

# Kaheawa Pastures Wind Energy Generation Facility

## Habitat Conservation Plan

FY-2011 Annual Report: Year 5 HCP Implementation



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KAHEAWA PASTURES WIND ENERGY GENERATION FACILITY  
HABITAT CONSERVATION PLAN

YEAR 5 HCP IMPLEMENTATION  
JULY 2010 – JUNE 2011

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## I. EXECUTIVE SUMMARY

In June 2006 Kaheawa Wind Power, LLC (KWP) began operating the island of Maui's first commercial wind energy generation facility in the Kaheawa Pastures area of West Maui. The State Board of Land and Natural Resources approved a Conservation District Use Application (CDUA) for the proposed facility, which is situated on State conservation lands in January 2003. Pursuant to Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended, and under a similar program, Chapter 195-D, Hawai'i Revised Statutes, KWP developed a project-specific Habitat Conservation Plan (HCP) in cooperation with the USFWS, DLNR and the Hawai'i Endangered Species Recovery Committee (ESRC). Upon final approval of the HCP, the federal ITP (TE-118901-0) and state ITL (ITL-08) were issued in January 2006. Both permits have duration of twenty (20) years. This report summarizes how KWP has implemented the provisions of the HCP during the fifth full year of project operations (July 1, 2009 through June 30, 2011), as specified under the HCP.

The HCP anticipates that the incidental take of four listed species (Hawaiian Petrel, Newell's Shearwater, Nene, and Hawaiian Hoary Bat) may potentially occur as a result of the operation of the wind farm. No other listed, proposed or candidate species are known or believed to be present in the project area.

The incidental take of five Nene and one Hawaiian Hoary Bat were documented at KWP during Year 5. In addition, the carcasses of three White-tailed tropicbirds, one Great Frigatebird, one Eurasian Skylark, a Japanese White-eye, and a Black Francolin were also documented during monitoring in Year 5. Applying the results of monitoring, including Searcher Efficiency (SEEF), Carcass Removal, and Indirect Take we estimated adjusted take for Nene to be 8.74 birds during Year 5. Similar adjustments were used to estimate 3.16 Hawaiian Hoary Bats killed in Year 5. An accounting of take for each covered species through the end of the fifth year of the project estimates that, on average 1.20 Hawaiian Hoary Bats, 0.52 Hawaiian Petrels, and 2.93 Nene takes may have occurred each year as a result of project operations. No take of Newell's Shearwater have been directly observed or documented. Take levels for Nene and Hawaiian Hoary Bats may initiate the development and implementation of adaptive management measures if deemed necessary, as described in the HCP.

DOFAW has indicated that construction of the new release pen for Nene on Maui is complete and the first releases commenced in May, 2011.

Regarding mitigation for the two seabird species, in Year 5 we began planning for a dog-assisted seabird nesting burrow survey at Makamaka'ole, West Maui with collaborators in New Zealand and completed several population modeling exercises that provide estimated projections of project success under various baseline and management scenarios. We are developing the final mitigation plan for seabirds and continuing to explore contingencies on Maui and Kauai while we plan for implementation in Year 6.

Mitigation for the baseline level of take for Hawaiian hoary bats was provided in 2006 in the form of funding for research. In addition, since August, 2008 KWP biologists have been conducting acoustic monitoring of bats at Kaheawa using remote acoustic data loggers. Acoustic sensors are moved periodically to survey different portions of the site. There were 96 individual bat call sequences which qualified as passes documented from July 1, 2010 through June 30, 2011. Consistent with past years, bat activity in 2011 appeared highest in the fall with 76% of bat passes documented during the months of August-September.

KWP maintains an active and well coordinated wildlife education and outreach program (WEOP) for all personnel on site including numerous staff, contractors, and visitors that regularly perform activities at KWP.

KWP biologists have been implementing a year-round monitoring program to document downed (i.e., injured or dead) wildlife incidents involving HCP-listed and non-listed species on the project site and its vicinity since operations began in June, 2006. Beginning in Year 5, KWP obtained approval from DOFAW to modify the downed wildlife monitoring plot layout and begin managing vegetation to increase the carcass detection capacity of monitors.

First Wind and DOFAW have agreed to implement a cooperative downed wildlife monitoring program at KWP in Year 6, providing the agency with an opportunity to independently verify results derived from systematic downed wildlife monitoring.

The HCP provides for a wide range of avoidance, minimization, and mitigation measures intended to result in a net conservation benefit for the four covered species. KWP continues to implement these measures in accordance with the HCP and the recommendations provided by DLNR, USFWS, and the ESRC following the fourth full year of implementation.

*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.*



8/16/2011

David P. Cowan  
Vice President, Environmental Affairs  
First Wind Energy, LLC as manager for Kaheawa Wind Power, LLC



## II. INTRODUCTION

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

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

In fulfillment of this condition, KWP developed a project-specific HCP in cooperation with the USFWS, DLNR and the Hawai'i Endangered Species Recovery Committee (ESRC). Upon final approval of the HCP, the federal ITP (TE-118901-0) and state ITL (ITL-08) were issued in January 2006. Both permits have a duration of twenty (20) years. Commercial operation of the project commenced in June 2006.

As described in Section VI of the HCP, KWP will provide annual monitoring and reporting on project activities. As specified in the federal permit, reporting will include a summary and discussion of incidental take, including adjusted take calculations pursuant to Section V of the HCP; results of searcher efficiency and carcass removal trials; results and discussion of seabird colony searches and management activities; results of nene nest surveys and protocols; vegetation monitoring of affected plant critical habitat areas; an overall summary of management activities; circumstances that triggered adaptive management and how the adaptive management was implemented; description of all occurrences of changed circumstances and how they were addressed; description of any unforeseen circumstances; progress made in achieving biological goals and objectives; any problems that occurred and how they were handled; description of cost expenditures and other information related to funding assurances; an annual work plan including an implementation schedule and entities responsible for implementation; and any other pertinent information such as actions taken by any State or Federal agencies related to implementation of the HCP.

KWP has submitted five (5) previous annual reports and two quarterly progress reports to the USFWS and DLNR to date: in January 2007, February 2008, October 2008, November, 2009, September 2010, November 2010, and February 2011. Following submittal of the Year 4 Annual Report in September 2010, there was some follow up discussion with both agencies and a final set of comments associated with the Annual Review was expected but has not been received. KWP has been advised by USFWS and DOFAW that a meeting would be held to discuss comments and finalize the annual report for approval by the ESRC. KWP remains interested in addressing these comments and discussing the initiatives underway in Year 6, especially the improvements to manage vegetation, the implementation of a cooperative downed wildlife monitoring plan with DOFAW staff, and advancements in developing successful mitigation for seabirds.

This report summarizes how KWP has implemented the provisions of the HCP during the fifth full year of project operations (July 1, 2010 through June 30, 2011), as specified under the HCP. Year 5 activities have continued to include measures to monitor and minimize the risks of adverse effects (i.e., take) on the four listed species, and mitigate for take to accomplish a net ecological benefit for each covered species.

KWP has achieved most, if not all of its obligations according to the terms of the HCP, in addition to implementing measures in the interest of good stewardship that go significantly beyond the minimum requirements of the HCP. Table 1 (below) provides a summary of the provisions contained in the HCP that ensure compliance under the terms of the ITL, ITP, and Implementing Agreement (IA), including impact avoidance, minimization, monitoring, mitigation measures, funding assurance, and reporting.

Table 1. Timeline and implementation status of each principle wildlife compliance initiative at the end of Year 4 as outlined in the Kaheawa Wind Power HCP.

<b>Compliance Measure</b>	<b>Timeline</b>	<b>Status</b>
WEOP Implementation <sup>1, 2, 3, 4</sup>	Life of Project	Ongoing
Downed Wildlife Surveys <sup>3, 4</sup>	Life of Project	Ongoing
Searcher Efficiency Studies <sup>3, 4</sup>	Years 1-2	In-progress
Carcass Removal Trials <sup>3, 4</sup>	Years 1-2	In-progress
Nene Interaction Surveys <sup>3, 4</sup>	Year 1	Completed June, 2007
Funding for Nene Release Pen <sup>5</sup>	Permit Issuance	Completed January, 2008
Annual Funding for Nene Gosling Production or Translocation <sup>5</sup>	Years 1-5	Completed February, 2011
Nene Contingency Fund <sup>5</sup>	Permit Issuance	Initiated January, 2006

Seabird Colony Searches and Mitigation <sup>5</sup>	Years 1-2 then implement management measures	In-progress
On-Site Seabird Radar Surveys <sup>3, 4</sup>	Year 1	Completed in Year 1
Seabird Contingency Fund <sup>5</sup>	Permit Issuance	Initiated January, 2006
On-Site Bat Surveys <sup>3, 4</sup>	Year 1	Completed in Year 1
Hoary Bat Research Fund <sup>5</sup>	Permit Issuance	Completed June, 2006
Hoary Bat Contingency Fund <sup>5</sup>	Permit Issuance	Initiated January, 2006

1 = impact minimization, 2 = impact avoidance, 3 = monitoring, 4 = documentation and reporting, 5 = mitigation

## Covered Species

The HCP anticipates that the incidental take of four listed species (Hawaiian Petrel, Newell's Shearwater, Nene, and Hawaiian Hoary Bat) may potentially occur as a result of the operation of the wind farm. These species presently are known to, or believed to fly, in the vicinity of the project site and could be injured or killed if they collide with a wind turbine. No other listed, proposed or candidate species are known or believed to be present in the project area.

The Hawaiian Petrel is known to nest primarily on Maui and, to a lesser extent, on Kaua'i, Lana'i, and Hawai'i. On Maui, these petrels are known to nest on Haleakala Crater on East Maui and studies undertaken by KWP biologists and others have ascertained that nesting is likely in the mountains of West Maui. The anticipated direct take of the Hawaiian Petrel in conjunction with the operation of the wind energy generation facility is up to one individual per year. When indirect impacts are taken into consideration, the overall take is not expected to exceed 1.5 birds per year on average.

The Newell's Shearwater breeds on several of the main Hawaiian Islands, with indications that the species may also nest on Maui, although the status of the species on Maui is unclear at this time. Like the Hawaiian Petrel, the anticipated take of the Newell's Shearwater is up to one individual per year. When indirect impacts are taken into consideration, the overall take is not expected to exceed 1.5 birds per year on average.

As part of the State and Federal plans for Nene recovery, Nene have been re-introduced onto the islands of Kaua'i, Maui, Moloka'i and Hawai'i; this recovery program includes a captive-release pen in the Hana'ula area of the West Maui mountains, near the upper end of the project site. As of 2006, 104 Nene had been released from this pen since releases began in 1994 and, although some monitoring is routinely done by DOFAW, their exact distribution, movements, and present population structure are not well known. The anticipated take of the Nene is up to two individuals per year. When indirect impacts are taken into consideration, the overall take is not expected to exceed three birds per year on average.



Little is known about the distribution or habitat use of the Hawaiian Hoary Bat. While it has been recorded on several islands, it is believed to be most abundant on Hawai'i and present in low numbers on Maui. The species has been detected in the project area, although these limited observations have been seasonal and few, despite ongoing efforts to detect and monitor their presence at the site. The anticipated take of the Hawaiian Hoary Bat in conjunction with the operation of the wind energy generation facility is up to one per year.

### III. AVIAN AND BAT FATALITY MONITORING

#### **Monitoring Surveys to Document Downed Wildlife**

KWP biologists have been implementing a year-round monitoring program to document downed (i.e., injured or dead) wildlife incidents involving HCP-listed and non-listed species on the project site and its vicinity since operations began in June, 2006. Protocols outlined in the HCP ensure that KWP wildlife monitors follow a clear set of reporting and response guidelines that help facilitate specimen recovery and/or rehabilitation and documentation.

Since systematic intensive surveys began in June, 2006, foot searches by trained monitoring personnel have been the standard method used to conduct daily surveys for downed wildlife at KWP. Since Year 4 we have also been conducting supplemental searches once per week of all bare areas around the turbine pads on an ATV. On November 11, 2010 DOFAW approved a request by KWP to change the size and configuration of the 20 WTG search plots from their previous 180 x 200 meter rectangular shape to circular plots measuring 73 meters outward from the base of each WTG (Fig. 1). In addition, we surveyed three meteorological (met) towers in a circle roughly 10 meters beyond their anchor points. In the five years since project operations began there has been no observed take documented at any of the met towers, though at one time there were as many as 7 guyed met towers in place.

We established all search plot boundaries using a Trimble GPS Pathfinder Geo-XT handheld receiver, a rangefinder and a compass. The plot perimeters are marked using heavy gauge galvanized steel fence posts that are set in place in a manner that facilitates each markers association with the boundary of a specific plot (grooved edge of t-post directed toward respective WTG). Transects are run parallel to each other and we use a lighter gauge 5-ft steel fence post to mark transects, which enables the monitors to maintain an even search coverage without relying heavily on the GPS.

In past years, due to the size and shape of the plots, portions of the WTG 1-3 search plots overlapped with the adjacent Manawainui and Papalaua Gulches. These overlap areas were not searchable on foot due to steep terrain and sensitive vegetation (Fig. 2). The new 73 meter plot radii have significantly reduced the overlap in WTG 1 and nearly eliminated overlap altogether

in WTG 2-3. Therefore, we no longer perform visual surveillance in the gulch overlap areas as previously reported.

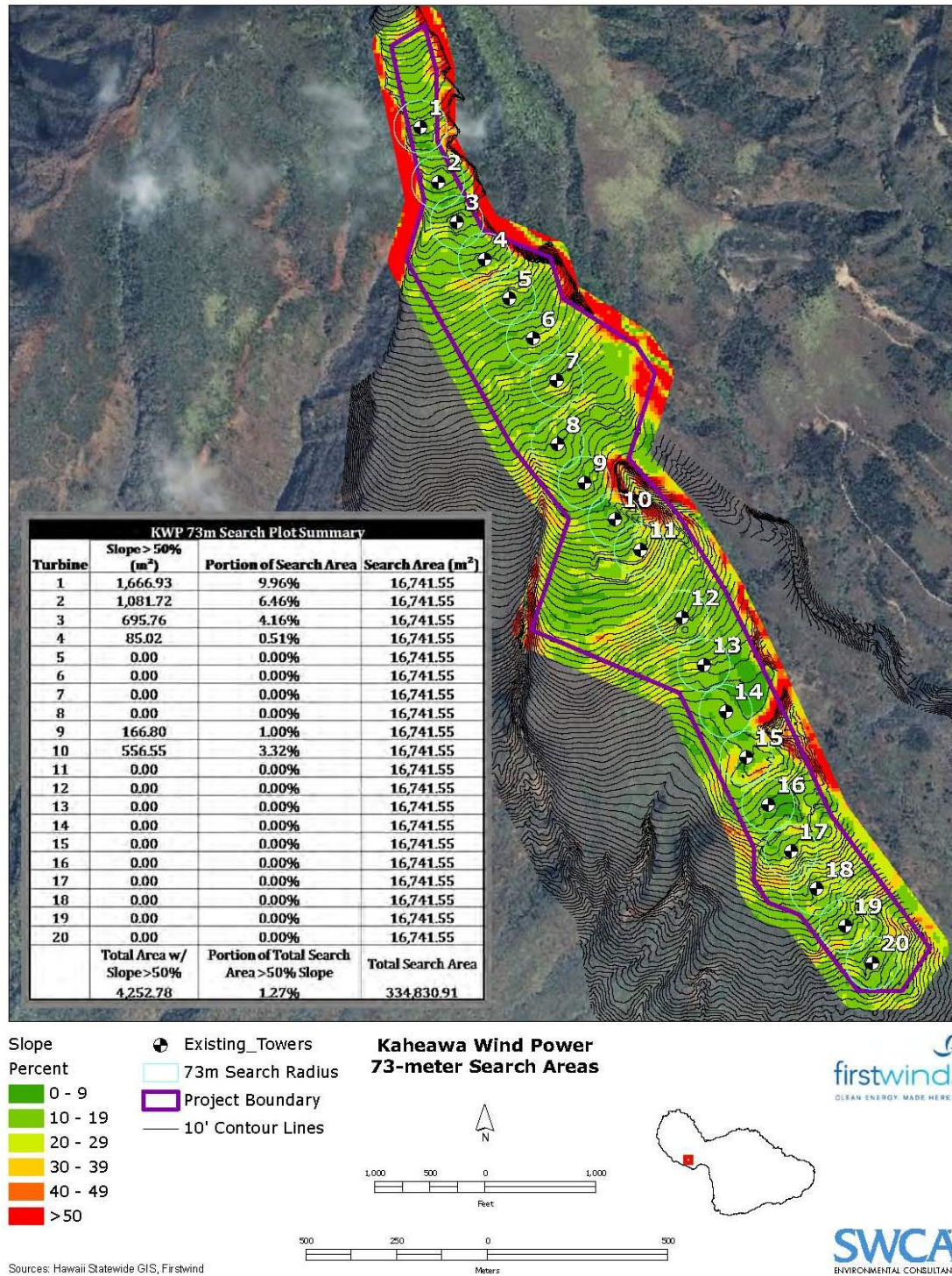


Figure 1 – Map showing the layout and slope profiles of the 73 meter plots at Kaheawa Wind Power.

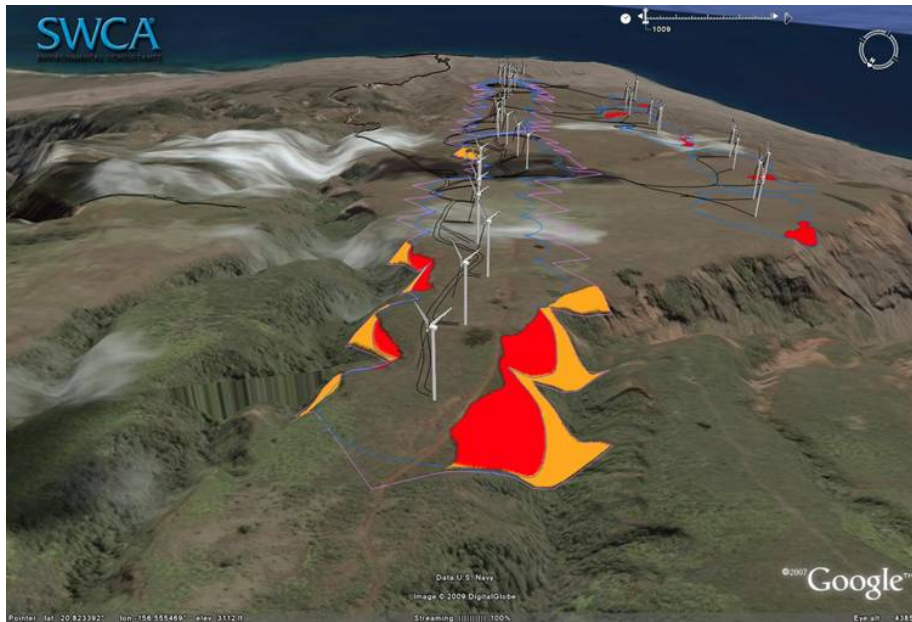


Figure 2 – Prior to changing the size and shape of search plots in November, 2010 the shaded portions adjacent to WTG 1-3 represent  $\geq 50\%$  slope and required visual surveillance from the edges of Papalaua and Manawainui Gulches as an alternative monitoring method.

The downed wildlife monitoring program initially included two types of monitoring periods. The year-round intensive monitoring regime in place during Year 5 consists of full coverage of all plots by trained searchers (wildlife monitors/technicians) once per week. Prior to the November, 2010 approval, during the Nene and seabird fledging seasons, May-June and October-November, respectively, search effort increased to two searches of the site each week in order to provide more coverage during these presumably higher risk periods. This was discontinued concurrent with the new plot layouts because it was agreed results of monitoring do not suggest a higher fatality level for juveniles of these species and juveniles of both species are the same size and physical proportions as adult birds. Therefore, no difference in the retention time or detection probability of juvenile vs. adult carcasses is expected.

KWP wildlife monitoring staff performed systematic searches of the twenty WTG search plots and three met tower search plots weekly, according to the approved monitoring regime during Year 5 (Table 2).

Because vegetation and ground cover can influence the detection of fatalities and behavior of scavengers, at the recommendation of USFWS and DOFAW, KWP has developed a coarse ground cover classification (bare, grass, shrub) to account for the effects of ground cover variability on carcass detection (Year 4 Annual Report, Appendix 10). While not specifically



prescribed in the HCP, it was agreed to as an adaptive measure that should improve the accuracy of our take estimates.

Table 2. Average number of days that elapsed between searches of downed wildlife monitoring plots by month at Kaheawa Wind Power during Year 5.

Month	Search Interval (days)	
	WTGs	Mets
July	7.43	7.06
August	6.85	7.00
September	7.05	6.50
October	6.74	6.98
November	8.14	7.25
December	7.60	8.50
January	7.74	7.58
February	6.81	6.83
March	7.26	8.78
April	7.00	7.00
May	7.33	7.07
June	7.05	7.05

Since 2007 we have possessed permits from the DLNR and USFWS to use Wedge-tailed Shearwater (*Puffinus pacificus*) carcasses as surrogates to assess searcher efficiency and carcass removal rates for the two listed seabirds at KWP. In 2009 we also contacted the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (Wildlife Services) in Alaska to inquire on the availability of goose carcasses, knowing the agency performs population control seasonally in the vicinity of airports in the south-central Alaska region. We started receiving carcasses of Lesser Canada Goose (*Branta canadensis parvipes*) late in FY-2010 and began incorporating them into trials at KWP in Year 5.

### Searcher Efficiency Studies

Searcher efficiency studies (SEEF) provide estimates of carcass detection probability and are an important component of downed wildlife monitoring at KWP. SEEF trials 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. Before initiating a SEEF exercise, specimens are removed from cold storage and thawed (usually overnight). Prior to the arrival of searchers to the site, carcasses are placed inside scheduled search plots according to whatever ground cover type has been pre-selected by tossing the carcass into the air and allowing the specimen to reach a resting position. On the same day, after the proctor completes the carcass drops, searchers perform their

scheduled surveys as normal and report observations and findings. Carcasses that go un-detected are collected and sometimes refrozen for subsequent use in CARE.

Project managers frequently discuss the results of SEEF exercises with monitoring technicians to assess factors that may have affected detection capacity under various search conditions, but proctoring details are not disclosed to monitors.

In Year 3 there were 46 SEEF trials performed at KWP using mostly medium-sized seabird carcasses (WTSH), representing by far the largest sample size among all years. A clear difference in detection rates depending on ground cover type is evident at KWP with a steady decline in detection rates going from bare ground to shrub (Fig. 3). These coarse ground cover parameters provide some indication of general conditions but many areas of mixed ground cover are present.

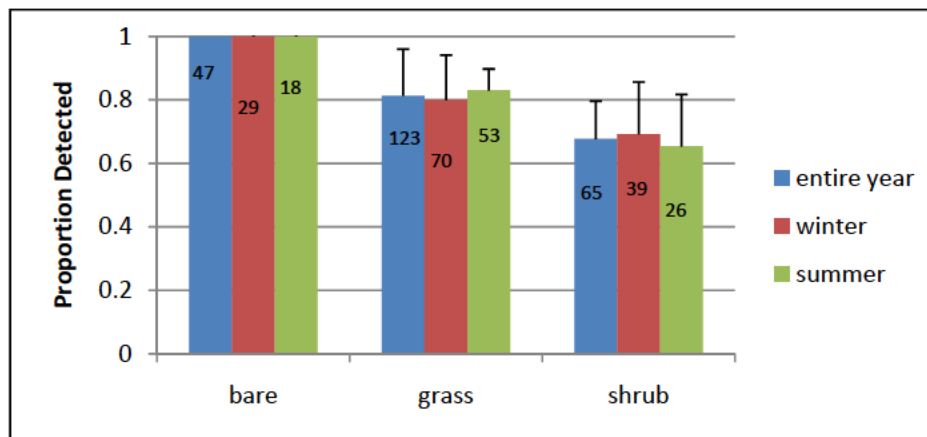


Figure 3 – Proportion of shearwater carcasses detected by searchers in three different ground cover types at Kaheawa Wind Power during Year 3 (n=235).

Nene may be more detectable than petrels and shearwaters in most types of ground cover due to their larger size. However, trials conducted in Year 5 using carcasses of Lesser Canada Goose resulted in detection efficiencies that were similar overall to what we observed for medium-sized seabird carcasses in Year 3 (Appendix 2).

### Carcass Removal Trials

The objective of performing carcass removal studies at KWP has been to determine the average amount of time an avian or bat carcass is expected to remain visible to searchers before being removed by scavengers or otherwise rendered undetectable. The length of time (expressed in

days) that a carcass remained visible to monitors was determined for each experimental carcass used in the trial. Mean carcass removal time was calculated for each carcass size class and vegetation type by summing the retention time for each carcass and dividing by the total number of carcasses used in the trial.

The HCP recommends that specimens shall be observed daily for the first 7 days of the trial, then again on Days 10 and 14. In order to obtain the most accurate estimate of carcass retention time, we checked carcasses on each of the 14 days the trials were in progress. On each day of the trial the status and condition of carcasses are assessed concerning presence/absence, evidence of scavenging and/or decomposition, change in position/location, visibility, and overall condition of the carcass. Table 3 provides a summary of the results of each trial conducted in Year 5.

Numerous trials have been conducted with Wedge-tailed shearwaters at KWP and we began using Lesser Canada Goose and small mammals in Year 5 as surrogates for Nene and bats.

Table 3. Number of days to scavenging events and disposition of Canada Goose (CAGO), shearwaters (WTSH), and small mammal (Norway rat and domestic rat, NORA and DOMO) carcasses used in CARE trials to estimate retention times for Nene, seabirds, and bats at KWP during Year 5.

Avian Carcasses				
Carcass ID	First scavenging	Increased scavenging	Most tissue removed	Days present and visible
CAGO - A	7	8	9	14
CAGO - B	3	4-14		14
CAGO - C	1	2-3	4	14
CAGO - D	6	7-13	13	14
CAGO - G	1	2-3	4	14
CAGO - H	3	4-9	10	14
CAGO - I	7	8-10	10	14
CAGO - N	2	3-8	10	14
CAGO - P	1	6-9	10	14
CAGO - CC	NO SCAVENGING OBSERVED			14
CAGO - II	8	9-14		14
CAGO - KK	NO SCAVENGING OBSERVED			14
CAGO - NN	NO SCAVENGING OBSERVED			14
CAGO - RR	1	2-8		14
CAGO - SS	NO SCAVENGING OBSERVED			14
WTSH - E	8	9		14
WTSH - F	1		2	14
WTSH - M	10	10-12	12	12
WTSH - O	1			2
WTSH - Q	8	9-12		12
WTSH - DD	NO SCAVENGING OBSERVED			14
WTSH - GG	1	2-9		10
WTSH - JJ	NO SCAVENGING OBSERVED			14
WTSH - MM	NO SCAVENGING OBSERVED			14
WTSH - PP	NO SCAVENGING OBSERVED			14
WTSH - TT	NO SCAVENGING OBSERVED			14



Small Mammal Carcasses				
Carcass ID	First scavenging	Increased scavenging	Most tissue removed	Days present and visible
NORA - J				5
NORA - K				3
NORA - L				3
NORA - R				1
NORA - S				5
NORA - T				2
DOMO - U	NO SCAVENGING OBSERVED			14
DOMO - V	NO SCAVENGING OBSERVED			14
DOMO - W	NO SCAVENGING OBSERVED			14
DOMO - X	NO SCAVENGING OBSERVED			14
DOMO - Y	NO SCAVENGING OBSERVED			14
DOMO - Z	NO SCAVENGING OBSERVED			14
DOMO - AA	NO SCAVENGING OBSERVED			14
DOMO - BB	NO SCAVENGING OBSERVED			14
DOMO - FF	NO SCAVENGING OBSERVED			14
DOMO - HH	NO SCAVENGING OBSERVED			14
DOMO - LL				5
DOMO - OO	NO SCAVENGING OBSERVED			14
DOMO - QQ	NO SCAVENGING OBSERVED			14

### Direct Observations of Incidental Take

Downed wildlife incidents documented at KWP during Year 5 are summarized in Table 4. Six of these incidents involved HCP-covered species; 5 Nene and 1 Hawaiian hoary bat.

