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

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

August, 2014

ITL-15 and ITP-TE27260A-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 II, LLC (KWPII) has been implementing a Habitat Conservation Plan (HCP) since approval December 2011. The HCP supports a Federal Incidental Take Permit TE-2760A-0 and State of Hawaii Incidental Take License ITL-15, both issued in January 2012. The project began construction in 2011 and was completed in July 2012. KWPII was commissioned to begin operating (COD) on July 2, 2012. Species covered under the HCP include the Hawaiian Petrel (HAPE), Newell's Shearwater (NESH), Hawaiian Goose (Nēnē), and the Hawaiian Hoary bat (bat). This report is for FY 2014 of operations and State of Hawaii Fiscal Year (FY) 2014, July 1, 2013 through June 30, 2014. KWPII has submitted annual HCP progress reports for State of Hawaii Fiscal Years (FY) 2013 to USFWS and DOFAW.

Fatality monitoring search plots have parallel marked transects at six meter intervals. The plot radii of 75 meters at KWP II equal 75% of the maximum WTG height. Plots are scheduled to be searched weekly. During Fiscal Year (FY) 2014, the search interval mean and standard deviation (SD) in days for KWPII was 7.13 (SD = 1.82).

Two Hawaiian hoary bat fatalities were observed during FY 2014; however no avian species listed under the Incidental Take License (ITL) and Incidental Take Permit (ITP) were found in FY 2014. Considering a credibility level of 50%, the FY 2013-2014 adjusted take (Dalthorp et al 2013), indirect take, and loss of productivity combined for KWPII HCP for Nēnē is not more than two adults and 0.43 juveniles, two and one rounded up, and for bats is not more than 13 adults and 0.5 juveniles or 14 adults rounded up (as amended).

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 Nene estimated take at a credibility level of 80% is not more than three adults and one juvenile and for bats is not more than 18 bats and two juveniles or 19 adults (as amended).

WEST has been contracted to proctor independent CARE trials and SEEF trials for one year at KWPII. 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 SEEF and carcass retention trials (CARE) results from the Western EcoSystems Technology, Inc. (WEST) study in progress have been included in the fatality estimates.

CARE trials in FY 2014 were six Canada Geese (CAGO), two Wedge-tailed Shearwaters (WTSH) and 11 rats; including WEST study trials conducted in FY 2014. Considering the first 14 days of the trials as the trial length the CARE mean and SD for each surrogate in days were 14 for CAGO (SD = 0), 13.5 for WTSH (SD = 1.81) and 4.95 for rats (SD = 4.30).

The mean for Searcher Efficiency (SEEF) trials in FY 2014 for large, medium, and small carcasses was 71.4 % (N = 7), 63.6% (N = 33), and 52.0% (N = 50), respectively.

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

Eight Wildlife Acoustics SM2BAT+™ ultrasonic detectors and one "long-term" Anabat detector, detected bats at eight of the nine locations at KWPII on 85 of 2183 detector nights (3.89%) in FY 2014.

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

Vegetation management for FY 2014 resulted in 54,377 square meters of total plot area treated using hand-held weed whackers, track loader, chainsaws, and weed pulling.

A mitigation responsibility for KWPII is to re-introduce native plant species at discrete locations on-site over the next three years. We have committed to planting 5,000 native plants at a designated site north of KWPI WTG-17. To date 2,472 of 5,000 plants have been planted.

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 2014.

With the approval of the Na Ala Hele Advisory Council (NAHAC), two signs were designed and erected as part of the Na Ala Hele trail systems on March 2014 at the east and west points of the trail head upon entering KWP leased land.

Agency visits 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 July 2012 Kaheawa Wind Power Phase II, LLC (KWPII) began commercial operation to meet the growing need for renewable energy across the island of 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 August 2010. Condition 15 of the CDUP (as amended in November 2010) requires that KWP II obtain both a federal Incidental Take Permit and state Incidental Take License prior to erecting turbines on the site.

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, KWP II developed a project-specific HCP that is similar to, yet separate from, the KWP Phase I HCP. The HCP was prepared in consultation with the USFWS, DLNR and the Hawai`i Endangered Species Recovery Committee (ESRC). Upon final approval of the HCP, the Federal ITP (TE-2760A-0) and State ITL (ITL-15) were issued in January 2012, each with a duration of twenty (20) years. 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 II during the second year of project operations (July 1, 2013 through June 30, 2014).

FATALITY MONITORING

KWPII 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 July 2012.

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; 75m on KWPII. All fourteen WTGs are searched once weekly as part of the KWPII fatality monitoring protocol. Steep pad cut/fill slopes are searched using rappelling equipment.

The search interval mean and SD in days for KWPII was 7.13 (SD = 1.82) (Table 2 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 of height when possible and is managed only during the non-breeding season for Nēnē (May - October). KWPII biologists are investigating ways to extend the management period. The average search interval was slightly raised due to periods of high winds and changing search dates to maintain interval averages at both KWP project sites. 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). There were two periods of extended high winds during FY 2014, from November 25th to December 5th and December 23rd to 29th. Other periods of high winds occurred but did 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 in compliance with the HCP.

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

WTG	1	2	3	4	5	6	7
Mean	7.14	7.14	7.14	7.14	7.12	7.12	7.12
SD	1.70	1.77	1.88	1.91	1.86	2.25	2.07
WTG	8	9	10	11	12	13	14
Mean	7.12	7.12	7.10	7.10	7.12	7.12	7.27
SD	2.09	1.59	1.62	1.69	1.71	1.71	1.67

Mean TOTAL	7.13
SD TOTAL	1.82

FATALITIES

Direct Observations of Incidental Take

Downed wildlife incidents documented at KWPII during FY 2014 are summarized in Table 2. Locations of fatalities found with reference to WTGs and site facilities are described using ArcMap in Figure 1. Two incidents involved HCP-covered Hawaiian Hoary bats 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 1. Documented wildlife fatalities at KWPII in FY 2014.

Species	*Date*	*Location (WTG)*	*Distance to Turbine (m)*
HCP Covered Species and Species of Concern			
Hawaiian Hoary Bat	11/5/13	7	25.8
Hawaiian Hoary Bat	2/26/14	2	34.1
MBTA and Other Non-HCP Covered Species			
Spotted Dove	10/29/13	7	0
African Silverbill	11/19/13	2	<1
Wedge-tailed Shearwater (MBTA)	11/26/13	5	38.2
Eurasian Skylark (MBTA)	12/3/13	12	27.4
Spotted Dove	12/9/13	5	<1
Eurasian Skylark (MBTA)	1/31/14	4	4
Eurasian Skylark (MBTA)	2/21/14	11	31
Common Myna	3/31/14	3	4.2

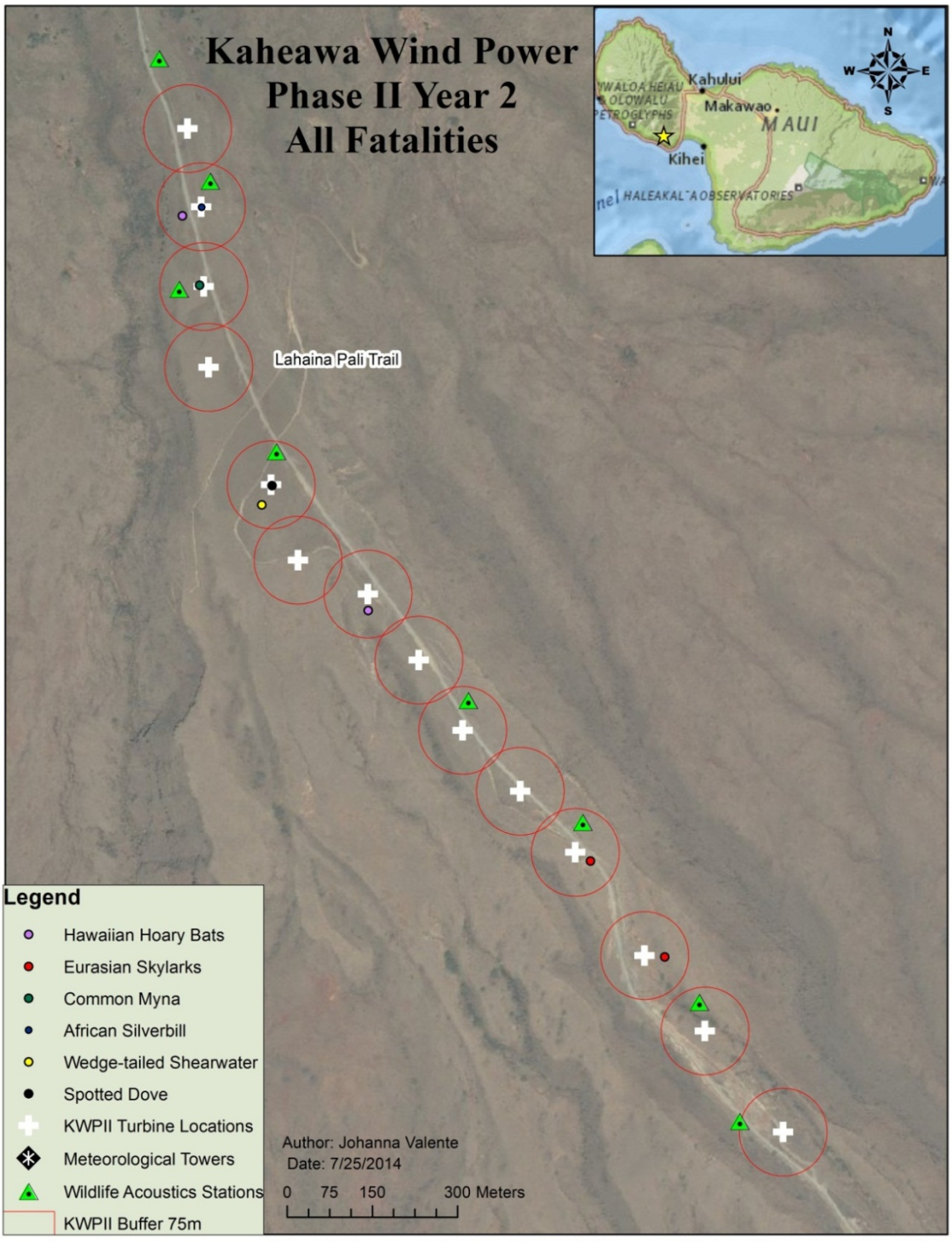

Figure 1. All downed wildlife observed over FY 2014 throughout KWPII in reference to WTGs, meteorological towers, wildlife acoustics monitors, and site facilities.

TAKE ESTIMATION

Two bat fatalities were observed during FY 2014. The total observed take for each species at KWPII since operations began is one Nēnē, zero HAPE or NESH and three bats. 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 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 newer version 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 II this year, and discussions regarding how best to apply the method and interpret the output are ongoing. This method has been selected for use at KWP II where searching is intensive yet observed fatalities of the HCP-covered species (Nēnē and bats) are very low.

The SEEF and CARE results from the ongoing WEST study have been included in the fatality estimates. The time span used for both estimates is 2 years. The Dalthorp et al. (2013) estimation for Nēnē and bat take with a 50% credibility level is not greater than 2 and 13 adults, respectively (Appendix 2). 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 Nene estimated take at a credibility level of 80% is not more than three adults and one juvenile and for bats is not more than 18 bats and two juveniles or 19 adults as amended (Request for clarification for the ITL and ITP for Kaheawa II, July, 31, 2014).

The indirect take and lost productivity calculation for Nēnē (using two adults) is 0.43 juveniles (Appendix 3). The indirect take calculation for bats is one juvenile. The FY 2014 adjusted take (Dalthorp et al 2013), indirect take, and loss of productivity combined for KWPII HCP species is two adults and 0.43 juveniles for Nēnē or two and one, rounded up, and 13 adults and 0.5 juveniles (1.0/2.1 = 0.5) or 14.0 adults, rounded up, when using the amended bat take levels. The Tier 2 amended take limit of 11 bats is exceeded.

INDEPENDENT SEEF and CARE TRIAL STUDY

In October 2013, WEST was chosen as an independent contract 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, medium and large sized bird surrogates across three vegetation classes; bare, grass, and shrub (Appendices 4 and 6). WEST is informed of the 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 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 the Maui DOFAW 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), two Wedge-tailed Shearwaters (WTSH) and 11 rats (Appendices 4 and 5). 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 for CAGO (SD = 0), 13.5 for WTSH (SD = 1.81) and 4.95 for rats (SD = 4.30).

SCAVENGER TRAPPING

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

Due to recent scavenger observations, HCP personnel plan to implement a full trapping program starting in early July. KWPII trapping will consist of ten A24 Goodnature™ traps, ten body grip (DOC250) traps, six live capture Havahart™, and one portable pig trap. Traps will be placed in areas where WEOP observations have shown a high frequency of predators and will be moved in order to

ensure that all KWPII plots are represented when evaluating predation levels and trap effectiveness. Two 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 KWPII trapping protocol will be submitted to DOFAW for review with consideration of all HCP listed species prior to implementation. The proposed KWPII trapping and monitoring procedure is summarized below (Table 3).

