 1999). Fledging (i.e., development of wing feathers large enough for flight) occurs at 10 to 12 weeks for captive birds but may be later in the wild (Banko et al. 1999). During molt, adults are flightless for a period of 4 to 6 weeks and generally attain their flight feathers at about the same time as their offspring. When flightless, goslings and adults are extremely vulnerable to predators such as cats, dogs, and mongooses. After molting and fledging, around June to September, family groups frequently congregate in post-breeding flocks, often far from nesting areas. Hawaiian geese reach sexual maturity at 1 year of age but usually do not form pair bonds until the second year. Females are highly philopatric (loyal to their place of birth) and nest near their natal area, while males more often disperse (Banko et al. 1999).

Hawaiian geese and one or more now extinct species of *Branta* are thought to have once been widely distributed among the main Hawaiian Islands. Fossil remains of Hawaiian geese have been found on Maui, Moloka'i, Lāna'i, and Kaua'i (Olson and James 1991). Hawaiian goose fossils have not yet been found on Ni'ihau (USFWS 2004b). On O'ahu, all fossils appear to be of a related but extinct *Branta* form (Olson and James 1991). The fossil record indicates the prehistoric (before 1778) range of the Hawaiian goose was much greater than the historically observed range (Banko et al. 1999). But it is difficult to estimate original Hawaiian goose population numbers because the species composition and the gross structure of the vegetation before Polynesian arrival is poorly understood (USFWS 2004b). By 1960, fewer than 30 Hawaiian geese remained on Hawai'i Island (Smith 1952). The release of captive-bred Hawaiian geese, which began in 1960, helped save the species from extinction (USFWS 2004b). As a result of such programs, wild populations of Hawaiian goose now occur on four of the main Hawaiian Islands. As of 2017, the statewide population was 3,252 individuals, with 1,104 individuals on Hawai'i, 1,482 individuals on Kaua'i, 627 individuals on Maui, and 37 individuals on Moloka'i (DOFAW 2018).

From 2011 to 2016, the State of Hawai'i translocated 646 Hawaiian geese from Kaua'i to Hawai'i (598) and Maui (48) (USFWS 2018). The birds were released in pens at Pi'ihonua on Hawai'i and Waiopae (Haleakalā Ranch) on Maui, two of the proposed mitigation sites. A similar release pen is located at

Pi'iholo Ranch on Maui, another potential mitigation site, where the State of Hawai'i released captive-bred birds for several years. These pens are managed to provide protection from non-native, introduced predators, such as mongooses and feral cats.

Threats

Current threats to Hawaiian goose include predation by non-native mammals, exposure in high-elevation habitats, insufficient nutritional resources for both breeding females and goslings, a lack of lowland habitat, human-caused disturbance and mortality (e.g., road mortality, disturbance by hikers), behavioral problems related to captive propagation, inbreeding depression, and infectious/inflammatory diseases of which toxoplasmosis predominates (USFWS 2004a; Work et al. 2015; SWCA 2019). Predators of Hawaiian goose eggs and goslings include dogs, cats, rats, and mongooses. Dogs and mongooses are also responsible for most of the known cases of adult predation (USFWS 2004a). Hawaiian goose have also been negatively impacted by human recreational activities (e.g., hikers and hunters). In recent years, Hawaiian geese have been struck and killed by golf balls and vehicles (USFWS 2004a).

Starvation and dehydration can be major factors in gosling mortality. Approximately 81.5% of gosling mortality in Haleakalā National Park during the 1994 to 1995 breeding season was due to starvation and dehydration (USFWS 2004a). From 2005 to 2007, between 30 to 50% of the goslings at the Hakalau Forest Unit died due to drought and/or exposure (SWCA 2019). A lack of adequate food and water supplies also seems to be a limiting factor in Hawai'i Volcanoes National Park (USFWS 2004a, Work et al. 2015).

For Hawaiian goose populations to survive they must be provided with generally predator-free breeding areas and sufficient food resources; human-caused disturbance and mortality must be minimized; and genetic and behavioral diversity maximized. At the same time, it is recognized that Hawaiian geese are highly adaptable, successfully utilizing a gradient of habitats, ranging from highly altered to completely natural, which bodes well for recovery of the species.

Twenty-three Hawaiian goose fatalities at KWP I have been observed in the search area since the beginning of operations in 2006 through June 2017 (KWP I 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, and 2017). Four Hawaiian goose fatalities at KWP II have been observed from July 2012 through June 2017 (KWP II 2013, 2014, 2015, 2016, and 2017).

Occurrences in and near the Project Area

The Hana'ula release pen is located near the upper end of the existing KWP I project area, approximately 550 m (1,800 feet) from the nearest KWP I wind turbine and 3,707 m (12,011 feet) from KWP II turbine 1. DOFAW has suspended using this release pen for future releases. A number of Hawaiian geese from the Hana'ula release site have remained as residents within or near the KWP I and KWP II project areas. Little is known about the exact distribution and movements of the birds released at the Hana'ula release pen, although they have been recorded as far west as Lahaina (approximately 12.3 kilometers, or 7.7 miles, from the project area) and as far east as Haleakalā National Park, indicating that at least some birds from this release site move extensively around the island (Medeiros 2011). The Hawaiian goose population in this region (Hana'ula/West Maui) is estimated at 169 birds (Nēnē Recovery Action Group 2017). This population is monitored under the KWP I and KWP II HCPs, and the survey effort is now well coordinated between DOFAW and KWP I and KWP II biologists.

In 1998, four goslings were successfully fledged from the first nest reported in the area since reintroduction began (DOFAW 2000). Monitoring studies at KWP I and KWP II have resulted in the discovery of a few Hawaiian goose nests annually only in the vicinity KWP I.

Hawaiian goose presence has been monitored regularly in the KWP I and KWP II project areas prior to and after commencing operation of KWP I and KWP II. Data collected from incidental surveys and the WEOP program (December 2006–June 2017) have provided information about Hawaiian goose distribution and behavior at KWP I and KWP II. Monitoring of Hawaiian goose during the construction period at KWP I (January–June 2006) also documented the species' use of the KWP I area and the down road KWP II area. Both of these data sets combined provide over 800 observations (n = 820 individuals) on Hawaiian goose distribution and span over 3.5 years.[6]

Results show that Hawaiian geese are seen almost twice as frequently (n = 532 individuals) at the KWP I area than at the KWP II down road area (n = 288). Most of the down road observations are in the upper elevations of the KWP II area, near the Pali Trail Junction (Mile Marker 1.75) and in the vicinity of MECO's 64-kilovolt overhead transmission route crossing (Mile Marker 2.25). The birds periodically use the area for browsing and socializing (SWCA 2019). No nesting is expected to occur within the KWP II project area (see above).

In addition to the WEOP observations, systematic surveys were also conducted at KWP I and consisted of 116.8 hours of observation time from June 2006 to June 2007. The primary purpose of the systematic surveys was to record Hawaiian goose flight behavior around the existing KWP I. Surveys were conducted in the mornings (6–10 a.m.), afternoons (10 a.m.–2 p.m.), and evenings (2 p.m.–6 p.m.). Systematic surveys show that flight activity did not vary with time of day (range = 0.29–0.38 flocks in flight/hour; $X^2 = 0.464$, degrees of freedom (*df*) = 2, probability (p) = 0.79).

Data from the WEOP surveys and systematic surveys document that Hawaiian geese frequently fly within the RSZ of the turbines at KWP I (66.1% of all flights observed, n = 97) with 16.9% occurring below the RSZ and also 16.9% occurring above the RSZ.

[6] To standardize the effort spent surveying both of the KWP I and KWP II project areas, data were chosen only from time periods when the entire stretch of road leading from the base of KWP II to KWP I was surveyed. For WEOP observations, the two time periods that fit this criterion were 6:30 to 9:00 a.m. and 3:30 to 7:00 p.m. As the entire roadway was surveyed during the construction period, all Hawaiian goose observations were used from that dataset.

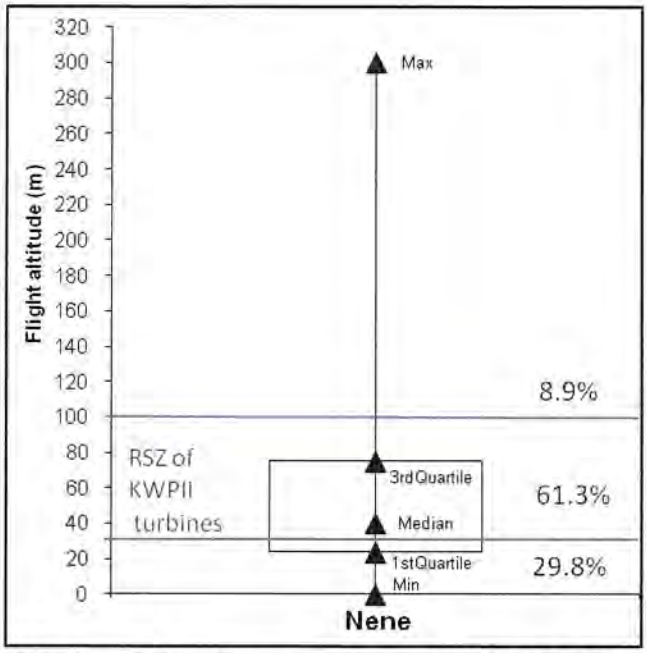

Figure 3.2. Flight altitudes of Hawaiian geese from the Wildlife Education and Observation Program and systematic observations (n = 97), imposed on the rotor-swept zone of turbines at KWP II. (percentages on the right are the percentages of Hawaiian goose flights expected to occur at, below, and above the rotor-swept zone).

As turbine towers at KWP II are 10 m taller, the RSZ height is also raised by 10 m (the area remains the same). Assuming that flight characteristics of Hawaiian geese at KWP II are similar to those observed at KWP I, slightly fewer Hawaiian geese (61.3%) are expected to be flying at RSZ height at KWP II, further reducing collision risk (Figure 3.2). In addition, the KWP II site is situated at an elevation that reduces its propensity for dense cloud cover that may improve the avoidance behavior of Hawaiian geese encountering turbines in their airspace. Flock sizes in flight averaged 2.7 birds.

In summary, fewer Hawaiian geese are seen in the KWP II down road area compared to KWP I. Applying Hawaiian goose behavioral observations at KWP I to KWP II, Hawaiian geese may transit through the KWP II area at any time during daylight hours. As KWP II turbine towers are 10 m taller than the KWP I turbines, fewer Hawaiian goose flocks will fly within the RSZ of the KWP II turbines (61% versus 66%), and the flight avoidance behavior observed at KWP I is expected to further lower the risk of take at KWP II. The greater visibility on-site due to the lower elevation, and the decrease in the frequency and extent of cloud cover at KWP II, could also potentially decrease the risk of turbine collision for Hawaiian goose.

3.5.3 *Impacts*

3.5.3.1 FAUNA

3.5.3.1.1 Alternative 1 (No Action Alternative)

The environmental effects of the existing KWP II were analyzed previously under HRS Chapter 343 and NEPA (Planning Solutions 2010; USFWS 2011). Under the No Action Alternative, a major amendment to the ITL would not be issued. The only change to the existing operation would be KWP II implementing a full nighttime shut-down in order to avoid impacts to the Hawaiian hoary bat.

Impacts observed and expected include fatalities of invasive and endemic avian wildlife species as a result of collision with turbines during daytime operation. Scavenger control at the turbine site to improve carcass retention for fatality monitoring would be expected to temporarily reduce the presence of mammalian scavengers at the Project. Scavenger control is expected to benefit fatality monitoring by improving the probability of finding a fatality so as to better understand impacts on wildlife that should help to ensure that the take limits ITL are not exceeded.

KWP II's ongoing mitigation activities are expected to continue. Fence maintenance and outplanting of native plants at Makamaka'ole are expected to provide direct and indirect benefits to wildlife that may nest inside the predator-free enclosure. The protection of seabird nesting burrows from predators is expected to have benefits to biodiversity by providing predator-free nesting habitat for various species of seabirds, such as Bulwer's petrel and others. The Hawaiian hoary bat habitat restoration work at Kahikinui that began in 2014 is expected to continue to provide direct and indirect benefits to the bat and other native species. As mitigation areas are restored, it is expected that native forest birds such as the Hawai'i amakihi and the 'apapane to move into these areas (Berthold et al. 2015). Biodiversity of species that depend solely on the invasive species that are removed may be temporarily reduced by the removal of such vegetation, but the habitat restoration is expected to improve future biodiversity associated with native forest plant species.

3.5.3.1.2 Alternative 2 (Proposed Action)

Impacts to wildlife and biodiversity at the turbine sites would be expected to be the same as described for the No Action Alternative during daytime operations, and additional impacts would be expected to species flying at night that may collide with moving turbine blades. The USGS research study for bat mitigation involving the use of mist nets is not expected to have direct negative impacts on wildlife other than bats. Nontarget nocturnal flying species such as barn owls may be incidentally captured in the mist net. Standard operating procedures are in place to safely remove, treat if necessary, and release all captured species. Dietary studies of bat guano to better understand the diet of Hawaiian hoary bats may have indirect negligible impacts on localized insect populations in the future. Control of non-native predators in and around Hawaiian goose pens at Haleakalā Ranch and Pi'iholo Ranch is expected to benefit native species, including the Hawaiian goose, in the vicinity of the pens. The maintenance of the predator-free area and fence would have benefits to other wildlife that nest within the protected area.

3.5.3.1.3 Alternative 3 (Increased Curtailment)

Under Alternative 3, KWP II would cease turbine operations at night during the period from April 15 through September 15 and implement intermittent LWSC during the rest of the year, as described in the amended HCP. This operational change of the existing wind turbines related to take avoidance and minimization would result in similar impacts to wildlife and biodiversity as described for the Proposed Action.

Impacts to wildlife and biodiversity from the Hawaiian hoary bat USGS research project would have no impacts to wildlife and biodiversity. Impacts from Hawaiian goose mitigation would be identical to those described for the Proposed Action.

3.5.3.2 HAWAIIAN HOARY BAT

3.5.3.2.1 Alternative 1 (No Action Alternative)

The environmental effects of the approved ITP/ITL were analyzed previously under HRS Chapter 343 and NEPA (Planning Solutions 2010, USFWS 2011). Under the No Action Alternative, a major amendment to the ITL would not be issued.

