Kaheawa I Habitat Conservation Plan
FY-2014 Annual Report: FY 2014

Kaheawa Wind Power I, LLC
3000 Honoapiilani Highway
Wailuku, Hawaii 96768

August, 2014

ITL 08 and ITP TE118901-0

I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate and complete.

Hawaii HCP Manager
First Wind Energy, LLC

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EXECUTIVE SUMMARY

Kaheawa Wind Power I, LLC (KWPI) has been implementing a Habitat Conservation Plan (HCP) since approval January 2006. The HCP supports a Federal Incidental Take Permit TE-118901-0 and State of Hawaii Incidental Take License ITL-08. The project began construction in 2005 and was completed in June 2006. KWPI was commissioned to begin operating (COD) on June 22, 2006. Species covered under the HCP include Hawaiian Petrel (HAPE), Newell's Shearwater (NESH), Hawaiian Goose (Nēnē), and the Hawaiian Hoary bat (bat). This report is for the eigth year of operations and State of Hawaii Fiscal Year (FY) 2014, July 1, 2013 through June 30, 2014.

KWPI has previously submitted annual HCP progress reports for FY 2007, 2008, 2009, 2010, 2011, 2012 and 2013 to USFWS and DOFAW.

Fatality monitoring search plots have parallel marked transects at six meter intervals. The plot radii of 73 meters at KWPI equal 75% of the maximum WTG height. In addition, three MET towers have a plot with a radius of 50m (50% of the tower height). Plots are scheduled to be searched weekly. During FY 2014, the search interval mean and standard deviation (SD) in days for KWPI was 7.16 (SD = 2.13).

Three Nēnē, one HAPE and four bat fatalities were observed during FY 2014. The total estimated take for KWPI HCP species is a mean of 27 adults for Nēnē and 24 for the bat (Huso 2012). Using Dalthorp et al (2013) for HAPE take estimation there is an 50% credibility level that the take is not greater than seven adults. Although an appropriate credibility level has not yet been determined for KWPII, at the request of USFWS and for illustrating a broader range, the 80% credibility level is also reported. The 20 and 80% confidence intervals for Nēnē are 20 and 34, respectively, and for bat are 18 and 29. The 80% credibility level for HAPE is not greater than 9. The lost productivity calculation for 21 Nēnē is five juveniles. The lost productivity calculation for seven HAPE is 10 juveniles.

WEST has been contracted to proctor independent CARE trials and SEEF trials for one year at KWPI. The scope of work for SEEF and CARE trials commenced March 31, 2014. WEST will submit a final report to First Wind and wildlife agencies 15 days after the completion of the study in FY 2015-Q4. The searcher efficiency trials (SEEF) and carcass retention trials (CARE) results from the Western EcoSystems Technology, Inc. (WEST) study in progress have been included in the estimates.

CARE trials in FY 2014 used six Canada Geese (CAGO), 14 Wedge-tailed Shearwaters (WTSH), and 23 rats. Considering the first 14 days of the trials as the trial length the CARE mean and SD for each surrogate in days were 14.0 for CAGO (SD = 0), 13.0 for WTSH (SD = 2.54) and 6.7 for rats (SD = 4.95).

The mean for SEEF in FY 2014 for large, medium and small carcasses was 72.7% (N = 11), 75.5% (N = 45) and 59.5% (N = 79).

A six-month canine efficiency trial has been contracted to handler Teresa Gajate. She has purchased a Springer Spaniel from New Zealand and they are currently in a rigorous training program. Closely monitored trials on KWP will commence once training is deemed complete.

Nine Wildlife Acoustics SM2BAT+™ ultrasonic detectors and one “long-term” Titley™ Anabat detector, recorded bat detections at 9 of the 10 detector locations at KWPI on 101 of 2700 detector nights (3.74%) in FY 2014.

A total of 39 site personnel received WEOP trainings through June 30, 2014.

Vegetation management for FY 2014 resulted in 55,055 square meters of total plot area treated using hand-held weed whackers, compact track loader, chainsaws, and weed pulling.

As seabird mitigation for both KWPI and KWPII construction of predator-resistant fences at Makamaka’ole was completed on September 2013. Activities currently focus on trapping and monitoring rodents and predators, fence maintenance and monitoring seabird activity near burrow locations. Searches for alternative sites for seabird colony searches were completed in West Maui in August 2013. East Maui surveys will be completed in FY 2015-2016.

Agency meetings occurred at least once a month, except for the month of August, in FY 2014. In addition to the FY 2014 annual report, First Wind also provided quarterly reports for FY 2014 Q1, Q2 and Q3.

INTRODUCTION

In June 2006 Kaheawa Wind Power, LLC (KWPI) began operating the island of Maui's first commercial wind energy generation facility in the Kaheawa Pastures area of West Maui. The State Board of Land and Natural Resources approved a Conservation District Use Permit (CDUP) for the facility, which is situated on state conservation lands, in January 2003. One condition of the CDUP was a requirement to "comply with the Incidental Taking Permit requirements of the U.S. Fish and Wildlife Service, including the preparation of the Habitat Conservation Plan."

Pursuant to Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended, the U. S. Fish and Wildlife Service (USFWS) may permit, under certain terms and conditions, the "taking" of a listed species that is incidental to, and not the purpose of, an otherwise lawful activity. To qualify for a federal Incidental Take Permit (ITP) an applicant must develop, fund, and implement a USFWS-approved Habitat Conservation Plan (HCP) to minimize and mitigate the effects of the incidental take. Under a similar program, Chapter 195-D, Hawai`i Revised Statutes authorizes the Hawai`i Department of Land and Natural Resources (DLNR) to issue an Incidental Take License (ITL).

In fulfillment of this condition, KWPI developed a project-specific HCP in cooperation with the USFWS, DLNR and the Hawai`i Endangered Species Recovery Committee (ESRC). Upon final approval of the HCP, the federal ITP (TE-118901-0) and state ITL (ITL-08) were issued in January 2006, each with a duration of twenty (20) years. Commercial operation of the project commenced in June 2006. The ITP and ITL cover four federally-listed and endangered species: the Hawaiian Petrel or 'Ua'u (*Pterodroma sandwichensis*), Newell's Shearwater or 'a'o (*Puffinus auricularis newelli*), Hawaiian Goose or Nēnē (*Branta sandvicensis*), and the Hawaiian Hoary bat or 'ope'ape'a (*Lasiurus cinereus semotus*).

This report summarizes HCP related activities for KWP I1 during the eighth year of project operations (July 1, 2013 through June 30, 2014).

FATALITY MONITORING

KWPI biologists have been implementing a year-round monitoring program to document downed (i.e., injured or dead) wildlife incidents involving HCP-listed and non-listed species on the project site and its vicinity since operations began in June 2006.

Systematic searches are conducted on foot within circular plots centered on the wind turbine generators (WTGs) and meteorological towers (MET). At each WTG a plot is marked with a radius equivalent to 75% of the maximum WTG rotor swept zone height; 73m on KWPI. Each MET tower has a plot with a radius of 50m (50% of the tower height). Three met towers and 20 WTGs are searched once weekly as part of the KWPI fatality monitoring protocol.

The search interval mean and standard deviation (SD) in days for KWPI was 7.16 (SD = 2.13) (Table 1 and Appendix 1). The mean is larger than 7 because it includes the longer than typical search intervals that occurred during high winds. Search plots are classified into four vegetation types: bare, grass, shrub and unsearchable gulch. Vegetation is maintained below 25cm when possible and is managed only during the non-breeding season for Nēnē (May - October). The search interval was slightly raised due to occurrences of high winds. For the safety of the First Wind technical staff, monitoring is halted during periods when wind speeds are reported higher than 15 meters per second (m/s). During FY 2014 there were two periods of extended high winds from November 25th to December 5th and December 23rd to December 29th. Other periods of high winds occurred but they did not last for greater than five days. Notifications of a change in interval due to high winds were reported to state and federal agencies via e-mail within one week, the HCP required time limit for reporting.

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Table 1. Mean and standard deviation in days per WTG plot on KWPI FY 2014.

WTG	1	2	3	4	5	6	7	8	9	10
Mean	7.12	7.16	7.13	7.16	7.16	7.16	7.16	7.16	7.16	7.16
SD	2.15	2.33	1.83	1.99	1.99	1.74	1.93	1.87	2.14	2.00
WTG	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Mean	7.16	7.16	7.18	7.18	7.18	7.18	7.16	7.16	7.18	7.18
SD	1.92	2.19	2.10	2.20	2.15	2.22	2.36	2.36	2.53	2.51

	MET1	MET2	MET3
Mean	6.98	7.31	7.18
SD	1.93	2.09	2.30

Mean TOTAL	7.16
SD TOTAL	2.13

FATALITIES

Direct Observations of Incidental Take

Downed wildlife incidents documented at KWPI during FY 2014 are summarized in Table 2. Locations of fatalities found with reference to WTGs and site facilities are described using ESRI™

ArcMap in Figure 1. Ten of these incidents involved HCP-covered species or species of concern – two Hawaiian Short-eared Owls (Pueo), four bats, three Nēnē and one HAPE and were reported to DOFAW and USFWS within 24 hours. Details of all HCP-covered fatalities are provided in Downed Wildlife Incident Reports submitted to DOFAW and USFWS within three calendar days of each discovery.

Table 2. Documented wildlife fatalities at KWPI in FY 2014.

Species	*Date*	*Location (WTG)*	*Distance to Turbine (m)*
HCP Covered Species and Species of Concern			
Hawaiian Hoary Bat	09/10/13	10	48.5
Hawaiian Goose	10/17/13	15	50.5
Hawaiian short-eared Owl[1]	12/03/13	4	51
Hawaiian Hoary Bat	12/14/13	18	35.2
Hawaiian Goose	12/29/13	16	69
Hawaiian Hoary Bat	02/24/14	16	26.8
Hawaiian Hoary Bat	05/07/14	6	33
Hawaiian Short-eared Owl	06/04/14	7	63.5
Hawaiian Goose	06/16/14	5	70
Hawaiian Petrel	06/24/14	3	18
MBTA and Other Non-Covered Species			
Common Myna	07/08/13	12	25
Ring-necked Pheasant	07/08/13	13	35
White-tailed Tropicbird (MBTA)	08/02/13	14	69
Ring-necked Pheasant	08/02/13	8	65
Ring-necked Pheasant	08/02/13	10-11	106
Eurasian Skylark (MBTA)	10/10/13	14	73.3
Eurasian Skylark (MBTA)	11/01/13	8	49
Eurasian Skylark (MBTA)	12/04/13	17	15.6

[1] Hawaiian Short-eared owl (Pueo) is considered a species of concern on Maui.

Ring-necked Pheasant	03/17/14	7	89.2
White-tailed Tropicbird (MBTA)	03/26/14	5	49.4
Ring-necked Pheasant	03/26/14	9	3.2
Ring-necked Pheasant	03/26/14	5	30
Ring-necked Pheasant	03/26/14	6	55.5
Ring-necked Pheasant	04/01/14	2	61
Gray Francolin	04/04/14	6	3
White-tailed Tropicbird (MBTA)	04/04/14	6	31
Pacific Golden Plover (MBTA)	04/10/14	6	70.8
Pacific Golden Plover (MBTA)	04/10/14	6	42.6
Ring-necked Pheasant	04/10/14	9	43.7
Japanese White-eye	04/18/14	18	22.5
Ring-necked Pheasant	04/18/14	19	38.5
Pacific Golden Plover (MBTA)	05/08/14	Phase I Substation	113 to WTG-11
Eurasian Skylark (MBTA)	06/09/14	6	37.5
Unknown Species			
Bone Fragment	4/29/14	11	43

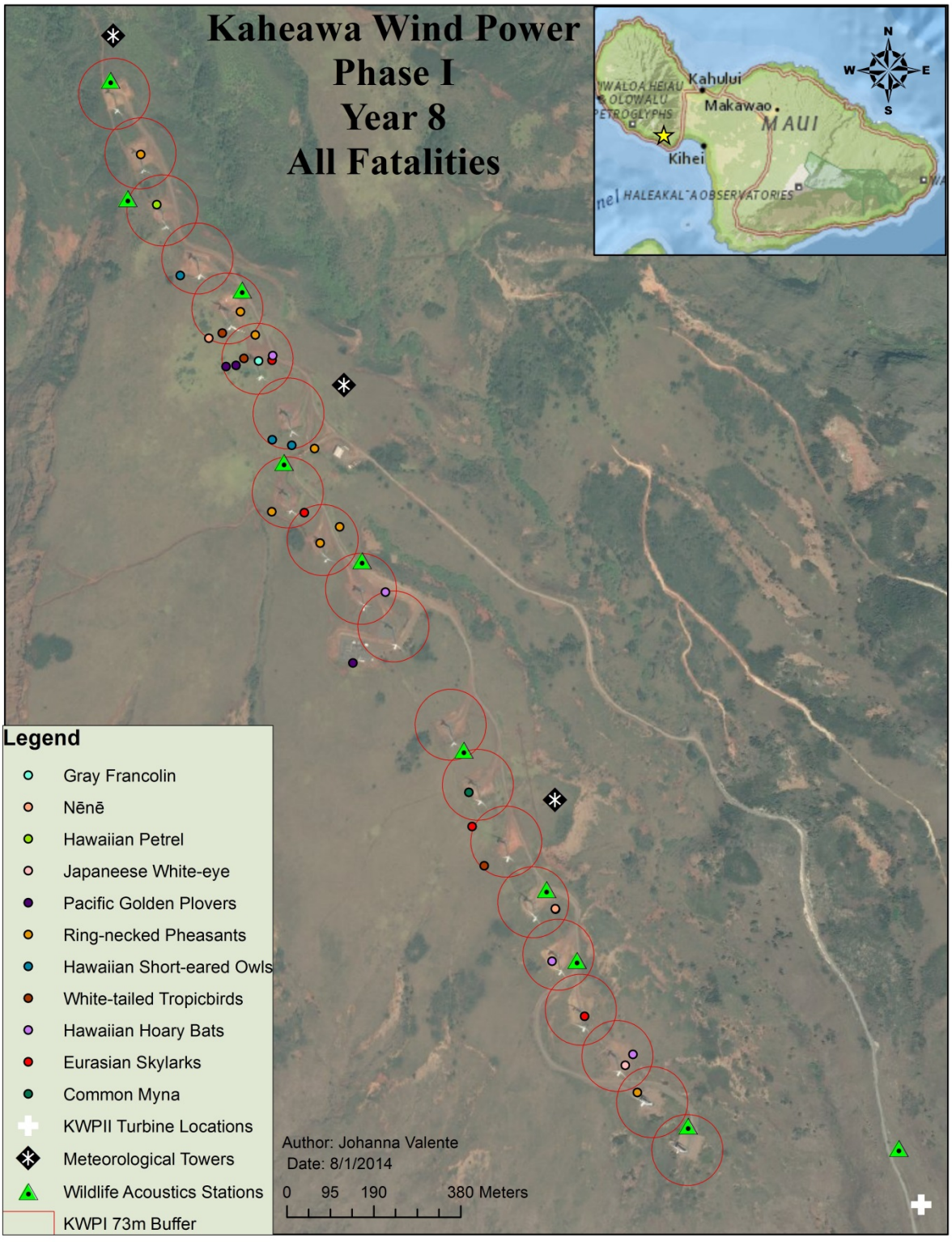

Figure 1. All downed wildlife observed over FY 2014 throughout KWPI in reference to WTGs, meteorological towers, wildlife acoustics monitors, and site facilities.

TAKE ESTIMATION

Three Nēnē, one HAPE and four bat fatalities were observed during FY 2014. The total observed take for each species over all eight years of monitoring at KWPI is 17 Nēnē, five HAPE, eight bats and no NESH. Observed take is the only take that has been documented and confirmed at the site. However, for the purposes of estimating potential take for permitting and mitigation, various statistical methods have been developed for estimating additional take that may have occurred but that was not observed. This "unobserved take" attempts to account for fatalities that may have fallen outside of search plots, were missed by searchers, or were removed by scavengers or environmental factors such as high winds. Estimating unobserved take is an evolving science and no one method is universally accepted or valid in all situations. Further, use of different estimators can sometimes yield widely differing results. The estimators used in this report were developed by USGS and have been recommended by DOFAW and USFWS.

The Dalthorp (2013) estimator is a new method introduced within the last year, specifically developed for situations where searching is intensive yet observed fatalities are very low, as is often the case with HCP-covered species in Hawaii. The estimator's output is a value that represents the number of fatalities that has not likely been exceeded during the survey period. Values can be generated for varying levels of "credibility" (confidence), expressed as a percentage (e.g., 50%, 80%, etc.) - the higher the desired level of credibility, the more conservative (higher) the estimated value. An estimator value with 50% credibility has an equal chance of being higher or lower than the true value. This method is being used for the first time at KWP I this year, and discussions regarding how best to apply the method and interpret the output are ongoing. For this report this method is being applied only for HAPE.

