BOARD OF LAND AND NATURAL RESOURCES
STATE OF HAWAI'I

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| IN THE MATTER OF<br><br>A Contested Case Hearing Re Final Habitat Conservation Plan and Incidental Take License for the Na Pua Makani Wind Energy Project by Applicant Na Pua Makani Power Partners, LLC; Tax Map Key Nos. (1) 5-6-008:006 and (1) 5-6-006:018, Ko'olauloa District, Island of O'ahu, Hawai'i. | ) Case No. BLNR-CC-17-001<br>)<br>)<br>) FINDINGS OF FACT,<br>) CONCLUSIONS OF LAW, AND<br>) DECISION AND ORDER<br>)<br>)<br>)<br>) |



**FINDINGS OF FACT,**
**CONCLUSIONS OF LAW, AND DECISION AND ORDER**

The Board of Land and Natural Resources ("Board") hereby adopts the following Findings of Fact (FOF), Conclusions of Law (COL), and Decision and Order (D&O), based on the records maintained by the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW) on contested case number BLNR-CC-17-001, A Contested Case Hearing Re Final Habitat Conservation Plan ("HCP") and Incidental Take License for the Na Pua Makani Wind Energy Project by Applicant Na Pua Makani Power Partners, LLC; Tax Map Key Nos. (1)5-6-008:006 and (1)5-6-006:018, Ko'olauloa District, Island of O'ahu, Hawai'i, and the witness testimonies and exhibits presented and accepted into evidence.

If any statement denominated a COL is more properly considered a FOF, then it should be treated as a FOF, and conversely, if any statement denominated a FOF is more properly considered a COL, then it should be treated as a COL.

FOF and COL proposed by the parties to this contested case that are not incorporated in this Recommendation have been excluded because they may be duplicative, not relevant, not

material, taken out of context, contrary (in whole or in part) to the found facts, an opinion (in whole or in part), contradicted by other evidence, or contrary to law. Parties' proposed FOF and COL that have been incorporated may have minor modifications or corrections that do not substantially alter the meaning of the proposed finding or conclusion.

## I. INTRODUCTION

This contested case concerns an application for an incidental take license and habitat conservation plan. Na Pua Makani ("NPM") hopes to build an 8 turbine wind farm near Kahuku, O'ahu. It would reduce $CO^2$ emissions by about 1 million tons in its 20 year life.

The wind turbines are likely to take some endangered species of birds and the endangered Hawaiian hoary bat, or ōpe'ape'a. To allow these inadvertent deaths the wind farm needs the approval of the incidental take license and habitat conservation plan, or it cannot be built. The estimated take of the protected birds is very low. The major dispute at the contested case hearing concerned the ōpe'ape'a. Another wind farm, on the immediately adjacent property in Kahuku, with 12 somewhat smaller turbines, found one dead ōpe'ape'a in three years of operation after it began idling its turbines during low wind speeds, when ōpe'ape'a are more likely to be active. Based on statistical models, there were probably one or two other ōpe'ape'a killed but not found during this time period. NPM used data from this Kahuku wind farm to estimate its project would take an average of 1.7-2.5 ōpe'ape'a per year. It proposes to mitigate this take by protecting habitat capable of supporting an equivalent number of ōpe'ape'a, and funding research.

After carefully considering the evidence during the contested case hearing, the Board has decided to follow the recommendation of the Endangered Species Review Committee ("ESRC"),

a scientific panel that advises the Board on these subjects, and approve the incidental take license and HCP.

The hearing officer in the contested case recommended denial of the HCP, primarily over issues with the ōpe'ape'a. The reasons for the Board adopting a different decision are given more fully in the findings of fact, conclusions of law, and decision and order which follow.

In summary, the Board's decision differs because:

a. The hearing officer did not give sufficient weight to the scientific expertise of the ESRC and DOFAW, which recommended approval of the HCP.

b. The HCP properly relied upon the actual experience of the adjacent Kahuku wind farm in estimating the probable take of ōpe'ape'a.

c. The HCP requires that the wind farm idle its turbines at wind speeds less than 5.0 meters per second ("m/s"), during the months that bats are found more often. The hearing officer supported a 6.5 m/s requirement. Current science does not establish that this will significantly reduce bat fatalities, and it is not what the ESRC recommends. The Board's decision would require that turbines be idled at wind speeds higher than 5.0 m/s under certain circumstances.

d. The hearing officer was skeptical that part of the proposed mitigation for the take of bats—the protection of existing ōpe'ape'a habitat in a native forest—would be effective. This type of mitigation is supported by the consensus of scientific opinion, including the ESRC, DOFAW, and the U.S. Fish and Wildlife Service's Endangered Species Recovery Plan.

The Board notes that the hearing officer's recommendation does not appear to be based on factors such as the demeanor of witnesses at the hearing where she would be in a better position than the Board to evaluate the evidence in the record.

## II. FINDINGS OF FACT

A. The Parties

1. Na Pua Makani Power Partners, LLC ("Applicant" or "NPM") is a Delaware limited liability company and the Applicant of the Habitat Conservation Plan ("HCP") and Incidental Take License ("ITL") in the above-captioned matter.

2. Keep the North Shore Country ("KNSC") is a grassroots, volunteer-based North Shore non-profit, formed in 2006, to preserve, protect and enhance the heritage and rural character of the North Shore of O'ahu, Hawai'i, in partnership with communities from Ka'ena Point to Kahalu'u. Direct Testimony of Gil Riviere.

3. Elizabeth Rago ("Rago") is an individual who resides in Kahuku near the proposed Na Pua Makani Wind Energy Project site.

B. Procedural History

a. Prior to Contested Case

4. NPM began studies for the HCP in 2012. Ex. A-31 at 5. Formal consultations with DOFAW and USFWS on the HCP began in January, 2013, and continued through 2015. *Id.*, see also Ex. A-29 at ¶ 12-14.

5. Because the proposed Project will utilize State lands, a Final Environmental Impact Statement ("FEIS") was prepared and approved for the Project. Exs. A-12 through A-26.

6. The FEIS was accepted by the Board on July 22, 2016, and notice of the acceptance was published in the OEQC *Environmental Notice* on August 8, 2016. Ex. A-13; Ex. A-39 at 4; Ex. A-40 at 5-7. No timely legal challenge to the acceptance of the FEIS was filed pursuant to Hawai`i Revised Statutes ("HRS") § 343-7.

7. The public was notified of the proposed HCP through the notices published in OEQC's *Environmental Notice*. The draft HCP was published in the *Environmental Notice* on March 8, 2015. Ex. A-37; Ex. A-29 (Oller Written Direct Testimony ("WDT")) at ¶ 107. The initial 60-day public comment period was extended to 90-days in the May 8, 2015 *Environmental Notice*. Ex. A-38; Ex. A-29 (Oller WDT) at ¶ 108. The notice identified the area encompassed by the HCP, the proposed Project and HCP activities, and the ecosystems, natural communities, and habitat types within the HCP area. *See* Ex. A-37; Ex. A-29 (Oller WDT) at 108.

8. Both public input and relevant data were requested and received during this comment period. Ex. A-26 (Copies of HCP comments and data received during comment periods); Ex. A-29 (Oller WDT) at ¶ 109.

9. A public hearing on the draft HCP was held on June 4, 2015. Ex. A-29 (Oller WDT) at ¶ 109. Additionally, the ESRC noticed and held public meetings on the proposed final HCP, including the meeting on December 14, 2015 and the final public meeting on February 25, 2016. Vol. 1, Tr. 08/07/17 at 154:3-11.

10. Between the time of the public hearing on the draft HCP and the final HCP, Applicant increased the maximum height of the wind turbine generators ("WTGs") for the Project to a maximum of 200 meters. No public hearing was held to address the change in WTG height. Tr. 8/7/17 at 52:21 to 54:24 (Oller).

11. The HCP was developed through consultation not only with the ESRC, but also with DOFAW and the United States Fish & Wildlife Service ("USFWS"), species experts, other important stakeholders, and the public. Input and the incorporation of requirements and revisions from the ESRC occurred throughout the development process

and public review periods of the HCP. Public meetings with the ESRC were held on the following dates:

- July 2, 2014 – Informational presentation to ESRC
- March 30, 2015 – ESRC site visit to the Project
- March 31, 2015 – Review of draft HCP during the State public comment period
- December 17, 2015 – Review of draft final HCP
- February 25, 2016 – Review of revised draft final HCP; ESRC recommendation to Board for approval of final HCP granted

Ex. A-29 (Oller WDT) at ¶ 113.

12. The ESRC did not rubber-stamp the NPM HCP. At the December 17, 2015 meeting, where it could have approved it, the members instead requested amendments. Ex. A-35.

13. The ESRC voted 7-0 to recommend that the BLNR approve the amended NPM HCP at its February 25, 2016 meeting. Six of the members voting in favor of the HCP had doctoral degrees. Ex. A-2 at 4, Ex. A-36.

14. The ESRC also unanimously adopted the "Hawaiian Hoary Bat Guidance Document". Ex. A-44. The ESRC had held a two-day workshop in which it discussed the Bat Guidance Document on April 14-15, 2015, attended by government regulators, ecological researchers, consultants, industry personnel, and members of the public. *Id.*at 3-4.

15. The purpose of the workshop, and the Bat Guidance Document, was "to develop cohesive, consistent guidelines for project proponents attempting to avoid, minimize, and mitigate for incidental bat take, and for the regulators tasked with overseeing those projects." *Id.*

16. The Bat Guidance Document constitutes the best science currently available on how the potential impacts of wind farms on the ōpe'ape'a should be handled in an HCP.

b. Contested Case Proceedings

17. The HCP and ITL were first brought before the Board for consideration on October 28, 2016. Decision-making was deferred at the time and the matter was again presented to the Board on November 10, 2016.

18. At the November 10, 2016 Board meeting, KNSC requested a contested case, as did Kent Fonoimoana. Consequently, the Board again deferred decision-making.

19. KNSC followed up its oral request for a contested case hearing with the required written petition on November 19, 2016.

20. On November 21, 2016, the Board received four additional written petitions for a contested case hearing—one from Rago, and three separate petitions from Kent Fonoimoana, one each on behalf of himself individually, as President of Kahuku Community Association ("KCA"), and as President of Makani Pono 'O Kahuku ("MPK") (Fonoimoana, KCA and MPK are collectively referred to herein as the "Fonoimoana Petitioners").

21. Over the written objections from Applicant, the Board, on December 9, 2016, approved KNSC's petition for a contested case. The request for approval of the HCP and ITL was thus withdrawn pending the outcome of the contested case proceeding. Ex. A-41 at 15 (12/09/16 BLNR Minutes).

22. On January 13, 2017, the Board voted to consolidate the Rago, Fonoimoana, KCA, and MPK petitions for a contested case hearing with KNSC's contested case hearing and left the determination of standing of these petitioners to the hearing officer. Ex. A-42 at 9 (01/13/17 BLNR Minutes).

23. On February 14, 2017, the Board issued Minute Order No. 1 selecting Yvonne Y. Izu as the Hearing Officer in this proceeding, but allowed the parties and petitioners

the opportunity to file objections. No objections were received.

24. On April 27, 2017, the Fonoimoana Petitioners, through counsel James Wright, Esq., formally withdrew their petitions for a contested case proceeding. Ex. A-43.

25. With no objections, Rago was granted standing to participate in the contested case proceeding pursuant to Hawai`i Administrative Rule § 13-1-31(c). Minute Order No. 4, as corrected by Errata to Minute Order No. 4.

26. The issues in the contested case proceeding were set forth in Minute Order No. 6 and Minute Order No. 7.

27. The Notice of Contested Case Hearing was issued on June 7, 2017.

28. Applicant filed its Opening Brief, written witness statements and exhibits on June 26, 2017. KNSC and Rago filed Responsive Briefs, written witness statements and exhibits on July 17, 2017. On July 25, 2017, Applicant filed its Reply Brief, written reply testimony and exhibits.

29. On July 13, 2017, KNSC submitted a request for subpoenas for Dr. Scott Fretz, Dr. Frank Bonaccorso, Marcos Gorreson, Corinna Pinzari, Andre Raine, and Jay Penniman. Applicant filed an objection to the request and the request was denied by the Hearing Officer. Minute Order No. 8. KNSC filed a motion for reconsideration, and amending its original request for subpoenas of six persons, and agreed to waive their request for the others, except one: Dr. Scott Fretz ("Fretz"). The motion for reconsideration was granted and a subpoena for the appearance of Fretz at the hearing was issued. Minute Order No. 9.

30. On August 7, 2017, immediately preceding the evidentiary hearing, arguments were heard from KNSC and the Applicant on KNSC's request that witnesses be excluded from the hearing room when not testifying. The Hearing Officer denied the request. Vol. 1,

Tr. 08/07/17 at 7:3-8:16.

31. The evidentiary hearing was held on August 7 and 8, 2017.

32. All exhibits proffered by the parties were accepted into evidence.

33. Following the close of the evidentiary proceedings, the Hearing Officer set September 8, 2017 as the deadline for parties to submit proposed findings of fact, conclusions of law and decisions and orders. On August 23, 2017, KNSC filed a Motion for Extension of Deadline, requesting a three-week extension of the deadline to file its proposed findings of fact, conclusions of law and decision and order. The Motion for Extension was denied, but the deadline for submission of proposed findings of fact, conclusions of law, and decisions and orders was revised to September 11, 2017.

34. All parties timely filed their respective proposed findings of fact, conclusions of law, and decisions and orders.

35. The hearing officer issued recommended findings of fact, conclusions of law, and a recommended decision and order (Minute Order No. 11) on November 1, 2017.

36. The parties filed timely exceptions and responses to the hearing officer's report.

37. The Board heard oral arguments on January 12, 2018.

37A. At the oral argument, Board member Stanley Roehrig recused himself from participation. KNSC also moved for the disqualification of Board member Dr. Sam "Ohu" Gon. NPM opposed the disqualification. After briefing from the parties and receiving a statement from Dr. Gon, the Board denied the motion.

C. Description of the Proposed Project

38. The Na Pua Makani Wind Energy Project ("Project") is proposed to be a 25 megawatt wind generating facility sited on approximately 706.7 acres in Kahuku on the North

Shore, Ko'olauloa District, Island of O'ahu, identified by Tax Map Key Nos. (1) 5-6-008:006 and (1) 5-6-006:018 ("Project Site"). Ex. A-1 at 1, 4; *see also* Ex A-12 at 1-3.

39. Approximately 254.7 acres of the Project Site are State of Hawai'i lands managed by DLNR. The remaining lands that will be used for the Project (451.9 acres) are privately owned. Ex. A-1 at 4. No part of the proposed Project or the implementation of the HCP will require or involve the use of submerged lands, mining, or blasting. Ex. A-29 (Oller WDT) at ¶ 134; Ex. A-31 (Cutbirth WDT) at ¶ 24.

40. The Project originally proposed to develop 9 WTGs, a permanent meteorological tower ("Met Tower"), access roads, operation and maintenance facilities ("O&M"), electrical collection and interconnection infrastructure, including an electrical substation, a temporary laydown area, and associated infrastructure. Ex. A-1 at 4-5; Ex. A-31 at ¶ 8 (Cutbirth WDT).

41. After the contested case hearing, Applicant proposed that conditions of approval should limit the project to 8 WTG's. (Applicant's Exceptions to Recommended Findings of Fact, Conclusions of Law, and Decision and Order at 6).

42. The footprint for the permanent O&M building, storage, and parking area will be approximately one (1) acre. Ex. A-1 at 5; Ex. A-31 at ¶ 8 (Cutbirth WDT). Figure 2 of the HCP shows the proposed Project layout. Ex. A-1 at 3; Ex. A-31 at ¶ 8 (Cutbirth WDT).

43. The maximum blade tip height was anticipated to range from 427 feet (130 meters) to 656 feet (200 meters) above ground level. Ex. A-1 at 5; Ex. A-31 at ¶ 9 (Cutbirth WDT). At present, there are no commercially available turbines that are 656 feet (200 m). Vol. 1, Tr. 08/07/17 at 18:16-19. The Met Tower will be approximately 262 feet tall. Ex. A-1 at 6; Ex. A-31 at ¶ 10 (Cutbirth WDT).

44. The use of fewer, but taller WTGs was selected in response to state agency comments as well as community concerns about visual impacts. Vol. 1, Tr. 08/07/17 at 22:8-12.

45. A visual impact analysis of the wind turbines at 656 feet tall was done. Vol. 1, Tr. 08/07/17 at 22:18-20; Ex. A-12 § 4.16.

46. During construction, approximately four (4) acres (which includes the 1 acre permanent site) will be used for temporary storage and laydown area, refueling, and waste collection. Ex. A-1 at 5; Ex. A-31 at ¶ 10 (Cutbirth WDT). Staging areas disturbed during construction but not needed for permanent operations will be revegetated with non-invasive resident species compatible with Project operations. Ex. A-1 at 6; Ex. A-31 (Cutbirth WDT) at ¶ 10.

47. The anticipated life of the Project is 21 years (1 year for construction and 20 years of commercial operation). Ex. A-12 at 2-29; *see also* Ex. A-1 at 4; Ex. A-31 at ¶ 11 (Cutbirth WDT). After that time, Applicant will re-evaluate whether to continue operating the Project, or to decommission it. Ex. A-12 at 2-29; Ex. A-31 (Cutbirth WDT) at ¶ 11. If the Project operation is extended beyond the initial 21-year period, the facilities may be upgraded, with appropriate lease, modifications, permits, and approvals, as required. Ex. A-12 at 2-29.

48. If the Project is decommissioned, the power generation equipment and associated Project infrastructure will be removed and the site will be returned to a condition that is as close to its pre-construction state as practicable. Ex. A-1 at 4. The decommissioning process is anticipated to take approximately 1 year and will be done in accordance with the provisions of Applicant's lease with the DLNR, lease with private landowner, and the Power Purchase Agreement ("PPA") with Hawaiian Electric Company ("HECO"). *Id.*

49. The purpose of the proposed Project is to generate renewable wind energy on the

island of O'ahu. Ex. A-1 at 1; Ex. A-29 at ¶ 115 (Oller WDT). This Project will help Hawai'i achieve its 100% renewable energy initiative that was signed into law by the Governor in 2015. H.B. 623; HRS § 269-92; Ex. A-29 at ¶ 115 (Oller WDT). To that end, wind-generated energy facilities are authorized under the State land use laws. *See* HRS § 205-2; Ex. A-29 (Oller WDT) at ¶ 116. Furthermore, renewable energy facilities, like the proposed Project, are encouraged by the State of Hawai'i, through the Hawai'i Clean Energy Initiative. Ex. A-29 (Oller WDT) at ¶ 117.

D. Need for ITL and HCP

50. The "take" of any endangered or threatened species is prohibited. HRS § 195D-4(e). However, the Board may issue an Incidental Take License (ITL) to permit take otherwise prohibited, if the take is incidental to, and not for the purpose of, carrying out an otherwise lawful activity. HRS § 195D-4(g). Issuance of the ITL is conditioned upon the preparation, and implementation, of a Habitat Conservation Plan (HCP). HRS § 195D-4(g).

51. The Project will, separately, require an approval by the USFWS for an incidental take permit and habitat conservation plan because of the federal endangered species law. *See* 16 U.S.C. §1539(a). The federal process is independent of the state process. NPM's application is currently under review by USFWS but a final decision had not been made by the time of the evidentiary hearing. (Oller, Tr. 8/7/17 at 33, l. 6-25 to 34, l. 1-6.)