Take of Hawaiian hoary bats in exceedance of 11 would not be authorized and mitigation for fatalities in excess of the authorized take would not be assured. KWP II has already exceeded the permitted Hawaiian hoary bat take. Under the No Action Alternative, KWP II would modify its WTG operational regime to ensure that no further take of bats occurs. Failure to do so would result in a violation of the take prohibitions under Section 9 of the ESA and may result in enforcement actions. Restricting turbine operations to only daytime hours is likely to avoid additional take of the Hawaiian hoary bat.

Mitigation activities for the Hawaiian hoary bat under the approved HCP/ITL, including reforestation and fence maintenance, are expected to have beneficial effects on the bat by increasing roosting habitat containing native species with which the bat evolved.

3.5.3.2.2 Alternative 2 (Proposed Action)

Under Alternative 2, operation, authorized take, and associated minimization and mitigation activities at KWP II would be as described in Section 2.2. KWP II would be authorized to take up to 27 Hawaiian hoary bats through January 2, 2032. The take of a bat during the breeding season may result in the indirect loss or take of a dependent offspring. In order to account for the immediate loss and future loss, indirect take is assessed to the females taken during the breeding season, taking into account the estimated survival rate of dependent young. The bat population on Maui or statewide is not known.

Acoustical detections indicate the Hawaiian hoary bat is well distributed throughout Maui and statewide (Johnston et al. 2018; Starcevich 2019; Wolfe 2018). It is certain that the entire population of bats on Maui would not be directly extirpated by the operation of KWP II on Maui because not every bat would be expected to transgress across the wind farm and not every bat that does transgress across the wind farm would result in a fatality. While bats are highly mobile and have been known to travel up to 12 miles in a night, they tend to focus their activity where the resources are available and spend the majority of their time in their core use area. The bat population that utilizes the turbine area for foraging would be at higher risk of fatality than bats that do not use that area. A local effect on the bat population would be expected if the core use area overlaps with the turbine sites because of the slightly higher probability of encountering turbines during nightly usage. Fatalities from this subpopulation would be expected to cause a localized decrease in the population. This local effect on population could impact the species, either by reducing genetic diversity or by reducing the local population below a threshold that would cause the population to decline. Mobility of the bats provides an adaptive ability to potentially sustain genetic diversity, at least within an island potentially minimizing the effect of localized subpopulation decrease. Acoustic detections have not shown a decline at KWP II since beginning operation, suggesting that use has not decreased over the last 6 years (KWP II 2013, 2014, 2015, 2016, 2017). Lost future productivity of an adult bat would also be expected under this alternative. Bats may live up to 10 years, although it is unknown if they breed each year or how many years they may produce young. The loss of an adult bat would be expected to result in the additional loss of future generations on that island. The indirect loss of dependent pups is included in the amount of take and for which mitigation to the maximum extent practicable is provided regardless of whether the adult female had dependent young.

The guidance provided in the ESRC *Hawaiian Hoary Bat Guidance Document* (Amlin and Siddiqi 2015) communicated that it was appropriate to allocate a mitigation credit of one Hawaiian hoary bat for each $50,000 of funding that is included in a proposed or amended HCP and assured of implementation by KWP II or permittee through a letter of credit or other financial assurances acceptable to the USFWS and DOFAW. The research component of the mitigation program is intended to reduce uncertainty in mitigation effectiveness and inform more consistent, scientifically justifiable, and quantifiable mitigation practices for Hawaiian hoary bat in the future. The USGS research project funded by KWP II to mitigate for 19 bats was reviewed and selected at the direction of the ESRC and its bat advisory subcommittee comprised of bat biologists. The research is expected to provide beneficial impacts to the bats by furthering understanding of diet, roosting habitat selection, movement, and distribution throughout the

Island of Hawai'i. This research, while not directly providing a resource that improves bat productivity or survival, provides indirect support for identification and long-term improvement of bat habitat and furthers our understanding of bat needs and habitat use to the benefit of future bat generations. The activities associated with conducting the research activities consist of capture through mist nets, handling, collection of genetic and fecal samples, measurements, tagging, and tracking, and are expected to cause temporary, nonlethal harassment to the bat. The qualified biologists conducting the research possess a USFWS recovery permit and adhere to strict capture, handling, sampling, and release guidelines for the bat's protection and to assure that no lasting harm to the bat occurs. The impacts to the bat in the form of discomfort are expected to be short term and the benefits of these research actions are expected to be long term in the form of knowledge gained through sampling and tracking the bats.

To avoid a lag in implementation, planning for Tier 4 mitigation would be triggered when 75% of the take in the current authorized tier is reached. In the event that Tier 4 is reached, the mitigation would be expected to replace the adults and dependent young in advance of the take to avoid impacts to productivity and future generations. Tier 4 would mitigate take of up to eight bats. The Tier 4 mitigation would focus on land acquisition on Maui that is not already in conservation, where bats are present, and where the land parcel is in danger of being developed or compromised with regard to bat use. The approximate acreage per bat would be 60 to 80 acres, or 480 to 640 acres for eight bats. Acreage is based on the quality of the habitat provided for the bats. The specific parcel would be determined when funding and planning for Tier 4 take is triggered. Prior to any planned land purchase, bat detectors would be deployed to ensure that bats are present on or near the parcel. At least 10 bat detectors would be deployed throughout the parcel for at least 3 months. Bat detection would have to occur on at least three detectors during the assessment period. The bat monitoring may be expected to cause short-term, infrequent disturbance to bats in the form of disturbance during deployment and retrieval of detectors and the changing of cards or batteries. The expected impacts of land acquisition for bat use is expected to benefit the bats by providing resources for multiple future generations.

3.5.3.2.3 Alternative 3 (Increased Curtailment)

Under Alternative 3, KWP II would cease turbine operations at night during the period from April 15 through September 15 and implement intermittent LWSC during the rest of the year, as described in the amended HCP. This operational change of the existing wind turbines related to take avoidance and minimization would reduce the take authorization under Alternative 3 to an additional 15 bats for Tier 3 through the permit term ending January 2, 2032.

Beneficial impacts to the Hawaiian hoary bat associated with the USGS research project would be indirect but significant by providing much needed biological information about the Hawaiian hoary bat. This new information would enable the Service to make more informed future decisions about impacts to and mitigation for the Hawaiian hoary bat.

3.5.3.3 HAWAIIAN GOOSE

3.5.3.3.1 Alternative 1 (No Action Alternative)

The environmental effects of the approved 2011 ITL were analyzed previously under HRS CHAPTER 343 and NEPA (Planning Solutions 2010; USFWS 2011). Under the No Action Alternative, a major amendment to the ITL would not be issued. The approved ITL authorizes take of up to 30 Hawaiian geese. KWP II would continue to conduct daytime operations and maintenance at the wind facility until it reaches the maximum authorized take amount of Hawaiian geese.

The implementation of a nighttime shut down would not result in any changes to the previously analyzed effects to the Hawaiian goose.

3.5.3.3.2 Alternative 2 (Proposed Action)

Under Alternative 2, KWP II would be requesting to increase its authorized take of the Hawaiian goose from 30 to 44 individuals. This change would have minor impacts to the Hawaiian goose population in the immediate area of the KWP II facility, but the effect would be negligible to the population on Maui or throughout Hawai'i.

KWP II's mitigation actions for the Hawaiian goose include predator control and fence maintenance at the Pi'iholo Ranch pen, the Haleakalā Ranch pen, or a new pen and is expected to provide benefits to the Hawaiian goose in the form of increased productivity above baseline. The USGS Hawaiian hoary bat research project is not expected to impact the Hawaiian goose.

3.5.3.3.3 Alternative 3 (Increased Curtailment)

Under Alternative 3, KWP II would cease turbine operations at night during the period from April 15 through September 15 and implement intermittent LWSC during the rest of the year, as described in the amended HCP. Under this alternative, KWP II would be requesting to increase its authorized take of the Hawaiian goose from 30 to 44 individuals. This change in operation would have minor impacts to the Hawaiian goose population in the immediate area of the KWP II facility, but the effect would be negligible to the population on Maui or throughout Hawai'i.

KWP II's mitigation actions for the Hawaiian goose includes predator control and fence maintenance at the Pi'iholo Ranch pen, the Haleakalā Ranch pen, or a new pen and is expected to provide benefits to the Hawaiian goose in the form of increased productivity above baseline. The Hawaiian hoary bat USGS research mitigation project is expected to have no impacts to the Hawaiian goose.

3.6 Historic, Archaeological, and Cultural Resources

The 2010 EIS provides an overview of the prehistoric and historic land uses in the project area for Ukumehame Ahupua'a and Kaheawa Pastures. The EIS also discusses the site's archaeological and historic features as well as cultural uses and resources. Impacts to these resources, as well as mitigation measures, are provided in the 2010 EIS.

The Hawaiian hoary bat is important to Hawai'i's heritage and culture and thus is considered a cultural resource. The Hawaiian name for bat ('ōpe'ape'a) compares the animal's wing to the sails (pe'a) of a canoe and the half-leaf remaining on the taro stalk after the top half has been removed for cooking (Pukui and Elbert 1986). The 'ōpe'ape'a is also considered an 'aumākua. 'Aumākua are family or personal gods, deified ancestors who might assume the shape of [various animals]" (Pukui and Elbert 1986). A symbolic relationship exists between 'aumākua and their associated families. Various cultural protocols are followed to steward the relationships between the family and their 'aumākua (Kittinger et al. 2011). A family did not harm or eat the animal form their 'aumākua takes, and the 'aumākua cared for the family in various ways. 'Aumākua warns and reprimands humans in dreams, visions, and calls; guides in times of trouble; and gives inspiration or strength in times of need. 'Aumākua can be associated with families for many generations or can be recent additions based on events that carry special cultural meaning and significance (Kittinger et al. 2011).

3.6.1 *Impacts*

No change in project impacts are anticipated for historic,archaeological, and cultural resources (beyond what is described in the 2010 EIS). Potential impacts as a result of increased take of the Hawaiian hoary bat or the Hawaiian goose and mitigation measures under the amended HCP are listed below.

3.6.1.1 ALTERNATIVE 1 (NO ACTION ALTERNATIVE)

Under the No Action Alternative, a major amendment to the ITL would not be issued. The only change to existing operation would be KWP II implementing a full nighttime shut down in order to avoid impacts to the Hawaiian hoary bat. The implementation of nighttime shut down would not result in any effects to cultural resources.

3.6.1.2 ALTERNATIVE 2 (PROPOSED ACTION)

Under the Proposed Action, there is expected to be an impact to those who consider Hawaiian hoary bats to have special cultural significance as ʻaumākua. It is unknown how many individuals may identify ʻōpeʻapeʻa as their ʻaumākua across the Hawaiian Islands. Such spiritual beliefs and values are personal and immeasurable; therefore, the effects to this type of cultural value cannot be quantified. Minimization and mitigation measures proposed under the amendment would be expected to result in long-term beneficial impacts to Hawaiian hoary bats.

3.6.1.3 ALTERNATIVE 3 (INCREASED CURTAILMENT)

Under Alternative 3, KWP II would cease turbine operations at night during the period from April 15 through September 15 and implement intermittent LWSC during the rest of the year, as described in the amended HCP. Impacts to cultural resources would be similar to those describe for the Proposed Action, although impacts to those that identify ʻōpeʻapeʻa as their ʻaumākua may be incrementally lessened by the reduced take level associated with this alternative.

Impacts to cultural resources from the Alternative 3 mitigation activities would be similar to but on a lesser scale than those described for the Proposed Action, due to the smaller mitigation acreages needed for this alternative.

3.7 Visual Resources

The 2010 EIS discusses existing scenic and aesthetic resources and potential islandwide and local impacts relative to visual resources that could result from project construction and operations. No change to visual resources impacts (including cumulative impacts) beyond what is described in the 2010 EIS are anticipated as a result of increased take or mitigation measures under any alternative.

3.8 Noise

The 2010 EIS provides a description of 11 HAR 46, Community Noise Control standards and applicable sound limits, and describes the pre-Project sound levels. The EIS also describes possible noise impacts from construction and operations, noise control standards, and compliance with noise limits. No change to noise resources impacts, including cumulative impacts, beyond what is described in the 2010 EIS are anticipated as a result of increased take or mitigation measures under any alternative.

3.9 Land Use and Socioeconomic Resources

The 2010 EIS discusses existing land use, population and housing, and economic resources associated with the Project, and potential land use and socioeconomic impacts. Socioeconomic benefits of the Project include construction employment and expenditures, operational employment, and state revenues. No change to land use and socioeconomic resources impacts beyond what is described in the 2010 EIS are anticipated as a result of increased take of the Hawaiian goose or the Hawaiian hoary bat.

3.10 Public Infrastructure and Services

The 2010 EIS describes existing transportation facilities (i.e., roadways, harbors, airports); utilities; and public services; construction- and operational-phase traffic impacts; traffic mitigation measures; and impacts to airports, air traffic, harbors, and ocean navigation. Impacts to water supply, wastewater, telecommunications, police and fire service, public safety, health care facilities, and solid waste are also analyzed. Potential impacts under the amended HCP are described below.

3.10.1 *Alternative 1 (No Action Alternative)*

Under the No Action Alternative, a major amendment to the ITL would not be issued. The only change to the existing operation would be KWP II implementing a full nighttime shut down in order to avoid impacts to the Hawaiian hoary bat. Year-round nighttime shutdown of turbines would have the potential to reduce the amount of wind energy generated by approximately 50% of current production capacity. This is an estimate only and is relative to its current operating regime that includes day operation and night operation with LWSC. The loss of this portion of renewable energy would need to be made up by some additional source of energy production to meet island wide energy demand.

3.10.2 *Alternative 2 (Proposed Action)*

Under Alternative 2, implementation of seasonal nighttime LWSC, with the possibility to extend the duration of the initial period commensurate with take, would have the potential to reduce the amount of wind energy generated by KWP II up to approximately 20% of current production capacity. This estimate would vary depending on wind speed and is strictly based on the relative amount of non-operation time, when the turbines would be curtailed due to wind speeds below the cut-in speed. The loss of this portion of renewable energy would need to be made up by some additional source of energy production to meet island wide energy demand.