Table 4. Documented wildlife fatalities at Kaheawa Wind Power in Year 5 (FY-2011).

Species	Date	Location (WTG)	Distance to turbine (m)	Type of Detection
<b>HCP-Covered Species</b>				
Nene	June 30 – 2011	12	19.0	Routine
Nene	May 31 – 2011	12	42.5	Routine
Nene	May 12 – 2011	20	40.0	Incidental/Supplemental
Nene	December 30 – 2010	18	13.4	Incidental
Nene	December 8 – 2010	13	33.4	Routine
Hawaiian Hoary Bat	April 26 – 2011	16	11.4	Supplemental
<b>MBTA and Other Non-Covered Species</b>				
White-tailed Tropicbird	June 27 – 2011	8	67.2	Incidental
White-tailed Tropicbird	May 23 – 2011	3	42.6	Incidental
White-tailed Tropicbird	August 3 – 2010	11	67.6	Incidental
Great Frigatebird	September 16 – 2010	17	30.0	Routine
Eurasian Skylark	May 26 – 2011	17	26.0	Routine
Japanese White-eye	February 22 – 2011	1	27.8	Routine
Black Francolin	November 22 – 2010	7	5.5	Routine

DOFAW officials on Maui collected each of the HCP and MBTA carcasses usually the same day. Copies of the reports detailing the circumstances associated with each incident are contained in Appendix 9.

### **Estimating the Adjusted Take of Covered Species**

Observed Direct Take (ODT) is a fundamental variable that is adjusted by applying results of SEEF, Carcass Removal (CARE) Trials, and search frequency to estimate the Total Direct Take, as described in Section V of the HCP. In Year 5, there were six (6) occurrences of Observed Direct Take (ODT) of Covered Species documented at KWP. In each case the cause of death is assumed to be project-related based on the proximity of the remains to project structures.

SEEF and Carcass Removal Trials, into their 6<sup>th</sup> year at the time of this writing, have been performed using mostly Wedge-tailed Shearwater carcasses and a few medium-sized birds (mostly introduced game birds) as surrogates for seabirds, which until Year 5 proved problematic for applying these results in calculations of adjusted take for Nene and Hawaiian Hoary Bats. Beginning in Year 5 we began using Lesser Canada Goose carcasses for Nene, which has significantly improved the accuracy of SEEF and CARE estimates for this species. Small mammals (Norway and domestic rats) were used as surrogates for bats in CARE and SEEF. Due to inconsistencies in the retention times of small mammals there needs to be a greater emphasis placed on conducting trials using bat carcasses.

As presented in Section V of the HCP, the components that go into estimating the Adjusted Take are, a) Observed Direct Take, b) Unobserved Direct Take, c) Indirect Take, and d) Loss of Productivity. The SEEF and CARE results are used to estimate the Unobserved Direct Take (UDT). To calculate adjusted estimates of the number of Nene and Hawaiian Hoary Bat fatalities that may have occurred at KWP in Year 5, based on five (5) ODT of Nene and one (1) ODT of a Hawaiian Hoary Bat, we used an estimator,  $m$ , as proposed by Shoefeld (2004) and Kerns and Kerlinger (2003) to estimate fatality rates using the formula:

$$m = \left( \frac{N * I * C}{k * t * p} \right) \left( \frac{e^{I/t} - 1 + p}{e^{I/t} - 1} \right)$$

where  $I$  (search interval), represents the number of days between plot searches,  $N$  is equal to the number of turbine search plots,  $k$  is the number of plots searched (in the case of KWP,  $N$  and  $k$  are the same value),  $t$  is the mean carcass retention time,  $p$  is used to represent the detection probability (searcher efficiency),  $e^{I/t}$  is a logarithmic value, and  $C$  is the actual number of carcasses observed (ODT) during downed wildlife monitoring.

Indirect take resulting from the loss of eggs or dependent young is taken into consideration on a species-specific basis and is dependent on the time of year in which the take occurs. Timing of each incident provides a basis for applying indirect take, while federal necropsy reports are expected to provide information on cause of death, condition of the individual, gender, maturity, and reproductive status. Two of the Nene incidents were documented during the known breeding season for Nene on Maui (although one of these incidents comprised only skeletal remains, and is therefore thought to have occurred prior to the breeding season); the other three include a juvenile and two birds presumed to be adults. Although there have been no veterinary examination reports made available from which to ascertain life history status of the other three birds taken outside the breeding season, indirect take is assessed for the individual taken on December 30, 2010 for purposes of estimating the adjusted take.

Because they are resident at Kaheawa on a year-round basis, Nene may be taken at any time during the year at KWP. We considered values for search interval (I) that corresponded to the mean search interval during the month was observed and carcass retention time (t) at the nearest point at which take occurred or an average of all retention times, whichever is more representative. We applied the detection probability (p) by pooling ground cover types since a more precise treatment of ground cover proportions is necessary in order to appropriately apply SEEF results according to these criteria. Table 5 (below) provides a summary of how these variables are applied to the Shoefeld (2004) formula to estimate total direct take for Nene and Hawaiian Hoary Bats in Year 5.

Table 5. Estimation of the Total Direct Take of Nene and Hawaiian Hoary Bats at the Kaheawa Wind Power facility during Year 5 (FY-2011).

Species	Date	C	N	k	I	t	p	$e^{-t/I}$	Indirect take	m
NENE	6-30-11	1	20	20	7.33	14	0.64	1.68805		1.579
NENE	5-31-11	1	20	20	7.33	14	0.64	1.68805		1.579
NENE	5-12-11	1	20	20	7.33	14	0.64	1.68805		1.579
NENE	12-30-10	1	20	20	7.60	14	0.64	1.72092	0.8005	2.402
NENE	12-8-10	1	20	20	7.60	14	0.64	1.72092		1.601
HHBA	4-26-11	1	20	20	7.00	9.4	0.30	2.10577		3.158

Total Estimated Adjusted Take in Year 5	
NENE	HHBA
<b>8.740</b>	<b>3.158</b>
Annual not to exceed Take Limit <sup>1</sup>	
<b>8</b>	<b>2</b>

<sup>1</sup> Incidental Take License No. ITL-08, Special Condition Nos. 6 and 7.

At the end of Year 5 estimates suggest that the annual take levels for Nene, when indirect take is applied, may exceed the take limits for a single fiscal year and are just below this limit on a running average at the Baseline level. After adjustments are applied, the estimated take levels for Hawaiian Hoary Bat appear to exceed those allowed in any given fiscal year in each year take was documented (2009 and 2011) and is running just over one take per year on average (Table 6).

Table 6. Current estimated take levels for Nene (NENE), Hawaiian Petrels (HAPE), Newell's Shearwaters (NESH), and Hawaiian Hoary Bats (HHBA) under the Kaheawa Wind Power HCP at the end of Year 5 (FY-2011).

Species	Adjusted Take by Fiscal Year				
	2007	2008	2009	2010	2011
NENE		3.34	1.30	1.28	8.74
HAPE		2.62			
NESH					
HHBA			2.84		3.16
Species	Running Annual Average (yr ending 6/30)				
	2007	2008	2009	2010	2011
NENE		1.67	1.55	1.48	2.93
HAPE		1.31	0.872	0.654	0.523
NESH					
HHBA			0.95	0.71	1.20

Running annual averages are based on 5 years since permit issuance.

When annual take levels are assessed for Hawaiian Petrel, including indirect take incurred in 2007, average take remains less than one individual per year at the end of FY-2011. No Newell's Shearwater fatalities have been documented at the site to date, and the adjusted take estimate for this species remains at zero.

#### IV. MITIGATION INITIATIVES

##### NENE

##### **Funding for Construction and Operation of a New Nene Release Facility**

Upon permit issuance, KWP set aside funds internally to contribute to a Nene propagation and release and/or translocation program, as prescribed in the HCP. At the request of the USFWS in December, 2007 KWP disbursed \$100,000 to the DLNR to support the first year of this project. A second payment of \$41,000 was made in February 2009 while a double-annual payment was disbursed in February, 2010. KWP made a final payment of \$41,000 to DOFAW in February, 2011 in fulfillment of Baseline mitigation requirements under the HCP. During Year 5 DOFAW

reports that the construction of the release pen has been completed and the first releases of birds were performed in May, 2011 (J. Medeiros, pers. comm.).

### **Funding for Nene Captive Propagation and Reintroduction**

As presented in the HCP, captive propagation of Nene goslings to compensate for take is closely tied to the construction of the new release pen. In December, 2007, 2009, 2010, and 2011 KWP disbursed funds to the DLNR to support this project (see above). DOFAW and USFWS recently conducted an interisland translocation exercise that resulted in birds from Kauai being relocated to the new release site that was completed in Year 5. An as-yet unconfirmed number of birds were released in the first reintroduction and the project is expected to continue in subsequent years.

## **HAWAIIAN PETREL AND NEWELL'S SHEARWATER**

### **Colony Searches to Identify Management Options in West Maui**

According to the HCP, the first priority for seabird mitigation for KWP has been to locate as-yet unknown or unconfirmed nesting colonies of Hawaiian Petrels and Newell's Shearwaters in West Maui, identify management needs, and where practicable, implement management measures that promote the recovery of the species by enhancing survival and productivity.

The discovery of Hawaiian Petrels at Makamaka'ole, West Maui in 2007 led to efforts to quantify the numbers of birds, their activity levels and distribution, and the numbers and locations of nesting sites in the area. Surveys conducted in the upper reaches of Kahakuloa Valley confirmed that in addition to Hawaiian Petrels, Newell's Shearwaters also frequented the area, though pinpointing the exact location of nesting colonies of both species in this higher elevation area proved difficult due to the remoteness, steep terrain, and frequent poor weather conditions (Fig. 4). Initial conclusions at the time were that few, if any practicable management options were available.



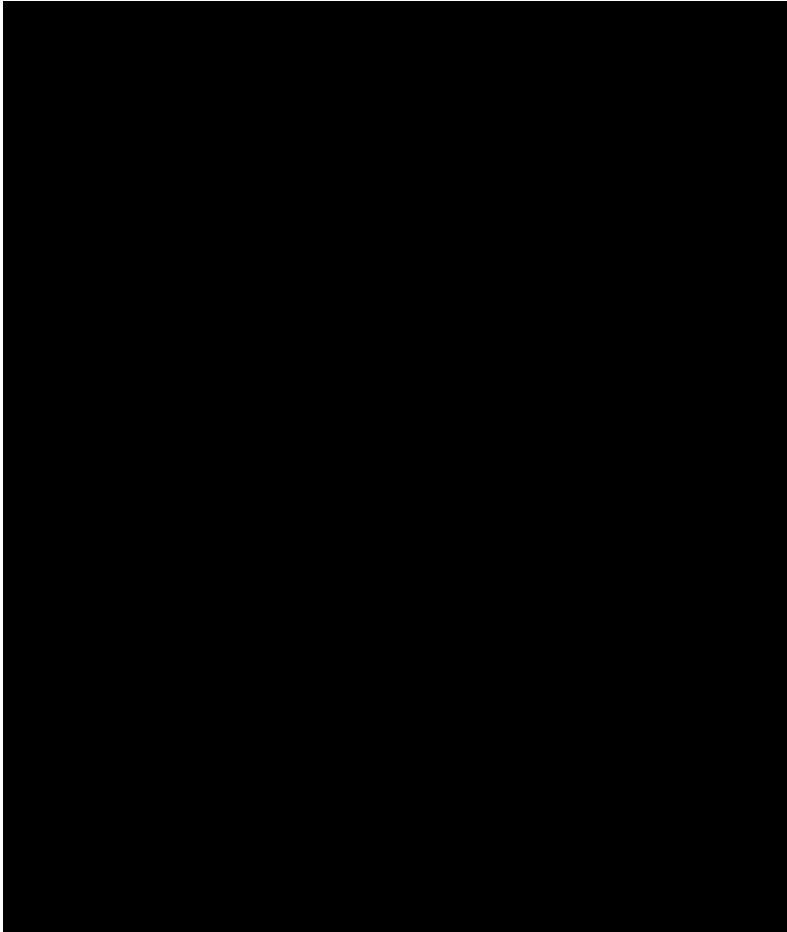


Figure 4 – Hawaiian Petrels and Newell’s Shearwaters detection sites documented by KWP biologists during field studies in 2007-2010.

Numerous visits including nocturnal observations at the Makamaka’ole site in 2008 and 2009 did not provide enough information on the exact location of nesting sites which was believed necessary to adequately inform the feasibility of protecting the suspected colony and advancing mitigation.

In February, 2010 KWP met with DLNR/DOFAW and USFWS to discuss how best to structure mitigation activities at Makamaka’ole in order to provide the most meaningful benefit to the colony. Because First Wind was preparing separate HCPs for projects on Maui and Oahu (KWP II and Kahuku Wind Power, respectively) that contained mitigation provisions for Hawaiian Petrels and Newell’s Shearwaters, the agencies and ESRC agreed the three projects should combine seabird mitigation resources at Makamaka’ole or another suitable site. Although the number and distribution of burrows at the site had not yet been confirmed, the 2010 Action Plan was submitted for review in May, 2010 outlining goals and objectives for the 2010 breeding season, which included social attraction and installation of artificial nesting burrows.

In July, 2010 DOFAW, with the concurrence of the Hawaii Seabird Working Group, USFWS, and the ESRC, recommended that KWP perform a more precise assessment of the project’s

feasibility before proceeding with the plan. In addition, it was recommended that KWP only proceed with social attraction in conjunction with a predator-free fenced enclosure, and only after confirming the presence and location of active burrows.

### **Makamaka'ole Project Feasibility Assessment**

The principle mitigation measure being proposed at Makamaka'ole is the installation of a cat-mongoose-rat resistant fence that would be designed to protect a seabird nesting colony from these mammalian predators. The feasibility assessment was designed to better define petrel activity levels, core use areas, movement patterns, nest distribution, and the site-specific factors affecting construction and maintenance of the proposed fenced enclosure. Once complete, the assessment was expected to provide information necessary to adequately inform the question of whether Makamaka'ole contains enough baseline reproductive capacity to respond favorably to proposed management actions. The specific tasks undertaken during the feasibility assessment included:

- Audio-visual point count surveys
- Radar surveys
- Searches for nesting burrows
- Fence construction feasibility
- Preliminary recommendations and feasibility assessment

Audio-visual point count stations were established in the vicinity of the suspected seabird colony to document localized activity in the area. Bird activity rates were analyzed to show changes in activity rates over the breeding season. A total of 19 point count surveys were performed between May 30 and August 12, 2010. Results indicated that a core area of high call frequency exists between point count stations 1 and 6, as shown in Figure 5 for the month of July. Fly-bys and paired flight displays typical of courtship behavior are common over the core area and appear to peak approximately 40-60 minutes after sunset before declining.

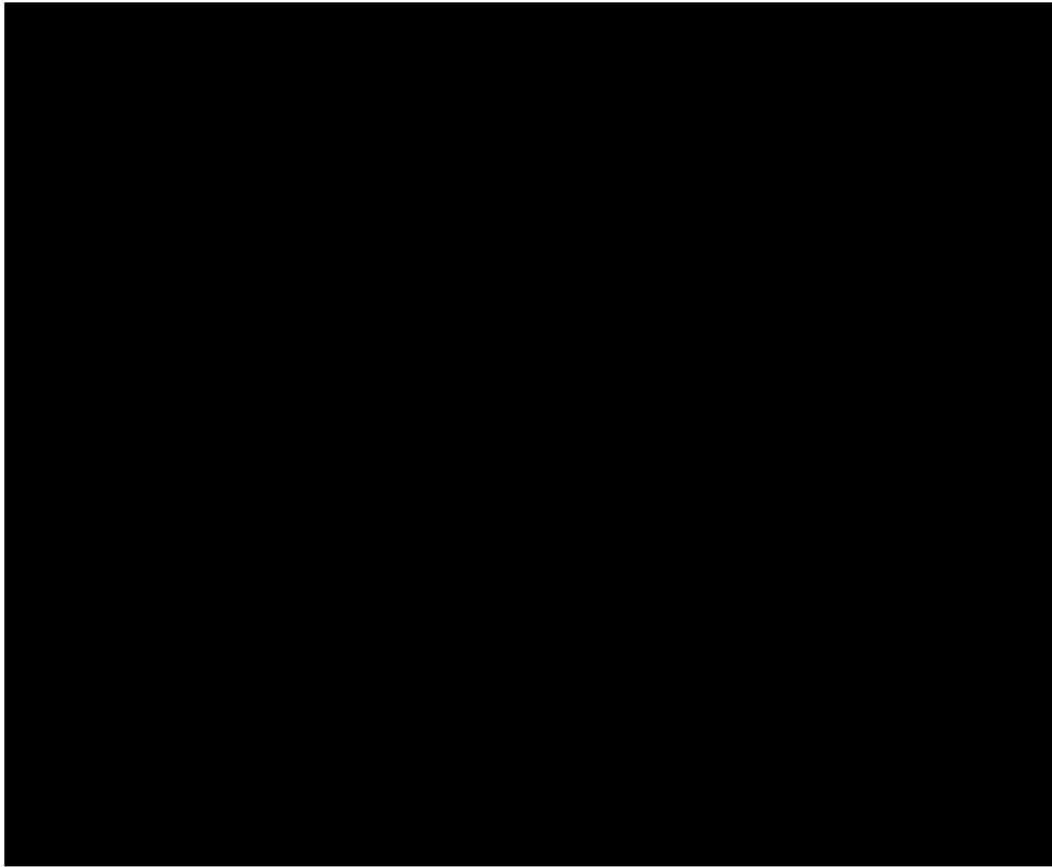


Figure 5 – Call frequencies measured from 5 locations where audio-visual point count surveys were conducted at Makamakaole in July, 2010.

We followed the methods developed by Day and Cooper (1995) for studying inland and seaward movements of Newell's Shearwaters and Hawaiian Petrels using a Furuno (Model FCR-1510) X-band radar mounted to an SUV and transmitting at 9.410 GHz through a slotted wave guide with a peak power output of 12 kW. The antenna face is tilted upward by  $\sim 10^\circ$ , and operated at a range setting of 0.75 km and a pulse-length of 0.07  $\mu$ sec. Audio visual point counts were performed from 1-2 stations concurrent with the radar surveys during May, June, July, and August 2010. In addition to Hawaiian Petrels, we detected Newell's Shearwaters on 8 out of 14 sampling nights and a maximum of 13 Newell's Shearwaters flying over Makamaka'ole during audio-visual point count surveys conducted at the site during late June through early August, 2010. We found that as movement rates of targets observed on radar begin to decline, numbers of auditory detections increase at point count stations, suggesting that some birds moving through the Makamaka'ole Valley are remaining in the vicinity of the study area (Fig. 6).

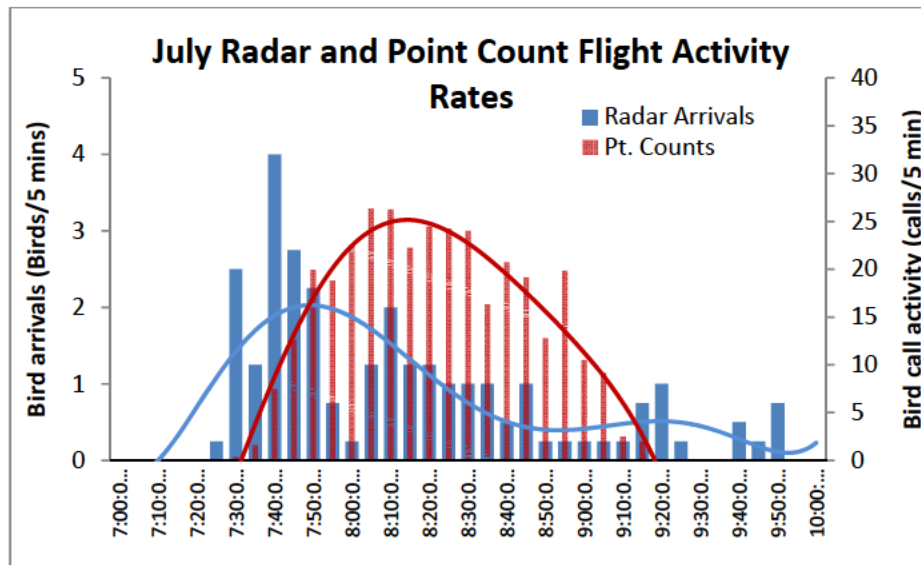


Figure 6 – Inland movement rates and activities of petrel-like targets observed on radar and during audio-visual point counts conducted at Makamaka’ole in July, 2010.

In addition to audio-visual point counts and radar surveys to assess movements and activity levels of petrels and shearwaters over the study area, we also conducted a broad and intensive ground search effort to locate nesting burrows. Our searches were performed by 2-5 biologists from June through October, 2010 and GPS was used to quantify the areas that were searched. In addition, many adjacent areas were searched that were not documented with GPS. Despite substantial effort to locate nesting burrows, progress was slow and secondary signs such as guano and feathers were significantly lacking. In September, as the numbers of non-breeding birds began to decline sharply, we re-directed our nocturnal efforts and used IR night vision goggles (NVGs) to scan what was considered the “core activity area” in an effort to locate and track birds that would presumably be returning to their nesting sites to provision chicks. We successfully identified a Hawaiian petrel that displayed behavior characteristic of a breeding bird returning to a nest site and following several repeated passes (a strong indication of this behavior), we watched the bird drop into the canopy. This provided a compelling piece of information that was previously lacking and we chose to search the area during the subsequent joint-nesting burrow search effort with DOFAW biologists planned for early October, 2010.

On October 6, 2010 DOFAW biologists Fern Duvall, Jay Penniman, and Sandee Hufana joined First Wind biologists for a cooperative search effort that entailed an initial overview of the search area, search methods and areas covered previously during the season, and a discussion of the observations made several days earlier of a petrel presumably returning to a nesting site on the narrow ridgeline between the two adjacent sections of Makamaka’ole Stream, within the core activity area. The team directed its initial search effort in the vicinity of where the returning bird was believed to have entered the canopy. First Wind and DOFAW biologists nearly simultaneously discovered some fresh feathers and nearby carcass remains of Hawaiian Petrel.



The remains appeared several months old. Additional searching in the vicinity of the remains revealed the entrance to a nesting burrow. No other burrows were discovered during the cooperative search efforts on October 6, though 2 old and long unused burrows were identified further up the central Makamaka'ole ridge during a subsequent search effort in October, 2010.

During the December 6th ESRC meeting in Honolulu, three options were proposed by DOFAW and First Wind to address remaining uncertainties about the number and distribution of Hawaiian petrel (and possibly Newell's shearwater) nesting burrows at Makamaka'ole. These included:

1. DOFAW biologists to direct, train and/or work in close cooperation with First Wind biologists, to conduct systematic searches for burrows;
2. Select a Third Party to perform systematic searches for nesting burrows; and
3. First Wind to explore the use of dogs that have been specially trained to search for nesting burrows and report on the feasibility of this method for implementation at Makamaka'ole.

First Wind, having proposed the idea, agreed to proceed with recommendation number 3. First Wind contacted several *Pterodroma* petrel researchers in New Zealand and Australia to learn more about the use of trained dogs for petrel management and conservation. We were directed to the services of Ecoworks New Zealand, a group of conservation professionals that specialize in the use of trained dogs and other services that support the recovery of several threatened petrel species.

We prepared a formal work plan and consulting agreement with Ecoworks that included bringing 2 specially-trained conservation detector dogs and their skilled handlers from New Zealand to Maui during the 2011 breeding season and submitted a project scope to USFWS and DOFAW on December 16, 2011. The plan detailed a process for implementing the surveys including a timeline that would coincide with the peak burrow occupancy period for breeding adults and prospecting pre-breeders in order to maximize the probability of success. As planning proceeded, a project update was submitted to the agencies in March, 2011 that provided the results of preliminary Hawaiian Petrel population modeling (Ainley et. al. 2011) intended to evaluate mitigation success projections under various active burrow scenarios.

The dog-assisted Hawaiian Petrel (and Newell's Shearwater) nesting burrow searches at Makamaka'ole were scheduled to take place July 9 – August 1, 2011 (and as of this writing, the surveys have been completed). Throughout the planning and coordination process leading up to the nesting burrow searches we anticipated that some burrows would be discovered and we have continued working closely with the modeling team to refine the models for Hawaiian Petrels and Newell's Shearwaters and plan various contingencies depending upon the outcome of the search effort and its affect on the overall assessment of project feasibility.

## **Planning for Mitigation Contingencies**

Recognizing that uncertainties concerning the feasibility of Makamaka'ole as a site that can achieve mitigation criteria for Hawaiian Petrels and Newell's Shearwaters, KWP and its other First Wind project collaborators under the joint-project scenario have been evaluating several potential contingency sites that include:

### ***Hawaiian Petrels***

1. Haleakala National Park (South Rim, previously unmanaged section of the nesting colony);
  - Control mongoose, cats, and possibly rats by trapping and removal to reduce predation mortality of breeding adults, prospecting pre-breeders, chicks, and eggs.
2. Cooperate with the National Science Foundation to enhance proposed Hawaiian Petrel mitigation measures being implemented under an HCP by the Advanced Technology Solar Telescope (ATST) *or* coordinate with the ATST to take over mitigation after the ATST meets its projected mitigation obligation >year 6;
  - Measures might include upgrading of the proposed ATST ungulate fence to a cat and mongoose-proof configuration, or
  - Take over the same set of mitigation measures being implemented at the ATST site once ATST has sufficiently met its mitigation obligations.

### ***Newell's Shearwaters***

In April, 2011 the USFWS announced that in order to complete their Findings of No Significant Impact and Biological Opinion under the provisions of their NEPA review process for KWP II, First Wind must demonstrate that mitigation for Newell's Shearwaters is possible on the island of Maui, where additional shearwater take is being requested and is already permitted for KWP. Thus, the guidance KWP received from the USFWS was to direct seabird mitigation resources in Year 5 to identify colony-based mitigation options for Newell's Shearwaters on Maui.

