BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

IN THE MATTER OF 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 MINUTE ORDER NO. 11; CERTIFICATE OF SERVICE

MINUTE ORDER NO. 11

Attached are the Hearing Officer's Recommended Findings of Fact, Conclusions of Law, and Decision and Order.

The Board of Land and Natural Resources, by a separate minute order, will provide the opportunity for any party in this case to file written exceptions to the Recommended Findings of Fact, Conclusions of Law, and Decision and Order.

DATED: Honolulu, Hawai`i, November 1, 2017.

YVONNE Y. IZU
Hearing Officer

BOARD OF LAND AND NATURAL RESOURCES

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of Minute Order No. 10 was duly served upon the following parties, by Hand Delivery, U.S. Mail, postage prepaid, or electronically, at the addresses below:

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DATED: Honolulu, Hawai`i, November 1, 2017.

KATHERINE CULLISON
Department of Land and Natural Resources

BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

IN THE MATTER OF 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 HEARING OFFICER'S RECOMMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

HEARING OFFICER'S RECOMMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

The Hearing Officer recommends that the Board of Land and Natural Resources ("Board") adopt the following Findings of Fact (FOF), Conclusions of Law (COL), and Decision and Order (D&O) (collectively, "Recommendation"), 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 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. 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 Oʻahu, Hawaiʻi, in partnership with communities from Kaʻena Point to Kahaluʻu. 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. 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.

5. 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.

6. 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.

7. 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.

8. A public hearing on the draft HCP was held on June 4, 2015. Ex. A-29 (Oller WDT) at ¶ 109. Additionally, the Endangered Species Recovery Committee ("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.

9. 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).

10. The HCP was developed through consultation not only with the ESRC, but also with DOFAW and the US 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.

11. At its February 25, 2016 meeting, the ESRC agreed to recommend to the Board that the HCP be approved. Ex. A-2 at 4; Ex. A-36.

b. Contested Case Proceedings

12. 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.

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

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

15. 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 ʻO Kahuku ("MPK") (Fonoimoana, KCA and MPK are collectively referred to herein as the "Fonoimoana Petitioners").

16. 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).

17. 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).

18. 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.

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

20. 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.

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

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

23. 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.

24. On July 13, 2017, KNSC submitted a request for subpoenas for 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: Mr. 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.

25. 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.

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

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

28. 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.

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

C. Description of the Proposed Project

30. The Na Pua Makani Wind Energy Project ("Project") is a 25 megawatt wind generating facility sited on approximately 706.7 acres in Kahuku on the North Shore, Koʻolauloa District, Island of Oʻahu, 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.

31. Approximately 254.7 acres of the Project Site are State of Hawaiʻi 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.

32. The Project proposes 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).

33. 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).

34. The maximum blade tip height is 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).

35. 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.

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.

37. 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.

38. 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.

39. 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.*

40. The purpose of the proposed Project is to generate renewable wind energy on the island of Oʻahu. Ex. A-1 at 1; Ex. A-29 at ¶ 115 (Oller WDT). This Project will help Hawaiʻi achieve its 100% renewable energy initiative that was signed into law by the Governor last

summer. 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

41. 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).

42. 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	`A`o	Newell's shearwater
Himantopus mexicanus knudseni	Ae`o	Hawaiian black-necked stilt
Fulica alai	`Alae ke`oke`o	Hawaiian coot
Gallinula chloropus sandvicensis	`Alae `ula	Hawaiian common moorhen
Anas wyvilliana	Koloa maoli	Hawaiian duck
Branta sandvicensis	Nene	Hawaiian goose
Asio fammeus sandwichensis	Pueo	Hawaiian short-eared owl
Lasiurus cinereus semotus	Ope`ape`a	Hawaiian hoary bat

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.

43. 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.

E. HCP Provisions By Species

44. 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

45. 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.

46. 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.

47. 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.

48. 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.

49. 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.

50. 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.

51. 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.

52. 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.

53. **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 expect 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 `a`o.

- 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 `ope`ape`a, it will also reduce the risk to `a`o, 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.

54. **Mitigation**. The USFWS Newell's Shearwater Recovery Plan and the State of Hawai`i's Comprehensive Wildlife Conservation Strategy for `a`o 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 `a`o 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.

55. USFWS has created an account with the National Fish and Wildlife Foundation (NFWF) where funds for `a`o mitigation can be deposited and then used according to an appropriate `a`o 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 `a`o that could have been supported through smaller scale investments. Ex. A-1 at 67.

56. 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 `a`o conservation plan. Ex. A-1 at 67-68 and Appendix F. Within one year of the COD, USFWS will have developed an appropriate `a`o 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.

57. **Measures of Success**. The mitigation measure for `a`o 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.

58. 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

59. 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.

60. **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.

61. 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.

62. 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.

63. Koloa maoli historically occurred on all the main Hawaiian Islands except Lana`i and Kahoolawe; however, by the 1960s, they were found in small numbers only on Kauai and probably Niihau. From the late 1950s through the early 1990s, koloa maoli were reintroduced to Oahu, Maui, and Hawai`i Island through captive propagation and release. Populations of koloa

maoli currently exist on Kauai, Niihau, Maui and Hawai`i Island; however, genetics studies show that the Oahu population is heavily compromised through hybridization with feral mallards. Ex. A-1 at 27.