KWP II's proposed mitigation actions would have no impact on public services and utilities.

3.10.3 *Alternative 3 (Increased Curtailment)*

Under Alternative 3, implementation of nighttime shutdown of turbine operations from April 15 through September 15, and intermittent LWSC during the rest of the year, as described in the amended HCP, would have the potential to reduce the amount of wind energy produced up to approximately 32% of current production capacity. This estimate would vary depending on wind speed and is strictly based on the relative amount of non-operation time, when the turbines would be curtailed due to wind speeds below the cut-in speed. The loss of this portion of renewable energy would need to be made up by some additional source of energy production to meet island-wide energy demand.

KWP II's proposed mitigation actions would have no impact on public services and utilities.

3.11 Hazardous Materials

The 2010 EIS describes the results of a Phase I Environmental Site Assessment of the KWP I project site. The proximity of the KWP II site and similarity of past uses suggest that conditions are similar. KWP II construction period risks, operational period risks, and containment, spill prevention, and control measures are listed in the 2010 EIS. No change to hazardous material resources impacts, including cumulative impacts, beyond what is described in the 2010 EIS are anticipated as a result of increased take or mitigation measures under any alternative.

3.12 Natural Hazards

The 2010 EIS describes existing natural hazards, such as flooding, tsunamis, seismic hazards, and fire hazards. KWP II facilities are located well outside of flood hazard areas identified in Flood Insurance Rate Maps and are designed to meet all applicable codes. Impacts to the structures from seismic hazards, hurricane and high wind hazards, lightning strikes, and fire hazards are discussed in the 2010 EIS. No change to natural hazard resources impacts, including cumulative impacts, beyond what is described in the 2010 EIS are anticipated as a result of increased take of the Hawaiian hoary bat or the Hawaiian goose.

The USGS research study for bat mitigation is not expected to have impacts involving the occurrence of natural hazards such as flooding or wildfire. The impacts of accessing Hawaiian hoary bat mist net sites and acoustic monitoring sites are temporary, and no open flames, smoking, or incendiary devices would be used. Haleakalā Ranch is predominantly upland. Maintenance within and outside the Hawaiian goose pen, outplanting of native plant species, and fuel-load reduction are expected to have beneficial impacts by minimizing the potential for impacts involving flooding or wildfire. Predator control and fence maintenance at the Pi'iholo Ranch pen, the Haleakalā Ranch pen, or a new pen to benefit the Hawaiian goose is not expected to influence the likelihood of flooding or wildfire within the affected area.

4 OTHER HAWAI'I REVISED STATUTES CHAPTER 343 TOPICS

4.1 Cumulative Impacts

A detailed discussion of cumulative impacts on the Hawaiian hoary bat and the Hawaiian goose is provided below based on analyses from the amended HCP. Most of the impacts to resources, such as soils or land use, are not associated with specific past, present, or future actions; therefore, it is not possible to assess cumulative effects relative to these resources. Affected environment resources that would be impacted by any of the three alternatives considered herein that may have measurable cumulative effects are cultural resources, public utilities and services, and the Covered Species. Therefore, the cumulative effects analysis is limited to consideration of cultural resources (inclusive of Hawaiian hoary bats as 'aumākua), public utilities and services, the Hawaiian hoary bat, and the Hawaiian goose.

Assessment of cumulative impacts considered other actions that occurred in the recent past, present and reasonably foreseeable future within the vicinity of the Project and involve impacts to resources also affect by the Project. For this amendment, it considered the cumulative impacts of requested and authorized take of Hawaiian hoary bat and Hawaiian goose through HCPs for projects on O'ahu, Maui, Hawai'i Island, Kaua'i, and Lāna'i (Table 4.1). HCPs are required to minimize and mitigate the effects of incidental take to the maximum extent practicable. In addition to the above requirements, the State of Hawai'i requires that all HCPs and their actions be designed to provide overall net benefit to the

threatened and endangered species in Hawai'i (HRS 195D-30). Accordingly, all project-related impacts associated with these authorizations have already been avoided, minimized, or mitigated.

In addition to the take that has already been authorized, proposed wind facilities on Hawai'i, Maui, and O'ahu (Table 4.1) also have the potential to result in incidental take and contribute to cumulative impacts to the Covered Species. Additionally, it is anticipated that the state's objective to reach a renewable portfolio standard of 100% by 2045 will encourage future wind energy development in Hawai'i, however, it is expected that if HCPs are developed and approved for all current and future projects that mitigation measures would appropriately offset the anticipated take and provide net benefit to the Covered Species.

On a broader scale, KWP II represents one of the many projects that can be expected to occur in the state. The Hawaiian Islands have experienced increases in population and real estate development, which will likely continue into the future. This growth may further contribute toward the causes of decline of the Hawaiian hoary bat and the Hawaiian goose. KWP II's HCP amendment includes mitigation measures for both species that are expected to offset take and provide a net benefit.

Take for the Hawaiian hoary bat and/or the Hawaiian goose has been authorized or likely will be authorized on O'ahu, Maui, Kaua'i, and Hawai'i through several HCPs (Table 4.1).

Table 4.1. Known and Reasonably Foreseeable Future Projects that Have, or Are Expected to Have, Impacts to the Hawaiian Hoary Bat and the Hawaiian Goose

Project Name	Permit or Project Term	Location	Current Take Authorization (status of impacts)[1]		Proposed Take Request (expected impacts)[2]	
			Hawaiian Hoary Bat	Hawaiian Goose	Hawaiian Hoary Bat	Hawaiian Goose
Coast Guard-Kalepa Comm. Tower (BiOp)	2013–2033	Kalepa, Kaua'i	0	0		
FCC- Kalaheo Communications Tower (BiOp)	2013–2033	Kalaheo, Kaua'i	0	0		
Kaua'i Island Utility Coop. (Short-term HCP)	2011–2016	Kaua'i Island	0	0		
Kaua'i Seabird Recovery Project (DOFAW)		Kaua'i Island				
Kaua'i Island Utility Coop. (Long-term HCP)	Requesting 30 years	Kaua'i Island			Not applicable(N/A)	N/A
Kaua'i Seabird (HCP)	Draft; 30-year request	Kaua'i Island	N/A	N/A	0	0
Kōke'e Air Force Station (BiOp)	2017–foreseeable future	Kōke'e, Kaua'i	0	0		
Tower Kaua'i Lagoons (HCP)	2016–2042	Lihu'e, Kaua'i	0	15 (+)		
DoD Military Radar		O'ahu	(-)			
James Campbell NWR (CCP)	Perpetuity	Kahuku, O'ahu	+	+		
Kahuku Wind Power (BiOp/State HCP)	2010–2030	Kahuku, O'ahu	32 (+)	0		
Kawailoa Wind Power (HCP)	2012–2032	Haleiwa, O'ahu	60 (+)	0	220 (+)	0

Project Name	Permit or Project Term	Location	Current Take Authorization (status of impacts)[1]		Proposed Take Request (expected impacts)[2]	
			Hawaiian Hoary Bat	Hawaiian Goose	Hawaiian Hoary Bat	Hawaiian Goose
Na Pua Makani Wind (HCP)	2018–2038	Kahuku, O'ahu	51 (+)	6 (+)	N/A	N/A
Pearl Harbor NWR (CCP)	Perpetuity	Ewa, O'ahu	+	+		
Palehua Wind (HCP)	No draft submitted	Makakilo, O'ahu	N/A	N/A	Not available	Not available
U.S. Army Kahuku Training Area Single Wind Turbine (BiOp)	2010–2030	Kahuku, O'ahu	4 (-)	0		
US Army (INRMP)		O'ahu	(+)			
Auwahi Wind (HCP)	2012–2037	'Ulupalakua, Maui	21 (+)	5 (+)	119 (+)	N/A
Auwahi II Wind (HCP)	No draft submitted	'Ulupalakua, Maui	N/A	N/A	Not available (+)	Not available (+)
Daniel K Inouye Telescope (BiOp; State HCP)	Ending 2019	Haleakalā, Maui				
Haleakalā National Park		Haleakalā, Maui	(+)	(-/+)		
Haleakalā Ranch (SHA)	2019–2069	Kula, Maui		(+)		
Kahikinui Wind (HCP)	No draft submitted	Kahikinui, Maui	N/A	N/A	Not available (+)	Not available (+)
Kaheawa Wind Phase I (HCP)	2006–2026	Maalaea, Maui	50 (+)	60 (+)		
Kaheawa Wind Phase II (HCP)	2012–2032	Maalaea, Maui	11 (+)	30 (+)	27 (+)	14 (+)
Kalama Beach Park		Kalama, Maui				
Maui County		Maui (islandwide)				
Maui Nui Seabird Recovery Project		Maui Nui				
Pi'iholo (SHA)	Pending for 50 years	Pi'iholo, Maui		(+)		
Island of Molokai (SHA)	2003–2033	Moloka'i (islandwide)		(+)		
Pu'u O Hoku (SHA)	2001–2023; pending amendment	East Moloka'i		(+)		
Pulama Lanai Seabird Project (MOU)	Perpetuity	Lanai Hale, Lanai				
Big Island Beef Community Wind Project[4]	N/A	Paauilo, Hawai'i	0 (No impact)	0 (No impact)		
Hakalau NWR	Perpetuity	Hakalau, Hawai'i		(+)		
Hawaii Volcanoes NP	Perpetuity	Kīlaeua and Mauna Loa, Hawai'i	(+)	(+)		

Project Name	Permit or Project Term	Location	Current Take Authorization (status of impacts)[1]		Proposed Take Request (expected impacts)[2]	
			Hawaiian Hoary Bat	Hawaiian Goose	Hawaiian Hoary Bat	Hawaiian Goose
Hawi Wind (HCP)	Draft pending	Upolu Point, Hawai'i	0 (unknown)	0 (unknown)	Not yet determined (+)	Not yet determined (+)
Kamehameha Schools-Keauhou and Kīlauea Forest (SHA)	2018–2068	East Mauna Kea, Hawai'i	(+)	(+)		
Lalamilo Wind Repowering (HCP)[5]	Not yet issued; 20 years	Lālāmilo, Hawai'i	0		6 (+)	0
North Kohala Microgrid Project[4]	N/A	North Kohala, Hawai'i	0 (No impact)	0 (No impact)		
Pakini Nui Wind (HCP)	Draft requests 10 years	Ka Lae, Hawai'i	0 (-)	0 (unknown)	26	3
Pelekane Bay Watershed Restoration Project (BiOp)	2010–2030	Pelekane, Hawai'i	16 (-)			
Pohakuloa Training Area (BiOp)	Draft INRMP expected 2019	Pohakuloa, Hawai'i	(-/+)	(+)	(+)	(+)
Timber (HCP)	Pending	Hawai'i Island			Not yet determined (+/-)	
Waikoloa Water Community Wind Project4Waikoloa Water Community Wind Project4	N/A	Waikoloa, Hawai'i	0 (No impact)	0 (No impact)		
Hawaii Army National Guard (INRMP)		Kaua'i, O'ahu, Maui, Hawai'i	(+/-)	(+/-)		
USDA-NRCS Farm Bill (SHA)	2007–2057	State of Hawai'i		(+)		
USFWS National Wildlife Refuge Complex	Perpetuity	Kaua'i, O'ahu, Maui, Hawai'i	(+)	(+)		

Other species may also have incidental take authorizations not reported here. Number reflects federal authorized incidental take for the permit term; effects to the species shown parentheses (+) = take of, or impacts to, the species are offset with beneficial actions; (-) negative effects not mitigated or offset; (negligible) = minor, short-term effects only; (No impact) = no effects; (-/+) negative effects and beneficial effects both occurring, but benefits may be lagging

Proposed take request includes the previous authorized take

Take was higher than initially anticipated, KIUC continues to mitigate impacts while the Long term HCP is under development

Informal consultation completed with a **"Not likely to adversely affect"** determination-no incidental take (turbines inactive at night)

4.1.1 *Hawaiian Hoary Bat*

The temporal scope of this cumulative effects analysis is the operational life of the known and future wind energy projects (approximately 20 years) (Table 4.1). The spatial extent of this cumulative effects analysis is statewide across the bat's range, as described in the *Recovery Plan for the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)* (USFWS 1998) as well as island wide for the Island of Maui, in accordance with HRS 343. Assuming very little movement between islands, this analysis also considers the total anticipated bat take impact per island. The cumulative effects analysis for the Hawaiian hoary bat is lengthier than for the Hawaiian goose due to various sources of uncertainty and knowledge gaps.

Tree trimming and harvesting activities are not necessarily incompatible with bat habitat needs (Johnson and Strickland 2003; Patriquin and Barclay 2003), although they have the potential to impact juvenile bats that may be unable to fly away from an occupied tree when it is cut or disturbed. DOFAW recommends

that harvesting or trimming woody plants more than 15 feet tall not be conducted between June 1 and September 15. It is not known how many bat fatalities attributed to tree trimming and harvesting occur on private lands statewide. Based on the majority of federal and state projects adhering to the Service's recommendations to avoid the bat pupping period, these impacts are likely minor and are not expected to contribute significantly to cumulative effects on the bat.

Bat mortality caused by individuals becoming snagged on barbed wire has been documented. Annual mortality estimates range from 0 to 0.8 Hawaiian hoary bat per 100 kilometers of barbed wire (Zimpfer and Bonaccorso 2010). Most barbed wire fences are not systematically monitored, and bat fatalities due to snagging may be quickly taken by predators or scavengers. In addition, the surrounding landscape may affect the risk of bat collisions with a barbed wire fence. Although observed bat fatalities are uncommon, the extent of the impact of barbed wire fences is largely unknown. DOFAW recommends removal or replacement of barbed wire with smooth wire. Barbed wire usage is expected to decrease statewide, but the amount of remaining barbed wire in use statewide is unknown. Based on the low estimates of mortality related to bat impalement on barbed wire fences and the decrease in barbed wire use, this impact is not expected to contribute significantly to cumulative effects to this species.