Table 2. KWPII 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
Havaheart 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

SEARCHER EFFICENCY TRIALS

SEEF trials provide estimates of carcass detection probability and are an important component of downed wildlife monitoring at KWP II. SEEF trials conducted by First Wind are controlled by a 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 trials proctored by First Wind and by WEST in FY 2014 for large, medium, and small carcasses was 61.2 % (N = 19), 69.1% (N = 68), and 45.4% (N = 110), respectively (Appendices 6 and 7).

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

Table 3. KWPII SEEF results for all vegetation classes in FY 2014.

	CAGO	WTSH	Rat
Bare	100% (N = 6)	84.0% (N = 25)	65.7% (N = 35)
Grass	62.5% (N = 8)	67.6% (N = 34)	20.0% (N = 15)
Shrub/Slope	33% (N=3)/ 0% (N=2)	42.9%(N=7)/0% (N=2)	0% (N=10)/ 0% (N=0)

CANINE ASSISTED SEACHER EFFICENCY 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 trial 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).

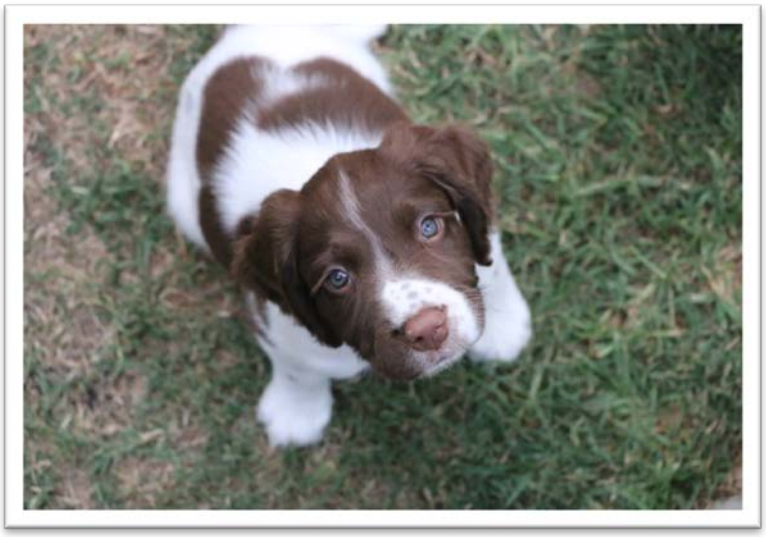

Figure 3. Makalani, KWP contracted canine to be used in searcher efficiency trials.

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 HCP species 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 detectors have been 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 8 SM2's with one microphone (mic) each in October 2013 throughout KWPII. All of the SM2 mics were mounted horizontally at 6.5 meters high. Five were placed near the WTGs while two were placed near gulch edges; each mic was positioned away from the prevailing trade winds. The two detectors were placed near the gulch edges to gain more knowledge of bat activity in that location.

Hawaiian Hoary bat detections were recorded on 85 of 2183 detector nights (3.89%) at 8 of 9 locations between July 2013 and June 30, 2014 (Table 5). No activity was detected in July-September during the current fiscal year. 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.

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.

In FY 2013 at KWPII using only Anabat detectors seven nights with detections were documented within the monitoring area from July 1, 2012 through June 30, 2013. The majority of these detections were recorded during the months of September and October. Unusually high activity was recorded during one week in October. During this week bat feeding was recorded, a very rare occurrence at any detector location since acoustic detection began at KWP. Bat activity occurred during every hour between 1800 and 0600 hours except in hour 4, and peaked between 9 p.m. and midnight. Bat presence by month, turbine and hour are shown in Figures 4, 5, and 6.

Table 4. Hawaiian Hoary bat nights with detections and total detection nights at KWPII in FY 2014.

KWPII 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	316	8	2.53%
7/1/14	2	262	8	3.05%
7/1/14	3G	266	14	5.26%
7/1/14	5	258	10	3.88%
*7/1/14	7	40	0	0.00%
7/1/14	9	207	9	4.35%
7/1/14	11	258	11	4.26%
7/1/14	13	258	16	6.20%
7/1/14	14G	318	9	2.83%
TOTALS:	**KWPII**	**2183**	**85**	**3.89%**
***KWPII WTG-7 was an Anabat detector that was removed at the beginning of October due to failure**				

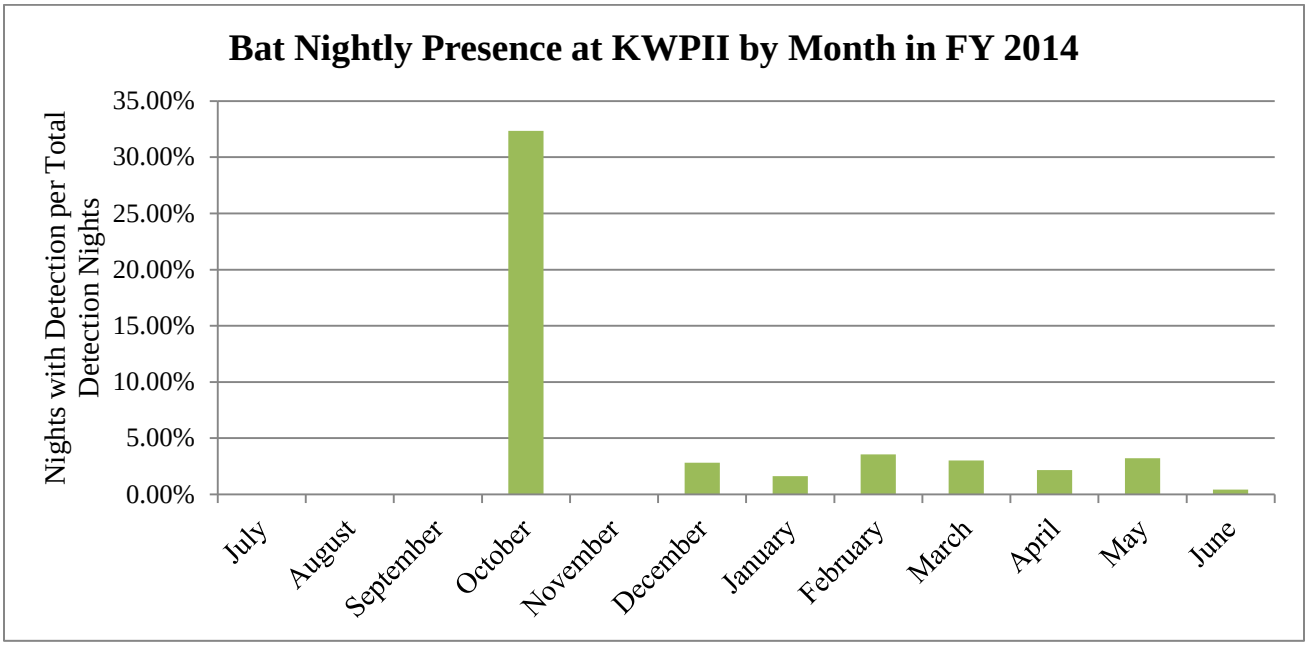

Figure 4. Bat presence at KWPII by month in FY 2014.

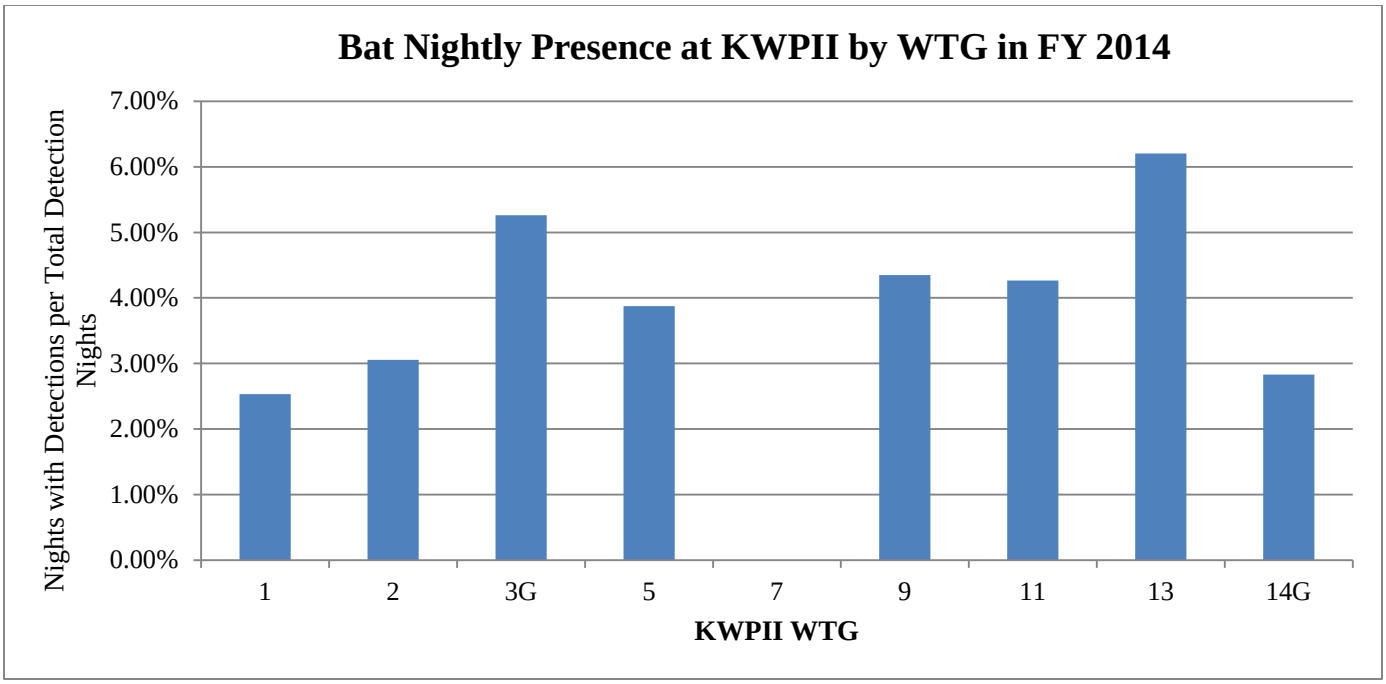

Figure 5. Bat nightly presence at KWPII by turbine (WTG) during FY 2014 (these locations range from the highest elevation on the left (WTG-1) and lowest on the right (WTG-14)) (*Please note that 7 was only active July1, 2013 – September 30, 2013).

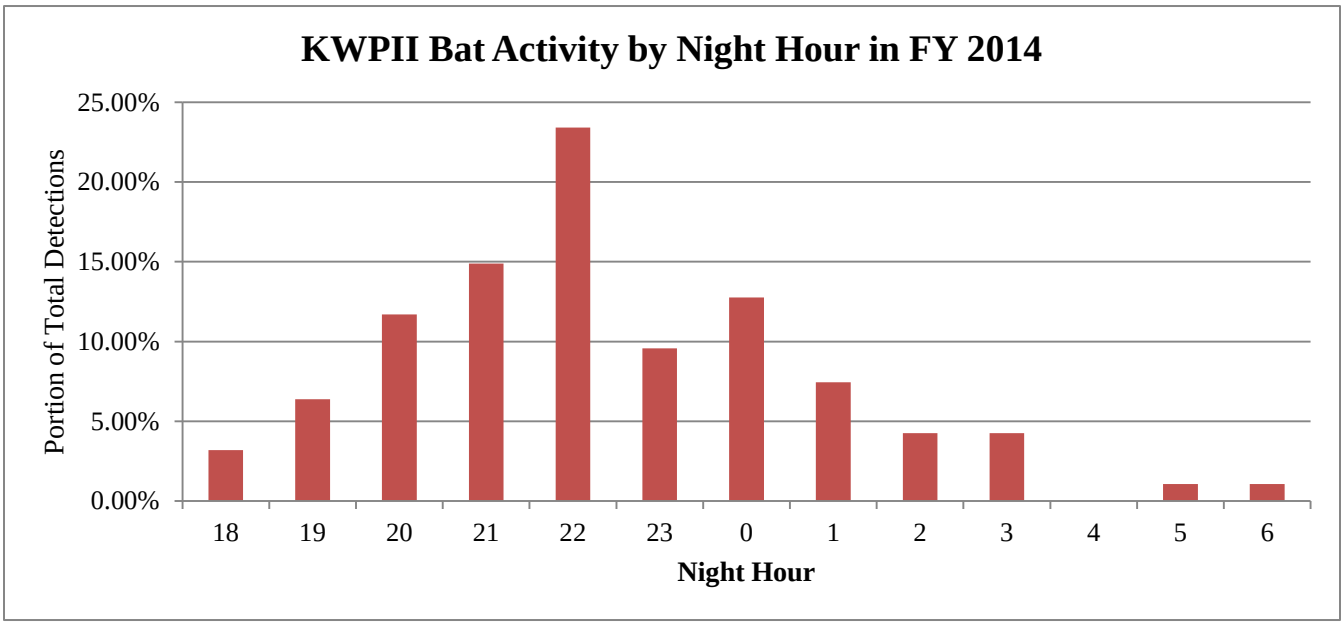

Figure 6. Bat detections by night hour in FY 2014.