64. 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.

65. 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.

66. 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.

67. 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.

68. 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.

69. **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.

70. Nesting generally occurs from mid-February through August on freshly exposed mudflats interspersed with low-growing vegetation. Ex. A-1 at 28.

71. 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.

72. Ae`o are found on all the main Hawaiian Islands except Kahoolowe and is 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.

73. 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.

74. Oahu 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 Oahu, 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.

75. 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.

76. 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.

77. **`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.

78. `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.

79. `Alae ke`oke`o 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.

80. `Alae ke`oke`o 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.

81. `Alae ke`oke`o historically occurred on all the main Hawaiian Islands except Lana`i and Kahoolawe, which lacked suitable wetland habitat. However, they are now present on Lana`i due to the creation of artificial wetland-like features, such as water treatment sites. `Alae ke`oke`o have always occurred in greatest numbers on Oahu, Maui and Kauai, and were likely once fairly common in large natural marshes and ponds. Ex. A-1 at 31.

82. Winter biannual waterbird surveys from 1997 through 2006 indicated a population average of approximately 2000 `alae ke`oke`o, 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 `alae ke`oke`o disperse readily and exploit seasonally flooded wetlands, their populations naturally fluctuate according to climatic and hydrologic conditions. Ex. A-1 at 31.

83. During 1995 – 2007, the `alae ke`oke`o populations on Oahu 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 Ka`elepulu 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 `alae

ke`oke`o have been observed in smaller numbers include Coconut Grove Marsh, La`ie wetlands, and the Turtle Bay golf course ponds. Ex.A-1 at 31.

84. There is no suitable habitat for `alae ke`oke`o in the Project area. In lowland environments, `alae ke`oke`o use wetlands, marshes, or ponds, which are not present in the Project area. Therefore, if `alae ke`oke`o 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.

85. No `alae ke`oke`o 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 know biology of the species and the results of avian point counts, the frequency of `alae ke`oke`o transiting the Project area is likely to be low. Ex. A-1 at 31.

86. **`Alae `ula** (Hawaiian common moorhen). The endangered `alae `ula 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.

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

88. `Alae `ula 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.

89. `Alae `ula 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.

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

91. `Alae `ula historically occurred on all of the main Hawaiian Islands except Lana`i (probably due to a lack of wetland habitat) and probably Niihau. From the late 19th to the mid-20th centuries, `alae `ula populations on all but Kauai and Oahu were extirpated. Reintroduction efforts on Maui, Molokai and Hawai`i Island all failed (although there are unsubstantiated reports of `alae `ula on Hawai`i Island and Maui from the late 20th century). Ex. A-1 at 33.

92. 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.

93. Approximately half the statewide population of `alae `ula resides on Oahu. Areas supporting the largest populations include Dillingham Ranch large pond, Amorient Aquafarm (part of Kahuku Aquaculture Farms, JCNWR Ki`i Unit, and Waimea Valley. Amorient

Aquafarm and JCNWR are within 5 miles of the Project. Other wetlands within 5 miles of the Project where `alae `ula have been observed in smaller numbers include Coconut Grove Marsh, La`ie wetlands, Kahuku Prawn Farms (part of Kahuku Aquaculture Farms), Punaho`olapa Marsh, and the Turtle Bay golf course ponds. Ex. A-1 at 33.

94. There is no suitable habitat for `alae `ula in the Project area. `Alae `ula use wetlands, marshes or ponds, which are not present in the Project area. Thus, if `alae `ula 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.

95. No `alae `ula 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 `alae `ula transiting the Project area is likely to be low. Ex. A-1 at 33.

96. **Avoidance and Minimization**. Direct take of koloa maoli, ae`o, `alae ke`oke`o, and `alae `ula 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.

97. 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.

98. 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.

99. 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.

100. Applicant requests an authorize take of 4 koloa maoli, 4 ae`o, 8 `alae ke`oke`o and 8 `alae `ula over the 21-year permit term. Ex. A-1 at 52-53.

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

102. 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 `alae ke`oke`o and `alae `ula is substantially higher than for the koloa maoli and ae`o, the estimated take for `alae ke`oke`o and `alae `ula is increased to reflect this difference. Ex. A-1 at 52.

103. 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.

104. 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.

105. **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.

106. 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.

107. 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.

108. 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.

109. 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.

110. 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.

111. **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.

112. Whether the fence is effective in reducing predation or improving breeding habitat is not included as a measure of success. Whether the staff biologist is effective in

educating the public or whether monitoring activities have a positive impact on improving habitat for waterbirds is not included as a measure of success. Ex. A-1 at 75.

c. Nene

113. The nene 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.

114. 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 nene habitat, restoring and enhancing habitat, controlling alien predators, and minimizing nene conflicts with human activities. Ex. A-1 at 24.

115. Nene 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 nene from Kauai to Hawai`i and Maui, however, has resulted in the unexpected occurrence of birds on Oahu. 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.

116. Predation by non-native mammals is the greatest factor limiting nene populations. Feral cats, dogs, rats, and mongoose are each likely to be predators on Oahu, 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.