Huso has informally suggested (pers comm during the July 2014 workshop) that the Huso 2012 (D729) estimator be used when the number of fatalities observed is greater than five or six. This method is used in this report for the Nēnē and bat at KWP I. One assumption of this estimator is that carcasses observed that are older than the search interval (approximately seven days for KWPI) are accounted for in the SEEF trials and are therefore not input as observed fatalities. We could not determine that any bats found were older than the search interval. There were four Nēnē excluded that were clearly older than seven days. These were found May 14, 2010, December 8, 2010, January 3, 2013 and January 15, 2013.

The total estimated take for The KWPI HCP listed species is a mean of 27 for Nēnē and 24 for the Hawaiian hoary bat (Huso 2012) (Appendix 2). The Dalthorp et al (2013) estimation for HAPE take with a 50% credibility level is not greater than seven (Appendix 3). Although an appropriate credibility level has not yet been determined for KWPI, at the request of USFWS and for illustrating a broader range, the 80% confidence interval and credibility level is also reported. The 20 and 80% confidence intervals for Nēnē are 20 and 34, respectively, and for bat are 18 and 29. The 80% credibility level for HAPE is not greater than 9.

The indirect take and lost productivity calculation for Nēnē (using 21) is 4.2 juveniles rounded up to five (Appendix 4). Fatalities occurring before 2011 are not included in the lost productivity

assessment (May 20, 2014 meeting notes). The use of 21 Nēnē, rather than 27 Nēnē was based on wildlife agencies prior approval to suspend the inclusion of productivity loss that accumulated prior to 2011. These fatalities are not included since the pen intended for mitigation was not available to introduce Nēnē goslings prior to 2011. The lost productivity calculation for HAPE (using seven adults) is 10 juveniles (Appendix 5) and is 13 using nine adults. KWPI HCP does not separately prescribe lost productivity for bats to be calculated. The latest SEEF and CARE results from the ongoing WEST study have been included in the fatality estimates.

INDEPENDENT SEEF and CARE STUDY

In October 2013, WEST was chosen as an independent contractor to proctor SEEF and CARE trials throughout both KWPI and KWPII project sites. Trials are being conducted over a one-year period beginning in March 2014 using small mammal and medium and large sized bird surrogates across three vegetation classes; bare, grass, and shrub. WEST is informed of the KWP search schedule on a daily basis and place carcasses in accordance with the approved work plan, without the knowledge of searchers. Search technicians use neon flagging to "tag" each trial carcass found and detection results are reported daily to WEST along with notes of carcass status and questions related to findings. WEST reports results directly to the USFWS and DOFAW on a monthly basis. A small subsample of the total trial carcasses that were missed are reported to First Wind HCP staff to use as "training SEEFs" to educate technicians in the field. Selected trial carcasses are also used in CARE trials to estimate the persistence of a small mammals or avian carcasses over time. Game cameras are also randomly placed on CARE trial carcasses to gather information on scavenger types and effects of wind, rain and decomposition. A final report with will be submitted after one year, within 15 days of the study's completion.

CARCASS RETENTION TRIALS

CARE trials are used to estimate how long a carcass remains detectable to searchers before complete removal by scavengers or weather conditions. Trials proctored by First Wind were conducted using CAGO, WTSH, and laboratory rats as surrogates for the large and medium birds and small mammals, respectively. CAGO were obtained from the USDA-APHIS in Alaska. WTSH carcasses are generally deceased fledglings that have been found by the public and delivered to Sea Life Park on Oahu and also from the DOFAW Maui branch. We possess state and federal wildlife collection permits for KWPI and KWPII, numbers WL 15-05 and MB24151B-0, respectively. Rat carcasses came from Layne Laboratories, Inc. in California, a pet food company. These rats are brown and/or black and are the Layne Laboratory "Small Colored" size category (approximately 11.3 cm in body length) and were chosen to mimic body size of Hawaiian hoary bats (Figure 2).

Figure 2. Hawaiian Hoary bat and rat surrogate for CARE and SEEF trials.

Including WEST study trials conducted in FY 2014, CARE trials in FY 2014 used six Canada Geese (CAGO), 14 Wedge-tailed Shearwaters (WTSH), and 23 rats (Appendices 6 and 7). CARE trials in the past and at other sites have only lasted for 14 days. Trial lengths recently have been standardized to one month. For comparison across sites and years we present the mean here assuming trials lasted only 14 days. When estimating fatalities however we use the data as it has been collected (up to 30 day trials). Considering the first 14 days of the trials as the trial length the CARE mean and SD for each surrogate in days were 14.0 for CAGO (SD = 0), 13.0 for WTSH (SD = 2.54) and 6.7 for rats (SD = 4.95).

SCAVENGER TRAPPING

Predator trapping was not conducted during FY 2014 at KWPI. Moultrie™ game cameras staged on SEEF and CARE trials documented an increase of predators throughout KWPI (Figure 3). Wildlife Education and Observation (WEOP) notes have also shown an increase of feral pigs and cats.

Figure 3. Feral cat recorded via game camera at KWPI near WTG-20.

Due to recent findings of scavenger observations, HCP personnel plan to implement a full trapping program once approved. KWPI trapping will consist of ten A24 Goodnature™ traps, ten body grip (DOC250) traps, six live capture Havahart™, and one portable pig trap, and one pig corral trap (Table 3). Traps will be placed in areas where WEOP and game camera observations have shown a high frequency of predators and will be moved in order to ensure that all KWPI plots are represented when evaluating predation levels and trap effectiveness. Four game cameras will be used to monitor trapping locations and document scavengers' interactions with the traps. Trapping is intended to decrease the number of predators and scavenging rates, and may have the added benefit of improving fledgling survival and nesting success of Nēnē. All traps have been designed to minimize inadvertent interaction with nesting birds. The proposed KWPI trapping protocol will be submitted to DOFAW for review with consideration of all HCP listed species prior to implementation. The proposed KWPI trapping and monitoring procedure is summarized below.

Table 3. KWPI trapping and monitoring protocol.

Trap Type	Species Targeted	Monitoring Frequency	Frequency of Baiting/Re-setting	Frequency of Cleaning and Re-Locating
Good Nature© A24	Mongoose, Rat	Monthly	Monthly	Minimum 1x per 6 months
DOC250	Mongoose, Rat	Weekly	Weekly	Minimum 1x per 3 months
Havahart live trap	Cat, Mongoose	48 hours	2-7 days	Minimum 1x per 3 months
Pig portable trap	Feral Pig	48 hours	2-3 days	Minimum 1x per 3 months
Pig coral trap	Feral Pig	48 hours	2-3 days	Minimum 1x per 3 months

SEARCHER EFFICENCY TRIALS

SEEF trials provide estimates of carcass detection probability and are an important component of downed wildlife monitoring at KWPI. SEEF trials conducted by First Wind are controlled by a qualified proctor and conducted in conjunction with the daily search plan. Searchers are not informed in advance that a trial is being initiated. Carcasses were randomly placed using ESRI™ ArcMap point generator feature by vegetation class.

The mean for SEEF in FY 2014 for large, medium and small carcasses was 72.7% (N = 11), 75.5% (N = 45) and 59.5% (N = 79) (Appendices 8 and 9).

The Table 4 shows the overall searcher efficiency percentages for all ground cover types.

Table 4. KWPI SEEF results for all vegetation classes.

VEG TYPE	CAGO	WTSH	Rat
Bare	100% (N = 2)	100% (N = 12)	81.6% (N = 49)
Grass	100% (N = 5)	76.2% (N = 21)	36.8% (N = 19)
Shrub	50% (N = 4)	50% (N = 12)	8.3% (N = 12)

CANINE ASSISTED SEARCHER EFFICIENCY TRIALS

Over the past year First Wind has been developing a program at Kawailoa and Kahuku on Oahu to use specially-trained search dogs to aid in downed wildlife detection. Through continued progress, results have shown that teaming human monitors and trained canines to search turbine plots is more efficient and effective than human-only search methods. A canine program has the potential to improve wildlife detection at KWP II as well. While we are excited to begin a canine program we also recognize that many factors exist specifically at KWP that could affect overall success. High winds, variable weather, high vegetation, uneven terrain and onsite endangered wildlife are all sensitive aspects that need to be considered. Therefore, it is important to conduct a full canine efficiency trial at the site before further developing the program.

The Canine Efficiency Trial has been contracted to Teresa Gajate, a canine search specialist with over 15 years of experience in training and handling search and rescue canines. In January 2014, Teresa chose a Springer Spaniel from New Zealand with strong working/search bloodlines (Figure 3). The puppy will be trained for a minimum of 9 months or until Teresa determines the canine is ready to begin onsite efficiency studies. The trail will last for a total of six months with an option to continue if more

data is needed. Due to the sensitive nature of the search area, strict parameters have been set to ensure a safe and effective trial.

Four main phases of training must be met with success before the canine enters the KWP project site. The phases include obedience, socialization, conditioning and searching. Obedience is the understanding of precise commands with an instant response time along with specific search commands for recall and emergency stop. Socialization will be necessary in order to make sure the canine is able to conduct himself calmly and passively in a wide variety of situations. Socialization training will follow the guidelines of the Canine Good Citizen Certification (CGC) and Airport Etiquette test to fully prepare the dog. Conditioning will be a training process in which the dogs search ability will be stretched for accuracy and precision as well as increasing duration. The searching phase will try to recreate the targeted sights and smells of the KWP project site in order to mimic the working trial. Scent of both SEEF species and HCP species have been used to train the canine to distinguish between target odors and distractions (undesired odors).

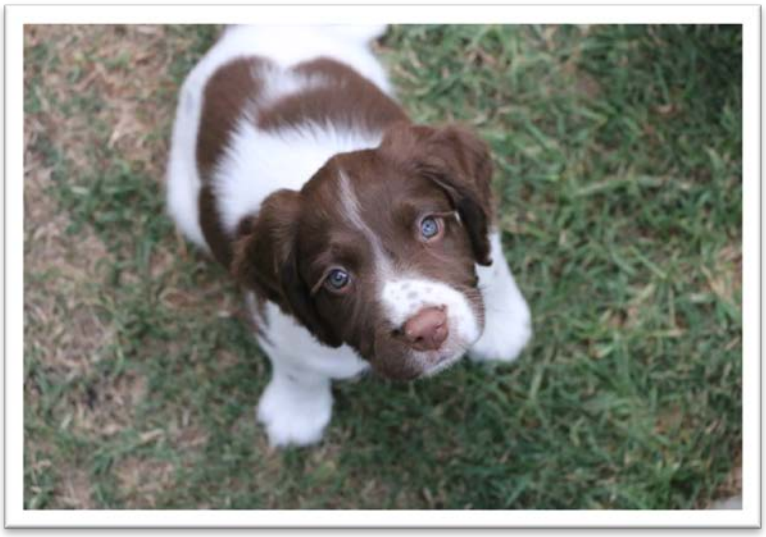

Figure 4. Makalani, KWP contracted canine to be used in searcher efficiency trials.

Once the dog is completely trained, a carefully designed methodology will be followed for a canine searching trial:

1) The canine team will be partnered with a KWP technician or biologist. The technician will conduct a full preliminary search of the area to ensure there are no Nēnē near or within the plot before the canine is allowed to search. The technician will continue to monitor the area for HCP species while the plot is searched by the canine.

2) Carcasses will be both “blind” and “double blind”. Blind study carcasses will be placed by the handler while the canine is in a crate stationed within a vehicle. Double blind carcasses will be placed

by a First Wind Technician, Biologist or contracted personal without previous notification to the handler.

3) Turbine plots used for the canine study will have been previously searched by KWP technicians on foot as part of the regular monitoring interval. Carcasses found by the canine or the canine handlers that are not part of the canine efficiency study will be counted and recorded as routine monitoring.

4) Weather data and trial efficiency data will be logged by both KWP personnel and canine handler to avoid bias.

At the end of the six month trial a full report will be submitted to First Wind. The trial is expected to be in FY 2015 Q2 and Q3. During this time, canine searcher efficiency will be studied and a full cost-benefit analysis of a canine program will be conducted. If this study reveals a high success rate at KWP with minimal to no effect on endangered wildlife, First Wind may move forward with a long-term contracted canine program beginning in 2015.

HAWAIIAN HOARY BAT MONITORING

Since 2006, 28 Titley™ Anabat SD1 and SD2 units were deployed at various locations throughout the KWP I and KWP II project sites. The detectors were originally installed as part of the KWP I mitigation to study bat activity throughout the site. In July 2013 ten Anabat detectors remained operational; six at KWP I and four at KWP II. In October 2013 the number of Anabat detectors was reduced to four in order to upgrade equipment to Wildlife Acoustics™ SM2BAT+ (SM2) systems. One "long-term" Anabat detector at each project site remained for two months to collect data (detectors at KWP1 3G and KWP2 14G), the two with the highest activity records for each site (near gulches at the top and bottom, respectively of the entire KWP1/KWP2 strings). Two of the four detectors were paired with SM2's to compare the two types of detectors and past records. Results immediately showed the Wildlife Acoustics™ detectors superior to the Anabat, and ongoing failures of the Anabat detectors resulted in a complete switch from Anabat to Wildlife Acoustics™.

In order to better understand variations in bat activity specifically near the WTGs, First Wind deployed 9 SM2's with one microphone (mic) each in October 2013 throughout KWPI. All of the SM2 mics were mounted horizontally at 6.5 meters high. Eight were placed near the WTGs while one was placed near a gulch edge; each mic was positioned away from the prevailing trade winds. The detector placed near the gulch edges to gain more knowledge of bat activity in that location.

Hawaiian hoary bat detections were recorded on 101 of 2700 detector nights (3.74%) at 9 of 10 locations between July 2013 and June 2014 (Table 5). Past and current records indicate a higher level of bat activity near the gulches and during the months of July – October. Activity increased in October which coincides with the deployment of the new detectors. Although SM2 detectors were expected to be more sensitive than Anabat detectors past detections at both KWPI and KWPII have peaked in

September and October. Two of eight (25%) bat fatalities at KWPI were found during these two months (in 2008 and 2013), four of eight were found in April and May (in 2011, 2013 and 2014) and the remaining two were found in December and February (in 2013 and 2014). The months fatalities were found do not correlate highly with peaks in detected bat activity.

At KWPI in FY 2013 17 nights with detections were documented within the monitoring area. The majority of the documented passes (59%) were recorded during October 2012 at two Anabat stations (detector ID 22 & 26; Table 7); consequently October also had the highest mean detection rate.

Bat activity in FY 2014 occurred during every hour between 1800 and 0600 hours except in hours 5 and 6. A distinct peak in activity is evident before midnight that gradually declines toward morning. Bat presence by month, turbine and hour are shown in Figures 5, 6, and 7.

Table 5. Hawaiian Hoary bat nights with detections and total detection nights at KWPI in FY 2014.

KWPI Hawaiian Hoary bat nights with detections and total detection nights in FY 2014*				
Start Date	**Detector Location (WTG)**	**Total Detector Nights**	**Total Detector Nights with Activity**	**Detector Nights with Activity/Total Detector Nights**
7/1/14	1	324	7	2.16%
7/1/14	3G	322	19	5.90%
7/1/14	5	257	8	3.11%
7/1/14	8	346	13	3.76%
7/1/14	10	242	5	2.07%
7/1/14	13	332	13	3.92%
7/1/14	15	263	16	6.08%
7/1/14	16	288	6	2.08%
7/1/14	20	263	14	5.32%
TOTALS:	**KWPI**	**2700**	**101**	**3.74%**
***KWPI WTG-14 had an Anabat detector that was removed at the beginning of October due to failure**				

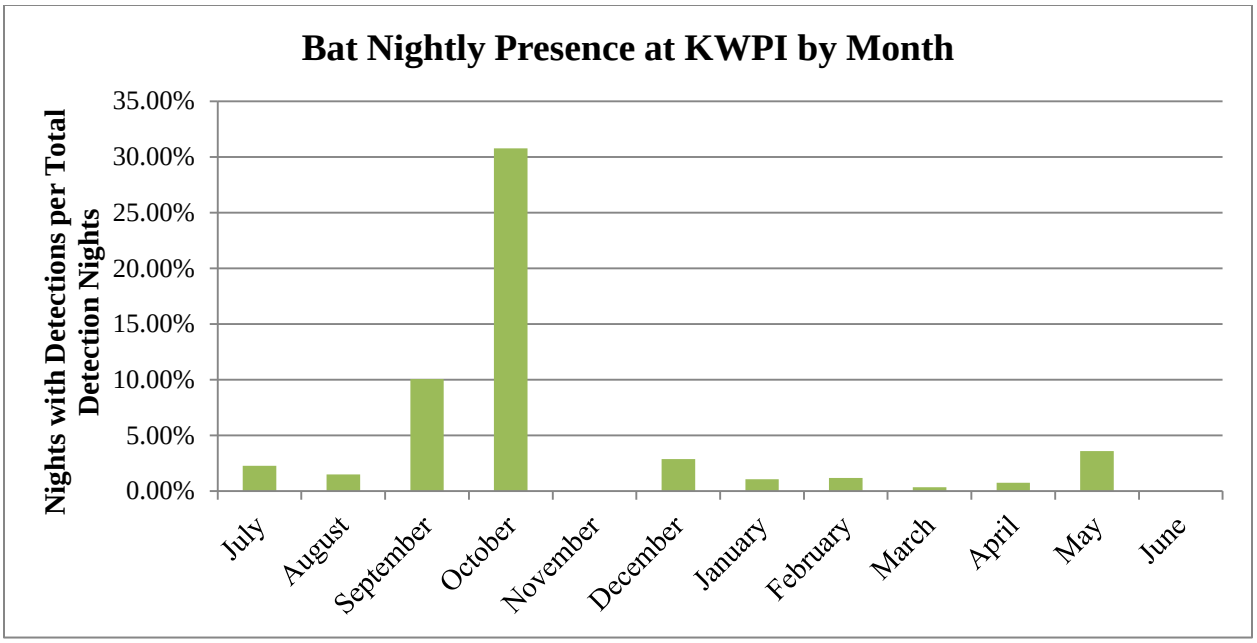

Figure 4. Bat presence at KWPI by month in FY 2014.