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 quarter (Appendix 8). The staff was 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 83 observations have been reported to date during this fiscal year on KWPII alone, including 74 observations of Nēnē or Hawaiian Geese (HAGO), eight sightings of the Hawaiian Short Eared Owl (PUEO), and one observation of a cat (Figure 7). Data collected was used to better protect and understand HCP species and their habitat use.

Gosling sightings were reported as part of the Wildlife Observation Surveys made by KWP Technicians. DOFAW personnel were notified of all observed breeding activity. Figure 8 and Figure 9 illustrate observed Nēnē goslings found on KWPII WTG-8 and Nēnē juvenile seen frequently on KWPII on WTG-1 and WTG-2.

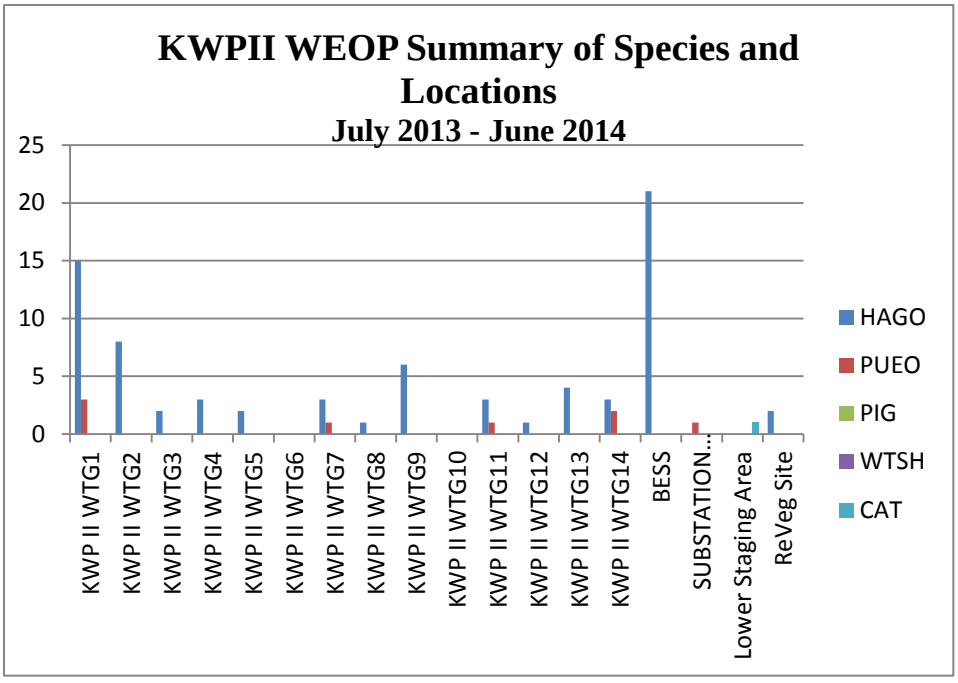

Figure 7. Wildlife observed and recorded as part of WEOP at KWPI by species and turbine location or meteorological tower.

VEGETATION MANAGEMENT

The goal of HCP vegetation management is to maintain ground cover at a stature that will improve monitoring efficiency without compromising soil stability and minimize impacts to native plants. Previously, dry conditions at KWPII allowed for plant growth to be naturally sustained below 25cm of height. This year, due to an intense rainy season on KWPII, vegetation management was deemed necessary as part of KWPII HCP compliance and vegetation management goals. Ground cover classifications were established before the commencement of the vegetation management season and total area to be treated was determined (Table 6). Rocky and steep terrain conditions require all treatment be done via Weed Wacker at KWP II.

Vegetation management activities are currently limited to the months of May through October to avoid the Nēnē nesting season November-April. Areas within the turbine pads are managed year round in accordance with the Fire Management Plan. Treatment for plot areas began on May 1st, 2014. To date there have been 23 calendar days veg management by the HCP team occurred. The HCP team will continue vegetation management through October, with the help of two contractors. Photos depicting before and after treatments with Weed Wacker are shown below (Figure 10 and Figure 11).

Table 5. Ground cover classification and area treated to date at KWPII.

Total Bare Coverage	**Total Grass Coverage**	**Total Shrub Coverage**
54,377 (Sq. meters)	146,364 (Sq. Meters)	2,462 (Sq. Meters)
	Total area Weed Whacked	**Time Spent**
	15,289 (Sq. Meters)	5,283 minutes

Figure 10. KWPII WTG-1 before treatment using weed whacker.

Figure 11. KWPII WTG-1 after treatment using weed whacker.

KWPII REVEGETATION

Revegetation goals for KWP II are specified in Section 6.7 and Appendix 8 of the KWPII HCP, as summarized below:

1. Address the immediate need to stabilize exposed soils following construction activities at KWP II, in accordance with erosion and sedimentation control BMPs and NPDES storm water discharge permitting requirements.

2. Re-introduce native plant species in selected areas throughout the site over the next several years, to re-establish native plant species in areas that have been overgrown with non-native species for a century or more.

Goal 1 was accomplished with hydroseeding and hardscaping potential erosion areas as prescribed in Appendix 8 of the HCP and completed shortly after construction ended with watering intervals that continued into Year 1. In FY 2014 a plan was submitted to state and federal agencies proposing to meet the prescribed standards of Goal 2 by selecting a singular "restoration site" in the vicinity of the adjacent KWP project, outside of KWP search plots.

The plan proposed installing a minimum of 5,000 individual plants during the first three years following construction with a 75% success survival rate after one year, in accordance with Appendix 8. In addition to the planting goal, the HCP specifies that the location of plantings will be determined in consultation with the Department of Land and Natural Resources (DLNR) and U.S. Fish and Wildlife Service (USFWS). First Wind identified several prospective areas adjacent to KWP II, and "Site 1" was accepted as the preferred location. Onsite native seed collection commenced in June 2013. Propagation of native seedlings was contracted by Kula Native Nursery.

In December, a Rainbird™ irrigation system was installed over approximately 2500 square meters using drip irrigation attached to a 5,000 gallon tank. On January 10 planting of four native species; ʻOhiʻa (*Metrosideros Polymorpha*), ʻAkia (*Wilkstroemea Oahuensis*), Koʻokoʻolau (*Bidens Micrantha*), and ʻIliahi (*Santalum Freycinetianum*), commenced with the help of First Wind personnel and volunteer groups.

To date, a total of 2,472 plants have been planted this year since January 10th. Planting was slightly delayed due to the observation of a Nēnē nesting pair at the south end of the restoration site in the month of February. Nēnē were given a 75m buffer which halted all planting activity until the nest was confirmed to have successfully hatched goslings and abandoned. Of the 2,472 plants in the ground, 598 are Koʻokoʻolau, 741 are ʻOhiʻa, 817 are ʻAkia, and 25 are of the ʻIliahi species (Figure 9 and Figure 10). Planting success is determined by calculating the average survival through bi-weekly randomized counts of 100 plants "Top" Middle" and "Bottom" areas of the restoration site. Currently survival rates are 92%, 82% and 89% for "Top", "Middle", and "Bottom", respectively.

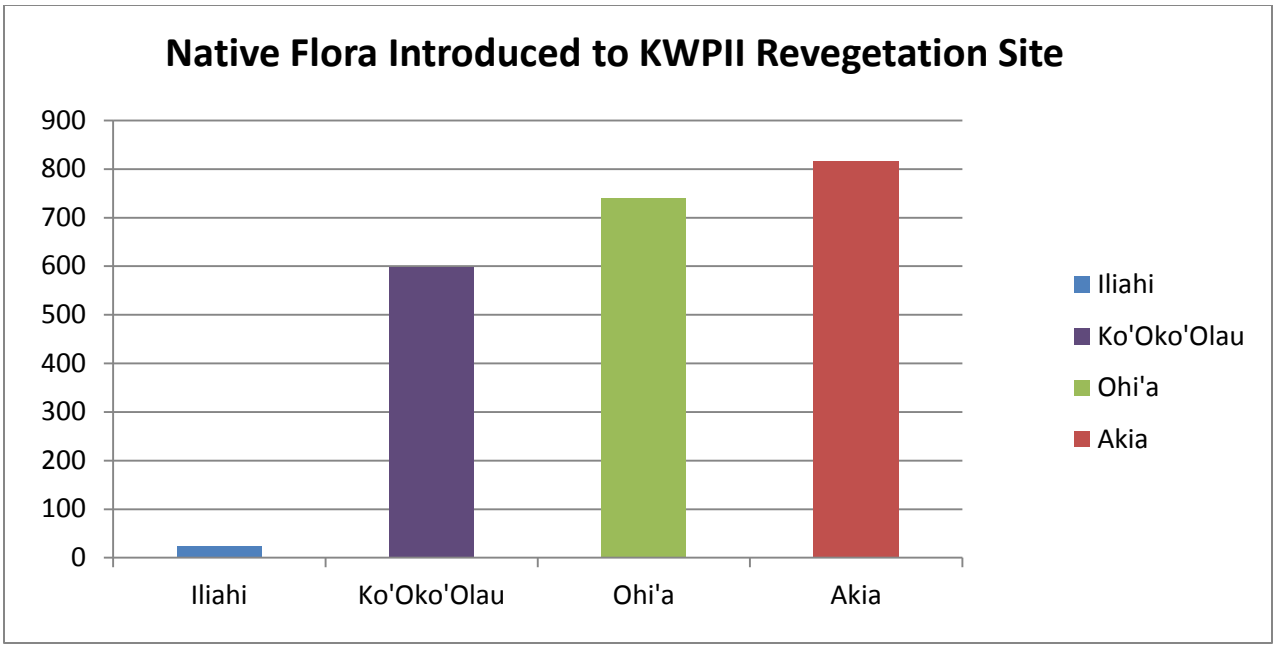

Figure 12. Native plant restoration by species number.

Figure 13. Ko'Oko'Olau (*Bidens micrantha*) planted at the KWPII Revegetation Site.

MITIGATION

Hawaiian Petrel and Newell's Shearwater - Makamakaole

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 14). 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.

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 16. New NARS ungulate fence boardering NE edge of Enclosure B.

Figure 14. Two completed enclosures on the Makamaka'ole Seabird Mitigation site.

Silt socks were also installed to divert water away from the skirt as 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 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 15).

F decoy, burrow box and a speaker that is used for acoustic attraction.

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 16). 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 17). 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 Bulwer's Petrel and a species of Storm Petrel are the possible.

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

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

interactions using night vision goggles and infrared lighting. Spencer Engler was assigned the position of Makamakaʻole 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) have been routinely maintained (Figure 18). 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 9). 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. Predator traps 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

The KWPII HCP states that First Wind will provide funding to DOFAW in 2016 for an additional Nēnē release pen as well as five years of funding for conducting predator control, vegetation management and monitoring. On May 14th a site visit to the pen to observe fence maintenance and preparation for Nēnē propagation for KWPI resulted in a discussion of building the KWPII pen adjacent to the existing KWPI pen. State officials seem open to the idea; a plan and proposal is in development (Figure 19).

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

Hawaiian Hoary Bat – Kahikinui Forest Reserve

The baseline bat activity survey for the Kahikinui Hoary Bat Mitigation Site was completed by USGS in FY 2014 Q2 and a report is expected (Figure 20). Complete funding obligations for Tier 1 and Tier 2 bat mitigation ($375,000) has been provided in FY 2014 Q4, by KWPII. DOFAW has created a draft plan for Kahikinui that details how these funds will be used (Appendix 10) to fence and manage the forest reserve through ungulate removal, habitat restoration and bat monitoring. Ungulate fencing is scheduled to be completed after year six of KWPII operations.

The USGS began an acoustic bat survey at the Kahikinui Forest Reserve on Maui in July 2012. Nine bat detectors were staged at three elevation levels within the reserve. Due to large variability in the annual variation the study has been extended 6-12 months.