USFWS suggested several locations where recent and historic records suggest Newell's Shearwaters may be breeding, but where feasibility had either been assumed to be low, or had not been evaluated. These sites include:

#### **1. Upper Kahakuloa Valley**

- This site is believed to be located inside the Kahakuloa Natural Area Reserve in West Maui and was identified by KWP biologists in 2007 but at the time was determined to not represent a feasible management opportunity (discussed above);

- KWP submitted an application for a Special Use Permit from the Natural Areas Reserve System (NARS) in May, 2011 requesting permission to establish a landing zone and 3-4 audio-visual point count stations to determine whether a colony exists and management options are feasible;
- Extensive review by the NARS Commission and coordination with local Maui NARS personnel is expected to result in the issuance of the Special use Permit sometime in early July, 2011.

## 2. Koolau Gap (Waikamoi Preserve, Hawaii Nature Conservancy)

- Several observations (published and unpublished) over the years suggest there may be (or may have been) a colony somewhere in this area but historic observations have never confirmed the presence of a nesting colony;
- KWP is coordinating with the Hawaii TNC and has obtained permission to access the area during the 2011 seabird breeding season to conduct audio-visual point counts in an effort to pinpoint a focal activity area that might reveal the presence of a nesting colony.

## Kaupo Gap (Kipahulu Valley, Haleakala National Park)

- Recent and historic records indicate some Newell's Shearwaters are heard calling in the remote portions of this area;
- Inquiries with the National Park Service (NPS) indicate that regardless of whether a Newell's Shearwater colony may exist in this area, the NPS will not support any additional management actions in this sensitive ecological region in the foreseeable future.

## Kauaula (West Maui NAR, Panaewa Section)

- We received a report from MISC personnel that Newell's Shearwaters were heard calling in the vicinity of Kauaula LZ in early June, 2011 and are following up on this report.

## Various options on the island of Kauai

Despite the guidance we received from the USFWS that mitigation for requested take of Newell's Shearwaters must be implemented on the island of Maui, there is the possibility that field investigations will determine that no management opportunities currently exist or are otherwise infeasible. Several known breeding areas for Newell's Shearwaters currently exist on Kauai, yet none presently receive any measureable protection or management actions that are directed at significantly reducing mortality due to introduced predators and improving productivity. Though not presently consistent with guidance offered by the USFWS, we believe

it is prudent to consider how KWP could satisfy mitigation requirements for Newell's Shearwaters on Kauai in the event that management options on Maui are insufficient.

KWP and its collaborators are working to gain access to each of these sites in order to identify which, if any represent a feasible opportunity to implement management actions that would offset threats, protect breeding birds, promote increased productivity, and translate into mitigation credit and net benefit for these species.

## HAWAIIAN HOARY BAT

### **Monitoring to Assess Presence and Activity Levels**

Visual detections of Hawaiian Hoary Bats at KWP are very infrequent. In fact, no confirmed sightings of bats occurred during the entire first year of project operations while systematic visual observations were performed by KWP biologists as prescribed in the HCP. Two separate bat sightings were reported by contractors in Year 2, but subsequent interviews did not provide enough information to confirm the reports. Since August, 2008 KWP biologists have been using Anabat (Titley Electronics, New South Wales, Australia) remote acoustic data loggers to monitor the presence of bats at KWP and the proposed KWP II project sites.

Each Anabat station consists of a detector attached to a double T-post platform and programmed to record on a 12-hour duty cycle (1800-0600) at a height of about five feet above ground level along an elevation gradient between roughly 1900-3200 ft (above mean sea level). Every 7 days (on average) the systems are inspected to ensure they are working properly and data are downloaded from internal CF storage cards. Recorded call files are sorted by detector-night and visually inspected on a computer screen using Analook<sup>®</sup> software and custom filtering tools to determine whether recorded sound files are recognizable as qualifying Hoary Bat calls based on the known shape and frequency profile displayed by this species.

Summary data provided in Table 7 (below) include the total qualifying bat passes recorded for 9 operating detectors in Year 5 (Fig. 7). Passes are defined as call sequences containing three or more distinct call pulses. Detection rates were calculated for each detector based on the number of bat passes and the number of nights during the deployment period in which the detectors were fully operational (also known as detector-nights).

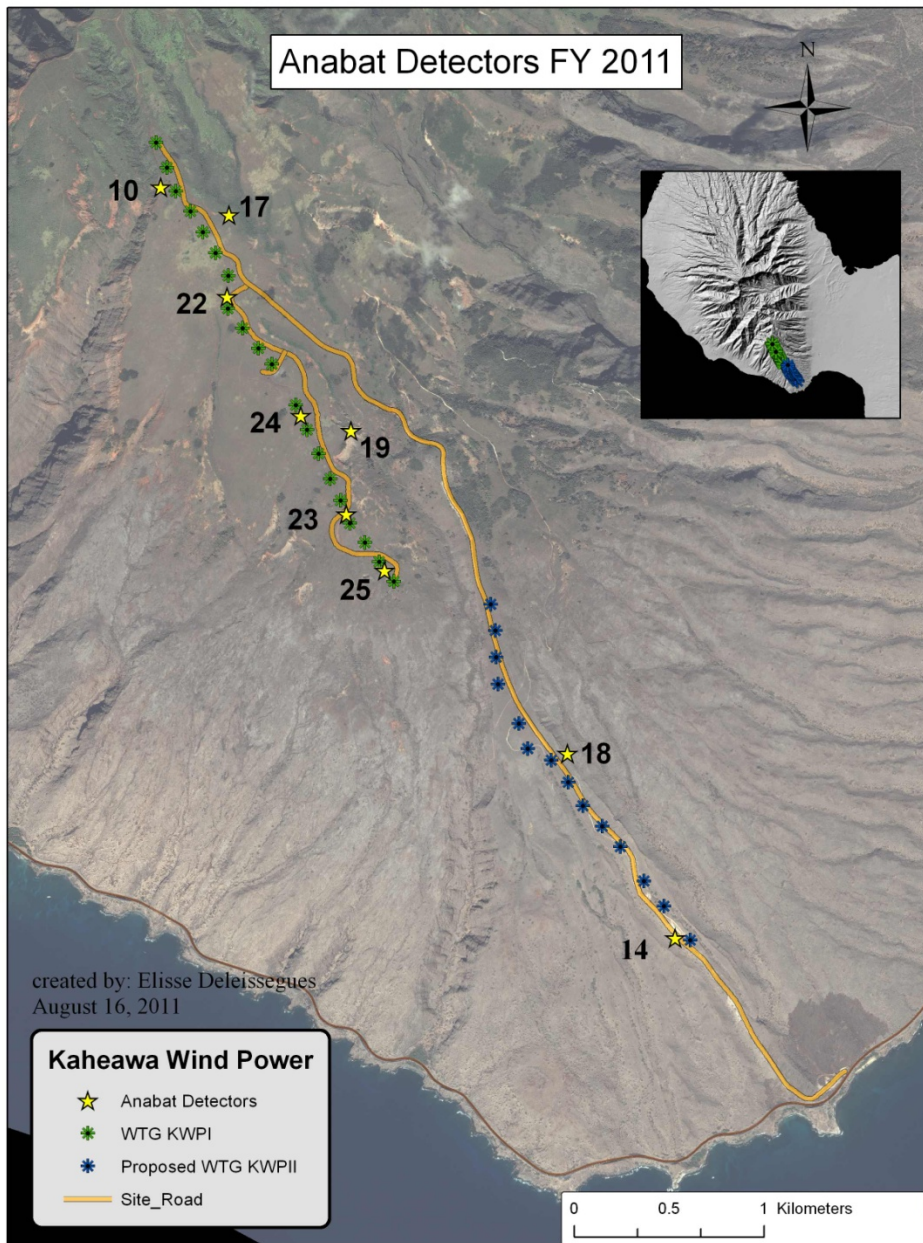


Figure 7 – Locations of Anabat acoustic detectors used to monitor the presence of Hawaiian Hoary Bats at the KWP and KWP II project areas in Year 5 (FY-2011).

Overall, 96 qualifying bat passes were documented within the monitoring area from July 1, 2010 through June 30, 2011. Seventy-six per cent of the documented passes in FY-2011 were recorded during the months of September and October, 2010, coinciding with post-lactation dispersal documented for Hawaiian Hoary Bats on the island of Hawaii (Fig. 8) (Menard 2001).



Table 7. Frequency of Hawaiian Hoary Bat passes recorded by Anabat acoustic detectors at Kaheawa Wind Power, West Maui, July 2010 – June 2011.

Detector ID	Location	Survey Dates	Detector Nights	Passes	Total Detection Rate (passes/detector night)
10	KWP I	07/01/10-06/30/11	324	26	0.080
17	KWP I	07/01/10-06/30/11	335	10	0.030
19	KWP I	07/01/10-06/30/11	356	12	0.034
22	KWP I	07/01/10-06/30/11	250	4	0.016
23	KWP I	07/01/10-05/12/11	184	6	0.033
24	KWP I	07/01/10-04/22/11	96	0	0.000
25	KWP I	07/01/10-01/25/11	43	0	0.000
14	KWP II	07/01/10-06/30/11	364	25	0.069
18	KWP II	07/01/10-06/30/11	325	13	0.040

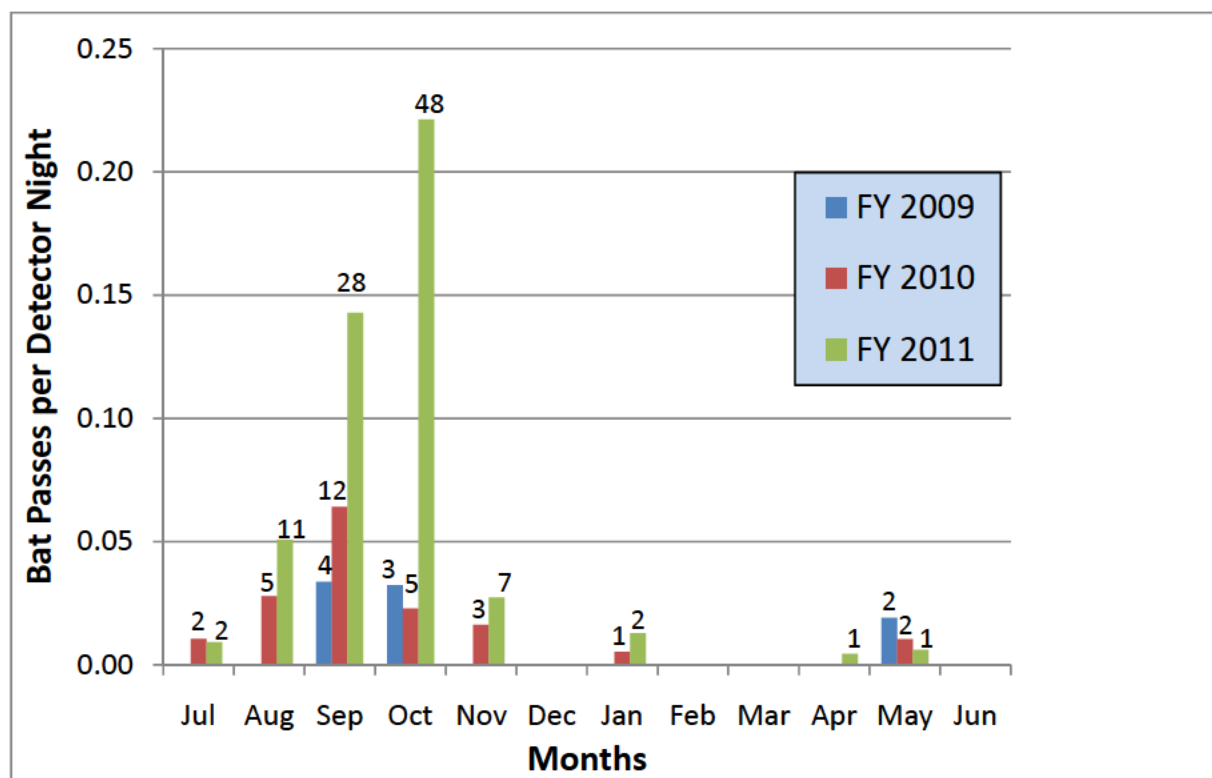


Figure 8 – Cumulative distribution of Hawaiian Hoary Bat passes documented at Kaheawa Wind Power, West Maui (2008-2011).

It should be noted that the majority of detections have been documented at the two most active Anabat stations (10 and 14). Consequently, these two monitoring stations have been established as long-term reference sites. The higher overall detections documented in 2011 are probably related mostly to the locations that have been selected for monitoring, rather than an increase in the numbers of bats. We moved detectors around extensively during the first 2 years of acoustic

monitoring because it was unclear where sampling would provide the most representative data on bat activity and presence. The 2011 data suggest that we are now sampling areas where bat detection probability is greater than where we had been sampling previously. Monitoring efforts planned in FY-2012 are expected to continue providing information necessary to guide risk analyses and management considerations toward minimizing project-related impacts to Hawaiian Hoary Bats at KWP and the proposed KWP II project areas.

## V. WILDLIFE EDUCATION AND OBSERVATION PROGRAM

### **Personnel Orientations, Information Exchange, and Reporting**

The Wildlife Education and Observation Program (WEOP) continues to be an important impact avoidance and minimization measure that has proven to be a valuable component of the HCP. KWP maintains an active and well coordinated wildlife orientation and outreach process for all personnel on site. Numerous staff, contractors, and visitors regularly perform activities at KWP which necessitate timely orientations with personnel as they arrive at the work site. These frequently include refresher sessions for those present on a longer-term basis and as circumstances warrant. Regular staff and visitor updates provide timely information on recent wildlife observations, such as adult Nene pairs browsing in the vicinity of work zones or travel corridors, current levels of Nene activity being observed on site such as the presence of family groups and goslings, and include recommendations for safely performing activities in the vicinity of covered wildlife. The WEOP orientations include verbal and visual descriptions of the covered species, an overview of requirements and guidelines for minimizing interactions and disturbance to wildlife, and instructions for reporting observations. In addition, all staff and project personnel are issued two laminated fact sheets explaining the natural history of each HCP covered species along with detailed procedures for promptly reporting any downed wildlife events. Throughout the year, and especially during the Nene breeding season, regular staff updates by KWP biologists, sometimes in coordination with DLNR/DOFAW, enable KWP and contractor personnel to anticipate the likelihood of encountering Nene on the site. These measures enable project personnel to report their observations and exchange important information with wildlife staff in a timely and proactive manner.

KWP Operations staff are required to inform the Senior Wildlife Biologist in advance of new personnel arriving to ensure that adequate wildlife orientations are provided. A Wildlife Observation Logbook is posted on site and enables all staff and contract personnel to record the details of their observations of HCP and non-HCP covered wildlife. The logbook contains fields for entering data that include:

- Observer Name, Date and Time of observations
- Species and Number of Individuals
- Location

- Proximity to Wind Turbine(s) and other Structures
- Apparent Behavior
- Estimated Height Above Ground (in meters) if observed in flight
- Flight Direction
- Pertinent Comments
- Weather

The Logbook has proven an effective means of obtaining observations that might otherwise have not been possible relying on verbal communication alone. Observations recorded in the WEOP logbook during Year 5 are summarized in Appendix 7. The WEOP guidelines and protocols have significantly improved our ability to track and monitor the movements of Nene and other wildlife on site, even when environmental staff can not directly observe their presence. Prior to their participation at KWP, many of the operations and maintenance personnel and contractors have had few opportunities to view species like Nene in the wild. Thus, this program serves to promote a sense of responsibility for these species and their habitats, and has been an important part of our efforts to care for the well-being of HCP covered species. Furthermore, WEOP provides broad training capacity that reaches all site participants. As a result, it has facilitated the timely documentation and reporting of several downed wildlife incidents independent of routine downed wildlife monitoring.

## VI. BOTANICAL RESOURCES

Several botanical resource assessments have been performed at KWP in the past. Those conducted since formal operations began in June, 2006 are summarized in the Year 3 Annual Report (Kaheawa Wind Power 2009). Those surveys focused primarily on describing the plant community on the KWP site and along the access road prior to construction of the facility and road network, in addition to identifying sensitive native plant communities and ESA-listed plant species that occur in the search plot overlap portions of WTG 1-3. In January, 2009 a survey was performed on and adjacent to the KWP site to document any changes in the plant community following the 2006 wildfire (Hobdy 2009). None of the species identified in this survey are classified as Threatened, Endangered, or candidates for listing under the provisions of the federal ESA. No conditions warranted nor resulted in the commissioning of botanical assessments in Year 5.

No significant or apparent impacts are known to have occurred in the search plot overlap portions of Papalaua and Manawainui Gulches and WTG 1-3 in Year 4. All of the downed wildlife monitoring in this area is performed from outside the sensitive overlap portions of these plots. The fenceline installed by DLNR and its partners along the edge of Manawainui Gulch appears weathered but intact and free of breaches, and no feral animals have been observed

anywhere near these areas. Thus, there is no reason to believe that any increased or cumulative impacts to the sensitive botanical resources in these areas are occurring.

### **Native Plant Establishment**

During the first year of project operations, KWP began implementing a native plant reestablishment program intended to restore important native plants common in the region and in the foot-print of the project area. This was a requirement under the terms of the CDUP (MA-3103) for the project and involved considerable coordination with other conservation partners, volunteers, and the community. These outplantings continued for 3 consecutive years and resulted in nearly 25,000 native plants comprising six species (*Metrosideros*, *Dodonaea*, *Bidens*, *Heteropogon*, *Wikstromia*, and *Scaveola*) which were, with the exception of *Heteropogon*, grown solely from seeds collected at Kaheawa with survival estimated to be on the order of 80-90% overall. In part, through successful long-term working relationships with Maui Cultural Lands, Inc. and other conservation groups, including local native plant growers and restoration enthusiasts, significant portions of the site are becoming re-established with native species common in the area. By Year 5 it has become evident that most of the planted areas are maturing and increased substantially in overall ground cover, canopy area and stature, and diversity – resulting in enhanced retention of propagules, natural recruitment and soil stabilization (Fig. 9 and 10).



Figure 9 – Three year old ‘a’ali’i grown from seed and out-planted on a previously bare fill slope adjacent to WTG-8 at the Kaheawa Wind Power facility in 2010.



Though considered appropriate at the time, many of the outplanted areas are within the downed wildlife search areas. Five years into project operations many of these previously bare areas are now dominated by shrub canopy cover that has essentially reduced the detection capacity of searchers that monitor the area for avian and bat fatalities. This outcome was probably not anticipated and has become a concern given the increased emphasis on controlling vegetation in the search areas to improve and maintain a high downed wildlife detection capacity (see below).



Figure 10 – Mature Pili Grass planted as seedlings at the Kaheawa Wind Power facility on Maui.

### **Minimizing and Managing Invasive Species**

KWP continues to work actively with stakeholders, agency staff, construction teams and contractors, and several conservation groups on Maui to minimize the ingress of undesirable invasive plant species in the Kaheawa area. Most of the invasive and incipient species that dominate portions of the Kaheawa landscape also degrade the value of available habitat for species like Nene. Though most of these “pasture weeds” have been tolerated for years, KWP recognizes the need to identify and manage new ingress and to work pro-actively with the DLNR to manage invasive outbreaks as they arise.

Soon after Fireweed (*Senecio madagascariensis*) was first encountered at Kaheawa following the 2006 wildfires that swept through the region, KWP biologists co-established the Fireweed Working Group to address the Fireweed issue and its potential to affect the landscape of West Maui. The group is composed of representatives from the County of Maui, State of Hawaii, Maui Invasive Species Committee, Maui Cattleman’s Association, KWP, and other concerned



parties. This species has been a considerable concern for rangeland managers throughout Hawaii for many years because of its toxicity to livestock. KWP continues to welcome the support and collaboration we share with the DLNR, USDA Rangeland Extension Office, and the State Plant Quarantine Division to evaluate constructive management options to control this invasive species.

Construction activities associated with the KWP II facility began in December, 2010. An environmental consultant, Land Services, Inc. (LSI), was retained in part to inspect all incoming vehicles and equipment prior to proceeding to the KWP II and KWP project areas in order to minimize and where practicable completely eliminate the likelihood of unwanted invasive species introductions during the KWP II construction phase. Prior to construction, First Wind and LSI consulted with the Maui Invasive Species Commission (MISC) to ensure that minimization, avoidance, and monitoring protocols were adequate. During the planning process MISC personnel concurred that these protocols represent the most practical set of measures that could be implemented to ensure adequate screening of incoming vehicles and equipment prior to entering the work site. There have been no reports of new ingress or outbreaks of invasive species documented at the KWP or KWP II facilities in Year 5.

### **Vegetation Management to Improve Downed Wildlife Detection**

The Year 4 Annual Report contained a proposed vegetation management plan that provided the rationale and methods for managing vast sections of the downed wildlife search plots at KWP. This plan was reviewed by DOFAW and USFWS and resulted in a site visit with the Conservation Initiatives Coordinator (Sandee Hufana) on October 28, 2010. The site visit was coordinated to enable DOFAW to ask questions and understand what exactly was being proposed and how the proposed methods were expected to result in minimal impact to native plant species in the course of the management activities. On November 15, 2010 DOFAW approved the plan in writing.

The first round of vegetation management consisted of mowing/brush cutting using a Bobcat and mower attachment. As described in the management plan, each day prior to initiating mowing activities KWP wildlife staff conducted pre-treatment clearing surveys to ensure that Nene and other wildlife were not occupying the planned work areas. In addition, sensitive portions of the treatment areas were identified and discussed with the Bobcat operator to ensure adequate avoidance procedures were in place to minimize impacts to native species. During the initial round, roughly 60% of the areas accessible to the Bobcat were treated. Results suggest that substantial areas within the 73 meter search plots can be maintained in this manner, but that rocks and terrain features will prohibit access in others.

The next round of vegetation management commenced in January, 2011 and was directed at removing large stands of invasive trees (Ironwood, Silky oak, and Christmasberry) and shrubs

(Christmasberry and Lantana) within the plots. Some of these stands had grown to considerable proportions since project operations and monitoring commenced in 2006 and their removal has increased visibility within the search areas significantly. Woody debris resulting from the clearing and removal of trees and shrubs was removed from the project site, disposed of at the County Green Waste facility in central Maui, while some was chipped and spread over the cleared areas previously occupied by these dense stands. Results have been very encouraging to date.

We chose to curtail vegetation management activities after the first round of tree and dense shrub removals until after the Nene breeding season due to sensitivities associated with possible disturbance of family groups. In addition, the DLNR Land Division on Maui received a report from a volunteer that erroneously reported that KWP was creating a roadway where no road previously existed in the native species-dominated WTG-3 search plot area. The report raised concerns and a follow up site visit was coordinated with DLNR Division of Conservation and Resource Enforcement (DOCARE) officers who met with Greg Spencer (KWP Senior Wildlife Biologist) to gather additional information and otherwise substantiate the report. The DOCARE officers were impressed with the achievements that were evident (namely the complete removal of a large stand of ironwood) during their site visit. Greg agreed to complete a report outlining the events and circumstances that led to a skid-track through the brush where some of the heavy debris was dragged to the roadside where it could be loaded and removed from the site. Because there was no violation of the CDUP, no citation was issued and KWP agreed to replant roughly 30 individual Ohia and pukiaawe in the skid track, which was considered commensurate with the estimated number of plants that were impacted during the debris removal. This report is contained in Appendix 10 of this report.

The next round of vegetation management is anticipated early in Year 6 and will include brush cutting and mowing in addition to follow-up cutting and removal of additional trees and shrubs.

## VII. ADAPTIVE MANAGEMENT CONSIDERATIONS

Adaptive management provisions are an inherent and necessary component of this HCP, providing a mechanism to make adjustments to mitigation and other project functions as new information derived from monitoring and reporting becomes available to inform success or identify challenges as they arise. In the case of Nene, as stated in the HCP and in Special Condition No. 6 of the ITL,

*“Incidental take of Branta sandvicensis authorized under this license exceeding a running average of three per fiscal year, or greater than eight in any one fiscal year, requires the development and implementation of adaptive management strategies approved by DLNR and USFWS and reviewed by the Endangered Species Recovery Committee in accordance with the HCP”.*

At the completion of Year 5, incidental take for Nene appears to have slightly exceeded the limit of eight birds during fiscal year 2011 based on five documented Nene fatalities, while the corresponding running average remains fewer than three birds. Although Nene mitigation appears to be proceeding and can be expected to result in a net benefit for this covered species at the current expected rate of take, adaptive management options should be developed and, if necessary, implemented according to the provisions of adaptive management built into the HCP.

Take levels for Nene in 2011 increased sharply toward the end of the fiscal year for reasons that may be explained but are difficult to quantify because Nene are present year-round in the project area and their habits are sometimes difficult to predict. One explanation for the unexpectedly high take levels documented in the last weeks of 2011 may relate to the timing of seeding and revegetation associated with the new KWP II Battery Energy Storage System (BESS) facility adjacent to the KWP site. In accordance with the project's storm water management plan (NPDES), the bare areas surrounding the foundation of the new facility were seeded with Annual rye grass in order to stabilize soils and reduce and/or eliminate storm water discharge into the adjacent gulches during rainfall events. This coincided with the post-nesting season flocking period for Nene, when adults and hatch year juveniles aggregate in areas that provide ample browse, reasonable shelter and which facilitate social interaction prior to fledging and post-breeding season dispersal. Beginning in late April, 2011 we noted that substantial numbers of flocking Nene were present on a regular basis at the BESS, favoring the newly emergent rye grass that was filling in on the treated slopes. Two Nene were killed as a result of collisions with WTG-12 over a 4 week period, signaling to KWP biologists that the newly establishing vegetation at the BESS may have created an increased risk of collision for these birds.

Recognizing the correlation between the high numbers of Nene occupying the BESS and the higher than normal level of take documented at a single turbine, KWP immediately implemented measures to eliminate the attraction offered by the rye grass by placing 2-4 inch rock rip-rap onto the slopes, essentially burying the rye grass and maintaining the slope stabilization measures required under the NPDES permit. This immediately discouraged use of the site by birds, substantially reducing the risk of take.

KWP welcomes the cooperation of DOFAW, USFWS, and the ESRC in reviewing avoidance and minimization and developing adaptive management measures to address the unusually high take of Nene documented in Year 5.

On January 24, 2011 the USFWS approved KWP's request for a Minor Modification to the HCP which clarifies that a return to baseline under the Safe Harbor Agreement at the initial Nene release site within the 20-year term of the ITP and ITL would constitute failure of the initial mitigation site and trigger construction and operation of a second (replacement) pen at a site to be selected by DOFAW. The modification includes revision of item 3 under the Nene mitigation and adaptive management discussion headings on pages 62-63 of the HCP.

## VIII. CHANGED OR UNFORESEEN CIRCUMSTANCES

There were no events or circumstances that would be considered changed circumstances during the Year 5 reporting period at KWP. There has been considerable regeneration of the ground cover and vegetation in the entire region following the wildfire in June 2010 which consumed an estimated 6,400 acres of grasslands and mostly invasive stands of forest in West Maui. There were no unforeseen circumstances at KWP in Year 5.