52. The Project has the potential to result in incidental take of species listed under the Federal Endangered Species Act (ESA) and state endangered species statutes (HRS Chapter 195D). The following listed species have the potential to be killed or injured by colliding with Project WTGs or other components, or during Project activities:

| Scientific Name | Hawaiian Name | Common Name |
|---|---|---|
| *Puffinus newelli* | ʻAʻo | Newell's shearwater |
| *Himantopus mexicanus knudseni* | Aeʻo | Hawaiian black-necked stilt |
| *Fulica alai* | ʻAlae keʻokeʻo | Hawaiian coot |
| *Gallinula chloropus sandvicensis* | ʻAlae ʻula | Hawaiian common moorhen |
| *Anas wyvilliana* | Koloa maoli | Hawaiian duck |
| *Branta sandvicensis* | Nēnē | Hawaiian goose |
| *Asio fammeus sandwichensis* | Pueo | Hawaiian short-eared owl |
| *Lasiurus cinereus semotus* | Ōpeʻapeʻa | Hawaiian hoary bat |

53. Indirect take of some of these species could also occur, as it is possible that the death of a listed adult during the breeding season could result in the loss of eggs or dependent young. Ex. A-1 at 1.

54. Applicant's study of the Project Area to prepare the HCP included a biological reconnaissance survey and a 1-year avian point count survey. *See* Exs. A-3 & A-4; Ex. A-29 (Oller WDT) at ¶ 98. These surveys were one of the primary sources in understanding the distribution and abundance of any species in the Project Area. *Id.* Results from these surveys are described in Section 3 of the HCP. Ex. A-1 at 13-37; Ex. A-29 (Oller WDT) at ¶ 99. Overall, the proposed Project Area has been highly disturbed by agricultural activities, and the vegetation is dominated by a mixture of aggressive non-native weedy species that took over following the abandonment of sugar cane agriculture. See Ex. A-18 (App. E to FEIS – Biological Survey Report) at 2; Ex. A-29 (Oller WDT) at ¶ 99. Plants and wildlife are dominated by non-native

species and no listed threatened or endangered plant species were identified in the Project Area. Ex. A-1 at 4; Ex. A-29 (Oller WDT) at ¶ 100. Non-listed native species are widespread and common outside of the Project Area. Local impacts to these species associated with the construction, operation and decommissioning of the Project will not substantially increase the risk of causing any of those species to become threatened or endangered. Ex. A-1 at 4; Ex. A-29 (Oller WDT) at ¶ 101.

55. The HCP and ITL must determine an expected level of take of each species. This expected level of take is significant because it is one basis for determining whether the take will jeopardize the continued existence of the species or its subpopulations. It also provides the basis for the amount of mitigation that would offset the take.

56. During the operation of the facility holding the HCP and ITL, if the rate of take exceeds expectations, this will trigger "adaptive management" to try to decrease the amount of take. Ex. A-1 at 86-87. If the total take approaches that authorized by the ITL, the facility must seek an amendment to the ITL. If that is denied, the facility would be in violation if it exceeded its authorized numbers.

57. NPM must perform mitigation to offset the expected take of the endangered species. NPM has made a financial commitment of $3.736 million to fund its "Tier One" mitigation obligations. Ex. A-1 at 85. It must pay for the Tier One mitigation projects even if it does not take the expected numbers. For the ōpe'ape'a, if the Tier One level of take is exceeded, NPM must support an additional $894,000 of mitigation. Ex. A-1 at 86.

E. HCP Provisions By Species

58. The criteria for an HCP are set forth in HRS § 195D-21 and HRS § 195D-4(g). Because the minimization and mitigation measures vary among the Covered Species, the

following findings of fact are structured in a manner that discusses the HCP provisions with respect to each species separately, except that the Waterbirds - ae'o (Hawaiian black-necked stilt), 'alae ke'oke'o (Hawaiian coot), 'alae'ula (Hawaiian common moorhen), and Koloa maoli (Hawaiian duck) - are grouped together.

a. 'A'o

59. The 'a'o (Newell's shearwater) is a migratory, highly pelagic seabird endemic to the Hawaiian Islands and is listed as threatened under the ESA and by the State. Like other procellariids (i.e., shearwaters, petrels, fulmars, and prions), the 'a'o spends up to 80% of its life at sea, only returning to land to breed. Ex. A-1 at 19-20.

60. The Newell's Shearwater Recovery Plan, completed in 1983, and the State of Hawai`i Comprehensive Wildlife Conservation Strategy recommend several strategies to benefit 'a'o. The first strategy is recommending efforts to reduce fallout. Seabird fallout occurs when birds are attracted to artificial lights causing disorientation, thus resulting in birds coming to the ground as a result of collision or exhaustion. Other recommended measures include the protection of known colonies, the development of efficient predator control methods, and the expansion of our knowledge of the species' status and distribution. Ex. A-1 at 20.

61. Important factors in the decline of 'a'o include the loss of breeding habitat, predation by introduced mammalian predators, and historical hunting by humans. Other threats include collisions with power lines and other human-made structures, disorientation and fall out associated with light attraction, impacts to pelagic habitat associated with climate change, and decline in food resources due to overfishing. Ex.A-1 at 21.

62. The Project area, consisting of low elevation habitat dominated by aggressive introduced species, is not appropriate 'a'o nesting habitat. However, 'a'o could fly through the

Project area when moving between potential unknown nesting colonies in the Ko`olau or Waianae mountain ranges and the ocean. Ex. A-1 at 22.

63. Applicant requests an authorized take of 4 adults/fledged young (direct take) and 2 chicks/eggs (indirect take) of 'a'o for the 21-year permit term. Ex. A-1 at 48.

64. Direct take is conservatively estimated based on observed passage rates and flight heights of 'a'o -like targets observed over 3 seasons of avian radar surveys, the physical attributes of the WTGs, and an estimate of the species' ability to avoid collision. Ex. A-1 at 45.

65. The potential for indirect take of 'a'o exists if birds transit the site while flying to or from an undiscovered nesting colony, i.e., if an adult is killed while incubating an egg or rearing a chick. Ex. A-1 at 47.

66. Should the maximum requested take of 4 adult/fledgling 'a'o occur, it should not have a population-level impact, as it would represent an increase in mortality rate of 0.01 percent of the population distributed over the 21-year permit term. Ex. A-1 at 48.

67. **Avoidance and Minimization**: The HCP provides for the following measures to minimize take of Newell's shearwaters:

- The three Project temporary guyed met towers were fitted with bird flight diverters and/or white poly tape to increase visibility and, as a result, the likelihood of avoidance by 'a'o.
- The Project plans to install an un-guyed, free-standing permanent met tower to maximize the detectability of all features of the structure for birds and bats and minimize the risk of collisions. This permanent tower would replace one temporary guyed met tower and the remaining temporary met towers would be removed before the commercial operation date.
- On-site lighting at the O&M building and substation will be shielded and/or directed downward, triggered by a motion detector, and fitted with non-white light bulbs. Lighting is only expected to be used when workers are at the site at night. Most operations and maintenance activities are expected to occur during daylight hours.

- Nacelle lighting will not be used except as required by FAA standards. Flashing red lights have been shown to not be attractive to birds and will be used in accordance with FAA requirements.

- The collection line will be placed below ground to the maximum extent practicable, thereby reducing the risk of collision of ʻaʻo.

- New above-ground portions of power lines associated with the Project will use line marking devices to improve visibility to birds and follow Avian Protection Plan Guidelines.

- NPM will implement low wind speed curtailment from March – November between sunset and sunrise. Although this minimization measure is proposed to reduce the potential impacts to ʻopeʻapeʻa, it will also reduce the risk to ʻaʻo, which could transit the Project at night from April – November.

- NPM will maximize the amount of construction activity that can occur in daylight during the seabird breeding season including the peak fledgling period (approximately October 15 to November 23).

- Should nighttime construction be required, NPM will use shielded lights and maximize the use of non-white lights, provided that construction safety is not compromised, to minimize the attractiveness of construction lights to wildlife.

- A biological monitor will be in the construction area to watch for the presence of Covered Species at all times during nighttime construction. Should a Covered Species be observed, construction activities will stop and construction lighting will be shut down until the individual(s) move out of the area.

- When not in use, construction cranes will be lowered at night, when practicable, to minimize the risk of bird collisions.

Ex. A-1 at 38-40.

68. **Mitigation**. The USFWS Newell's Shearwater Recovery Plan and the State of Hawai'i's Comprehensive Wildlife Conservation Strategy for ʻaʻo recommend efforts to reduce fallout, protect known colonies, and develop efficient predator control methods while expanding knowledge of the species' status and distribution. Although providing mitigation for ʻaʻo on

Oahu would be preferred, this approach is not likely the most effective because no nesting colonies are known on Oahu and locating any breeding populations, if any exist, would take considerable effort with low chance of success. Combined with additional threats such as fallout potential due to heavy urbanization on Oahu, this makes conservation efforts on Oahu impractical on a scale that is within the scope of the Project. Ex. A-1 at 66.

69. USFWS has created an account with the National Fish and Wildlife Foundation (NFWF) where funds for ʻaʻo mitigation can be deposited and then used according to an appropriate ʻaʻo conservation plan. The overall intent is that pooled resources can be used to fund larger management projects or to resolve larger research questions targeted at the recovery of ʻaʻo that could have been supported through smaller scale investments. Ex. A-1 at 67.

70. NPM will make a one-time payment of $160,800, payable no later than the commercial operation date ("COD") to NFWF to be used for an appropriate ʻaʻo conservation plan. Ex. A-1 at 67-68 and Appendix F. Within one year of the COD, USFWS will have developed an appropriate ʻaʻo conservation plan to which NPM's payment will have contributed. The conservation plan will include appropriate biological measures of success. Ex. A-1 at 67-68.

71. **Measures of Success**. The mitigation measure for ʻaʻo for the Project will have been accomplished upon the payment of $160,800 to NFWF by the commercial operation date. Ex. A-1 at 68.

72. NPM will provide the status and results of the research or management efforts in its annual report to the agencies. Results will include biological measures related to reductions in predators or other measures appropriate to the program that is funded, with results appropriately scaled to the relative proportion of the overall funds that were contributed by

NPM. Ex. A-1 at 68. However, it is not anticipated that NPM will have to provide different or additional mitigation even if biological measurements of success are not met.

b. Hawaiian Waterbirds

73. Four waterbirds – koloa maoli (Hawaiian duck), ae'o (Hawaiian black-necked stilt), 'alae ke'oke'o (Hawaiian coot), and 'alae'ula(Hawaiian common moorhen) – occur or have the potential to occur in the Project area. Aside from the threat of hybridization with feral mallards for the koloa maoli, all of these waterbirds face the same suite of threats. The Revised Hawaiian Waterbirds Recovery Plan, completed in 2011, and the State of Hawai`i`s Comprehensive Wildlife Conservation Strategy recommend preservation of wetland habitat and management of introduced predators in priority wetlands. Ex. A-1 at 26.

74. **Koloa maoli** (Hawaiian Duck). The endangered koloa maoli is a small dabbling duck that is endemic to the Hawaiian Islands. Koloa maoli utilize a variety of wetland habitats, from sea level up to 10,000 feet in elevation, including freshwater marshes, flooded grasslands, coastal ponds, streams, montane pools, forest swamplands, agricultural and artificial wetlands, and irrigation ditches. Ephemeral wetlands are important foraging habitat for koloa maoli. Ex. A-1 at 26.

75. Koloa maoli breed year-round, although the majority of nesting records are from March through June. Nesting occurs on the ground near, but not necessarily adjacent to, water, but little else is known of specific koloa maoli nesting habits. Ex. A-1 at 26.

76. Koloa maoli are non-migratory but exhibit some seasonal, altitudinal, and inter-island movements. However, the timing and mechanics of these movements are not well understood. The species may use different habitats for nesting, feeding, and resting, and may move seasonally among areas. A seasonal pattern of high use of lowlands in winter and declining

use in the summer may reflect dispersal into montane areas during breeding season. Ex. A-1 at 27.

77. Koloa maoli historically occurred on all the main Hawaiian Islands except Lana'i and Kaho'olawe; however, by the 1960s, they were found in small numbers only on Kaua'i and probably Ni'ihau. From the late 1950s through the early 1990s, koloa maoli were reintroduced to O'ahu, Maui, and Hawai'i Island through captive propagation and release. Populations of koloa maoli currently exist on Kaua'i, Ni'ihau, Maui and Hawai'i Island; however, genetics studies show that the O'ahu population is heavily compromised through hybridization with feral mallards. Ex. A-1 at 27.

78. The koloa maoli population appears to be increasing overall due to increases in the population on Kauai; however, pure koloa maoli populations are declining on other islands. These population trends may be inaccurate due to incomplete survey coverage and difficulty in distinguishing koloa maoli from hybrids. Ex. A-1 at 27.

79. The only mechanism for the development of pure koloa maoli on Oahu would be an intensive koloa maoli reintroduction and feral mallard management effort conducted by USFWS or DOFAW. The Recovery Plan for Hawaiian Waterbirds identifies the removal of feral mallards on all islands as a critical element in the recovery of the species. Although the Recovery Plan prioritizes the establishment of self-sustaining populations of koloa maoli on Maui and/or Molokai, DOFAW has initiated planning of recovery efforts that are to include populations on Oahu. Ex. A-1 at 28-7-28.

80. During biannual winter counts from 1999-2003, koloa maoli-like birds (presumed hybrids) were reported in low numbers at the following wetlands within 5 miles of the Project: James Campbell National Wildlife Refuge ("JCNWR") (core wetland), Kahuku aquaculture

ponds (supporting wetland), La'ie wetlands (supporting wetland), the Kuilima Wastewater Treatment Plant at Turtle Bay (supporting wetland), and the Turtle Bay Golf Course Ponds. "Core wetlands" are areas that provide habitat essential for survival and recovery, supporting large populations of Hawaiian waterbirds; "supporting wetlands" are areas that provide habitat important for survival and recovery, but may support only smaller waterbird populations or may be occupied only seasonally. These areas represent potential areas of future koloa maoli occupancy. Ex. A-1 at 28.

81. Assuming a reintroduction effort is successful, suitable habitat for koloa maoli in the Project area is very limited. A small stretch of Malaekahana Stream along the southern border of the Project area could be suitable habitat for koloa maoli; however the abundance of high quality habitat at managed wetland areas outside of the Project area minimizes the importance of this area. Therefore, if koloa maoli occur in the Project area, this occurrence would be primarily limited to their transit of the area when flying between wetland habitats outside of the Project area. Ex. A-1 at 28.

82. No koloa maoli-like birds were observed in the Project area during avian point count surveys conducted over a 1-year period. In contrast, surveyors recorded 61 koloa maoli-mallard hybrids in adjacent wetland areas, indicating the suitability of habitat for koloa maoli in the vicinity of the Project. Ex. A-1 at 28.

83. **Ae'o** (Hawaiian black-necked stilt). The endangered ae'o is an endemic subspecies of the black-necked stilt, a moderately sized wading bird. Ae'o are associated with a variety of aquatic habitats, primarily within the lower elevation coastal plains of Hawai'i, but are limited to habitats with a water depth of less than 9 inches, and sparse low-growing vegetation or exposed tidal mudflats. Ex. A-1 at 28.

84. Nesting generally occurs from mid-February through August on freshly exposed mudflats interspersed with low-growing vegetation. Ex. A-1 at 28. Ae'o are opportunistic feeders, eating a wide variety of invertebrates and other aquatic organisms that occur in shallow water and mudflats. Ae'o typically feed in shallow flooded wetlands that are ephemeral in nature, and have been documented moving between islands in order to exploit seasonal food resources. Ex. A-1 at 29.

85. Ae'o are found on all the main Hawaiian Islands except Kaho'olawe and are non-migratory except for seasonal movements between adjacent islands. Long-term census data show year-to-year variability in the number of ae'o observed, but indicate statewide populations have been relatively stable or slightly increasing through the late 1980s. Biannual waterbird surveys from 1998 through 2007 documented an average population of 1,484 birds, ranging from approximately 1,100 to 2,100 birds. The annual variability is at least partially a result of rainfall patterns and reproductive success. Ex. A-1 at 29.

86. Available habitat is thought to limit the carrying capacity for ae`o. Models indicate that if the currently available habitat is maintained, primarily through predator control and regulation of water level fluctuations, the ae'o population should increase to fill available habitat. Conversely, altering the model parameters to reflect a cessation of predator control resulted in 100 percent chance of extinction over 200 years, with a mean time to extinction of 32 years. Ex. A-1 at 29.

87. O'ahu supports the largest number of ae'o in the Hawaiian Islands, accounting for 35 to 50 percent of the state's population (450 to 700 birds during any single year). On O'ahu, ae'o can be found in large concentrations at JCNWR, the Kahuku aquaculture ponds, and the Pearl Harbor National Wildlife Refuge. Both JCNWR and the Kahuku aquaculture

ponds are within 5 miles of the Project area, and are core and supporting wetlands, respectively. Other wetlands within 5 miles of the Project area where ae'o have been observed include the Kahuku airstrip ponds, Coconut Grove Marsh, the Turtle Bay Golf Course ponds, and the Kuilima Wastewater Treatment Plant at Turtle Bay. Ex. A-1 at 29.

88. There is no suitable habitat for ae'o in the Project area. Ae'o require wetlands, marshes, or ponds, and these are not present in the Project area. Therefore, if ae'o occur in the Project area, this occurrence would be primarily limited to their transit of the area when flying between wetland habitats outside of the Project area. Ex. A-1 at 29-30.

89. No ae'o were observed within the Project area during Project avian point count surveys conducted over a 1-year period. In contrast, surveyors recorded 40 ae'o detections in wetland areas adjacent to the Project and studies indicated some movement between JCNWR and wetlands outside of the refuge and the adjacent shrimp ponds. Based on the known biology of the species, the frequency of ae'o transiting the Project area is likely to be low. Ex.A-1 at 30.

90. **'Alae ke'oke'o** (Hawaiian coot). The endangered 'alae ke'oke'o is a non-migratory species endemic to the Hawaiian Islands. Previously considered a subspecies of the American coot (*Fulcia americana*), and originally listed under the ESA as such, the 'alae ke'oke'o is now regarded as a distinct species. Ex.A-1 at 30.

91. 'Alae ke'oke'o are associated with lowland wetland habitats that have emergent vegetation interspersed with open water. They typically occur along the coastal plain from sea level up to 850 feet elevation. 'Alae ke'oke'o are generalist feeders, consuming seeds and leaves of aquatic plants, snails, crustaceans, and aquatic or terrestrial insects, tadpoles, and small fishes. They forage in mud, sand, or near the surface of the water, and they can dive up to 48 inches below the water surface. Ex. A-1 at 30.

92. ʻAlae keʻokeʻo nest on open freshwater and brackish ponds, flooded taro fields, shallow reservoirs and irrigation ditches. They construct floating or semi-floating nests of aquatic vegetation so that nests can move with changing water levels. They are thought to breed opportunistically in response to rainfall, but peak breeding occurs March – September. Ex. A-1 at 30.

93. ʻAlae keʻokeʻo are non-migratory, but exhibit pronounced irregular movements based on rainfall. They commonly wander, and larger bodies of water may have large concentrations of birds during the non-breeding season. As movements are associated with fall and winter rain events, which occur after the peak breeding season, movements between wetlands are most likely to occur after independence of young. Ex. A-1 at 30-31.

94. ʻAlae keʻokeʻo historically occurred on all the main Hawaiian Islands except Lanaʻi and Kahoʻolawe, which lacked suitable wetland habitat. However, they are now present on Lanaʻi due to the creation of artificial wetland-like features, such as water treatment sites. ʻAlae keʻokeʻo have always occurred in greatest numbers on Oʻahu, Maui and Kauaʻi, and were likely once fairly common in large natural marshes and ponds. Ex. A-1 at 31.

95. Winter biannual waterbird surveys from 1997 through 2006 indicated a population average of approximately 2000 ʻalae keʻokeʻo, ranging from approximately 1,500 to 2,800 birds statewide. Waterbird counts indicate short-term population fluctuations and a slight long-term increase in population between 1976 and 2008. As ʻalae keʻokeʻo disperse readily and exploit seasonally flooded wetlands, their populations naturally fluctuate according to climatic and hydrologic conditions. Ex. A-1 at 31.