Competition for food resources is also a consideration. Coqui frogs (*Eleutherodactylus coqui*), introduced in the State of Hawai'i in the late 1980s (Woolbright et al. 2006) are widely established on Hawai'i Island and are found in smaller areas on Maui, O'ahu, and Kaua'i Islands (Hawai'i Invasive Species Council 2018). The highest densities of frogs are found at elevations lower than 2,200 feet above sea level (20,000 –40,000 individuals/2.47 acres) (Beard et al. 2009), but the frogs are now spreading to midelevation forests and have the ability to thrive and successfully overwinter at higher elevations in Hawai'i (Hawai'i Invasive Species Council 2018; Kraus and Campbell 2002). The spread to higher elevations poses an increased threat to insect resources that overlap with the Hawaiian hoary bat. At this time, coqui frog may pose a minor threat to Hawaiian hoary bat prey resources, but the threat may be expected to increase in the future if the frog persists and expands in range.

Climate change may exacerbate the impacts of coqui frogs on the Hawaiian hoary bat by allowing an expansion of their numbers into higher elevation areas, where they would compete with the bat by changing the composition of the insect fauna available to forage (USFWS 2019). Other impacts from climate change to the bat are unknown. Warmer temperatures may allow an expansion of pupping habitat into higher elevation areas but may also result in a reduction in available prey availability. These impacts may be partially mitigated by the ability of the Hawaiian hoary bat to range widely in search of resources.

Unquantifiable threats to the Hawaiian hoary bat include the incidental introduction and establishment of non-native and invasive species that have likely reduced bat roosting habitat, foraging habitat, and/or prey availability (USFWS 2011, 2019). Resort or housing developments, farming, road construction, and pesticides are expected to persist into the future and have the potential to result in further habitat loss or alteration. Wildfires can cause direct loss of adult bats and dependent young that are unable to escape a forest fire. Historically, conversion of native forests to large-scale agriculture or the expansion of human development has resulted in an appreciable reduction in Hawaiian hoary bat roosting, potential foraging habitat, and possible changes in insect prey populations (USFWS 1998). An estimated 1.475 million acres of forest currently occurs across the major Hawaiian Islands (Reeves and Amidon 2018), although portions of the forest have been degraded or fragmented over time. The high mobility of the bat provides capability to utilize fragmented landscapes. On O'ahu, Maui, and Hawai'i, the three islands where wind facilities are located and where almost all of the cumulative effects to the Hawaiian hoary bat are occurring, about 1.1 million acres of forest currently exists.

Another direct impact to the Hawaiian hoary bat is through collisions with human-made objects. Bats colliding with fishing line, vehicles, or vehicle antennas, although rarely reported, have been documented.

The impacts from these sources is largely unquantified because of the lack of systematic monitoring and reporting. Based on the incidents reported, the impact is expected to be minor.

Rotating wind turbine blades pose a known risk of collision if bats are present. LWSC is implemented by most wind projects in Hawai'i to avoid and minimize collision risks to bats. The area under wind turbines is systematically monitored, and the fatality rate can be estimated through modeling. There is uncertainty associated with predicting how many fatalities will occur in the future. The incidental take requested in the amended HCP has been informed by site-specific fatality monitoring results and reflects a refinement in take estimation and accountability for observed as well as unobserved take that was not previously taken into account with the approved HCP/ITL. The incidental take of Hawaiian hoary bats has been higher than anticipated under the approved HCP, in part because the risk to bats associated with wind energy development in Hawai'i was largely unknown and underestimated at the time the ITLs were issued. The amount of projected bat incidental take in the future includes observed and unobserved fatalities in addition to fatalities of dependent young (indirect take). Advancements have been made in how bat fatality rates are estimated to appropriately account for imperfect detection and unobserved fatalities that may have occurred.

DOFAW has adopted a conservative (on the side of the species) standard for estimating bat take and has rigorous compliance monitoring standards. The probability of detecting a bat fatality is informed by measured factors and variables. These include project-specific searcher efficiency, carcass retention times, the interval time between searches, the probability that if a bat carcass is missed it will be found on a subsequent search, the size and terrain of the searchable area, the portion of bat fatalities expected to occur in the actual searched area based on density dependent ballistics, turbine height, wind direction, and the number of turbines. It is important to understand that each project has its own set of numerical values for each of the factors because of its unique site and monitoring characteristics. When the approved HCP was prepared, postconstruction bat mortality monitoring data from Hawai'i wind farms was limited. Estimates of bat take were based on the best available monitoring data from one operating wind farm in Hawai'i and general comparisons of bat acoustic activity between sites, which underestimated the collision risk for bats. Advancements in acoustic monitoring and thermal imaging have shown that prior occupancy studies significantly under-reported habitat use and distribution of the Hawaiian hoary bat. Evidence of Absence software (version 2.0.6), used as a standard by DOFAW and the USFWS to project future bat take and calculate current take levels, incorporates project-specific inputs from all project-specific monitoring efforts, resulting in reduced uncertainty and more accurate project-specific take estimates and projections. For these reasons, it is expected the amended HCP more accurately estimates the range of Hawaiian hoary bat take over the remaining years of project operation.

The Hawaiian Electric Company, Inc. issued a renewable energy request for proposals seeking to develop an additional 60 MW of renewable energy on Maui (Hawaiian Electric Company, Inc. 2018). No new wind energy projects were identified for Maui as a result of this process. It is not known if a similar request will be initiated in the future, but the start of operations of a new project in the next 5 years is unlikely given that no projects were identified in 2018. The HCEI (HRS 196-10.5) and Renewable Portfolio Standards (HRS 269-92) specifies that the State of Hawai'i will establish a renewable portfolio standard of 100% of net electricity sales from renewable sources by 2045. It would be anticipated that new wind projects will be proposed in the future, but the timing, approval, construction, and operation of such projects is uncertain. It is also expected that future wind energy projects that would pose a risk to the Hawaiian hoary bat would offset authorized take impacts through an approved HCP.

In addition to the take that has already been authorized within the State of Hawai'i, several proposed wind facilities may be expected to request take in the future and were included in the analysis (see Table 4.1). On Hawai'i Island, there are two other commercial-scale wind facilities besides Pakini Nui Wind Farm that are in operation and are in the process of developing or finalizing HCPs and seeking Incidental Take Permits for bats. The Lalamilo project has requested a total of six bats for its 20-year operational period,

and Hawi Wind Farm, which has been in operation for about 20 years and does not have an approved monitoring plan or ITL, is developing an HCP and seeking an ITL. The amount of unauthorized take attributable to this facility is uncertain. On Maui, there are two wind projects that may seek MECO approval and power purchase agreements in the future, but DOFAW does not have the operating regime or draft HCPs for either of these projects. On O'ahu, there is one proposed wind energy project, Palehua Wind, but the operating regime and draft HCP have not been received.

The take projections and authorized take per island do not take into account deterrent technology or actions that could be developed and would be deployed in the future to reduce incidental take at any of the projects. Because of the tiering of take, there is incentive for projects to implement take reduction measures to reduce take that has not occurred in a future tier. The future development of bat deterrents is not considered in this analysis because the efficiency of the technology for lowering the fatalities of Hawaiian hoary bats is not known. The Service conducted this analysis of cumulative impacts using the assumption that little to no reduction in anticipated take would occur through future application of new deterrent technologies, so as to avoid underestimating the impacts of take. Testing of the deterrent technology on the mainland has shown promise, especially for reducing hoary bat fatalities. The wind industry in Hawai'i has invested in deterrents and is testing the deterrents in Hawai'i. Should results be similar to those observed on the mainland, the number of fatalities may be reduced by 20 to 100% once these deterrents are implemented.

The approved HCPs listed in Table 4.1 include mitigation actions that are expected to help offset the authorized incidental take impacts to Covered Species. These actions include 1) reforestation and restoration of foraging and roosting habitats, installation of water features, and removal of invasive species that degrade water sources, roosting, and foraging habitat of the bats; 2) conducting high-priority research to inform and improve management for the benefit of bats; and/or 3) acquisition of suitable habitat and protection of that land for perpetuity. The required measures of success for reforestation or restoration activities are objective and based on the best available science to appropriately gauge progress toward habitat improvements. All pending and approved ITLs and associated HCPs must include monitoring to document impacts to the Hawaiian hoary bat and the effectiveness of mitigation actions in addition to adaptive management. This combination of monitoring and adaptive management allows TerraForm Power, the USFWS, and DOFAW to track compliance with the ITP, ITL, and HCP; respond to conditions that indicate take or mitigation is not meeting the success criteria; and take corrective actions to ensure mitigation needs are met. Accordingly, project-related take impacts associated with these HCPs are likely to be avoided, minimized, and mitigated using the best available scientific practices and adaptive management to the extent that fully offsets the impacts of incidental take of this species.

Permitted projects with HCPs or USFWS biological opinions that have provided mitigation and potential projects in the foreseeable future with impacts to bats are shown in Table 4.1. Projects with a "+" shown in the Hawaiian hoary bat column have already or are expected to mitigate for the projected take over the duration of the project to avoid and minimize impacts to the bat population. The Hawaiian hoary bat recovery plan, while dated, identifies degradation and loss of habitat as a major contributing factor to the presumed decline of the Hawaiian hoary bat (USFWS 1998). A 5-year study of bat occupancy on the Island of Hawai'i indicates that while bats occur from sea level to the highest volcanic peaks on the island, with a fairly high occupancy throughout almost all regions, there is a significant association between occupancy and the prevalence of mature forest cover (Gorresen et al. 2013). All land-based actions have an acreage associated with them, but the acreage is not be used as a sole determinate for the mitigation value of a project. The core use information is provided only as a reference point for how many bats would reasonably be expected to be supported once the actual mitigation actions are added. The amount of acreage needed to support a bat is dependent upon on the amount of resources available within that acreage and what aspect of the bat's life is being supported, (e.g., foraging, day roosting, night roosting).

The raw data provided by Bonaccorso et al. (2015) provide a snapshot in time between August and October. The core use areas of some bats were quite small (around 6 acres) while others were over 100 acres. Johnston et al. (2019) tracked bats that had foraging ranges in the thousands of acres. It is important to understand that these foraging ranges and core use areas are polygons. It does not mean that the bat is utilizing every acre or resource within that polygon. It means the bat is somewhere within the polygon while it was being tracked. The polygon in some ways represents the limitation of the tracking technology. If a bat were to forage in a straight line to and from the roost every night, the acreage would be quite small. Bats do not fly in straight lines, and so the best way to characterize their foraging behavior is through polygons. A polygon (core use are or foraging area) means that the bat foraged somewhere within that area defined by the tracking technology.

In the case of a project's mitigation, the additive value of all of the actions are the basis for valuing the mitigation, not just the acreage. The size of a foraging range and core use area used by the bat varies based on a variety of factors, including prey availability and abundance. In the case of a restoration project designed to provide increased foraging opportunities, the overriding factor is the prey abundance and added foraging resources that will be measured, not a designated acreage per se. Somewhat akin to resource equivalency analysis modeling used for the endangered Indiana bat, the acreage estimated as a core use area of bats (Bonaccorso et al. 2015) was multiplied by the number of bats that are expected to be taken. The 20.3 median of the core use area was used as a surrogate for determining a reasonable size because half of the observations were below and half were above this amount. Smaller or larger areas could also be used. The total was used as a surrogate for the amount of habitat acreage needed that, when enhanced, restored, or protected, could be expected to provide sufficient bat resources to mitigate for the impacts of incidental take.

In addition to acreage criteria, mitigation sites were selected because the management actions that were part of the mitigation would create or restore a suitable habitat and provide new foraging resources for bats that would extend into the future. Actions include outplanting of native tree species, invasive plant removal, and enhancement of water resources that increase roosting and foraging opportunities. While bats have been reported to use non-native and invasive plant species as roosting sites, invasive plant species can negatively affect hydrology, soil erosion, native species diversity, changes in prey composition, and canopy characteristics that impact a wide range of native species in addition to bats. Tools to measure the direct impacts of land-based mitigation actions on bat productivity or survival are largely based on acoustical detections and knowledge gained from radiotracking and, more recently, thermal imaging and insect composition. Surrogate measurements of success include improved canopy density, outplanting success, and the amount of area cleared of invasive species. The impacts provided by the land-based mitigation of the existing projects is expected to benefit the bat population.

Concurrent with the several land-based mitigation projects for bats, researchers have increased the understanding of aspects of Hawaiian hoary bat distribution, habitat use, prey consumption, and occupancy (Bonaccorso et al. 2015; Bonaccorso et al. 2016; Gorresen et al. 2013; H.T. Harvey and Associates 2016; Pinzari 2014; Starcevich et al. 2019; Todd et al. 2016; USFWS 2019). The *Recovery Plan for the Hawaiian Hoary Bat*, Hawaiian Hoary Bat Five-Year Status Review (USFWS 2011), and the ESRC *Hawaiian Hoary Bat Guidance Document*, identify research on Hawaiian hoary bat biology, population, and limiting factors as priorities for the species (Amlin and Siddiqi 2015; USFWS 1998, 2011). The need for bat research was identified decades ago but has largely gone unsupported due to limited funding and higher priorities. These and other research findings are used to inform the land-based mitigation actions to further benefit the bats and aid in identifying appropriate mitigation sites to support foraging, pupping, and roosting needs. The baseline information from those surveys indicated that detection probabilities, mean pulses/night, percentage of nights with feeding activity, and acoustic detections are greater in recovering forest areas than in unrestored shrublands (Todd et al. 2016). These results show that more detections are occurring in the restoration areas than had previously occurred prior

to restoration; however, there is no monitoring technique or technology available to determine whether the increase in detections is a direct result of an increase in bat production/reproductive success within restoration areas.

The biological objective of habitat protection and preservation as mitigation is to protect and preserve, in perpetuity, bat roosting and/ or foraging habitat that would otherwise be threatened with degradation or development. The environment a bat utilizes daily and throughout its life is varied. Removal of suitable tree habitats for roosting, breeding, or foraging; reduction or modification of prey base; introduction of a new threat or disturbance; or loss of other resources necessary for bat population growth and stability are all forms of habitat loss. Such losses can be attributed to a variety of sources, including encroachment by development, agriculture, or invasive species that degrade or reduce a resource necessary to the bat. The result of the losses is a reduced carrying capacity of the island for the Hawaiian hoary bat. The acquisition, protection, and preservation of land that provides life services to the Hawaiian hoary bat contributes to sustaining and growing the land's carrying capacity. Land selected for acquisition and preservation for perpetuity provides long-term suitability for the Hawaiian hoary bat.