117. Habitats on Oahu that are most likely to support nene 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 nene, which could include areas beneath WTGs. Ex. A-1 at 25-26.

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

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

120. Take is conservatively estimated based on as-yet unproven assumptions that the population of nene on Oahu would grow through future reproduction and arrival of additional birds. The HCP assumes that the nene 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.

121. During the first 9.33 years of operation at the 20-WTG Kaheawa Pastures I Wind Project on Maui, 21 nene fatalities were found or 0.11 fatalities/WTG/year. A flock of more than 100 nene 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.

122. Should the maximum requested take of 6 nene 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.

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

> 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 nene.
>
> - Should nene 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 nene 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 nene or NPM's ability to detect fatalities of nene.

Ex. A-1 at 38-40.

124. **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 nene population on Oahu, 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 nene use. Ex. A-1 at 68, Appendix F.

125. Given the small size of the nene 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.

126. The JCNWR contains suitable nene nesting habitat and is in proximity to the area where the adult pair of nene nested in the winter of 2013/2014. The area remains of frequent use

for the Oahu resident nene and is expected to be used by nene into the future. Fence construction is expected to benefit the nene 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 nene at this site, and, thus will increase the productivity and survival of the nene. Ex. A-1 at 68.

127. **Measures of Success**. The mitigation measure for nene 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.

128. 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 nene 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.

129. 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

130. 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 Oahu population of pueo is listed as endangered by the State. Ex. A-1 at 35.

131. 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 Oahu, and conducting research into limiting factors such as "sick owl syndrome" and vehicle collisions. Ex. A-1 at 35.

132. 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.

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

134. 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.

135. 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.

136. 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.

137. 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.

138. 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.

139. 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.

140. 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.

141. 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.

142. No pueo fatalities have been documented at operational wind farms on Oahu. 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 Oahu. 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.

143. 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.

144. No population estimates are available for pueo on Oahu or even more broadly in the Hawaiian Islands. The lack of systematic monitoring on Oahu 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 Oahu 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.

145. **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.

146. **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.

147. 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 Oahu than could have been supported through smaller scale investments. Ex. A-1 at 76.

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

- Identify and understand limiting factors on Oahu;
- 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.

149. 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.

150. **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.

151. 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. <u>`Ope`ape`a</u>

152. `Ope`ape`a (Hawaiian hoary bat) 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.

153. The Hawaiian Hoary Bat Recovery Plan 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 `ope`ape`a research. Ex. A-1 at 17.

154. `Ope`ape`a has been observed in a variety of habitats that include open pastures and more heavily forested areas in both native and non-native habitats. Typically `ope`ape`a feed over streams, bays, along the coast, over lava flows, or at forest edges. `Ope`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.

155. `Ope`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.

156. `Ope`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.

157. Although `ope`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 `ope`ape`a on the Island of Hawai`i use coastal lowlands during the breeding season and migrate to interior highlands during the winter. However, `ope`ape`a can also range between habitats and elevations within a single night to target optimal local foraging opportunities. Ex. A-1 at 18.

158. 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 `ope`ape`a young that survive to reproductive age. Ex. A-1 at 18.

159. Confirmed reports of `ope`ape`a are known from all the main Hawaiian islands except Niihau and Kahoolawe. The species is most often seen on Hawai`i Island, Maui and Kauai. Ex. A-1 at 18.

160. Today, the largest known breeding populations are thought to occur on Kauai and Hawai`i Island. Breeding was recently documented on Oahu. Ex. A-1 at 18.

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

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

163. 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 `ope`ape`a use the Project area; however, bat use is expected to be low. Ex. A-1 at 19.

164. The main potential threats to `ope`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 `ope`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.

165. 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 `ope`ape`a fatalities at several wind farms in Hawai`i. Ex. A-1 at 18.

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

167. The Tier 1 estimate requests a maximum take of 34 `ope`ape`a, which is the anticipated and expected total take of `ope`ape`a over the 20-year ITL term. There is inherent uncertainty in take estimates for `ope`ape`a for wind energy projects due to the limited data about `ope`ape`a. 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 `ope`ape`a as predicted. Ex. A-1 at 41-44 and Table 7; Tr. 8/7/17 at 76:14 to 77:2 (Snetsinger).

168. The most likely potential source of direct bat mortality is a collision or barotraumas associated with an operational WTG. Ex. A-1 at 41.

169. NPM's estimates of direct take of `ope`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.

170. According to NPM, the Kahuku Wind Farm data was selected to estimate the Project's take of `ope`ape`a because it: (i) is adjacent to the Project; (ii) has the longest operational history on O'ahu; (iii) has a similar number of WTGs as the proposed Project; and (iv) is likely to be the most similar wind energy facility to the proposed Project because it is directly adjacent to the proposed Project and has similar vegetative and topographical characteristics. *Id.* at ¶ 34; Ex. A-1 at 41; Ex. A-27 (Snetsinger WDT) at ¶¶ 12-13; *see also* Ex. A-29 (Oller WDT) at ¶ 34. 171. In selecting the Kahuku Wind Farm as a surrogate for estimating take for the Project, NPM elected not to use data from other wind farms, including the other wind farm on Oahu at Kawailoa, reasoning that the bat data from the Kahuku project is more reflective of what to expect at this Project. Vol. 1, Tr. 08/07/17 at 108:18-109:1.