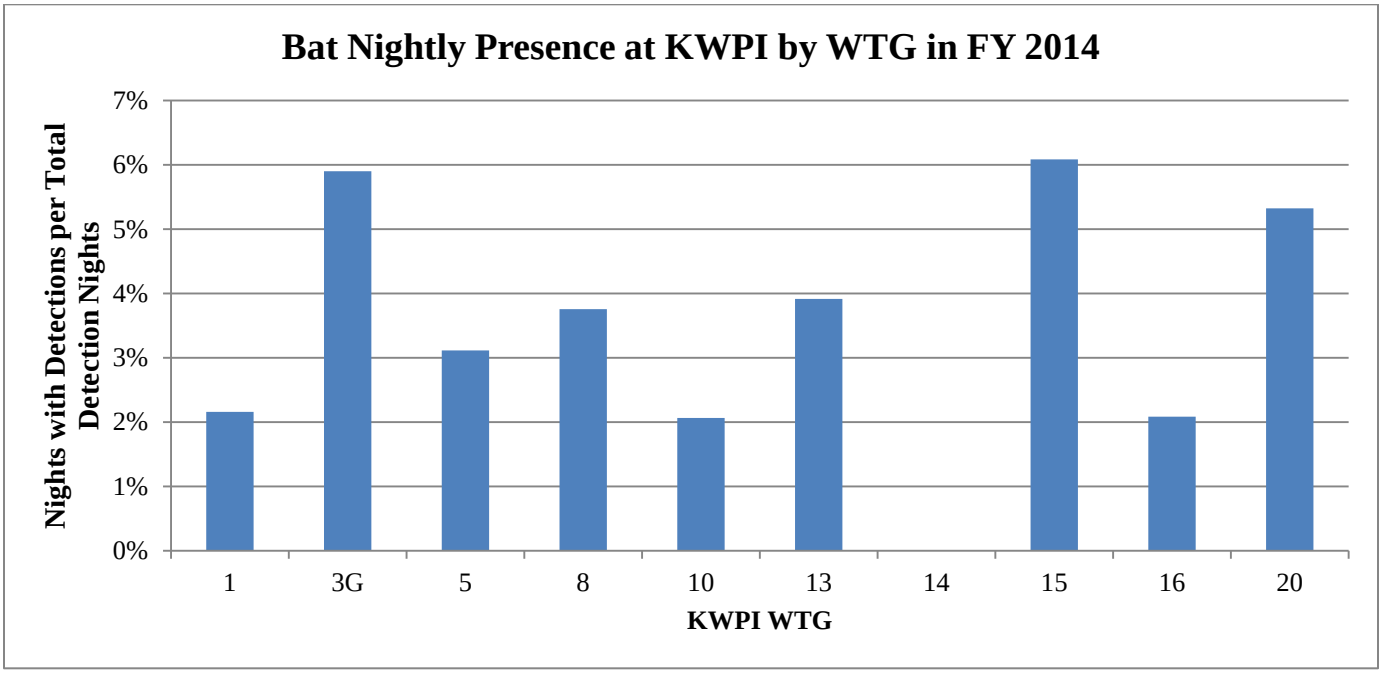

Figure 5. Bat nightly presence at KWPI by turbine (WTG) during FY 2014 (these locations range from the highest elevation on the left (WTG-1) and lowest on the right (WTG-20)) (*Please note that 14 was only active July1, 2013 – September 30, 2013).

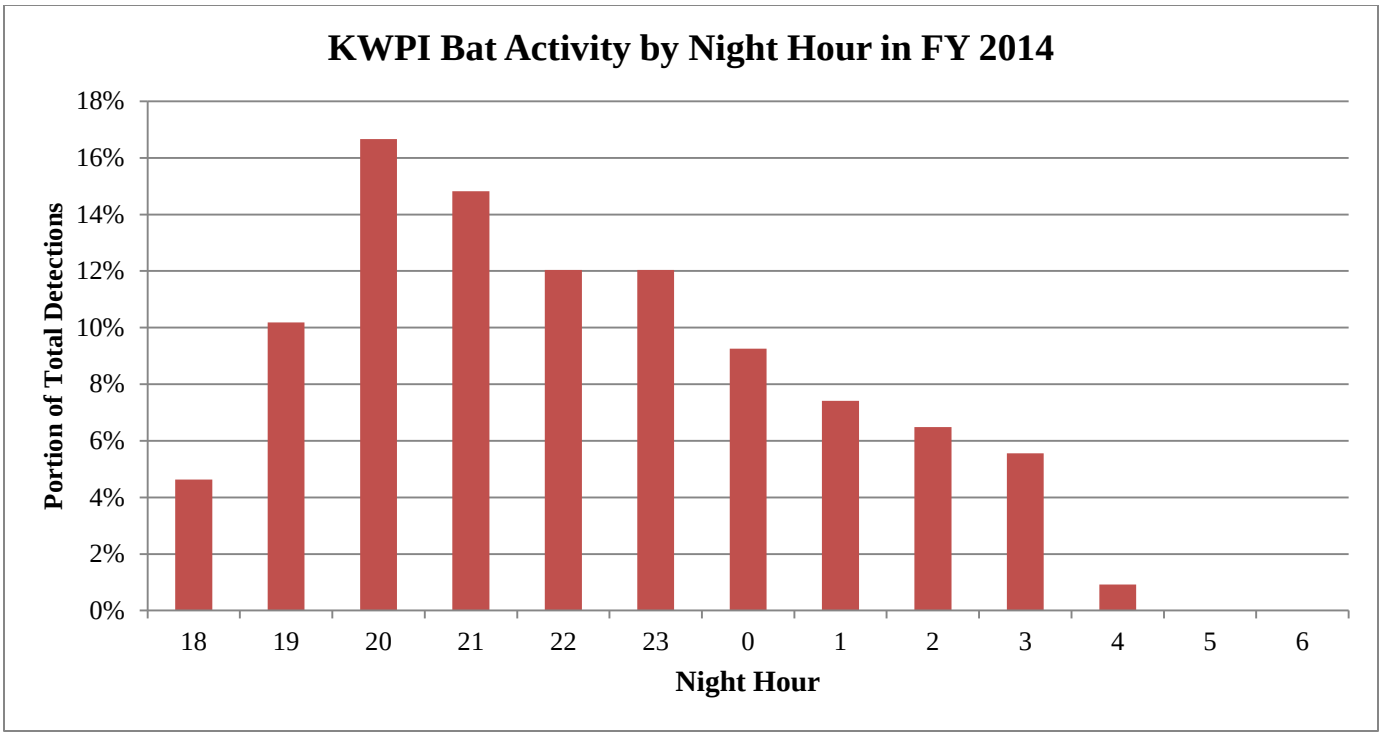

Figure 6. Bat detections by night hour in FY 2014.

WILDLIFE EDUCATION AND OBSERVATION PROGRAM

The Wildlife Education and Observation Program or "WEOP" helps to ensure the safety and well-being of native wildlife in work areas and along site access roadways. The training provides useful information to assist staff, contractors, and visitors in conducting their business in a manner consistent with the requirements of the HCP, CDUP, land use agreements and applicable laws.

WEOP trainings were given to 39 personnel who were on-site regularly for two days or more at different periods throughout the year (Appendix 10). The personnel were trained to identify listed and non-listed species of wildlife that may be found on-site and what protocol to follow, as determined in the HCP, when a downed wildlife is found. The trainees were also made aware of driving conditions and received instruction on how to drive and act around wildlife.

A total of 184 observations have been reported to date during this fiscal year on KWPI, including 158 observations of Nēnē, Hawaiian Goose (HAGO), 14 sightings of the Hawaiian Short Eared Owl (PUEO), two observations of Wedge-tailed shearwaters (WTSH), nine reports of feral pigs, and one observation of a cat (Figure 8). Data collected was used to better protect and understand HCP species and their habitat use.

Five Nēnē nests and three gosling sightings were reported as part of the Wildlife Observation Surveys made by KWP Technicians. DOFAW personnel were notified of all observed breeding activity.

Nests discovered within KWPI plots or revegetation areas were given a 50-75m avoidance buffer. Searching was minimized in the areas in order to avoid disturbance. Figure 9 illustrates observed Nēnē nesting areas on KWPI in FY 2014 in reference to KWP turbines and infrastructure.

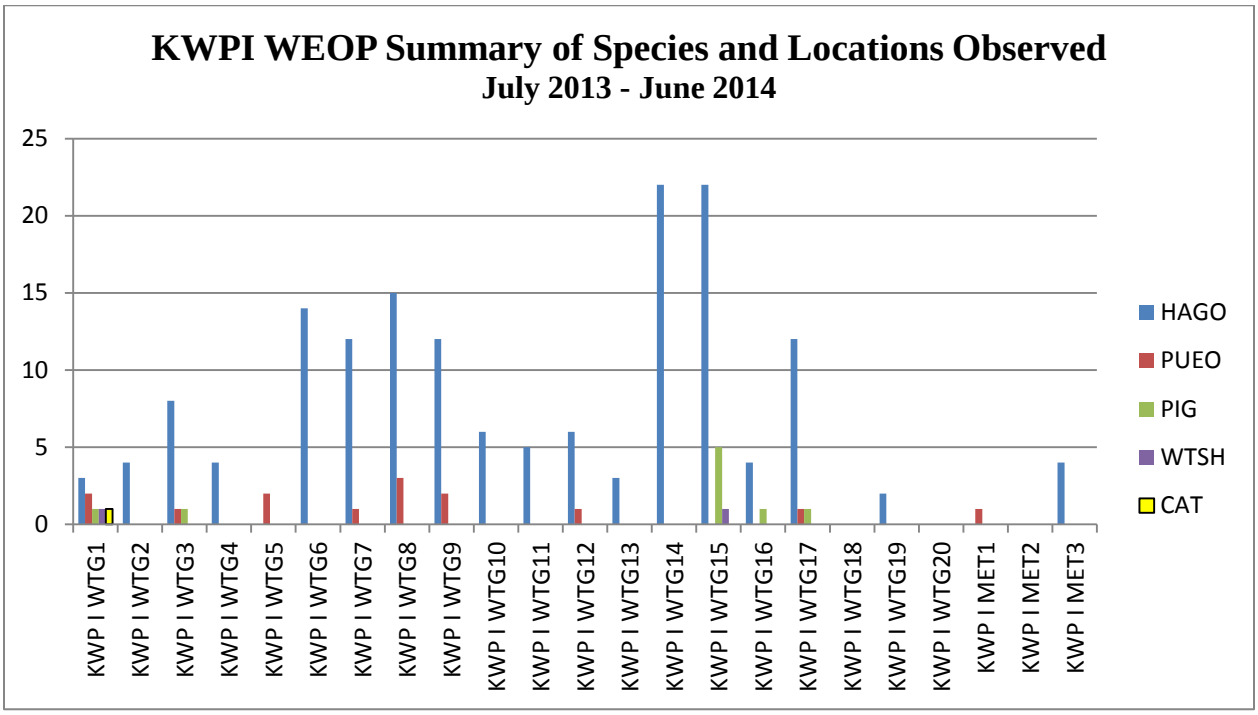

Figure 7. Wildlife observed and recorded as part of WEOP at KWPI by species and turbine location or meteorological tower.

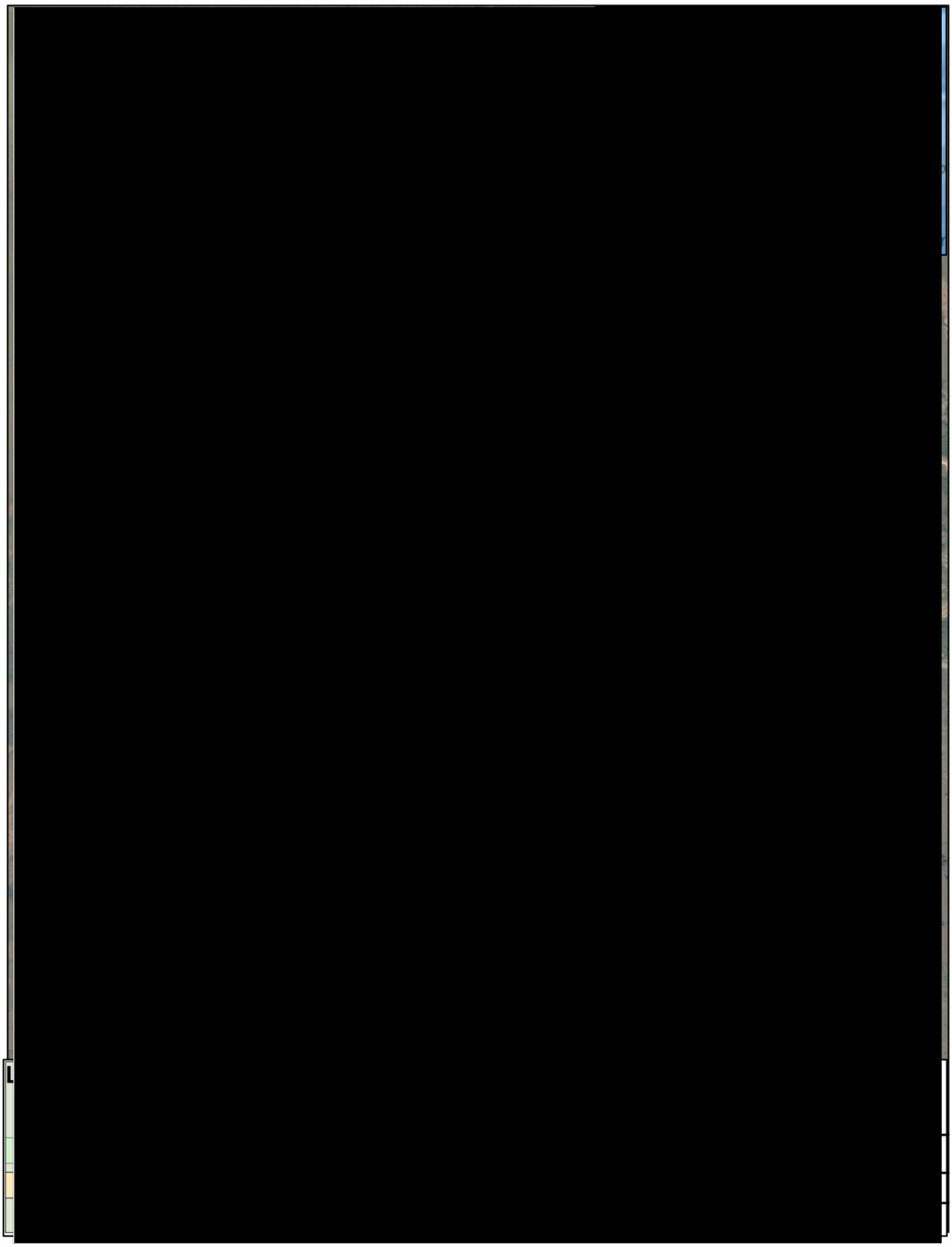

Figure 8. Observed Nēnē nesting sites in reference to KWPI turbines and infrastructure.

VEGETATION MANAGEMENT

The HCP team manages ground cover at a stature that will improve monitoring efficiency without compromising soil stability and minimize impacts to native plants. Due to Nēnē nesting season vegetation management activities within the plots are currently managed between the months of May to October, while areas associated with the turbines pads are managed year round in accordance with the Fire Management Plan. Treatment of the plot areas for the 2014 season began on June 27th. In total, 33 calendar days of vegetation management were recorded by the HCP team. Within the allowed time period, approximately 90 percent of the KWPI fatality monitoring plot maintenance was completed. Tall grasses were reduced to 8cm in height, and non-native shrubs and trees were cut out and removed from the plots.