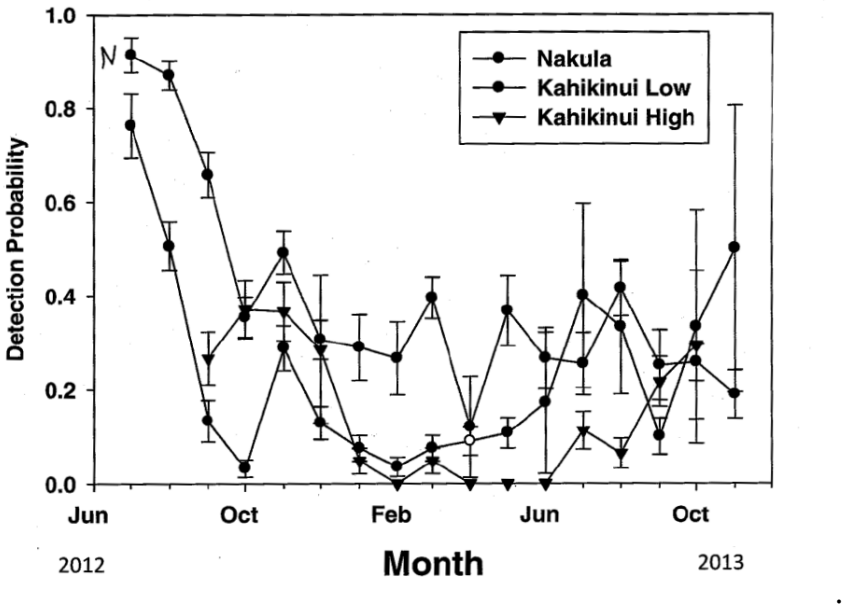

Figure 17. Detection probability and standard error for individual site location for the duration July 2012 - November 2013 (USGS draft).

Na Ala Hele Trail Signage

As part of the construction agreement on KWPII, First Wind worked closely with the NAHAC to design and provide enhancements to the Lahaina Pali Trail that passes through KWPII. Two signs were designed, approved by NAHAC, and erected on March 2014 at the east and west points of the trail head upon entering KWP II leased land (Figure 21 and Figure 22).

Figure 18. Signage established on the west side of the Lahaina Pali trail upon entrance to KWP leased lands.

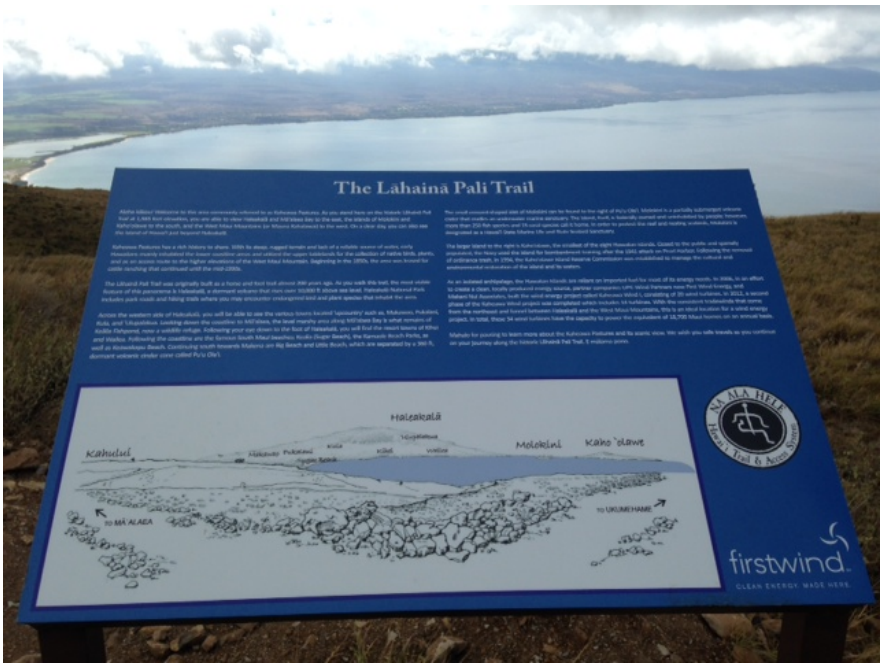

Figure 19. Signage established on the east side of the Lahaina-Pali trail.

ADAPTIVE MANAGEMENT

Adaptive management provisions provide a mechanism to make adjustments to mitigation and other project functions as new information derived from monitoring and reporting becomes available. In accordance with the KWPII HCP, low wind speed curtailment (LWSC) at 5 m/s was initially in effect for the months of April through November. This period was extended to begin mid-February and continue through December 15 in response to fatalities documented at KWPII on March 13, 2013 and February 26, 2014, and at KWPI on December 14, 2013. Prior to May 2014, 50 % of observed fatalities at KWPI and KWPII had occurred in April and September, suggesting that collision risk was higher during these months. LWSC was therefore increased from 5 m/s to 6 m/s on April 10 through April 30, 2014, and was proposed to be raised to 6 m/s again in September.

On June 6th First Wind offered an adaptive management proposal to the USFWS and DOFAW for bats and suggested the LWSC could be raised higher than 5m/s between February 15 and December 15 (Appendices 11). These proposals are under discussion and subject to further modification. 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 7.

Table 6. KWPII 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 12).

KWPII 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. KWPII continues to notify agencies of these fatalities via email within 24 hours 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.

Quarterly reports for FY 2014 Q1, Q2 and Q3 were 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 $588,794 (Appendix 13).

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. 2013. Kaheawa Pastures Wind Energy Generation Facility, Habitat Conservation Plan: Year 8 Annual Report. First Wind Energy, LLC, Wailuku, HI 96793.

Shoenfeld, Peter, S. 2004. Suggestions Regarding Avian Mortality Extrapolation. Prepared forthe Mountaineer Wind Energy Center Technical Review Committee.

Appendix 1. Plot Monitoring Search Days at KWPII

July, 2013

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1-Jul	1-Jul	1-Jul	1-Jul	2-Jul	2-Jul	2-Jul	2-Jul	2-Jul	3-Jul	3-Jul	3-Jul	3-Jul	3-Jul
8-Jul	8-Jul	8-Jul	8-Jul	9-Jul	9-Jul	9-Jul	9-Jul	9-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul
15-Jul	15-Jul	15-Jul	15-Jul	15-Jul	15-Jul	15-Jul	16-Jul	16-Jul	16-Jul	16-Jul	17-Jul	17-Jul	17-Jul
22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	22-Jul	23-Jul	23-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	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**
5-Aug	5-Aug	5-Aug	5-Aug	6-Aug	6-Aug	6-Aug	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug
13-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	16-Aug	16-Aug	13-Aug
19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	19-Aug	20-Aug	19-Aug	20-Aug	20-Aug	20-Aug	20-Aug	20-Aug	20-Aug
28-Aug	28-Aug	28-Aug	28-Aug	27-Aug	28-Aug	28-Aug	28-Aug	28-Aug	28-Aug	28-Aug	28-Aug	28-Aug	28-Aug

September, 2013

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1-Sep	1-Sep	1-Sep	1-Sep	1-Sep	1-Sep	1-Sep	1-Sep	1-Sep	3-Sep	3-Sep	3-Sep	3-Sep	3-Sep
7-Sep	7-Sep	7-Sep	7-Sep	7-Sep	7-Sep	7-Sep	7-Sep	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep
14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep
22-Sep	22-Sep	22-Sep	22-Sep	22-Sep	22-Sep	22-Sep	24-Sep	24-Sep	24-Sep	24-Sep	24-Sep	24-Sep	24-Sep
30-Sep	30-Sep	30-Sep	30-Sep	30-Sep	30-Sep								

October, 2013

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
						1-Oct	1-Oct	1-Oct	1-Oct	1-Oct	1-Oct	2-Oct	2-Oct
6-Oct	6-Oct	6-Oct	6-Oct	6-Oct	6-Oct	8-Oct	8-Oct	8-Oct	8-Oct	8-Oct	8-Oct	9-Oct	9-Oct
12-Oct	12-Oct	12-Oct	12-Oct	12-Oct	12-Oct	13-Oct	13-Oct	13-Oct	13-Oct	17-Oct	17-Oct	17-Oct	17-Oct
19-Oct	19-Oct	21-Oct	21-Oct	21-Oct	21-Oct	21-Oct	21-Oct	21-Oct	21-Oct	21-Oct	22-Oct	22-Oct	22-Oct
26-Oct	26-Oct	26-Oct	26-Oct	26-Oct	26-Oct	29-Oct	29-Oct	29-Oct	29-Oct	29-Oct	29-Oct	31-Oct	31-Oct

November, 2013

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
4-Nov	4-Nov	4-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	6-Nov	6-Nov
9-Nov	9-Nov	9-Nov	9-Nov	9-Nov	9-Nov	13-Nov	13-Nov	13-Nov	13-Nov	13-Nov	13-Nov	15-Nov	15-Nov
19-Nov	19-Nov	19-Nov	19-Nov	19-Nov	21-Nov	21-Nov	21-Nov	21-Nov	22-Nov	22-Nov	22-Nov	22-Nov	22-Nov
26-Nov	26-Nov	26-Nov	26-Nov	26-Nov	26-Nov	27-Nov	27-Nov	27-Nov	27-Nov	27-Nov	27-Nov	27-Nov	27-Nov

December, 2013

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
2-Dec	2-Dec	2-Dec	2-Dec	2-Dec	2-Dec	2-Dec	2-Dec	2-Dec	3-Dec	3-Dec	3-Dec	3-Dec	3-Dec
8-Dec	8-Dec	8-Dec	8-Dec	9-Dec	9-Dec	9-Dec	9-Dec	9-Dec	9-Dec	12-Dec	12-Dec	11-Dec	12-Dec
14-Dec	14-Dec	17-Dec	17-Dec	17-Dec	16-Dec	16-Dec	16-Dec	16-Dec	16-Dec	16-Dec	17-Dec	17-Dec	17-Dec
21-Dec	21-Dec	21-Dec	21-Dec	21-Dec	23-Dec	23-Dec	23-Dec	23-Dec	23-Dec	23-Dec	24-Dec	24-Dec	24-Dec
30-Dec	30-Dec	30-Dec	30-Dec										

January, 2014

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
				2-Jan	2-Jan	3-Jan	2-Jan	2-Jan	2-Jan	3-Jan	2-Jan	2-Jan	2-Jan
10-Jan	10-Jan	10-Jan	10-Jan	10-Jan	10-Jan	10-Jan	10-Jan	11-Jan	11-Jan	11-Jan	12-Jan	12-Jan	12-Jan
15-Jan	15-Jan	16-Jan	16-Jan	16-Jan	11-Jan	11-Jan	11-Jan	18-Jan	18-Jan	18-Jan	18-Jan	18-Jan	18-Jan
23-Jan	23-Jan	23-Jan	23-Jan	24-Jan	24-Jan	24-Jan	24-Jan	24-Jan	24-Jan	25-Jan	25-Jan	25-Jan	25-Jan
29-Jan	30-Jan	30-Jan	30-Jan	30-Jan	30-Jan	30-Jan	30-Jan	30-Jan	30-Jan	31-Jan	31-Jan	31-Jan	31-Jan

February, 2014

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
7-Feb	7-Feb	7-Feb	7-Feb	7-Feb	8-Feb	8-Feb	8-Feb	8-Feb	8-Feb	8-Feb	9-Feb	9-Feb	9-Feb
12-Feb	12-Feb	14-Feb	14-Feb	14-Feb	14-Feb	14-Feb	14-Feb	14-Feb	13-Feb	14-Feb	14-Feb	14-Feb	14-Feb
19-Feb	19-Feb	19-Feb	19-Feb	21-Feb	21-Feb	21-Feb	21-Feb	21-Feb	21-Feb	21-Feb	21-Feb	21-Feb	21-Feb
26-Feb	26-Feb	26-Feb	26-Feb	26-Feb	26-Feb	26-Feb	27-Feb	27-Feb	27-Feb	28-Feb	28-Feb	28-Feb	

March, 2013

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
3-Mar	3-Mar	3-Mar	3-Mar	3-Mar	3-Mar	3-Mar	3-Mar	3-Mar	4-Mar	4-Mar	4-Mar	4-Mar	4-Mar
10-Mar	10-Mar	10-Mar	10-Mar	10-Mar	10-Mar	11-Mar	11-Mar	11-Mar	11-Mar	11-Mar	11-Mar	11-Mar	11-Mar
18-Mar	18-Mar	18-Mar	18-Mar	18-Mar	18-Mar	18-Mar	20-Mar	18-Mar	18-Mar	19-Mar	19-Mar	20-Mar	20-Mar
25-Mar	25-Mar	25-Mar	25-Mar	25-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	26-Mar	27-Mar	27-Mar	27-Mar
31-Mar	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar					

April, 2014

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
									1-Apr	1-Apr	1-Apr	1-Apr	1-Apr
7-Apr	7-Apr	9-Apr	7-Apr	9-Apr	8-Apr	8-Apr	8-Apr	10-Apr	10-Apr	9-Apr	9-Apr	9-Apr	9-Apr
16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr
23-Apr	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr	27-Apr	27-Apr	27-Apr	28-Apr	28-Apr	28-Apr

May, 2014

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May	6-May
13-May	13-May	14-May	14-May	14-May	14-May	14-May	14-May	14-May	14-May	14-May	14-May	14-May	14-May
19-May	19-May	19-May	19-May	19-May	19-May	19-May	19-May	19-May	19-May	19-May	19-May	19-May	20-May
29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May	29-May

June, 2014

WTG Search Plot													
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
2-Jun	2-Jun	2-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun	3-Jun
10-Jun	10-Jun	10-Jun	10-Jun	10-Jun	10-Jun	10-Jun	10-Jun	10-Jun	11-Jun	11-Jun	11-Jun	11-Jun	11-Jun
17-Jun	17-Jun	17-Jun	17-Jun	17-Jun	17-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun	18-Jun
23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	23-Jun	24-Jun	24-Jun	24-Jun

Appendix 2. Take Estimation for Nēnē at KWPII.