## IX. FUNDING

A summary of HCP-related expenditures for Years 5 is contained in Appendix 11. This summary lists all costs (including staff labor) that KWP has expended toward fulfilling the terms of the HCP in Year 5, and compares them against the budgeted amounts specified in Appendix 11 of the HCP. Total expenditures exceed the total budgeted amount for the five-year period. Expenditures within categories do vary, however. For example, Nene expenditures initially lagged due to the one-plus-year delay that occurred before commencing payment of the Nene propagation funds to DOFAW. A double payment was disbursed in 2010, which should bring this into line. Spending on seabird mitigation also was initially lagging slightly, but has since exceeded the originally-budgeted amount due to the costs associated with current management initiatives and studies at the Makamaka`ole site. Spending has exceeded budgeted amounts for fatality monitoring and is expected to remain at levels exceeding the figures listed in Appendix 11 of the HCP as a result of cooperative monitoring with DOFAW that is expected to commence in Year 6. The rate of spending on monitoring should decrease markedly once a sufficient long-term monitoring plan is adopted in subsequent years, however will likely continue to exceed budgeted amounts for the foreseeable future. Also included in Appendix 11 is a summary of the three Contingency Funds and related interest accrual at 2.5% annually per the HCP and Implementing Agreement.

Finally, a listing of additional conservation measures being implemented by KWP and their approximate costs is provided. These are either related to CDUP compliance, or voluntary on the part of KWP. They are not included in the HCP budget.

## X. LOOKING AHEAD

The HCP provides for a wide range of avoidance, minimization, and mitigation measures intended to result in a net conservation benefit for the four covered species. KWP has continued

to implement these measures in accordance with the HCP and the recommendations provided by DLNR, USFWS, and the ESRC through the fourth full year of implementation. Several specific items have been presented that point to accomplishments and challenges encountered during Year 5. Finding innovative solutions and building on what has been learned during five years of successful monitoring are expected to result in continued fine-tuning and improvement.

Progress on Nene mitigation appears very encouraging. Inter-island translocation has resulted in the first releases at the newly-completed release pen on Maui, which are expected to continue on an annual basis to meet the mitigation requirements for KWP and reintroduction goals for this population.

KWP has made substantial advancement in mitigation for seabirds in West Maui and at several contingency sites. As the feasibility assessment continues, new insights from field work in 2011 with trained search dogs and population modeling are enabling long-term mitigation planning to proceed toward full project implementation.

Searcher Efficiency and Carcass Removal Trials using avian carcasses more representative of Nene (e.g., Lesser Canada Goose) along with fresh carcasses of small mammals (rats) as trial surrogates for Hawaiian Hoary Bats have improved confidence in the take adjustments for these Covered Species in Year 5.

KWP anticipates implementing a cooperative downed wildlife monitoring plan with DOFAW in Year 6 that will enable the agency to independently evaluate monitoring results while providing an opportunity to advance collaboration on the HCP.

## XI. LITERATURE CITED

- Ainley, D.G., D. Zajan, and N. Nur. 2011. Hawaiian Petrel Population Modeling. Draft modeling exercise prepared for First Wind Energy.
- Hobdy, R.W. 2009. Post-Fire Botanical Survey and Assessment. Prepared for Kaheawa Wind Power, LLC. 12 pp.
- Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual Report for 2003.
- Menard, T. 2001. Activity Patterns of the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) in Relation to Reproductive Time Periods. Master's Thesis, Univ. of Hawaii.
- Shoefeld, P.S. 2004. Suggestions Regarding Avian Mortality Extrapolation. Prepared for the Mountaineer Wind Energy Center Technical Review Committee.



## **APPENDIX 1**

### **AVIAN and BAT FATALITY MONITORING RECORD**

Kaheawa Wind Power  
Habitat Conservation Plan

Year 5 Annual Report

**July, 2010**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
7/8	7/8	7/8	7/1	7/1	7/1	7/1	7/2	7/2	7/2	7/2	7/16	7/6	7/6	7/6	7/6	7/7	7/7	7/7	7/7	
7/15	7/15	7/15	7/8	7/9	7/9	7/9	7/9	7/16	7/16	7/16	7/23	7/16	7/12	7/12	7/13	7/13	7/13	7/13	7/13	
7/20	7/22	7/22	7/15	7/14	7/14	7/16	7/16	7/22	7/22	7/22	7/30	7/23	7/23	7/19	7/19	7/20	7/20	7/20	7/20	
7/27	7/27	7/30	7/22	7/22	7/22	7/22	7/22	7/30	7/30	7/30		7/30	7/30	7/30	7/27	7/27	7/27	7/27	7/27	
			7/30	7/30	7/30	7/30	7/30													7.43

**August, 2010**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
8/4	8/4	8/4	8/4	8/4	8/4	8/5	8/5	8/5	8/5	8/3	8/6	8/6	8/6	8/6	8/6	8/2	8/2	8/2	8/2	
8/10	8/10	8/11	8/11	8/11	8/11	8/11	8/12	8/12	8/12	8/5	8/12	8/13	8/13	8/13	8/13	8/13	8/10	8/10	8/10	
8/17	8/17	8/17	8/18	8/18	8/18	8/18	8/18	8/19	8/19	8/12	8/19	8/19	8/20	8/20	8/20	8/20	8/20	8/17	8/17	
8/23	8/23	8/23	8/25	8/25	8/25	8/25	8/26	8/26	8/26	8/19	8/26	8/26	8/27	8/27	8/27	8/27	8/27	8/27	8/23	
8/31	8/31	8/31	8/31	8/31	8/31					8/26										6.85

**September, 2010**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
9/10	9/7	9/7	9/7	9/7	9/7	9/1	9/1	9/1	9/1	9/1	9/2	9/2	9/9	9/2	9/2	9/2	9/2	9/3	9/3	
9/17	9/17	9/14	9/14	9/14	9/14	9/7	9/8	9/8	9/8	9/8	9/9	9/9	9/16	9/9	9/9	9/10	9/10	9/10	9/10	
9/23	9/23	9/23	9/21	9/21	9/21	9/14	9/15	9/15	9/15	9/15	9/15	9/15	9/22	9/16	9/16	9/16	9/17	9/17	9/17	
				9/28	9/28	9/21	9/21	9/21	9/21	9/21	9/22	9/22	9/29	9/22	9/22	9/22	9/23	9/23	9/23	7.05
						9/28	9/28	9/28	9/29		9/29									

**October, 2010**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
10/1	10/1	10/1	10/1	10/8	10/4	10/4	10/4	10/4	10/4	10/4	10/5	10/5	10/5	10/5	10/6	10/6	10/6	10/6	10/6	6.74
10/7	10/7	10/7	10/8	10/15	10/15	10/12	10/12	10/12	10/12	10/12	10/13	10/13	10/13	10/13	10/13	10/14	10/14	10/14	10/14	
10/14	10/15	10/15	10/15	10/22	10/22	10/22	10/18	10/18	10/18	10/18	10/18	10/19	10/14	10/19	10/19	10/21	10/21	10/21	10/21	
10/22	10/22	10/22	10/22	10/27	10/27	10/28	10/28	10/25	10/25	10/25	10/25	10/25	10/19	10/25	10/25	10/26	10/26	10/26	10/26	
10/29	10/29	10/29	10/27										10/25							

**November, 2010**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
11/3	11/8	11/8	11/8	11/8	11/9	11/9	11/1	11/9	11/1	11/1	11/1	11/1	11/2	11/2	11/2	11/2	11/3	11/3	11/3	8.14
11/12	11/19	11/15	11/15	11/15	11/15	11/22	11/9	11/22	11/10	11/10	11/10	11/10	11/11	11/11	11/11	11/11	11/12	11/12	11/12	
11/19	11/24	11/24	11/22	11/22	11/22	11/29	11/22	11/30	11/23	11/23	11/17	11/17	11/17	11/17	11/18	11/18	11/18	11/18	11/18	
11/24				11/29	11/29		11/29		11/30	11/30	11/23	11/23	11/23	11/23	11/23	11/23	11/24	11/24	11/24	

**December, 2010**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
12/3	12/3	12/3	12/3	12/14	12/7	12/7	12/7	12/7	12/7	12/7	12/8	12/1	12/1	12/1	12/1	12/2	12/2	12/2	12/2	7.60
12/14	12/14	12/14	12/14	12/20	12/15	12/15	12/15	12/15	12/15	12/15	12/16	12/8	12/9	12/9	12/9	12/9	12/9	12/9	12/9	
12/23	12/20	12/20	12/20	12/27	12/20	12/21	12/21	12/21	12/21	12/21	12/22	12/16	12/16	12/16	12/16	12/17	12/17	12/17	12/17	
12/31	12/31	12/27	12/27		12/27	12/27	12/28	12/28	12/28	12/28	12/28	12/22	12/22	12/22	12/22	12/23	12/23	12/23	12/23	
												12/29	12/29	12/29	12/29	12/29	12/29	12/31	12/31	

January, 2011

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1/10	1/10	1/4	1/4	1/4	1/4	1/4	1/5	1/5	1/5	1/5	1/5	1/6	1/6	1/6	1/6	1/7	1/7	1/7	1/7	7.74
1/19	1/19	1/10	1/10	1/11	1/11	1/11	1/11	1/11	1/12	1/12	1/12	1/12	1/13	1/13	1/13	1/13	1/14	1/14	1/14	
1/26	1/26	1/19	1/20	1/20	1/20	1/20	1/20	1/20	1/21	1/21	1/21	1/21	1/21	1/21	1/21	1/24	1/24	1/24	1/24	
		1/26	1/26	1/26	1/27	1/27	1/27	1/27	1/27	1/27	1/28	1/28	1/28	1/28		1/31	1/31	1/31	1/31	

February, 2011

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
2/8	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	2/1	2/1	2/1	2/1	6.81
2/14	2/8	2/9	2/9	2/9	2/9	2/9	2/10	2/10	2/10	2/10	2/10	2/11	2/11	2/11	2/11	2/11	2/8	2/8	2/8	
2/22	2/14	2/14	2/15	2/15	2/15	2/15	2/15	2/16	2/16	2/16	2/16	2/16	2/17	2/17	2/17	2/17	2/17	2/14	2/14	
2/28	2/22	2/22	2/22	2/22	2/23	2/23	2/23	2/23	2/23	2/24	2/24	2/24	2/24	2/24	2/25	2/25	2/25	2/25	2/25	
	2/28	2/28	2/28	2/28																

March, 2011

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
3/7	3/7	3/7	3/7	3/7	3/1	3/1	3/1	3/1	3/1	3/2	3/2	3/2	3/2	3/2	3/3	3/3	3/3	3/3	3/3	7.26
3/14	3/14	3/14	3/14	3/14	3/8	3/8	3/8	3/8	3/8	3/8	3/9	3/9	3/9	3/9	3/9	3/10	3/10	3/10	3/10	
3/21	3/21	3/21	3/21	3/21	3/15	3/15	3/15	3/15	3/15	3/15	3/16	3/16	3/16	3/16	3/16	3/17	3/17	3/17	3/17	
3/28	3/28	3/28	3/28	3/28	3/22	3/22	3/22	3/22	3/22	3/22	3/30	3/30	3/30	3/30	3/30	3/24	3/24	3/24	3/24	
					3/29	3/29	3/29	3/29	3/29	3/29						3/31	3/31	3/31	3/31	

**April, 2011**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
4/4	4/4	4/4	4/4	4/4	4/5	4/5	4/5	4/5	4/5	4/5	4/6	4/6	4/6	4/6	4/6	4/7	4/7	4/7	4/7	7.00
4/11	4/11	4/11	4/11	4/11	4/12	4/12	4/12	4/12	4/12	4/12	4/13	4/13	4/13	4/13	4/13	4/14	4/14	4/14	4/14	
4/18	4/18	4/18	4/18	4/18	4/19	4/19	4/19	4/19	4/19	4/19	4/20	4/20	4/20	4/20	4/20	4/21	4/21	4/21	4/21	
4/25	4/25	4/25	4/25	4/25	4/26	4/26	4/26	4/26	4/26	4/26	4/27	4/27	4/27	4/27	4/27	4/28	4/28	4/28	4/28	

**May, 2011**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
5/2	5/2	5/2	5/2	5/2	5/3	5/3	5/3	5/3	5/3	5/3	5/6	5/6	5/6	5/6	5/11	5/12	5/12	5/12	5/12	7.33
5/9	5/9	5/9	5/9	5/9	5/10	5/10	5/10	5/10	5/10	5/10	5/11	5/11	5/11	5/11	5/18	5/20	5/20	5/20	5/20	
5/16	5/16	5/16	5/16	5/16	5/17	5/17	5/17	5/17	5/17	5/17	5/18	5/18	5/18	5/18	5/25	5/26	5/26	5/26	5/26	
5/23	5/23	5/23	5/23	5/23	5/24	5/24	5/24	5/24	5/24	5/24	5/25	5/25	5/25	5/25						
5/31	5/31	5/31	5/31	5/31	5/3															

**June, 2011**

WTG Search Plot																				Average Search Interval (days)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
6/6	6/6	6/6	6/6	6/6	6/1	6/1	6/1	6/1	6/1	6/1	6/2	6/2	6/2	6/2	6/2	6/3	6/3	6/3	6/3	7.05
6/13	6/13	6/13	6/13	6/13	6/7	6/7	6/7	6/7	6/7	6/7	6/8	6/8	6/8	6/8	6/8	6/9	6/9	6/9	6/9	
6/20	6/20	6/20	6/20	6/20	6/14	6/14	6/14	6/14	6/14	6/14	6/15	6/15	6/15	6/15	6/15	6/16	6/16	6/16	6/16	
6/27	6/27	6/27	6/27	6/27	6/21	6/21	6/21	6/21	6/21	6/21	6/22	6/22	6/22	6/22	6/22	6/24	6/24	6/24	6/24	
					6/29	6/29	6/29	6/29	6/29	6/29	6/30	6/30	6/30	6/30	6/30	6/3	6/3	6/3	6/3	



July, 2010				August, 2010				September, 2010				October, 2010			
Met Plot			Average Interval	Met Plot			Average Interval	Met Plot			Average Interval	Met Plot			Average Interval
1	2	3		1	2	3		1	2	3		1	2	3	
7/1	7/9	7/7	7.06	8/4	8/5	8/6	7.00	9/10	9/3	9/3	6.50	10/1	10/8	10/8	6.98
7/8	7/16	7/13		8/13	8/13	8/13		9/17	9/8	9/10		10/7	10/15	10/13	
7/14	7/22	7/23		8/17	8/20	8/16		9/23	9/16	9/17		10/14	10/22	10/19	
7/20	7/30	7/30		8/23	8/27	8/27			9/22	9/22		10/22	10/27	10/26	
7/27				8/31					9/29	9/29		10/29			

November, 2010				December, 2010				January, 2011				February, 2011			
Met Plot			Average Interval	Met Plot			Average Interval	Met Plot			Average Interval	Met Plot			Average Interval
1	2	3		1	2	3		1	2	3		1	2	3	
11/3	11/9	11/3	7.25	12/3	12/7	12/2	8.50	1/10	1/4	1/6	7.58	2/8	2/3	2/4	6.83
11/12	11/16	11/11		12/14	12/14	12/14		1/19	1/11	1/13		2/14	2/9	2/11	
11/19	11/22	11/17		12/23	12/21	12/22		1/26	1/20	1/21		2/22	2/15	2/16	
11/24	11/29	11/23		12/31	12/28	12/29		1/31	1/27	1/28		2/28	2/23	2/24	

March, 2011				April, 2011				May, 2011				June, 2011			
Met Plot			Average Interval	Met Plot			Average Interval	Met Plot			Average Interval	Met Plot			Average Interval
1	2	3		1	2	3		1	2	3		1	2	3	
3/14	3/1	3/2	8.78	4/4	4/5	4/6	7.00	5/2	5/3	5/6	7.07	6/6	6/1	6/2	7.05
3/21	3/14	3/17		4/11	4/12	4/13		5/9	5/10	5/11		6/13	6/7	6/8	
3/28	3/22	3/23		4/18	4/19	4/20		5/16	5/17	5/18		6/20	6/14	6/15	
	3/29	3/30		4/25	4/26	4/27		5/23	5/24	5/25		6/27	6/21	6/22	
								5/31					6/29	6/30	

## **APPENDIX 2**

### **SEARCHER EFFICIENCY**

Kaheawa Wind Power  
Habitat Conservation Plan

Year 5 Annual Report

Appendix 2. Searcher Efficiency  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report

Observers	Date	Proctor	Search Plots	Number of Carcasses	Trial Species	Number Detected	Detection Efficiency	Ground Cover Type
Medrano Bordenave	6-Jul-2010	Craig	WTG 14	1	ZEDO	0	0.00	Bare/Burn
			WTG 14	1	BLFR	1	1.00	Bare/Burn
			WTG 15	2	ZEDO	1	0.50	Bare/Burn
			WTG 15	1	SEOW	1	1.00	Bare
Medrano Craig	8-Sep-2010	Spencer	WTG 07	1	CAGO	1	1.00	Grass
			WTG 09	1	WTSH	1	1.00	Grass
			WTG 10	1	WTSH	1	1.00	Grass/Bare
Medrano Craig	9-Nov-2010	Spencer	WTG 08	1	WTSH	1	1.00	Shrub/Bare
			WTG 09	1	CAGO	1	1.00	Grass
Medrano Craig	23-Nov-2010	Spencer	WTG 11	1	WTSH	1	1.00	Bare
			WTG 12	3	WTSH	2	0.67	Grass
Medrano Craig	30-Nov-2010	Spencer	WTG 09	2	DORA	1	0.50	Bare
			WTG 10	1	CAGO	1	1.00	Grass
			WTG 10	2	WTSH	1	0.50	Bare
			WTG 11	1	WTSH	1	1.00	Shrub
			WTG 12	2	WTSH	1	0.50	Shrub
			WTG 12	1	DORA	1	1.00	Bare
Medrano Craig	9-Dec-2010	Spencer	WTG 15	2	DORA	0	0.00	Grass
			WTG 15	1	DORA	1	1.00	Bare
			WTG 15	2	CAGO	1	0.50	Shrub
			WTG 18	2	CAGO	2	1.00	Shrub
			WTG 20	2	DORA	1	0.50	Grass
			WTG 20	1	DORA	0	0.00	Bare
Medrano Fujii-Doe Deleissegues	16-Feb-2011	Spencer	WTG 09	1	WTSH	1	1.00	Bare
			WTG 09	1	WTSH	1	1.00	Grass
			WTG 11	1	CAGO	1	1.00	Grass/Shrub
			WTG 11	1	WTSH	1	1.00	Bare/Grass

Observers	Date	Proctor	Search Plots	Number of Carcasses	Trial Species	Number Detected	Detection Efficiency	Ground Cover Type
E. Deleissegues D. Fujii-Doe	2-Mar-2011	D. Medrano	WTG 12	2	DOMO	0	0.00	Grass
			WTG 12	1	WTSH	0	0.00	Shrub
			WTG 13	1	CAGO	1	1.00	Bare
E. Deleissegues D. Fujii-Doe	10-Mar-2011	D. Medrano	WTG 17	1	DOMO	0	0.00	Bare
			WTG 17	1	DOMO	0	0.00	Grass
			WTG 17	1	WTSH	1	1.00	Bare
			WTG 17	1	CAGO	1	1.00	Bare
			WTG 18	1	DOMO	0	0.00	Shrub
			WTG 18	1	WTSH	0	0.00	Grass
			WTG 18	1	CAGO	0	0.00	Grass
			WTG 18	1	CAGO	0	0.00	Shrub
			WTG 18	1	CAGO	0	0.00	Shrub
E. Deleissegues D. Fujii-Doe D. Medrano	15-Mar-2011	G. Spencer	WTG 06	1	DOMO	0	0.00	Bare
			WTG 06	1	DOMO	0	0.00	Grass
			WTG 08	1	DOMO	0	0.00	Shrub
			WTG 08	2	DOMO	2	1.00	Bare

### Results

Species	Placed	Detected	Detection Efficiency
Wedge-tailed Shearwater	18	13.00	0.72
Canada Goose	12	9.00	0.75
Small Mammal (rats/mice)	19	6.00	0.32

## **APPENDIX 3**

### **SCAVENGER REMOVAL and CARCASS RETENTION**

Kaheawa Wind Power  
Habitat Conservation Plan

Year 5 Annual Report





CARE Trial #1 – August 2010

Carcass ID: A			Species: Canada Goose	Location: 100 meters ENE of WTG-7
Trial Day	Date	Status	Condition	Comments
0	11-Aug-10	P	Fr	Veg Class: BARE/BURNED ground.
1	12-Aug-10	P	I,U	Carcass was moved 30m NE (being less visible from roadside) by techs and laid on top of low laying-burnt ulei, surrounded by bare/burnt ground.
2	13-Aug-10	P	I,U	Unnoticeable changes to surrounding vegetated area.
3	14-Aug-10	P	I,U	Unchanged from DAY 2.
4	15-Aug-10	P	I,U	Unchanged from DAY 3.
5	16-Aug-10	P	I,U	Unchanged from DAY 4.
6	17-Aug-10	P	I,U	Unchanged from DAY 5.
7	18-Aug-10	P	D, Sp	Scavenging begins. L.Wing severed. L.Chest eaten. Insects visible.
8	19-Aug-10	P	D, Sp	Scavenging continues. R.Chest eaten. Insects visible.
9	20-Aug-10	P	F, Sc	Completely scavenged. Remains are identifiable as a Goose. The head, neck, and body remains attached to skeleton.
10	21-Aug-10	P	F	Head found detached from body. Visible remains are: Head, one webbed foot, two wings. Rendered detectable/identifiable.
11	22-Aug-10	P	F	Unchanged from DAY 10.
12	23-Aug-10	P	F	Feathers and skeleton body dispersed further apart. Still remains detectable. Ability to identify carcass is questionable.
13	24-Aug-10	P	F	Only one wing and body-skeleton remain visible with scattered feathers. Unable to positively identify carcass.
14	25-Aug-10	P	F	Skeleton visible with scattered feathers. Detect ability is good.
28	8-Sep-10	P	F	Little remnants of feathers and bones are left behind. Detect ability is lowered.
33	13-Sep-10	P	F	Less feathers since DAY 28. Detect ability remains the same.
40	20-Sep-10	P	F	Very few feathers and bones remain. Rendered detectable.
50	30-Sep-10	P	F	Unchanged from DAY 40.
58	8-Oct-10	P	F	Bones are present. Feathers a little. Re-growth of surrounding vegetation begins.
89	8-Nov-10	P	F	Bones are partially visible; where feathers appear to be absent.
119	8-Dec-10	P	F	Vegetation has covered most of bones left behind; however, still remains visible under normal searching conditions.

CARE Trial #1 – August 2010

Carcass ID: B			Species: Canada Goose	Location: 40 meters SE of WTG-4
Trial Day	Date	Status	Condition	Comments
0	11-Aug-10	P	Fr	Veg Class: GRASS.
1	12-Aug-10	P	I,U	Unchanged from DAY 0. Rendered detectable/identifiable.
2	13-Aug-10	P	I,U	Unchanged from DAY 1.
3	15-Aug-10	P	I, Sp	Scavenging beings. Pulled slightly deeper. Innards eaten.
4	15-Aug-10	P	I, Sp	Scavenging continues. Pulled deeper into grass.
5	16-Aug-10	P	I, Sp	Unchanged from DAY 4. Remains detectable/identifiable.
6	17-Aug-10	P	D, I, Sp	Unchanged from DAY 5. Insects visible.
7	18-Aug-10	P	D,I, Sp	Unchanged from DAY 6.
8	19-Aug-10	P	D, I, Sp	Unchanged from DAY 7
9	20-Aug-10	P	D, I ,Sp	Unchanged from DAY 8.
10	21-Aug-10	P	D, I, Sp	Unchanged from DAY 9.
11	22-Aug-10	P	D, I, Sp	Unchanged from DAY 10.
12	23-Aug-10	P	D, I, Sp	Unchanged from DAY 11.
13	24-Aug-10	P	D ,I ,Sp	Unchanged from DAY 12
14	25-Aug-10	P	D, I, Sp	Unchanged from DAY 13. The whole of the body seems to still remain intact, detectable, and identifiable.
28	8-Sep-10	P	D, I, Sc	Remains intact, leg bones begin to exposed. Body appears to have decomposed significantly. Feathers begin to separate from body. Scavenging may have ended. Remains detectable/identifiable.
33	13-Sep-10	P	D,I	Overall, still remains slightly intact. Remains detectable/identifiable.
40	20-Sep-10	P	D,I	Decomposed significantly but remains intact. Still detectable/identifiable.
50	30-Sep-10	P	D,F	Completely decomposed. Only feathers and bones. Remains detectable, but no longer identifiable.
58	8-Oct-10	P	F	Detectable by feathers and bones only. Bones have completely dried-up and feathers begin to lose a bit of its color.
89	8-Nov-10	P	F	Remains detectable. Complete discoloration of feathers and bones.
119	8-Dec-10	P	F	Detect ability is lowered due to a slight overgrowth of grass. Feathers and bones appear to have "sunk-like", deeper into grass.