In summary, information obtained by recent and ongoing research projects is helping us to better understand how bats are using certain habitats, what the general distribution of bats is across specific areas, and how to supplement their needs. The mobility of the Hawaiian hoary bat contributes to the resiliency of the species and may be expected to lessen the impacts of localized threats and contribute to its continued existence and recovery. Impacts from ongoing past, present, and reasonably foreseeable future actions and other sources, as described above, would likely result in major, if not significant, cumulative effects to the Hawaiian hoary bat if adequate minimization and mitigation measures (as described above) were not implemented. Habitat conservation and restoration, along with other mitigation actions, are likely to provide conservation benefits to the Hawaiian hoary bat by protecting foraging and roosting habitats and by enabling the affected bat populations to remain stable, if not slightly increase.

4.1.1.1 ALTERNATIVE 1 (NO ACTION)

Under the No Action Alternative, a new ITL or amendment would not be issued for the Project and its associated, amended HCP would not be implemented. As such, the Project would not contribute to the cumulative effects on the Hawaiian hoary bat because no adverse impacts would be expected to occur in the absence of nighttime turbine operation.

4.1.1.2 ALTERNATIVE 2 (PROPOSED ACTION)

The amended HCP, if approved, would permit take of up to 27 Hawaiian hoary bats for the remainder of the permit term . This would be in addition to the existing approved take of up to 11 bats. Considering the current available take estimates from wind energy generation sites, potential amendments to currently approved federal and state take permits and wind generation sites that are likely to apply for take permits, the total projected take of bats at a conservative 80% credibility level in Hawai'i may be up to 643 adult bats over the 20- to 21-year permit periods and 228 adult bats for Maui alone. The requested take amount is the maximum expected to occur if no new avoidance and minimization measures were to be implemented. The numbers do not mean that the amount of take will absolutely occur. Take could be less, but there is uncertainty in the effectiveness that future avoidance and deterrent technologies may have. The take includes the loss of the adult as well as the loss of the dependent pups that would be assumed to exist if a female is taken during the breeding season. Under the HCP, adaptive management provisions are in place to avoid exceeding the requested amount of take.

The presence of wind farms operating at night pose a risk to bats on the Islands of O'ahu, Maui, and Hawai'i. The absence of commercial wind facilities on Kaua'i, Lāna'i, and Moloka'i, suggest that bat populations on those islands do not face the same level of risk. Interisland movement is limited.

Most basic demographic parameters typically used to model population viability are not known for most bat species (Frick et al. 2017), including the Hawaiian hoary bat. These parameters include population size, ratio of males to females, annual birth rate, survival to weaning, survival to first reproduction, survival rate of adults by age, longevity, and sources of mortality. Consideration of the impact on Hawaiian hoary bats from wind energy operations and the species' viability is only possible using demographic parameters assumed from other bat species.

A stochastic model of population growth (assuming a normal distribution of lambda; mean = 1.01; standard deviation = 0.1; 10,000 simulations) was used to identify the starting population that would be capable of offsetting permitted bat take on Maui (N = 228) and the State of Hawai'i (N = 643) over a period of 20 years. If the annual growth rate of the species is assumed as 1% of the total population of adults (Frick et al. 2017), and a 20–year period is considered, the starting population before any take has occurred would have to be at least 2,950 adults statewide, or 1,100 adults in Maui alone, to end up with a net gain (mean of 644 statewide and 228 in Maui) to offset the proposed take after 20 years. Although the population size is unknown and will likely never be known, 2,700 adults statewide is a relatively small population size necessary to sustain the impact of the take from all of the wind farms operating or planned to be operating in Hawai'i.

Hawaiian hoary bats are highly mobile, capable of using fragmented habitats, and are more widespread than previously thought. Acoustic monitoring at wind facilities has not shown a decrease in bat activity. While bats are highly mobile and have been known to travel up to 12 miles in a night, the bats tend to focus their activity in areas where food and sheltering resources are available and spend the majority of their time in their core use area. A local effect on the bat population is possible if the core use area overlaps with the turbine sites because of the slightly higher probability of bats encountering turbines during nightly usage. This local effect on the population could impact the species, either by reducing genetic diversity or by reducing the local population below a threshold that, with the contribution of other mortality factors, would cause the population to decline. Mobility of the bats provides an adaptive ability to sustain gene flow, at least on an island. Lost future productivity of an adult bat may also occur. Bats may live up to 10 years, although it is unknown if they breed each year and for how many years they may produce young. The loss of an adult bat would also foreclose future additional recruitment by its progeny into future generations of the bat on that island. Under the amended HCP, mitigation actions are focused on the same island on which take impacts occur and are expected to provide beneficial effects on the resident island population to offset the impacts of the taking for the reasons discussed below.

The amended HCP would mitigate impacts of the taking by a combination of research that focuses on the bats' distribution, diet, and habitat use that will benefit future bat management actions and land acquisition to protect Hawaiian hoary bat habitat in perpetuity, providing a net recovery benefit to the species. Mitigation actions are focused on the island on which the take is occurring to minimize any potential reductions in genetic diversity. These mitigation actions are expected to reduce the impacts on the bat population of Maui and avoid a significant adverse effect on the bat population statewide as a whole, thereby providing a net recovery benefit to the species. The ongoing and proposed research projects and bat monitoring are expected to benefit the bats through informing more refined, efficient management and conservation approaches that increase the likelihood of recovery of the species in the wild.

Future wind and non-wind projects may be expected to contribute to bat fatalities if the Project operates at night and there are no technologies available to completely avoid collisions. Future wind projects would be expected to mitigate the impacts of the take through land- and research-based actions. The effects of those actions are expected to provide a benefit to the species on the island on which the take occurs and improve the understanding of how to effectively conserve and recover the Hawaiian hoary bat. Under this alternative, bat fatalities would be expected to occur, but mitigation would also be expected to offset the impacts of the taking on the bat.

Other sources that contribute to Hawaiian hoary bat mortality or limit its productivity include bat fatalities associated with barbed wire, removal of trees that harbor non-volant bat pups during the pupping season, predation, and wildfire. BMPs provided in the approved HCP and existing projects (see Table 4.1) minimize such effects through avoidance and minimization measures that include removal of barbed wire at projects, BMPs to prevent the introduction of invasive species, and scavenger and predator control. The implementation of these measures avoids additive adverse effects from these sources and may provide a slight benefit to the bat in the form of predator removal.

For the reasons discussed above, no significant cumulative effects to the Hawaiian hoary bat are expected to occur with implementation of Alternative 2 given the likely benefits of the habitat conservation and restoration actions proposed by KWP II to mitigate its authorized take of bats along with its commitment to implement take avoidance and minimization measures.

4.1.1.3 ALTERNATIVE 3 (INCREASED CURTAILMENT)

Under this alternative, the turbines would cease operation dusk to dawn from April 15 through September 15 for the remaining years of the permit. This would be expected to reduce the potential take of Hawaiian hoary bat to no more than 26 over the next 20 years. This would be in addition to the existing approved take of Hawaiian hoary bat that has already occurred or could occur over the next 20 years (see Table 4.1). The requested take amounts would be the maximum expected to occur if no new avoidance and minimization measures were to be implemented. The numbers do not mean that the amount of take will absolutely occur. Take could be less, but there is uncertainty in the effectiveness that future avoidance and deterrent technologies may have.

The take requested under this alternative would be expected to result in fewer fatalities of individuals than Alternative 2. The non-operation of the turbines at night for 5 months would avoid the killing of adult bats from April 15 through September 15. In addition, it would avoid the indirect loss of dependent pups. A local effect on the bat population might be expected if the core use area of the bat from September 16 through April 14 overlaps with the turbine sites because of the slightly higher probability of encountering turbines during nightly usage. Mobility of the bats provides an adaptive ability to sustain genetic diversity, at least within an island. Avoidance of take during the breeding season may also have fewer impacts to genetic diversity because dependent young would not be at risk of indirect take. The negative impacts from this alternative on individual bats would be expected to be less than those expected in Alternative 2 because fewer bats, in general, are taken from April through September.

Commensurate with the expected reduction in take proposed in this alternative, the land-based mitigation and proposed research project would be reduced slightly in scope.

Mitigation actions would occur on the same island on which bat take would occur, and similar beneficial impacts are likely to occur as those described for Alternative 2, but with less acreage involved. Cumulative impacts from other sources would also be similar to those described under Alternative 2.

4.1.2 *Hawaiian Goose*

4.1.2.1 ALTERNATIVE 1 (NO ACTION)

Under this alternative, take of Hawaiian geese could still occur as a result of collisions with WTG towers or stationary turbine blades, or strikes by turbine blades during daytime operations at KWP II. The amount of take expected to occur over the life of the Project would be expected to be slightly less than projected for Alternatives 2 and 3 because the turbines would not operate at night.

Under this alternative, mitigation actions already completed by KWP II are expected to offset the authorized take under its approved ITL. Based on the take levels requested in the amended HCP, up to 14 Hawaiian geese in exceedance of the current ITL authorization could occur over the life of the Project. The loss of 14 Hawaiian geese, in combination with the cumulative effects discussed above, is not expected to have significant impacts on the Maui (627) or statewide (3,252) populations.

4.1.2.2 ALTERNATIVE 2 (PROPOSED ACTION)

Under this alternative, the proposed mitigation measures at KWP II are expected, at a minimum, to offset the estimated incidental take, and contribute to the species' recovery by providing a net conservation benefit, as required by state law. The beneficial impacts of the proposed mitigation actions, in combination with the cumulative effects discussed above, are not expected to have significant impacts on the Maui or statewide Hawaiian goose population.

4.1.2.3 ALTERNATIVE 3 (INCREASED CURTAILMENT)

Under Alternative 3, the beneficial impacts would be expected to be similar to those of described for Alternative 2. The number of fatalities might be expected to be slightly less because the turbines would not be operating at night from April 15 through September 15, although, as described under Alternative 1, the risk of collision with a stationary blade would still exist. Under this alternative, the beneficial impacts of the proposed mitigation actions, in combination with the cumulative effects discussed above, are not expected to have significant impacts on the Maui or statewide Hawaiian goose population.

4.1.3 *Cultural Resources*

4.1.3.1 ALTERNATIVE 1 (NO ACTION)

Under this alternative, the Project would not be expected to impact archaeological or cultural resources and would therefore not contribute to the cumulative impacts to archaeological or cultural resources associated with other projects or actions.

Existing and foreseeable future actions may contribute to the loss of ʻaumākua. For the purposes of this analysis, it is assumed that those sources are the same as those that contribute to the loss of the associate species. It is unknown how many individuals may identify ʻōpeʻapeʻa as their ʻaumākua across the Hawaiian Islands. Such spiritual beliefs and values are personal and immeasurable; therefore, the effects to this type of cultural value cannot be quantified.

4.1.3.2 ALTERNATIVE 2 (PROPOSED ACTION)

Under this alternative, the Project is not expected to impact archaeological resources. Archaeological investigations, including consultations with the SHPD, would be conducted prior to commencing any ground disturbing activities associated with the proposed mitigation actions. Any historical, cultural, and archaeological resources that are identified would be avoided through micrositing and other BMPs. Contractor requirements would include precautionary measures related to the inadvertent discovery of cultural remains, such as stopping work in the immediate area of the discovery and immediately notifying the SHPD. With these measures, mitigation activities are not expected to cause or contribute to cumulative effects to archaeological resources.

There is expected to be a cumulative impact to those who consider the Hawaiian hoary bat, ʻōpeʻapeʻa, as having special cultural significance as ʻaumākua. Under this alternative, loss of ʻōpeʻapeʻa, some proportion of which may be considered as ʻaumākua, could occur over the next 20 years. These impacts

would be in addition to the authorized take of ʻōpeʻapeʻa at other existing projects, at future wind projects if they were to operate at night, and from other sources that contribute to the fatality of ʻōpeʻapeʻa if recognized as an ʻaumākua. For the purposes of this analysis, it is assumed that those sources that contribute to the loss of ʻaumākua are the same as those that contribute to the loss of the associate species. It is unknown how many individuals may identify ʻōpeʻapeʻa as their ʻaumākua across the Hawaiian Islands. Such spiritual beliefs and values are personal and immeasurable; therefore, the effects to this type of cultural value cannot be quantified. Minimization and mitigation measures proposed under the amended HCP would be expected to result in long-term beneficial impacts to the Hawaiian hoary bat. Other ongoing and future non-wind projects and threats to ʻaumākua occur throughout Hawaiʻi. This alternative would be expected to have the greatest cumulative impact on ʻōpeʻapeʻa as ʻaumākua.

4.1.3.3 ALTERNATIVE 3 (INCREASED CURTAILMENT)

Under this alternative, the Project is not expected to have impacts on archaeological resources. Archaeological investigations, including consultation with the SHPD, would be conducted prior to commencing any ground-disturbing activities associated with the proposed mitigation actions. Any historical, cultural, and archaeological resources that are identified would be avoided through micrositing and other BMPs. Contractor requirements would include precautionary measures related to the inadvertent discovery of cultural remains, such as stopping work in the immediate area of the discovery and immediately notifying the SHPD. With these measures, mitigation activities are not expected to contribute cumulative effects to archaeological resources.

There is expected to be a cumulative impact to those who consider the Hawaiian hoary bat, ʻōpeʻapeʻa, as having special cultural significance as ʻaumākua. Under this alternative, loss of ʻōpeʻapeʻa, some proportion of which may be considered to be ʻaumākua, could occur over the next 15 years. These impacts would be in addition to the authorized take of ʻōpeʻapeʻa at other projects and at future wind projects if they were to operate at night. For the purposes of this analysis, it is assumed that those sources that contribute to the loss of ʻaumākua are the same as those that contribute to the loss of the associate species. It is unknown how many individuals may identify ʻōpeʻapeʻa as their ʻaumākua across the Hawaiian Islands. Such spiritual beliefs and values are personal and immeasurable; therefore, the effects to this type of cultural value cannot be quantified. Minimization and mitigation measures proposed under the amended HCP would be expected to result in long-term beneficial impacts to the Hawaiian hoary bat. Other ongoing and future non-wind projects and threats to ʻaumākua occur throughout Hawaiʻi.