Parameter	Current Value	Prior distribution		Prior distribution		Sampling Dates	Posterior Distribution				
carcass count (X)	1	m	P(M = m)	m	P(M = m)	0	g = P(observe|arrive)	0.60136	95% CI:	0.495	0.664
sampling coverage (A)	0.7	0	0.00498	0	0.00498	7.38	50% credible maximum	2			
searcher efficiency (p)	0.62	1	0.00498	1	0.00498	14.76	m	P(M = m)	P(M > m)		
min p	0.38	2	0.00498	2	0.00498	22.14	0	0	1		
max p	0.85	3	0.00498	3	0.00498	29.52	1	0.35969	0.64031		
k	0.9	4	0.00498	4	0.00498	36.9	2	0.28454	0.35577		
Sampling Dates	Formula	5	0.00498	5	0.00498	44.28	3	0.1709	0.18487		
interval (I)	7.38	6	0.00498	6	0.00498	51.66	4	0.09233	0.09253		
span	730	7	0.00498	7	0.00498	59.04	5	0.04731	0.04522		
Persistence Distribution	Log-Logistic	8	0.00498	8	0.00498	66.42	6	0.02354	0.02168		
?	2.122606	9	0.00498	9	0.00498	73.8	7	0.01151	0.01017		
?	25.40074	10	0.00498	10	0.00498	81.18	8	0.00557	0.00459		
min b	20.79557	11	0.00498	11	0.00498	88.56	9	0.00268	0.00191		
max b	35.52503	12	0.00498	12	0.00498	95.94	10	0.00129	0.00062		
mean persistence (CP)	37.75001	13	0.00498	13	0.00498	103.32	11	0.00062	0		
r = P(persist until 1st search)	0.98	14	0.00498	14	0.00498	110.7					
interval (Ir)	7	15	0.00498	15	0.00498	118.08					

Prior Distribution	Uniform	16	0.00498	16	0.00498	125.46					
max	200	17	0.00498	17	0.00498	132.84					
Credibility Level (1 - ?)	0.5	18	0.00498	18	0.00498	140.22					
Arrival Function	Uniform	19	0.00498	19	0.00498	147.6					
---	NA	20	0.00498	20	0.00498	154.98					
---	NA	21	0.00498	21	0.00498	162.36					

Appendix 2 (cont). Take Estimation for Bats at KWPII.

Parameter	Current Value	Prior distribution		Prior distribution		Sampling Dates	Posterior Distribution				
carcass count (X)	3	m	P(M = m)	m	P(M = m)	0	g = P(observe|arrive)	0.28179	95% CI:	0.188	0.388
sampling coverage (A)	0.9	0	0.005	0	0.005	7.38	50% credible maximum	13			
searcher efficiency (p)	0.48	1	0.005	1	0.005	14.76	m	P(M = m)	P(M > m)		
min p	0.37	2	0.005	2	0.005	22.14	0	0	1		
max p	0.59	3	0.005	3	0.005	29.52	1	0	1		
k	0.7	4	0.005	4	0.005	36.9	2	0	1		
Sampling Dates	Formula	5	0.005	5	0.005	44.28	3	0.00672	0.99328		
interval (I)	7.38	6	0.005	6	0.005	51.66	4	0.01856	0.97472		
span	730	7	0.005	7	0.005	59.04	5	0.0322	0.94251		
Persistence Distribution	Lognormal	8	0.005	8	0.005	66.42	6	0.04496	0.89756		
?	0.5434	9	0.005	9	0.005	73.8	7	0.05521	0.84234		
?	1.4367	10	0.005	10	0.005	81.18	8	0.06232	0.78002		
min b	1.1237	11	0.005	11	0.005	88.56	9	0.06629	0.71374		
max b	1.889	12	0.005	12	0.005	95.94	10	0.06748	0.64626		
mean persistence (CP)	5.52	13	0.005	13	0.005	103.32	11	0.06643	0.57982		
r = P(persist until 1st search)	0.89	14	0.005	14	0.005	110.7	12	0.06372	0.5161		
interval (Ir)	3	15	0.005	15	0.005	118.08	13	0.05986	0.45624		

Prior Distribution	Uniform	16	0.005	16	0.005	125.46	14	0.0553	0.40094		
max	200	17	0.005	17	0.005	132.84	15	0.05039	0.35055		
Credibility Level (1 - ?)	0.5	18	0.005	18	0.005	140.22	16	0.0454	0.30516		
Arrival Function	Uniform	19	0.005	19	0.005	147.6	17	0.04052	0.26464		
---	NA	20	0.005	20	0.005	154.98	18	0.03588	0.22876		
---	NA	21	0.005	21	0.005	162.36	19	0.03156	0.1972		
							20	0.027609	0.169589		
							21	0.024039	0.14555		
							22	0.020848	0.124702		
							23	0.01802	0.106683		
							24	0.015531	0.091151		
							25	0.013355	0.077796		
							26	0.011461	0.066336		
							27	0.009819	0.056517		

Appendix 3. Nene Accumulated Indirect Take and Lost Productivity at KWPII.

	2013	2014		2014
Adults (Est take)	2	0		3
Lost Offspring multiplier	0.09	0.09		0.09
Indirect Take (1st generation)	0.18	0		0.27
2013	0.18	0.162	2014	0.27
				0.27
2014		0		
		0.162		

Appendix 4. Carcass Retention Trials KWPII in FY 2014.

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

KWP II	1			2			3			4			5			6			7		
Carcass Type WTG	NORA 1			NORA 2			NORA 13			NORA 14			NORA 2			NORA 9			NORA 1		
Vegetation Type	Grass			Grass			Bare			Bare			BARE			Grass			Bare		
Proctor	JV			JV			SE			SE			JE			DS			DS		
	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes	P/A	date	Notes
day 0	P	8/13		P	8/13		P	10/10	A	P	10/10	A	P	11/2		P	12/15		P	12/15	
day 1	P	8/14	NC	P	8/14	NC	N/C	10/11	-	N/C	10/11	-	P	11/3	NC	P	12/16		P	12/16	
day 2	P	8/15		P	8/15		P	10/12	A/H/L	P	10/12	L	P	11/4		P	12/17		P	12/17	
day 3	P	8/16	DHI	P	8/16	DI	P	10/13	L	P	10/13	L	P	11/5	C	P	12/18	C	P	12/18	A
day 4	P	8/17	NC	P	8/17	NC	N/C	10/14	Holiday	N/C	10/14	Holiday	P	11/6	C/M	P	12/19	N/C	P	12/19	A/H/D
day 5	P	8/18	NC	P	8/18	NC	A	10/15		p	10/15	L/H/A	p	11/7	CA	P	12/20	N/C	P	12/20	N/C
day 6	P	8/19	DHI	P	8/19	DHI				P	10/16	M		11/8	N/C	P	12/21	HAD	P	12/21	A/H/D
day 7	P	8/20	NC		8/20	NC				A	10/17		A	11/9		p	12/22	N/C	P	12/22	N/C
day 8	P	8/21	DHI	A	8/21	A										P	12/23	HAD	p	12/23	A/H/D
day 9	P	8/22	DHI													P	12/24	HAD	A	12/24	
day 10	P	8/23	DHI													P	12/25	N/C			
day 11	P	8/24	NC													P	12/26	HAD			
day 12	P	8/25	NC													P	12/27	HAD			
day 13	P	8/26	DHI													p	12/28	HAD			
day 14		8/27	NC													**p**	12/29	HAD			
day 15		8/28	NC													**p**	12/30	HSIA			
day 16	A	8/29	A													**P**	12/31	N/C			
day 17																**P**	1/1	N/C			
day 18																**P**	1/2	HAD			
day 19																**N/C**	1/3	N/C			
day 20																**A**	1/4				
day 21																					
day 22																					
day 23																					
day 24																					
day 25																					
day 26																					
day 27																					
day 28																					
Retention (days)	***13***			***6***			***3***			***6***			***5***			***18***			***8***		

Appendix 5. KWPII CARE Trials from 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
c3	4	54	CAGO	Grass	3/31/2014	I	I	I	I	I	I	I	nc	S	I	nc	S	S	S	S	S	S	S	S
c8	13	55	CAGO	bare	2014-06-08	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
r25	4	18	RATS	Bare	5/7/2014	S	S	S	O															
r26	5	22	RATS	Bare	5/7/2014	I	S	S	O															
r27	6	37	RATS	Grass	5/7/2014	S	O																	
r28	12	76	RATS	Grass	5/7/2014	S	S	S	O															
r4	6	89	RATS	Grass	3/31/2014	O																		
r5	12	52	RATS	Grass	3/31/2014	O																		
r6	14	39	RATS	Bare	3/31/2014	S	S	O																
r68	1	41	RATS	bare	2014-06-08	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S
r69	4	44	RATS	Grass	2014-06-08	I	I	I	I	I	O													
r70	5	70	RATS	Grass	2014-06-08	I	I	O																
r71	9	43	RATS	Grass	2014-06-08	I	I	O																
r72	10	23	RATS	Bare	2014-06-08	I	I	I	O															
w18	18	20	WTSH	Grass	5/7/2014	I	I	S	S	S	S	S	s	s	s	s	s	s	s	s	s	s	s	s

w19	4	72	WTSH	Grass	5/7/2014	I	I	I	S	S	S	S	s	s	s	s	s	s	s	s	s	s	s	s
w20	7	38	WTSH	Bare	5/7/2014	I	I	I	S	S	S	S	s	s	s	s	s	s	s	s	s	s	s	s
w21	10	32	WTSH	Bare	5/7/2014	I	I	S	S	S	S	S	s	s	s	s	s	s	s	s	s	s	s	s
w4	1	23	WTSH	Bare	3/31/2014	I	I	I	I	I	I	I	nc	I	I	nc	I	I	I	S	S	S	S	S
w5	2	24	WTSH	Bare	3/31/2014	I	I	I	I	I	I	I	nc	I	I	nc	I	I	I	I	S	S	S	S
w6	7	13	WTSH	Bare	3/31/2014	I	I	I	I	I	I	I	nc	I	I	nc	I	I	S	I	I	S	S	S
w7	13	11	WTSH	Bare	3/31/2014	I	I	I	I	I	I	I	nc	I	I	nc	I	I	S	S	S	S	S	S
w44	5	57	WTSH	Grass	2014-06-08	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
w45	5	32	WTSH	Bare	2014-06-08	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S
w46	6	58	WTSH	Grass	2014-06-08	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S
w47	7	41	WTSH	Grass	2014-06-08	I	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S
w48	14	60	WTSH	Bare	2014-06-08	I	I	I	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Appendix 6. First Wind Proctored SEEF Trials from August 2013 to February 2014 (0 = No, 1 = Yes).