CARE Trial #1 – August 2010

Carcass ID: C			Species: Canada Goose	Location: 70 meters NNE of WTG-3
Trial Day	Date	Status	Condition	Comments
0	11-Aug-10	P	Fr	Veg Class: SHRUB.
1	12-Aug-10	P	D,Sp	Hole in chest. Insects (wasps and flies).
2	13-Aug-10	P	D,Sp	Scavenging continues. Moved 2' NE. Insects still present.
3	14-Aug-10	P	D,Sp	Scavenging continues. Insects still present. Chest cavity completely exposed.
4	15-Aug-10	P	F,Sc	Completely scavenged, with only feathers & bones left.
5	16-Aug-10	P	F	
6	17-Aug-10	P	F	
7	18-Aug-10	P	F	Bones moved 1ft. South-West.
8	19-Aug-10	P	F	Bones moved 1ft. North-East.
9	20-Aug-10	P	F	
10	21-Aug-10	P	F	
11	22-Aug-10	P	F	
12	23-Aug-10	P	F	
13	24-Aug-10	P	F	
14	25-Aug-10	P	F	
28	8-Sep-10			
33	13-Sep-10			
40	20-Sep-10			
50	30-Sep-10			
58	8-Oct-10			
89	8-Nov-10			
119	8-Dec-10			

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #2 – September 2010

Carcass ID: D			Species: Canada Goose	Location: 55 meters S of WTG-7
Trial Day	Date	Status	Condition	Comments
0	8-Sep-10	P	Fr	Veg Class: GRASS.
1	9-Sep-10	P	I,U	
2	10-Sep-10	P	D,I,U	Ants.
3	11-Sep-10	P	D,I,U	
4	12-Sep-10	P	D,I,U	
5	13-Sep-10	P	D,I,U	
6	14-Sep-10	P	D,I,Sp	
7	15-Sep-10	P	D,Sp	Scavenging continues.
8	16-Sep-10	P	F,Sp	
9	17-Sep-10	P	F,Sp	Scavenging continues on remnants.
10	18-Sep-10	P	F,Sp	Scavenging continues on remnants.
11	19-Sep-10	P	F,Sp	Scavenging continues on remnants.
12	20-Sep-10	P	F,Sp	Scavenging continues on remnants.
13	21-Sep-10	P	I, F,Sp	Scavenging continues on remnants. Many flies.
14	22-Sep-10	P	I,F,Sc	

Carcass ID: E			Species: Wedge-tailed Shearwater	Location: 25 meters SSE of WTG-9
Trial Day	Date	Status	Condition	Comments
0	8-Sep-10	P	Fr	Veg Class: GRASS.
1	9-Sep-10	P	I,U	
2	10-Sep-10	P	D,I,U	Ants.
3	11-Sep-10	P	D,I,U	Ants.
4	12-Sep-10	P	D,I,U	Ants.
5	13-Sep-10	P	D,I,U	Ants.
6	14-Sep-10	P	D,I,U	Ants.
7	15-Sep-10	P	D,I,U	Ants.
8	16-Sep-10	P	D,I,U	Ants.
9	17-Sep-10	P	D,Sp	Moved 10m SW. Desiccation evident.
10	18-Sep-10	P	D,Sp	No obvious further scavenging
11	19-Sep-10	P	D,Sp	No obvious further scavenging
12	20-Sep-10	P	D,Sp	No obvious further scavenging
13	21-Sep-10	P	D,Sp	No obvious further scavenging
14	22-Sep-10	P	D,Sp	



CARE Trial #2 – September 2010

Carcass ID: F			Species: Wedge-tailed Shearwater		Location: 30 meters SE of WTG-10
Trial Day	Date	Status	Condition	Comments	
0	8-Sep-10	P	Fr	Veg Class: GRASS/BARE.	
1	9-Sep-10	P	I,U		
2	10-Sep-10	P	F,Sc	One wing found in open grass., another wing found under shrub. Body absent.	
3	11-Sep-10	P	F	Only one wing (on grass) is present.	
4	12-Sep-10	P	F	Only one wing (on grass) is present.	
5	13-Sep-10	P	F	Only one wing (on grass) is present.	
6	14-Sep-10	P	F	Only one wing (on grass) is present.	
7	15-Sep-10	P	F	Only one wing (on grass) is present.	
8	16-Sep-10	P	F	Only one wing (on grass) is present.	
9	17-Sep-10	P	F	Only one wing (on grass) is present.	
10	18-Sep-10	P	F	Only one wing (on grass) is present.	
11	19-Sep-10	P	F	Only one wing (on grass) is present.	
12	20-Sep-10	P	F	Only one wing (on grass) is present.	
13	21-Sep-10	P	F	Only one wing (on grass) is present.	
14	22-Sep-10	P	F	Only one wing (on grass) is present.	

Carcass ID: G			Species: Canada Goose		Location: 45 meters SW of WTG-13
Trial Day	Date	Status	Condition	Comments	
0	8-Sep-10	P	Fr	Veg Class: GRASS/BARE.	
1	9-Sep-10	P	I,U		
2	10-Sep-10	P	F,Sc	One wing found in open grass., another wing found under shrub. Body absent.	
3	11-Sep-10	P	F	Only one wing (on grass) is present.	
4	12-Sep-10	P	F	Only one wing (on grass) is present.	
5	13-Sep-10	P	F	Only one wing (on grass) is present.	
6	14-Sep-10	P	F	Only one wing (on grass) is present.	
7	15-Sep-10	P	F	Only one wing (on grass) is present.	
8	16-Sep-10	P	F	Only one wing (on grass) is present.	
9	17-Sep-10	P	F	Only one wing (on grass) is present.	
10	18-Sep-10	P	F	Only one wing (on grass) is present.	
11	19-Sep-10	P	F	Only one wing (on grass) is present.	

Appendix 3. Carcass Removal Trials (CARE)  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report

12	20-Sep-10	P	F	Only one wing (on grass) is present.
13	21-Sep-10	P	F	Only one wing (on grass) is present.
14	22-Sep-10	P	F	Only one wing (on grass) is present.

Carcass ID: H			Species: Canada Goose		Location: 60 meters ENE of WTG-16
Trial Day	Date	Status	Condition	Comments	
0	8-Sep-10	P	Fr	Veg Class: GRASS/BARE.	
1	9-Sep-10	P	I,U		
2	10-Sep-10	P	F,Sc	One wing found in open grass., another wing found under shrub. Body absent.	
3	11-Sep-10	P	F	Only one wing (on grass) is present.	
4	12-Sep-10	P	F	Only one wing (on grass) is present.	
5	13-Sep-10	P	F	Only one wing (on grass) is present.	
6	14-Sep-10	P	F	Only one wing (on grass) is present.	
7	15-Sep-10	P	F	Only one wing (on grass) is present.	
8	16-Sep-10	P	F	Only one wing (on grass) is present.	
9	17-Sep-10	P	F	Only one wing (on grass) is present.	
10	18-Sep-10	P	F	Only one wing (on grass) is present.	
11	19-Sep-10	P	F	Only one wing (on grass) is present.	
12	20-Sep-10	P	F	Only one wing (on grass) is present.	
13	21-Sep-10	P	F	Only one wing (on grass) is present.	
14	22-Sep-10	P	F	Only one wing (on grass) is present.	

Carcass ID: I			Species: Canada Goose		Location: 45 meters NNE of WTG-19
Trial Day	Date	Status	Condition	Comments	
0	8-Sep-10	P	Fr	Veg Class: GRASS/BARE.	
1	9-Sep-10	P	I,U		
2	10-Sep-10	P	F,Sc	One wing found in open grass., another wing found under shrub. Body absent.	
3	11-Sep-10	P	F	Only one wing (on grass) is present.	
4	12-Sep-10	P	F	Only one wing (on grass) is present.	
5	13-Sep-10	P	F	Only one wing (on grass) is present.	
6	14-Sep-10	P	F	Only one wing (on grass) is present.	
7	15-Sep-10	P	F	Only one wing (on grass) is present.	
8	16-Sep-10	P	F	Only one wing (on grass) is present.	
9	17-Sep-10	P	F	Only one wing (on grass) is present.	

Appendix 3. Carcass Removal Trials (CARE)  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report

10	18-Sep-10	P	F	Only one wing (on grass) is present.
11	19-Sep-10	P	F	Only one wing (on grass) is present.
12	20-Sep-10	P	F	Only one wing (on grass) is present.
13	21-Sep-10	P	F	Only one wing (on grass) is present.
14	22-Sep-10	P	F	Only one wing (on grass) is present.

Carcass ID: J			Species: Norway Rat	Location: 30 meters S of WTG-8
Trial Day	Date	Status	Condition	Comments
0	25-Oct-10	P	Fr	Veg Class: Bare ground.
1	26-Oct-10	P	I,U	No sign of any disturbance.
2	27-Oct-10	P	I,U	No sign of any disturbance.
3	28-Oct-10	P	I,U	No sign of any disturbance.
4	29-Oct-10	P	I,U	No sign of any disturbance.
5	30-Oct-10	A		

Carcass ID: K			Species: Norway Rat	Location: 70 meters N of WTG-9
Trial Day	Date	Status	Condition	Comments
0	27-Oct-10	P	Fr	Veg Class: Grass
1	28-Oct-10	P	I,U	No sign of any disturbance.
2	29-Oct-10	P	I,U	No sign of any disturbance.
3	30-Oct-10	A		

Carcass ID: L			Species: Norway Rat	Location: 45 meters N of WTG-11
Trial Day	Date	Status	Condition	Comments
0	27-Oct-10	P	Fr	Veg Class: Shrub.
1	28-Oct-10	P	I,U	No sign of any disturbance.
2	29-Oct-10	P	I,U	No sign of any disturbance.
3	30-Oct-10	A		

Status Codes: A = Absent, P = Present

Condition Codes: D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #4 – November 2010

Carcass ID: M			Species: Wedge-tailed Shearwater	Location: 25 meters ENE of WTG-8
Trial Day	Date	Status	Condition	Comments
0	9-Nov-10	P	Fr	Veg Class: Shrub.
1	10-Nov-10	P	D,I,U	Ants.
2	11-Nov-10	P	D,I,U	Ants.
3	12-Nov-10	P	D,I,U	Ants.
4	13-Nov-10	P	D,I,U	Ants.
5	14-Nov-10	P	D,I,U	Ants.
6	15-Nov-10	P	D,I,U	Ants.
7	16-Nov-10	P	D,I,U	Ants.
8	17-Nov-10	P	D,I,U	Ants.
9	18-Nov-10	P	D,I,U	Ants.
10	19-Nov-10	P	D,Sp	Feather pile with one wing and head, body is missing. Some feathers strewn nearby but body not found.
11	20-Nov-10	P	D	Unchanged.
12	21-Nov-10	P	D	Unchanged.
13	22-Nov-10	P	D,Sc	More disturbance to remnants, head is missing.
14	23-Nov-10	P	D	Unchanged from 22-Nov-10.

Carcass ID: N			Species: Canada Goose	Location: 40 meters NW of WTG-9
Trial Day	Date	Status	Condition	Comments
0	9-Nov-10	P	Fr	Veg Class: Grass.
1	10-Nov-10	P	D,I,U	Ants/Flies.
2	11-Nov-10	P	D,I,U	Ants.
3	12-Nov-10	P	D,I,Sp	Scavenging begins around the face/neck area.
4	13-Nov-10	P	D,I,Sp	Scavenging continues. Head and neck muscles eaten. Top area of chest partially eaten. (INMO on motion-sensor camera).
5	14-Nov-10	P	D,I	Ants, flies, and wasps. No change in pics from motion sensor. Scavenging discontinued.
6	15-Nov-10	P	D,I	No further scavenging. Lots of flies.
7	16-Nov-10	P	D,I,Sp	Scavenging continues. Appears as though scavenger covered carcass with grass. Insects present.
8	17-Nov-10	P	D,I,Sp	Scavenging continues. Insects present. (FECA on motion-sensor camera.)
9	18-Nov-10	P	D,Sc	Scavenging complete. All muscle meat is gone. Carcass was moved 5ft.-West. One

Appendix 3. Carcass Removal Trials (CARE)  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report

				wing and feathers at original placement.
10	19-Nov-10	P	D	Unchanged.
11	20-Nov-10	P	D	Moved 1 ft., Unchanged. Rained.
12	21-Nov-10	P	D	Unchanged.
13	22-Nov-10	P	D	Unchanged.
14	23-Nov-10	P	D	Unchanged.

Carcass ID: O			Species: Wedge-tailed Shearwater	Location: 20 meters SSE of WTG-10
Trial Day	Date	Status	Condition	Comments
0	9-Nov-10	P	Fr	Veg Class: Bare.
1	10-Nov-10	P	D,Sp	Moved 10m SE under molasses grass/pukiawe. Partially detectable under normal searching conditions, with the neck- and upper body-area partially scavenged. Ants visible.
2	11-Nov-10	A		Absent under normal searching efforts. Found under molasses grass/pukiawe; where scavenging continues.

Carcass ID: P			Species: Canada Goose	Location: 50 meters WSW of WTG-11
Trial Day	Date	Status	Condition	Comments
0	9-Nov-10	P	Fr	Veg Class: Bare.
1	10-Nov-10	P	D,I,U	Ants/Flies.
2	11-Nov-10	P	D,I,U	Ants.
3	12-Nov-10	P	D,I,U	Ants/Flies.
4	13-Nov-10	P	D,I,U	Ants/Flies.
5	14-Nov-10	P	D,I,U	Ants/Flies.
6	15-Nov-10	P	D,I,U	Ants, flies, maggots.
7	16-Nov-10	P	D,I,Sp	Scavenging begins with chest partially opened. FECA cat on motion sensor. Insects present.
8	17-Nov-10	P	D,I,Sp	Scavenging continues. Maggots/insects seen in cavity.
9	18-Nov-10	P	D,Sp	Scavenging continues. Moved 3ft-West. Head is severed and nearby. Desiccation is obvious. FECA on camera.
10	19-Nov-10	P	D	Insects and desiccation, no further scavenging.
11	20-Nov-10	P	D	Insects and desiccation, no further scavenging, rained.
12	21-Nov-10	P	D	Insects and desiccation, no further scavenging.
13	22-Nov-10	P	D	Insects and desiccation, no further scavenging.
14	23-Nov-10	P	D	Insects and desiccation, no further scavenging.



CARE Trial #4 – November 2010

Carcass ID: Q			Species: Wedge-tailed Shearwater	Location: 20 meters ENE of WTG-11
Trial Day	Date	Status	Condition	Comments
0	9-Nov-10	P	Fr	Veg Class: Shrub.
1	10-Nov-10	P	D,I,U	Flies.
2	11-Nov-10	P	D,I,U	Ants.
3	12-Nov-10	P	D,I,U	Ants.
4	13-Nov-10	P	D,I,U	Ants.
5	14-Nov-10	P	D,I,U	Ants.
6	15-Nov-10	P	D,I,U	Ants.
7	16-Nov-10	P	D,I,U	Ants.
8	17-Nov-10	P	D,I,U	Ants.
9	18-Nov-10	P	D,Sp	Scavenging begins; chest and body cavity absent. Moved 3 ft south onto bare ground.
10	19-Nov-10	P	D	No further scavenging.
11	20-Nov-10	P	D	No further scavenging, rained.
12	21-Nov-10			
13	22-Nov-10	P	D,Sc	Feather pile only. Parts of carcass and feathers found 3 meters downhill under Christmasberry bush- feathers visible from outside bush.
14	23-Nov-10	P	D	Feather pile unchanged.

Carcass ID: R			Species: Norway Rat	Location: 25 meters N of WTG-12
0	9-Nov-10	P	Fr	Veg Class: Bare.
1	10-Nov-10	A		Carcass absent. No remains found. Paw prints found in the surrounding area suggest a feral cat.

Carcass ID: S			Species: Norway Rat	Location: 57 meters NE of WTG-13
0	9-Nov-10	P	Fr	Veg Class: Grass.
1	10-Nov-10	P	D,I,U	Ants.
2	11-Nov-10	P	D,I,U	Ants.
3	12-Nov-10	P	D,I,U	Ants.
4	13-Nov-10	P	D,I,U	Ants/maggots. Strong odor.
5	14-Nov-10	A		No remains/signs found.

CARE Trial #4 – November 2010

Carcass ID: T			Species: Norway Rat		Location: 30 meters SSW of WTG-15
0	9-Nov-10	P	Fr	Veg Class: Shrub.	
1	10-Nov-10	P	D,I,U	Ants.	
2	11-Nov-10	A		No remains/signs found.	

CARE Trial #5 – January-February 2011

Carcass ID: U			Species: Domestic Rat/Mouse		Location: 25 meters W of WTG-3
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Grass. Would not be present under normal search conditions	
1	25-Jan-11	P	I,U	No sign of any disturbance. Manipulation of grass to find DOMO	
2	26-Jan-11	P	D,I,U	Flies present	
3	27-Jan-11	P	D,I,U	Hair loss on backside	
4	28-Jan-11	P	D,I,U	Flies and dirt on remains, noticeable decomposition	
5	29-Jan-11	P	D,Des,I, U	feet are dried, flies present, fur falling off carcass	
6	30-Jan-11	P	Des	Unable to find under normal searches.	
7	31-Jan-11	P	D,Des,I, U	Barely able to see this specimen	
8	1-Feb-11	P	D,Des,I, U	Specimen is essentially invisible	
9	2-Feb-11	P	Des	Unable to find under normal searches.	
10	3-Feb-11	P	Des	Unable to find under normal searches.	
11	4-Feb-11	P	Des	Unable to find under normal searches.	
12	5-Feb-11	P	Des	Unable to find under normal searches.	
13	6-Feb-11	P	Des	Unable to find under normal searches.	
14	7-Feb-11	P	Des	Unable to find under normal searches. Removed carcass from field.	

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #5 – January-February 2011

Carcass ID: V			Species: Domestic Rat/Mouse		Location: 45 meters NNE of WTG-4
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Bare.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	D,I,U	ants present	
3	27-Jan-11	P	D,I,U	Unchanged from Day 2	
4	28-Jan-11	P	D,I,U	Noticeable decomposition; fly larvae present, holes in skin	
5	29-Jan-11	P	D,I,U	hair/skin absent approx. 70% of visible portion	
6	30-Jan-11	P	Des		
7	31-Jan-11	P	D,U, Des	ants, bone/gristle visible, fur absent approx. 80%	
8	1-Feb-11	P	D,U, Des	ants, bone/gristle visible, fur absent approx. 85%	
9	2-Feb-11	P	Des		
10	3-Feb-11	P	Des	Bones visible	
11	4-Feb-11	P	Des	Bones	
12	5-Feb-11	P	Des	Bones, desiccated.	
13	6-Feb-11	P	Des	Bones, desiccated.	
14	7-Feb-11	P	Des	Bones. Removed carcass from field.	

Carcass ID: W			Species: Domestic Rat/Mouse		Location: 40 meters N of WTG-6
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Grass.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	I,U	nothing remarkable	
3	27-Jan-11	P	I,U,D	Ants	
4	28-Jan-11	P	I,U,D	Ants present; Noticeable decomposition	
5	29-Jan-11	P	Des, D, U, I	Barely able to see this specimen	
6	30-Jan-11	P	Des	Unable to find under normal searches.	
7	31-Jan-11	P	Des, D, U, I	Specimen is essentially invisible	
8	1-Feb-11	P	Des, D, U, I	Specimen is essentially invisible	
9	2-Feb-11	P	Des	Unable to find under normal searches.	
10	3-Feb-11	P	Des	Unable to find under normal searches.	
11	4-Feb-11	P	Des, I	Ants. Unable to find under normal searches.	
12	5-Feb-11	P	Des	Unable to find under normal searches.	
13	6-Feb-11	P	Des	Unable to find under normal searches.	
14	7-Feb-11	P	Des	Unable to find under normal searches. Removed carcass from field.	

CARE Trial #5 – January-February 2011

Carcass ID: X			Species: Domestic Rat/Mouse		Location: 28 meters N of WTG-8
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Shrub.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	I,U	ants present around head	
3	27-Jan-11	P	I,U,D	Ants	
4	28-Jan-11	P	I,U,D	Ants; Noticeable decomposition; specimen essentially invisible	
5	29-Jan-11	P	I,U,D	fur/skin absent approx. 80% of specimen, ants and malodorous; specimen essentially invisible	
6	30-Jan-11	P	Des	Insects visible	
7	31-Jan-11	P	I,U,D	fur/skin absent approx. 85% of specimen, ants and malodorous	
8	1-Feb-11	P	I,U,D	fur/skin absent approx. 90% of specimen, ants and malodorous	
9	2-Feb-11	P	Des, I	Unable to find under normal searches.	
10	3-Feb-11	P	Des	Unable to find under normal searches. Fur and bones left.	
11	4-Feb-11	P	Des, I	Ants. Unable to find under normal searches.	
12	5-Feb-11	P	Des	Unable to find under normal searches.	
13	6-Feb-11	P	Des	Unable to find under normal searches.	
14	7-Feb-11	P	Des	Unable to find under normal searches. Removed carcass from field.	

Carcass ID: Y			Species: Domestic Rat/Mouse		Location: 19 meters NE of WTG-9
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Shrub.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	I,U	ants present around head	
3	27-Jan-11	P	I,U,D	Ants	
4	28-Jan-11	P	I,U,D	Ants; Advanced decomposition; specimen essentially invisible	
5	29-Jan-11	P	I,U,D	fur/skin absent approx. 80% of specimen, ants and malodorous; specimen essentially invisible	
6	30-Jan-11	P	Des	Insects visible	
7	31-Jan-11	P	I,U,D	fur/skin absent approx. 85% of specimen, ants and malodorous	
8	1-Feb-11	P	I,U,D	fur/skin absent approx. 90% of specimen, ants and malodorous	
9	2-Feb-11	P	Des, I	Unable to find under normal searches.	
10	3-Feb-11	P	Des	Unable to find under normal searches. Fur and bones left.	
11	4-Feb-11	P	Des, I	Ants. Unable to find under normal searches.	
12	5-Feb-11	P	Des	Unable to find under normal searches.	
13	6-Feb-11	P	Des	Unable to find under normal searches.	
14	7-Feb-11	P	Des	Unable to find under normal searches. Removed carcass from field.	

CARE Trial #5 – January-February 2011

Carcass ID: Z			Species: Domestic Rat/Mouse		Location: 30 meters N of WTG-11
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Bare.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	I,U	abdomen deflated; loss of hair on visible portion of specimen	
3	27-Jan-11	P	I,U,D	Ants and Flies	
4	28-Jan-11	P	I,U,D	Noticeable decomposition and odor from 0.5 m; Ants present	
5	29-Jan-11	P	I,U,D	Fur/skin absent approx.60%; insects visible	
6	30-Jan-11	P	Des	Insects visible	
7	31-Jan-11	P	Des, I, U	Fur/skin absent approx. 70%; Ants, scavenger beetles present	
8	1-Feb-11	P	Des, I, U	bones visible; ants present	
9	2-Feb-11	p	Des, I, U	Insects visible	
10	3-Feb-11	P	Des	Unable to find under normal searches. Fur and bones left.	
11	4-Feb-11	P	Des, I	Ants. Unable to find under normal searches.	
12	5-Feb-11	P	Des, I	Desiccated, beetles and ants.	
13	6-Feb-11	P	Des, I	Desiccated, ants.	
14	7-Feb-11	P	Des	Unable to find under normal searches. Removed carcass from field.	

Carcass ID: AA			Species: Domestic Rat/Mouse		Location: 53 meters N of WTG-13
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Grass.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	I,U	nothing remarkable	
3	27-Jan-11	P	D,Des	Ants and maggots present.	
4	28-Jan-11	P	D,Des	Dirt drifting over portion of carcass	
5	29-Jan-11	P	Des, I, U	Ants and Fly larvae present	
6	30-Jan-11	P	Des	Noticeable decomposition; dirt present on carcass	
7	31-Jan-11	P	Des, I, U	Bones visible fur/skin absent approx. 90%; ants present	
8	1-Feb-11	P	Des, I, U	Dirt present on specimen; ants present	
9	2-Feb-11	P	Des, I	Insects visible	
10	3-Feb-11	P	Des	Unable to find under normal searches. Fur and bones left.	
11	4-Feb-11	P	Des	Skin and bones. Very desiccated.	
12	5-Feb-11	P	Des	Desiccated.	
13	6-Feb-11	P	Des	Desiccated, ants and beetles present	
14	7-Feb-11	P	Des	Desiccated. Removed carcass from field.	



CARE Trial #5 – January-February 2011

Carcass ID: BB			Species: Domestic Rat/Mouse		Location: 17 meters SW of WTG-12
Trial Day	Date	Status	Condition	Comments	
0	24-Jan-11	P	Fr	Veg Class: Bare.	
1	25-Jan-11	P	I,U	No sign of any disturbance.	
2	26-Jan-11	P	I,U	abdomen deflated	
3	27-Jan-11	P	D,Des	Ants and Maggots	
4	28-Jan-11	P	D,Des	Initially absent, found carcass 1m N of initial location; dramatic position change.	
5	29-Jan-11	P	D,Des	Dirt present on specimen; ants present	
6	30-Jan-11	P	Des	Fur absent on visible portion; Dirt present on specimen, ants present	
7	31-Jan-11	P	Des	Downhill from Day 1	
8	1-Feb-11	P	Des	Dirt present on specimen; ants present	
9	2-Feb-11	P	Des	Fur and bones.	
10	3-Feb-11	P	Des	Unable to find under normal search conditions.	
11	4-Feb-11	P	Des	Dirt on carcass.	
12	5-Feb-11	P	Des	Dirt on carcass.	
13	6-Feb-11	P	Des	Dirt on carcass, bones visible	
14	7-Feb-11	P	Des	Removed carcass from field.	

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #6 – February-March 2011

Carcass ID: CC			Species: Canada Goose		Location: 50 meters SSE of WTG-1
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Bare/Shrub	
1	1-Mar-11	P	I,U	Undisturbed.	
2	2-Mar-11	P	D,I,U	Flies and ants present.	
3	3-Mar-11	P	I,U	Flies and ants present. Dew.	
4	4-Mar-11	P	I,U	Dew. Undisturbed.	
5	5-Mar-11	P	I,U	Flies present and noticeable odor. All aspects of carcass wet.	
6	6-Mar-11	P	I,U	Feathers begin to come apart.	
7	7-Mar-11	P	I,U	Undisturbed and unchanged from Day 6.	
8	8-Mar-11	P	I,U	Undisturbed, some feathers falling off	
9	9-Mar-11	P	I,U	Unchanged from Day 8.	
10	10-Mar-11	P	I,U	Unchanged from Day 9.	
11	11-Mar-11	P	I,U	Insects present.	
12	12-Mar-11	P	I,D,Des	Insects present. Feathers from neck coming off.	
13	13-Mar-11			Unchecked.	
14	14-Mar-11	P	I,D,Des	Many insects present. Odor is strong. Undisturbed. Feathers from neck coming off.	
21	21-Mar-11	P	I,D,Des	The whole of carcass remains intact, but seems to be dried out.	
28	28-Mar-11	P	I,D,Des	Many insects present. Feathers from neck continue to detach. Odor still strong.	

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #6 – February-March 2011

Carcass ID: DD			Species: Wedge-tailed Shearwater		Location: 24 meters SSE of WTG-3
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Short grass	
1	1-Mar-11	P	I,U	Undisturbed.	
2	2-Mar-11	P	I,U	Unchanged from Day 1.	
3	3-Mar-11	P	I,U	Unchanged from Day 1.	
4	4-Mar-11	P	I,U	Dew. Undisturbed.	
5	5-Mar-11	P	I,U	Flies present. All aspects of carcass wet.	
6	6-Mar-11	P	I,U	Unchanged from Day 5.	
7	7-Mar-11	P	I,U	Undisturbed and unchanged from Day 6.	
8	8-Mar-11	P	I,U	Undisturbed, flies present. Dew	
9	9-Mar-11	P	I,U	Unchanged from Day 8.	
10	10-Mar-11	P	I,U,D	Unchanged from Day 9.	
11	11-Mar-11	P	I,U,D		
12	12-Mar-11	P	I,U,D	Unchanged from Day 11.	
13	13-Mar-11	P	I,U,D	Unchanged from Day 12.	
14	14-Mar-11	P	I,U	Unchanged from Day 13.	
21	21-Mar-11	P	I,U,D	Appears to be dried and hollowed out. Feathers begin to detach from carcass.	
28	28-Mar-11	P	I,D, Des	Sunken appearance, Feathers continue to detach.	

Carcass ID: EE			Species: Domestic Rat/Mouse		Location: 27 meters NE of WTG-5
0	28-Feb-11	P	Fr	Veg class: Bare	
1	1-Mar-11	P	I,U	Undisturbed.	
2	2-Mar-11	P	D,I,U	Ants present.	
3	3-Mar-11	A		Body absent. Possible signs of mongoose tracks.	