In addition to the HCP team, two temporary employees were hired to work 40 hours per week from September 30th to November 1st. Their primary task was to weed-whack KWPI WTG-3 to WTG-20. They totaled 440 hours weed-whacking (Figure 10). Maui Cultural Lands assisted with Ironwood removal using chainsaws and wood-chippers for the larger trees on the roadside leading up to the site and on KWPI WTG-12 and 20 (Figure 11). Their assistance aided in the county fire contingency plan as well as with HCP search plot vegetation management.

Vegetation management for KWPI will resume at the end of July 2014 after the intensive effort at KWPII has been underway, and will continue through October. A CAT™ compact track loader with a mower attachment, weed whackers, and cut stump removal of invasive trees will be used as treatment methods.

Figure 9. Freshly mowed plot on KWPI taken July 2013.

Figure 10. Maui Cultural Lands assisting in clearing invasive ironwoods.

Ironwood removal consisted of cut stump herbicide treatment. Trees were removed with chainsaw or machete and herbicide immediately applied to the stump. The herbicide used was Garlon™ 4 Ultra at 50% mix. All tree debris was then removed from plots.

Table 6. Total dayss recorded for vegetation management during FY 2014.

Method	Total Days Worked (8hr work day)	Target Species
Track Loader	20	Molasses grass, Kikuyu grass, Lantana
Hand Pulling	4	Lantana, balloon plant, fireweed
Cut Stump	9 (2 with MCL)	Ironwood, Christmas berry
Two Temporary Hires (Weed Whack)	25 (440 hours)	Molasses grass, Kikuyu grass, Lantana

Table 7. Approximate area of vegetation targeted during FY 2014.

Method	Species	Approximate Area (Square Meters)	KWPI WTG
Mowing/Weed Whacking	Molasses grass, Kikuyu grass, Lantana	52,710	3-20
Cut Stump	Ironwood, Christmas berry	2,195	4,11,19,20
Weed pulling	Lantana, balloon plant, Fireweed	150	4,5,17,20

MITIGATION

Hawaiian Petrel and Newell's Shearwater- Makamaka'ole

In January 2012 a final mitigation plan for KWPI and KWPII HAPE and NESH was approved to establish artificial nest sites protected within two predator resistant enclosures (Figure 12). The Makamaka'ole seabird habitat project includes two 4.5 acre enclosures, one for each species, artificial burrow structures suitable for ground-nesting seabirds, and a song playback system that broadcasts social calls attractive to each species. Ecoworks™ Consultant Steve Sawyer is under contract to review progress reports, answer questions, and provide regular input and feedback as needed.

Figure 11. Two completed enclosures on the Makamaka'ole Seabird Mitigation site (Enclosure B is left and Enclosure A is right).

Fence construction of both enclosures was completed on September 5, 2013. Sixty-two artificial burrows have been installed (32 in Enclosure A, and 30 in Enclosure B). To limit erosion of areas disturbed during fence construction, jute matting was placed and annual rye grass seed – a short lived non-invasive species - was dispersed to establish initial vegetation cover.

Figure 12. Newell's Shearwater decoy, burrow box and a speaker that is used for acoustic attraction.

Figure 13. New NARS ungulate fence bordering NE edge of Enclosure B.

Silt socks were also installed on the western slope of Enclosure A and on the mid-eastern slope of Enclosure B as water bars. Burrow locations are carefully monitored and special considerations have been taken to avoid burrow flooding and to create a structurally sound breeding space. Cement abutments were built around both the interior and exterior sides of culverts through

the lower fence lines of Enclosure A (three culverts) and Enclosure B (one culvert) to prevent erosion and exclude predators. Screens were installed on both ends of the culverts to prevent predator ingress. On February 6th, all remaining construction materials and supplies for the completion of the Makamaka'ole Seabird Mitigation enclosures were mobilized off-site via helicopter. Three sets of solar panels and speakers have been installed (two in Enclosure A and one in B) and were activated on March 6th. Speakers broadcast social calls specific to HAPE and NESH to attract them to the nest sites (Figure 13).

The NARS ungulate fence that bisected Enclosure B was detached and reconstructed with a 12 foot buffer around the NE edge of B; completed on June 3rd (Figure 14). Re-vegetation began outside of Enclosure A on June 19th; 60 Uki (*Machaerina augustifolia*) and 115 Fimbristylis (*Rychospora caduca*) have been planted by June 30.

On June 11th a game camera set on burrows under the north speaker inside Enclosure B captured an unidentified petrel or storm petrel (Figure 15). An additional camera was then set at the same location to record video. The same unidentified bird was recorded on June 14th, June 23rd and July 4th. A formal identification has not been determined but either a Bulwer's Petrel or a species of Storm Petrel are the leading contenders.

Figure 14. Unidentified petrel inside Enclosure B on June 11th.

Since May 1st, technicians have been performing bi-monthly night surveys during peak activity times to ensure that the sound systems are working correctly, and to monitor bird activity and interactions using night vision goggles and infrared lighting.

Spencer Engler was assigned the position of Makamaka'ole Lead Technician on January 13th. His primary duties are to focus on trapping, tracking, and ongoing maintenance of both enclosures. Trapping using a combination of Victor™ Rat traps and Doc 200's (all encased in "bird-safe" boxes)

Figure 15. Rat caught inside "bird-safe" trap box (the top is removed here).

has been routinely maintained (Figure 16). Experimentation with bait and trap types have been ongoing to maximize predator control efforts. Three game cameras have been deployed to monitor small mammal activity near culverts. Ten tracking tunnels on A and 10 inside B have been inked and baited monthly to determine current populations of small mammals inside each of the enclosures. As of January 24, 2014 we believe no rats or mongoose are inside either enclosure. Twenty-five stations using Diphacinone bait blocks will continue to be deployed inside Enclosure A and 20 bait stations have been placed within Enclosure B.

Monitoring checklists have been created to ensure persistent data collection on a regular basis (Appendix 11). These checklists include sound system battery checks, game camera data collection, burrow checks for erosion damage, signs of bird activity and ongoing perimeter checks of fences and culverts. Predators are also monitored regularly using tracking tunnels and game cameras. Doc200s, Victor™ Rat traps, and mouse traps are cleaned and re-baited weekly. Ecoworks™ Consultant Steve Sawyer was onsite November 11-22 and March 11-18 to oversee Makamakaʻole project progress and task items.

Nēnē – Haleakala Ranch Pen

As part of KWP I mitigation, the Haleakala Ranch pen was paid for in 2008 by KWPI and constructed three years later by DOFAW. During the 2013 Nēnē Recovery Action Group's annual meeting, 34 birds were reported to have been trans-located from Kauai to the Haleakala Ranch pen. In 2012, two fledglings produced in the pen from the trans-located birds were reported as credit to KWPI. In 2013, eight more fledglings were reported as credit. A site visit to Haleakala Ranch was made by First Wind on May 14th. The pen was found to be in excellent condition and the program was well managed and monitored (Figure 17). USFWS and DOFAW have agreed that KWP I will not accrue lost productivity for Nēnē take that occurred prior to 2011 when the pen was actually constructed. Six fatalities were documented during this period: October 9 and December 8, 2007; June 10, 2009; May 14,

December 8 and December 30, 2010. Lost productivity for these fatalities has not been included in the take estimates provided in this report.

Figure 16. Haleakala Ranch Nēnē pen visited on May 14th.

Hawaiian Hoary Bat

To date, over eight years of monitoring, a total of 8 Hawaiian hoary bat fatalities have been documented at KWP I. It is assumed that additional take is likely to have occurred - but not observed - due to carcasses being missed by searchers, removed by scavengers, or having fallen outside of search plots. Huso's 2012 estimator, developed by USGS, is the USFWS' latest recommended method for estimating bat take at KWP I. The latest estimate of 24 suggests the Baseline level of take (20 bats) for KWPI has been exceeded. This is a recent and unexpected development; the take estimate one year ago (FY 2013) for four observed bats was nine bats.

Importantly, the sudden apparent increase in the estimated number of bat fatalities at KWP I over the last year is due to two factors working in tandem. One, the total number of observed fatalities increased two-fold in just one year (i.e., there have been as many bat fatalities documented in the last year – four - as there were in the prior seven years combined). Two, there have been changes in the way the Huso (2012) estimator is applied during the same time period that have served to further increase the estimated take. The end result is that the two-fold increase seen in the observed take (from four to eight in one year), yields a 2.7 fold increase in the estimated take (Figure 18). These two factors have caused KWP I to exceed the Baseline take level of 20 bats much sooner than anticipated.

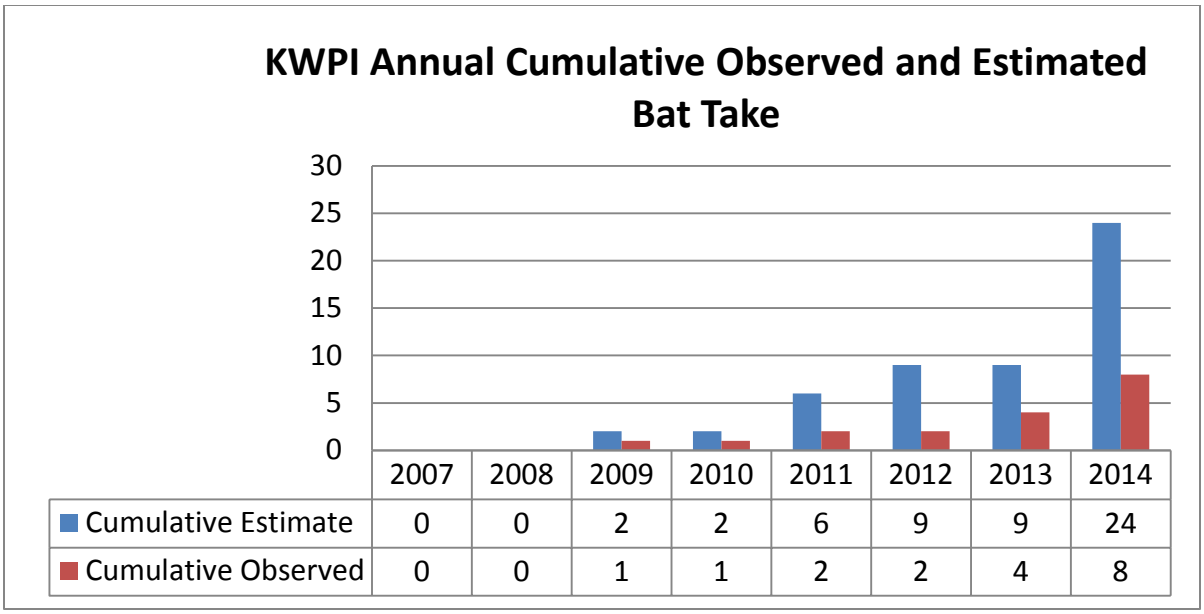

Figure 18. KWPI annual cumulative observed and estimated bat take.

As stated on page 65 of the HCP, "If monitoring indicates a Higher level of take (*i.e.*, a total of 2-5 bats per year), then Kaheawa Wind Power will provide additional funding at the rate of $1000 per bat taken, to be used specifically for the expansion of research efforts as described above." The ITL and ITP both allow for take to be increased up to the Notably Higher Take scenario for the Hawaiian hoary bat provided the USFWS and DOFAW determine that mitigation has been implemented such that benefits to the species outweigh the losses. A total of $20,000 was paid during FY 2014-Q4 in fulfillment of the HCP stated requirement. KWP I is currently in discussions with USFWS and DOFAW to determine what additional mitigation may be necessary to ensure that benefits to the species outweigh the losses.

ADAPTIVE MANAGEMENT

Adaptive management provisions are an inherent and necessary component of the HCP, providing a mechanism to make adjustments to mitigation and other project functions as new information derived from monitoring and reporting becomes available.

First Wind provided the USFWS and DOFAW with planned bat adaptive management in response to bat fatality estimation exceeding the Baseline take level (Appendix 12). When approved internally First Wind intends to implement low wind speed curtailment at KWPI and to add bat detectors and ground level weather stations. KWP I has investigated installation of ultrasonic bat deterrents at

each nacelle but the technology is new and has not yet proven to be effective or feasible at nacelle height.

AGENCY VISITS AND REPORTING

During FY 2014, KWPI attended and hosted several meetings with agencies to discuss a variety of topics. Breakdowns of the meetings are noted in Table 8.

Table 8. KWPI agency meetings for FY 2014.

Date	Who	Where	Topics
7/15/13	NARS	Makamaka'ole	Evaluate Maka progress and give recommendations
9/27/13	NARS	Makamaka'ole	Evaluate Maka progress and give recommendations
10/28/13	DOFAW	Makamaka'ole	Evaluate Maka progress and give recommendations
11/15/13	DOFAW	Makamaka'ole	Evaluate Maka erosion and give recommendations
12/12/13	USFWS	Makamaka'ole and KWPI&II	Evaluate Maka progress and site visit KWP
1/24/14	NARS and DOFAW	Maui Baseyard	Makamaka'ole permit renewal
1/24/14	USFWS and DOFAW	Phone	KWP/Makamaka'ole coordination meeting
2/28/14	USFWS and DOFAW	Honolulu	KWP/Makamaka'ole coordination meeting
3/21/14	Endangered Species Recovery Committee (ESRC)	Honolulu	Progress reports for Makamaka'ole and the KWP independent SEEF/CARE study
3/25/14	USFWS and DOFAW	Honolulu	KWP/Makamaka'ole coordination meeting
4/11/14	USFWS and DOFAW	Honolulu	KWP/Makamaka'ole coordination meeting
5/20/14	USFWS and DOFAW	Honolulu	KWP/Makamaka'ole coordination meeting
6/10/14	DOFAW and Maui Nui Seabird	Maui Baseyard	Discuss potential sites for backcounty mitigation activities in East Maui

Improvements to work at Makamaka'ole were made and documented in the scope of work provided to Scott Fretz on October 2, 2013 (Appendix 13).

KWP has discontinued providing full fatality reports for non-ESA/non-MBTA (i.e., non-native) species for consistency with reporting done across the state at all Wind Farms. KWP continues to notify agencies of these fatalities via email within 24hours and sends out a downed wildlife report within three business days. A full fatality report within three business days for all HCP listed and ESA listed species is maintained with notification to DOFAW via phone for carcass retrieval and notice of the downed wildlife observation to agencies within 24 hours.

A Quarterly report for FY 2014 Q1, Q2 and Q3 was provided. Daily searcher forms are reviewed on a weekly basis and uploaded onto DOFAW's internet based storage site, Basecamp.

EXPENDITURES

The total HCP related expenditures in FY 2014 is $279,379 (Appendix 14).

CITATIONS

Dalthorp and Huso, 2013. Evidence of Absence. U.S. Geological Survey, Data Series (Draft).

Huso, M.M.P., N. Som, L. Ladd. 2012. Fatality Estimator. U.S. Geological Survey, Data Series (Draft).

Kaheawa Wind Power, LLC. 2007. Kaheawa Pastures Wind Energy Generation Facility, Habitat Conservation Plan: Year 1 Annual Report. First Wind Energy, LLC, Wailuku, HI 96793.

Kaheawa Wind Power, LLC. 2008. Kaheawa Pastures Wind Energy Generation Facility, Habitat Conservation Plan: Year 2 Annual Report. First Wind Energy, LLC, Wailuku, HI 96793.

Kaheawa Wind Power, LLC. 2009. Kaheawa Pastures Wind Energy Generation Facility, Habitat Conservation Plan: Year 3 Annual Report. First Wind Energy, LLC, Wailuku, HI 96793.

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Kaheawa Wind Power, LLC. 2012. Kaheawa Pastures Wind Energy Generation Facility, Habitat Conservation Plan: Year 6 Annual Report. First Wind Energy, LLC, Wailuku, HI 96793.

Kaheawa Wind Power, LLC. 2013. Kaheawa Pastures Wind Energy Generation Facility, Habitat Conservation Plan: Year 7 Annual Report. First Wind Energy, LLC, Wailuku, HI 96793.

Appendix 1. Plot Monitoring Search Days at KWPI.