4.1.4 *Public Services and Utilities*

4.1.4.1 ALTERNATIVE 1 (NO ACTION)

Under this alternative, the production of renewable wind-generated energy supplied by the Project could be reduced by up to 50% as a result of curtailment necessary to stay within currently permitted take limits however, there is no way to determine what percentage of overall Hawaiʻi-wide energy use this represents or what percentage of Hawaiʻi-generated renewables this represents. This alternative would have short-term impacts on achieving island-wide energy needs since utility companies have the ability to transition to fossil fuels as needed. Cumulatively, the loss of this renewable energy generation would result in significant, long-term effects to the ability of the State of Hawaiʻi to meet its renewable energy goal. Although new renewable energy projects could be developed, it would likely take several years of planning, compliance, and construction before such projects would contribute to renewable energy production. Solar energy potentially could be developed with reduced planning and compliance needs but would only be able to offset the daytime loss of wind energy production.

4.1.4.2 ALTERNATIVE 2 (PROPOSED ACTION)

Under this alternative, the production of renewable wind-generated energy supplied by the Project could be reduced by up to 20% as a result of curtailment to stay within proposed amended take limits; however, there is no way to determine what percentage of overall Hawai'i-wide energy use this represents or what percentage of Hawai'i-generated renewables this represents. This alternative would have short-term impacts on achieving island-wide energy needs since utility companies have the ability to transition to fossil fuels as needed. The loss of this renewable energy generation would result in minor, short-term effects to the State of Hawai'i's ability to meet its renewable energy goal.

4.1.4.3 ALTERNATIVE 3 (INCREASED CURTAILMENT)

Under this alternative, the production of renewable wind-generated energy supplied by the Project could be reduced by up to 40%; however, there is no way to determine what percentage of overall Hawai'i-wide energy use this represents or what percentage of Hawai'i-generated renewables this represents. This alternative would have short-term impacts on achieving island-wide energy needs since utility companies have the ability to transition to fossil fuels as needed. The loss of this renewable energy generation would result in moderate, long-term effects to the State of Hawai'i's ability to meet its renewable energy goal. Although new renewable energy projects could be developed, it would likely take several years of planning, compliance, and construction before such projects would contribute to renewable energy production. Solar energy potentially could be developed with reduced planning and compliance needs but would only be able to offset the daytime loss of wind energy production.

4.2 Secondary Impacts

Title 11 HAR Chapter 200-17(I) requires consideration of the direct and indirect effects of a proposed action as well as its induced and secondary effects. The Project is not directly or indirectly related to other actions planned by KWP II and would not lead to secondary or indirect changes to land use and development on Maui, as no change in wind farm operation is proposed. The 2010 EIS addressed the direct and indirect effects of the Proposed Action and its induced and secondary impacts and concluded that the Project would not cause significant secondary effects relative to land use and development on Maui. The impacts resulting from implementation of the Project are in line with the 2010 EIS analysis.

4.3 Short-Term Uses versus Long-Term Productivity

The relationship between short-term uses and long-term productivity in relation to the Project was discussed in the 2010 EIS, and there are no substantive changes to this information. Continued operation of the Project would provide a source of electrical energy generated from a clean, local, and renewable energy source; the Project is compatible with current land uses and does not preclude present or future agricultural productivity.

4.4 Irreversible and Irretrievable Commitment of Resources

The irretrievable and irreversible commitment of resources associated with the Project was discussed in the 2010 EIS, and there are no substantive changes to this information. No new construction or modification of current project components and operations would occur under the proposed ITL amendment. Therefore, there would be no impact to nonrenewable resources.

At this time, no technology other than complete nighttime shutdown is available to absolutely avoid risks to Hawaiian hoary bat and other species that may collide with moving turbine blades. Alternative 1, followed by Alternative 3, would require the most use of fossil fuels (diesel or coal) or other energy development to offset the loss of renewable power during nighttime shutdown of the Project to avoid or reduce potential take of nocturnally active species. Issuance of the ITL under Alternative 2 would be expected to require the least amount of fossil fuel use because the turbines would be able to operate on nights with winds above the curtailment speed.

4.5 Unavoidable Impacts and Rationale for Proceeding

The 2010 EIS describes KWP II's commitment to avoiding or mitigating adverse effects to the maximum extent practical. A list of original mitigation measures for the Project is included in the 2010 EIS, which have been implemented as part of ongoing operations. KWP II proposes to implement additional avoidance, minimization, and mitigation measures specific to the Hawaiian hoary bat and the Hawaiian goose and are further detailed in the amended HCP.

Although the Project may result in greater impacts to the Hawaiian hoary bat and the Hawaiian goose, it is ultimately expected to provide a net benefit to these species.

4.6 Unresolved Issues

As discussed in the 2010 EIS, there were no significant issues related to the design and implementation of the Project when the EIS was published. The 2010 EIS also noted that permits and approvals needed to be obtained before project implementation and that issues could arise as applications for these were prepared and processed. As previously noted, the permits and approvals were successfully obtained, and the Project began operation in 2012.

Because project operations have resulted in greater impacts to the Hawaiian hoary bat and the Hawaiian goose than previously anticipated, KWP II is seeking an amendment to its HCP and ITP/ITL to increase authorized take levels for the Hawaiian hoary bat and the Hawaiian goose and implement additional mitigation measures that address the increased take of these species. Updated information associated with the amended HCP is provided in this final SEIS. DLNR will need to accept this final SEIS before approving the amended HCP. Upon approval of the amended HCP, it is anticipated that the USFWS and DLNR would authorize the increased take levels under the ITP/ITL.

5 CONSISTENCY WITH EXISTING LAND USE PLANS, POLICIES, AND CONTROLS

In accordance with the requirements of 11 HAR 200-17, this chapter discusses the relationship of the Proposed Action to land use plans, policies, and controls as well as other federal and state laws that are applicable to the Project. The proposed increased take and mitigation measures under any alternative do not affect compliance with land use plans, policies, and controls discussed in the 2010 EIS and, thus, most plans, policies, and controls do not need to be updated or revised. The following sections provide a summary of federal and state regulations that have the potential to be impacted by the Proposed Action.

5.1 Federal Regulations

5.1.1 *National Environmental Policy Act*

The proposed issuance of an ITP by the Service is a federal action that may affect the human environment and therefore is subject to review under the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321 et seq.). NEPA requires that federal agency decision-makers, in carrying out their duties, use all practicable means to create and maintain conditions under which people and nature can exist in productive harmony and fulfill the social, economic, and other needs of present and future generations of Americans. NEPA provides a mandate and a framework for federal agencies to consider all reasonably foreseeable environmental effects of their proposed actions and to involve and inform the public in the decision-making process. The act also established the Council on Environmental Quality (CEQ) in the Executive Office of the President to formulate and recommend national policies that ensure that the programs of the federal government promote improvement of the quality of the environment. The CEQ set forth regulations (40 Code of Federal Regulations [CFR] 1500–1508) to assist federal agencies in implementing NEPA during the planning phases of any federal action. These regulations, together with specific federal agency NEPA implementation procedures, help ensure that the environmental impacts of any proposed decisions are fully considered and that appropriate steps are taken to mitigate potential environmental impacts.

The Service is preparing and has provided for public review a PEIS that evaluates the potential environmental impacts of issuing an amended ITP and approving implementation of an amended Project HCP. The Service will not make a decision on ITP issuance until after the NEPA process is complete.

5.1.2 *Endangered Species Act*

The ESA provides broad protection for plants, fish, and wildlife that have been listed as threatened or endangered in the United States or elsewhere and conserves ecosystems on which these species depend (16 USC 1531–1544). Section 9 of the ESA prohibits the unauthorized take of any endangered or threatened species of fish or wildlife listed under the ESA. *Take* means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect species listed as endangered or threatened, or to attempt to engage in any such conduct (50 CFR 17.3). *Harm* has been defined by the Service to mean an act that actually kills or injures wildlife, and may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). *Harass* has been defined to mean an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns that include but are not limited to breeding, feeding, or sheltering (50 CFR 17.3). Section 10 of the ESA contains exceptions and exemptions to Section 9, if such taking is incidental to the carrying out of an otherwise lawful activity.

KWP II is working with the Service to obtain an amendment to the current ITP under ESA Section 10 for increased take of the Hawaiian hoary bat and the Hawaiian goose associated with the Project. This process includes preparation of an amended HCP, a PEIS evaluating the impacts of increased take, and execution of an ITP with the Service.

5.1.3 *Migratory Bird Treaty Act*

The bird species addressed in the approved and amended HCP are also protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703-712). The MBTA prohibits the take of Part 10.13. Unless permitted by regulations, under the MBTA it is unlawful to pursue, hunt, take, capture, or

kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product. The USFWS does not currently have a comprehensive program under the MBTA to permit the take of migratory birds by otherwise lawful activities. On December 22, 2017, the Department of the Interior Office of the Solicitor issued a memorandum opinion concluding that the MBTA does not prohibit incidental take of migratory birds.

To avoid and minimize impacts to migratory birds, the amended HCP incorporates design and operational features based on application of the *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* (2012). These voluntary guidelines contain materials to assist in evaluating possible wind power sites, wind turbine design and location, and pre- and postconstruction research to identify and/or assess potential impacts to wildlife. Specific measures that have been adopted by KWP II to avoid and minimize the potential for adverse impacts to migratory birds are detailed in Section 4.3 of the amended HCP. The HCP also specifies that any migratory bird collisions or other impacts that occur with implementation of covered activities would be documented and reported to the Service and DOFAW.

5.1.4 *Other Federal Laws*

Because there is no change to project impacts other than impacts associated with increased take and mitigation measures, compliance with other federal laws remains the same as described in the 2010 EIS. These include the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act.

5.2 State of Hawai'i

5.2.1 *Hawai'i State Energy Resources (Hawai'i Revised Statutes Chapter 196)*

The Hawai'i Clean Energy Initiative (HCEI) is a partnership between the U.S. Department of Energy and the State of Hawai'i that was enacted in 2008 and added to state law as HRS 196. The primary intention of HRS 196 is to reduce Hawai'i's dependence on imported fossil fuels. Additional initiatives have been added since, such as the 2015 Renewable Portfolio Standards amendment and 2017 legislation to reduce GHG emissions statewide in alignment with the Paris Agreement. KWP II, LCC is in compliance with the goals set by the HCEI and contributes toward the achievement of 100% clean energy by 2045.

5.2.2 *Hawai'i State Historic Preservation (Hawai'i Revised Statutes 6E) and the National Historic Preservation Act (Section 106)*

HRS 6E ensures that activities, plans, and programs within the state are conducted in a manner consistent with the preservation and enhancement of historic and cultural property. The SHPD was provided a copy of the 2010 EIS and the archaeological inventory survey report. After reviewing the material, SHPD concurred with the reports' recommendations and accepted KWP IIthe preservation plan for Site 5648 as final.

5.2.3 Hawai'i State Plan (Hawai'i Revised Statutes 226)

The sections of the plan that are most relevant to the Proposed Action are HRS 226-18(a) and (b), which present the objectives and policies for energy facility systems. These are listed as follows:

(a)

(1) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all: Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;

(2) Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased;

(3) Greater energy security in the face of threats to Hawai'i's energy supplies and systems; and

(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.

(b) To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.

By capturing the wind resources that naturally occur at KWP II, the Project would continue to produce clean, renewable energy, thus contributing to energy self-sufficiency by increasing the ratio of indigenous to imported energy use. The Project would continue to generate up to 70 MW of clean, renewable power, contributing to the array of renewable energy projects in Hawai'i and thus increasing energy security for the state. Wind-based energy production generates minimal emissions and, as such, the Project would continue to help to reduce GHG emissions associated with the state's energy supply.

5.2.4 Hawai'i Administrative Rules (Title 11 Chapter 200)

Title 11HAR Chapter 200-12 provide criteria "in determining whether an action may have a significant effect on the environment" and "in considering the significance of potential environmental effects, agencies shall consider the sum of effects on the quality of the environment and shall evaluate the overall and cumulative effects of an action." The specific criteria that apply to the Proposed Action are detailed below:

(9) Substantially affects a rare, threatened, or endangered species, or its habitat;

All action alternatives result in effects to rare, threatened, or endangered species in the form of increased take and effects to habitat dependent on the level of mitigation effort required. This document discusses the potential impacts to the Project's evaluated Covered Species and any specific avoidance, minimization, and mitigation measures applicable to each alternative. To offset potential Covered Species take that could result from project operations, KWP II would continue to implement Tier 1 and Tier 2 mitigation measures as well as implement additional mitigation for the remaining estimated take of the Hawaiian hoary bat and the Hawaiian goose over the rest of the 20-year permit. Based on these measures, combined with the predicted low level of project-related mortality, no local or regional population-level effects are anticipated for Covered Species for any action alternative.

5.2.5 Hawai'i Environmental Impact Statements (Hawai'i Revised Statutes 343)

HRS 343 (Environmental Impact Statements) was developed "to establish a system of environmental review which will ensure that environmental concerns are given appropriate consideration in decision

making along with economic and technical considerations" (343-1). This chapter requires the development of an EIS, which is an informational document that discloses the effects of a proposed action, including the cumulative and overall effects, relative to an established set if 13 significance criteria, as defined in 11 HAR 200-12. As previously mentioned, an EIS for the construction and operation of this Project was completed in 2010. The original triggers for compliance with HRS 343 was 1) the use of state or county lands or funds, and 2) the use of land classified as a conservation district.

The size, character, or use of the land will not change and no new construction is planned as a component to the Proposed Action. Because the proposed amendment would increase authorized incidental take analyzed in the original assessment, KWP II has prepared this final SEIS to assess the impacts that the Proposed Action and identified alternatives would have on the human environment.