SEARCH DATE	SPECIES	WTG	TERRAIN	FOUND?
8/17/2012	CAGO	14	Slope	0
9/5/2012	CAGO	7	Slope	0
10/11/2012	CAGO	5	Grass	1
10/18/2012	CAGO	10	Grass	0
4/7/2013	CAGO	14	Grass	1
6/5/2013	CAGO	8	Bare	1
6/5/2013	CAGO	11	Grass	1
8/13/2013	CAGO	2	Grass	1
8/22/2012	CAGO	12	Bare	1
9/5/2012	DOMO	6	Bare	0
4/7/2013	DOMO	13	Bare	1
5/16/2013	NORA	11	Grass	0
5/16/2013	NORA	14	Grass	0
5/29/2013	NORA	1	Grass	0
5/29/2013	NORA	2	Grass	0
6/5/2013	NORA	9	Grass	0
6/5/2013	NORA	10	Grass	0
6/12/2013	NORA	1	Grass	0
6/12/2013	NORA	2	Grass	1
6/12/2013	NORA	3	Grass	1
6/12/2013	NORA	4	Bare	1
6/12/2013	NORA	4	Bare	1
6/12/2013	NORA	5	Bare	0
6/12/2013	NORA	6	Grass	1
6/12/2013	NORA	7	Bare	0
6/12/2013	NORA	9	Grass	0
6/12/2013	NORA	10	Bare	1
6/17/2013	NORA	1	Grass	1
6/24/2013	NORA	1	Grass	0
8/13/2013	NORA	2	Grass	0
8/29/2013	NORA	4	Grass	0
10/1/2013	NORA	8	Bare	1
10/1/2013	NORA	11	Bare	1
10/9/2013	NORA	13	Bare	1
10/9/2013	NORA	14	Bare	1
10/13/2013	NORA	8	Bare	1
10/13/2013	NORA	9	Bare	1
10/13/2013	NORA	10	Bare	0
10/22/2013	NORA	6	Bare	1
10/22/2013	NORA	13	Grass	1
10/31/2013	NORA	13	Bare	1
10/31/2013	NORA	14	Bare	1
11/26/2013	NORA	1	Grass	0

11/26/2013	NORA	3	Bare	0
11/26/2013	NORA	5	Bare	0
11/27/2013	NORA	7	Bare	0
11/27/2013	NORA	9	Bare	1
11/27/2013	NORA	10	Bare	0
11/27/2013	NORA	12	Bare	1
11/27/2013	NORA	11	Bare	1
11/4/2013	NORA	2	Bare	1
8/13/2013	NORA	1	Grass	1
8/21/2013	NORA	12	Grass	0
8/29/2013	NORA	1	Bare	0
8/29/2013	NORA	3	Bare	0
8/29/2013	NORA	7	Bare	0
9/5/2012	WTSH	7	Bare	1
9/5/2012	WTSH	7	Grass	1
10/11/2012	WTSH	4	Slope	0
10/18/2012	WTSH	9	Grass	1
10/18/2012	WTSH	11	Grass	0
10/1/2013	WTSH	7	Grass	0
10/1/2013	WTSH	10	Grass	0
10/13/2013	WTSH	8	Grass	1
10/19/2013	WTSH	1	Grass	1
10/19/2013	WTSH	2	Grass	1
10/22/2013	WTSH	10	Grass	1
10/22/2013	WTSH	14	Bare	0
11/26/2013	WTSH	6	Grass	1
11/27/2013	WTSH	9	Grass	1
8/22/2012	WTSH	13	Slope	0
8/29/2013	WTSH	2	Grass	1

Appendix 7. KWPII SEEF Trials from WEST Independent Study.

Date1	Species	Carcass ID	KWPII Turbine Number	Distance From Turbine (m)	Cover Class	Found1	DayA Found Date	DayA Available
03/30/14	CAGO	c3	4	54	Grass	N	3/31/14	Y
2014-05-19	CAGO	c7	9	23	Grass	N	2014-05-19	Y
2014-06-07	CAGO	c8	13	55	Bare	Y	2014-06-09	Y
2014-06-28	CAGO	c9	5	48	Bare	Y	2014-06-30	Y
03/30/14	RATS	r4	6	89	Grass	N		N
03/30/14	RATS	r5	12	52	Grass	N		N
03/30/14	RATS	r6	14	39	Bare	Y	4/1/14	Y
04/19/14	RATS	r14	10	40	Bare	N	4/27/14	N
04/19/14	RATS	r15	10	30	Bare	N	4/27/14	N
04/19/14	RATS	r16	11	31	Bare	N	4/27/14	N
04/19/14	RATS	r17	11	26	Grass	N	4/27/14	N
04/19/14	RATS	r18	12	45	Grass	N	4/28/14	N
04/19/14	RATS	r19	13	18	Grass	N	4/28/14	N
04/19/14	RATS	r20	14	46	Bare	N	4/28/14	N
05/06/14	RATS	r25	4	18	Bare	Y	5/6/14	Y
05/06/14	RATS	r26	5	22	Bare	N	5/6/14	Y
05/06/14	RATS	r27	6	37	Grass	N	5/6/14	Y
05/06/14	RATS	r28	12	76	Grass	N	5/6/14	Y
05/11/14	RATS	r38	7	32	Bare	N	5/14/14	N
05/11/14	RATS	r36	1	24	Grass	N	5/13/14	Y
05/11/14	RATS	r37	4	7	Bare	N	5/14/14	Y
05/12/14	RATS	r39	11	71	Grass	N	5/14/14	N
05/12/14	RATS	r40	12	35	Bare	Y	5/14/14	Y
05/12/14	RATS	r41	13	41	Grass	N	5/14/14	Y
2014-05-19	RATS	r50	3	4	Bare	Y	2014-05-19	Y
2014-05-19	RATS	r51	10	67	Grass	N	2014-05-19	Y
2014-05-19	RATS	r52	10	35	Grass	N	2014-05-19	Y
2014-05-19	RATS	r53	11	55	Bare	N	2014-05-19	Y
2014-06-07	RATS	r70	5	70	Grass	N	2014-06-10	N
2014-06-07	RATS	r71	9	43	Grass	N	2014-06-11	N
2014-06-07	RATS	r72	10	23	Bare	N	2014-06-11	N
2014-06-07	RATS	r68	1	41	Bare	Y	2014-06-10	Y
2014-06-07	RATS	r69	4	44	Grass	N	2014-06-10	Y
2014-06-30	RATS	r87	2	52	Bare	N	2014-06-30	Y
2014-06-30	RATS	r88	4	18	Bare	Y	2014-06-30	Y
2014-06-30	RATS	r89	6	7	Bare	Y	2014-06-30	Y
2014-06-30	RATS	r90	8	12	Bare	N	2014-07-01	Y
2014-06-30	RATS	r91	13	50	Bare	N	2014-07-01	Y
2014-07-06	RATS	r100	10	26	Bare	N	2014-07-09	N
2014-07-06	RATS	r101	12	16	Bare	N	2014-07-09	N
2014-07-06	RATS	r97	4	20	Grass	N	2014-07-09	N

2014-07-06	RATS	r98	6	11	Bare	N	2014-07-09	N
2014-07-06	RATS	r99	8	12	Bare	**N**	2014-07-09	N
03/30/14	WTSH	w4	1	23	Bare	Y	3/31/14	Y
03/30/14	WTSH	w5	2	24	Bare	Y	3/31/14	Y
03/30/14	WTSH	w6	7	13	Bare	Y	3/31/14	Y
03/30/14	WTSH	w7	13	11	Bare	Y	4/1/14	Y
04/19/14	WTSH	w13	13	39	Bare	Y	4/28/14	Y
04/19/14	WTSH	w11	8	39	Grass	Y	4/23/14	Y
04/19/14	WTSH	w12	10	33	Grass	N	4/27/14	Y
05/06/14	WTSH	w20	7	38	Bare	Y	5/6/14	Y
05/06/14	WTSH	w21	10	32	Bare	N	5/6/14	Y
05/06/14	WTSH	w18	4	20	Grass	N	5/6/14	Y
05/06/14	WTSH	w19	4	72	Grass	Y	5/6/14	Y
05/11/14	WTSH	w26	4	48	Bare	Y	5/14/14	Y
05/11/14	WTSH	w27	7	55	Grass	N	5/14/14	Y
05/11/14	WTSH	w28	10	74	Grass	Y	5/14/14	Y
2014-05-19	WTSH	w30	2	45	Bare	Y	2014-05-19	Y
2014-05-19	WTSH	w34	13	22	Bare	Y	2014-05-20	Y
2014-06-02	WTSH	w37	9	37	Grass	N	2014-06-03	Y
2014-06-02	WTSH	w38	11	61	Grass	Y	2014-06-03	Y
2014-06-07	WTSH	w45	5	32	Bare	N	2014-06-10	Y
2014-06-07	WTSH	w48	14	60	Bare	N	2014-06-11	Y
2014-06-07	WTSH	w44	5	57	Grass	Y	2014-06-10	Y
2014-06-07	WTSH	w46	6	58	Grass	N	2014-06-10	Y
2014-06-07	WTSH	w47	7	41	Grass	N	2014-06-10	Y

Appendix 8. 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 9. 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 10.

KAHEAWA WIND POWER II

HAWAIIAN HOARY BAT MITIGATION PLAN

Applicant

Kaheawa Wind Power II, LLC
First Wind
56 Honuhula Street
Kihei, HI 96753

Prepared by

Hawai`i Department of Land & Natural Resources
Division of Forestry & Wildlife
1151 Punchbowl Street, Room 325
Honolulu, HI 96813

May 2014

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1.0 INTRODUCTION

The Hawaiian hoary bat is an endangered species found on all the Main Hawaiian Islands except Niʻihau. Current population estimates range from a few hundred to a few thousand, but the actual number remains essentially unknown. According to the state Comprehensive Wildlife Conservation Strategy (2005), primary threats include habitat loss (especially tree cover), pesticides, predation, and roost disturbance.

As per the mitigation requirements described in the Kaheawa Wind Power II (KWP II) Habitat Conservation Plan (HCP) (SWCA, 2011), Kaheawa Wind Power II, LLC (Kaheawa Wind) must provide funding for Tier 1 mitigation for the authorized take of 6 adult bats and 3 juveniles (see Section 5.2.5.3 of the HCP), which equates to a total of 7 adults (with an estimated 30% survival rate of juveniles to adulthood; see Appendix 5 of the HCP for life history information). According to the HCP, baseline mitigation must consist of, "implementation of bat habitat improvement measures to benefit bats as approved by DNLR, USFWS, and ESRC in consultation with KWP II."

The HCP specifies that, "one core area of 84.3 ac supports one male bat at a given time, and assuming that the lifespan of a Hawaiian hoary bat is approximately 10 years…then it could be assumed that one core area could be used by, or benefit, up to 2 male bats over the 20-year permit term… Based on this assumption, the mitigation area required for 4 adult male bats is two male core areas totaling 168.6 acres." Since the management is being conducted on State conservation lands, the required acreage is doubled, meaning 338 acres must be restored to mitigate for the requested Tier 1 take of bats at the KWP II facility at a cost of $250,000 ($126,260 Years 1-5, $123,740 Years 6-20). Mitigation measures must contribute to preserving or enhancing foraging and/or roosting habitat capable of supporting a commensurate number of bats to achieve the mitigation requirement.

Should take occur at the Tier 2 level – 9 adult bats and 5 juveniles, equating to a total of 11 adults – then additional restoration of 84.3 ac of forest at Kahikinui or at another location on Maui would be required. If management is being conducted on State conservation land, then KWPII will fund the management of 169 ac (see Section 6.5.2.2 of the HCP). This plan does not outline specific actions to be performed with the additional level of funding, but provides guidance for expanding this project, or selecting a complementary effort that will adequately mitigate for the Tier 2 level of take per the commitments outlined in the HCP (see Section 4.5 of this document).

Currently, there are multiple ongoing restoration efforts being conducted at Kahikinui through various sources of funding, including funding from another First Wind development project – Kahuku Wind Power. In conjunction with these ongoing efforts, this document provides a description of the proposed allocation of the $250,000 in mitigation funds to fencing and restoring a 340 acre section of the Kahikinui Forest Reserve (FR) in order to achieve the mitigation goals described in the HCP.

2.0 OBJECTIVE

The objective of the mitigation effort is to implement measures that will not only mitigate for the permitted take, but provide a net benefit to the species by increasing population numbers of the Hawaiian hoary bat via the creation/restoration of available foraging and roosting habitat.

3.0 STUDY AREA

The proposed 340 acre project area is located between the 4,800 to 6,200 foot elevation contours in the Kahikinui FR (Mauka Unit). The upper reaches of this area are located just below the temperature inversion layer, which settles at about 6,500 feet in elevation. This is a koa-ohia montane mesic forest with an understory comprised of aʻaliʻi and other native plant species. Mesic forests are found in the transition zones between dry forest and rainforest in Hawaiʻi, receiving about 120-150 cm of annual precipitation. Mesic forests are home to a large number of endemic plant species and provide important ecosystem services in the form of habitat for native animal species and watershed protection. There is great potential for koa-ohia reforestation efforts in this wetter zone of the FR. Due to ungulate grazing and the lack of ungulate control in the area, the natural forest understory has been largely eliminated and replaced by non-native pasture grasses. However, gulches, intermittent stream beds, and other topographically protected areas still contain a diversity of native overstory tree species, understory plants, and native ferns.

Over time, restoration efforts are intended to increase native vegetation cover and provide a forest structure suitable for bat foraging, roosting and breeding. Additionally, the restoration of native forest within the parcel is expected to improve the functional connectivity of habitat within the Kahikinui area across the FR, Nakula Natural Area Reserve (NAR), and the adjacent Department of Hawaiian Home Lands (DHHL) lands.

4.0 PROPOSED MANAGEMENT ACTIONS

As mentioned above, multiple management efforts are occurring across the larger Kahikinui area, including efforts to control ungulates, restore and create native habitat, and increase native forest bird populations. The efforts funded by KWP II mitigation funds will contribute to a broader restoration and conservation management effort in the region, and will not only benefit the Hawaiian hoary bat, but other native plant and animal species as well. This collaborative, concentrated management approach increases the likelihood of success as compared to a similar project that might be isolated and surrounded by conflicting land uses.

The following measures will be implemented using funds provided by First Wind and other sources in a collective effort to improve native habitat.

4.1 Fencing

Approximately 2.8 miles of fence apron is currently being installed by DOFAW field crews, and is planned to be completed by July 2014.