July, 2013

WTG Search Plot																			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
3-Jul	3-Jul	3-Jul	1-Jul	1-Jul	1-Jul	1-Jul	2-Jul	2-Jul	2-Jul	2-Jul	1-Jul	1-Jul	1-Jul	1-Jul	1-Jul	2-Jul	2-Jul	2-Jul	2-Jul
12-Jul	12-Jul	12-Jul	9-Jul	9-Jul	9-Jul	13-Jul	13-Jul	13-Jul	13-Jul	13-Jul	12-Jul	8-Jul	8-Jul	8-Jul	9-Jul	9-Jul	12-Jul	12-Jul	12-Jul
17-Jul	17-Jul	17-Jul	15-Jul	15-Jul	16-Jul	16-Jul	16-Jul	16-Jul	16-Jul	16-Jul	16-Jul	15-Jul	15-Jul	15-Jul	15-Jul	17-Jul	17-Jul	17-Jul	17-Jul
23-Jul	23-Jul	23-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	23-Jul	22-Jul	22-Jul	22-Jul	22-Jul	23-Jul	23-Jul	23-Jul	23-Jul
30-Jul			30-Jul	30-Jul	30-Jul	30-Jul	30-Jul	30-Jul	30-Jul	30-Jul									

August, 2013

WTG Search Plot																			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
	1-Aug	1-Aug									1-Aug	1-Aug	2-Aug	2-Aug	2-Aug	2-Aug	2-Aug	2-Aug	2-Aug
7-Aug	6-Aug	7-Aug	5-Aug	5-Aug	5-Aug	5-Aug	5-Aug	5-Aug	5-Aug	5-Aug	6-Aug	6-Aug	6-Aug	6-Aug	6-Aug	6-Aug	6-Aug	6-Aug	6-Aug
13-Aug	15-Aug	15-Aug	13-Aug	13-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	16-Aug	16-Aug	16-Aug	16-Aug	16-Aug	16-Aug
20-Aug	20-Aug	20-Aug	19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	20-Aug	20-Aug	20-Aug	20-Aug	20-Aug	20-Aug	20-Aug	20-Aug
28-Aug	28-Aug	28-Aug	26-Aug	26-Aug	26-Aug	26-Aug	26-Aug	26-Aug	26-Aug	26-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug

September, 2013

WTG Search Plot																			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
3-Sep	3-Sep	3-Sep	3-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	4-Sep	6-Sep	6-Sep
8-Sep	9-Sep	9-Sep	9-Sep	9-Sep	9-Sep	9-Sep	9-Sep	10-Sep	10-Sep	10-Sep	10-Sep	10-Sep	10-Sep	10-Sep	11-Sep	10-Sep	10-Sep	10-Sep	10-Sep
16-Sep	17-Sep	17-Sep	17-Sep	17-Sep	17-Sep	17-Sep	17-Sep	17-Sep	17-Sep	18-Sep	18-Sep	18-Sep	18-Sep	18-Sep	18-Sep	18-Sep	18-Sep	18-Sep	20-Sep
28-Sep	28-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	28-Sep	28-Sep	29-Sep	29-Sep	29-Sep	29-Sep	29-Sep

October, 2013

WTG Search Plot																			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
3-Oct	3-Oct	3-Oct	2-Oct	2-Oct	2-Oct	2-Oct	2-Oct	2-Oct	2-Oct	2-Oct	2-Oct	3-Oct	3-Oct	3-Oct	3-Oct	3-Oct	3-Oct	5-Oct	5-Oct
7-Oct	7-Oct	9-Oct	7-Oct	7-Oct	7-Oct	7-Oct	9-Oct	9-Oct	9-Oct	9-Oct	10-Oct	10-Oct	10-Oct	10-Oct	10-Oct	10-Oct	10-Oct	10-Oct	10-Oct
15-Oct	15-Oct	16-Oct	15-Oct	15-Oct	15-Oct	15-Oct	16-Oct	16-Oct	16-Oct	16-Oct	16-Oct	17-Oct	17-Oct	17-Oct	17-Oct	17-Oct	17-Oct	19-Oct	19-Oct
23-Oct	23-Oct	24-Oct	23-Oct	23-Oct	23-Oct	23-Oct	24-Oct	24-Oct	24-Oct	24-Oct	24-Oct	24-Oct	24-Oct	25-Oct	25-Oct	25-Oct	25-Oct	25-Oct	25-Oct
31-Oct		31-Oct	31-Oct	31-Oct															

November, 2013

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	1-Nov				1-Nov	1-Nov	1-Nov	1-Nov	1-Nov	1-Nov	4-Nov	4-Nov	4-Nov	4-Nov	4-Nov	4-Nov	4-Nov	4-Nov	4-Nov
6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	6-Nov	7-Nov	7-Nov	7-Nov	7-Nov	7-Nov	7-Nov	7-Nov
13-Nov	13-Nov	12-Nov	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov	12-Nov	12-Nov	12-Nov	12-Nov	12-Nov	12-Nov	12-Nov	13-Nov	13-Nov
16-Nov	16-Nov	17-Nov	16-Nov	16-Nov	16-Nov	16-Nov	17-Nov	17-Nov	16-Nov	17-Nov	17-Nov	17-Nov	17-Nov	19-Nov	19-Nov	19-Nov	19-Nov	19-Nov	19-Nov
24-Nov	24-Nov	24-Nov	23-Nov	23-Nov	23-Nov	23-Nov	23-Nov	23-Nov	24-Nov	24-Nov	24-Nov	25-Nov	25-Nov	25-Nov	25-Nov	25-Nov	25-Nov	25-Nov	25-Nov
30-Nov	30-Nov	30-Nov	30-Nov																

December, 2013

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
				1-Dec	1-Dec	1-Dec	1-Dec	1-Dec	1-Dec	1-Dec	5-Dec	5-Dec	4-Dec	4-Dec	4-Dec	4-Dec	4-Dec	4-Dec	4-Dec
3-Dec	3-Dec	13-Dec	3-Dec	3-Dec	7-Dec	7-Dec	7-Dec	7-Dec	7-Dec	7-Dec	12-Dec	12-Dec	12-Dec	12-Dec	14-Dec	14-Dec	14-Dec	15-Dec	15-Dec
17-Dec	18-Dec	18-Dec	17-Dec	17-Dec	18-Dec	18-Dec	18-Dec	18-Dec	18-Dec	18-Dec	18-Dec	19-Dec	19-Dec	19-Dec	19-Dec	19-Dec	19-Dec	19-Dec	20-Dec
26-Dec	26-Dec	27-Dec	26-Dec	26-Dec	26-Dec	26-Dec	28-Dec	28-Dec	27-Dec	27-Dec	28-Dec	28-Dec	29-Dec	29-Dec	29-Dec	29-Dec	29-Dec	30-Dec	30-Dec

January, 2014

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4-Jan	4-Jan	4-Jan	7-Jan	6-Jan	5-Jan	5-Jan	5-Jan	5-Jan	5-Jan	4-Jan	4-Jan	4-Jan	4-Jan	4-Jan	4-Jan	4-Jan	3-Jan	3-Jan	3-Jan
8-Jan	10-Jan	10-Jan	10-Jan	10-Jan	9-Jan	9-Jan	9-Jan	8-Jan	8-Jan	8-Jan	8-Jan	8-Jan	8-Jan	8-Jan	8-Jan	6-Jan	6-Jan	6-Jan	6-Jan
15-Jan	15-Jan	15-Jan	15-Jan	15-Jan	14-Jan	14-Jan	14-Jan	13-Jan	13-Jan	13-Jan	13-Jan	13-Jan	13-Jan	12-Jan	12-Jan	12-Jan	12-Jan	12-Jan	12-Jan
23-Jan	23-Jan	23-Jan	21-Jan	21-Jan	23-Jan	21-Jan	21-Jan	21-Jan	21-Jan	21-Jan	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan	18-Jan	18-Jan	18-Jan
27-Jan	27-Jan	27-Jan	27-Jan	27-Jan	27-Jan	27-Jan	27-Jan	27-Jan	29-Jan	29-Jan	29-Jan	26-Jan	26-Jan	26-Jan	27-Jan	26-Jan	25-Jan	25-Jan	25-Jan

February, 2013

WTG Search Plot																			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
7-Feb	7-Feb	7-Feb	6-Feb	6-Feb	3-Feb	3-Feb	3-Feb	3-Feb	3-Feb	3-Feb	3-Feb	3-Feb	3-Feb	2-Feb	2-Feb	2-Feb	1-Feb	1-Feb	1-Feb
12-Feb	12-Feb	12-Feb	11-Feb	11-Feb	11-Feb	11-Feb	11-Feb	11-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	9-Feb	10-Feb	10-Feb
19-Feb	19-Feb	19-Feb	19-Feb	19-Feb	19-Feb	20-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	17-Feb	17-Feb	17-Feb	17-Feb
25-Feb	25-Feb	25-Feb	26-Feb	26-Feb	25-Feb	25-Feb	25-Feb	25-Feb	25-Feb	25-Feb	24-Feb	24-Feb	24-Feb	24-Feb	24-Feb	24-Feb	24-Feb	24-Feb	24-Feb

March, 2013

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4-Mar	4-Mar	5-Mar	5-Mar	5-Mar	5-Mar	5-Mar	7-Mar	7-Mar	7-Mar	7-Mar	8-Mar	8-Mar	8-Mar	8-Mar	8-Mar	9-Mar	9-Mar	10-Mar	10-Mar
11-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	12-Mar	14-Mar	14-Mar	14-Mar	14-Mar	14-Mar	14-Mar
18-Mar	19-Mar	19-Mar	19-Mar	19-Mar	19-Mar	19-Mar	19-Mar	20-Mar	20-Mar	20-Mar	21-Mar	21-Mar	21-Mar	21-Mar	22-Mar	24-Mar	21-Mar	21-Mar	24-Mar
24-Mar	24-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	28-Mar	28-Mar	28-Mar	28-Mar	28-Mar	28-Mar	28-Mar	28-Mar

April, 2013

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1-Apr	1-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr	4-Apr
8-Apr	8-Apr	8-Apr	11-Apr	10-Apr	10-Apr	10-Apr	10-Apr	10-Apr	10-Apr	11-Apr	11-Apr	10-Apr	10-Apr	11-Apr	11-Apr	11-Apr	11-Apr	11-Apr	10-Apr
17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	17-Apr	18-Apr	18-Apr	18-Apr	18-Apr	18-Apr	18-Apr	18-Apr	18-Apr
28-Apr	28-Apr	28-Apr	28-Apr	28-Apr	28-Apr	28-Apr	28-Apr	28-Apr	30-Apr	30-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr

May, 2013

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
7-May	7-May	7-May	7-May	7-May	7-May	7-May	7-May	7-May	8-May	8-May	9-May	9-May	9-May	9-May	9-May	9-May	9-May	9-May	9-May
15-May	15-May	13-May	15-May	15-May	13-May	13-May	13-May	15-May	15-May	15-May	15-May	15-May	15-May	15-May	15-May	16-May	16-May	16-May	16-May
20-May	21-May	21-May	20-May	20-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	21-May	22-May	22-May
27-May	27-May	27-May	27-May	27-May	27-May	27-May	27-May		27-May	27-May	27-May								

June, 2013

WTG Search Plot																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
								2-Jun				2-Jun	2-Jun	2-Jun	2-Jun	2-Jun	2-Jun	2-Jun	2-Jun
4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	4-Jun	5-Jun	5-Jun	5-Jun	6-Jun	6-Jun	6-Jun	5-Jun	5-Jun
9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	9-Jun	11-Jun	11-Jun	11-Jun	12-Jun	12-Jun	12-Jun	12-Jun	12-Jun
16-Jun	16-Jun	16-Jun	16-Jun	16-Jun	16-Jun	16-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun	19-Jun	19-Jun	19-Jun	19-Jun	19-Jun	19-Jun
24-Jun	24-Jun	24-Jun	24-Jun	24-Jun	24-Jun	24-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	25-Jun	26-Jun	26-Jun

KWPI Meteorological Towers

1	2	3
3-Jul	1-Jul	1-Jul
12-Jul	9-Jul	8-Jul
17-Jul	16-Jul	15-Jul
23-Jul	22-Jul	22-Jul
30-Jul	30-Jul	30-Jul

1	2	3
		2-Aug
7-Aug	5-Aug	6-Aug
13-Aug	15-Aug	15-Aug
20-Aug	19-Aug	20-Aug
28-Aug	29-Aug	27-Aug

1	2	3
3-Sep	4-Sep	6-Sep
8-Sep	10-Sep	10-Sep
16-Sep	18-Sep	18-Sep
28-Sep	28-Sep	28-Sep

1	2	3
3-Oct	3-Oct	3-Oct
7-Oct	7-Oct	10-Oct
15-Oct	15-Oct	16-Oct
23-Oct	23-Oct	24-Oct
31-Oct		

1	2	3
	1-Nov	4-Nov
6-Nov	6-Nov	6-Nov
13-Nov	12-Nov	12-Nov
16-Nov	16-Nov	17-Nov
24-Nov	24-Nov	25-Nov

1	2	3
5-Dec	4-Dec	4-Dec
13-Dec		12-Dec
17-Dec	18-Dec	19-Dec
26-Dec	26-Dec	29-Dec

1	2	3
4-Jan	5-Jan	4-Jan
8-Jan	9-Jan	8-Jan
15-Jan	14-Jan	13-Jan
23-Jan	23-Jan	21-Jan
27-Jan	27-Jan	26-Jan

1	2	3
3-Feb	3-Feb	3-Feb
7-Feb	11-Feb	10-Feb
12-Feb	20-Feb	18-Feb
19-Feb	24-Feb	24-Feb
25-Feb		

1	2	3
4-Mar	5-Mar	8-Mar
12-Mar	12-Mar	12-Mar
18-Mar	19-Mar	21-Mar
24-Mar	26-Mar	28-Mar

1	2	3
4-Apr	4-Apr	4-Apr
8-Apr	10-Apr	10-Apr
17-Apr	17-Apr	18-Apr
28-Apr	28-Apr	29-Apr

1	2	3
7-May	7-May	9-May
15-May	13-May	15-May
20-May	21-May	21-May
27-May	27-May	

1	2	3
		2-Jun
4-Jun	4-Jun	5-Jun
9-Jun	9-Jun	11-Jun
16-Jun	16-Jun	18-Jun
24-Jun	24-Jun	25-Jun

Appendix 2. Huso (2012) fatality estimation for Nēnē and Hawaiian hoary bat at KWPI.

This study included all 20 turbines located at the study site.								
User-defined alpha level of 0.2; all reported confidence intervals (CI) are 80% confidence intervals.								
Requested Summaries								
Group	Level	Number Found	Per Turbine Estimate	Per Turbine Lower CI	Per Turbine Upper CI	Site Total Estimate	Site Total Lwr CI	Site Total Upper CI
Species	**Nēnē**	**13**	1.31	1.03	1.66	**27**	20	34

This study included all 20 turbines located at the study site.								
User-defined alpha level of 0.2; all reported confidence intervals (CI) are 80% confidence intervals.								
Requested Summaries								
Group	Level	Number Found	Per Turbine Estimate	Per Turbine Lower CI	Per Turbine Upper CI	Site Total Estimate	Site Total Lower CI	Site Total Upper CI
Species	**Bat**	**8**	1.16	0.92	1.42	**24**	18	29

Appendix 3. Dalthorp et al (2013) KWPI HAPE estimation.

Credibility level (1 - ?)						Posterior distribution for total fatality for 8 years.	Posterior distribution for total fatality for 8 years.				
0.5						g = P(observe|arrive):	g = P(observe|arrive):	0.6985	95% CI:	0.645	0.749
Yr	X	g	min(g)	max(g)	rel_wt	80% credible maximum:	50% credible maximum:	7			
1	0	0.647	0.5	0.737	1	m	m	P(total = m)	P(total > m)		
2	1	0.647	0.5	0.737	1	0	0	0	1		
3	0	0.749	0.715	0.774	1	1	1	0	1		
4	0	0.719	0.632	0.764	1	2	2	0	1		
5	0	0.739	0.701	0.762	1	3	3	0	1		
6	2	0.637	0.516	0.709	1	4	4	0	1		
7	1	0.704	0.586	0.759	1	5	5	0.117779	0.882221		
8	1	0.746	0.701	0.771	1	6	6	0.209511	0.67271		
						7	7	0.219116	0.453594		
						8	8	0.175955	0.277639		
						9	9	0.120132	0.157507		
						10	10	0.073456	0.08405		
						11	11	0.041479	0.042571		
						12	12	0.022062	0.020509		
						13	13	0.011204	0.009305		
						14	14	0.005486	0.003819		
						15	15	0.002608	0.001211		
						16	16	0.001211	0		

Appendix 4. Nēnē Accumulated Lost Productivity and Indirect Take at KWPI.