CARE Trial #6 – February-March 2011

Carcass ID: FF			Species: Domestic Rat/Mouse		Location: 12 meters SSE of WTG-7
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Grass	
1	1-Mar-11	P	I,U	Lots of ants. Unable to detect under normal search conditions because of dense shrub.	
2	2-Mar-11	P	I,U	Unchanged from Day 1. NOTE: Undetectable under normal search conditions due to the thick-density of grass.	
3	3-Mar-11	P	D,I,U	Ants present.	
4	4-Mar-11	P	D,I,U	Lots of ants.	
5	5-Mar-11	P	D,I,U	Lots of ants. All aspects of carcass wet. Not able to find under normal search conditions.	
6	6-Mar-11	P	D,I,U	Carcass appears to be dried out.	
7	7-Mar-11	P	I,U,D	Not able to find under normal search conditions.	
8	8-Mar-11	P	I,U,D	Not able to find under normal search conditions.	
9	9-Mar-11	P	D,I,U	The whole of carcass remains intact, but dried out.	
10	10-Mar-11	P	D,I,U	Unchanged from Day 9.	
11	11-Mar-11	P	D,I,U	Unable to find under normal search conditions.	
12	12-Mar-11	P	D,I,U	Unchanged from Day 11. Not able to find under normal search conditions.	
13	13-Mar-11	P	D,I,U	Carcass has dried out, with body deflated-like.	
14	14-Mar-11	P	D,I,U	Unchanged from Day 13. Not able to find under normal search conditions.	
21	21-Mar-11	P	D,I,U	Bones begins to puncture through its skin. Over growth of surrounding vegetation makes the carcass absent.	
28	28-Mar-11				

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #6 – February-March 2011

Carcass ID: GG			Species: Wedge-tailed Shearwater		Location: 20 meters NNW of WTG-9
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Grass	
1	1-Mar-11	P	I,U	Lots of ants. Unable to detect under normal search conditions because of dense shrub.	
2	2-Mar-11	P	I,U	Unchanged from Day 1. NOTE: Undetectable under normal search conditions due to the thick-density of grass.	
3	3-Mar-11	P	D,I,U	Ants present.	
4	4-Mar-11	P	D,I,U	Lots of ants.	
5	5-Mar-11	P	D,I,U	Lots of ants. All aspects of carcass wet. Not able to find under normal search conditions.	
6	6-Mar-11	P	D,I,U	Carcass appears to be dried out.	
7	7-Mar-11	P	I,U,D	Not able to find under normal search conditions.	
8	8-Mar-11	P	I,U,D	Not able to find under normal search conditions.	
9	9-Mar-11	P	D,I,U	The whole of carcass remains intact, but dried out.	
10	10-Mar-11	P	D,I,U	Unchanged from Day 9.	
11	11-Mar-11	P	D,I,U	Unable to find under normal search conditions.	
12	12-Mar-11	P	D,I,U	Unchanged from Day 11. Not able to find under normal search conditions.	
13	13-Mar-11	P	D,I,U	Carcass has dried out, with body deflated-like.	
14	14-Mar-11	P	D,I,U	Unchanged from Day 13. Not able to find under normal search conditions.	
21	21-Mar-11	P	D,I,U	Bones begins to puncture through its skin. Over growth of surrounding vegetation makes the carcass absent.	
28	28-Mar-11				

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #6 – February-March 2011

Carcass ID: HH			Species: Domestic Rat/Mouse		Location: 30 meters NNW of WTG-10
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Shrub/Bare	
1	1-Mar-11	P	I,U	Lots of ants. Unable to detect under normal search conditions because of dense shrub.	
2	2-Mar-11	P	D,I,U	Ants present. NOTE: Unable to detect under normal search conditions because of dense vegetation.	
3	3-Mar-11	P	U,D	Many ants. NOTE: Unable to detect under normal search conditions because of dense vegetation.	
4	4-Mar-11	P	U,D	Desiccation occurring, insides coming out of body.	
5	5-Mar-11	P	D,I,U	Slug on abdomen, internal organs visible. Carcass saturated. Unable to find under normal search conditions.	
6	6-Mar-11	P	D,I,U	Cranial exposed.	
7	7-Mar-11	P	D,I,U	Ants. Unable to find under normal search conditions.	
8	8-Mar-11	P	D,I,U	Ants. Unable to find under normal search conditions.	
9	9-Mar-11	P	D,I,U	Completely dried up.	
10	10-Mar-11	P	D,I,U	Unchanged from Day 9.	
11	11-Mar-11	P	D,I,U	Unable to find under normal search conditions.	
12	12-Mar-11	P	D,I,U	Ants. Unable to find under normal search conditions. Body has dried.	
13	13-Mar-11	P	D,I,U	Unchanged from Day 12.	
14	14-Mar-11	P	D,I,U	Ants. Unable to find under normal search conditions.	
21	21-Mar-11	P	D,Des,I,U	Carcass is hidden under shrub. Surround dirt discolors carcass.	

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.



CARE Trial #6 – February-March 2011

Carcass ID: II			Species: Canada Goose		Location: 30 meters SW of WTG-12
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Grass/Shrub	
1	1-Mar-11	P	I,U	Undisturbed. Flies. Dew.	
2	2-Mar-11	P	I,U	Unchanged from Day 1.	
3	3-Mar-11	P	I,U	Unchanged from Day 2.	
4	4-Mar-11	P	I,U	Undisturbed.	
5	5-Mar-11	P	I,U	Undisturbed. All aspects of carcass wet	
6	6-Mar-11	P	D,I,U	Flies present.	
7	7-Mar-11	P	D,I,U	Some decomposition occurring at base of tail.	
8	8-Mar-11	P	D,I,U	Undisturbed.	
9	9-Mar-11	P	Sp,D,I	Scavenging begins with partial eaten-out chest area.	
10	10-Mar-11	P	Sp,D,I	Appears as though scavenging did not continue. Unchanged from Day 9.	
11	11-Mar-11	P	Sp,D,I	No further scavenging apparent. Loose feathers, insects.	
12	12-Mar-11	P	Sp,D,I	Odor from body. Lots of insects.	
13	13-Mar-11	P	Sp,D,I	Unchanged from Day 12.	
14	14-Mar-11	P	Sp,D,I	Odor from body. Lots of insects.	
21	21-Mar-11	P	Sp,D,I	No noticeable changes to the carcass.	
28	28-Mar-11	P	Sp,D,I	No noticeable changes to the carcass. The whole of the carcass still remains mostly intact.	

**Status Codes:** A = Absent, P = Present

**Condition Codes:** D = Natural decomposition (insects usually visible); Des = Desiccation evident; F = Feathers and Bone fragments; Fr = Fresh; I = Intact; R = Remains discovered; U = Undisturbed; Sp = Partially Scavenged; Sc = Completely Scavenged.

CARE Trial #6 – February-March 2011

Carcass ID: JJ			Species: Wedge-tailed Shearwater		Location: 12 meters N of WTG-14
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Shrub	
1	1-Mar-11	P	I,U	Undisturbed.	
2	2-Mar-11	P	I,U	Unchanged from Day 1.	
3	3-Mar-11	P	I,U	Unchanged from Day 2.	
4	4-Mar-11	P	I,U	Undisturbed.	
5	5-Mar-11	P	I,U	Undisturbed. All aspects of carcass wet, has become covered by vegetation.	
6	6-Mar-11	P	I,U	Unchanged from Day 5.	
7	7-Mar-11	P	I,U	Unchanged from Day 6.	

Appendix 3. Carcass Removal Trials (CARE)  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report

8	8-Mar-11	P	I,U	Difficult to find under normal search conditions.
9	9-Mar-11	P	I,U	Unchanged from Day 8.
10	10-Mar-11	P	I,U	Unchanged from Day 9.
11	11-Mar-11			Moved, carcass is turned over. Wind event?
12	12-Mar-11	P	I,Des	Moved from original location and turned over.
13	13-Mar-11	P	I,Des	Unchanged from Day 12.
14	14-Mar-11	P	I,Des	Still in new location. Not scavenged.
21	21-Mar-11	P	I,Des	Unchanged from Day 14.
28	28-Mar-11	P	I,Des	Carcass appears to be weathered. Surrounding dirt begins to cover the carcass.

CARE Trial #6 – February-March 2011

Carcass ID: KK			Species: Canada Goose		Location: 50 meters E of WTG-16
Trial Day	Date	Status	Condition	Comments	
0	28-Feb-11	P	Fr	Veg class: Shrub	
1	1-Mar-11	P	I,U	Undisturbed.	
2	2-Mar-11	P	I,U	Unchanged from Day 1.	
3	3-Mar-11	P	I,U	Unchanged from Day 2.	
4	4-Mar-11	P	I,U	Undisturbed.	
5	5-Mar-11	P	I,U	Undisturbed. All aspects of carcass wet, has become covered by vegetation.	
6	6-Mar-11	P	I,U	Unchanged from Day 5.	
7	7-Mar-11	P	I,U	Unchanged from Day 6.	
8	8-Mar-11	P	I,U	Difficult to find under normal search conditions.	
9	9-Mar-11	P	I,U	Unchanged from Day 8.	
10	10-Mar-11	P	I,U	Unchanged from Day 9.	
11	11-Mar-11			Moved, carcass is turned over. Wind event?	
12	12-Mar-11	P	I,Des	Moved from original location and turned over.	
13	13-Mar-11	P	I,Des	Unchanged from Day 12.	
14	14-Mar-11	P	I,Des	Still in new location. Not scavenged.	
21	21-Mar-11	P	I,Des	Unchanged from Day 14.	
28	28-Mar-11	P	I,Des	Carcass appears to be weathered. Surrounding dirt begins to cover the carcass.	

## **APPENDIX 5**

### **MAKAMAKA'OLE PROJECT FEASIBILITY ASSESSMENT**

Kaheawa Wind Power  
Habitat Conservation Plan

Year 5 Annual Report



































































































































































## **APPENDIX 9**

### **DOWNED WILDLIFE INCIDENT REPORTS**

Kaheawa Wind Power  
Habitat Conservation Plan

Year 5 Annual Report

**Kaheawa Wind Power, LLC**

**Habitat Conservation Plan  
Downed Wildlife Incident Documentation and Reporting Form**

Date Discovered:	June 30, 2011		
Type of Discovery (shade one):	<input checked="" type="checkbox"/> Routine Search	<input type="checkbox"/> Supplemental	<input type="checkbox"/> Incidental
Discovered by:	Elisse Deleissegues		
Affiliation:	First Wind		
Species (common name):	<b>Hawaiian Goose</b>		
Time Discovered (HST):	8:52 am		
Time and Date Initially Reported to Agencies (HST):	8:00 am July 1, 2011		
Time and Date Responders Arrive /Advise (HST):	3:00 pm July 1, 2011		
Location Description:	WTG 12		
GPS Coordinates:	<u>Head</u> Lat 20° 48' 44" Long -156° 32' 58" <u>Main carcass</u> Lat 20° 48' 43" Long -156° 32' 58"		
Date Last Surveyed:	June 22, 2011		
Distance of carcass to base of nearest WTG (m):	Head: 13.1 Main carcass: 19.0		
Bearing of carcass from base of nearest WTG (deg):	Head: 270 Main carcass: 240		
Ground Cover Type (bare, grass, shrub, other):	Bare		
Wind Direction and Speed (mph):	NE/ 14.5		
Cloud Cover (%):	0		
Cloud Deck (meters agl):	>100		
Precipitation:	0		
Temperature (°F):	70		

Condition of Specimen	The body of the carcass was separated from the head; the abdominal area of the main carcass appeared ruptured. The head was discovered separately but intact roughly 10 meters from the main carcass. The carcass may have been lightly scavenged in the abdominal area.
Probable Cause of Injuries/Fatality and Supportive Evidence	Based on the location of the carcass near the turbine and the condition of specimen materials at the incident site, collision with the nearby WTG is considered probable.

Sequence of Events		
Date and Time (HST)	Event Summary	Action Taken
June 30, 2011; 8:52 am	Carcass was discovered by wildlife technician Elisse Deleissegues during routine search.	Monitors notify Greg Spencer (Senior Wildlife Biologist) and gather proper documentation.
June 30, 2011 8:55 am	Danielle Fujii-Doe notified Greg Spencer by phone.	Greg inspects the incident site between 11:00-11:30 am, confirms fatality, and gathers additional information and photos.
June 30, 2011 10:50 am	Wildlife technicians obtained GPS points, photos, and standard documentation of the incident.	Compiled documentation and completed internal communication on the incident.
July 1, 2011 8:00 am	DLNR and USFWS notified of the incident by phone.	Greg contacted Sandee Hufana (DLNR/DOFAW) and Dawn Greenlee (USFWS) to report the incident.
July 1, 2011 10:00 am	Greg coordinates with Maui DOFAW staff on carcass collection.	Sasha Smith (Maui DOFAW) agrees to salvage the carcass materials same day.
July 1, 2011 3:00 pm	Maui DOFAW arrives at the incident site, obtains documentation, and collects the carcass materials.	All carcass materials collected by Maui DOFAW staff for transport to Maui DOFAW base yard.

## Summary

Wildlife monitors discovered the carcass of a Nene during routine searches for downed wildlife at the WTG 12 search plot. The area was last searched on June 22, 2011, although on June 27, 2011, photographs were obtained from a nearby trial specimen at WTG 12 and no Nene carcass was observed by monitors at that time.

Additional information is being reviewed to determine whether the revegetation of nearby disturbed areas may have created a greater collision risk factor for Nene in the last 2 months at KWP. There have been 3 documented takes of Nene between May 11 and June 30, 2011 and 5 total observed takes this fiscal year, which is much higher than in past years.

For additional information or clarification on this incident, please contact:

Gregory Spencer  
Senior Wildlife Biologist  
Kaheawa Wind Power

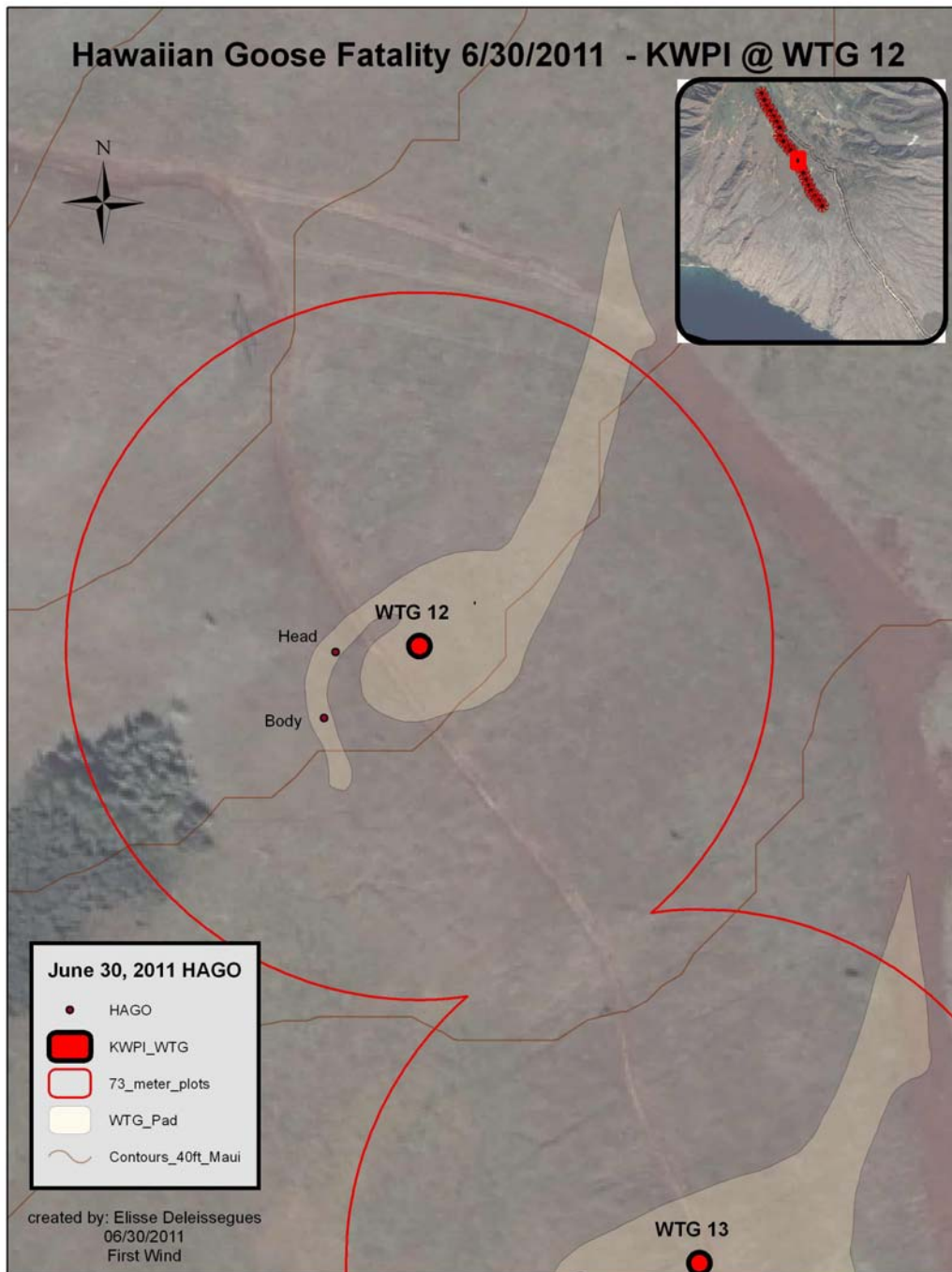


Figure 1 – Map showing the location where a Nene carcass was discovered by searchers performing routine fatality monitoring at Kaheawa Winder Power on June 30, 2011.





Figure 2 – Carcass of a Nene discovered 19 meters WSW of WTG 12 at Kaheawa Wind Power on June 30, 2011.





Figure 3 – Close up of the body of a Nene carcass found at WTG 12 at Kaheawa Wind Power on June 30, 2011.



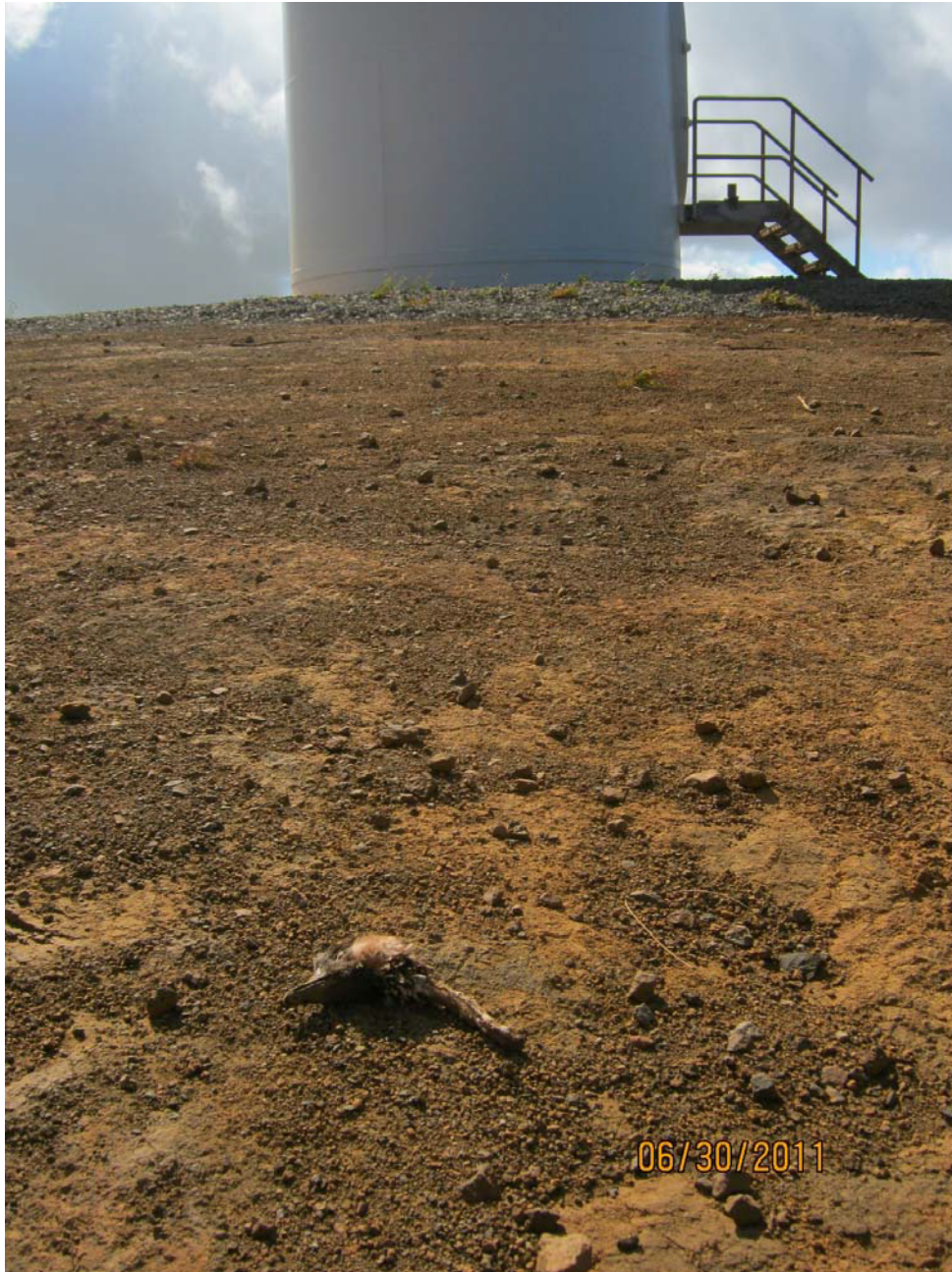


Figure 4 – The head of a Nene associated with a carcass found near WTG 12 on June 30, 2011.





Figure 5 – Close up of the head of a Nene carcass that was found 13 meters west of WTG 12 on June 30, 2011.

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan Downed Wildlife Incident Documentation and Reporting Form

Date:	May 12, 2011		
Type of Discovery (shade one):	<input checked="" type="checkbox"/> Routine Search	<input type="checkbox"/> Supplemental	<input type="checkbox"/> Incidental
Discovered by:	Danielle Fujii-Doe		
Affiliation:	Kaheawa Wind Power, Environmental Affairs		
Species (common name):	<b>Hawaiian Goose</b> (Nene – YOY)		
Time Discovered (HST):	09:49		
Time Initially Reported to Agencies (HST):	11:00		
Time Responders Arrive / Advise (HST):	14:00		
Location Description:	WTG 20 search plot		
GPS Coordinates:	20° 48' 12" N 156° 32' 41" W		
Date Last Surveyed:	April 28, 2011		
Distance of carcass to base of nearest WTG (m):	40		
Bearing of carcass from base of nearest WTG (deg):	340		
Ground Cover Type (bare, grass, shrub, other):	Shrub		
Wind Direction and Speed (mph):	0		
Cloud Cover (%):	100		
Cloud Deck (meters agl):	90-95		
Precipitation:	0		
Temperature (°F):	89		

**Condition of Specimen.** The carcass was intact with no obvious indication of scavenging; flies and maggots were visible; tissue decomposition evident. The body was positioned with wings extended partially outwards.

**Probable Cause of Injuries and Supportive Evidence.** Based on the location of the carcass inside the search plot, collision with the nearby WTG structure is likely.

#### Sequence of Events

Time (HST May 12, 2011)	Event Summary	Action Taken
09:49	Carcass discovered by wildlife technician Danielle Fujii-Doe during routine search.	Monitors pause their search and commence notification of personnel and documentation procedures.
09:50	Danielle Fujii-Doe notified Senior Wildlife Biologist (Greg Spencer) by phone.	Greg Spencer travels to the incident site to evaluate and confirm prior to initiating agency notifications.
10:00 – 10:45	Wildlife technicians obtained GPS points, photos, and standard documentation of the incident.	Compiled documentation and completed internal communication on the incident.
11:00-11:20	Greg Spencer begins agency phone notifications.	Greg contacted Sandee Hufana (DOFAW) and left message with Dawn Greenlee (USFWS).
12:00-12:30	Greg Spencer coordinated with local Maui DOFAW officials to salvage carcass.	Maui DOFAW confirms that staff assigned to salvage carcass.
14:00-14:15	Maui DOFAW technician Chris Alexander arrives to salvage carcass.	Chris Alexander quickly salvages the carcass and leaves the incident site.



15:15	Maui DOFAW confirms salvaged carcass by phone, safe and secure at baseyard complex.	Incident response and salvage activities officially complete.
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## Summary

Wildlife monitors discovered the carcass of a juvenile Nene during routine searches for downed wildlife at the WTG-20 search plot. The incident occurred at the end of the breeding season for Nene when dependent young are fledging and adults are completing their annual molting cycle ("flocking"). At this stage in the breeding season birds are displaying augmented social behavior and are frequently seen in flocks of several individuals (up to 36 in any one location documented in 2011). This incident represents the seventh observed take for Nene at KWP in 5 years of project operation and monitoring, still much lower than the 2-3 takes per year expected at Baseline levels as described in the HCP.

Two consecutive days of severe weather (high winds, rainfall, and reduced visibility) made searches impractical on May 4<sup>th</sup> and 5<sup>th</sup>, which resulted in a 2 week period that elapsed since the WTG-20 plot was last searched. In principle, there should have been no more than 9 days since the plot was last searched given the lag due to weather. However, due to technical oversight in scheduling around weather days and the weekend break, the WTG 17-20 plots were unaccounted for at the end of the monitoring week. Furthermore, this oversight was not accounted for until the Nene take occurred. This shortcoming in attentiveness to compliance scheduling has been addressed internally and should not arise in the future.

Weather and other natural events (e.g., fire) infrequently affect the monitoring schedule and are usually reported to the agencies if they are expected to persist for more than 2 days.



Figure 3 – Carcass of a juvenile Nene discovered 40 m west of the lowermost (c. 1,900 ft elevation) wind turbine (WTG-20) at the Kaheawa Wind Power facility on the island of Maui, May 12, 2011.