Source: Partially funded by Capital Improvement Project funds and DOFAW Forestry operating funds

4.2 Ungulate Control

Following the completion of the fence apron (slated to be completed by July 2014), DOFAW Forestry staff will conduct ACETA (aerial capture, eradication, and tagging of animals) missions to dispatch all feral ungulates within the Nakula NAR and Kahikinui FR. These missions will be completed by December 2014. Subsequent missions will be conducted to ensure that these units remain at 'zero tolerance'.

Source & Cost: Ungulate control work will be funded by KWP II funds. ($16,000 – approx. 8 trips).

4.3 Site Preparation – Soil Testing/Conditioning

Soil sampling to detect any nutrient deficiencies in the bare soil areas will be conducted from May to September 2014. Possible soil conditioning of nutrients to bare soil areas may be conducted to possibly increase outplanting survival rates within these nutrient depleted areas.

Source & Cost: Helicopter time for site prep work to be funded by KWPII funds.*

4.4 Plant Quality & Procurement

Based on bat recovery recommendations from Hawaiian hoary bat experts, koa and ohia were chosen as the forest canopy species of choice along with other native overstory species (pers. comm. Frank Bonaccorso & Chris Todd, March 2014). Other native tree species will be interspersed among the koa and ohia, along with a diverse understory of native species.

Source & Cost: Helicopter time, crew subsistence payments and plant purchase to be funded by KWP II funds and CIP funds at a 60-40 ratio as detailed below.*

Initial actions for implementation starting January 2015 when precipitation increases:

a. 15' x 15' spacing; approximately 200 trees per acre (TPA)
b. 200 TPA x 340 acres = 68,000 seedlings at $3.00 per seedling
    1. 63,000 koa and ohia seedlings
    2. 5,000 seedlings of other native overstory species (kolea lau nui, sandalwood, olapa, ohe, etc.)
    3. 3 to 1 species ratio (koa to ohia)

    Cost: $210,000 ($136,000 KWP II, $84,000 CIP; price subject to change)

Subsequent actions beginning in January 2016:

a. Approximately 15,000 seedlings of understory plant species to be outplanted (pilo, aʻaliʻi, mamane, ferns, etc.)
    Cost: $45,000 ($27,000 KWP II, $18,000 CIP; price subject to change)
b. Weed surveys and suppression to commence FY 2014

Cost: $50,000 ($30,000 KWP II, $20,000 CIP)

**Total Helicopter time cost to be determined.*

Total funded by KWP II: $199,000 as listed here. However, these are preliminary estimates, and the total does not include all helicopter time or any monitoring costs.

4.5 Mitigation for Tier 2 Rates of Take

Page 114 of the HCP states, "recommended [Tier 2] mitigation would consist of the additional restoration of 84.3 ac of forest at Kahikinui or at another location on Maui. If the acreage is required to be doubled because management is being conducted on State conservation land, KWPII will fund the management of 169 ac (84.3 x 2 = 169 ac) of land." However, per page 115 of the HCP, "if, at the time the Tier 2 level of take is triggered, new scientific information may indicate mitigation measures other than habitat restoration are more important or pressing for recovery of the Hawaiian hoary bat, KWPII may revise the Tier 2 mitigation plans with the approval of USFWS and DLNR."

Given that the cost for restoration and monitoring of the 340 acre unit exceeds the amount required to mitigate Tier 1 take levels, it is recommended that Kaheawa Wind direct Tier 2 mitigation funds toward the same 340 acre parcel to cover additional planting, as well as monitoring efforts which will occur in five year increments over the life of the project (Section 6.0).

5.0 SCHEDULE AND DURATION

Table 1 provides a tentative schedule for mitigation activities.

Table 1. Preliminary Schedule of Mitigation Activities.

Implementation Activities	FY 2014	Fiscal FY 2014015				Fiscal FY 2014016				Fiscal FY 2014017				Entity Responsible
	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	
Fence Construction	XX	XX												DOFAW Maui Nui Branch
ACETA Activities	XX	XX	XX											DOFAW Maui Nui Branch
Soil Sampling and Conditiong	XX	XX												DOFAW to collect samples, NRCS or CTAHR to conduct analysis
Plant Procurement	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	Obtained from Native Nursery, LLC* by DOFAW
Initial Planting of Overstory Species			XX	XX			XX	XX				XX	XX	DOFAW Maui Nui Branch
Subsequent Planting of Understory Species							XX	XX	XX			XX	XX	DOFAW Maui Nui Branch

* DOFAW's current contract is with Native Nursery, LLC. However, this contract expires December 2014 and is currently out for bid.

6.0 MONITORING & MEASURES OF SUCCESS

According to the HCP (page 116) management measures will be considered successful if:

Prior to the start of management measures:

a. Ground and canopy cover at the mitigation site is measured.

After 6 years:

b. The fencing is completed.
c. The ungulates have been removed within the fenced area and the area is kept free of ungulates for the 20-year permit term.

After 20 years:

d. The cover of non-native species (excluding kikuyu grass) in the managed areas is less than 50%.
e. The mitigation area should have a canopy cover composed of dominant native tree species (particularly koa and ohia) that are representative of that habitat after 15 years of growth. According to Wagner *et al.* (1999), mature koa/ohia montane mesic forests "consist of open-to-closed uneven canopy of 35 m tall koa emergent above 25 m tall ohia." Therefore, there should be at least a 25% increase in canopy cover over original conditions throughout the mitigation area, and closed canopy areas should attain at least 60% canopy cover.
f. Restoration trials are implemented.
g. Radio-transmitter monitoring (or other measures as appropriate) is conducted every three to five years to detect changes in bat density and home range core area size as the site is restored.

Adaptive Management

The Annual Reports received in the Years 3 through 5 after the initial planting shall contain an evaluation of whether or not efforts are on track to reach the mitigation targets described above. If they are not on track, then DOFAW, USFWS, and Kaheawa Wind will discuss adaptive management measures to address the problem. Such measures could include additional planting, intensive management measures (*e.g.*, watering, fertilizer, etc.), increased monitoring frequency, or other measures as deemed appropriate by all parties.

6.1 Forest Health Monitoring

Monitoring of ungulate populations, forest cover, and canopy structure will be conducted once per quarter by DOFAW Forestry staff and/or Leeward Haleakala Watershed Restoration Partnership (LHWRP) staff. An Annual Report will be produced by DOFAW at the end of each fiscal year describing the activities that took place during the year (*e.g.*, fence construction/ incursions, weed control, bat detections, etc.), documenting the flora species present, status of ungulate populations, and a visual assessment of canopy cover and forest structure, with a quantitative scientific analysis of canopy cover completed if deemed necessary by field staff, DOFAW, and USFWS.

6.2 Bat Activity Level Monitoring

It was determined by USFWS and DOFAW, and agreed upon by Kaheawa Wind, that radio-transmitter monitoring to determine bat density would not be the most effective way to measure the success of the restoration activities at Kahikinui. Instead, it was determined that acoustic monitoring for bat activity levels would be a more appropriate approach. As of the writing of this plan, a study entitled Baseline Surveys for Two Wind Power Habitat Conservation Plans in the State of Hawaii is being conducted by USGS under Principal Investigator Frank Bonaccorso. This effort is funded by a Section 6 Cooperative Endangered Species Conservation Fund Habitat Conservation Planning Assistance Grant. The results of the study are expected in 2015, and will be used as the baseline bat activity level for Kahikinui.

Considering input from Mr. Bonaccorso (pers. comm., April 2014), it was determined by the agencies that subsequent monitoring efforts should occur at years 5, 10, 15, and 20 (measured after the start of habitat restoration activities), and should consist of 3-month continual sampling efforts in the same three months of each sampling year. Selection of the appropriate 3-month time period will be determined in collaboration with Mr. Bonaccorso based on the results of the USGS Baseline Surveys. A 5-year cycle of feedback will be very important in planning new restoration parcels for other mitigation activities in Kahikinui as well as for adaptive management of the current project.

Mr. Bonaccorso's suggested monitoring approach for 340 acres would employ at least four detection stations, but could potentially employ up to eight depending on the heterogeneity of the habitat (more heterogeneity would require more detectors). Based on the cost of this type of effort in 2014, it is estimated that each sampling effort will cost approximately $70,000. This is a rough figure that includes helicopter time, salaries for two field biologists for field data collection, data analysis and report preparation, inter-island travel costs of the two biologists, supplies, and contractor overhead and/or profit margin for a third-party contractor. This costing also assumes the permanent equipment (bat detectors) is already available for the project, otherwise this equipment will need to be purchased ($1,500 per bat detector station at 2014 prices).

Given that four monitoring efforts at a cost of $70,000 cannot be supported by the budget for this project, the agencies will work to lower or supplement costs by:

a. Incorporating agency staff into monitoring efforts (*e.g.*, assisting with detector set up, downloading data from detectors, etc.);

b. Putting out a Request for Proposals to see if another qualified entity can provide similar services at a lower bid;
c. Seeking additional grant funding;
d. Pooling funding from current and future HCP mitigation efforts at Kahikinui; or
e. Other actions as deemed appropriate by the agencies and ITL Applicants.

It is understood that given the timeframe of this effort, it is not confirmed what entity or entities (agency or third party) will implement the monitoring efforts, and therefore a prescriptive scope of work is not laid out in this plan. The scope of work will be developed for the Year 5 monitoring effort, and will set the precedent for all subsequent monitoring. Protocols and equipment should remain identical in the Year 10, 15, and 20 sampling efforts to the extent practicable. Any amendments to the protocol/equipment must be justified by the entity carrying out the monitoring effort (*e.g.*, a particular brand of detector is no longer available), and must be taken into consideration during data analysis. A report will be produced at the conclusion of each monitoring season and will be reviewed by the agencies, Kaheawa Wind, and other bat experts as deemed appropriate to determine success of this project.

7.0 REFERENCES

DLNR. 2005. Hawaii's Comprehensive Wildlife Conservation Strategy. As submitted to the National Advisory Acceptance Team, October 1, 2005.

SWCA. 2011. Kaheawa Wind Power II Wind Energy Generation Facility Habitat Conservation Plan. Prepared for Kaheawa Wind Power II, LLC. December 2011.

Appendix 11.

June 6, 2014

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

Adaptive Management Response to Hawaiian Hoary Bat Fatalities at Kaheawa Wind Power, Phase II, LLC

On February 26, 2014 First Wind HCP Compliance Technicians found the third Hawaiian hoary bat fatality at Kaheawa Wind Power, Phase II (KWPII) since permit issuance in 2012, and the second in FY 2014. Adjusted take is estimated to be near or at the limit for Tier 2 take and therefore adaptive management measures are required. KWP II also is preparing an application to amend its existing permits to increase authorized take above the existing levels in its current permits. This letter is intended to propose adaptive management measures to avoid/minimize incidental take of bats at KWP II.

The KWPII HCP:

Section 7.3 Summary Adaptive Management Program

"As an adaptive management process, the Applicant will also promptly discuss this situation with USFWS and DLNR to review the total take of that species recorded to date at the KWP II facility and the mitigation performed to date on behalf of that species, and to identify whether mitigation performed to date has compensated for the Tier 2 rate of take, or whether changes in mitigation are needed to compensate for the Tier 2 rate of take. ***The Applicant may also consider whether changes in operational practices are needed to reduce levels of take****. "*

6.5.2 Mitigation for Tier 2 Rates of Take

6.5.2.1 Additional Research

"KWPII will review the fatality records in an effort to determine whether measures in addition to the low wind speed curtailment can be implemented that will reduce or minimize take. If causes cannot be readily identified, KWPII will conduct supplemental investigations that may include but not be limited to:

1. *additional analysis of fatality and operational data*
2. *deployment of acoustic bat detectors to identify areas of higher bat activity during periods when collisions are believed to be occurring*

3. *using thermal imaging or night vision equipment to document bat behavior*
4. *use of telemetry to document home range size and habitat usage, and density/population estimation; if new technology is available to address these goals, they may be used with approval of USFWS and DOFAW instead of telemetry.*
5. *determining whether certain turbines are causing most of the fatalities or if fatality rates are related to specific conditions (e.g., wind speed, other weather conditions, season)*

Other measures to reduce bat fatalities will be implemented as identified and feasible and may include changes in project operations, such as modifying structures and lighting, and implementing measures to repel or divert bats from areas of high risk without causing harm if practicable. These data may also be used to refine low-wind speed curtailment options, such as determining the times of year when curtailment is mandatory, or if curtailment can be confined to a subset of "problem" turbines. These additional measures will be implemented by KWPII with the concurrence of USFWS and DLNR."