	2011	2011	2012	2013	2014	2014		2012	2013	2014		2013	2014		2014
Adults (Estimated take)	2.1	6.3	2.1	4.2	2.1	4.2		8.4	2.1	4.2		8.4	6.3		8.4
Lost Offspring multiplier	0.09	(not during reprod. Season)	0.09	0.09		0.09		0.09	0.09	0.09		0.09	0.09		0.09
Indirect Take (1st generation)	0.19		0.19	0.38		0.38		0.76	0.19	0.38		0.76	0.57		0.76
2011	0.19	0.17	0.15	0.14		0.14	**2012**	0.76	0.68	0.61	**2013**	0.76	0.68	**2014**	0.76
				0.01		0.01	**2013**		0.19	0.17	**2014**		0.57		**0.76**
						0.01	**2014**			0.38			**1.25**		
2012			0.19	0.17		0.15				**1.16**			Accumulated Total Indirect Take and Lost Productivity		**4.20**
2013				0.38		0.34									
2014						0.38									
						1.03									

Appendix 5. HAPE Accumulated Lost Productivity and Indirect Take at KWPI.

	2008	2009	2010	2011	2011	2012	2013	2014		2009	2010	2011	2012	2013	2014		2010	2011	2012	2013	2014		2011	2012	2013	2014		2012	2013	2014		2013	2014		2014
Adults (Estimated take)	1.4					2.8	1.4	1.4		1.4				2.8	1.4		1.4				2.8		1.4					1.4				1.4			1.4
Lost Offspring multiplier	0.5					0.5	0.5	0.5		0.5				0.5	0.5		0.5				0.5		0.5					0.5				0.5			0.5
Indirect Take (1st generation)	0.7					1.4	0.7	0.7		0.7				1.4	0.7		0.7				1.4		0.7					0.7				0.7			0.7
2008	0.70	0.49	0.34	0.24	0.17	0.12	0.12	0.12	2009	0.70	0.49	0.34	0.24	0.17	0.12	2010	0.70	0.49	0.34	0.24	0.17	2011	0.70	0.49	0.34	0.24	2012	0.70	0.49	0.34	2013	0.70	**0.49**	2014	**0.70**
						0.06	0.04	0.03							0.06																				
							0.06	0.04																								**0.34**			
								0.06	2013					2.56	1.79	2014					2.56					**0.24**									
																					2.73														
2012						1.40	0.98	0.69	2014						1.28																				
															3.25																				
2013							0.70	0.49																											
2014								0.70																											
								2.12																											

Accumulated Indirect Take and Lost Productivity	9.87

Appendix 6. Carcass Retention Trials at KWPI in FY 2014.

KWP I	1			2			3		
Carcass Type WTG	Large/CAGO 5			Large/CAGO 4			Large/CAGO 19		
Vegetation	Shrub			Shrub			Shrub		
Proctor	JV			MP			SE		
	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes
day 0	P	8/13		p	9/25		P	12/14	
day 1	P	8/14	NC	p	9/26	NC	P	12/15	A
day 2	P	8/15		p	9/27	NC	P	12/16	A
day 3	P	8/16		p	9/28	NC	P	12/17	A
day 4	P	8/17	NC	p	9/29	NC	P	12/18	A
day 5	P	8/18	NC	p	9/30	FI	P	12/19	A
day 6	P	8/19	I	p	10/1	FI	p	12/20	N/C
day 7	P	8/20	NC	p	10/2	ADF	p	12/21	AI
day 8	P	8/21	FIL	p	10/3	ADF	p	12/22	AI
day 9	P	8/22	FILB	p	10/4	NC	p	12/23	AI
day 10	P	8/23	FILB	p	10/5	NC	p	12/24	AI
day 11	P	8/24	NC	p	10/6	NC	P	12/25	N/C
day 12	P	8/25	NC	p	10/7	ILWF	p	12/26	ADLI
day 13	P	8/26	FILB	p	10/8	ILWF	P	12/27	D/A
day 14	P	8/27	NC	p	10/9	ILWF	p	12/28	D/A
day 15	P	8/28	NC	p	10/10	ILWF	p	12/29	D/A
day 16	P	8/29	FILB	p	10/11	NC	p	12/30	D/A
day 17	P	8/30	NC	p	10/12	ILWF	P	12/31	N/C
day 18	P	8/31	NC	p	10/13	ILWF	P	1/1	N/C
day 19	P	9/1	NC	P	10/14	NC	P	1/2	F/D
day 20	P	9/2	NC	p	10/15	NC	p	1/3	N/C
day 21	P	9/3	FILB	p	10/16	NC	p	1/4	F/D
day 22	P	9/4	FILB	p	10/17	FS	P	1/5	F/D
day 23	P	9/5	NC	p	10/18	NC	p	1/6	F/D
day 24	P	9/6	NC	p	10/19	FS	p	1/7	N/C
day 25	P	9/7	NC	p	10/20	NC	P	1/8	F/D/I
day 26	P	9/8	NC	p	10/21	FS	p	1/9	F/D/I
day 27	P	9/9	NC	p	10/22	FS	p	1/10	F/D/A
day 28	P	9/10	FILB	P	10/23	FS	p	1/11	F/D/A
day 29	P	9/11	NC	p	10/24	FS	p	1/12	F/A/D
day 30	P	9/12	FILB	p	10/25	nc	p	1/13	F/D/I
Retention (days)	***30***			***30***			***30***		

Code Key			
A	ants	**H**	hair loss
B	body feathers	**I**	Insects
C	dirt covered	**L**	fly larvae
D	desiccated	**M**	moved
F	feather dispersal	**S**	skeleton
P/A	Present/Absent	**W**	wing feathers
NC	Not checked		

KWP I	1			2		
Carcass Type WTG	WTSH 15			WTSH 17		
Vegetation Type	Grass			Grass		
Proctor	MP			SE		
	P/A	date	Notes	P/A	date	Notes
day 0		11/7		P	12/14	
day 1	P	11/8	N/C	p	12/15	D
day 2	P	11/9	A	P	12/16	**D**
day 3	p	11/10	A	P	12/17	D
day 4	P	11/11	I	P	12/18	D
day 5	P	11/12	I	P	12/19	F/D/I
day 6	P	11/13	I/A	P	12/20	N/C
day 7	p	11/14	N/C	P	12/21	F/D/I
day 8	p	11/15	N/C	p	12/22	F/D/I
day 9	P	11/16	N/C	p	12/23	F/D/I
day 10	p	11/17	N/C	p	12/24	F/D/I
day 11	p	11/18	N/C	p	12/25	N/C
day 12	p	11/19	F	P	12/26	F/D/I
day 13	p	11/20	N/C	p	12/27	F/D/I
day 14	p	11/21	N/C	p	12/28	F/D/I
day 15	p	11/22	N/C	p	12/29	F/D/I
day 16	p	11/23	N/C	p	12/30	F/D/I
day 17	p	11/24	N/C	P	12/31	N/C
day 18	p	11/25	F	P	1/1	N/C
day 19	p	11/26	F	P	1/2	F/D/I
day 20	p	11/27	F	p	1/3	N/C
day 21	p	11/28	N/C	p	1/4	F/D/I
day 22	p	11/29	N/C	P	1/5	F/D/I
day 23	p	11/30	f	p	1/6	F/D/I
day 24	p	12/1	f	P	1/7	N/C
day 25	p	12/2	F	P	1/8	A/F/D/I
day 26	p	12/3	F	p	1/9	A/F/D/I
day 27	p	12/4	F	p	1/10	A/F/D/I
day 28	p	12/5	N/C	P	1/11	A/F/D/I
day 29	p	12/6	N/C	p	1/12	A/D/F
Day 30	P	12/7	F	p	1/13	F/D/I
Day 31	P	12/8	F			
Retention (days)	***31***			***30***		

KWP I	1			2			3			4		
Carcass Type WTG	NORA 4			NORA 2			NORA 3			NORA 5		
Vegetation Type	Bare			Bare			Bare			Bare		
Proctor	JV			MP			MP			MP		
	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes	p	date	Notes
day 0	P	8/13		p	9/17		p	9/17		p	9/17	
day 1	P	8/14	NC	p	9/18		p	9/18		p	9/18	
day 2	P	8/15			9/19	N/C		9/19	N/C		9/19	N/C
day 3	P	8/16		p	9/20		p	9/20		P	9/20	
day 4	P	8/17	NC		9/21	N/C		9/21	N/C		9/21	N/C
day 5	P	8/18	NC	P	9/22		A	9/22		A	9/22	
day 6	P	8/19	D		9/23	N/C						
day 7	P	8/20	NC		9/24	N/C						
day 8	P	8/21	DI	A	9/25							
day 9	P	8/22	DIH									
day 10	P	8/23	MDIH									
day 11		8/24	NC									
day 12		8/25	NC									
day 13	A	8/26	A									
day 14												
day 15												
day 16												
day 17												
day 18												
day 19												
day 20												
day 21												
day 22												
day 23												
day 24												
day 25												
day 26												
day 27												
day 28												
day 29												
day 30												
Retention (days)	***10***			***5***			***3***			***3***		

KWP I	5			6			7			8		
Carcass Type WTG	NORA 6			NORA 3			NORA 8			NORA 20		
Vegetation Type	Bare			Bare			Bare			BARE		
Proctor	MP			MP			MP			JE		
	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes
day 0	p	9/17		p	10/9		p	10/9		P	11/2	
day 1	p	9/18		p	10/10	A	p	10/10	A		11/3	NC
day 2		9/19	N/C	p	10/11	N/C	p	10/11	N/C	P	11/4	
day 3	p	9/20	ran over	p	10/12	A	p	10/12	A	P	11/5	C
day 4		9/21	N/C	p	10/13	LIB	p	10/13	LIB	P	11/6	C/I
day 5	P	9/22		p	10/14	NC		10/14	NC	A	11/7	
day 6		9/23	N/C	p	10/15	SH		10/15	NC			
day 7		9/24	N/C	p	10/16	SH		10/16	NC			
day 8	A	9/25		p	10/17	SH	A	10/17				
day 9				p	10/18	NC						
day 10				p	10/19	SH						
day 11				p	10/20	SH						
day 12				p	10/21	SH						
day 13				A	10/22							
day 14												
day 15												
day 16												
day 17												
day 18												
day 19												
day 20												
day 21												
day 22												
day 23												
day 24												
day 25												
day 26												
day 27												
day 28												
day 29												
day 30												
Retention (days)	***5***			***12***			***4***			***4***		

KWP I	9			10			11		
Carcass Type WTG	NORA 19			NORA 14			NORA 18		
Vegetation Type	BARE			Grass			Bare		
Proctor	MP			SE			SE		
	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes
day 0	P	11/7		p	11/20		p	11/20	
day 1	P	11/8		p	11/21	A/I/L	P	11/21	A,I,L
day 2	P	11/9	A	p	11/22	N/C		11/22	N/C
day 3	p	11/10	MH	P	11/23	S,A	A	11/23	Pig Tracks
day 4	P	11/11	H	p	11/24	SHA			
day 5	P	11/12	I/A/L	P	11/25	SHA			
day 6	A	11/13	A	p	11/26	SHA			
day 7				p	11/27	SHA			
day 8				p	11/28	N/C			
day 9				p	11/29	N/C			
day 10				p	11/30	SHI			
day 11				p	12/1	SHI			
day 12				p	12/2	SHI			
day 13				p	12/3	SHI			
day 14				P	12/4	SHI			
day 15				p	12/5	N/C			
day 16				P	12/6	N/C			
day 17				p	12/7	SHI			
day 18				p	12/8	N/C			
day 19				p	12/9	SHI			
day 20				p	12/10	SHI			
day 21				P	12/11	SH			
day 22				P	12/12	SH			
day 23				P	12/13	N/C			
day 24				P	12/14	N/C			
day 25				P	12/15	N/C			
day 26				P	12/16	SHI			
day 27				P	12/17	SHI			
day 28				P	12/18	SHI			
day 29				p	12/19	N/C			
day 30				p	12/20	N/C			
Retention (days)	***5***			***30***			***1***		

Appendix 7. KWPI CARE Trials from the WEST Independent Study (O=missing/removed, I=intact, S=scavenged, but still present).

						Day																		
Carcass #	**Turbine #**	**Dist From Turbine (m)**	**Species**	**Cover Class**	**Day1 Date**	1	2	3	4	5	6	7	9	11	13	15	17	19	21	23	25	27	29	30
c1	4	26	CAGO	Bare	3/31/2014	I	I	I	nc	S	S	S	nc	S	S	nc	S	S	S	S	nc	S	S	**S**
c2	14	12	CAGO	Grass	3/31/2014	I	I	I	nc	I	I	I	nc	I	S	nc	S	S	S	S	nc	S	S	**S**
c4	20	31	CAGO	Heavy Shrub	5/7/2014	I	I	I	I	S	S	S	s	s	s	s	s	s	s	s	s	s	s	**s**
r1	4	35	RATS	Bare	3/31/2014	I	I	I	nc	I	I	I	nc	I	I	nc	I	I	S	S	nc	S	S	**S**
r2	20	49	RATS	Heavy Shrub	3/31/2014	O																		
r21	2	26	RATS	Bare	5/7/2014	I	I	I	I	S	S	S	s	s	**s**	o								
r22	8	27	RATS	Bare	5/7/2014	I	I	S	S	S	S	S	s	s	s	s	s	s	s	s	**s**	o		
r23	8	54	RATS	Grass	5/7/2014	I	S	S	S	S	S	S	s	s	s	s	s	s	s	s	s	s	s	**s**
r24	11	58	RATS	Grass	5/7/2014	I	I	I	S	S	S	S	s	s	**s**	o								
r3	20	73	RATS	Heavy Shrub	3/31/2014	O																		
r63	4	63	RATS	Heavy Shrub	2014-06-08	I	I	I	**S**	O														
r64	7	61	RATS	Bare	2014-06-08	I	I	I	**S**	O														
r65	13	64	RATS	Bare	2014-06-08	I	I	S	S	S	S	O												
r66	16	52	RATS	Grass	2014-06-08	I	I	O																
r67	19	72	RATS	Heavy Shrub	2014-06-08	I	I	O																
w1	2	54	WTSH	Bare	3/31/2014	I	I	I	nc	I	I	I	nc	I	I	nc	I	I	I	I	nc	S	S	S
w15	9	65	WTSH	Grass	5/7/2014	I	I	I	I	S	S	S	s	s	s	s	s	s	s	s	s	s	s	s

w16	13	30	WTSH	Bare	5/7/2014	I	I	I	S	S	S	S	s	s	s	s	s	s	s	s	s	s	s	s
w17	17	59	WTSH	Grass	5/7/2014	I	I	I	I	I	S		s	s	s	s	s	s	s	s	s	s	s	s
w2	6	27	WTSH	Grass	3/31/2014	I	i	I	nc	I	I	I	nc	I	I	nc	I	I	S	S	nc	S	S	S
w3	19	65	WTSH	Heavy Shrub	3/31/2014	I	I	I	nc	I	I	I	nc	I	I	nc	I	I	I	I	nc	S	S	s
w36	2	44	WTSH	Heavy Shrub	2014-06-08	I	I	I	S	S	S	S	O											
w39	5	12	WTSH	Bare	2014-06-08	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S
w40	10	59	WTSH	Grass	2014-06-08	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
w41	10	20	WTSH	Bare	2014-06-08	I	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S
w42	19	53	WTSH	Heavy Shrub	2014-06-08	I	I	I	I	I	S	S	O											
w43	20	53	WTSH	Heavy Shrub	2014-06-08	I	I	I	S	S	S	S	S	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS

Appendix 8. KWPI First Wind Proctored SEEF Trails from August 2013 to February 2014 (0 = no, 1 = yes).

SEARCH DATE	SPECIES	WTG	TERRAIN	FOUND?
8/13/2013	CAGO	5	Shrub	0
8/20/2013	CAGO	16	Grass	1
9/4/2013	CAGO	7	Grass	1
9/10/2013	CAGO	8	Grass	1
9/26/2013	CAGO	4	Grass	1
8/13/2013	NORA	4	Bare	0
8/21/2013	NORA	20	Bare	1
9/4/2013	NORA	9	Bare	0
9/4/2013	NORA	15	Grass	0
9/10/2013	NORA	5	Bare	1
9/17/2013	NORA	2	Bare	1
9/17/2012	NORA	3	Bare	1
9/17/2013	NORA	5	Bare	1
9/17/2013	NORA	5	Bare	1
9/18/2013	NORA	13	Bare	0
9/18/2013	NORA	14	Bare	1
9/18/2013	NORA	15	Bare	1
9/26/2013	NORA	8	Bare	1
9/26/2013	NORA	12	Bare	1
10/9/2013	NORA	8	Bare	1
10/9/2013	NORA	3	Bare	1
10/9/2013	NORA	8	Bare	1
10/22/2013	NORA	15	Grass	1
10/22/2013	NORA	12	Bare	1
10/31/2013	NORA	3	Grass	0
11/4/2013	NORA	20	Bare	0
11/7/2013	NORA	16	Grass	1
11/7/2013	NORA	20	Bare	1
11/21/2013	NORA	18	Bare	0
12/5/2013	NORA	13	Shrub	1
12/5/2013	NORA	13	Bare	1
12/18/2013	NORA	2	Bare	1
12/18/2013	NORA	6	Bare	1
12/18/2013	NORA	8	Bare	1
12/18/2013	NORA	9	Bare	1
8/20/2013	WTSH	17	Grass	0
9/4/2013	WTSH	12	Grass	0
9/10/2013	WTSH	4	Shrub	1

9/17/2013	WTSH	6	Grass	1
9/26/2013	WTSH	6	Grass	0
9/26/2013	WTSH	10	Shrub	0
10/19/2013	WTSH	19	Grass	1
10/19/2013	WTSH	20	Grass	1
10/22/2013	WTSH	14	Grass	1
10/22/2013	WTSH	11	Bare	1
10/31/2013	WTSH	1	Bare	1
10/31/2013	WTSH	5	Bare	1
11/7/2013	WTSH	14	Grass	1
11/7/2013	WTSH	17	Grass	1
11/21/2013	WTSH	16	Shrub	0
12/5/2013	WTSH	12	Grass	1
12/14/2013	WTSH	17	Shrub	1
12/14/2013	WTSH	18	Shrub	1

Appendix 9. KWPI SEEF Trials from the WEST Independent Study.