96. During 1995 – 2007, the ʻalae keʻokeʻo populations on Oʻahu fluctuated between approximately 500 and 1,000 birds. Large concentrations have been observed at JCNWR, the Kahuku aquaculture ponds, the Kuilima wastewater treatment plant, the Kaʻelepulu Pond in Kailua, the Pearl Harbor NWR, and the Hawai`i Prince Golf Course, the first three of which are within 5 miles of the Project area. Other wetlands within 5 miles of the Project where ʻalae keʻokeʻo have been observed in smaller numbers include Coconut Grove Marsh, Laʻie wetlands, and the Turtle Bay golf course ponds. Ex.A-1 at 31.

97. There is no suitable habitat for ʻalae keʻokeʻo in the Project area. In lowland environments, ʻalae keʻokeʻo use wetlands, marshes, or ponds, which are not present in the Project area. Therefore, if ʻalae keʻokeʻo occur in the Project area, occurrences would be primarily limited to their transit of the area when flying between wetland habitats outside of the Project area. Ex. A-1 at 31.

98. No ʻalae keʻokeʻo were observed within the Project area during avian point count surveys conducted over a 1-year period. In contrast, surveyors detected 14 individuals in wetland areas adjacent to the Project. Based on the known biology of the species and the results of avian point counts, the frequency of ʻalae keʻokeʻo transiting the Project area is likely to be low. Ex. A-1 at 31.

99. **ʻAlaeʻula** (Hawaiian common moorhen). The endangered ʻalaeʻula is a non-migratory subspecies endemic to the Hawaiian Islands. It is predominantly associated with lowland wetland habitats that have emergent vegetation interspersed with open water including natural ponds, marshes, streams, springs or seeps, lagoons, grazed wet meadows, taro and lotus fields, shrimp aquaculture ponds, reservoirs, sedimentation basins, sewage ponds, and drainage ditches. They appear to have a preference for freshwater over brackish. Ex. A-1 at 32.

100. ʻAlaeʻula are apparently opportunistic feeders; the diet likely varies by habitat and includes, algae, aquatic insects, mollusks, snails, seeds and other plant parts. ʻAlaeʻula glean food from the water surface and leaves of floating plants while swimming or walking on these plants. Although ʻalaeʻula typically forages in and along areas of dense vegetation, they also forage on open ground. Ex. A-1 at 32.

101. ʻAlaeʻula typically nest over shallow water (less than 24 inches) along emergent vegetation edges of narrow interconnecting waterways, but also in wet meadows or on solid ground in the presence of tall cover. They nest year-round, but breeding activity is concentrated during March – August and is affected by both vegetation height and water levels. Ex. A-1 at 32.

102. ʻAlaeʻula are non-migratory and generally sedentary; however, they readily disperse in spring, presumably to breed. As with other Hawaiian waterbirds, dispersal may be related to the timing of wet and dry periods with dispersal occurring with the creation of new seasonal habitat during periods of flooding. Ex. A-1 at 33.

103. Given the short duration of dependence, sedentary nature of the species, and timing of dispersal events, ʻalaeʻula are unlikely to move between wetland areas when caring for dependent young. Ex. A-1 at 33.

104. ʻAlaeʻula historically occurred on all of the main Hawaiian Islands except Lanaʻi (probably due to a lack of wetland habitat) and probably Niʻihau. From the late 19$^{th}$ to the mid-20$^{th}$ centuries, ʻalaeʻula populations on all but Kauaʻi and Oʻahu were extirpated. Reintroduction efforts on Maui, Molokaʻi and Hawaiʻi Island all failed (although there are unsubstantiated reports of ʻalaeʻula on Hawaiʻi Island and Maui from the late 20$^{th}$ century). Ex. A-1 at 33.

105. Although only a rough measurement of recent population trends exist, statewide population counts have been stable during the decade from 1997-2008, with an average count of 287 birds. Ex. A-1 at 33.

106. Approximately half the statewide population of ʻalaeʻula resides on Oʻahu. Areas supporting the largest populations include Dillingham Ranch large pond, Amorient Aquafarm (part of Kahuku Aquaculture Farms, JCNWR Kiʻi Unit, and Waimea Valley. Amorient Aquafarm and JCNWR are within 5 miles of the Project. Other wetlands within 5 miles of the Project where ʻalaeʻula have been observed in smaller numbers include Coconut Grove Marsh, Laʻie wetlands, Kahuku Prawn Farms (part of Kahuku Aquaculture Farms), Punahoʻolapa Marsh, and the Turtle Bay golf course ponds. Ex. A-1 at 33.

107. There is no suitable habitat for ʻalaeʻula in the Project area. ʻAlaeʻula use wetlands, marshes or ponds, which are not present in the Project area. Thus, if ʻalaeʻula occur in the Project area, the occurrences would be primarily limited to their transit of the area when flying between wetland habitats outside of the Project area. Ex. A-1 at 33.

108. No ʻalaeʻula were observed within the Project area during Project avian point count surveys conducted over a 1-year period. In contrast, surveys detected 16 individuals in wetland areas adjacent to the Project. Based on known biology of the species and the results of avian point counts, the frequency of ʻalaeʻula transiting the Project area is likely to be low. Ex. A-1 at 33.

109. **Avoidance and Minimization**. Direct take of koloa maoli, aeʻo, ʻalae keʻokeʻo, and ʻalaeʻula is anticipated to be low because of the lack of habitat, absence of these birds observed during the surveys, and the ability of the taxa to avoid collisions. Moreover, direct take

of koloa maoli is expected to be low because many of the koloa maoli-like ducks on Oahu have been shown to be hybrids. Ex. A-1 at 51.

110. Overall, waterbirds are expected to have a low frequency of transiting the Project area because of their limited presence in the Project area and demonstrated avoidance behavior. None of these waterbird species have been detected as fatalities at existing wind generation facilities in the Hawaiian Islands. Ex. A-1 at 52.

111. Due to the low expected frequency of waterbirds transiting the Project area and the ability of waterbirds to detect and avoid obstacles, the risk of collision with other Project components is considered negligible. Project components such as construction equipment, and the met tower are stationary or slow moving and are more visible and affect a much smaller portion of the airspace than WTGs. In addition Project transmission lines will be marked increase visibility, which will make any risk of collision with the Project components negligible. Ex. A-1 at 52.

112. Because there is no waterbird habitat in the Project area, the potential for vehicles to kill waterbirds at the Project is negligible. Ex. A-1 at 52.

113. Applicant requests an authorize take of 4 koloa maoli, 4 ae`o, 8 ʻalae keʻokeʻo and 8 ʻalaeʻula over the 21-year permit term. Ex. A-1 at 52-53.

114. Direct take for these waterbird species could occur as a result of collision with the WTGs. Ex. A-1 at 52.

115. Although the direct take over the 21-year permit term is not anticipated to exceed 1 individual of each of the four Hawaiian waterbird covered species, the value is increased to account for uncertainty that is inherent when estimating the frequency and magnitude of a rare event over an extended period of time. Furthermore, as the estimated benefit of the proposed

mitigation for the ʻalae keʻokeʻo and ʻalaeʻula is substantially higher than for the koloa maoli and aeʻo, the estimated take for ʻalae keʻokeʻo and ʻalaeʻula is increased to reflect this difference. Ex. A-1 at 52.

116. Indirect take could occur if adults with eggs or dependent young occur as a fatality due to the Project. Such indirect take is unlikely as Hawaiian waterbirds are likely to move among wetlands only after their young are independent. Thus, the potential for indirect take is considered negligible. Ex. A-1 at 52.

117. Should the requested take of the four waterbird species occur over the 21-year permit term, it should not have a population-level impact on the respective populations. Each of these species has a statewide population that is stable or increasing. Therefore, no population is likely to be particularly sensitive to losses on the order of one bird every 3 to 5 years. Ex. A-1 at 53.

118. **Mitigation**. NPM will contribute $126,250 for the design and construction of a 1,555-ft stretch of fence that would create a boundary between Hamakua Marsh and the adjacent shopping center. The fence will include informational signs to educate the public about resident waterbirds and actions that can be taken to support them. Fence construction will be completed within one year of the COD. Additionally, NPM will contribute funds towards the maintenance of the fence for 2 years from the completion of fence construction. Ex. A-1 at 73, Appendix F.

119. In addition to fence construction and maintenance, NPM will provide funds for a half-time staff biologist who will act as an on-site monitor and conduct public outreach and education. Funding for this half-time staff biologist will commence upon completion of construction of the fence and continue for 2 years thereafter. Funding for fence maintenance and the half-time biologist amounts for $43,000 per year for two years. Ex. A-1 at 73, Appendix F.

120. The USFWS Recovery Plan for Hawaiian Waterbirds identifies habitat loss and degradation and predation by introduced mammals as the primary threats to ae'o, 'alae ke'oke'o and 'alae'ula, and identifies these factors as the most important causes of decline in koloa maoli. Appropriate habitat management of core wetlands is the first recovery criterion listed for each of these waterbirds. Ex. A-1 at 70-71.

121. Hamakua Marsh is a state-owned (DLNR) waterbird sanctuary located on the edge of Kailua town and is adjacent to Kawainui Marsh, a waterbird management area. Hamakua Marsh is managed as breeding habitat for ae`o, 'alae ke'oke'o and 'alae'ula, and is likely to provide future habitat for koloa maoli should a population become established on Oahu through recovery efforts. Hamakua Marsh is identified as a core wetland in the USFWS Recovery Plan for Hawaiian Waterbirds. Ex. A-1 at 71.

122. Hamakua Marsh has an unprotected perimeter of high human traffic, which has resulted in a number of negative impacts including death and disturbance of waterbirds and an accumulation of trash at the site. A portion of the north boundary of the Hamakua Marsh abuts a shopping center, where local residents and nearby restaurants often discard bread or other food in the parking area. Attracted by the food, waterbirds leave the marsh and forage for crumbs in the parking area and these birds are regularly killed by vehicles and occasionally, by people. Additionally, dog owners throw tennis balls into the marsh for their dogs to retrieve, which disturbs nesting birds or can result in direct predation. Moreover, open access to the wetland invites trespassing and illegal disposal of garbage, degrading nesting habitat. Ex. A-1 at 71.

123. Controlling access to Hamakua Marsh and educating the public about threats to Hawaiian waterbirds should provide a net benefit to endangered waterbirds by reducing activities that have resulted in waterbird mortality. Ex. A-1 at 74.

124. **Measures of Success**. The HCP identifies the timely fence construction and funding for fence maintenance and a half-time staff biologist as the measures for successful mitigation. Ex. A-1 at 75.

125. The construction of the fence is, in itself, an appropriate measure of success. Dogs have been getting into the marsh and killing birds. The fence will prevent or at least greatly hinder dogs from getting into the marsh. To prove that the fence actually reduces the amount of dog predation would require a before-and-after study of transitory and difficult-to-observe events. This would be neither feasible nor necessary. NPM proposes monitoring whether observed fatalities (generally off-marsh, typically in the parking lot) are reduced after the mitigation effort. This is an appropriate measure of success for the hiring of the biologist, who is, in part, expected to educate the public not to feed birds. *Id.* at 71-75.

c. Nēnē

126. The nēnē is the only remaining endemic goose in the Hawaiian Islands. It is listed as endangered under the ESA and by the State. Ex. A-1 at 24.

127. The draft Hawaiian Goose Recovery Plan, revised in 2004, and the State of Hawai'i Comprehensive Wildlife Conservation Strategy share several recommended strategies to benefit the Hawaiian goose. These include identifying and protecting nēnē habitat, restoring and enhancing habitat, controlling alien predators, and minimizing nēnē conflicts with human activities. Ex. A-1 at 24.

128. Nēnē typically remain on the islands on which they were hatched, but may range over large intra-island areas following the fledgling of young. The sedentary nature of the species suggests low levels of natural inter-island movement. A recent effort to translocate nēnē

from Kaua'i to Hawai'i and Maui, however, has resulted in the unexpected occurrence of birds on O'ahu. Two translocated adult geese and three goslings were documented at JCNWR, which is less than a mile from the Project area. Ex. A-1 at 25, 48.

129. Predation by non-native mammals is the greatest factor limiting nēnē populations. Feral cats, dogs, rats, and mongoose are each likely to be predators on O'ahu, where the few birds present are close to human populations. Other threats to the species include lack of access to seasonally important lowland habitats, insufficient nutritional resources for breeding females and for goslings, human-caused disturbance and mortality (e.g., road mortality), behavioral problems related to captive propagation and inbreeding depression. Ex. A-1 at 25.

130. Habitats on O'ahu that are most likely to support nēnē are lowland areas managed as golf courses, habitat for Hawaiian waterbirds, and grazed agricultural areas. In addition, areas where vegetation is mowed can be attractive to nēnē, which could include areas beneath WTGs. Ex. A-1 at 25-26.

131. Given the proximity of the Project to recently occupied habitat (JCNWR), it is possible that nēnē will use the Project area to forage during the permit term. In addition, nēnē has the potential to fly through the Project area in transit between foraging areas. Ex. A-1 at 26.

132. Applicant requests an authorized direct and indirect take of 6 adults/fledged young nēnē for the 21-year permit term. Ex. A-1 at 51.

133. Take is conservatively estimated based on as-yet unproven assumptions that the population of nēnē on O'ahu would grow through future reproduction and arrival of additional birds. The HCP assumes that the nēnē population would increase from the current 3 to 50 individuals over the 21-year permit term and that the number of fatalities would increase as the population increases. Ex. A-1 at 48-51.

134. During the first 9.33 years of operation at the 20-WTG Kaheawa Pastures I Wind Project on Maui, 21 nēnē fatalities were found or 0.11 fatalities/WTG/year. A flock of more than 100 nēnē is currently resident in the vicinity of the Kaheawa Pastures I Wind Project. The take request for the Project used the take data from Kaheawa Pastures I Wind Project and adjusted for the facts and circumstances of the Project. Ex. A-1 at 49-51.

135. Should the maximum requested take of 6 nēnē occur, it should not have a population level impact, as it would represent an increase in mortality rate of less than 0.3 percent of the population distributed over the 21-year permit term. Ex. A-1 at 51; Ex. A-1 at 74.

136. **Avoidance and Minimization**. The HCP provides for the following measures to minimize take of the nēnē:

> Measures will be taken to increase visibility of met towers and decrease night time lighting.
>
> - A vehicular daytime speed limit of 25 miles per hour and a nighttime speed limit of 10 mph will be observed on the Project area roads to minimize the potential for vehicle collision with nēnē.
> - Should nēnē begin to use the Project area for foraging or nesting, NPM will reduce vehicular daytime speed limit to 10 mph.
> - To the extent practicable, NPM will minimize the creation of suitable nēnē nesting habitat (shrubs adjacent to low-growing grass) in developing post-construction monitoring search plots.
> - Trash will be collected in lidded receptacles and removed from the construction area on a weekly basis to avoid attraction of ants and other animals such as mongooses, cats, and rats that may negatively affect the nēnē or NPM's ability to detect fatalities of nēnē.
>
> Ex. A-1 at 38-40.

137. **Mitigation**. Within six months of the COD, NPM will contribute $50,000 for fence construction at the JCNWR. If, prior to construction of the fence, USFWS and DOFAW

determine that another mitigation approach would have greater benefit to the nēnē population on O'ahu, the same level of funding could be used toward an alternative mitigation approach. Such an approach would most likely consist of funding of predator control efforts in an area of nēnē use. Ex. A-1 at 68, Appendix F.

138. Given the small size of the nēnē population on Oahu, USFWS and DOFAW have proposed a mitigation approach consisting of habitat management to reduce potential impacts of predation in suitable habitat. Ex. A-1 at 68.

139. The JCNWR contains suitable nēnē nesting habitat and is in proximity to the area where the adult pair of nēnē nested in the winter of 2013/2014. The area remains of frequent use for the O'ahu resident nēnē and is expected to be used by nēnē into the future. Fence construction is expected to benefit the nēnē population because 1) the species exhibits strong site fidelity and natal philopatry, 2) the population is assumed to grow over time at least partially due to natural reproduction, and 3) USFWS is committed to providing long-term fence maintenance and management of the area. The proposed hogwire fence will significantly reduce the predation from dogs, which have been identified as a predator of concern for the nēnē at this site, and, thus will increase the productivity and survival of the nēnē. Ex. A-1 at 68.

140. **Measures of Success**. The mitigation measure for nēnē for the Project will have been accomplished upon payment of $50,000 to USFWS within six months of the COD. Ex. A-1 at 70, Appendix F.

141. NPM will provide status/results of the construction of the fence in its annual report to the agencies. Results reported will include documentation of observed nēnē and activities within the fenced area, documentation of pig and/or dog activity within the fenced area,

and documentation of other management efforts that are facilitated by the presence of the fence. Ex. A-1 at 70.

142. If an alternative mitigation approach (other than fencing of a portion of the JCNWR) is used, the biological measures will be reported that will satisfy the net benefit requirement. Ex. A-1 at 70.

d. Pueo

143. The pueo (Hawaiian short-eared owl) is an endemic subspecies of the short-eared owl. It likely colonized the islands following the arrival of the Polynesians to the island chain and the concurrent introduction of the Polynesian rat. The O'ahu population of pueo is listed as endangered by the State. Ex. A-1 at 35.

144. The State of Hawai`i's Comprehensive Wildlife Conservation Strategy recommends a combination of conservation actions, monitoring and research. These recommendations include continuing conservation efforts at refuges and wildlife sanctuaries, expanding survey efforts to monitor populations status and trends on O'ahu, and conducting research into limiting factors such as "sick owl syndrome" and vehicle collisions. Ex. A-1 at 35.

145. Pueo are most common in open habitats, including grasslands, shrublands, and montane parklands; however, they use a broad spectrum of other habitats including wetlands, wet and dry forests, and urban areas. Pueo have been found from sea level to 8,000 feet above mean sea level. Unlike its mainland counterpart, pueo is largely diurnal. Ex. A-1 at 35.

146. Little is known about the breeding biology of pueo, but active nests have been found year round. Ex. A-1 at 35.

147. Pueo primarily consume small mammals, but their diet also includes a variety of bird species. They forage in a variety of habitats and their prey likely varies with the habitat. Ex. A-1 at 35.

148. Pueo historically occurred on all of the southeastern Hawaiian Islands including adjacent islets. They are considered sacred by native Hawaiians, but early settlers killed them and populations had declined by the late 1800s. In the 2000s, however, populations seemed to have stabilized, although populations show episodic peaks and "die-offs." Ex. A-1 at 36.

149. Pueo are susceptible to many of the same factors that threaten other native Hawaiian birds, including loss and degradation of habitat, predation by introduced mammals, and disease. They are also susceptible to pesticide poisoning, food shortages and vehicle collisions. However, pueo persist in modified landscapes and at elevations where extensive exposure to avian malaria and avian pox is certain, which suggests that the species is able to cope with some of these threats. Ex. A-1 at 36.

150. Pueo are rare on Oahu. Although none were detected during biological surveys for the Project, the species was detected once during pre-construction avian point count surveys and once during pre-construction radar surveys for the neighboring Kahuku Wind Project. Habitat within the Project area is similar to that at the Kahuku Wind Project and is consistent with the habitat used by pueo throughout the Hawaiian Islands. However, given their diurnal and crepuscular activity pattern, and the few recordings of use of the Project area and vicinity, the likelihood of the species breeding in the area is low. Pueo is assumed to be an irregular visitor to the Project area. Ex. A-1 at 36.

151. There is the potential for pueo to breed somewhere in the vicinity of the Project and to occasionally transit the Project are or use it for foraging while breeding. Ex. A-1 at 54.

152. Applicant requests an authorized direct take of 4 pueo and indirect take of another 4 pueo over the 21-year permit term. Ex. A-1 at 54-55.