6.5.4 Measures of Success

"The success of the mitigation efforts will be determined as follows:

1. *Both components of on-site research into Hawaiian hoary bat habitat utilization and bat interaction with wind facilities will be considered successful if KWPII joins the HBRC and the specified survey and monitoring is carried out, including proper deployment and operation of bat detectors, data reduction and analysis, and reporting of findings to DLNR, USFWS and ESRC.*
2. *In the event that KWPII exceeds the Tier 1 rate of take measures to reduce bat fatalities will be considered successful if one or more causes can be identified and corrective measures are implemented that result in an estimated 50 percent or greater reduction in bat fatalities over previous levels when averaged over a five-year period."*

Proposed Adaptive Management Measures

The following adaptive management measures are proposed by KWPII based on recent research and experience regarding methods for minimizing bat fatalities at wind energy installations.

Low Wind Speed Curtailment

In accordance with the HCP, low wind speed curtailment (LWSC) at 5 m/s was initially in effect for the months of April through November. This period was extended to begin mid-February and continue through December 15 in response to fatalities documented at KWPII on March 13, 2013 and February 26, 2014, and at KWPI on December 14, 2013 (Appendix B). Prior to May 2014, 50 % of observed fatalities at KWPI and KWPII had occurred in April and September, suggesting that collision risk was higher during these months (Appendix A). LWSC was therefore increased from 5 m/s to 6 m/s on April 10 through April 30, 2014, and will be raised to 6 m/s again in September. We are reviewing increasing cut-in speed to 6 m/s for a more extended period while awaiting a proposal from GE on deterrent device availability and potential implementation.

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. 2013). 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

KWPII has had varying numbers of bat detectors deployed since FY 2007 and more were added in FY 2010 and FY 2012. All on the ground detectors were recently converted to Wildlife Acoustics full spectrum SM2+BAT ™ type with mics 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 P. Craig

Mitchell Craig
First Wind Hawai'i HCP Manager

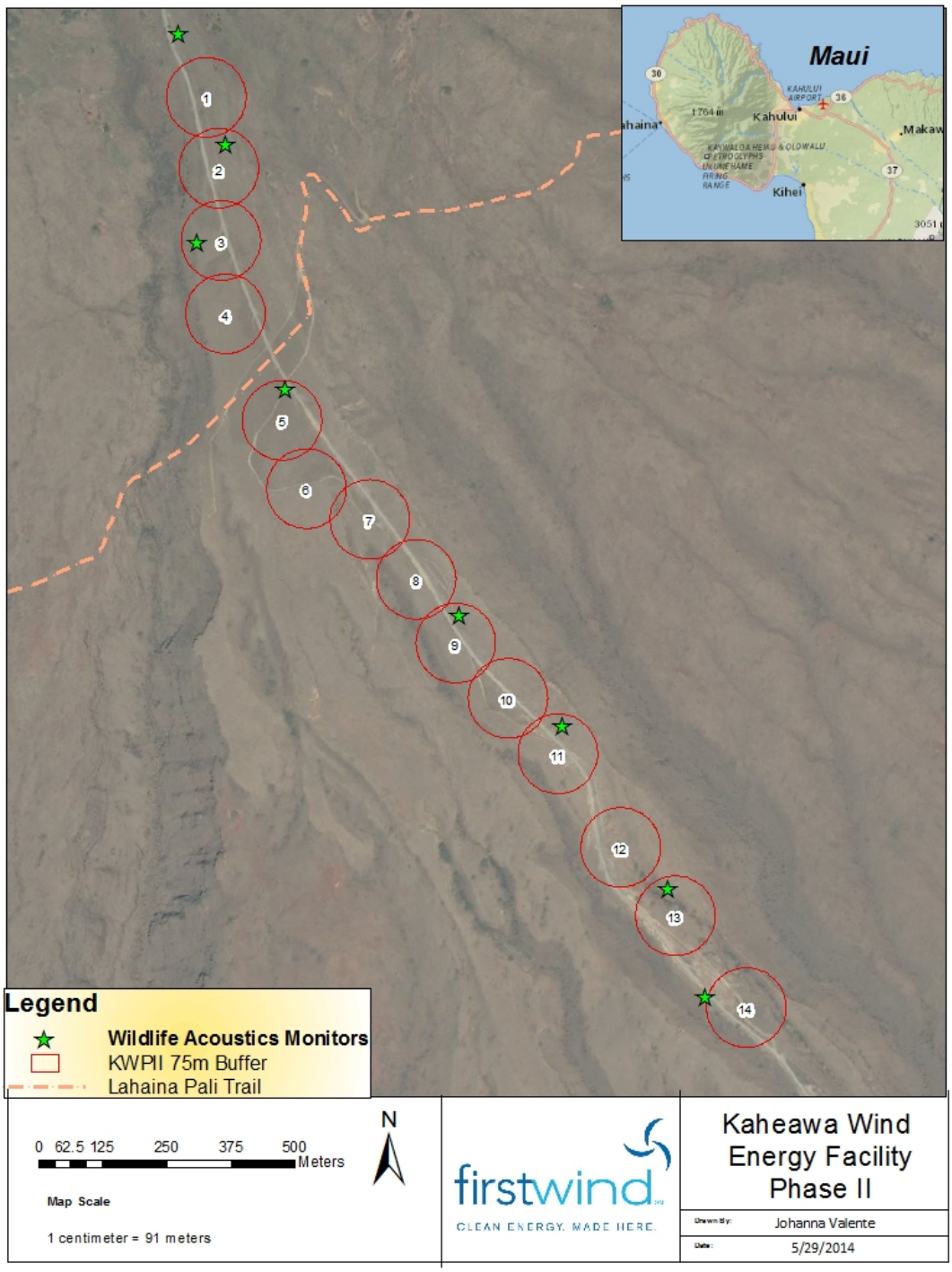
References

Arnett, E. B., C. D. Hein, M. R. Schirmacher, M. M. P. Huso, and J. M. Szewczak. 2013. 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 and II.

Site	Date	WTG	FY
KWPI	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	
KWPII	3/13/2013	6	2013
	11/5/2013	7	2014
	2/26/2014	2	

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



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

---

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.

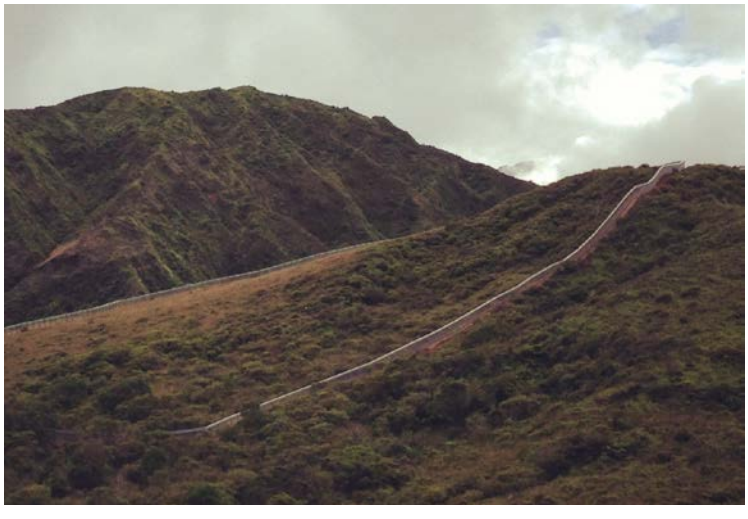


Figure 2. Jute matting partially installed at Enclosure B.

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:

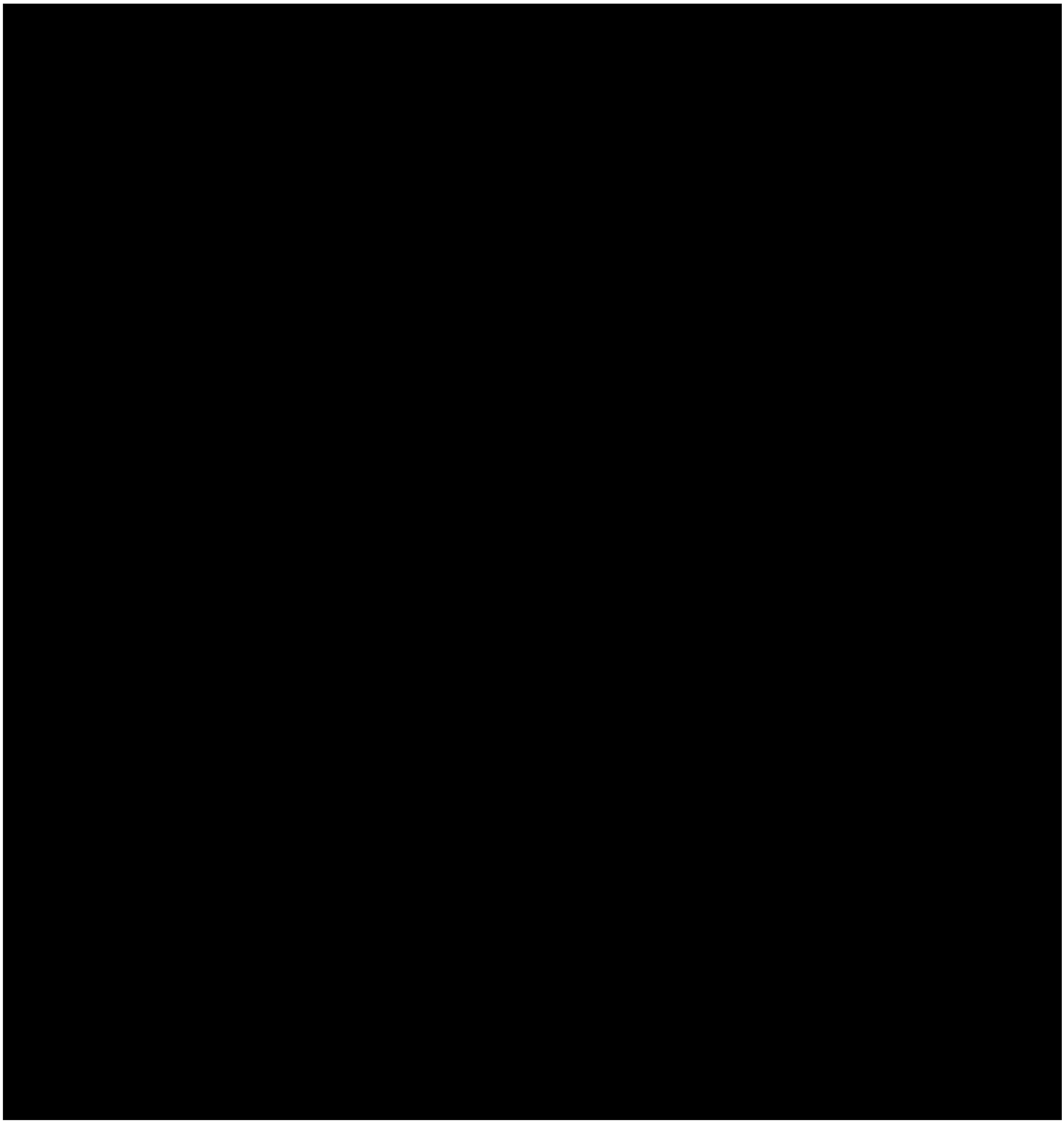
- All tools and equipment coming onsite are inspected and cleaned to be sure they are free of invasive species. Shoes and clothing are inspected and cleaned upon entrance to the site in adherence with NARS and DLNR permits. This protocol will continue for the life of the project.
- The fence line is 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.



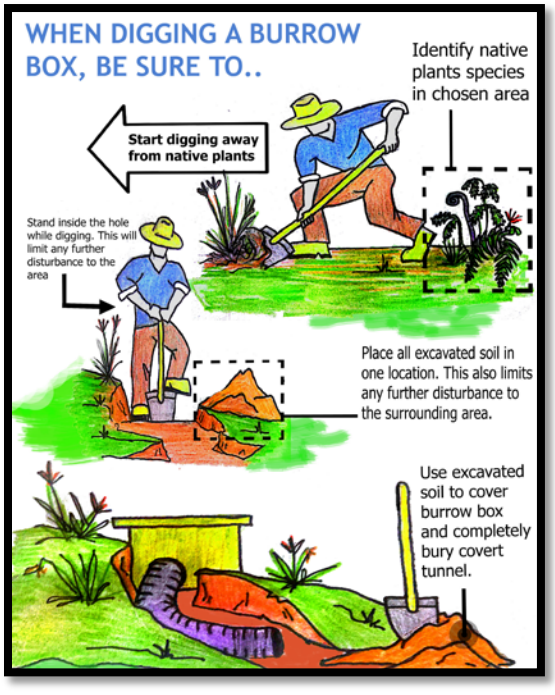


Figure 9. Methodology used to minimize disturbance to native plants while installing burrows. Grant, Cameron. Burrow Methodology. 2013. First Wind.

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. Expenditures at KWPII in FY 2014

KWPII	Cost
Permit Compliance	$334,656
Seabird Management	$26,880
Vegetative Management	$32,418
Fatality Monitoring	$7,494
Equipment and Supplies	$9,739
First Wind Labor	$165,835
Capital Expenses	$11,773
Total Cost for FY 2014	$588,794