Date1	Species	Carcass ID	KWPI Turbine Number	Distance From Turbine (m)	Cover Class	Found1	DayA Found Date	DayA Available
03/30/14	CAGO	c2	14	12	Grass	Y	04/04/14	Y
03/30/14	CAGO	c1	4	26	Heavy Shrub	N	04/01/14	Y
05/06/14	CAGO	c4	20	31	Heavy Shrub	Y	05/09/14	Y
2014-05-21	CAGO	c5	11	80	Bare	Y	2014-05-21	Y
2014-05-21	CAGO	c6	20	42	Heavy Shrub	N	2014-05-23	Y
2014-07-07	CAGO	c10	20	18	Bare	Y	2014-07-08	Y
03/30/14	RATS	r2	20	49	Heavy Shrub	N		N
03/30/14	RATS	r3	20	73	Heavy Shrub	N	03/31/14	N
03/30/14	RATS	r1	4	35	Bare	N	04/04/14	Y
04/21/14	RATS	r12	6	57	Grass	N	04/28/14	N
04/21/14	RATS	r9	2	62	Heavy Shrub	N	04/28/14	N
04/21/14	RATS	r7	1	63	Heavy Shrub	N	04/28/14	Y
04/21/14	RATS	r8	1	68	Heavy Shrub	N	04/28/14	Y
04/21/14	RATS	r10	4	32	Grass	Y	04/28/14	Y
04/21/14	RATS	r11	5	73	Bare	N	04/28/14	Y
04/21/14	RATS	r13	7	43	Bare	Y	04/28/14	Y
05/06/14	RATS	r21	2	26	Bare	Y	05/07/14	Y
05/06/14	RATS	r22	8	27	Bare	Y	05/07/14	Y
05/06/14	RATS	r23	8	54	Grass	N	05/07/14	Y
05/06/14	RATS	r24	11	58	Grass	Y	05/08/14	Y
05/11/14	RATS	r29	1	73	Heavy Shrub	N	05/15/14	N
05/11/14	RATS	r30	2	28	Bare	Y	05/15/14	Y

05/11/14	RATS	r31	11	70	Grass	N	05/15/14	Y
2014-05-15	RATS	r32	12	31	Grass	Y	2014-05-15	Y
2014-05-15	RATS	r33	12	14	Heavy Shrub	N	2014-05-15	Y
2014-05-15	RATS	r34	20	69	Heavy Shrub	N	2014-05-16	Y
2014-05-15	RATS	r35	20	27	Bare	Y	2014-05-16	Y
2014-05-19	RATS	r42	4	62	Heavy Shrub	N	2014-05-20	Y
2014-05-19	RATS	r43	7	27	Bare	Y	2014-05-21	Y
2014-05-21	RATS	r48	19	62	Heavy Shrub	N	2014-05-22	N
2014-05-21	RATS	r44	11	31	Grass	Y	2014-05-21	Y
2014-05-21	RATS	r45	14	64	Grass	N	2014-05-21	Y
2014-05-21	RATS	r46	15	64	Grass	N	2014-05-21	Y
2014-05-21	RATS	r47	15	55	Bare	Y	2014-05-21	Y
2014-05-21	RATS	r49	20	9	Bare	N	2014-05-23	Y
2014-05-28	RATS	r57	18	42	Grass	N	2014-06-02	N
2014-05-28	RATS	r58	18	68	Bare	N	2014-06-02	N
2014-05-28	RATS	r54	9	67	Grass	N	2014-06-02	Y
2014-05-28	RATS	r55	13	25	Heavy Shrub	N	2014-06-02	Y
2014-05-28	RATS	r56	17	16	Bare	Y	2014-06-02	Y
2014-06-02	RATS	r59	3	35	Heavy Shrub	N	2014-06-04	N
2014-06-02	RATS	r61	6	21	Bare	N	2014-06-04	N
2014-06-02	RATS	r60	4	73	Heavy Shrub	N	2014-06-04	Y
2014-06-02	RATS	r62	10	60	Grass	N	2014-06-04	Y
2014-06-07	RATS	r66	16	52	Grass	N	2014-06-11	N
2014-06-07	RATS	r67	19	72	Heavy Shrub	N	2014-06-12	N
2014-06-07	RATS	r63	4	63	Heavy Shrub	N	2014-06-09	Y

2014-06-07	RATS	r64	7	61	Bare	Y	2014-06-09	Y
2014-06-07	RATS	r65	13	64	Bare	Y	2014-06-11	Y
2014-06-18	RATS	r78	15	11	Bare	N	2014-06-19	N
2014-06-18	RATS	r82	20	18	Heavy Shrub	N	2014-06-19	N
2014-06-18	RATS	r75	9	47	Grass	N	2014-06-18	Y
2014-06-18	RATS	r76	10	40	Grass	N	2014-06-18	Y
2014-06-18	RATS	r77	15	50	Grass	N	2014-06-19	Y
2014-06-18	RATS	r79	17	23	Heavy Shrub	N	2014-06-19	Y
2014-06-18	RATS	r80	18	21	Bare	Y	2014-06-19	Y
2014-06-18	RATS	r81	19	70	Heavy Shrub	N	2014-06-19	Y
2014-06-24	RATS	r73	2	30	Bare	Y	2014-06-24	Y
2014-06-24	RATS	r74	4	36	Bare	Y	2014-06-24	Y
2014-06-24	RATS	r83	7	79	Bare	Y	2014-06-24	Y
2014-06-24	RATS	r84	14	44	Bare	Y	2014-06-25	Y
2014-06-24	RATS	r85	18	71	Grass	N	2014-06-25	Y
2014-06-30	RATS	r86	14	21	Bare	Y	2014-07-02	Y
2014-07-06	RATS	r92	4	24	Bare	N	2014-07-07	N
2014-07-07	RATS	r93	7	72	Bare	**N**	2014-07-07	N
2014-07-07	RATS	r94	10	38	Bare	**N**	2014-07-07	N
2014-07-07	RATS	r95	11	16	Bare	**N**	2014-07-07	N
2014-07-07	RATS	r96	16	47	Bare	N	2014-07-08	N
03/30/14	WTSH	w1	2	110	Bare	Y	04/01/14	Y
03/30/14	WTSH	w2	6	27	Grass	Y	04/04/14	Y
04/19/14	WTSH	w9	5	64	Bare	Y	04/28/14	Y
04/19/14	WTSH	w10	6	39	Grass	Y	04/28/14	Y

04/19/14	WTSH	w8	3	69	Heavy Shrub	N	04/28/14	Y
04/21/14	WTSH	w14	8	41	Grass	Y	04/28/14	Y
05/06/14	WTSH	w16	13	30	Bare	Y	05/08/14	Y
05/06/14	WTSH	w15	9	65	Grass	Y	05/07/14	Y
05/06/14	WTSH	w17	17	59	Grass	N	05/09/14	Y
05/11/14	WTSH	w22	9	22	Bare	Y	05/12/14	Y
05/11/14	WTSH	w23	13	25	Heavy Shrub	Y	05/15/14	Y
05/13/14	WTSH	w24	18	27	Grass	N	05/16/14	Y
05/13/14	WTSH	w25	20	33	Heavy Shrub	Y	05/16/14	Y
2014-05-21	WTSH	w32	18	22	Bare	Y	2014-05-21	Y
2014-05-21	WTSH	w29	17	68	Grass	Y	2014-05-21	Y
2014-05-21	WTSH	w33	20	52	Heavy Shrub	N	2014-05-23	Y
2014-05-28	WTSH	w35	14	55	Grass	Y	2014-06-02	Y
2014-06-07	WTSH	w39	5	12	Bare	Y	2014-06-09	Y
2014-06-07	WTSH	w41	10	20	Bare	Y	2014-06-09	Y
2014-06-07	WTSH	w40	10	59	Grass	Y	2014-06-09	Y
2014-06-07	WTSH	w36	2	44	Heavy Shrub	Y	2014-06-09	Y
2014-06-07	WTSH	w42	19	53	Heavy Shrub	N	2014-06-12	Y
2014-06-07	WTSH	w43	20	53	Heavy Shrub	N	2014-06-12	Y
2014-06-16	WTSH	w49	3	9	Bare	Y	2014-06-16	Y
2014-06-16	WTSH	w50	18	62	Grass	Y	2014-06-19	Y
2014-06-24	WTSH	w53	2	16	Bare	N	2014-06-24	N
2014-06-24	WTSH	w52	18	63	Bare	Y	2014-06-25	Y
2014-06-24	WTSH	w51	10	34	Grass	Y	2014-06-25	Y
2014-06-28	WTSH	w54	2	26	Bare	Y	2014-07-02	Y

2014-06-28	WTSH	w55	10	37	Bare	Y	2014-07-02	Y

Appendix 10. Annual Wildlife Education Observation FY 2014 Training List.

Date	Name	Affiliation
6/7/2013	[redacted]	G.E.
6/24/2013	[redacted]	First Wind
7/8/2013	[redacted]	First Wind
7/8/2013	[redacted]	First Wind
7/10/2013	[redacted]	Prolec G.E.
7/10/2013	[redacted]	Prolec G.E.
7/22/2013	[redacted]	T.J. Gomes Trucking
7/22/2013	[redacted]	T.J. Gomes Trucking
7/22/2013	[redacted]	APB
7/22/2013	[redacted]	T.J. Gomes Trucking
7/22/2013	[redacted]	T.J. Gomes Trucking
7/30/2013	[redacted]	First Wind
8/6/2013	[redacted]	G.E.
9/23/2013	[redacted]	X.P.
9/23/2013	[redacted]	First Wind
9/24/2013	[redacted]	Prolec G.E.
9/30/2013	[redacted]	Altres Staffing
9/30/2013	[redacted]	Maui Industrial Metal Fab.
9/30/2013	[redacted]	Maui Industrial Metal Fab.
9/30/2013	[redacted]	Maui Industrial Metal Fab.
10/1/2013	[redacted]	G.E.
10/16/2013	[redacted]	First Wind
10/16/2013	[redacted]	First Wind
10/24/2013	[redacted]	Pyro A.C.
10/24/2013	[redacted]	RMT Inc.
11/4/2013	[redacted]	3M
11/4/2013	[redacted]	First Wind
11/11/2013	[redacted]	T.J. Gomes Trucking
11/11/2013	[redacted]	T.J. Gomes Trucking
11/11/2013	[redacted]	T.J. Gomes Trucking
11/11/2013	[redacted]	T.J. Gomes Trucking
11/19/2013	[redacted]	G.E.
12/3/2013	[redacted]	G.E.
12/3/2013	[redacted]	G.E.
12/3/2013	[redacted]	G.E.
2/10/2014	[redacted]	First Wind
4/7/2014	[redacted]	G.E.
4/21/2014	[redacted]	G.E.
5/12/2014	[redacted]	First Wind

Appendix 11. Makamaka'ole Weekly Technician Checklist.

Makamaka'ole Weekly Technician Check List

Enclosure A Task	Check, Date, Initial	Notes
Perimeter Check		
Culvert Check (3)		
Trap Line Inside (6)		
Trap Line outside (13)		
Sound Sys. Battery Check (2)		
Collect Game Cam Cards (9)		
Bait Station Check		
Burrow Check (32)		
Enclosure B Task	**Check, Date, Initial**	**Notes**
Perimeter Check		
Culvert Check (1)		
Trap Line Inside (6)		

Trap Line outside (8)		
Sound Sys. Battery Check (1)		
Collect Game Cam Cards (8)		
Bait Station Check		
Burrow Check (30)		
Misc. Tasks	Check, Date, Initial	Notes
Mule Maint. Check		
Carcass Disposal Burial		
Needs for Upcoming Week		
Monthly Track Tunnel Deploy		

Appendix 12.
First Wind Makamaka'ole Scope of Work Memo to Scott Fretz on 10/2/13

Kaheawa Wind Power I HCP, ITL No. ITL-08 and ITP No. TE118901-0
Kaheawa Wind Power II HCP, ITL No. ITL-15 and ITP No. 27260A-0

October 2, 2013

To: Scott Fretz, Maui District Manager, Department of Land and Natural Resources, Division of Forestry and Wildlife

From: Johanna Valente, Supervisor HCP Compliance, First Wind Energy

Re: Makamaka'ole Seabird Mitigation Project Disturbance Issues

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On July 15th, 2013, Peter Landon and Bryon Stevens (DOFAW) met with Erica Thoele (First Wind) and Steve Sawyer (EcoWorks) to examine the progress at the Makamaka'ole Seabird Mitigation Site. Several issues were identified and later communicated in writing to First Wind through an email sent by Scott Fretz (DOFAW) on August 15, 2013.

DOFAW identified the following six issues:

1) Potential for soil erosion in disturbed areas
2) Potential for recruitment and establishment of invasive plant species in disturbed areas
3) Disturbance of native vegetation
4) Surplus and discarded materials
5) Vehicle access
6) Potential erosion at the culvert outlets

1) <u>Potential for Soil Erosion in Disturbed Areas</u>

DOFAW expressed concerns about soil erosion around the perimeter of the fence. First Wind is addressing these concerns with the following measures:

- 4,500 square feet of biodegradable jute matting has been installed in a 1 meter wide course to provide temporary stabilization of disturbed soils around the outside of each of the enclosures. An additional 3,600 feet will be put down by the first week of October to complete the installation for a total of 8,100 square feet surrounding both enclosures. The purpose of the jute matting is to hold soils in place in order to minimize erosion during the re-vegetation period (Figure 1, 2 and 3).

Figure 1. Enclosure A with jute matting in place.

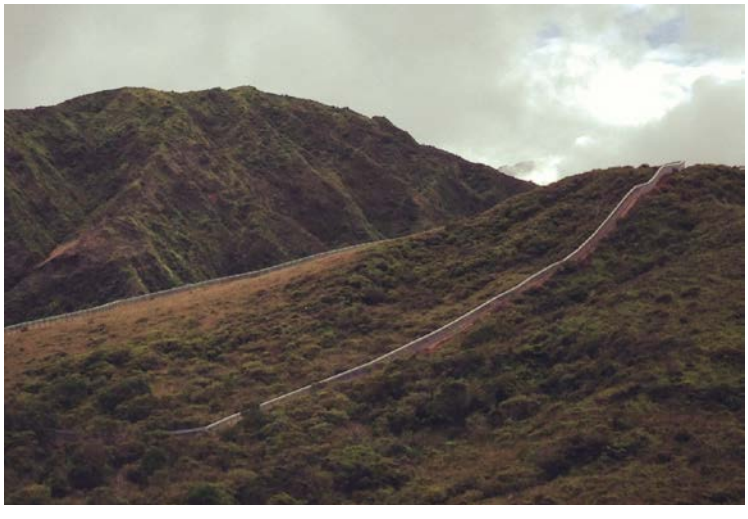


Figure 2. Jute matting partially installed at Enclosure B.

Figure 3. Jute matting around Enclosure B.

- Outplanting of native species will be used for long term erosion control. 3000 *Machaerina angustifolia* (‘Uki) seeds and 2,000 *Rhychospora caduca* (beak-sedge) seeds were delivered to Kula Native Nursery on July 26 and are being cultivated. Plants will be spaced 2 feet on center in disturbed areas. A total of 2,500 plants will be transplanted in 2013, with potentially another 3,500 plantings to occur in future years as needed.
- Discontinued use of the excavator for fence clearing. Excavator use was discontinued upon request from the DOFAW on July 20. No excavator work was performed on Enclosure B.
- Water diverters are in the process of being installed on the east side of the fence line of Enclosure A (Figure 4). Water diverters will be spaced every 6-10 feet at 45˚ angles at the most vertical aspects of the fence. These will be completed by October 11, 2013. The fence contractor has already completed diversions for Enclosure B (Figure 5).

Figure 4. Proposed placement of water diverters at Enclosure A.

Figure 5. Recently completed water diversion and jute matting on the west facing slope of Enclosure B.