172. The fact that the Project is adjacent to the Kahuku Wind Farm and shares similar vegetative and topographical characteristics are appropriate, but by NPM's own admission, not the only, bases for estimating take based on data from the Kahuku Wind Farm.

173. According to NPM, another reason for selecting the Kahuku Wind Project as a surrogate for estimating take is the similar number of WTGs (12 WTGs at Kahuku; 9 for the Project).

174. It is unknown whether the relationship between bat deaths and the number of turbines is linear. It is not something that has been studied closely. The data is analyzed under the assumption that the number of turbines to bats killed is proportional to the amount of fatalities. However, there could be factors associated with bigger projects can change relative to bats. Vol. 1, Tr. 08/07/17 at 97:12-100:2.

175. Nevertheless, in its calculation of bat mortality, NPM assumes that the number of bat deaths is directly proportional to the number of WTGs (i.e. a linear relationship). NPM

divides bat mortality per WTG at Kahuku to calculate the fatality rate and then multiplies the fatality rate by NPM's number of WTGs. Transcript Vol I at 97; Exhibit A-1 at 42.

176. Because the fatality calculation is based on an average per turbine and then multiplied by the number of turbines proposed by NPM, it appears that NPM presumes that the number of WTGs in a Project is irrelevant. If the number of WTGs is irrelevant, NPM fails to explain why its analysis was limited to data from the Kahuku Wind Project and did not consider fatalities per WTG from other wind energy projects in Hawai`i. Given the lack of information about the relationship between the size of a wind project to the number of bat fatalities, NPM should have analyzed bat mortality at other wind projects in Hawaii in estimating take for the Project, instead of relying solely on data from the Kahuku Wind Project.

177. According to NPM, it further relied on data from the Kahuku Wind Project (and elected not to use data from Kawailoa) because Kahuku had the longest operational history on Oahu.

178. 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.*; Transcript Vol II at 195 (Fretz).

179. 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. NPM argues that 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 therefore at those low wind speeds, is the likely period of greatest risk to bats. Vol. 1, Tr. 08/07/17 at 94:11-18.

180. Whether the partially operational period is included or excluded, the difference in operational periods between Kahuku and Kawailoa amounts to no more than 6 months. NPM has failed to articulate why this 6-month period is a rational basis for rejecting data from Kawailoa and relying exclusively on data from Kahuku.

181. Other wind facilities in Hawai`i have been in operation for longer periods. NPM failed to provide any analysis on the relationship between the length of operational period to bat mortality that justifies its reliance solely on data from the Kahuku Wind Project and exclusion of data from other Hawai`i wind projects.

182. The Kahuku wind power facility consists of twelve WTGs with a maximum height of 128 m. Exhibit B-23 at 8. The Kawailoa wind power facility consists of thirty WTGs

with a maximum height of 150.5 m. Exhibit B-35 at 13. The Project will have 9 WTGs with maximum height of 200 m.

184. According to the Applicant, 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. 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.

185. Applicant contends that notwithstanding the difference in height between the WTGs at Kahuku and the Project's WTGs, the Kahuku Wind Project is an appropriate surrogate because there is no direct correlation between turbine height and take. Vol. 1, Tr. 08/07/17 at 54:15-24; 72:4-11; *see* Ex. A-10.

186. Applicant relies on a research article by Zimmerling and Francis, *Bat Mortality Due to Wind Turbines in Canada*, printed in the Journal of Wildlife Management. The authors stated that they found no relationship between bat mortality/turbine and height of wind turbines. However, the authors noted that there was relatively little variation in the height of the wind turbines in the sample for which they had data, with most of the turbines being between 117 m and 136 m. Ex. A-10 at 5.

187. Hein and Schirmacher, in their 2016 article *Impact of Wind Energy on Bats*, note that taller turbines are associated with larger rotor-swept areas, which presumably contribute to greater fatality rates. They note that numerous studies support the hypothesis that taller turbines are associated with greater fatalities of bats. Although this article was published after the final HCP had been drafted, the article cited to studies conducted in 2007, 2008, and 2009 regarding the relation between turbine height and bat mortality. Ex. B-1 at p. 24. See also Ex. A-50 at 5.

188. A 2007 publication by Barclay, et al, *Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height*, concluded that minimizing tower height may help minimize bat fatalities and, conversely, that replacing older, smaller turbines with fewer larger ones may result in increased numbers of bat fatalities. Ex. B-7.

189. There is agreement that turbine height alone may not account for differences in bat mortality, but it is a factor to be considered in analyzing impact on bats. Ex. B-1 at 24; Ex. A-44 at § III.a.; Vol. 2, Tr. 08/08/17 at 192:6-25, 194:10-13 (Fretz).

190. In relying on the Kahuku Wind Project as a surrogate for the Project, Applicant failed to consider the difference in turbine height in estimating take for the Project. For example, although the WTGs at Kawailoa are taller than Kahuku's (but still not as tall as the maximum proposed for the Project) Applicant elected not to use data solely from Kahuku and not Kawailoa. Contrary to Applicant's contention, the best scientific data does not support the hypothesis that there is no correlation between turbine height and take.