5.2.6 *Hawai'i State Environmental Policy (Hawai'i Revised Statutes 344)*

The purpose of this chapter is to "establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i" (344-1). It provides guidance with respect to specific guidelines for the conservation of natural resources and enhancement of quality of life for Hawaiian people. Specific guidelines applicable the Project are as follows:

(3) Flora and fauna

- *a. Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard;*
- *b. Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.*

(7) Energy

- *a. Encourage the efficient use of energy resources.*

The Project is considered to be consistent with these guidelines and the overall policy, as it would serve to provide clean renewable energy, with minimal impact to natural resources.

5.2.7 *Hawaii Endangered Species Law (Hawai'i Revised Statutes 195D-4)*

The purpose of HRS 195D (Conservation of Aquatic Life, Wildlife, and Land Plants) is "to insure the continued perpetuation of indigenous aquatic life, wildlife, and land plants, and their habitats for human enjoyment, for scientific purposes, and as members of ecosystems" (195D-1). Chapter 195D-4 states that any endangered or threatened species of fish or wildlife recognized by the ESA shall be so deemed by state statute. Like the ESA, the unauthorized take of such endangered or threatened species is prohibited (195D-4(e)). Under 195D-4(g), the BLNR, after consultation with the state's ESRC, may issue an ITL to allow a take otherwise prohibited if the take is incidental to the carrying out of an otherwise lawful activity.

Both the Hawaiian hoary bat and the Hawaiian goose, the Covered Species evaluated for increased take in this EIS, are eligible for protection under HRS 195D-4. As with the original ITL application, KWP II would work with the ESRC and DOFAW to develop and continually monitor the status of the Covered Species throughout the life of the Project. Proposed monitoring and mitigation efforts can be found in Section 2.2 of this document.

5.2.8 Hawai'i Land Use Law (Hawai'i Revised Statutes 205)

When KWP II was initially proposed, a detailed evaluation under each criterion was provided in the 2010 EIS. That document was submitted in support of KWP II's Conservation District Use Application (CDUA) for the project and was ultimately approved. The existing State Land Use District boundaries within the project area remain consistent with the original EIS for the Project. KWP II does not seek to modify or change the current approved use of the land; thus, effects from the Proposed Action do not affect land use under HRS 205.

5.2.9 Hawai`i Coastal Management Zone Program (Hawai'i Revised Statutes 205A)

The Hawai'i Coastal Zone Management (CZM) Program (HRS 205A) was promulgated in 1977 in response to the Federal Coastal Zone Management Act of 1972. Hawaii's CZM area encompasses the entire state, including all marine waters seaward to the extent of the state's police power and management authority, including the 12-mile U.S. territorial sea and all archipelagic waters. The 2010 EIS describes the project's compliance with the Hawai'i CZM Program and is incorporated by reference. No substantive changes beyond what is described in the 2010 EIS are anticipated as a result of increased take or mitigation measures under any alternative.

5.2.10 Nā Ala Hele Trails and Access Program

The State of Hawai'i established the Nā Ala Hele Trail and Access Program in 1988 by adopting Act 236 (HRS 198D). Program responsibility, assigned to the DLNR, includes planning, developing, acquiring, constructing, and coordinating a statewide trail and access system. The program's intent is to ensure adequate public access to coastal and mountain areas consistent with sound conservation principles. The program's vision statement calls for the state to develop, via the Nā Ala Hele program, a trail and access network and management system that

- provides a broad range of recreational, cultural, religious, and subsistence opportunities for all of Hawai'i's people, and
- helps to conserve Hawai'i's cultural heritage and environment.

The Lahaina Pali Trail has been designated a demonstration trail on the Nā Ala Hele Trail and Access Program and is the first trail so designated on Maui. The trail, which is 7.2 kilometers (4.5 miles) long, starts near the County of Maui's Ukumehame Beach Park and ends near Pu'u Hele. It traverses the Kaheawa Pastures below the lower end of the existing KWP I turbines. The trail joins the access road just before the road crosses the Malalowaiaole Gulch at an elevation of about 500 m (1,600 feet) above sea level.

KWP I, LLC consulted with the State's Nā Ala Hele Trails and Access Program in conjunction with the development of the existing KWP I facility and used the input it received to guide the placement of several WTGs so as to reduce the visual impact of the facility to trail users.

KWP II added 14 additional WTGs to the hillside, three of which are closer to the trail than the existing KWP I WTGs; however, the additional WTGs for the KWP II facility are over 900 feet away from the closest trail and do not compromise the ability of the trail to meet the objectives of the Nā Ala Hele Trail and Access program.

5.2.11 County Zoning

Title 19 of the Maui County Code defines zoning districts and regulates development within them.

The Project is within the State Conservation District and is therefore exempt from the Maui County zoning code. Consequently, county zoning regulations are not applicable to the Project.

5.2.12 *Maui County General Plan*

The Maui County General Plan is a comprehensive document with long-range social, economic, environmental, and design objectives as well as broad policies to facilitate the attainment of those objectives. The general plan is divided into the following subject areas: population, economic activity, the natural environment, housing, transportation and utilities, energy, physical development and urban design, public safety, health and education, culture and recreation, and government operations and fiscal management. The general plan consists of the Countywide Policy Plan, the Maui Island Plan, and nine Community Plans. The project area falls within the Kīhei-Mākena Community Plan and West Maui subregions.

5.2.13 *Countywide Policy Plan*

The Countywide Policy Plan, 2030 General Plan provides the policy framework for the development of the Maui Island Plan and the nine community plans that will address the unique character of each of the islands within the county. It outlines goals, objectives, and policies related to 11 topics:

- Protect the Natural Environment
- Preserve Local Culture and Traditions
- Improve Education
- Strengthen Social and Health Care Services
- Expand Housing Opportunities for Residents
- Strengthen the Local Economy
- Improve Parks and Public Facilities
- Diversify Transportation Options
- Improve Physical Infrastructure
- Promote Sustainable Land Use & Growth Management
- Strive for Good Governance

The goals and objectives outlined in the Countywide Policy Plan confirm that renewable energy will remain a priority for the county well into the future. The Project is an example of the type of public-private partnership that the county seeks to encourage in expanding its renewable energy portfolio. As discussed throughout this document, the Project is expected to result in significant environmental, economic, and community benefits by providing a clean renewable energy source, generating tax and lease revenue, and contributing to Maui's energy independence.

5.2.14 *Maui Island Plan*

The Maui Island Plan, adopted in 2012, provides a guide for the future growth of the island to the year 2030. The Maui Island Plan establishes a vision and a set of long-range guiding principles, goals, objectives, policies, and maps to guide the growth and development of the island.

As in support of the Countywide Policy Plan, the Project would continue to provide significant environmental, economic, and community benefits by contributing up to 21 MW of renewable energy to Maui's electrical grid.

5.2.15 *Kīhei Mākena Community Plan*

The Kīhei-Mākena Community Plan, updated in 1998, identifies planning goals, objectives, policies, and implementation considerations to guide decision-making in the region through the year 2010. Provisions of the plan are anchored in three basic themes: needed public facilities and infrastructure, preservation and enhancement of significant natural resources, and enhancement of neighborhoods. With these three themes in mind, goals and standards for the plan include the following objectives: land use, environment, cultural resources, economic activity, housing and urban design, physical and social infrastructure, government, and indigenous architecture.

Project activities associated with the Proposed Action primarily relate to physical and social infrastructure—specifically, energy and public utilities—and do not conflict with the goals, objectives, and policies as outlined in the Kīhei-Mākena Community Plan. The Project is consistent with the objective to increase the generation and use of renewable energy.

5.2.16 *West Maui Community Plan*

The West Maui Community Plan of 1996 provides specific recommendations to address goals, objectives, and policies in the general plan for West Maui. In general, themes associated with the West Maui Community Plan consist of public recreational space, rate of population growth and stabilizing the economy, protection of natural resources and promotion of environmentally sound uses and activities, development, and agriculture. Several of the goals, standards, and policies identified in the West Maui Community Plan are relevant to other community plans on Maui—specifically, the Kīhei-Mākena Community Plan. Discussion on similar or identical objectives are the same for both communities.

Project activities would continue to involve working with federal, state, and local agencies to ensure that operation of the facility is consistent with the goals of each entity's respective plan. As with the Kīhei-Mākena Community Plan, activities surrounding the Proposed Action remain consistent with the West Maui Community Plan.

6 REQUIRED PERMITS AND APPROVALS

The required permits and approvals for the project are listed in Table 6.1.

Table 6.1. Required Relevant Permits and Approvals

Permit or Approval	Issuing Agency	Status
Endangered Species Act Section 10 Incidental Take Permit	U.S. Fish and Wildlife Service	HCP Approved and ITP issued 2012; amendment in progress
State Endangered Species Incidental Take License	Department of Land and Natural Resources	HCP Approved and ITL Issued 2012; amendment in progress

7 AGENCY CONSULTATION AND DISTRIBUTION

Table 7.1 includes agencies, organizations, and persons contacted during preparation of the final SEIS as well as agencies, organizations, and persons on the state Environmental Impact Statement Preparation Notice (EISPN) distribution list.

Table 7.1. SEISPN Distribution List

Federal Agencies	Elected Officials
U.S. Geological Survey, Pacific Islands Water Science Center	Governor David Ige
U.S. Fish and Wildlife Service	U.S. Senator Brian Schatz
National Marine Fisheries Service	U.S. Senator Mazie Hirono
National Parks Service	U.S. Representative Tulsi Gabbard
National Resources Conservation Service	State Representative Angus McKelvey
U.S. Army Corps of Engineers	State Representative Troy Hashimoto
Department of the Navy	State Representative Justin Woodson
Federal Aviation Administration	State Representative Tina Wildberger
Federal Transit Administration	State Representative Kyle Yamashita
Federal Highways Administration	State Representative Lynn DeCoite
U.S. Coast Guard	State Senator Rosalyn Baker
Environmental Protection Agency	State Senator Gilbert Keith-Agaran
State of Hawai'i Agencies	State Senator Kalani English
Hawai'i Emergency Management Agency	Mayor Michael Victorino
Hawai'i State Energy Office	Councilmember Kelly King
Department of Agriculture	Neighborhood Board Representative
Department of Accounting and General Services (DAGS)	**Libraries**
DAGS Archives Division	Hawai'i State Library, Hawai'i Documents Center
Department of Business, Economic Development and Tourism (DBEDT)	DBEDT Research Division Library
DBEDT Strategic Industries Division	Legislative Reference Bureau Library
DBEDT Office of Planning	Kahului Regional Library
Department of Education (DOE)	Lahaina Public Library
Department of Hawaiian Home Lands	University of Hawai'i Thomas H. Hamilton Library
Department of Health (DOH), Clean Water Branch	University of Hawai'i Maui College Library
DOH Environmental Health Administration	**News Media**
DOH Environmental Planning Office	Honolulu Star Advertiser
Department of Land and Natural Resources (DLNR)	Maui News
DLNR Division of Forestry and Wildlife	Hawai'i Tribune Herald
DLNR Commission on Water Resource Management	West Hawai'i Today
DLNR Division of Conservation and Resource Enforcement	The Garden Island
DLNR Land Division	Moloka'i Dispatch
DLNR Office of Conservation and Coastal Lands	Honolulu Civil Beat
Department of Labor and Industrial Relations	**Organizations, Individuals, and Consulted Parties**
State Historic Preservation Division	Hawaiian Telcom
Department of Transportation	Maui Electric Company, Ltd.
University of Hawai'i Water Resources Research Center	Maui Contractors Association
University of Hawai'i Environmental Center	Kihei Community Association
Office of Hawaiian Affairs	Maui Chamber of Commerce
Maui County Agencies	Sierra Club Maui Group
Department of Water Supply	Maui Tomorrow Foundation, Inc.
Department of Public Works & Environmental Management	Blue Planet Foundation
Department of Parks and Recreation	Hawai'i Audubon Society
Department of Planning	Keep the North Shore Country

Department of Transportation Services	Good Shepherd Foundation
Department of Fire and Public Safety	Keahi Bustamante
Police Department	Brandon Gurat
Department of Housing and Human Concerns	Paul Hanada
Department of Environmental Management	John Lu'uwai
	Shawn Slocum
	Jim Weigand
	Sally Kaye
	Bryan Harry
	James Ryan

7.1 Distribution of the Supplemental Environmental Impact Statement Preparation Notice

The Supplemental Environmental Impact Statement Preparation Notice (SEISPN) was published in the Office of Environmental Quality Control (OEQC) Environmental Notice on February 23, 2017, for a 30-day public review period, which began on the date of publication and ended on March 28, 2017. Notice of the SEISPN publication was distributed to the parties listed in Table 7.1.

7.2 Comments Received on the Supplemental Environmental Impact Statement Preparation Notice

Table 7.2 lists the comments received on the SEISPN.

Table 7.2. Summary of Comments Received on SEISPN

Commenter	Comment Date	Summary
Keahi Bustamante - email	3/7/17	Disapprove of the increase of take.
Brandon Gurat - email	3/1/17	Disapprove of the increase of take.
Paul Hanada - email	3/7/17	Disapprove of the increase of take.
John Lu'uwai - email	2/27/17	Disapprove of the increase of take.
Shawn Slocum - email	3/26/17	Disapprove of the increase of take.
Laura McIntyre, Department of Health Environmental Planning Office - letter		1. Recommends regular review of State and Federal environmental health land use guidance 2. EPO has recently updated the environmental GIS website page. It now compiles various maps and viewer from the environmental health programs. 3. EPO encourages examination and utilization of the Hawaii Environmental Health Portal. 4. EPO suggests review of the requirements of the Clean Water Branch and/or National Pollutant Discharge Elimination System permit. 5. Recommend review the draft Office of Environmental Quality Control (OEQC) viewer.
Bryan Harry- email	3/27/17	Approve of the increase of take.
Thorne Abbott, Hawaii Audubon Society – email	4/13/17	1. The Hawaii Audubon Society anticipates the DEIS will sufficiently address mitigation measures and how they will be evaluated. 2. Requests that the Audubon Society be included in your list of stakeholders and parties to be consulted. 3. Requests digital links to copies of the draft and final EIS and any corresponding permits or documents.
Jim Weigand - email	3/25/17	1. Disapprove of the increase of take. 2. Request more scientifically sound research around all of Maui turbines for several years before any new conditions are given. 3. Considers having searchers monitor these huge wind turbines just once a week and only out 65-75 meters from the base of the turbines is not likely to count all carcasses potentially killed by the project.