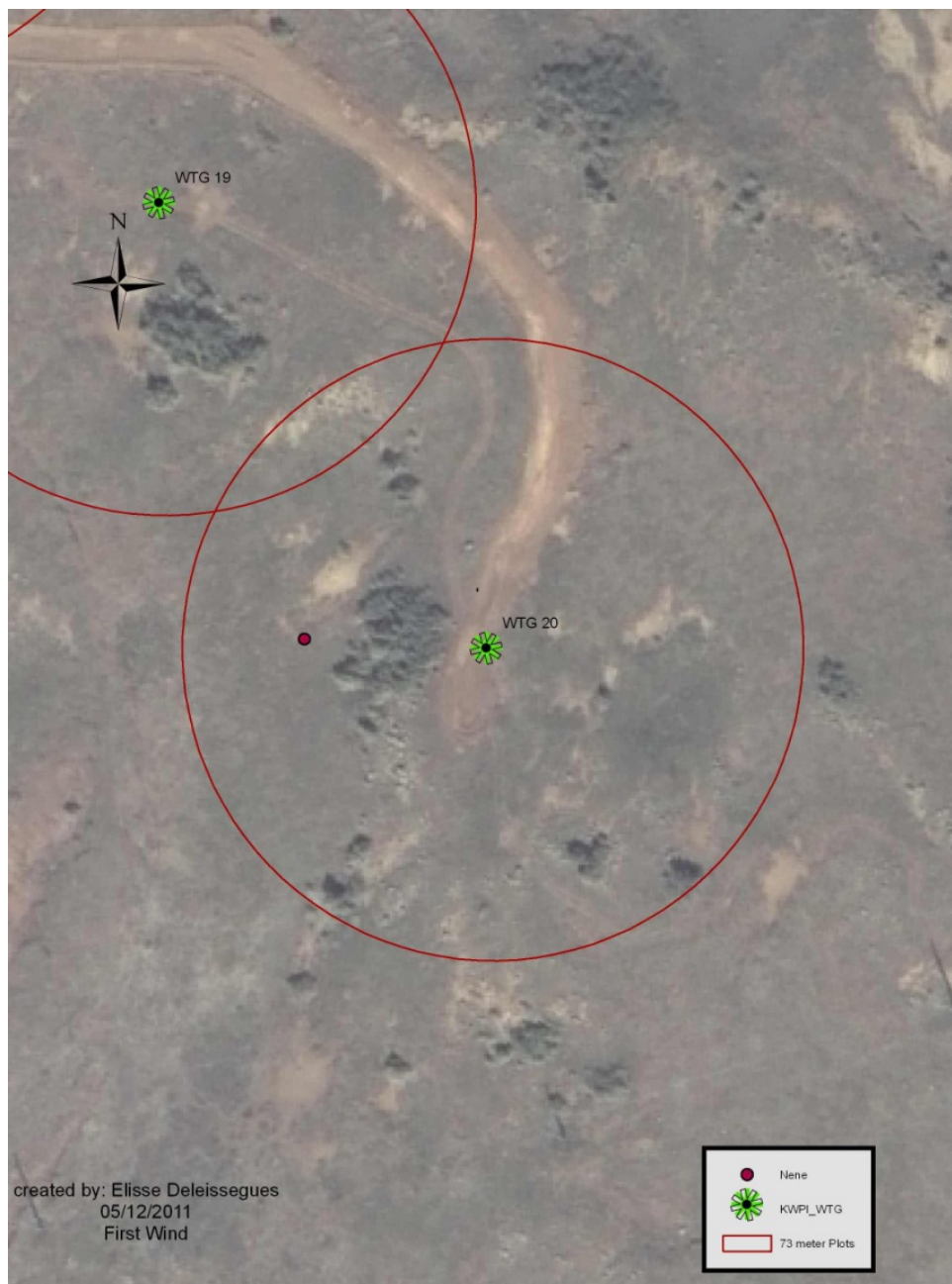


Figure 2 – Map showing the location where a juvenile Nene carcass was discovered by searchers performing routine fatality monitoring at the Kaheawa Wind Power facility May 12, 2011.





Figure 3 – Juvenile Nene carcass located 40 m from WTG 20 in an area dominated by low-statured native shrubs and scattered boulders.

For additional information or clarification, please contact:

Greg Spencer, Senior Wildlife Biologist  
Kaheawa Wind Power

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan

### Downed Wildlife Incident Documentation and Reporting Form

Date:	December 8, 2010
Type of Discovery (shade one):	<input checked="" type="checkbox"/> Routine Search <input type="checkbox"/> Incidental
Discovered by:	David (Kawika) Medrano
Affiliation:	First Wind, Kaheawa Wind Power
Species (common name):	Hawaiian Goose (Nene)
Time and Date Discovered (HST):	13:40 12/8/2010
Time Initially Reported to Agencies (HST):	09:30 12/9/2010
Time Agency Responders Arrive/Advise (HST):	11:30 12/9/2010
Location Description:	WTG 13 at base of turbine fill slope
GPS Coordinates:	20° 48' 38" N, 156° 32' 55" W
Date Last Surveyed:	December 1, 2010
Distance of carcass to base of nearest WTG (m):	33.4
Bearing of carcass from base of nearest WTG:	160°
Ground Cover Type (bare, grass, shrub, other):	Shrub (thick, deep Lantana)
Wind Direction and Speed (mph):	SSW 5
Cloud Cover (%):	0
Cloud Deck (magl):	unlimited
Precipitation:	0
Temperature (°F):	74

**Condition of Specimen:** Remains limited to weathered, partially bleached skeletal segments and loose bones, few feathers, some bones and fragments partially buried and over grown.

**Probable Cause of Injuries and Supportive Evidence:** Unknown. Proximity to WTG is consistent with turbine collision mortality. However location of remains within dense mature vegetation cover and partially buried suggests remains had been present for a considerable period of time, making cause of death and timing of the incident difficult to ascertain.

**Sequence of Events:** The following information summarizes the events and response measures associated with the discovery and reporting of this incident:

- KWP wildlife technicians discovered the bones and partial skeletal remains of a Nene at the SSE base of the WTG 13 fill slope beneath dense Lantana shrubbery at 13:40;
- Technicians reported the discovery to the Senior Wildlife Biologist (Greg Spencer) at 13:45 on 12/8/2010;
- Greg arrived at the site where the remains were discovered and verified the report at 15:00 on 12/8/2010;



- Traffic cones were placed at the immediate discovery site and at the roadway adjacent to the incident site at 15:15 on 12/8/2010;
- Photos and documentation of the discovery and surrounding conditions were gathered on 12/8/2010 and 12/9/2010;
- DOFAW (Sandee Hufana and John Medeiros) and USFWS (James Kwon) were notified by phone at 09:00 on 12/9/2010;
- James Kwon and Dawn Greenlee (USFWS) confirmed receipt of notification by phone around 09:30 and 10:30, respectively on 12/9/2010;
- John Medeiros confirmed receiving notification by 11:00 on 12/9/2010 and coordinated with Greg Spencer for subsequent DOFAW staff response and collection of materials;
- Sasha Smith and assistant (Maui DOFAW) arrived at the site by 11:50 on 12/9/2010, collected the materials, and searched the immediate area for bands (none were found);
- DOFAW staff left the site by 12:45 on 12/9/2010.


## Summary and Discussion

The remains were discovered during routine foot searches. The vegetation in the immediate area is comprised of dense grasses and dense shrubbery that makes searches difficult. The remains appeared very old and were partially buried in soil and woody debris. KWP biologists are inquiring among forensic and taphonomic experts in Hawaii and elsewhere to learn whether reliable techniques may be used to estimate the time that may have elapsed since death.

Vegetation management in the monitoring plots at KWP is planned to commence in early 2011. Clearing of dense shrubbery and tall grass in the search areas will substantially improve the detection efficiency of searchers.

For additional information or clarification, please contact:

Gregory Spencer  
Senior Wildlife Biologist  
First Wind, Kaheawa Wind Power



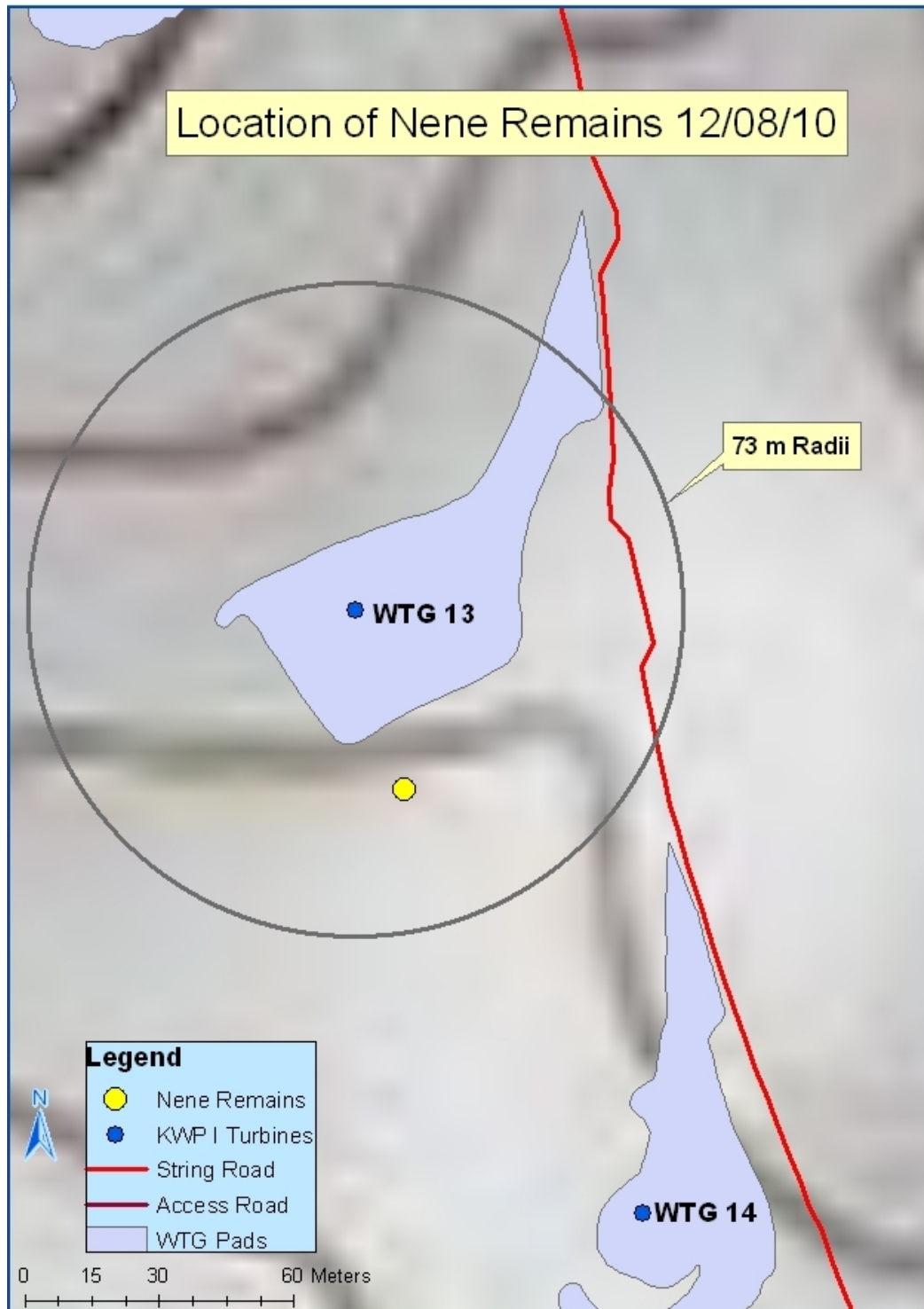


Figure 1 – Location where Nene bones and skeletal remains were discovered SSE of WTG 13.



Figure 2 – Skeletal remains discovered beneath dense Lantana shrub at the base of the fill slope below WTG 13 at the Kaheawa Wind Power facility on December 8, 2010.





Figure 3 – A wildlife technician takes notes during documentation of the discovery of Nene remains SSE of WTG 13 (note the dense Lantana and deep grass which dominate the ground cover in the immediate vicinity).

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan

#### Downed Wildlife Incident Documentation and Reporting Form

Date:	December 30, 2010	
Type of Discovery (shade one):	Routine Search	Incidental
Discovered by:	Gregory Spencer	
Affiliation:	First Wind, Kaheawa Wind Power	
Species (common name):	Nene (Hawaiian Goose)	
Time and Date Discovered (HST):	15:40 12/30/2010	
Time Initially Reported to Agencies (HST):	15:50 12/30/2010	
Time Agency Responders Arrive/Advise (HST):	17:25 12/30/2010	
Location Description:	WTG 18	
GPS Coordinates:	20° 48' 20.9" N, 156° 32' 45" W	
Date Last Surveyed:	December 23, 2010	
Distance of carcass to base of nearest WTG (m):	13.4	
Bearing of carcass from base of nearest WTG:	005°	
Ground Cover Type (bare, grass, shrub, other):	Bare	
Wind Direction and Speed (mph):	SW 0-5	
Cloud Cover (%):	0	
Cloud Deck (magl):	none	
Precipitation:	0	
Temperature (°F):	80	

**Condition of Specimen:** Fresh, post-mortem; carcass intact and molting; age and gender unknown, presumed adult.

**Probable Cause of Injuries and Supportive Evidence:** Wildlife biologists Greg Spencer and Mitch Craig observed the Nene being struck by a turbine rotor during relatively calm weather and apparent low-risk conditions that included clear skies, intermittent and variable wind conditions, and short duration, low velocity turbine rotation. Extensive molting was evident in the downed Nene, which may have affected its ability to maneuver in flight. The pair was observed passing within the vicinity of the rotor-swept zone several (3-4) times before the collision occurred, circling back and at times clearly exhibiting intentional avoidance behavior while appearing inclined to land. The downed individual, which appeared to labor and was following the lead bird, was struck twice and fell to the ground less than 15 meters from the base of the WTG. The bird was immediately inspected and confirmed dead.

<b>Sequence of Events</b>	
15:40	Incident first observed.
15:50	Senior wildlife biologist (Greg Spencer) notified DOFAW (Sandee Hufana, Conservation Initiatives Coordinator) and USFWS (James Kwon and Dawn Greenlee) by phone and email.
16:00—16:45	Greg contacted Maui DOFAW wildlife biologists, John Medeiros and Fern Duvall, and they agreed to respond immediately.
16:30	Mitch and Greg gathered information and documentation at the incident scene and covered the carcass to avoid scavenging until DOFAW arrival.
17:25	DOFAW wildlife biologist Fern Duvall arrived, provided assistance capturing and securing the injured bird (see below), collected the Nene carcass, and departed the site by 18:45.

## Summary and Discussion

During the period immediately before the incident the Nene appeared compromised in its ability to maneuver in flight. The condition of the primary and secondary flight feathers suggested the Nene was molting. This is consistent with the timing of molt that is observed in the West Maui population. This bird was paired in flight with a second Nene and both birds were attempting to land in the vicinity of WTG 17/18, where a third bird was present. Following the collision, the second bird landed and immediately paired up with the third bird on a boulder slope below WTG 17.

The second bird was confirmed to be a known individual that possessed a leg injury (which coincidentally had been reported to Maui DOFAW just 24 hours earlier on December 29, 2010). The injury, which appeared unrelated to wind turbine interaction, compromised the bird's use of its right leg. In concurrence with DOFAW Biologist Dr. Fern Duvall a decision was made to capture the injured bird and seek veterinary assistance. First Wind biologists worked together with Dr. Duvall to capture the injured bird, and place it in a secure carrier. Dr. Duvall took custody for transport to an off-site facility.

All three birds had been banded and band identifications were provided to Maui DOFAW officials.

For additional information or clarification, please contact:

Gregory Spencer  
Senior Wildlife Biologist  
First Wind, Kaheawa Wind Power

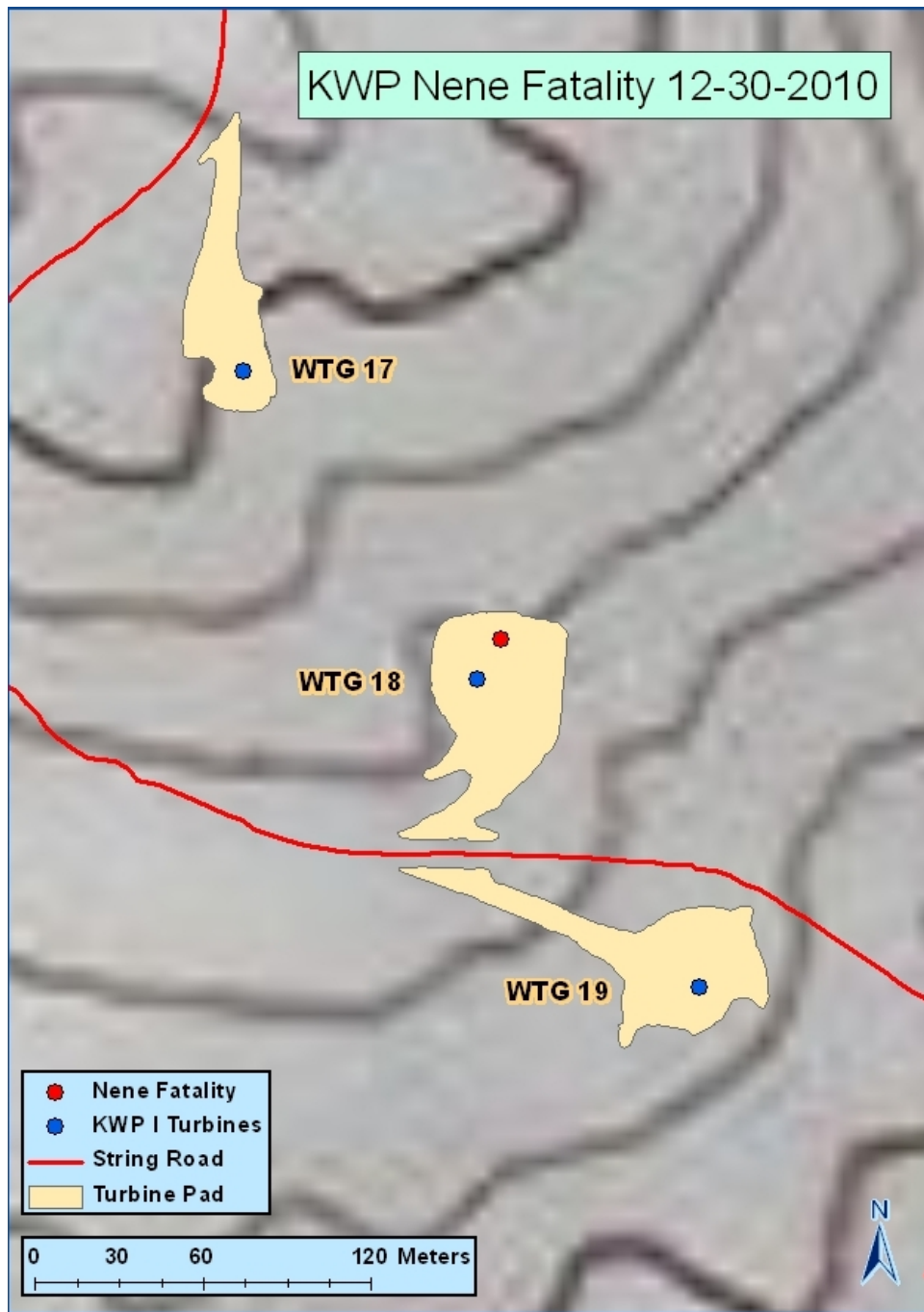


Figure 1 – Map showing the location where a nene fatality incident was observed at Kaheawa Wind Power on December 30, 2010.





Figure 2 – The banded adult nene carcass observed near the base of WTG 18 after colliding with turbine rotors at Kaheawa Wind Power on the island of Maui, December 2010.





Figure 3 – Carcass of an adult nene with DLNR color band “272” clearly visible on the right tarsus (above); molting primaries (below).

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan Downed Wildlife Incident Documentation and Reporting Form

Date Discovered:	Tuesday May 31, 2011
Type of Discovery (shade one):	<input type="checkbox"/> Routine Search <input type="checkbox"/> Supplemental <input checked="" type="checkbox"/> Incidental
Discovered by:	Jesse Johnston
Affiliation:	Kaheawa Wind Power, Operations and Maintenance
Species (common name):	<b>Hawaiian Goose (Nene; foot)</b>
Time Discovered (HST):	12:34
Time Initially Reported to Agencies (HST):	Monday, June 6, 2011 10:00
Time Responders Arrive /Advise (HST):	Tuesday, June 7, 2011 9:00
Location Description:	WTG 12 search plot
GPS Coordinates:	20° 48' 43.7" N -156° 32' 57.4" W
Date Last Surveyed:	May 25, 2011
Distance of carcass to base of nearest WTG (m):	1.7
Bearing of carcass from base of nearest WTG (deg):	140
Ground Cover Type (bare, grass, shrub, other):	Bare
Wind Direction and Speed (mph):	ENE 15
Cloud Cover (%):	100
Cloud Deck (meters agl):	0
Precipitation:	5
Temperature (°F):	69.7

<b>Condition of Specimen</b>	The intact foot with tendons visible was discovered close to the base of the turbine with the base of the foot pointing upward.
<b>Probable Cause of Injuries and Supportive Evidence</b>	Based on the appearance of the severed foot and distance to the tower section, rotor strike appears probable.

#### Initial Event Summary

Time (HST May 31, 2011)	Event Summary	Action Taken
12:34	Foot discovered by the KWP Balance of Plant Manager (Jesse Johnston) during a routine tower inspection.	Jesse immediately contacted David Medrano, KWP wildlife technician.
12:36	David Medrano contacts Elisse Deleissegues, wildlife technician, who was in the vicinity of WTG 12 at the time.	Elisse proceeds to WTG 12 to investigate.

12:40	Elisse verifies the foot and discusses the discovery with Jesse, reiterating the importance of the report.	Elisse conducts a cursory inspection of the surrounding area for signs of any other remains.
12:48	Elisse contacts the wildlife biologist in charge, Greg Spencer to report the find and follow up on next steps. Greg recommended a thorough search of the entire area and an inspection of a nearby CARE trial carcass (CAGO) that has been present for 91 days.	Elisse conducts a more thorough search of the area and no further remains were accounted for in the surrounding area. The CAGO carcass is examined and photographed.
13:40	Elisse returns to O&M building for GPS unit and field documentation gear.	Elisse sends a brief email with photos of the foot and basic information of the discovery to Greg.
13:46	Elisse collects field documentation at the discovery site.	A large stick wrapped with orange duct tape is used to flag the location of the foot.

The discovery of the foot and subsequent documentation was completed on Tuesday afternoon and the outcome of the incident was left open and inconclusive. There have been several instances in the past in which Nene have been encountered with limps and other leg injuries and these generally appear to heal in time, although DOFAW captured and removed 1 bird from the project area in 2010, which later received veterinary care. None of these injuries appear to have been related to project operations. Monitoring staff may be unfamiliar with encountering anomalous circumstances related to downed wildlife, as evidenced by the initial conclusions concerning cause of death in the first documented Nene take incidents at KWP.

The current monitoring team have been performing regular searches according to protocol for 6 months and in this time have documented 1 Nene fatality and several non-HCP covered species. The circumstances associated with this incident should have pointed to the high probability that a rotor-severed leg would result in fatality. This was, in fact, conveyed to the monitoring team, along with directions to perform follow up inspections in the area, but was not followed through to full completion at the time while routine monitoring continued.

On Thursday, June 2, 2011 the WTG-12 plot was searched as part of the monitoring plan for the day. The remains of a Nene were not discovered during the search. The results of the search effort on June 2<sup>nd</sup> led monitors to believe that they had conducted a thorough assessment of the area, raising further questions about the whereabouts and presence of a downed Nene. By this time, the unconfirmed whereabouts of a carcass were beginning to confound the reporting requirements, necessitating a firm conclusion based on additional inspection of the surrounding area.



## Follow-Up Actions

On Saturday morning, June 4, 2011 Greg Spencer independently inspected the site and discovered the carcass of a Nene nearly 43 meters SW of WTG-12. The evidence and documentation performed during the preceding days clearly indicated that a bird was down in the area and a thorough search was necessary to make that determination.

## Subsequent Event Summary

Date Discovered:	June 4, 2011
Type of Discovery (shade one):	Routine Search <input type="checkbox"/> Supplemental <input checked="" type="checkbox"/> Incidental <input type="checkbox"/>
Discovered by:	Gregory Spencer
Affiliation:	Kaheawa Wind Power, Environmental Affairs
Species (common name):	<b>Hawaiian Goose (Nene; carcass)</b>
Time Discovered (HST):	9:00
Time and Date Initially Reported to Agencies (HST):	10:00 June 6, 2011
Time Responders Arrive /Advise (HST):	10:00 June 7, 2011
Location Description:	WTG 12 search plot
GPS Coordinates:	20° 48' 42.7" N -156° 32' 58.4" W
Date Last Surveyed:	June 2, 2011
Distance of carcass to base of nearest WTG (m):	42.5
Bearing of carcass from base of nearest WTG (deg):	220
Ground Cover Type (bare, grass, shrub, other):	Grass/Shrub
Wind Direction and Speed (mph):	Variable, 5-10
Cloud Cover (%):	30
Cloud Deck (meters agl):	>500
Precipitation:	0
Temperature (°F):	78

<b>Condition of Specimen</b>	Dorsal side facing up with wings partially spread; flies widespread beneath, some light abdominal scavenging possible. Legs inspected and 1 foot determined to be severed.
<b>Probable Cause of Injuries and Supportive Evidence</b>	Based on preliminary data gathered over the preceding days, the condition and location of the carcass, it appears the cause of this fatality was due to collision with the turbine structure.

For additional information or clarification on this incident, please contact:

Gregory Spencer  
Senior Wildlife Biologist, Kaheawa Wind Power



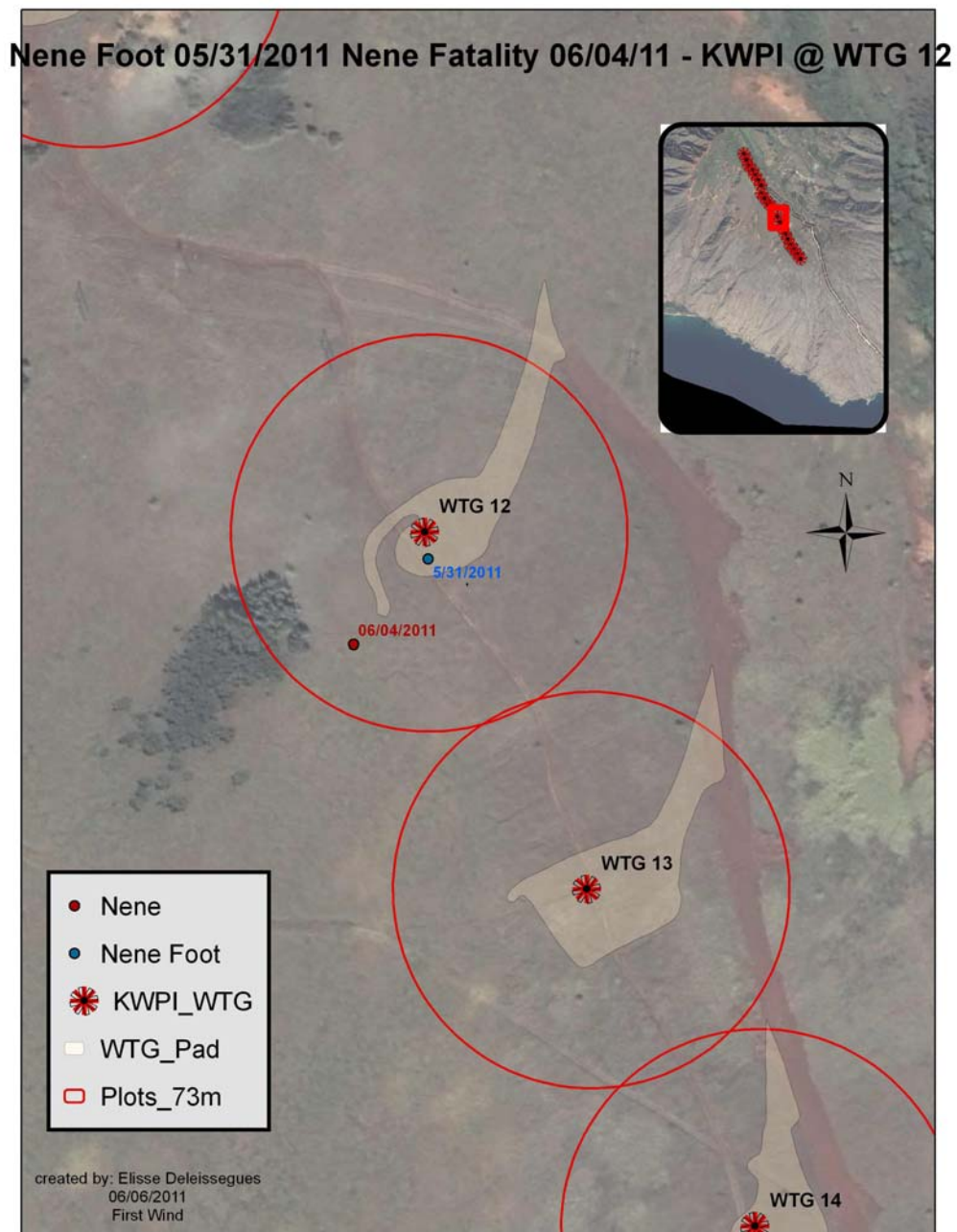


Figure 1 – Map showing the locations where a Nene foot and carcass were documented at the Kaheawa Wind Power facility, May 31 and June 4, 2011.