153. Direct take could occur as a result of collision with the WTGs. Although the direct take over the 21-year permit term is not anticipated to exceed 1 pueo, the value is increased to account for uncertainty that is inherent when estimating the frequency and magnitude of a rare event over an extended time period. Therefore, the estimated direct take over the 21-year permit term is 4 pueo. Ex. A-1 at 53-54.

154. WTG collision-associated fatalities are likely to be low because (i) pueo are expected to use the Project area only as irregular visitors, (ii) pueo are highly maneuverable in flight and able to avoid collision, and (iii) given the low likelihood of breeding in the area and that flights high above the ground are typically used only as pre-breeding display flights, pueo using the area are unlikely to fly within the rotor swept area. Ex. A-1 at 53.

155. No pueo fatalities have been documented at operational wind farms on O'ahu. Conversely, pueo fatalities have occurred at the operational Kaheawa Pastures I Wind Project on Maui, where pueo were detected regularly during pre-construction surveys and where the species is much more common than on O'ahu. This suggests that the risk of pueo collision with WTGs may be related to pueo density and/or breeding activity, which is either very low or non-existent in the Project area. Ex. A-1 at 53.

156. The direct take of a pueo during the breeding season may result in indirect loss of dependent chick(s) or egg(s). Based on life history information about pueo, it is calculated that the direct take of 4 adult pueo could result in the indirect take of 4 chicks/eggs. Ex. A-1 at 54-55.

157. No population estimates are available for pueo on O'ahu or even more broadly in the Hawaiian Islands. The lack of systematic monitoring on O'ahu makes it difficult to assess the

effect that take of pueo resulting from the Project may have on the local population, but anecdotal observations suggest the O'ahu population is low and any take may be of concern. Nevertheless, population-level impacts are not expected because the requested take of 4 adults and 4 chicks/eggs over 21 years is low. Ex. A-1 at 55.

158. **Avoidance and Minimization**. The HCP provides for the following measure to minimize take of the pueo.

- NPM will implement low wind speed curtailment from March – November between sunset and sunrise. Although this minimization measure is proposed to reduce the potential impacts to `ope`ape`a, it will also reduce the risk to pueo, which could transit the Project at night.

- A vehicular daytime speed limit of 25 miles per hour and a nighttime speed limit of 10 mph will be observed on the Project area roads to minimize the potential for vehicle collision with pueo.

- The selection of an unguyed, free-standing met tower maximizes the ability of pueo to detect the structure and avoid collision.

- The marking of Project transmission lines to increase visibility minimizes the potential for pueo collisions.

- Construction equipment will be at the Project site for relatively short periods of time; given the low frequency of use of the area by pueo and their ability to detect and avoid structures, the risk of collision with Project equipment is negligible.

Ex. A-1 at 54.

159. **Mitigation**. NPM will contribute $25,000 by the COD to the Endangered Species Trust Fund to be used for the express purpose of mitigating impacts to pueo. Ex. A-1 at 76-77, Appendix E.

160. Due to the low level of anticipated impact to pueo and a general desire to maximize the positive effects of investments in mitigation, DOFAW will use the Endangered Species Trust Fund to consolidate contributions for pueo mitigation from approved projects. Pooled resources can be used to fund larger management projects or resolve larger research

questions targeted at the recovery of pueo on O'ahu than could have been supported through smaller scale investments. Ex. A-1 at 76.

161. The funding for research and management supports a long-term effort that, among other goals, is designed to:

- Identify and understand limiting factors on O'ahu;
- Develop habitat management approaches to reduce the impact of limiting factors;
- Improve predator control and habitat management techniques;
- Improve population monitoring techniques; and
- Improve risk assessment techniques for wind energy facilities.

Ex. A-1 at 76.

162. This mitigation will provide a net benefit to the species because the funding will contribute to the knowledge of the species or improve its habitat. Information developed through these efforts will fill in data gaps and contribute to the ability to adaptively manage mitigation efforts in the future. By pooling mitigation resources from multiple sources, the potential scope of research and management efforts will be increased. Ex. A-1 at 76.

163. **Measures of Success**. The mitigation measure for pueo for the Project will have been accomplished upon the following: (1) by the COD, NPM shall have made a contribution of $25,000 to the Endangered Species Trust Fund for pueo mitigation; and (2) within 6 months of the COD, NPM and DOFAW will have an agreement documenting that the use of NPM's $25,000 contribution shall be reserved for research and/or management efforts contributing to improving management, monitoring, or understanding risk factors for pueo on Oahu. Ex. A-1 at 76-77, Appendix F.

164. NPM will provide status reports of the funding for research or management efforts in annual reports to the agencies. Ex. A-1 at 77.

e. Ōpe'ape'a

165. Ōpe'ape'a (Hawaiian hoary bat, *Lasirus cinereus semotus*) is the only fully terrestrial native mammal in the Hawaiian Islands. It is listed as endangered by both the federal and state governments. Ex. A-1 at 17.

166. The ōpe'ape'a is considered a subspecies of the hoary bat, which is extremely common throughout North and South America. Genetic evidence suggests at least two separate arrivals of the hoary bat in Hawai'i in the last 10,000 years, with the most recent being perhaps 800 years ago. Ex. A-44 at 39-40. The Hawaiian subspecies is about 45% smaller than the Mainland hoary bat. Ex. A-45 at 9. It weighs less than an ounce, with typical wingspans of 10.5-13.5 inches. *Id.*

167. On the Mainland, hoary bats (and other bat species) are killed by wind turbines in very large numbers, usually during their annual migrations. Some evidence indicates that they may actually be attracted to wind turbines. It does not appear that the ōpe'ape'a is attracted to wind turbines, however. Ex. A-11 at 44.

168. The Hawaiian Hoary Bat Recovery Plan (1998) (Ex. A-45) and the State of Hawai`i Comprehensive Wildlife Conservation Strategy recommend conservation of known occupied habitat, development and implementation of conservation plans that guide the management and use of forests to reduce negative known bat populations, and continued support for ōpe'ape'a research. Ex. A-1 at 17.

169. The Hawaiian Hoary Bat Recovery Plan is an official document prepared by the USFWS pursuant to §4(f) of the Endangered Species Act, 16 U.S.C. § 1533(f). It says that the

decline of the ōpe'ape'a is probably a result of habitat loss. Ex. A-45 at 8. It says the species has a "moderate" degree of threat and a "high potential for recovery." *Id.*

170. Ōpe'ape'a have been observed in a variety of habitats that include open pastures and more heavily forested areas in both native and non-native habitats. Typically, ōpe'ape'a feed over streams, bays, along the coast, over lava flows, or at forest edges. Ōpe'ape'a are insectivores whose prey include a variety of native and non-native night-flying insects, including moths, beetles, crickets, mosquitoes and termites. Ex. A-1 at 17.

171. Ōpe'ape'a are known to roost solitarily in tree foliage and have only rarely been seen exiting lava tubes, leaving cracks in rock walls, or hanging from human-made structures. Roosting foliage includes hala (*Pandanus tectorius*), coconut palms (*Cocos nucifera*), kukui (*Aleurites moluccana*), pukiawe (*Styphelia tameiameiae*), Java plum (*Syzygium cumini*), kiawe (*Prosopis pallid*), avocado (*Persea Americana*), shower trees (*Cassia javanica*), ohia trees (*Metrosideros polumorpha*), fern clumps, ironwood (*Casuarina equisetifolia*); lactating female with pups on Oahu, and mature eucalyptus (*Eucalyptus spp.*) plantations. They are also suspected of roosting in stands of Sugi pine (*Cryptomeria japonica*). Ex. A-1 at 17.

172. Ōpe'ape'a are found in both wet and dry areas from sea level to 13,000 feet elevation, with most observations occurring below 7500 feet elevation. Ex. A-1 at 18.

173. Although ōpe'ape'a may migrate between islands and within topographical gradients on the islands, long-distance migration is not known. Seasonal and altitudinal differences in bat activity have been suggested. Research indicates that on the Island of Hawai'i ōpe'ape'a use coastal lowlands during the breeding season and migrate to interior highlands during the winter. However, ōpe'ape'a can also range between habitats and elevations within a single night to target optimal local foraging opportunities. Ex. A-1 at 18.

174. Breeding activity takes place between April and August with pregnancy and birth of two young (twins) occurring from April to June. Lactating females have been documented from June to August and post-lactating females have been documented from September to December. Until weaning, young of the year are completely dependent upon the female for survival. No data are available for the percentage of ōpe'ape'a young that survive to reproductive age. Ex. A-1 at 18.

175. Confirmed reports of ōpe'ape'a are known from all the main Hawaiian islands except Ni'ihau and Kaho'olawe. The species is most often seen on Hawai'i Island, Maui and Kaua'i. Ex. A-1 at 18.

176. The most thorough study of the ōpe'ape'a on O'ahu in the record is Ex. A-11, a year-long study of their behavior at 23 sites in a 56 square kilometers (13,832 ac.) area in the northern Ko'olau Mountains, including both mountain and lowland sites. Ex. A-11, at 2 and fig.1. The researchers found bats at least some of the time at 21 of the 23 sites. They said that bats occur "fairly sparsely" throughout the study area, and that their findings "do not demonstrate high abundance" of bats in the area. *Id.* at 38.

177. The choice of the study area was in part due to the presence of the two existing O'ahu wind farms and concerns about their effect on bats. *Id.* at 1.

178. The study obtained data from acoustical monitoring at all the study sites, but also obtained extensive thermographic video records of bats at the Kawailoa Wind Farm. These video recordings showed that bats often occur when they are not acoustically detected. *Id.* at 12.

179. The authors speculated that the Kawailoa ōpe'ape'a were local residents foraging in familiar territory. *Id.* at 44. In contrast, bats in Canada and the U.S. Mainland apparently encounter wind turbines mainly during annual long-distance migrations. *Id.*

180. The record shows other areas on O'ahu, besides the Northern Ko'olau study area in Ex. A-11, where bats have either been seen or acoustically detected: urban Honolulu, near Portlock, near Mililani, near Kahalu'u, and in the southern Ko'olau Mountains (Ex. A-45, Fig. 5, 1976-1996 observations), Kolekole Pass, Bellows Field, and Ford Island (Ex. B-18), and at the Poamoho Ridge Mitigation Area (Ex. A-12 at 3.9.1.4).

181. Today, the largest known breeding populations are thought to occur on Kaua'i and Hawai'i Island. Breeding was recently documented on O'ahu. Ex. A-1 at 18.

182. Relatively little research has been conducted on the ōpe'ape'a, and data regarding its habitat and population status are very limited. Ex. A-1 at 18.

183. Population estimates for ōpe'ape'a range from hundreds to a few thousand; these estimates, however, are based on limited and incomplete data due to the difficulty in estimating populations of patchily distributed bats. Ex. A-1 at 18.

184. Population estimates are also lacking for most other bat species on the U.S. Mainland. Ex. A-54 at 15.

185. Based on the detection of bats through acoustic monitors at the Project and the observed incidental take at the nearby Kahuku Wind Project, it is concluded that ōpe'ape'a use the Project area; however, bat use is expected to be low. Ex. A-1 at 19.

186. The main potential threats to ōpe'ape'a are reduction in tree cover, loss of roosting habitat, roost disturbance, increases in pesticide use, reduction in prey availability due to introduction of non-native insects, and predation. However, it is unknown what effect these

threats have on local population dynamics. Observation and specimen records suggest that ōpe'ape'a are now absent from historically occupied areas; however, the magnitude of population decline is unknown. Ex. A-1 at 18; Ex. A-44 at § I.b.

187. Studies indicate that the ōpe'ape'a population on Hawai'i Island is stable and possibly increasing. Ex. A-44 at II.

188. The hoary bat is one of the bat species most frequently killed by WTGs in the continental United States, primarily during fall migration. Collision with WTGs has resulted in ōpe'ape'a fatalities at several wind farms in Hawai'i. Ex. A-1 at 18.

189. To determine whether they have killed birds or bats, and the numbers killed, the wind energy projects with habitat conservation plans conduct periodic searches of the areas around the turbines to try to find carcasses. The searches cannot guarantee that all carcasses are found. Some may be missed, some may be removed by scavengers (such as mongooses) before they can be found, and some may rot before the search is performed. Ex. A-44 at 11.

190. Because search intensity varies from project to project and factors such as scavenger activity may be different, the ratio of observed to unobserved take estimated by the model may differ between projects. (If scavenger activity is high, the project may employ predator control so that the observed take number is more reliable.)

191. The ESRC and agencies require that the operators report estimated total take at the 80% credibility (or confidence) level. This means that according to the statistical model, there is an 80% chance that the estimated total take (observed and unobserved) is equal to or less than the true number. This means that the estimated take, as reported, is likely an over-estimate. (Snetsinger, WDT at ¶41.)

192. For example, at Kahuku, at a time when three takes had been observed prior to instituting "low wind speed curtailment" ("LWSC") a practice of feathering the turbines when wind speeds are low, that tends to protect bats, the 50% credibility level (an equal chance that fewer or greater bats had actually been taken) was five adult bats, while the 80% credibility level was seven adult bats. Ex. B-38 at 10.

193. The Kahuku Wind Farm data upon which the NPM based its predicted take, was given at the 80% credibility level, and therefore, likely over-estimated the number of bats actually taken at Kahuku. *Id.*; Ex. A-1 at 42.

194. Whenever a figure is used in these findings of fact for estimated take, it is given at the 80% credibility level unless otherwise stated.

195. Basically similar statistical models were employed in the mainland U.S. and Canada in the various studies cited in these findings of fact to determine total bat take based on the observed take.

196. Applicant is requesting take of a total of 51 ōpeʻapeʻa over a 20-year term based on two tiered levels. Ex. A-1 at 43-44 & Table 7.

197. The Tier 1 estimate requests a maximum take of 34 ōpeʻapeʻa, which is the anticipated and expected total take of ōpeʻapeʻa over the 20-year ITL term. There is inherent uncertainty in take estimates for ōpeʻapeʻa for wind energy projects due to the limited data about ōpeʻapeʻa. To account for that uncertainty, the HCP identifies a second tier of incidental take which authorizes take of an additional 17 bats if, for example, minimization measures such as LWSC are not as effective in reducing take of ōpeʻapeʻa as predicted. Ex. A-1 at 41-44 and Table 7; Tr. 8/7/17 at 76:14 to 77:2 (Snetsinger).

198. The most likely potential source of direct bat mortality is a collision or barotrauma (injury due to rapid reduction in air pressure near the tips and blades, Ex. B-35 at 62) associated with an operational WTG. Ex. A-1 at 41.

199. NPM's estimates of direct take of ōpe'ape'a for the Project was calculated using the per turbine fatality rate observed at the Kahuku Wind Farm and a conservatively high assumed value for unobserved take (based on Kahuku Wind Farm data), and adjusted for the potential effectiveness of LWSC in reducing collision risk. The level of effectiveness of LWSC used here was based on the estimated effectiveness of LWSC from mainland studies. To account for the uncertainty associated with the effectiveness of this measure in Hawai'i, 150 percent of the estimated take was used to develop the total requested take limit. Ex. A-27 (Snetsinger WDT) at ¶ 17.

200. The Kahuku Wind Farm is immediately adjacent to the NPM Project, generally to the north. The closest turbine in the Kahuku Wind Farm is less than a quarter mile from the closest turbine in the Project. Ex. A-1, Fig. 2 shows the proximity of the two projects. The farthest Kahuku turbine is a little over a mile from the Project. See Ex. B-38, Fig. 1.

201. The Kahuku Wind Farm began commercial operations on March 23, 2011. Ex. B-38 at 4. Bat carcasses were found on Sept. 15, 2011, and on April 16 and April 23, 2012. After April 23, 2012, Kahuku began using LWSC, essentially feathering the turbine blades when wind speeds were less than 5 m/s (about 11 mph.) Bats are more active at low wind speeds. Ex. A-44, Fig. 19 at 25. LWSC was implemented sunset-sunrise, April to November, Ex. B-38 at 13, because monitoring data indicated more bat activity during that time period. Thereafter, there was only one observed death of an ōpe'ape'a, in FY 2015. Ex. A-55 at 8.

202. Kahuku did not operate between July 31, 2012, and August 29, 2013. *Id.* at 13. From August 29, 2013 to January 29, 2014, it was only partially operational because the electrical grid could not utilize the full power produced at high wind speeds. All turbines were operated, however, in the low wind speeds, so it was reasonable for NPM to use this five-month period in its calculations because the turbines operated when bats were more likely to be flying.

203. The NPM HCP used Kahuku data up to July 31, 2015. In the next fiscal year ending June 30, 2016, the Kahuku Wind Farm had no observed take of ōpe'ape'a. Ex. B-12 at 13. The HCP had been prepared before the FY2016 data was reported and therefore it was not part of the analysis of estimated take. It means, however, that the record shows only one observed ōpe'ape'a death in 3.08 years while Kahuku operated with LWSC, while the HCP was based on one observed death in 2.17 years.

204. There may have been unobserved fatalities. Kahuku adjusted for these using the approved statistical methods. When there had been three observed fatalities, this indicated a total of seven adult fatalities at the 80% credibility level. Ex. B-38 at 10. The additional fatality after LWSC had been instituted boosted the estimated number of adult bats taken to ten. Ex. A-55 at 8-9. This indicates that there were probably about two unobserved takes for every observed take, at the 80% credibility level. The figure at the 50% credibility level would be lower, but is not in the record.

205. During much of the time that it has been in operation, Kahuku searched with dogs, which increased the likelihood that carcasses would be found. Ex. A-34 at 34.

206. The NPM HCP adjusted for unobserved take by making the assumption that there were two unobserved takes for each observed fatality, based on a conservative interpretation of Kahuku's statistical analysis. Ex. A-1 at 41-42.

207. NPM made adjustments for the first year when LWSC had not been in effect at Kahuku, using data from studies that indicated that LWSC would result in about a 65% reduction in bat take. This results in a higher estimate of take than just using the period in which Kahuku actually used LWSC, because for the first year, the "corrected" figure, resulting from a 65% reduction in the actual take, was still much higher than the actual experience at Kahuku using LWSC. Ex. A-1, Table 5. *See also* Ex. A-34 at 34, explaining this point that using the first year's take at Kahuku increased the NPM estimated take.

208. The NPM HCP was calculated on a per-turbine basis. Kahuku had twelve turbines, while at the time it was finalized, NPM was proposing nine turbines.

209. The NPM HCP also included an estimate of "indirect take"—potential loss of dependent young due to the death of the mother. Ex. A-1 at 42-43.

210. KNSC contends that the HCP should have included data from the Kawailoa Wind Farm in the estimate. The Kawailoa Wind Farm is located between Haleiwa and Waimea Bay, on the other side of the Ko'olau Mountains, about 4.5 miles from the Kahuku Wind Farm and the Project.

211. Kawailoa, although operated by the same company as Kahuku, has had a much higher take of ōpe'ape'a. It instituted LWSC from its start of operations in November 2012, Ex. B-33 at 5, but by the end of FY 2015, its estimated take was 42 bats (at the 80% credibility level). 24 takes had been observed. Ex. B-33.

212. As of mid-2015, Kawailoa has had more observed bat fatalities than the other five windfarms in Hawai'i combined. Ex. A-1 at Table 3, p. 19.

213. Kawailoa has far more bat activity than Kahuku. Ex. A-11, the major bat study in the northern Ko'olau Mountains, completed in 2015, has detailed information about ōpe'ape'a

activity in the general area of the Kawailoa and Kahuku wind farms, and of ōpe'ape'a elsewhere in the northern Ko' olau Mountains.

214. Bat activity was acoustically monitored from May 2013 to May 2014. *Id.* at 4. The study concluded that "Hawaiian hoary bats were **more likely to occur and be acoustically detected** in certain parts of the study area than others. Bats were detected less frequently in the windward northern areas than in the leeward southern parts of the study area." (Emphasis added.) Ex. A-11 at 38.