191. To measure compliance for Hawaiian hoary bat take at Hawai‘i wind farms, DOFAW and USFWS estimate the take (and associated mitigation requirement for this take) at an 80% upper credible limit. Ex. A-1 at 40-56; Ex. A-12 at 4-109 to 4-122. That is, regulatory agencies are 80% confident that Applicant (and each other wind farm) will mitigate for more bats than it will take. Vol. 1, Tr. 08/07/17 at 81:11-20; 109:2-18.

192. However, existing data reveals that `ope`ape`a have been taken at a faster rate than predicted. Vol. 1, Tr. 08/07/17 at 84:6-10. This is an indication that DOFAW and USFWS, at least in the past, have underestimated take.

193. It may be that the location of the Kahuku Wind Farm and the similarities in topography and vegetation are the most influential factors in estimating the Project's potential

take of `ope`ape`a. By relying solely on data from the Kahuku Wind Project, without discussing data from other wind projects or sufficiently articulating why data from other wind projects are not applicable to the Project, NPM failed to meet its burden of showing that the best available scientific information was used in estimating take.

194. Because very little is known about the population status of `ope`ape`a (estimates range from a few hundred to a few thousand), and given the fact that take of `ope`ape`a by wind energy facilities may have been underestimated in the past, a robust analysis of potential take is critical. By relying solely on the Kahuku Wind Project as a surrogate and electing not to consider data from other wind facilities on Oahu or the other islands, and by failing to consider the impact of turbine height on bat mortality, the estimated take set forth in the HCP is not reliable enough for the Board to determine that the HCP will not jeopardize the continued existence of `ope`ape`a. HRS 195D-21(c), HRS 195D-21(c)(1).

195. **Avoidance and Minimization.** `Ope`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 `ope`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.

196. 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.

197. **LWSC**. To reduce the risk of take of `ope`ape`a, the HCP provides for the implementation of low wind speed curtailment ("LWSC"). The HCP provides that the cut-in speed for LWSC will be 5 meters/second ("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.

198. 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.

199. 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 meters per second 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.

200. 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.

201. Various studies in the US and Canada have looked at the impacts of raising cut-in speeds on number of bat fatalities. Result 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 meters per second. Ex. A-44 at 7.

202. 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. 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.

203. 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.

204. 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.

205. 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.

206. DOFAW's December 2015 Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document ("Bat Guidance") 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.

207. The inference from the Bat Guidance recommendation is that higher cut-in speeds afford greater protection, i.e., cut-in speed of 6.5 m/s is likely to result in less bat fatalities than a cut-in speed of 5 m/s. Fretz concurred that curtailing wind production at higher speeds could reduce bat take. Vol. 2, Tr. 08/08/17 at 200:4-6.

208. HRS § 1954(g)(1) requires the applicant to minimize and mitigate the impacts of the take to the maximum extent practicable. Although, studies to date 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, there some evidence that it does. Conversely, there is no evidence that cut-in speed of 5 m/s is more effective in minimizing impacts to bats than cut-in speed of 6.5 m/s. Moreover, the inferences are that curtailing wind production at higher speeds could reduce bat take. Therefore, the best scientific knowledge currently available suggests that increasing cut-in speed to 6.5 m/s, rather than 5 m/s, would minimize impacts to the maximum extent.

209. Increasing cut in speed reduces operating time to generate power. Lost power production resulting from experimental treatments 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.

210. Applicant did not provide evidence that increasing cut-in speed from 5 m/s to 6.5 m/s is not practicable.

211. **Mitigation**. There are separate mitigation actions associated with Tier 1 and Tier 2 levels. Tier 1 mitigation will be implemented upon the development of the Project. 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.

212. Mitigation measures provide for habitat improvement and to prevent degradation of existing `ope`ape`a habitat at Poamoho Ridge. Ex.A-1 at 59; Snetsinger WDT at ¶8. Such measures involve the removal of invasive species and pigs to provide an improved natural habitat and additional food sources for `ope`ape`a. 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.

213. 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.

214. 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 `op`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 `op`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.

216. Bat mitigation measures are still in their early stages and are being implemented, and monitoring is ongoing. Therefore, it is premature to conclude that the proposed mitigation measures will not benefit the Hawaiian hoary bat. Vol. 1, Tr. 08/07/17 at 124:1-7. By the same token, it is premature to conclude that the proposed mitigation measures will be a net benefit to `ope`ape`a. Fretz acknowledged that there is no existing definitive data that shows fence maintenance, restoration of native forests, invasive species removal, pig removal will directly increase the bat population. Vol. 2, Tr. 08/08/17 at 203:14-204:11.

217. A study of removal of axis deer and goats from the Kahikinui Forest Reserve and Nakula Natural Area Reserve indicated that the `ope`ape`a populations declined after removal.

See Ex. B-20. It is unknown whether there is a causal relationship between the removal of these animals and the decline in bat populations. Vol. 2, Tr. 08/08/17 at 205:15-206:2; Snetsinger Vol. 1, Tr. 123:10-124:7.