2) Potential for Recruitment and Establishment of Invasive Plant Species in Disturbed Areas

DOFAW expressed concerns that disturbed areas would be colonized by invasive species. First Wind shares this concern and is taking active steps to prevent establishment of invasives, including:

- All tools and equipment coming onsite are inspected and cleaned to be sure they are free of invasive species. Shoes and clothing are inspected and cleaned upon entrance to the site in adherence with NARS and DLNR permits. This protocol will continue for the life of the project.
- The fence line is walked on a weekly basis and all observed invasives, whether pre-existing or recently established, are hand-pulled. These are being securely stockpiled on-site and will be taken offsite for disposal (Figure 6). The fence line will continue to be inspected weekly.
- Observed invasives surrounding burrow boxes will be pulled.

Figure 6. Removing existing *Clidemia* from the Enclosures.

3) Disturbance of Native Vegetation

DOFAW expressed concerns regarding the disturbance of native vegetation during burrow installation. First Wind is decreasing the number of burrows placed inside each enclosure from 50 to 30 to reduce vegetation disturbance during the first year (Figure 7 and 8).

Figure 7. Artificial seabird burrows in Enclosure A.

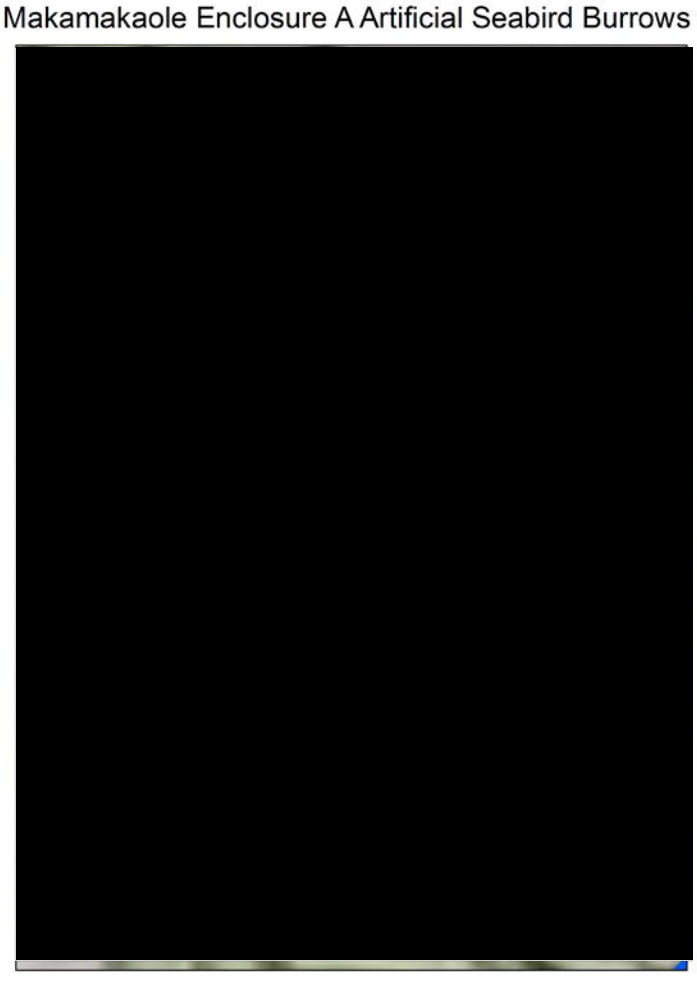


Figure 8. Enclosure A artificial burrow placement.

Installation of up to 20 additional burrows, for a total of 50 per each enclosure as specified in the HCP, will be considered in 2014 in consultation with DOFAW and USFWS. This will allow for a year of vegetation regrowth before more disturbance takes place. If regrowth is not sufficient after the rainy season additional planting will occur inside the enclosure. Special consideration will be made while installing burrow boxes to choose areas with limited native vegetation. When native vegetation disturbance is unavoidable, First Wind will use appropriate methods to minimize disturbance of native species (See Figure 9 below).

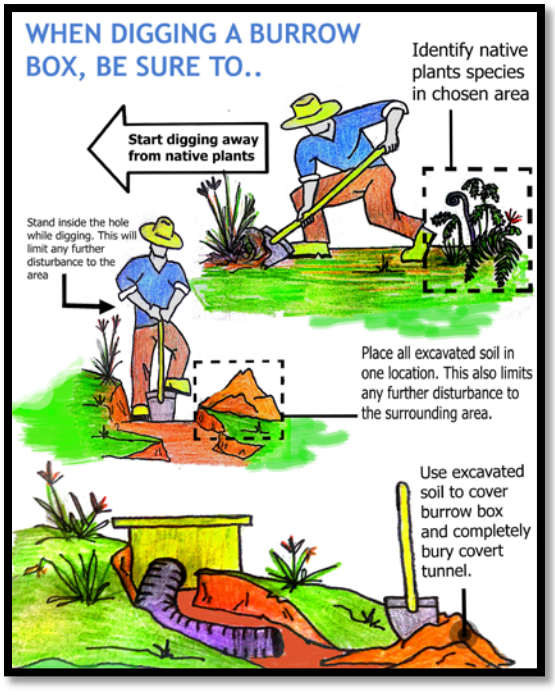


Figure 9. Methodology used to minimize disturbance to native plants while installing burrows. Grant, Cameron. Burrow Methodology. 2013. First Wind.

4) Surplus and Discarded Materials

DOFAW requested that First Wind remove all unnecessary or discarded materials from the site as soon as practicable. As of September 5 the fence contractor had removed all of their materials. First Wind will continue to remove remaining materials from the site in accordance with DOFAW's recommendations (Figure 10). All construction-related and unnecessary materials will be removed from the site as soon as possible and at the latest by the end of the year.

Figure 10. Remaining materials at Maka.

5) Vehicle Access

DOFAW requests that First Wind not park within the NW corner gate. Once construction is finished and all

large items are staged in or out First Wind will cease to drive in the NW corner gate.

6) Potential Impacts from Runoff through Culverts

Four pest-resistant culverts have been installed on the makai (north-facing) side of Enclosures A and B (Figure 11) to convey intermittent stream runoff through the fence during rainy periods. As recommended by DOFAW, rock-aprons will be installed to diffuse run-off velocity and prevent downstream erosion. All culverts will be closely monitored for erosion and sediment build-up on a weekly basis.

Figure 11. A screened culvert outlet before the rock apron is applied.

An update with pictures showing progress and completion and outstanding issues to resolve will be provided quarterly.

Appendix 13. KWPI Hawaiian Hoary Bat Adaptive Management Plan

June 6, 2014

Angela Amlin, Diane Sether, Afsheen Siddiqi, Jodi Charrier
Hawai'i Department of Forestry and Wildlife
U.S. Fish and Wildlife Service

Mitigation and Adaptive Management Response to Higher Take of Hawaiian Hoary Bats at Kaheawa Wind Power, Phase I LLC

On May 7, 2014 First Wind HCP Compliance Technicians found the eighth Hawaiian hoary bat since permit issuance in 2006, and the fourth in FY 2014. Adjusted take is estimated to be near to or above the "Baseline" permitted take of 20 bats over the 20-year life of the project, and thus approaching - or in - the "Higher" take level (a total of 2-5 bats per year). Take at the Higher level triggers additional mitigation as described below. In addition, exceeding a running average of one per year, or two per fiscal year, triggers the development and implementation of Adaptive Management (AM) measures.

The KWPI HCP:

Page 48: Assessment of Potential Impacts to Listed Species: Hawaiian Hoary Bat

> *"To ensure that all possible scenarios are addressed, this plan also considers Lower (less than 1 per year), Higher (2-5 per year) and Notably Higher (5-10 or more per year) take scenarios. As stated in Special Condition #3 of the DLNR ITL, the incidental take authorized by the license can be increased provided that mitigation has been implemented such that benefits to the species outweigh the losses as detailed in the HCP. As further stipulated in Special Condition #7, incidental takes exceeding a running average of one per fiscal year, or greater than two in any one fiscal year,* ***requires the development and implementation of adaptive management strategies*** *approved by DLNR and USFWS and reviewed by the Endangered Species Recovery Committee in accordance with the HCP."*
>
> *"The applicant's proposed mitigation for the anticipated take will contribute to a greater understanding of the species' occurrence and status, which in turn will help guide future management and recovery efforts and should result in an overall net conservation benefit for the species."*

Page 65:

> *"If monitoring indicates a Higher level of take (i.e., a total of 2-5 bats per year), then Kaheawa Wind Power will provide additional funding at the rate of $1000 per bat taken, to be used specifically for the expansion of research efforts as described above."*

Mitigation Payment

Although a final estimate of take has not been fully reviewed and agreed upon with USFWS and DOFAW, a preliminary estimate exceeds the baseline take level of 20 bats. Therefore, as prescribed in the HCP, KWPI is preparing a check in the amount of $20,000 as mitigation for up to 20 additional bats at the Higher take level. Because twenty additional bats exceed the upper range of the estimated take, this larger payment results in a benefit to the species that outweighs the losses, thereby producing a net conservation benefit. This payment contributes to the overall recovery strategy for Hawaiian hoary bats for research that can provide information on the subspecies' abundance and distribution, life history, and habitat associations. It can also be used to support other recovery goals, including protecting and managing current populations by identifying and managing threats; conducting a public education program; evaluating progress towards recovery; and revising recovery criteria as necessary.

Proposed Adaptive Management (AM) Measures

The KWPI HCP does not prescribe specific adaptive management measures at the Higher take level, or for exceeding the running average criterion. The following adaptive management measures are proposed by KWPI based on recent research and experience regarding methods for minimizing bat fatalities at wind energy installations.

Low Wind Speed Curtailment

Research at mainland sites has shown that the majority of bat fatalities occur at relatively low wind speeds, and that fatality rates can be reduced by feathering turbine blades to minimize rotation below cut-in (i.e., before commencing rotation to generate electricity), as well as by raising the cut-in speed 1-3 m/s above the manufacturer's specifications (Arnett et al. 2013a). Raising the cut-in speed is referred to as "Low Wind Speed Curtailment" (LWSC). LWSC has been effective at reducing fatalities of tree-roosting species similar to the Hawaiian hoary bat at mainland sites.

Following the seventh observed bat fatality documented at KWPI on February 24, 2014, KWPI conducted a review of fatality data and determined that 70 % of observed fatalities had occurred in the months of April and September (Appendix A). Based on this information, KWPI began implementing LWSC on all turbines beginning April 10, 2014. The cut-in speed was raised from the manufacturer's specified 3.5 m/s, to 5 m/s from sunset to sunrise. LWSC continued through April 30, 2014. KWPI proposes to implement LWSC at 5 m/s for the months of April and September as an adaptive management measure until further notice.

Acoustic Deterrent Device

Research at mainland facilities suggests that ultrasonic acoustic deterrents can be effective at reducing bat fatalities at wind energy installations (Arnett et al. 2013b). A bat deterrent device using ultrasonic sound emissions is being developed by GE and is currently in the testing phase of development. KWPI and KWPII are being considered by GE for possible deployment of multiple units on a demonstration or experimental basis in 2014 or 2015. If successful they would reduce the numbers of bats at risk in close proximity to the WTG's.

Bat Activity Assessment

KWPI has had varying numbers of bat detectors deployed at ground level since FY 2007, and recently converted all detectors on the ground to Wildlife Acoustics full spectrum SM2BAT+ ™ type with microphones at 6.5 m height (Appendix B). In order to better characterize bat activity and fatality risk relative to weather conditions, at least 6 additional bat detectors will be deployed with microphones at nacelle height, and at least 2 weather stations will be deployed on the ground.

Sincerely,

Mitchell Craig
First Wind Hawai'i HCP Manager

References

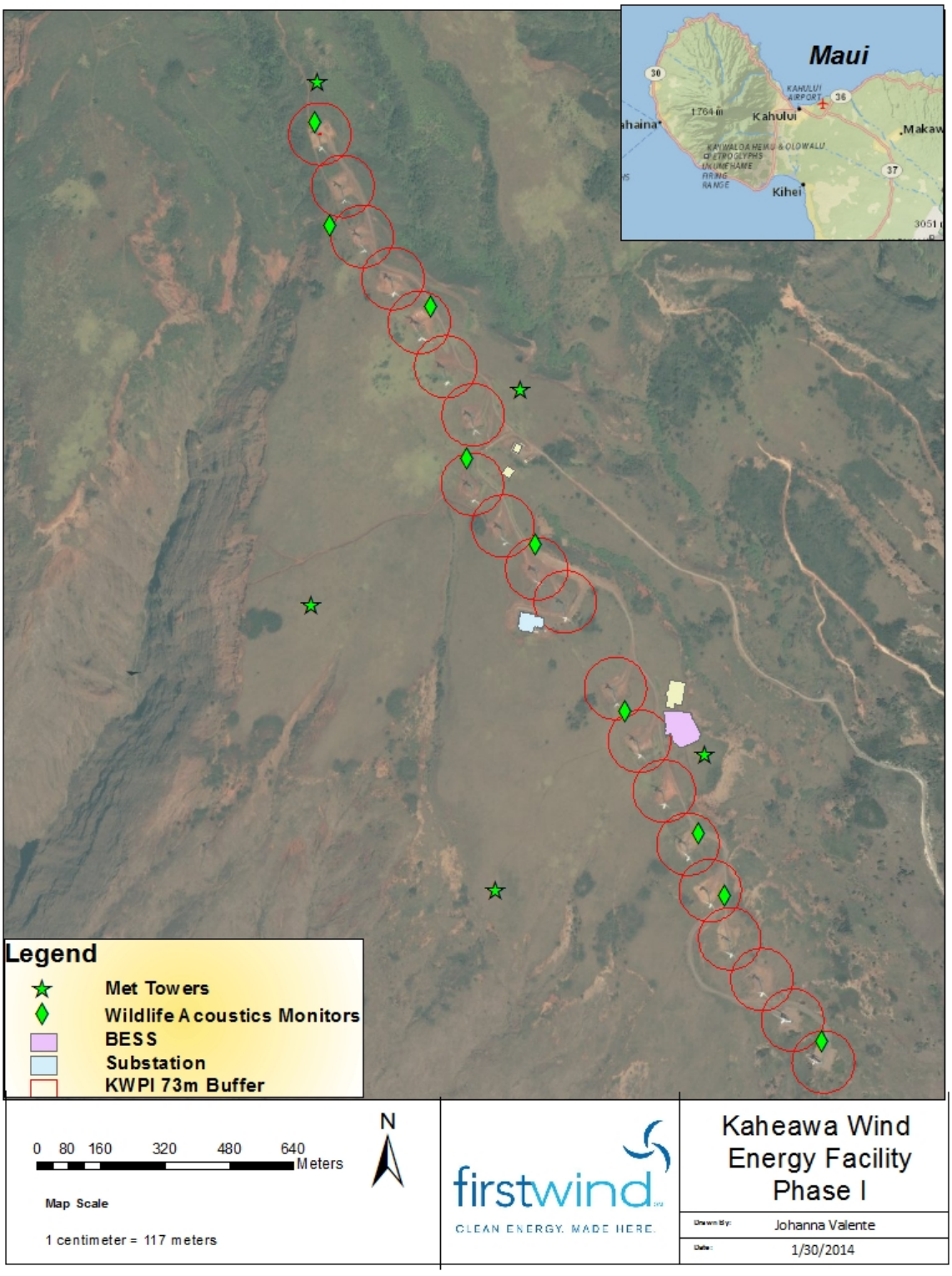
Arnett, E.B., G.D. Johnson, W.P. Erickson, and C.D. Hein. 2013a. A synthesis of operational mitigation studies to reduce bat fatalities at wind energy facilities in North America. A report submitted to the National Renewable Energy Laboratory. Bat Conservation International. Austin, Texas, USA.

Arnett, E. B., C. D. Hein, M. R. Schirmacher, M. M. P. Huso, and J. M. Szewczak. 2013b. Evaluating the effectiveness of an ultrasonic acoustic deterrent for reducing bat fatalities at wind turbines. PLoS ONE 8(6): e65794. Doi:10.1371/journal.pone.0065794.

Appendix A. Hawaiian hoary bat fatalities at KWPI.

Date	WTG	FY
9/26/2008	8	2009
4/26/2011	16	2011
4/11/2013	8	2013
4/17/2013	2	
9/9/2013	10	2014
12/14/2013	18	
2/24/2014	16	
5/7/2014	6	

Appendix B. Locations of ground based bat detectors at KWPI.



Appendix 14. Expenditures at KWPI in FY 2014

KWPI	Cost
Permit Compliance	$11,010
Seabird Management	$58,558
Vegetative Management	$19,178
Fatality Monitoring	$10,784
Equipment and Supplies	$14,014
First Wind Labor	$165,835
Capital Expenses	$290.345
Total Cost for FY 2014	$569,724