215. The "leeward southern parts" with more bats included the Kawailoa Wind Farm, while the "windward northern areas" included the Kahuku Wind Farm. See Fig. 4, p. 14: the two red dots on the left, western end, indicating a detection probability of > 0.120-0.240, are in the Kawailoa Wind Farm. The four dots at the northeastern end of Fig. 4 are in the Kahuku Wind Farm. The two blue dots indicate a detection probability of 0.00 to 0.13. The two green dots indicate a detection probability of 0.013 to 0.060. The easternmost green dot is right next to the NPM Project. The NPM Project is in the study area but did not have a monitoring site in this study.

216. Although the research in Ex. A-11 included thermographic video recordings that were done only at Kawailoa, Fig. 4 is based on acoustical monitoring, so it is a like-to-like comparison of Kawailoa bat activity vs. Kahuku.

217. The study gives only wide ranges for the results shown in Fig. 4 and discussed in FOF 215. The lowest value for the "red dot" sites, 0.120, is twice the highest value for the "green dot" sites, 0.60. The high end value for a "red dot" site, 0.240, is about twenty times the low end value for a "green dot" site, 0.013.

218. Ex. A-11, Fig. 3 gives a graphic representation of the monitoring data on a month-by-month basis. Unfortunately, the lines representing the different sites are not identified, but it is apparent that the sites with the most activity—which must be the "red dot" sites—have much more activity than the other sites.

219. The bat activity at Kawailoa is, by this research, much greater than Kahuku's. Because bat activity at the NPM Project is similar to the Kahuku Wind Farm, Ex. A-1 at 19, this means that bat activity at Kawailoa is much greater than at the NPM Project.

220. Other data in the record confirms that Kawailoa has a much higher level of bat activity than Kahuku. Compare the Kahuku FY 2014 Annual Report, Ex. B-38, Appendix 5, with the Kawailoa FY 2014 Annual Report, B-32, Appendix 7. Kawailoa's ground-based acoustical monitors averaged about ten times the activity of Kahuku's.

221. Pre-2011 data also showed bat activity at Kawailoa about ten times that of Kahuku. Ex. B-35 at 48.

222. In a wide-ranging discussion about the experience with bats, ESRC member Dr. Patrick Hart commented that Kawailoa was an "outlier in terms of the number of bats taken", Ex. A-34 at 24, and member Dr. John Harrison commented that there should be research to try to "nail down what it is about Kawailoa that's so different, and why particular individual turbines have been an issue". *Id.* at 25.

223. The preparers of the NPM HCP were aware of the Kawailoa data. They consciously, and correctly, chose not to incorporate it.

224. The ESRC was obviously aware that the NPM HCP used only Kahuku data to estimate take of ōpe'ape'a. This is disclosed in the HCP. The ESRC was also aware of the take figures at Kawailoa, based on the discussion at its meeting noted above. The NPM HCP also

discloses the observed bat take at all of the wind farms which have HCP's, including Kawailoa. Ex. A-1 at Table 3, p. 19.

225. The choice to use only Kahuku data, not Kawailoa, was proper because:

a. Kahuku is immediately adjacent to NPM.

b. Kahuku is also on the windward side of the Ko'olau Mountains; Kawailoa is more than four miles away on the leeward side.

c. Kahuku has similar topography and vegetation. Snetsinger, WDT at ¶ 12.

d. Kahuku has similar levels of bat activity to the NPM site.

e. Kawailoa has a much higher level of bat activity than Kahuku, and hence higher projected take, than the NPM site.

f. If Kawailoa data was included, there would have to be some weighting of the Kawailoa data vs. the Kahuku data. Any weighting—50/50? 20/80?—would be arbitrary.

226. All of the reasons given in par. 12 of Snetsinger's written testimony for using Kahuku data rather than Kawailoa are valid, after considering all of the credible evidence presented.

227. KNSC demonstrated in the contested case hearing that two reasons given by NPM for using Kahuku rather than Kawailoa are unpersuasive.

228. The difference in the operating periods for Kahuku vs. Kawailoa—about five months—does not seem significant. NPM and KNSC disputed whether several months during which Kahuku was only partially operational should be counted in the operational period for Kahuku. KNSC argued that Applicant should not have included the

months that the Kahuku wind project was only partially operational. From August 29, 2013 through January 29, 2014 the project was limited by HECO to generating a maximum of 5 MW of the possible 30 MW. Typically, during this period fewer than 12 WTGs operated in high winds, although in low winds all WTG's may have operated. Exhibit B-38 at 8. KNSC argued that the data on bat mortality collected for the five month period from August 29, 2013 through January 29, 2014 is not representative or comparable to other data from the Kahuku wind power facility because the facility was operating at 1/6 of its capacity and all the WTGs were not spinning as much as they normally do. *Id.*; Tr., 8/08/17 at 195 (Fretz).

229. Snetsinger, however, testified that it is reasonable to include the 5 months where Kahuku was partially operational as long as those are generally consistent with the operations that are ongoing at the turbines when bats are at risk and additional conservative assumptions are included in the estimate to account for uncertainty. Vol. 1, Tr. 08/07/17 at 90:3-12; *see also* Ex. B-38; Ex. A-55; Exs. A-8 & A-9. Furthermore, the Kahuku Wind Farm annual report states that during the 5 month period when Kahuku was partially operational up to all permitted turbines occurred when wind speeds were low, which is the time that bats are most vulnerable to collision. Vol. 1, Tr. 08/07/17 at 94:14-18; *see also* Ex. B-38 at 8.

230. It was reasonable to include the data from the time Kahuku was not fully operational as searches were still going on; and bats are most active and forage in low wind conditions, and the likely period of greatest risk to bats is at those lower wind speeds. Vol. 1, Tr. 08/07/17 at 94:11-18.

231. The fact that Kawailoa had 30 turbines and Kahuku had twelve was not significant given that the estimates were done on a per-turbine basis. Snetsinger's suggestion

that possibly the number of turbines in a wind farm itself may affect the per-turbine take is also not persuasive because if NPM is developed next to Kahuku it would create a group of 21 turbines vs. 30 at Kawailoa.

232. Excluding the two unpersuasive reasons for not using Kawailoa's take history, NPM still had ample justification for relying on Kahuku rather than including Kawailoa. The actual history of a wind farm operating on the adjacent land, with similar physical and environmental characteristics, and similar levels of bat activity, is the better predictor of future take.

233. KNSC stated at oral argument that the Kaheawa I and II wind projects on Maui, although adjacent, had very different take levels. Tr., 1/12/18, at 39:5-10. It is not clear that this is established by the record. No witness testified about this, and it is not in KNSC's proposed findings of fact, opening brief, responsive brief, or exceptions. Even assuming that this information can be gleaned from the record, if KNSC's point is that adjacent projects may have differing take rates of ōpe'ape'a, there is far too little in the record about the Maui projects to undermine the Kahuku/NPM comparison. We do not know whether the Kaheawa I and II sites had similar levels of bat activity, whether they had similar terrain and vegetation, their operational history in terms of LWSC or search intensity, or whether the purported differences in rates of take occurred over the same time intervals.

234. KNSC also contends that the NPM HCP should have adjusted the Kahuku per-turbine data for the fact that the NPM turbines would be taller than Kahuku's. This is also an argument that Kawailoa is more similar because the Kawailoa turbines are also taller than Kahuku's.

235. Kahuku has turbines mounted on a tower 80m high, with 48m long blades, giving a maximum blade height of 128m. Kawailoa has 100m towers with a 50.5m long blades, giving a maximum height of 150.5m.

236. NPM expects to have a mix of turbines. According to the FEIS, the largest would have towers up to 135m high, blade lengths up to 65m, for a tip height of 200m. Others might have 92m high towers and blade lengths up to 64m, for a total height of up to 156m. Ex. A-12 at 2.4.1 and Table 2-2. After the hearing officer's proposed decision, NPM stated that it would limit the highest turbines to 173m tip height. It is not clear whether this means that they would use the same larger turbines, but mounted on lower towers, or smaller turbines.

237. Depending upon the turbine used, NPM's turbines would each have a rotor sweep area 1.5 to 1.8 times that of a Kahuku turbine. (Ex. A-12, Table 2-2; KNSC Responsive Brief at 6).

238. The scientific evidence introduced at the contested case hearing does not establish that there is a direct correlation between either height or rotor-sweep area and bat mortality at the heights of the NPM turbines. Even if there is, the conservative assumptions made by the NPM HCP would more than accommodate an adjustment based on the greater height and rotor sweep area of the NPM turbines vs. the Kahuku turbines.

239. NPM primarily relied upon Ex. A-10, a comprehensive study of bat mortality from wind turbines in Canada published in 2016 (Zimmerling, et. al., 2016). Zimmerling found "no relationship between bat mortality and height of wind turbines." A-10 at 1364, see also Fig. 1. The Zimmerling study includes the data in Baerwald and Barclay (2009), Ex. B-11, discussed below, but has a much larger sample than that study.

240. KNSC points out that almost all of the turbines in the Zimmerling study were between 115m and 135m in tip height, *id.*, and argues that this data may have little relevance to whether NPM's turbines, with a maximum height of 200m (now 173m), will take more bats per turbine than Kahuku's, at 128m.

241. KNSC's argument applies with equal force to the studies relied upon by KNSC that it contends support the proposition that greater height leads to greater take of bats. These studies also lack data for tower height or blade tip height that is greater than Kahuku's.

242. Ex. B-7, (Barclay 2007) which found a very strong association between height and take, had no data for towers between the height of Kahuku's and NPM's. The tallest tower in that study was 80m high. *Id.* at Fig. 1, see also Ex. B-8. This study demonstrated a significant difference in bat take between towers less than 65m high, and those between 65 and 80m high, but had no data for towers more than 80m tall—the height of Kahuku. The author of Ex. B-7 theorized that the taller turbines killed more bats because they had started to reach up into the altitude where migrating bats were flying. This may not necessarily apply to the ōpe'ape'a, which do not migrate.

243. Ex. B-11 (Baerwald and Barclay 2009), studied nine sites in Canada. The tallest tower was 84m; one other tower was 80m. *Id.* at Table 1. Two were 50m high, the remainder were about 65m high. The study, therefore, does not tell us what differences may exist between towers 80m high (Kahuku) and 144m high (NPM before it lowered the tip height.)

244. Ex. B-11 says that "At sites with little bat activity, we expect fatality rates will also be low because there are few bats to be killed, and **tower height is inconsequential.**" (emphasis added.) *Id.* at 1347. Kahuku and NPM would be considered sites with little bat activity in terms of this study; the detection rates and fatality rates for all these Mainland study sites was

much higher than Kahuku's, or the NPM detection rate. The lowest fatality rate per turbine of any of the sites in this study was five times the rate at Kahuku under LWSC. *Id.* at 1346.

245. These findings of fact present the data for Ex. A-10 in terms of the tip height, and for Ex. B-7 and B-11 in terms of the tower height, because that is the way the authors of those studies presented the data. Generally, a higher tower will have a bigger rotor diameter, but there are some tall towers with smaller rotors. Ex. B-7 at 384.

246. The remaining sources cited for the proposition that bat take increases with height are secondary (in the sense that they rely on other studies). Ex. B-1 is a review of literature. It mentions Barclay (2007) and Baerwald and Barclay (2013), which are discussed above. *Id.* at 24. It also mentions two additional studies for the relationship between height and take of bats that are not in the record: Arnett (2008), and Fiedler (2007). The latter is, from its title, a study of a single site. *Id.* at 26. Without more, we cannot conclude that these studies demonstrate a difference due to the height differences between Kahuku and NPM.

247. Ex. A-50 and Ex. A-44 obviously rely on other studies and express the possible relationship as one that "may" exist.

248. Thus, the evidence presented at the contested case hearing does not demonstrate that the per-turbine take estimated from Kahuku should be adjusted upward because the NPM tower or blade tip height is higher, nor do they support using Kawailoa as being a more similar site.

249. Logically, the blade tip height (rather than the rotor sweep area) would be important only if significant numbers of bats flew at the higher altitudes. Ex. A-11, a study which included over 4000 hours of thermal imaging at the Kawailoa Wind Farm, found that 70% of bat flights were recorded at heights lower than the nacelle (turbine hub) (about 100m). At 23.

This data should not be interpreted as exact, however, because of two somewhat offsetting considerations: the cameras were on the ground, pointing up, capturing a field-of-view resembling an inverted pyramid, so they sampled a larger volume of air above the nacelle than below it, but bats were harder to image the farther they were from the camera. *Id.*

250. While the concept that more bats will be killed with a larger rotor-sweep area seems plausible, the two studies in the record which directly address this question came to contrary conclusions. "It might be expected that as rotor-swept area increased, more animals would be killed per turbine, but our analyses indicate that this is not the case. Rotor-swept area was not a significant factor in our analysis." Ex. B-7 at 384. Ex. A-9, at 69, did find that turbines with a bigger rotor-sweep area, mounted at the same height, did cause more bat fatalities, but this study was limited to one location. Ex. B-1, at 24, says that rotor-swept area "presumably" accounts for some of the differences found in the number of bats taken at taller towers but by its wording this seems to be an assumption rather than something proven by study.

251. On the current record, the concept that there is a direct correlation between rotor-swept area and bat fatalities must be considered unproven.

252. Even if there should have been an adjustment of the Kahuku data for either height or rotor-sweep area, several conservative adjustments made to the Kahuku data for the NPM HCP would more than make up the 1.5X-1.8 times difference in the rotor-sweep area between the NPM turbines and the Kahuku turbines.

253. First, the requested take in the NPM HCP incorporates a 50% increase in the number of bats that the analysis actually projected—51 bats being the requested take, 34 being the projected take.

254. Second, the NPM HCP, by using a ratio of two unobserved deaths for every observed death in the Kahuku data, increased the number of total deaths by 20% over the amount that would have been estimated using the statistical analysis actually employed at Kahuku. Snetsinger, WDT at fn. 1.

255. Third, NPM has reduced the number of turbines proposed from 9 to 8. This would cause an 11% decrease in the expected take calculated on a per-turbine basis.

256. Fourth, the NPM HCP did not incorporate the fact that Kahuku went another year without an observed take in FY 2016. This would reduce the per-year take at Kahuku, and thus reduce the NPM estimated take.

257. A simple way of considering the data is that Kahuku operated for three years with LWSC and had one observed bat take. Using a high estimate of the unobserved take, this means that it killed three bats in three years, or one per year. Kahuku has twelve turbines. NPM will have eight. Multiplying NPM's rotor sweep by 1.5-1.8X, the total rotor-sweep of the two projects is similar. This strongly indicates that the NPM HCP estimate that it will have 1.7-2.5 bat takes per year is reasonable.

258. KNSC's suggestion that the higher rate of bat take at Kawailoa, per turbine, is due to it having higher towers than Kahuku's is speculative, based on the record in the hearing. The Kawailoa towers are 100m high; the Kahuku turbines are 80m high. The rotor-sweep area is about the same per turbine because the blade lengths are about the same. The much greater bat activity at Kawailoa is a more likely explanation for the higher rate of take.

259. Monitoring at Kawailoa shows that bats continue to be there, despite the estimated take of 54 ōpe'ape'a between 2012 and 2015. Ex. B-34, Fig. 1 at 7. Recorded activity was much higher in 2015 than 2013 or 2014, but this may result from the substitution of better

detectors in late 2014, rather than an actual increase. Ex. B-33 at 10-11. There is, however, no apparent significant decrease in bat activity at Kawailoa after these years of operation.

260. At Kahuku, as well, ōpe'ape'a continued to be observed in low numbers from July 2013-July 2015 (the last data that appear in the record), Ex. A-55, Appendix 5, with no apparent change in the seasonal pattern.

261. While this information about continued bat presence at Kawailoa and Kahuku should not be over-extrapolated, for Kahuku, at least, it indicates that the fact that only one bat take was observed in the three years after LWSC is not the result of the Kahuku bats being nearly extirpated in 2011-2012 when three were taken before LWSC. Kahuku has had a consistent low level of bat activity.

262. Ex. A-11 shows that ōpe'ape'a are present, in varying numbers, throughout a study area of almost 14,000 acres. The NPM Project would occupy about 700 acres, Ex. A-12 at 1.2, although the actual area of turbines and pads is considerably less. It is not one of the areas of high bat abundance in the Northern Ko'olau region. Ex. A-11, Fig. 4.

263. Other than the NPM Project, there is no reasonably foreseeable additional onshore wind project planned for O'ahu. Ex. A-1 at 56. While the North Shore of O'ahu has the best wind resources on the island, no wind projects beyond NPM's can be developed without costly upgrades to HECO's transmission lines. Ex. A-12 at 2.3.1, 2.3.4. Even if another onshore wind project is proposed for O'ahu, its potential effects on the ōpe'ape'a will have to be evaluated, including potential cumulative effects.

264. KNSC points out that the actual rate of take of ōpe'ape'a at Hawai'i wind farms has exceeded that projected in their habitat conservation plans. KNSC argues that this casts doubt on the credibility of such projections.

265. Only two other habitat conservation plans are in the record: Kahuku (Ex. B-23, 2010), and Kawailoa (Ex. B-35, 2011.) Both habitat conservation plans attempted to estimate future take by using data from the U.S. Mainland and Canada that correlated bat fatalities with the number of passes that bats made through the wind farm area. They then extrapolated this data to their proposed projects. (Ex. B-23 at 71-73; Ex. B-35 at 85-91. In hindsight, these were estimates from situations—mostly bats struck during their annual migrations—that poorly resembled the conditions at Kahuku and Kawailoa. The NPM HCP relies on three years of data on an adjacent site with similar environmental conditions and similar levels of bat activity.

266. **Avoidance and Minimization.** Ōpe'ape'a roost in non-native and native woody vegetation that is at least 15 ft. (4.5 m) or taller. To minimize potential impacts to ōpe'ape'a, woody plants greater than 15 ft. (4.5 m) tall will not be removed or trimmed between June 1 and September 15 during the installation and ongoing maintenance of the Project structures. Ex. A-1 at 38-40.

267. Barbed wire will not be used on perimeter fences required to secure Project infrastructure to avoid the risk of entangling bats. Ex. A-1 at 38-40.

268. **LWSC**. To reduce the risk of take of ōpe'ape'a, the HCP provides for the implementation of LWSC. The HCP provides that the cut-in speed for LWSC will be 5 m/s and feathering of blades below cut-in speed between sunset and sunrise, March – November, and as otherwise necessary and determined to be appropriate through Adaptive Management. Ex. A-1 at 39.

269. Curtailment refers to a practice in which wind energy is available, but is not being collected and supplied to the grid. Curtailment can be implemented by the wind operator as an operational minimization measure. This involves increasing the wind speed at which turbines

will "cut-in" and start producing power, as bat collisions happen at a much higher rate when wind speed are low. Although wind turbines do not generate power below the cut-in speed, turbine blades continue spinning and therefore still pose a collision risk to wildlife. To combat this risk, blades are often feathered, which means they are turned parallel to the wind and therefore will not spin below the cut-in speed, although they may rotate very slowing (called free-wheeling). Ex. A-44 at 7.

270. Research suggests that more bat fatalities occur during relatively low-wind periods. Non-spinning turbine blades and turbine towers do not kill bats. Raising turbine cut-in speed (i.e., the lowest wind speed at which turbines generate power to the utility system) above the manufactured cut-in speed (usually 3.5 – 4.0 m/s on modern turbines) renders turbines non-operational until the higher cut-in speed is reached and turbines then begin to spin and produce power. Thus, raising turbine cut-in speed during low-wind periods should reduce bat kills. Ex. A-5 at 2.

271. Based on the best available science low wind speed "[c]urtailment is currently the primary minimization measure implemented by wind farms in the U.S., including those here in Hawai'i," Ex. A-44 § IV.c. at PDF page 7, for reducing incidental take risks, and is a wind industry best management practice highly effective at minimizing bat take. Vol. 1, Tr. 08/07/17 at 14:21-25.