218. There is no statistical data or studies to demonstrate that the `ope`ape`a population is likely to increase with the mitigation measures proposed by the HCP. However, the ESRC believes that the proposed mitigation measures are appropriate under the current conditions and scientific knowledge. Vol. 2, Tr. 08/08/17 at 207:3-9. 219. Fretz elaborated that there is not much evidence from the existing wind energy projects on whether or not the mitigation measures used by those projects have increased the bat population. Because gathering this type of data and associated habitat management are long-term efforts, results will take time to manifest. Therefore, even if results are not readily apparent, the ESRC wants to continue the management measures for another 5, 10, or 20 years to allow for analysis of such results and measures. These projects are being carried out because the agencies expect to get a result over the long term, and when the future results are apparent, the agencies want to understand the effect and apply it to ongoing and future mitigation strategies. Vol. 2, Tr. 08/08/17 at 208:8-18.

220. Mitigation includes funding for research by NPM targeting one of the research priorities in accordance with a research plan approved by DOFAW and USFWS. Ex. A-1 at 58.

221. NPM will either independently fund a research project or will contribute funding to expand an existing research project. NPM will contribute $100,000 of research funding for Tier 1 mitigation and an additional $50,000 if Tier 2 mitigation becomes necessary. 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.

222. 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) `ope`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.

223. 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.

224. The ERSC Bat Guidance includes support for research targeted at improving our knowledge of the `ope`ape`a so that future mitigation projects can leverage results to improve the efficacy of mitigation efforts. Snetsinger WDT at P29.

225. For example, if new research results point to increased reductions in `ope`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.

226. An alternative mitigation proposal being considered for the conservation of `ope`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.

227. **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. The HCP is silent as to what happens in the event that pigs, goats and invasive plants are not removed to the extent and in the timeframe provided in the management plan. See discussion of Adaptive Management below.

F. Adaptive Management

228. "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.

229. 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.

230. 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).

231. 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.

232. Section 9.5 of the HCP discusses its Adaptive Management strategy. In addition to discussing implementation of Tier 2 mitigation for `ope`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.

233. 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.

234. 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.

235. The HCP's adaptive management strategy focuses on avoidance and minimization measures and on Permittee's ability to comply with mitigation requirements (see examples above). There is no discussion, however, on revising mitigation plans when (i) meaningful measures of success are not being met, and (ii) new information comes to light that may indicate different mitigation measures that may be more effective in protecting the species and promoting its survivability. Oller explained an informal process between the Permittee and the agencies that rely on voluntary cooperation but without coercive or enforcement powers by the agencies, except in cases of violation of the ITL or HCP. Tr. 8/7/17 at 63:3 to 67:25 (Oller).

236. Most of the measures of success included in the HCP are not conducive to adaptive management strategies. For example, by contributing to a pool of money for `a`o conservation research or projects to be carried out by USFWS, there is no adaptive management strategy under the HCP in the event that the management project that was funded turns out to be ineffective. See FOF # 52.

237. Even where adaptive management strategies are practical, the HCP fails to specify actions that will be taken. For example, mitigation for take of Hawaiian waterbirds includes partial fencing of Hamakua Marsh and funding for a staff biologist to do public education and monitoring. The HCP does not discuss any adaptive management strategy in the event that fencing, monitoring and public education are not successful in reducing the number of predators entering the marsh, the amount of trash in the parking lot adjacent to the marsh, or increasing the nesting opportunities within the marsh.

238. Research is an acceptable form of mitigation if information gained through research will inform and benefit future mitigation efforts. Given the limited knowledge about `ope`aope`a, 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 `ope`ape`a. 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 `ope`ape`a on Oahu, especially as current knowledge indicate that `ope`ape`a use a variety of different, including disturbed, habitats. Adaptive management should enable revisions in NPM's mitigation plans due to new research findings. The HCP, however, does not include such adaptive management strategies.

G. Funding Commitments

239. 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.*

II. CONCLUSIONS OF LAW

1. 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.

1.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 53. 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 Oahu, 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. FOF 54-56.

1.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 105-110.

1.c. **Nene**. The HCP identifies a number of avoidance and minimization measures to minimize take of nene in the Project area. FOF 123. 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 nene populations, implementation of the HCP should enhance habitat important for the survival and recovery of nene.

1.d. **Pueo**. The HCP identifies a number of avoidance and minimization measures to minimize pueo collisions with Project's WTGs and met tower. FOF 145. 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 Oahu would be more effective for species protection and enhancement. FOF 146-149.

1.e. **`Ope`ape`a**. By providing for LWSC at 5 m/s, instead of 6.5 m/s, the HCP fails to minimize impacts to `ope`ape`a to the maximum extent practicable, and, therefore, may not be protecting or maintaining the habitat used by `ope`ape`a (i.e., the Project area) as required under HRS § 195D-21(b)(1)(A). FOF 197-210. Because of limited knowledge about `ope`ape`a, it cannot be concluded that the proposed mitigation of improvement of habitat at Poamoho Ridge will protect, maintain, restore, or enhance the ecosystems, natural communities, or habitat types upon which `ope`ape`a depend. FOF 216. As the HCP does not include an effective adaptive management strategy for revising mitigation measures if future research reveals that different mitigation measures would be more effective in protecting and maintaining habitat used by `ope`ape`a, FOF 228-238, the HCP does not meet this criterion with respect to `ope`ape`a.