Commenter	Comment Date	Summary
Sally Kaye	3/27/17	4. Requests that the ESRC or BLNR mandate that one or more proposed mitigation site be funded by the Applicant as a condition of approval of the Amendment? 5. Please define "near term." 6. Concerned about amending the existing HCP/ITL for the full remaining life of the KWP II wind facility (15-16 years) when the study results won't be available for 3-5 years. Requests issuance of a "temporary" amendment limited to a three to five-year period, in order to review results of the proposed studies. 7. If study results indicate additional stress to the Hawaiian Hoary Bat can the BLNR/ESRC mandate additional mitigation measures be implemented during the remaining life of the project, in addition to those proposed by the Applicant? 8. Dr Scott Fretz stated in the ESCR meeting on September 26, 2016 that "some of this take is already permitted and already behind in terms of what is supposed to be mitigated[.]" Requests clarification on this statement. 9. Has ESCR staff met with KWP II applicants to determine funding and contractual agreements, as stated at the ESCR meeting on September 26, 2016? 10. Requests the schedule to implement the mitigation measures outlined in the proposed Amendment. 11. Has the Applicant identified an adequate funding source, pursuant to §195-21(a)(6) and §195D-4(g)(3)? If so, what amount has been identified and has it been placed in a fund for the benefit of BLNR? 12. Please identify the total number of bats that have been taken as a result of the operation of the Auwahi, Kaheawa I and Kaheawa II wind facilities. 13. In the context of the proposed Amendment, how will the cumulative impacts of the bat takes experienced by KWPII and other wind facilities (Auwahi and Kaheawa I) be taken into consideration in assessing the "full range of the species on the island," pursuant to §195-21(b)(3)? 14. Given the unanticipated additional take of Nene and bats at KWPII, please specifically address why the facility shouldn't simply cease operations until mitigation measures in the proposed Amendment are put in place and the study results are known. 15. The SEISPN states, "Based on the level of mitigation efforts, no adverse impacts to either [nene or bat] is anticipated." Please address how this statement complies with §195-21(b)(7) by providing "objective, measurable goals." 16. Please explain how the proposed additional mitigation efforts will result in an objectively measurable net benefit to both species. 17. Please explain why no curtailment is planned for December 15-February 15. 18. Please explain why at page 4 the Applicant indicates curtailment "from sunset to sunrise." 19. Please confirm that BLNR or a related state entity independently corroborates the number of species "taken" at KWPII. 20. Please specifically identify the manner in which each bat has been "taken" since KWPII began operation (i.e. collision, lung impairment, etc.). 21. Please confirm that the Applicant is willing to implement all Tier 3 and 4 mitigation efforts listed on page 2-3 of the EISPN, to be initiated at a time determined by BLNR/ESRC, and would be willing to fund an independent third-party selected by ESRC or BLNR to monitor on-going progress.

Commenter	Comment Date	Summary
Keep the North Shore Country - letter	3/28/19	1. Which avoidance and minimization measures approved in the original HCP have proven effective? 2. Concerned that projected take and the observed take are different. How can we be assured that the current projections are valid? 3. How will avoidance and minimization measures be different from what was proposed in 2011? 4. How is "mitigation commensurate with take" measured and what does that mean? 5. Provide details of the net conservation benefits provided by KWP II for ʻŌpeʻapeʻa and Nēnē at Kaheawa and on Maui. 6. What are the current and 2010 populations of ʻŌpeʻapeʻa and Nēnē on Maui? 7. How many documented individuals have been added to the populations of ʻŌpeʻapeʻa and Nēnē? 8. By what reasonable standard does KWP II continue to operate when it has exceeded the permitted take of ʻŌpeʻapeʻa, an endangered species? Why is the project still operational and an ITL amendment not required to continue operation? 9. What is the actual reduction in fossil fuel and energy placed into the Maui grid accredited to KWP II in the last five years? How does this compare to the nameplate value? 10. Why are take estimates proving incorrect, and how will KWP II demonstrate that higher levels of take are not adversely impacting the Maui Population of the ʻŌpeʻapeʻa? 11. Provide details of the actions taken and the demonstrated recovery of the species within portions of its historic range (on Maui). 12. What do the data reveal from the continuing surveys of bat occupancy and how do they compare to assumptions used in the 2011 HCP? 13. Describe in detail the efforts accomplished to restore bat habitat, the amount of land restored, the amount of funds expended to achieve habitat restoration, and ongoing projects. 14. How many Nēnē have been added, net, to the population by measures taken by KWP II, and is it considered a success? 15. How much reforestation is KWP II directly responsible for today? What exactly has KWP II done to increase out planting and other proposed mitigative measures? 16. Is the ungulate fencing complete? What evidence exists to support the premise that ungulate fencing increases the viability of ʻŌpeʻapeʻa? 17. Why should third and fourth tiers for take be considered now? What evidence exists that bat fatalities are being reduced by 50 percent or greater? Please provide details regarding the net conservation benefit of each species, as measured in biological terms, that have occurred because of KWP II.
Maui County Department of Planning - letter	4/3/17	1. Requests a revised EISPN that includes a description of the receiving environment, site and any impacts of the receiving environment. Please also include the Tax Map Keys in the report for easy reference. Although an Environmental Impact was completed on April 19, 2010, environmental conditions could have changed since that time and should be discussed. 2. Requests a discussion of the planning horizon for the proposed action. Also, please discuss additional alternatives. There were only two (2) alternatives mentioned, one of which is a no action alternative that is not a viable, legal option.
Doug McLeod, Maui Tomorrow Foundation - email	3/12/17	1. Suggests a mitigation plan that includes payment to neuter feral cats to benefit endangered bird populations.
Department of Land and Natural Resources, Office of Conservation and Coastal Lands - letter	3/17/17	1. The Notice of Intent incorrectly identifies the OCCL as the accepting authority of the 2010 EIS. The Department of Land and Natural Resources was the accepting authority. Requests that this information be updated 2. Notes studies conducted for the 2010 EIS detected negligible and hopes that the supplemental EIS will result in a more effective detection of the Ope'ape'a. 3. Requests that the status of all mitigation, studies and actions that were to be implemented as noted in the 2010 EIS to mitigate KWPII potential impacts to the two listed species be included with the supplemental EIS.

Commenter	Comment Date	Summary
Albert Perez, Maui Tomorrow Foundation - letter	3/23/17	1. Requests that the EIS should discuss any shortcomings of previous studies that led to the lower estimates. 2. Requests that the EIS determine alternatives that could reduce the amount of carbon-based fuels that is being consumed, without killing more animals. 3. Requests that the EISPN include a full reassessment of the impacts of wind power using current information. 4. Requests that alternatives evaluation include: • The choice of another site that would have less impacts. • The possibility of making operational adjustments that would result in lower energy production without requiring higher "take." • Increasing the survival of the "take" species through trapping, fencing and other means of reducing or relocating rat, cat and mongoose populations in the habitat area.
James Ryan - email	3/17/17	Suggests capturing the bat's radar (frequency) and amplify it back to make turbines seem larger than it really is.
Adriane Raff Corwin, Sierra Club Maui Group - letter	3/28/17	1. Concerned about the proposed increase in take of Hoary bats. 2. Requests a thorough population survey to determine the percentage of the population on Maui that is being killed by way of an additional take. 3. Requests that the applicant be required to fund a population survey of the Hawaiian hoary bat in the Hawaiian islands 4. Requests that the Draft EIS include further mitigation efforts that the applicant will fund if population studies find additional take is a significant portion of the population or a significant portion of its range.
Syd Singer, Good Shepherd Foundation - email	02/24/17	1. Requests that the EISPN include an alternative for upgrading current technology that employs rotors that are more bird-friendly.

7.3 Distribution of the Draft Supplemental Environmental Impact Statement

The draft SEIS was submitted to the OEQC for publication in the August 8, 2019 edition of the Environmental Notice. Publication of the draft SEIS marked the beginning of a 45-day public review period, which ended on September 23, 2019. The parties listed in Table 7.1 were provided with either a copy of the draft SEIS or a letter with information on how to access a copy of the draft SEIS. The listed parties were also given instructions on how to submit comments.

7.4 Comments Received on the Draft Supplemental Environmental Impact Statement

Upon publication of the draft SEIS, a 45-day public comment period was held. A total of 11 comment letters were received in response to the draft SEIS. A list of the parties that submitted written comments and a brief summary of those comments is provided in Table 7.3. Copies of the comment letters and responses provided are in Appendix A.

Table 7.3. Summary of Comments Received on Draft SEIS

Commenter	Comment Date	Summary
John Lu'uwai	8/6/19	1. KWP II should be obligated to honor its original ITL, and should not be allowed to increase its incidental take of Hawaiian hoary bat and Hawaiian goose. 2. KWP II should be penalized for exceeding the incidental take limits of the original ITL approved by the DLNR. 2. KWP II's motivation is to continue making profit; the reports and the SEIS were written by consultants and are slanted towards allowing KWP II a free pass. 3. There is no amount of research funding, acquired land for conservation, of management of breeding pens that will ever mitigate the taking of the natural resources of Maui nei.
Paul Hanada	8/15/19	1. Companies are not doing enough to curtail the take of Covered Species. Do not increase take as it is an easy way out.
DLNR Land Division	9/20/19	1. N/A. Provided comments by the Engineering Division, Office of Conservation and Coastal Lands, and the Commission on Water Resource Management.
DLNR Engineering Division	8/22/19	1. The owner of the project property and/or their representative is responsible for researching the Flood Hazard Zone designation for the project.
DLNR Office of Conservation and Coastal Lands	9/17/19	1. OCCL will defer to DOFAW on decision making.
DLNR Commission on Water Resource Management	9/10/19	1. We recommend the use of best management practices for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events.
State of Hawaii Department of Accounting and General Services	8/26/19	1. No comment.
County of Maui Police Department	8/23/19	1. No comment.
County of Maui Department of Parks and Recreation	08/23/2019	1. No comment.

Commenter	Comment Date	Summary
County of Maui Department of Environmental Management	9/5/19	1. No comment.
County of Maui Department of Housing and Human Concerns	9/23/19	1. No comment.

7.5 Distribution of the Final Supplemental Environmental Impact Statement

The final SEIS was submitted to the OEQC for publication in the October 28, 2019 edition of the Environmental Notice. The parties listed in Table 7.4 were provided with either a copy of the final SEIS or a letter with information on how to access a copy of the final SEIS.

Table 7.4. Final SEIS Distribution List

Federal Agencies	Elected Officials
U.S. Geological Survey, Pacific Islands Water Science Center	Governor David Ige
U.S. Fish and Wildlife Service	U.S. Senator Brian Schatz
National Marine Fisheries Service	U.S. Senator Mazie Hirono
National Parks Service	U.S. Representative Tulsi Gabbard
National Resources Conservation Service	State Representative Angus McKelvey
U.S. Army Corps of Engineers	State Representative Troy Hashimoto
Department of the Navy	State Representative Justin Woodson
Federal Aviation Administration	State Representative Tina Wildberger
Federal Transit Administration	State Representative Kyle Yamashita
Federal Highways Administration	State Representative Lynn DeCoite
U.S. Coast Guard	State Senator Rosalyn Baker
Environmental Protection Agency	State Senator Gilbert Keith-Agaran
State of Hawai'i Agencies	State Senator Kalani English
Hawai'i Emergency Management Agency	Mayor Michael Victorino
Hawai'i State Energy Office	Councilmember Kelly King
Department of Agriculture	Neighborhood Board Representative
Department of Accounting and General Services (DAGS)	**Libraries**
DAGS Archives Division	Hawai'i State Library, Hawai'i Documents Center
Department of Business, Economic Development and Tourism (DBEDT)	DBEDT Research Division Library
DBEDT Strategic Industries Division	Legislative Reference Bureau Library
DBEDT Office of Planning	Kahului Regional Library
Department of Education (DOE)	Lahaina Public Library
Department of Hawaiian Home Lands	University of Hawai'i Thomas H. Hamilton Library
Department of Health (DOH), Clean Water Branch	University of Hawai'i Maui College Library
DOH Environmental Health Administration	**News Media**
DOH Environmental Planning Office	Honolulu Star Advertiser
Department of Land and Natural Resources (DLNR)	Maui News

DLNR Division of Forestry and Wildlife	Hawai'i Tribune Herald
DLNR Commission on Water Resource Management	West Hawai'i Today
DLNR Engineering Division	The Garden Island
DLNR Division of Conservation and Resource Enforcement	Moloka'i Dispatch
DLNR Land Division	Honolulu Civil Beat
DLNR Office of Conservation and Coastal Lands	**Organizations, Individuals, and Consulted Parties**
Department of Labor and Industrial Relations	Hawaiian Telcom
State Historic Preservation Division	Maui Electric Company, Ltd.
Department of Transportation	Maui Contractors Association
University of Hawai'i Water Resources Research Center	Kihei Community Association
University of Hawai'i Environmental Center	Maui Chamber of Commerce
Office of Hawaiian Affairs	Sierra Club Maui Group
Maui County Agencies	Maui Tomorrow Foundation, Inc.
Department of Water Supply	Blue Planet Foundation
Department of Public Works & Environmental Management	Hawai'i Audubon Society
Department of Parks and Recreation	Keep the North Shore Country
Department of Planning	Good Shepherd Foundation
Department of Transportation Services	Keahi Bustamante
Department of Fire and Public Safety	Brandon Gurat
Police Department	Paul Hanada
Department of Housing and Human Concerns	John Lu'uwai
Department of Environmental Management	Shawn Slocum
	Jim Weigand
	Sally Kaye
	Bryan Harry
	James Ryan

8 LIST OF PREPARERS

SWCA Environmental Consultants (SWCA)

- Amanda Ehrenkrantz, Project Manager
- Amanda Childs, Environmental Planner
- Stephanie Nagai, Environmental Planner

TerraForm Power

- Mitchell Craig, HCP Manager

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