272. Various studies in the US and Canada have looked at the impacts of raising cut-in speeds on number of bat fatalities. Results from studies conducted across numerous ecosystems and facilities, have consistently shown a decrease in fatalities of about 50 percent or more once cut-in speeds are equal to or greater than 5.0 m/s. Ex. A-44 at 7.

273. The LWSC controversy in this case is whether the cut-in speed for LWSC should be 5 meters/second as proposed by the HCP or the higher cut-in speed of 6.5 m/s (about 14.5 mph) advocated by KNSC. Increasing cut-in speed from 5 to 6.5 m/s would increase the amount of time that turbine blades are not spinning or feathering. However, the studies are inconclusive as to whether there is a significant difference in minimizing bat fatalities when the cut-in speeds are increased from 5 to 6.5 m/s.

274. In its 2008 annual report, the Bats and Wind Energy Cooperative stated that their data indicated no significant difference in fatalities between these two changes in cut-in speed (5.0 m/s and 6.5 m/s). But with low statistical power to detect such a difference, the report concluded that further research is needed to determine whether lower changes in cut-in speed may provide the same biological effects as higher cut-in speeds with less financial cost. Ex. A-6 at 27.

275. A study reported in Frontiers in Ecology and the Environment noted that contrary to prediction, there was no difference in bat fatalities between the 5.0 and 6.5 m/s treatments during either year of the study, and curtailment at 5.0 m/s proved to be far more cost effective. However, the authors found little differentiation in the amount of time different cut-in speed treatments were in effect, which may explain in part why they found no difference in bat fatalities between the two treatments. Ex. A-5 at 6-7.

276. The Fowler Ridge Wind Energy Facility (Indiana) study is the first to demonstrate that bat casualty rates were not only significantly different between control and treatment turbines, but that bat casualty rates were significantly different between cut-in speeds raised to 5.0 m/s (50% reduction in overall bat mortality) versus turbines with cut-in speeds raised to 6.5 m/s (78% reduction in overall bat mortality). Ex. B- 15 at 4, 70.

277. DOFAW's December 2015 Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document ("Bat Guidance Document") recommends "a minimum cut-in speed of 5.0 m/s, increasing to a higher cut-in speed through adaptive management if the rate of bat take is higher than initially expected." Ex. A-44 at § IV.c.; Vol. 1, Tr. 08/07/17 at 139:7-143:25. The proposal in the NPM HCP—that LWSC begin at 5 m/s, and that increases be considered through adaptive management if the rate of bat take is higher than initially expected—is what the Bat Guidance document recommends.

278. Increasing cut-in speed reduces operating time to generate power. Lost power production resulting from experimental treatments at one Mainland wind facility was markedly low when considering total annual productivity, but power loss was three times higher for the 6.5 m/s change in cut-in speed as compared with the 5.0 m/s treatment. Ex. A-5 at 2, 6-7. The amount of power lost from LWSC will depend upon the actual wind characteristics at the site in question during the hours and seasons that LWSC is implemented and hence, the data from this study cannot necessarily be extrapolated to NPM.

279. There is, however, a basic physical relationship between wind speed and power generated: the power increases as the cube of wind speed. Id. at 6-7. Thus, the ratio between the power generated at 6.5 m/s vs. 5.0 m/s is the ratio of the cube of 6.5 to the cube of 5, or about 2.2 times.

280. When questioned by KNSC's attorney about LWSC at a higher speed, NPM President Mike Cutbirth testified:

> Q And you could curtail operations at 6.5 meters per second?
>
> A Well, I suppose the project could be operated however we wanted to operate it.
>
> Q So you could, there is no--

A Well, we could, except that we have minimum production requirements under our power contract and so that's not really something that would satisfy those requirements. Curtailing production could potentially put us in a situation where we're not meeting our production requirements.

Q Have you looked at that specifically, or are you guessing right now?

A Well, I'm not guessing. That's just a statement of fact.

Tr., 8/07/17 at 23:20-25-24:1-4.

281. From this testimony, it is clear that although it would be possible from an operational standpoint to institute LWSC at 6.5 m/s, it would jeopardize NPM's ability to meet its requirements under its power contract.

282. NPM has obtained a Power Purchase Agreement with HECO. Ex. A-12 at 1.5.

283. Inability to meet the terms of a Power Purchase Agreement is obviously a significant economic problem for the applicant. Even if the terms can be renegotiated, a Power Purchase Agreement requires PUC approval. *See In re Maui Electric Co.*, 141 Haw. 249 (2017).

284. The record shows that NPM has somewhat unfavorable economic terms (for them) for the sale of electricity: they will develop the lowest cost wind energy project in the history of Hawai'i and will generate electricity at one-half the cost of burning oil. (Ex. A-31, WDT of Cutbirth at ¶12). The project needs to generate close to the anticipated power output to be economically viable, Ex. A-12 at 2.3.2.

285. There is also a statement in the ESRC minutes, regarding LWSC, that many of the wind facilities in Hawai'i "are at the edge of being profitable," although without more information this statement cannot be given great weight. Ex. B-21 at 5.

286. Lost power output is not just an economic issue for the Applicant. There is also a cost to the public: it reduces the amount of renewable energy generated. *See* FOF 342-345 below.

287. The best data in the record correlating bat activity with wind speed in Hawai'i is the study in the northern Ko'olau area, Ex. A-11. According to this study, at Kawailoa, where the researchers obtained extensive data from thermal imaging, "bats were more likely to be present when mean wind speeds were < 4.6 m/s." *Id.*, caption to Fig. 19, at 25. The study also says that "bats were more likely to be present when maximum wind speeds were <8.2 m/s." *Id.*, caption to Fig. 25 at 29. The difference between the two statements is due to the first referring to mean wind speeds, the second to maximum speeds, i.e. gusts, in ten-minute intervals. *Id.* At 28. According to Fig. 19, about 80% of bat observations occurred when mean wind speeds were < 5 m/s.

288. LWSC at speeds between 5 m/s and 6.5 m/s has not been proven to be an effective means of significantly reducing bat mortality. FOF 273-277.

289. To require LWSC at 6.5 m/s at the outset of operations, rather than as a part of adaptive management, is not necessary to minimize and mitigate the impacts of the take of ōpe'ape'a to the greatest extent practicable.

290. The HCP, in adopting a LWSC that begins at 5 m/s, increasing through adaptive management if the rate of take is higher than expected, is consistent with the recommendations in the Bat Guidance Document.

291. The ESRC's approval of the HCP constitutes its expert and professional judgment that to require LWSC at 5 m/s, increasing if the rate of take exceeds expectations, is an appropriate condition consistent with the standards of an HCP.

292. Whether the NPM Project would experience significantly fewer ōpe'ape'a fatalities if it operated with LWSC at 6.5 m/s vs. 5 m/s is, on the current record, highly speculative. Kahuku, operating next door with a project of roughly similar scale, had one

observed ōpe'ape'a fatality in three years with LWSC at 5 m/s. It cannot be known if it would have had zero observed take at 6.5 m/s.

293. **Any** action that reduces the time that blades spin when bats are flying **may** reduce bat mortality. The record indicates that factors that **may** influence ōpe'ape'a activity include hours of the night, number of insects, changes in barometric pressure, humidity, and other weather factors. *See* Ex. A-11 at 43-45. One focus of research is to learn more about these factors so that wind farms can operate in ways that take fewer ōpe'ape'a. None are sufficiently proven to require them as mitigation measures. They can be, in the future, through adaptive management.

294. Given the current state of knowledge, the practical difficulties of a 6.5 m/s LWSC, the modest scale of the estimated take, the tactic recommended by the ESRC in the Bat Guidance Document, and endorsed again in its recommendation of approval of the NPM HCP, is the right one: begin LWSC at 5 m/s, and if problems emerge, or research indicates better strategies, use adaptive management, which could include LWSC at higher speeds, longer seasonal restrictions, using higher LWSC at certain hours, or raise the speed taking certain weather factors into account.

295. At that point, the actual operational history of the project, and, perhaps, further research, would inform a more effective response. The number of possible options and the technical complexity of deciding which ones would be best in a specific instance are factors which strongly indicate that the ESRC, along with DOFAW and USFWS, should review the issue if there is a problem in the future. It is possible that these measures may be more effective than an across-the-board increase in LWSC to 6.5 m/s, and cause less loss in power generated.

296. The conditions of approval will require that the LWSC issue be re-visited if the rate of take exceeds the projections in the HCP.

297. **Mitigation.** According to the Bat Guidance Document: "The best available information to date indicates that habitat restoration that enhances or increases forested and foraging areas for bats is an optimum mitigation approach..." Ex. A-44 at 19.

298. "Studies on Hawaiian hoary bat activity and presence have shown that forested areas are positively associated with bat occupancy, though native- versus alien-dominated areas are not a significant factor tied to occupancy." *Id.* at 20.

299. Both the Bat Guidance Document and the USFWS Recovery Plan identify research as an important need to help ensure the survival and recovery of the ōpe'ape'a.

300. The Bat Guidance Document recommended a specific funding level of $50,000 per bat taken for mitigation, based on the cost of restoring or protecting forest areas and the habitat needs of the ōpe'ape'a. Ex. A-44 at 20.

301. The specific mitigation project—to improve habitat and prevent degradation of existing habitat at Poamoho Ridge, a site that has been recommended for inclusion in the Natural Area Reserve System —was developed in consultation with DOFAW and is consistent with the Bat Guidance Document.

302. The Poamoho Ridge site currently provides habitat for the ōpe'ape'a. It includes ōhi'a/'ōlapa forest and ōhi'a/koa forest The habitat is, however, declining because of feral pigs, which destroy vegetation, and invasive weeds. Ex. A-12 at 3.7.3. DLNR currently has funding to fence the site but not to maintain the fence, or fund control of invasive weeds. *Id.*

303. The specific plan is that NPM would fund fence maintenance, feral pig removal, invasive weed control, monitoring, and research, at the level recommended in the Bat Guidance

Document. Ex. A-1 at 58-61. The Tier One funding commitment is $1.758 million. *Id.* at Appendix F, Table F-1. NPM will have to pay this amount even if it does not take the expected number of bats. If Tier 2 mitigation is triggered, the funding requirement will be an additional $894,000. *Id.* Tier 2 mitigation will be implemented prior to reaching the Tier 1 take estimate if it is determined that the limits of Tier 1 may be exceeded before the 20-year term of the ITL. Tr. Vol. 1, 8/7/17 at 76:14 to 77:7; Ex. A-1 at 44, Ex. A-1 at 65-67, Snetsinger WDT at ¶16.

304. Although much of the Poamoho project area is good quality native forest, the fence maintenance, pig removal, and invasive weed removal would protect it from degradation that would otherwise occur, and thus preserve its qualities as ōpe'ape'a habitat. The Poamoho Ridge plan would also support a forested corridor connected with the Ahupua'a O Kahana State Park and forested habitat managed for conservation in neighboring military reservation areas. Ex. A-1 at 58-61. Mitigation measures also prevent the degradation of forest that support roosting activities. Tr. 8/7/17 at 112:14 to 113:5; Tr. 8/8/17 at 202-22 to 203:7, 224:10-13.

305. The Bat Guidance Document also recommends that mitigation projects should avoid close proximity to the impact area, that restoration should occur on the island where the impact is occurring, and that restoration efforts should focus on restoring native habitat so as to provide net environmental benefits. Ex. A-44 at 20. The NPM HCP is consistent with all of these recommendations.

306. At oral argument, KNSC's counsel agreed that the mitigation proposed in the NPM HCP is exactly the type of mitigation recommended in the Bat Guidance Document, although arguing that the ESRC should reconsider its recommendations. Tr., 1/12/18, at 43:11 to 44:14.

307. The Bat Guidance Document constitutes the best available science concerning what mitigation should be done for ōpe'ape'a by wind energy projects. The approval of the Bat Guidance Document by the ESRC constitutes its professional judgment and expert opinion that the type and amount of mitigation recommended in the Bat Guidance Document is appropriate to offset the expected take of ōpe'ape'a.

308. The ESRC's recommendation that the HCP be accepted constitutes its professional judgment and expert opinion that the proposed ōpe'ape'a mitigation meets the requirements of an HCP.

309. The proposed mitigation should more than offset the take of ōpe'ape'a. The level of mitigation required in the HCP, which follows the Bat Guidance Document, is to protect habitat sufficient for the number of bats estimated to be taken, given the best available scientific evidence. The amount of take, however is based on the 80% credibility level. This overestimates the actual take. The Tier One commitment thus overcompensates for the take of bats, because 34 bats at the 80% credibility level means that somewhat fewer than 34 bats have probably been taken. Similarly, the Tier Two commitment, which is triggered when the estimated take reaches 34 bats, will likely be triggered before the actual take is 34 bats. In addition, the benefits of habitat preservation at Poamoho Ridge should last longer than the 21 year term of the HCP. Thus, the HCP should improve the chances for recovery of the ōpe'ape'a.

310. The HCP provides that NPM will contribute towards habitat improvement at Poamoho Ridge by providing annual funds to the Ko`olau Mountains Watershed Partnership ("KMWP") or another mutually agreed upon organization for an 8-year period to cover the costs of two full-time employees per year performing forest restoration, management, and monitoring activities including fence maintenance, bat acoustic monitoring, pig/goat control

and monitoring, and invasive plant removal and monitoring within the fenced area, as well as needed supplies and helicopter time. If Tier 2 mitigation is required, habitat improvement contributions will continue for an additional four years. It is anticipated that the management work will be implemented by KMWP. Ex. A-1 at 63.

311. By removing invasive species, fencing to limit predators, removing pigs, and maintaining and improving the existing known habitat on Poamoho Ridge, NPM is providing an improved natural habitat for bats which presumably would provide additional food resources, thereby improving ōpe'ape'a survival and productivity and contributing to an increased likelihood of the survivability of the species. Vol. 1, Tr. 08/07/17 at 111:23-112:24. 215. Due to the lack of information available for the Hawaiian hoary bat, Applicant used surrogate measures to determine what would be appropriate mitigation for `ope`ape`a based on guidance from the Agencies as well as based on the ESRC Bat Guidance. Vol. 1, Tr. 08/07/17 at 118:16-20. Such measures include fencing of habitat, fence maintenance, invasive weed control, and native reforestation, employee field observation and site maintenance functions which are expected to achieve a net benefit to ōpe'ape'a by providing a sustained area of native high quality ecosystem. Vol. 1, Tr. 08/07/17 at 117:21-118:20; Ex. A-29 (Oller WDT) at ¶¶ 28-32, 95-97.

312. KNSC's criticism of the mitigation was primarily based upon skepticism about the effectiveness of mitigation for the ōpe'ape'a, citing comments made during the course of the March 31, 2015 ESRC meeting by Dr. Jacobi and Dr. Fretz, and USFWS representative Kristi Young. See KNSCs' Responsive Brief to Exceptions at 11-12, citing Ex. A-34 at 23-24.

313. After this meeting, however, the ESRC held its workshop on the Bat Guidance Document and unanimously adopted it at its December 17, 2015 meeting, with Drs. Fretz and Jacobi voting in favor. (Young was apparently absent.) Ex. A-35 at 1-2.

314. In his testimony at the contested case hearing, Dr. Fretz clarified that he had made these comments before the Bat Guidance Document had been finalized, and after a set of research projects had been formulated, and at the end of that, he was "more comfortable with a habitat management project like this that was accompanied by a research project." Tr., 8/08/17, at 206:10-25-207:1.

315. The Bat Guidance Document and the ESRC's approval of the HCP are entitled to much greater weight than comments made by ESRC members in the course of discussions, especially when Dr. Fretz explicitly says that information he received after making those comments during the bat workshop gave him greater confidence in the proposed mitigation, and Dr. Jacobi stated, in voting for the HCP, that he was "generally satisfied with the restoration work at Poamoho." Ex. A-36 at 6.

316. KNSC also cited a study of removal of axis deer and goats from the Kahikinui Forest Reserve and Nakula Natural Area Reserve, done between 2012 and 2014, which indicated that ōpe'ape'a activity, as measured by acoustical detection, declined after removal. Ex. B-20. It is unknown whether there is a causal relationship between the removal of these animals and the decline in bat activity. Vol. 2, Tr. 08/08/17 at 205:15-206:2; Snetsinger Vol. 1, Tr. 123:10-124:7. The study itself noted that another environmental variable—changes in rainfall—might have caused the result. Ex. B-20 at 13. In addition, the benefits to ōpe'ape'a which would be expected as a result of the removal of deer and goats and the fencing of the area—the regeneration of the forest—would obviously take longer to materialize than the length of the study in question.

317. KNSC also points to testimony it elicited from two witnesses who conceded that they could not demonstrate that bat mitigation or research, to date, had caused an increase in the ōpe'ape'a population. KNSC Closing Brief at 11-12.

318. KNSC draws too broad a conclusion from the witnesses' candor. It is extremely difficult to determine the population of ōpe'ape'a, a small, nocturnal, patchily distributed solitary animal. See Ex. A-45 at 14. Populations of wild animals can vary greatly due to various environmental factors and it is difficult to determine cause and effect. See Ex. B-13 at 20. Preserving its habitat benefits a species even if biologists are unable to quantify the effect.

319. KNSC argues that research does not show ōpe'ape'a are more common in native forest than non-native forests. They are more common in **forests**, however. Ex. A-44 at PDF p. 19-20. The Poamoho Ridge area provides existing forested habitat. The removal of pigs and alien weeds will preserve this existing forest habitat for the ōpe'ape'a. The Bat Guidance Document recommends mitigation that preserves native forests because of their other environmental benefits. *Id.* at 20.

320. The Hawaiian Hoary Bat Recovery Plan identifies research as one of the primary actions needed to move toward recovery and delisting of the species. Priority research areas include: (i) ōpe'ape'a population size and trend and population distribution on each island; (ii) habitat selection and suitability for roosting, foraging, and breeding; (iii) diet studies including prey selection, prey presence/absence and availability; and (iv) in-depth monitoring of bat response to a variety of bat mitigation projects. Ex. A-45.

321. Research is an acceptable form of mitigation if information gained through research will inform and benefit future mitigation efforts. Ex. A-44; Tr. 8/7/17 at 113:19 to 114:5; Tr. 8/8/17 at 202:22 to 203:7, 207:10 to 208:1; 208:8-18, 224:10-13.

322. The ERSC Bat Guidance includes support for research targeted at improving our knowledge of the ōpe'ape'a so that future mitigation projects can leverage results to improve the efficacy of mitigation efforts. Snetsinger WDT at p. 29.

323. For example, if new research results point to increased reductions in ōpe'ape'a fatalities by including other weather variables in curtailment triggers, Applicant could adjust the approved strategy in consultation with DOFAW and USFWS to further reduce impacts.

324. Within 6 months of the COD, NPM and the agencies will have agreed on the research proposal and funding shall occur within 6 months thereafter. Planning for research projects for Tier 2 will commence when 75 percent of the take associated with Tier 1 is reached. Ex. A-1 at 62, Appendix F.

325. An alternative mitigation proposal being considered for the conservation of ōpe'ape'a habitat is the acquisition of unprotected land to safeguard it from development. Acquisition of land for this purpose would mitigate impacts beyond the permit term. The selection of any acquisition property would require the approval of USFWS, DOFAW, and the ESRC. Ex. A-1 at 61, 65.

326. **Deterrence.** The Bat Guidance Document reviewed research on technological means to deter bats from coming close to wind turbines, such as ultrasound and low-level ultraviolet light. Ex. A-44 at PDF p.8-11.