2. HRS § 195D-21(b)(1)(B) requires that the HCP increase the likelihood of recovery of the Covered Species.

2.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 54-56.

2.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 105-110.

2.c. **Nene**. As predation is the greatest factor limiting nene populations, contributing to the fencing of JCNWR, a habitat shown to be suitable for breeding nene, is likely to increase the likelihood of recovery of nene. FOF 116, 124-136.

2.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 Oahu is probably the most effective means of increasing the likelihood of recovery of pueo. FOF 146-149.

2.e. **`Ope`ape`a**. Mitigation proposed for `ope`ape`a includes contributing towards habitat improvement at Poamoho Ridge by providing annual funds to the KMWP and funding for research. FOF 213, 220. Because of limited knowledge about `ope`ape`a, it cannot be concluded that the proposed mitigation of improvement of habitat at Poamoho Ridge will increase the likelihood of recovery of `ope`ape`a. FOF 216. As the HCP does not include an effective adaptive management strategy for revising mitigation measures if future research reveals that different mitigation measures would be more effective in protecting and maintaining habitat used by `ope`ape`a, FOF 228-238, the HCP does not meet this criterion with respect to `ope`ape`a.

3. 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. FOF 42, 43.

4. 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. FOF 30-39.

5. 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 § 19521(b)(2(C).

5.a. **`A`o**. See COL 1.a. and 2.a., above. 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. FOF 52.

5.b. **Hawaiian Waterbirds**. See COL 1.b. and 2.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 104.

5.c. **Nene.** See COL 1.c. and 2.c., above. Should the maximum requested take of 6 nene 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 122.

5.d. **Pueo**. See COL 1.d and 2.d., above. No population estimates are available for pueo on Oahu or even more broadly in the Hawaiian Islands. The lack of systematic monitoring on Oahu 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 Oahu 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 144.

5.e. **`Ope`ape`a**. See COL 1.e and 2.e., above. Because very little is known about the population status of `ope`ape`a (estimates range from a few hundred to a few thousand), and given the fact that take of `ope`ape`a by wind energy facilities may have been underestimated in the past, a robust analysis of potential take is critical. By relying solely on the Kahuku Wind Project as a surrogate and electing not to consider data from other wind facilities on Oahu or the other islands, and by failing to consider the impact of turbine height on bat mortality, the estimated take set forth in the HCP is not reliable enough for the Board to determine the cumulative impacts on `ope`ape`a. FOF 194.

6. 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. See other COL, however, regarding the adequacy of such proposed measures or actions.

7. 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.

7.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 54-56.

7.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 59.

7.c. **Nene.** 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 114.

7.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 Oahu, and conducting research into limiting factors such as "sick owl syndrome" and vehicle collisions. FOF 131.

7.e. **`Ope`ape`a**. Mitigation proposed for `ope`ape`a includes contributing towards habitat improvement at Poamoho Ridge by providing annual funds to the KMWP and funding for research, FOF 213, 220, 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 `ope`ape`a research. FOF 153.

8. 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.

8.a. See COL 1.a. through 1.e.

9. 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)

9.a. Most of the measurements of success in the HCP cannot be said, when achieved, to contribute significantly to the protection, maintenance, restoration or enhancement of ecosystems, natural communities, or habitat types. Instead, success is most often measured by the contribution of money, without any evaluation of whether the use of the money actually contributed significantly to the survival or recovery of the Covered Species. While in some cases, the contribution of money is the most practicable measure of success, in other areas, there should be more meaningful measures to determine whether the mitigation measures are successful in contributing to the survival and recovery of the Covered Species.

9.b. **`A`o.** The contribution of funds should not be a measure of success because contributing money does not, in and of itself, assure the protection, maintenance, restoration or enhancement of ecosystems, natural communities or habitat types required to support the survival and recovery of the `a`o. However, given that (i) the pooling of monetary resources to carry out the statewide `a`o recovery plan is determined to be the most effective means of protecting the `a`o and promoting its survival and recovery, (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 in this instance. FOF 54-58.

9.c. **Hawaiian Waterbirds**. The HCP proposes to measure success by timely fence construction and funding for fence maintenance and a half-time staff biologist. FOF 111. These actions, however, cannot be cannot be said, when achieved, to contribute significantly to the protection, maintenance, restoration or enhancement of ecosystems, natural communities, or habitat types. Meaningful measures of success should include assessments of the (i) effectiveness of the fence in reducing predation or improving breeding habitat, (ii) staff biologist's engagement with the public regarding the protection of waterbirds, and (iii) whether

monitoring activities contribute towards improving habitat for waterbirds. These types of measurements of success are not included in the HCP, FOF 112, and thus, are not compliant with HRS § 195D-21(b)(2)(G).

9.d. **Nene**. The contribution of funds should not be a measure of success because contributing money does not, in and of itself, assure the protection, maintenance, restoration or enhancement of ecosystems, natural communities or habitat types required to support the survival and recovery of the nene. However, given that (i) the pooling of monetary resources for habitat management at JCNWR, which contains suitable nesting habitat, is determined to be the most effective means of protecting the nene and promoting its survival and recovery, (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 in this instance. FOF 124-129.