327. This research—some done in Hawai'i—has shown considerable promise. Both ultrasound and UV light deterred ōpe'ape'a. Some Mainland research has shown success in reducing bat mortality around wind turbines. *Id.*

328. The Bat Guidance Document states, however:

> Both acoustic and UV deterrents have the potential to reduce the number of bat fatalities at wind energy facilities, and the USFWS and DOFAW have strongly

> encouraged ITL applicants to invest in deterrent research. However, given that the technology is unproven and currently expensive, applicants have been reluctant to do so without receiving credit for mitigation. The ESRC has identified that take reduction is a priority research topic. However, under the Federal ESA and associated regulations, measures to avoid and minimize take cannot be substituted as mitigation for take that is anticipated to occur under an Incidental Take Permit. Permitees are required to minimize take to the "Maximum Extent Practicable," as defined in the ESA regulations. Given that that federal regulations will not allow this type of research to serve as mitigation, the ESRC is not likely to recommend approval of an HCP that includes such provisions. Therefore, the ESRC encourages agencies, applicants, and other interested parties to pursue such research independently. If in the future federal regulations change to allow for such research to receive mitigation credit, the ESRC may consider changes to this guidance.

329. Research on avoiding the take of ōpeʻapeʻa, and implementing it if effective technologies are found, would seem a potentially effective way of ensuring the survival and recovery of the species. While federal regulations may not allow such research into deterrence to be credited **in lieu** of mitigation, in the context of the NPM HCP, which includes mitigation that should fully offset the expected take, the BLNR should have the power to require such research, and implementation of techniques if they are shown to be effective, **in addition to** the mitigation currently required. The HCP agrees that it should implement deterrence if it is proven "effective, economical, and commercially-viable", with consultation with the agencies. Ex. A-1 at 84. This Decision and Order therefore includes a requirement for NPM to fund research into deterrence, and to implement deterrence if it is demonstrated to be effective and commercially viable.

330. **Measures of Success**. The HCP identifies the completion of tasks, such as, but not limited to, having an approved research plan, timely funding the Poamoho Ridge habitat improvement plan, and having conducted acoustic bat monitoring. The HCP also lists monitoring of efforts in removal of pigs and goats and invasive plants. Ex. A-1 at 65-66. See discussion of Adaptive Management below. These are appropriate measures of success.

F. Adaptive Management

331. "Adaptive Management" is defined by the U.S. Department of the Interior as "a structured approach to decision making in the face of uncertainty that makes use of the experience of management and the results of research in an embedded feedback loop of monitoring, evaluation, and adjustments in management strategies." Ex. A-1 at 86.

332. Uncertainties include a lack of biological information for the Covered Species, lack of knowledge about the effectiveness of mitigation or management techniques, or doubt about the anticipated effects of the Project. Ex. A-1 at 86.

333. Adaptive Management is a required component of all HCPs. An adaptive management strategy must specify the actions to be taken periodically if the plan is not achieving its goals. *See* HRS § 195D-21(b)(2)(H).

334. An adaptive management strategy allows for the incorporation of new information into conservation and mitigation measures during HCP implementation. It allows for flexibility to adopt and implement improvements in mitigation and minimization plans or avoidance and minimization measures by adjusting approaches to take advantage of the latest research studies and technologies. Such flexibility allows for HCPs to incorporate current best science approaches to mitigation and reduction of impacts. Ex. A-1 at 86.

335. Section 9.5 of the HCP discusses its Adaptive Management strategy. In addition to discussing implementation of Tier 2 mitigation for ōpe'ape'a if take exceeds the number allowed in Tier 1, the HCP states that the NPM "will implement the use of proven new technologies or measures to minimize take as approved by and reasonably determined to be necessary by USFWS and DOFAW in consultation with Na Pua Makani Power Partners." Ex. A-1 at 86-87; Ex. A-29 (Oller WDT) at ¶ 85.

336. According to the Applicant, the annual reporting requirements also provide an opportunity to engage with DOFAW, USFWS, and the ESRC to address challenges in achieving the stated goals. Ex. A-29 (Oller WDT) at ¶ 86.

337. Adaptive Management, as proposed in the HCP, is considered when an observed fatality of a Covered Species occurs, when challenges to meeting measures of success are identified, and during the annual report review process. *See* Vol. 1, Tr. 08/07/17 at 63:3-23. When an observed fatality for a Covered Species occurs, the first question addressed with the Agencies is, "[i]s there any adaptive management that is needed?" (i.e., is there something we could have done to prevent this?). *See id.* For example, if a Hawaiian hoary bat fatality is observed outside of the period when LWSC is being implemented, Applicant would consult with USFWS and DOFAW to consider if expanding the period of LWSC is appropriate. In general, the answer to this question would be yes, there is a risk that we may be able to reduce by expanding the period of LWSC; however, expansion of this period may not always be appropriate (*e.g.*, if the observed fatality occurs during an anomalous weather event). Similarly, permitting challenges for the Hamakua Marsh fence might suggest adapting the approaches described in the HCP by adjusting the fence parameters. *See* Ex. A-1 at 71-74.

338. Research is an acceptable form of mitigation if information gained through research will inform and benefit future mitigation efforts. Given the limited knowledge about ōpeʻapeʻa , research is an appropriate form of mitigation provided that the knowledge gained from research will inform and benefit future mitigation efforts. The HCP's mitigation strategy calls, in part, for funding for research but relies on other, future wind projects to implement mitigation strategies arising out of the research. The requested ITL is for a 21-year period. Moreover, currently there is ongoing research on ōpeʻapeʻa . It is foreseeable, therefore, that

during the permit term, research efforts may conclude that protecting habitats other than Poamoho Ridge may be more effective in the survival of ōpe'ape'a on O'ahu, especially as current knowledge indicate that ōpe'ape'a use a variety of different, including disturbed, habitats. If that occurs, the HCP can be amended. It would be too speculative to have an alternative project at the present time, and to say that the mitigation project could be changed in the future without a definite process or proposal would leave the current HCP open to a charge that it is too indefinite.

G. Cumulative Environmental Benefits

339. H.R.S. § 195D-21(c) provides that the board shall disapprove a plan if "the cumulative activities, if any, contemplated to be undertaken within the areas covered by the plan are not environmentally beneficial".

340. It is not entirely clear whether in making this determination, the Board should consider only the negative impacts of the proposed take, balanced against the environmental benefits of the mitigation, or whether, in the case of a wind farm, the board should also consider the environmental benefits of the wind farm in reducing greenhouse gas emissions.

341. At oral argument, counsel for KNSC agreed that the global warming/greenhouse gas issue could be considered for the limited issue of whether the cumulative activities are environmentally beneficial. Tr., 1/12/18, at 36:25-38:8.

342. The findings of fact will first discuss whether the cumulative activities are environmentally beneficial without considering the benefits of renewable energy, then discuss the balance including renewable energy.

343. The Project, as explained above, more than offsets the individual take of birds and ōpe'ape'a through the mitigation commitments. For birds, the fencing of the Hamakua Marsh

will provide long-term predator control that should outlast the permit term. For the ôpe'ape'a, the Poamoho Ridge mitigation project, by protecting an area of high-quality native forest, preserves habitat for other native plants and animals as an incidental benefit.

344. Without considering the positive environmental effects of wind energy, the Project provides a net environmental benefit.

345. Considering the benefits of wind energy, solely for this issue of deciding whether the cumulative activities are environmentally beneficial, the Project, with the original nine turbines, would have reduced $CO^2$ emissions by 54,700 tons per year, or about 1.1 million tons in its 20 year life, compared to generating electricity by burning oil. Ex. A-12 at Table ES-1. The decrease to eight turbines might proportionately reduce this benefit, but the Project would still eliminate about one million tons of $CO^2$ over twenty years.

346. $CO^2$ is the most important greenhouse gas and contributor to global warming. *Massachusetts v. EPA*, 549 U.S. 497 (2006). "Scientific experts...have reached a strong consensus that global warming threatens (among other things) a precipitate rise in sea levels by the end of the century...[and] severe and irreversible changes to natural ecosystems..." *Id.* at 521(internal quotations omitted).

347. Global warming will be disastrous for wildlife. "Some scientists predict that on the basis of mid-range climate-warming scenarios for 2050, that 15-37% of species in our sample of regions and taxa will be 'committed to extinction.'" *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1190 (9th Cir. 2008). The IPCC Third Assessment Report says that climate change "may lead to abrupt breakdown of terrestrial and marine ecosystems...and increased risk of extinction." *Id.* at 1221.

348. While the Project will have only a small effect in the struggle against global warming, it is also obvious that reducing greenhouse gas emissions will require that thousands of similar actions be taken throughout the world. "We cannot afford to ignore even modest contributions to global warming." *Id.* at 1217.

H. Funding Commitments

349. As required by HRS § 195D-4(g)(2), Applicant has adequate funding for the HCP and will provide any required financial guarantee tool requested and approved by the Board (*e.g.*, an irrevocable letter of credit). Ex. A-1 at § 9.4; Ex. A-29 (Oller WDT) at ¶ 121. The Project's operational mitigation funds will be deposited in the endangered species trust fund created by HRS § 195D-31. Ex. A-1 at § 9.4. The funds will be adequate to ensure monitoring of the Covered Species by the State and to ensure that Applicant takes all actions necessary to minimize and mitigate the impacts of the take. Ex. A-29 (Oller WDT) at ¶ 122. Funding assurances include a budget for DOFAW to conduct compliance monitoring, if needed. *Id.* These funds will be used by DOFAW to verify Applicant's compliance with the terms of an approved HCP and corresponding ITL. *Id.*

## III. CONCLUSIONS OF LAW

A. Role of the ESRC and Scientific Expertise

1. By statute, the ESRC serves:

> "as a consultant to the board and the department on matters relating to endangered, threatened, proposed, and candidate species. The committee shall consist of two field biologists with expertise in conservation biology, the chairperson of the board or the chairperson's designee, the ecoregion director of the United States Fish and Wildlife Service or the director's designee, the director of the United States Geological Survey, Biological Resources Division or the director's designee, the dean of the University of Hawai'i at Manoa college of natural sciences or the dean's designee, and a person possessing a

background in native Hawaiian traditional and customary practices..." H.R.S. § 195D-25(a).

2. The ESRC's statutory responsibilities are to:

> (1) Review all applications and proposals for habitat conservation plans, safe harbor agreements, and incidental take licenses and make recommendations, based on a full review of the best available scientific and other reliable data and at least one site visit to each property that is the subject of the proposed action, and in consideration of the cumulative impacts of the proposed action on the recovery potential of the endangered, threatened, proposed, or candidate species, to the department and the board as to whether or not they should be approved, amended, or rejected;
>
> (2) Review all habitat conservation plans, safe harbor agreements, and incidental take licenses on an annual basis to ensure compliance with agreed to activities and, on the basis of any available monitoring reports, and scientific and other reliable data, make recommendations for any necessary changes.

H.R.S. § 195D-25(b).

3. ESRC meetings, including its workshops, are subject to H.R.S. Chap. 92F, and testimony is taken.

4. The Chair of the ESRC, Dr. Scott Fretz, has a doctoral degree in zoology and conservation biology. Tr. at 183, l. 18-22.

5. The Board relies on the ESRC to faithfully and diligently perform its duties. Its recommendation of an HCP and ITL constitutes its best professional scientific judgment that the HCP and ITL conform to the various criteria set forth in the statute.

6. In this case, this reliance is justified by the extensive consideration given to the NPM HCP shown by the minutes of the ESRC in the record, and by the testimony of its chair, Dr. Fretz, at the contested case hearing.

6A. The ESRC members are expected to go through the various criteria in HRS Chap. 195D in deciding whether to approve an HCP. Tr., 8/08/17, at 185, l. 17-24.

7. The ESRC's endorsement of the Bat Guidance Document constitutes its best professional scientific judgment of how impacts to the ōpe'ape'a should be handled when considering an HCP for a wind farm, including mitigation and minimization.

8. It would not be correct to say that the Board "defers" to the judgment and expertise of the ESRC in its decision on an HCP and ITL. The Board must exercise independent judgment in reviewing the evidence presented during the contested case, including the ESRC's recommendation. Given the statutory role of the ESRC, however, the Board must give its recommendation considerable weight as unbiased expert opinion on the conformity of the HCP and ITL to the statutory criteria. The Board also recognizes that the ESRC members, individually and collectively, have scientific expertise and a background in the issues that deserves respect, and that the ESRC meets specifically to review the kinds of issues that arise in this and other HCP's, giving it a great depth and familiarity with those issues. *See, for example*, the extensive discussions of issues involving the ōpe'ape'a shown in board minutes attached as Exs. B-21, A-34, and A-35.

9. Dr. Fretz testified that the various criticisms of the HCP offered by its opponents at the contested case hearings gave no reason to return the HCP to the ESRC for reconsideration. Tr., 8/08/17, at 216, l. 2-5.

10. The Board also relies upon the scientific expertise of its DOFAW staff, who recommended approval of the HCP and ITL.

11. The specific standards for an HCP in HRS Chap. 195D obviously require the application of a high degree of scientific expertise and judgment to specific facts.

12. KNSC offered no expert opinion testimony to rebut the opinions of the ESRC and DOFAW staff. It offered no expert testimony, for example, that a higher LWSC would significantly reduce ōpe'ape'a mortality, or that the HCP would not meet any other of the criteria in Chap. 195D.

13. NPM's consultants Oller and Snetsinger, who helped prepare the HCP, also qualify as expert witnesses. Their opinions are entitled to less weight than that of the ESRC and DOFAW staff because they are potentially biased. Nevertheless, their conclusions that the HCP conforms to the various requirements of Chap. 195D are based on valid evidence.

B. Specific Requirements of Chap. 195D

14. HRS § 195D-21(b)(1)(A) requires that the HCP further the purpose of HRS Chapter 195D by protecting, maintaining, restoring, or enhancing identified ecosystems, natural communities, or habitat types upon which endangered, threatened proposed or candidate species depend within the area covered by the plan.

14.a. **'A'o**. The HCP identifies a number of avoidance and minimization measures to protect the 'a'o's use of the Project area. FOF 67. The mitigation proposal for 'a'o is not aimed toward ecosystems within HCP area; however, given the low potential for mitigation efforts on a small scale to be successful on O'ahu, funding for protection, maintenance, restoration or enhancement of ecosystems in area where 'a'o breed would be more effective for species protection and enhancement. Contribution of funds to NFWF for 'a'o mitigation in accord with the USFWS Newell's Shearwater Recovery Plan, which identifies predator control and expanding knowledge of the species' status and distribution, are aimed at protecting, maintaining, restoring or enhancing ecosystems, natural communities or habitat types upon which 'a'o depend.

14.b. **Hawaiian Waterbirds**. Habitat loss and degradation and predation by introduced animals are the primary threats to Hawaiian waterbirds. Appropriate habitat management of core wetlands is the first recovery criterion for these waterbirds. The HCP mitigation proposal of contributing to the design and construction of a stretch of fence along Hamakua Marsh and funding for a half-time staff biologist to conduct monitoring and public education should enhance habitat important for the survival and recovery of these waterbirds. FOF 118-121.

14.c. **Nēnē**. The HCP identifies a number of avoidance and minimization measures to minimize take of nēnē in the Project area. FOF 136. The mitigation proposal is for NPM to contribute $50,000 towards fence construction at JCNWR. As predation by non-native mammals is the greatest factor limiting nēnē populations, implementation of the HCP should enhance habitat important for the survival and recovery of nēnē.

14.d. **Pueo**. The HCP identifies a number of avoidance and minimization measures to minimize pueo collisions with Project's WTGs and met tower. FOF 158. The mitigation proposal for pueo is not aimed towards habitats within the HCP area. However, given the low level of anticipated impact to pueo by the Project, a pooling of resources to fund larger management projects or resolve larger research questions targeted at the recovery of pueo on O'ahu would be more effective for species protection and enhancement. FOF 159.

14.e. **Ōpe'ape'a**.

Through the minimization measures identified in FOF 266-268, and by preserving existing ōpe'ape'a habitat in the Poamoho Ridge mitigation area, the HCP meets this criterion. Both the Bat Guidance Document and the Hawaiian Hoary Bat Recovery Plan specify preservation of existing habitat, with a preference for native ecosystems, as important for the survival and recovery of the ōpe'ape'a.

15. HRS § 195D-21(b)(1)(B) requires that the HCP increase the likelihood of recovery of the Covered Species. H.R.S. § 195D-4(g)(4) has a similar requirement, that the HCP shall increase the likelihood that the Covered Species will survive and recover.

15.a. **'A'o**. The goal of the USFWS Newell's Shearwater Recovery Plan is to promote the recovery of the 'a'o. Contribution of funds to NFWF for 'a'o mitigation is in accord with the Recovery Plan. FOF 60.

15.b. **Hawaiian Waterbirds**. Fencing of Hamakua Marsh and public education about predation threats to waterbirds address the primary threats to these waterbirds, and, therefore, the mitigation strategies in the HCP will increase the likelihood of recovery of these endangered waterbirds. FOF 118-123.

15.c. **Nēnē**. As predation is the greatest factor limiting nēnē populations, contributing to the fencing of JCNWR, a habitat shown to be suitable for breeding nēnē, is likely to increase the likelihood of recovery of nēnē. FOF 137-139.

15.d. **Pueo**. Given the low level of anticipated impact to pueo by the Project, a pooling of resources to fund larger management projects or resolve larger research questions targeted at the recovery of pueo on O'ahu is probably the most effective means of increasing the likelihood of recovery of pueo. FOF 160-162.

15.e. **Ōpe'ape'a.** The ESRC's recommendation that the HCP be approved constitutes its professional scientific judgment that the HCP will increase the likelihood of recovery of the ōpe'ape'a. This conclusion is supported by the fact that the Poamoho Ridge mitigation will provide long-term habitat for an equivalent number of bats, and that research may provide improved methods to conserve ōpe'ape'a on all islands. The proposed mitigation is also

consistent with the Bat Guidance Document and the Hawaiian Hoary Bat Recovery Plan. The proposed mitigation should more than offset the take of ōpe'ape'a. The level of mitigation required in the HCP, which follows the Bat Guidance Document, is to protect habitat sufficient for the number of bats taken, given the best available scientific evidence. The amount of take, however is based on the 80% credibility level. This overestimates the actual take. The Tier One commitment thus overcompensates for the take of bats, because 34 bats at the 80% credibility level means that somewhat fewer than 34 bats have probably been taken. Similarly, the Tier Two commitment, which is triggered when the estimated take reaches 34 bats, will likely be triggered before the actual take is 34 bats. The benefits from protecting the forest at Poamoho Ridge should last beyond the 21 year term of the HCP. Thus, the HCP should contribute to and increase the likelihood of the overall survival and recovery of the 'ope'ape'a. See FOF 259-263; 295-320; 323-327; 340-341.

16. In accordance with HRS § 195D-21(b)(1)(C), the HCP identifies geographic area encompassed by the HCP; ecosystem, natural communities, or habitat types within the Plan area; endangered, threatened, proposed and candidate species known or reasonably expected to be present in those ecosystems, natural communities or habitat types in the Plan area.

17. In accordance with HRS § 195D-21(b)(2)(B), the HCP identifies activities contemplated to be undertaken within the Plan Area with sufficient detail to allow DLNR to evaluate the impact of the activities on the particular ecosystems, natural communities, or habitat types within the plan area.

18. The HCP must identify the steps that will be taken to minimize and mitigate all negative impacts, including without limitation, the impact of any authorized incidental take, with consideration of the full range of the species on the island so that cumulative impacts associated

with the take can be adequately assessed; and the funding that will be available to implement those steps. HRS § 195D-21(b)(2(C).

18.a. **ʻAʻo**. See COL 14.a, above. Should the maximum requested take of 4 adult/fledgling ʻaʻo occur, it should not have a population-level impact, as it would represent an increase in mortality rate of 0.01 percent of the population distributed over the 21-year permit term. FOF 66.

18.b. **Hawaiian Waterbirds**. See COL 14.b above. Should the requested take of the four waterbird species occur over the 21-year permit term, it should not have a population-level impact on the respective populations. Each of these species has a statewide population that is stable or increasing. Therefore, no population is likely to be particularly sensitive to losses on the order of one bird every 3 to 5 years. FOF 117.

18.c. **Nēnē.** See COL 14.c above. Should the maximum requested take of 6 nēnē occur, it should not have a population level impact, as it would represent an increase in mortality rate of less than 0.3 percent of the population distributed over the 21-year permit term. FOF 135.