9.e. **Pueo**. The contribution of funds should not be a measure of success because contributing money does not, in and of itself, assure the protection, maintenance, restoration or enhancement of ecosystems, natural communities or habitat types required to support the survival and recovery of the pueo. However, 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, (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 in this instance. FOF 146-151.

9.f. **`Ope`ape`a**. 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. The HCP is silent as to what happens in the event that pigs, goats and invasive plants are not removed to the extent and in the timeframe provided in the management plan. FOF 227. Moreover, the HCP is silent on adaptive management strategies in the event future research reveals that the mitigation plan will not benefit `ope`ape`a. FOF 216. The HCP fails to include meaningful measures of success with respect to `ope`ape`a mitigation, and in this respect is not compliant with HRS § 195D-21(b)(2)(G).

10. The HCP's adaptive management strategy focuses on avoidance and minimization measures and NPM's ability to comply with authorized take levels and mitigation requirements. It fails to provide an enforceable adaptive management strategy for revising mitigation measures when new information supports alternative mitigation measures. FOF 228-238. This failure renders the HCP non-compliant with HRS § 195D-21(b)(2)H).

11. In three instances, Applicant failed to use the best scientific and reliable data in assessing impacts and mitigation as required under HRS § 195D-21(c): (i) electing to use LWSC cut-in speed of 5 m/s, instead of 6.5 m/s; (ii) concluding that the height of WTGs has no impact on take of `ope`ape`a; and (iii) by relying solely on data from the Kahuku Wind Project for estimating the Project's take of `ope`ape`a.

12. Because of the less than robust analysis of anticipated take of `ope`ape`a by the Project, combined with the limited information available about `ope`ape`a populations on Oahu and statewide, it cannot be determined with confidence whether the Project will jeopardize the continued existence of `ope`ape`a. HRS § 195D-21(c)(1). FOF 194.

13. The Project and implementation of the HCP is not likely to cause any native species to become listed as threatened or endangered. FOF 43. HRS § 195D-21(c)(2).

14. The HCP, by (i) relying solely on data from the Kahuku Wind Project excluding data from other wind projects in the State, and (ii) failing to analyze the impact of the increased height of WTGs on `ope`ape`a, failed to provide sufficient information for the Board to ascertain with reasonable certainty the effect of the plan on `ope`ape`a in the plan area and throughout its habitat range. HRS § 195D-21(c). FOF 194.

15. The notifications provided in the OEQC Bulletin met the requirements of HRS § 195D-21(a). FOF 5-7.

16. The HCP was developed after consultation with the ESRC. HRS § 195D-4(g). FOF 10.

17. 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 40.

18. HRS § 1954(g)(1) requires the applicant to minimize and mitigate the impacts of the take to the maximum extent practicable. Increasing cut-in speed to 6.5 m/s, rather than 5 m/s, would minimize impacts to the maximum extent. However, the HCP provides for cut-in speed at 5 m/s and Applicant did not provide evidence that increasing cut-in speed to 6.5 m/s is not practicable. Therefore, the HCP does not satisfy HRS § 195D-4(g)(1). FOF 208-210.

19. 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. FOF 239.

20. 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 239.

21. The minimization and mitigation measures proposed in the HCP are aimed at increasing the likelihood of survival and recovery of all of the Covered Species except `ope`ape`a. HRS § 195D-4(g)(4). See COL 5.a. through 5.e., above. Additionally, not enough information is known about the potential acquisition of property for protection of `ope`ape`a habitat for the Board to analyze whether it would mitigate the impacts of take. FOF 226.

22. Because Applicant conducted a less than robust analysis of anticipated take of `ope`ape`a, especially given the higher than anticipated rate of take experienced at other wind energy projects in the state, the Board is unable to adequately assess the cumulative impact of the take of `ope`ape`a as required by HRS § 195D-4(g)(5). FOF 194.

23. 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 239. HRS § 195D-4(g)(6).

24. The Project does not involve the use of submerged lands, mining or blasting. FOF 31. HRS § 195D-4(g)(7).

25. Overall, the mitigation measures required under the HCP will provide net environmental benefits. HRS § 195D-4(g)(8). See COL 1.a through 1.e. Even though the benefit to `ope`ape`a may be uncertain, the Poamoho Ridge habitat improvement plan will provide a net environmental benefit to other native species.

26. The Project is unlikely to cause the loss of genetic representation of an affected population of any endangered, threatened, proposed or candidate plant species as there no listed threatened or endangered plant species were identified in the Project area. FOF 43. HRS § 195D-4(g)(9).

27. The required public hearing was held on the draft HCP on June 4, 2015. Additionally, the public had the opportunity to attend ESRC meetings during which the draft HCP was discussed. Although the height of the WTGs was changed subsequent to the June 4, 2015 public hearing, and there was no active discussion about the change in WTG height at the ESRC meetings, HRS 195D-4(g) does not require that additional public hearings be held after changes are made to the draft HCP. FOF 8-10.

III. RECOMMENDED DECISION AND ORDER

Based on the foregoing FOF and COL, the Hearing Officer recommends that the Board find that the HCP fails to meet all the criteria for acceptance pursuant to HRS Chapter 195D, and therefore, DISAPPROVE the HCP.

Respectfully submitted, October 31, 2017,

YVONNE Y. IZU
Hearing Officer