18.d. **Pueo**. See COL 14.d above. No population estimates are available for pueo on Oʻahu or even more broadly in the Hawaiian Islands. The lack of systematic monitoring on Oʻahu makes it difficult to assess the effect that take of pueo resulting from the Project may have on the local population, but anecdotal observations suggest the Oʻahu population is low and any take may be of concern. Nevertheless, population-level impacts are not expected because the requested take of 4 adults and 4 chicks/eggs over 21 years is low. FOF 157.

18.e. **Ōpeʻapeʻa**. The HCP identifies the steps that will be taken to minimize the impact of the take. They include LWSC during the wind speeds and seasons that ōpeʻapeʻa are most likely to be active. The estimate of future take, based on the actual experience at the

adjacent Kahuku wind farm, is sufficiently reliable to project the impacts to the ōpe'ape'a on the island of O'ahu. The Project affects only a small area of the North Ko'olau region in which ōpe'ape'a are found. The immediate NPM area has much lower bat abundance than other areas in the region. Monitoring shows ōpe'ape'a continue to be found in the Kawailoa Wind Farm despite a much higher level of take, and in the Kahuku Wind Farm. The Project is likely to be the last onshore wind farm on O'ahu in the foreseeable future, FOF 263, so this is not likely to be just one of many new projects that may have a serious cumulative impact, and even if there is another wind project proposed for O'ahu, the impact on bats, including the cumulative effect, will have to be evaluated in an HCP process for that project. The take of bats at the Project should not affect populations on Maui, Kaua'i, and Hawai'i Island, where ōpe'ape'a occur, apparently in greater numbers than O'ahu. FOF 259-263, 266-293.

19. Pursuant to HRS § 195D-21(b)(2)(D), Appendix F and Section 9.4 of the HCP identifies those measures or actions proposed to be undertaken to protect, maintain, restore, or enhance the ecosystems, natural communities, or habitat types within the plan area; a schedule for implementation of the measure or actions; and an adequate funding source to ensure that the actions or measures, including monitoring, are undertaken in accordance with the schedule.

20. HRS § 195D-21(b)(2)(E) provides that the HCP must be consistent with the goals and objectives of any approved recovery plan for any endangered or threatened species known or reasonably expected to occur in the ecosystems, natural communities or habitat types in the plan area.

20.a. **'A'o**. Contribution of funds to NFWF for 'a'o mitigation is in accord with the USFWS Newell's Shearwater Recovery Plan Recovery Plan. FOF 60.

20.b. **Hawaiian Waterbirds**. The proposed mitigation for Hawaiian waterbirds is consistent with the Revised Hawaiian Waterbirds Recovery Plan, completed in 2011, and the State of Hawai`i`s Comprehensive Wildlife Conservation Strategy which recommend preservation of wetland habitat and management of introduced predators in priority wetlands. FOF 118-121.

20.c. **Nēnē.** Contributing to the fencing of JCNWR is consistent with the recommended strategies contained in the draft Hawaiian Goose Recovery Plan, revised in 2004, and the State of Hawai`i Comprehensive Wildlife Conservation Strategy which include identifying and protecting Hawaiian goose habitat, restoring and enhancing habitat, controlling alien predators, and minimizing Hawaiian goose conflicts with human activities. FOF 127, 129, 137-139.

20.d. **Pueo**. Contributing to the pool of resources to fund larger pueo management projects or resolve larger research questions is consistent with the State of Hawai'i's Comprehensive Wildlife Conservation Strategy which recommends a combination of conservation actions, monitoring and research. These recommendations include continuing conservation efforts at refuges and wildlife sanctuaries, expanding survey efforts to monitor populations status and trends on O'ahu, and conducting research into limiting factors such as "sick owl syndrome" and vehicle collisions. FOF 144, 160-162.

20.e. **Ōpe'ape'a**. Mitigation proposed for ōpe'ape'a includes contributing towards habitat improvement at Poamoho Ridge by providing annual funds to the KMWP and funding for research, FOF 317-320, which accords with the Hawaiian Hoary Bat Recovery Plan and the State of Hawai`i Comprehensive Wildlife Conservation Strategy, which recommend conservation of known occupied habitat, development and implementation of conservation

plans that guide the management and use of forests to reduce negative known bat populations, and continued support for ōpe'ape'a research. FOF 295-320.

21. Pursuant to HRS § 195D-21(b)(2)(F) the HCP must provide reasonable certainty that the ecosystems, natural communities, or habitat types will be maintained in the plan area, throughout the life of the plan, in sufficient quality, distribution, and extent to support within the plan area those species typically associated with the ecosystems, natural communities, or habitat types, including any endangered, threatened, proposed, and candidate species known or reasonably expected to be present in the ecosystems, natural communities, or habitat types within the plan area.

21.a. See COL 14.a-e; 15.a-e, 17, and 18.

22. The HCP must contain objective, measurable goals, the achievement of which will contribute significantly to the protection, maintenance, restoration, or enhancement of ecosystems, natural communities, or habitat types; time frames within which the goals are to be achieved; provisions monitoring (such as field sampling techniques), including periodic monitoring by representatives of DLNR or the ESRC, or both; and provisions for evaluating progress in achieving the goals quantitatively and qualitatively. HRS § 195D-21(b)(2)(G).

22.a. **'A'o.** Given that (i) the pooling of monetary resources to carry out the statewide 'a'o recovery plan is the most effective means of protecting the 'a'o and promoting its survival and recovery, and (ii) that carrying out the recovery plan will be conducted by governmental agencies and not NPM, the contribution of funds by NPM is the most practicable measure of success. FOF 71-72.

22.b. **Hawaiian Waterbirds**. The HCP proposes to measure success by timely fence construction and funding for fence maintenance and a half-time staff biologist. The

construction of the fence is, in itself, an appropriate measure of success. Dogs have been getting into the marsh and killing birds. The fence will prevent or at least greatly hinder dogs from getting into the marsh. To prove that the fence actually reduces the amount of dog predation would require a before-and-after study of brief and difficult-to-observe events. This would be neither feasible nor necessary. NPM proposes monitoring whether observed fatalities (generally off-marsh, typically in the parking lot) are reduced after the mitigation effort. This is an appropriate measure of success for the hiring of the biologist, who is, in part, expected to educate the public not to feed birds. FOF 124-125.

22.c. **Nēnē**. Given that (i) the pooling of monetary resources for habitat management at JCNWR, which contains suitable nesting habitat, is the most effective means of protecting the nēnē and promoting its survival and recovery, and (ii) that the management of JCNWR is under the control of USFWS and not NPM, the contribution of funds by NPM is the most practicable measure of success. FOF 140-141.

22.d. **Pueo**. Given that (i) the pooling of monetary resources to fund larger management projects or resolve larger research questions targeted at the recovery of pueo on Oahu is determined to be the most effective means of protecting the pueo and promoting its survival and recovery, and (ii) that the control and use of the Endangered Species Trust Fund rests with DOFAW and not NPM, the contribution of funds by NPM is the most practicable measure of success. FOF 163-164.

22.e. **Ōpe'ape'a**. The HCP contains provisions for assessing the success of the control of pigs and removal of invasive species from the Poamoho Ridge mitigation area. It also provides for the monitoring of bat populations. These constitute adequate goals and measures of success. FOF 327.

23. The Project and implementation of the HCP is not likely to cause any native species to become listed as threatened or endangered. HRS § 195D-21(c)(2).

24. The HCP provides sufficient information to ascertain with reasonable certainty the effect of the plan on ōpe'ape'a in the plan area and throughout its habitat range. HRS § 195D-21(c). FOF 199-263.

25. The notifications provided in the OEQC Bulletin met the requirements of HRS § 195D-21(a). FOF 7.

26. The HCP was developed after consultation with the ESRC. HRS § 195D-4(g). FOF9-14.

27. Construction and operation of the Project is a lawful activity. The take authorized by the ITL is incidental to the construction and operation of the Project and in accordance with HRS § 195D-4(g). FOF 49.

28. H.R.S. § 195D-4(g)(1) requires the applicant to minimize and mitigate the impacts of the take to the maximum extent practicable. The primary dispute over whether NPM has met this criterion is the argument that it should have used LWSC at 6.5 m/s, rather than 5 m/s, to meet this standard.

29. The primary reasons for accepting the HCP with the 5 m/s speed, initially, with adjustments possible through adaptive management are: (1) the 6.5 m/s speed has not been proven to be an effective means of reducing the take of bats, (2) the HCP proposal conforms to the Bat Guidance Document's recommendation, which is the best scientific advice on how to handle LWSC, and (3) the favorable recommendation of DOFAW staff and the ESRC, which constitute expert opinion that the 5 m/s proposal implements the "maximum extent practicable" standard. FOF 268-293.

30. A secondary reason is that the 6.5 m/s speed will jeopardize NPM's ability to meet its obligations under its Power Production Agreement. This makes it not practicable. The parties agree that the "maximum extent practicable" standard has an economic component. See Tr., 1/12/18, at 42, l. 18-25 to 43, l. 1-10.

31. Although KNSC argues that the evidence is insufficient on this point, Cutbirth's testimony is specific enough to treat the difficulty in meeting the Power Purchase Agreement as a fact. The record also demonstrates other economic issues that require NPM to generate close to its expected power output. FOF 280-285A. By implementing LWSC at 5 m/s, with the possibility of a higher limit under adaptive management, the other avoidance and minimization measures described above, and providing mitigation and research that should more than offset the expected take, the HCP minimizes and mitigates the impacts of the take to the maximum extent practicable.

32. To comply with HRS § 195D-4(g)(2), when the ITL is issued, NPM will provide a funding guarantee tool, e.g., an irrevocable letter of credit, as determined by the Board.
In accordance with HRS § 195D-4(g)(3), the Project's operational funds will be deposited in the endangered species trust fund created by HRS § 195D-3 to ensure adequate monitoring and to ensure that Applicant takes all actions necessary to minimize and mitigate the impacts of the take. FOF 346.

33. To assure that the measures required under HRS § 195D-21(b) will be met, the Project's operational funds will be deposited in the endangered species trust fund created by HRS § 195D-3 to ensure adequate monitoring and to ensure that Applicant takes all actions necessary to minimize and mitigate the impacts of the take. Additionally, NPM will provide a funding guarantee tool, e.g., an irrevocable letter of credit, as determined by the Board. FOF 346. HRS § 195D-4(g)(6).

34. The Project does not involve the use of submerged lands, mining or blasting. HRS § 195D-4(g)(7). FOF 39.

35. Overall, the mitigation measures required under the HCP will provide net environmental benefits. HRS § 195D-4(g)(8), FOF 340-341.

36. The Project is unlikely to cause the loss of genetic representation of an affected population of any endangered, threatened, proposed or candidate plant species because there were none identified in the Project area. FOF 54; HRS § 195D-4(g)(9).

37. The required public hearing was held on the draft HCP on June 4, 2015. Additionally, the public could attend ESRC meetings during which the draft HCP was discussed. Although the height of the WTG's changed after the public hearing, HRS § 195D-4(g) does not require that additional public hearings be held after changes are made to the draft HCP. FOF 9-11.

38. Based on the foregoing findings of fact and conclusions of law, the Board determines that:

(1) The HCP will further the purposes of HRS Chap. 195D by protecting, maintaining, restoring, or enhancing identified ecosystems, natural communities, or habitat types upon which the endangered, threatened, proposed, or candidate species depend within the area covered by the plan;

(2) The HCP will increase the likelihood of survival and recovery of the endangered or protected species that are the focus of the plan, and

(3) The HCP satisfies all of the requirements of Chapter 195D, HRS.

39. The Board further determines that the HCP:

(1) is not likely to jeopardize the continued existence of any endangered, threatened, proposed, or candidate species identified in the plan area;

(2) is not likely to cause any native species not endangered or threatened at the time of plan submission to become threatened or endangered;

(3) does not fail to meet the criteria of subsections (a) and (b) of HRS §195D-21; and

(4) does not fail to meet the criteria of HRS §195D-4(g).

## IV. DECISION AND ORDER

Based on the foregoing, the HCP and ITL shall be and hereby are approved, subject to the following conditions.

A. GENERAL CONDITIONS

1. This license only authorizes the permittee to conduct incidental take of the Covered Species on the lands owned or otherwise controlled by the Applicant on the Island of O'ahu at the time this license is issued pursuant to the "Na Pua Makani Wind Energy Project Habitat Conservation Plan" dated March 2016 (hereafter "HCP").

2. The incidental take license shall be issued substantially in the form shown in the Board submittal of October 27, 2016, p. 6-7. (Doc. 27.)

3. This license is valid only if Applicant abides by the terms and conditions of the HCP and ITL for the duration of the license.

4. This license is valid for species protected by federal law only if accompanied by proper federal permits. The permit number for the required permit must be provided to DOFAW when it is obtained.

5. This license shall become valid upon completion of the following:

a. A legal representative of Applicant has acknowledged, in writing, understanding and agreement to abide by the conditions.

b. Both copies of the signed license must be returned to DOFAW. Upon approval by the Chairperson of the BLNR, a copy of the license will be returned to the applicant.

6. The take authorization contained in this license is not effective until Na Pua Makani Power Partners provides DOFAW with an executed copy of the letter of credit (or other approved financial tool), which shall include the additional $100,000 in research funding required by Special Condition 8, containing terms reasonably acceptable to DOFAW. If Tier 2 mitigation is triggered, financial assurances for an additional $894,000 will be provided to ensure funding for Tier 2 mitigation. If triggered, funding assurances for Tier 2 will be provided before the Tier 1 take threshold is exceeded. An estimate of the costs for implementing the HCP is provided in Appendix F to the HCP.

7. The Board may suspend or revoke this license if the HCP is suspended or revoked. The Board may also suspend or revoke this license in accordance with applicable laws and regulations in force during the term of the license.

8. Persons in violation of the terms and conditions of this license and/or related or appropriate laws may be subject to criminal and/or administrative penalty under §§183D-5, 183D-21, 195D-9, and 195D-27, Hawaii Revised Statutes, and §124-8 Hawaii Administrative Rules, or as otherwise provided by law, and/or revocation of this permit.

9. Applicant shall submit an annual report to DLNR by August 1 of each fiscal year ending June 30, that includes a description of activities and accomplishments, analysis of the problems and issues encountered in meeting or failing to meet the objectives set forth in the

HCP, areas needing technical advice, status of funding, and plans and management objectives for the next fiscal year, including any proposed modifications thereto.

B. SPECIAL CONDITIONS

1. The allowable incidental take authorized by this license for the Covered Species includes observed, unobserved, direct, and indirect take as defined in the HCP.

2. The estimation of incidental take for the Covered Species will be calculated according to adjustments made to the observed direct take according to methods detailed in the HCP, including adjustments to include unobserved and indirect take.

3. The incidental take authorized by this license for the Hawaiian hoary bat is defined by two tiered levels, each of which is identified in the HCP. In the event that the take level for the Hawaiian hoary bat for Tier 1 is reached, incidental take at the Tier 2 level is authorized, provided that Applicant abides by the terms and conditions of the HCP.

4. DLNR will be notified within 24 hours, and a written incident report filed within 3 business days, of any mortalities, injuries, or disease observed on the property. Injured individuals or carcasses will be handled according to guidelines in the HCP.

5. The mitigation measures set for in the HCP shall be incorporated into this ITL and implemented by the Applicant.

6. If, during the permit term, DOFAW, in consultation with the ESRC, determines that additional reasonable minimization, avoidance, or mitigation measures are required, as supported by the best available scientific research, then the Applicant shall work with DOFAW to implement, through its Adaptive Management efforts, any such reasonable additional measures that will improve the survivability and recovery of the Covered Species. DOFAW shall not require the Applicant to implement any measures without prior consultation with the

Applicant. In the event of disagreement between DOFAW and the Applicant, the matter will be brought to the Board for final decision after review and recommendation by the ESRC. Any new mandatory measures are subject to the limitations in HRS § 195D-23, except as stated in Special Conditions 7,8, and 9, below, which are conditions of approval of this HCP and shall be considered to be part of the HCP. Implementation of Adaptive Management measures to reduce the risk of take shall not require an amendment to the HCP so long as there are no proposed major amendments to existing take limits.

7. If the rate of take of ōpe'ape'a exceeds the Applicant's projected rate of take, or as otherwise provided in the HCP, DOFAW, through Adaptive Management, in consultation with the Applicant and the ESRC, may require LWSC at higher cut-in speeds for some or all of the evening hours and seasonal period(s) when LWSC is employed. If take occurs outside of the seasonal period when LWSC is required under this HCP, DOFAW, through Adaptive Management, in consultation with the Applicant and the ESRC, may require LWSC for longer or different periods. In case of a disagreement between DOFAW, and the Applicant over the implementation of this condition the matter shall be brought to the Board for final decision.

8. In addition to the funding commitments set forth in the HCP, Applicant shall contribute $100,000 toward research on deterring bats. The resulting research may also utilize other funding sources. The research project or projects shall be approved by DOFAW and results shall be made publicly available. The research shall be focused on deterrence measures with the goal of reducing the take of ōpe'ape'a by wind turbines.

9. If, during the permit term, USFWS and DOFAW determine that reliable scientific evidence shows that a commercially-available bat deterrent technology will be effective in reducing the take of ōpe'ape'a, at a reasonable cost considering the expected reduction in take,

DOFAW shall require Applicant to implement the technology, after consultation with the Applicant and the ESRC. Without limitation on other means of determining whether the cost is reasonable, it shall presumptively be considered reasonable if the cost per bat expected to be saved does not exceed the per-bat mitigation cost. In case of a disagreement between Applicant and DOFAW over the implementation of this condition, the matter shall be brought to the ESRC for its review and recommendation, then to the Board for final decision.

10. Special conditions 8 and 9 shall be deemed severable, so that if one or both are determined to be invalid, that shall not affect the remaining conditions or the validity of the HCP or ITL.

11. The funding commitments set forth in the HCP shall be complied with upon approval and upon commencement of construction, through the issuance of a letter of credit to support those funding obligations set forth in Section 9.4 of the HCP and required by Special Condition 8.

12. Based on the representations of the Applicant, the Project shall include not more than eight wind turbines, with a maximum blade tip height of not more than 173 meters above pad elevation.

DATED: Honolulu, Hawai'i, April _____, 2018.

SUZANNE D. CASE, Chairperson
Board of Land and Natural Resources

I DO NOT CONCUR

KEITH "KEONE" DOWNING, Member

JAMES A. GOMES, Member

THOMAS OI, Member

SAMUEL "OHU" GON III, Member

RECUSED
STANLEY ROEHRIG, Member

CHRISTOPHER YUEN, Member

**Signature:**

**Email:** stanley.roehrig@hawaii.gov

JAMES A. GOMES, Member

THOMAS OI, Member

SAMUEL "OHU" GON III, Member

RECUSED
STANLEY ROEHRIG, Member

CHRISTOPHER YUEN, Member

**Signature:**

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BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

| | | |
|---|---|---|
| IN THE MATTER OF<br><br>A Contested Case Hearing Re Final Habitat Conservation Plan and Incidental Take License for the Na Pua Makani Wind Energy Project by Applicant Na Pua Makani Power Partners, LLC; Tax Map Key Nos. (1) 5-6-008:006 and (1) 5-6-006:018, Koolauloa District, Island of O'ahu, Hawaii. | ) | Case No. BLNR-CC-17-001<br><br>AMENDED CERTIFICATE OF SERVICE |

**AMENDED CERTIFICATE OF SERVICE**

The undersigned hereby certifies that a certified copy of Findings of Fact, Conclusions of Law, and Decision and Order was duly served upon the following parties, by certified mail, and regular U.S. Mail, postage prepaid, and by electronic mail on 18 May 2018 at the addresses below:

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DATED: Honolulu, Hawai`i, 18 May, 2018.

JAMES COGSWELL
Department of Land and Natural Resources