Figure 2 – Nene foot with attached tendons visible 1.7 m SSE from the base of WTG-12 on the bare gravel surrounding the tower base.





Figure 3 –Nene foot discovered May 31, 2011 at the base of WTG 12 at the Kaheawa Wind Power facility on the island of Maui.





Figure 4 – Nene carcass discovered on June 4, 2011 (top) near the site where the severed foot of a Nene was discovered on May 31, 2011 adjacent to WTG-12 at the Kaheawa Wind Power facility on Maui.



**Kaheawa Wind Power**  
**Habitat Conservation Plan**  
**Downed Wildlife Incident Documentation and Reporting Form**

Date:	April 26, 2011		
Type of Discovery (shade one):	Routine Search	Supplemental	Incidental
Discovered by:	Danielle Fujii-Doe and David Medrano		
Affiliation:	First Wind, Kaheawa Wind Power		
Species (common name):	Hawaiian Hoary Bat		
Time and Date Discovered (HST):	10:32 am, April 26, 2011		
Time Initially Reported to Agencies (HST):	11:00 am, April 26, 2011		
Time Responders Arrive /Advise (HST):	1:30 pm, April 26, 2011		
Location Description:	WTG 16		
GPS Coordinates:	20° 48' 27.36" N 156° 32' 50.158" W		
Date Last Surveyed:	April 21, 2011		
Distance of carcass to base of nearest WTG (m):	11.4		
Bearing of carcass from base of nearest WTG:	330°		
Ground Cover Type (bare, grass, shrub, other)	Bare		
Wind Direction and Speed (mph):	North at 5		
Cloud Cover (%):	80		
Cloud Deck (magl):	>500		
Precipitation:	0		
Temperature (° F):	80		

**Condition of Specimen:**

The carcass was discovered dead. The carcass was intact and whole, partially crushed by a vehicle tire. The remains were drying; body fur and wings were still intact. The carcass was oriented dorsal side up with wings partially folded beneath the body.

**Probable Cause of Injuries and Supportive Evidence:**

Because the carcass was found immediately below a wind turbine, collision appears likely; no other overhead structures are present in the immediate vicinity.

**Sequence of Events**

Time (April 26, 2011)	Event summary	Action taken
10:32 am	Carcass discovered (5 days since last search)	Immediately notified Senior Wildlife Biologist (Greg Spencer)
11:00 am	Greg Spencer notified Sandee Hufana (DOFAW) and Dawn Greenlee (USFWS) by phone	DOFAW agreed to coordinate carcass recovery same day

12:30 pm	Greg Spencer agrees to contact a Maui DOFAW biologist presently on-site (Leo Millan) to recover the carcass	Leo Millan agrees to collect the carcass and coordinate with Fern Duvall and/or John Medeiros (Maui DOFAW) to confirm storage and handling procedures
1:30 pm	DOFAW collected the bat carcass in a double bag containing a label to identify the and track the specimen	Carcass in DOFAW custody at the Kahului Baseyard
3:30 pm	Greg Spencer confirms the successful agency response and recovery with Sandee Hufana by phone	Incident documentation and reporting; no further action taken.

### Incident Summary

This carcass was discovered in the course of conducting a supplemental ATV-based inspection of WTG-16. Wildlife monitors at KWP often perform drive-through visual inspections via ATV of the large bare turbine pads in addition to routine foot searches. These inspections are done at least once per week and sometimes more frequently if time allows, and have been an ongoing part of monitoring for over a year. The supplemental inspections are performed specifically to increase detection of bat fatalities on the bare pad areas, but are equally useful for documenting any fatalities outside of the weekly monitoring coverage. The bare turbine pads themselves encompass an area around each turbine that includes a substantial portion of the area that most bat carcasses are expected to occur based on mainland studies, i.e., within 50% of the turbine height radius. For the GE 1.5 WTGs in operation at KWP the maximum rotor swept height is 96 meters, hence the area of highest likely occurrence is described by a radius of about 48 meters. The distance from the base of WTG-16 to the edge of the bare area in line with the bat carcass was 33 meters, or 34% of the rotor-swept height.

Based on the date the plot was last surveyed on foot and the drying condition of the carcass, the bat fatality is believed to have occurred sometime during the preceding week; however, a forensic examination would provide more basis for estimating the time since death. Cut-in wind speed (the minimum sustained wind speed at which the turbines rotors begin to operate) at KWP is roughly 6.9 mph (3.1 m/s).

Anabat files are being analyzed to determine whether bat call detections were documented at any of the seven units presently operational at Kaheawa in the time period the fatality is believed to have occurred. Results of the data gathered over the course of several days preceding the incident, along with a summary of wind speed and direction will be submitted to DOFAW and USFWS along with a discussion of the findings relative to the incident and an updated assessment of adjusted take as an addendum to this report. Documenting bat activity in relation to wind speed/direction and observed take might inform this incident, help better define periods of relative risk, and perhaps guide monitoring effort.

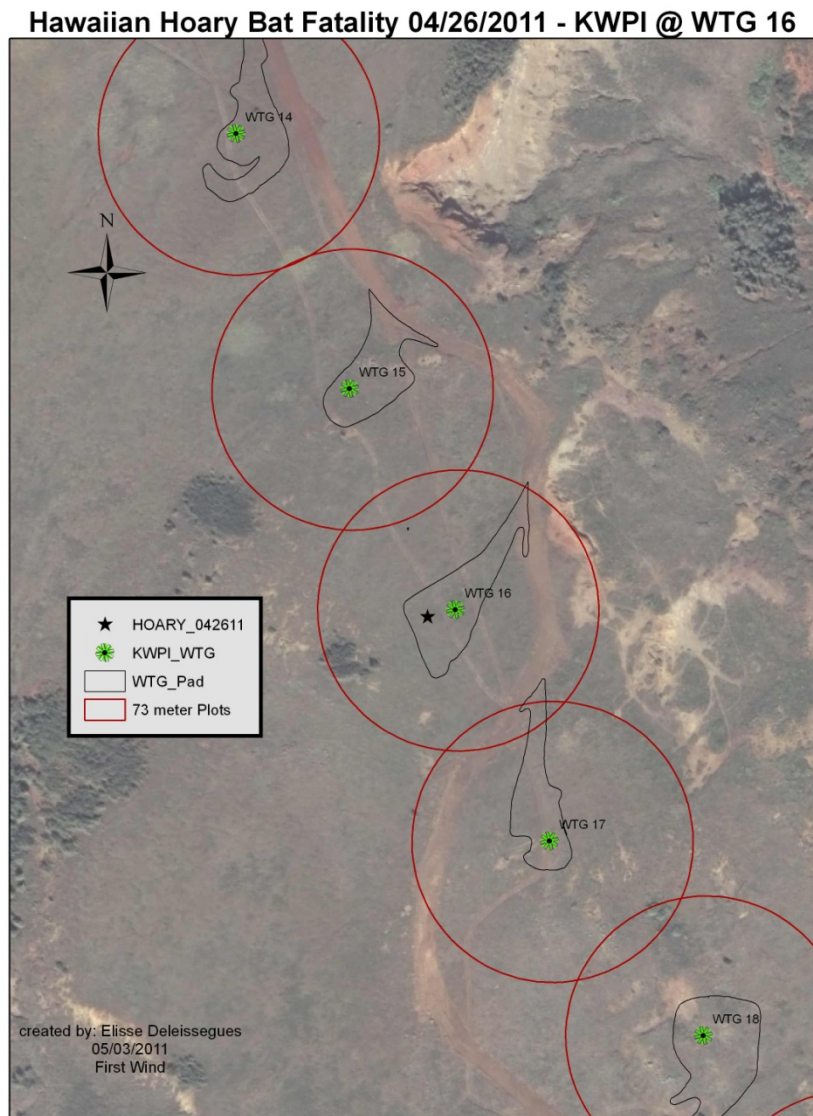


Figure 1 – Map showing the location of the Hawaiian Hoary Bat carcass that was discovered by monitors performing supplemental inspections of search areas near WTG-16 at Kaheawa Wind Power on April 26, 2011.





Figure 2 – Carcass of the Hawaiian Hoary Bat discovered on the bare ground of a turbine pad at Kaheawa Wind Power on April 26, 2011.



Figure 3 – The bare ground of the WTG-16 pad is evident with the carcass of the Hawaiian Hoary Bat visible in the foreground at a distance of 15 meters from the tower base.

**Kaheawa Wind Power, LLC**

**Habitat Conservation Plan  
Downed Wildlife Incident Documentation and Reporting Form**

Date Discovered:	6/27/2011		
Type of Discovery (shade one):	Routine Search	Supplemental	Incidental
Discovered by:	Jesse Johnston		
Affiliation:	Kaheawa Wind Power Operations and Maintenance		
Species (common name):	<b>White-tailed Tropicbird</b>		
Time Discovered (HST):	3:00 pm		
Time and Date Initially Reported to Agencies (HST):	9:30 am 6/28/2011		
Time Responders Arrive /Advise (HST):	2:30 pm 6/28/2011		
Location Description:	WTG 8		
GPS Coordinates:	20 ° 48'59.5" N -156 ° 33'11.6" W		
Date Last Surveyed:	6/21/2011		
Distance of carcass to base of nearest WTG (m):	67.2		
Bearing of carcass from base of nearest WTG (deg):	240		
Ground Cover Type (bare, grass, shrub, other):	Grass		
Wind Direction and Speed (mph):	NE@ 25		
Cloud Cover (%):	20		
Cloud Deck (meters agl):	>100		
Precipitation:	0		
Temperature (°F):	71		

**Condition of Specimen**

The carcass was intact with no obvious indication of scavenging; no flies or maggots were visible; no evidence of tissue decomposition. The bird was positioned dorsal-side up and facing away from the turbine with wings semi-tucked.

**Probable Cause of Fatality and Supportive Evidence**

Based on the location of the carcass relative to the WTG 8 structure, turbine collision appears probable.

### Sequence of Events

Time (HST)	Event Summary	Action Taken
2:59 pm (June 27, 2011)	Carcass discovered by Operations and Maintenance (O&M ) assistant manager, Jesse Johnston, during a firebreak road inspection near WTG 8	O&M Operations Manager Kanoa Taylor takes pictures of carcass and emails these to the project Senior Wildlife Biologist, Greg Spencer, for review and follow up
3:10 pm (June 27, 2011)	Kanoa Taylor calls Greg Spencer to notify him and discuss the incident	Greg Spencer coordinates with Wildlife Monitors to document the incident and gather information for reporting
8:00 am (June 28, 2011)	Wildlife Monitors, Elisse Deleissegues and Danielle Fujii-Doe, obtain GPS points of the carcass and gather standard documentation and other information at the incident site	Compiled field documentation, initiated internal notifications.
9:30 am (June 28, 2011)	Greg Spencer notifies DOFAW Conservation Initiatives Coordinator, Sandee Hufana, and USFWS Biologist, Dawn Greenlee of the incident by phone	DOFAW and USFWS confirm receipt of notification; initiate written agency reporting procedures
1:15 pm (June 28, 2011)	Greg Spencer contacts Maui DOFAW Wildlife Biologist, Fern Duvall, who agrees to visit Kaheawa and collect the carcass	Fern Duvall collects the carcass later the same day and officially takes over custody.



Figure 1 – General overview of the incident site, the yellow arrow points to the location of the White-tailed tropicbird (*Phaethon lepturus*) carcass.



Figure 2 – White-tailed tropicbird discovered 67.2 m from WTG 8 at Kaheawa Wind Power facility on the island of Maui, June 27, 2011.



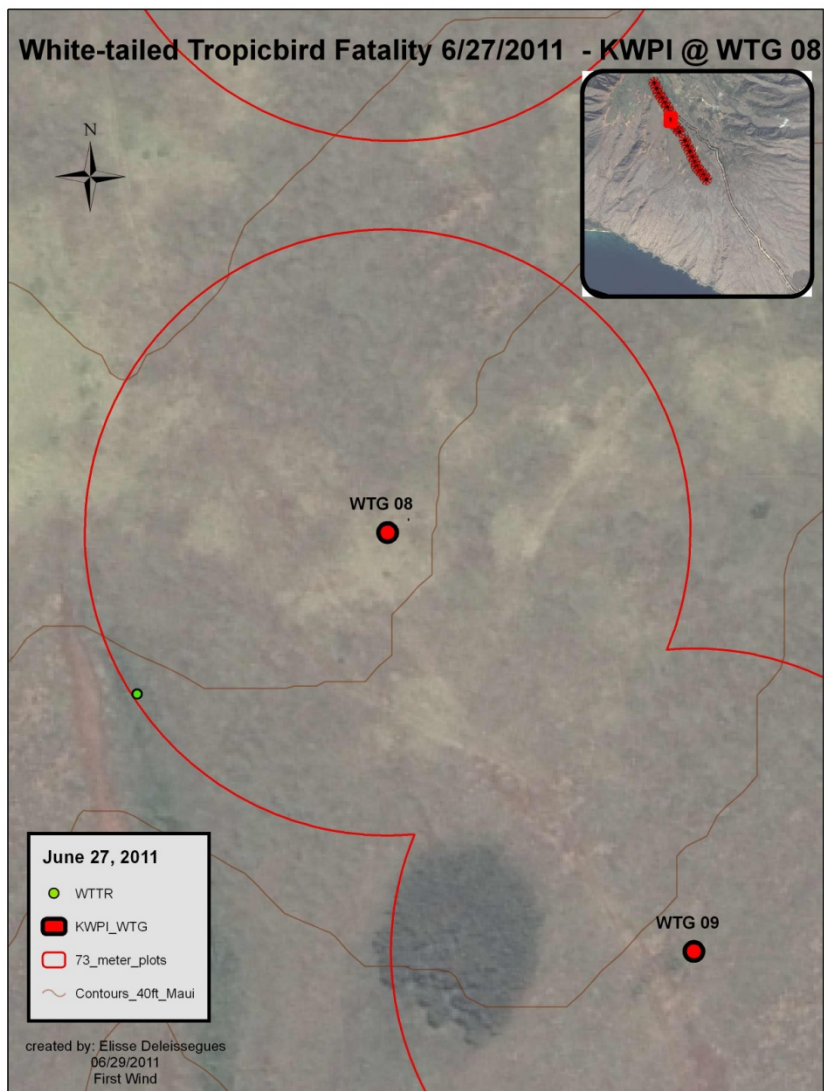


Figure 3 – The location of the White-tailed tropicbird discovered on June 27, 2011 is shown here with relevant site features and an inset of the project area.

For additional information or clarification on this incident, please contact:

Greg Spencer, Senior Wildlife Biologist  
Kaheawa Wind Power

# Kaheawa Wind Power, LLC

## Habitat Conservation Plan Downed Wildlife Incident Documentation and Reporting Form

Date:	May 23, 2011		
Type of Discovery (shade one):	Routine Search	Incidental	Supplemental
Discovered by:	Ekolu Lindsey		
Affiliation:	Maui Cultural Lands		
Species (common name):	White-tailed Tropicbird		
Time and Date Discovered (HST):	May 22, 2011; 12:00		
Date and Time Initially Reported to Agencies (HST):	May 23, 2011; 10:00		
Date and Time Responders Arrive /Advise (HST):	May 23, 2011; 17:00		
Location Description:	WTG-3 search plot		
GPS Coordinates:	20° 49' 21.71" N /-156° 33' 19.86" W		
Date Last Surveyed:	May 16, 2011		
Distance of carcass to base of nearest WTG (m):	42.6		
Bearing of carcass from base of nearest WTG (deg):	312		
Ground Cover Type (bare, grass, shrub, other)	Bare		
Wind Direction and Speed (mph):	East, 25-30		
Cloud Cover (%):	15		
Cloud Deck (magl):	>500		
Precipitation:	0		
Temperature (°F):	80		

**Condition of Specimen:** Tropicbird carcass appeared to be relatively fresh (few days) and intact; no indication of scavenging was evident; some ants present around eyes and bill. Wings un-severed but the left wing appeared fractured.

**Probable Cause of Injuries and Supportive Evidence:** Based on the location inside the monitoring plot adjacent to the turbine, cause of death was probably collision with the turbine structure.

### Sequence of Events

Time and Date	Event Summary	Action Taken
15:30 May 23	Carcass discovered at 12:00 by native plant volunteers during a plant watering and manual weed removal exercise.	Observer reported the discovery to the Kaheawa Wind Power wildlife biologist (Greg Spencer) who was on site at the time.
10:00 May 24	Agency notifications.	Greg Spencer initiates agency notifications; contacts Sandee Hufana (DOFAW, Honolulu) and Dawn Greenlee (USFWS, Honolulu) by phone.
10:00 – 10:45 May 24	Wildlife technicians obtained GPS points, photos, and standard documentation of the incident.	Compiled documentation and completed internal communication on the incident.
11:00 – 11:30 May 24	Greg Spencer coordinates with Maui DOFAW biologist Fern Duvall on carcass collection/salvage and the option of retaining the carcass as <i>in situ</i> CARE.	Fern Duvall confirms that carcass may remain in place for purposes of CARE.



Time and Date	Event Summary	Action Taken
17:00 – 17:30 May 24	DOFAW field documentation at the incident site.	Jay Penniman arrives at Kaheawa and gathers data and documentation.

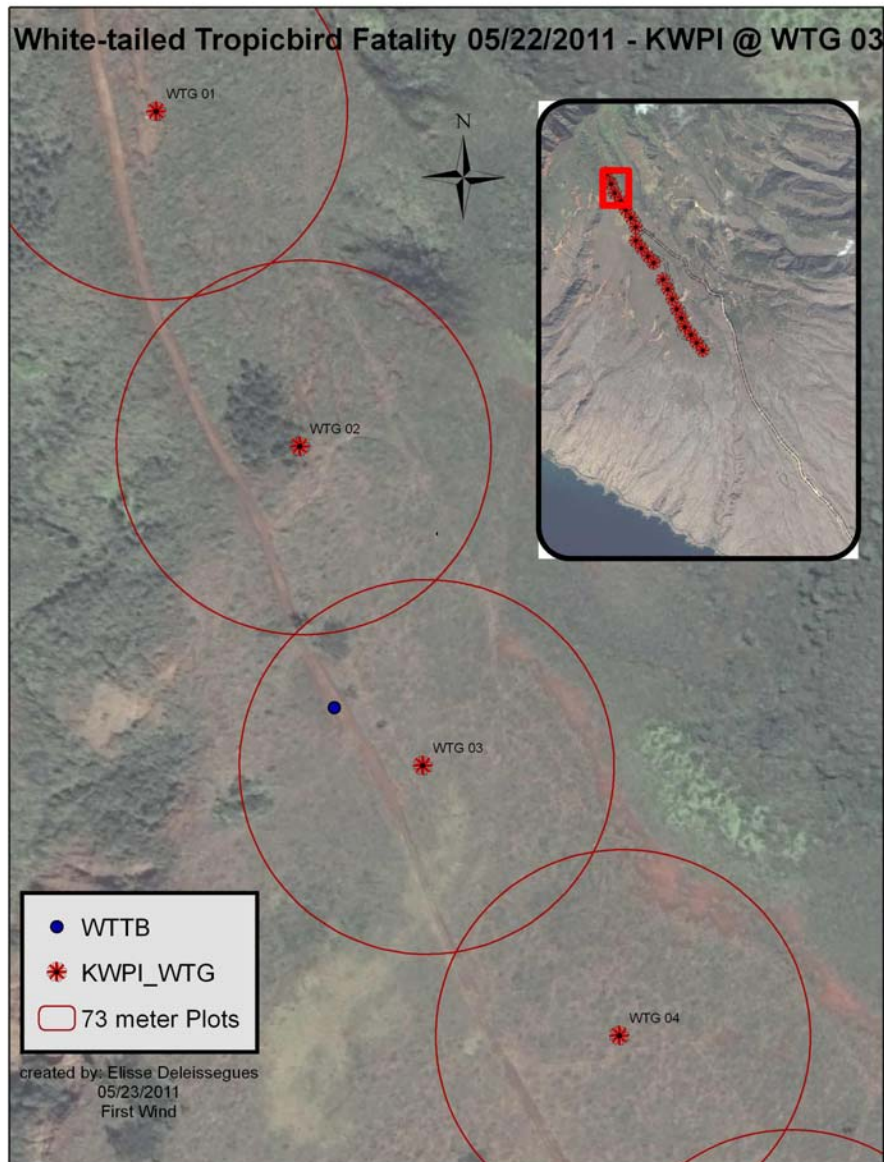


Figure 1 – Map showing the location where a White-tailed Tropicbird carcass was discovered at the Kaheawa Wind Power facility on May 22, 2011.



Figure 2 – White-tailed Tropicbird carcass discovered 42.6 m NW of WTG-3 on bare ground adjacent to the old Jeep access road track at Kaheawa Wind Power on the island of Maui, May 22, 2011.



Figure 3 – White-tailed Tropicbird carcass discovered at Kaheawa Wind Power on May 22, 2011.

## Summary

On Sunday, May 22, 2011 volunteers participating in native plant husbandry and weed removal activities discovered the carcass of a White-tailed tropicbird (*Phaethon lepturus*) near WTG-3 at the KWP facility. They reported their finding to the Senior Wildlife Biologist (Greg Spencer), who happened to be on site at the time. Greg visited the incident site Sunday afternoon and corroborated the report. The agencies were notified and the incident was documented on Monday morning, May 23, 2011.

During coordination of salvage and specimen collection, Greg requested that DOFAW wildlife biologist, Fern Duvall, determine whether this specimen could be left in place and incorporated into CARE exercises, given that the tropicbird is a seabird and no seabird carcasses have ever been left *in situ* and monitored for scavenging and carcass retention. It was agreed that the carcass could be retained for these purposes. Jay Penniman was assigned to inspect the incident site and gather independent documentation of the incident, but left the carcass in the location it was discovered. Later, after carefully considering the implications of incorporating this carcass into any in-progress or new CARE trials (necessity of the data for seabirds, additional carcasses in the field) it was agreed by KWP wildlife staff that retaining this carcass is not desirable. On Thursday, May 26, 2011 Greg Spencer coordinated with Jay Penniman to collect the tropicbird carcass while he was performing another task at Kaheawa. The carcass is now in DOFAW possession at the Kahului Baseyard.

For additional information or clarification, please contact:

Gregory Spencer, Senior Wildlife Biologist  
Kaheawa Wind Power, Environmental Affairs



## Kaheawa Wind Power, LLC

### Habitat Conservation Plan Downed Wildlife Incident Documentation and Reporting Form

Observer Name	Gary Henson (Operations Manager)
Date	August 3, 2010
Species (common name)	White-tailed Tropicbird
Time Observed (HST)	7:48 am
Time Initially Reported (HST)	Same
Time KWP Responders Arrive (HST)	7:55 am
Time DLNR Responders Arrive (HST)	1:45 pm
Location	KWP Substation below WTG-11
GPS Coordinates (specify units and datum)	LAT: 20° 48' 49" LONG: -156° 33' 03"
Date Last Surveyed	July 30, 2010
Distance to Base of nearest WTG (m)	Carcass: 67.6 to WTG-11
	Feather tuft: 100 to WTG-11
	Wing section: 170 to WTG-11
Bearing from Base of nearest WTG	SW (all materials)
Ground Cover Type	Bare Ground/Gravel (all materials)
Wind Direction and Speed (mph)	NE 20-30
Cloud Cover (%)	100
Cloud Deck (magl)	<100
Precipitation	1
Temperature (°F)	70

Precipitation Codes: None (0), Fog/Mist (1), Drizzle (2), Light rain (3), Rain (4), Heavy rain (5)

Distances are measured horizontally to the turbine base using a Nikon Forestry 550 Laser Rangefinder (accuracy 0.001 meters)

**Condition of Specimen:** The carcass exhibited severe trauma to its head and back. Wildlife Technicians searched the area and discovered a tuft of feathers 35m SSW from the carcass, in the MECO substation area (which was inaccessible), and a wing approximately 170m SSW of WTG 11.

**Probable Cause of Injuries and Supportive Evidence:** Based on the condition of the carcass, turbine collision appears probable. Strong NE trade winds and a very low cloud deck may have reduced visibility and contributed to increased avian collision risk.

**Action Taken:** The KWP Operations Manager (Gary Henson) notified the Senior Wildlife Biologist (Greg Spencer) and on-site Wildlife Monitors (David Medrano and Mitch Craig) by phone immediately upon discovering the carcass. Greg Spencer concurred by phone with David Medrano, arrived at the incident site by 8:45 am, and confirmed the identity of the carcass as a White-tailed tropicbird (*Phaethon lepturus*). Greg Spencer notified DLNR (Santee Hufana) and USFWS (James Kwon) by telephone at approximately 10:00 am on the same day. Field documentation and photographs were gathered immediately after notifications were initiated. A biologist with Maui DOFAW (Sasha Smith) responded by 1:45 pm, collected the carcass materials, and left the scene by 2:00 pm the same day.







Figure 2. The tropicbird carcass discovered alongside the KWP sub-station enclosure fence is clearly evident next to a work area on the morning of August 3, 2010.





Figure 3. Photo taken on the morning of on August 3, 2010 showing the separated wing section (white, in foreground) located on recently burned grasslands downwind of a White-tailed tropic bird carcass discovered at the KWP sub-station facility.

Kaheawa Wind Power, LLC

Habitat Conservation Plan  
Downed Wildlife Incident Documentation and Reporting Form

Date:	May 26, 2011		
Type of Discovery (shade one):	<input checked="" type="checkbox"/> Routine Search	<input type="checkbox"/> Supplemental	<input type="checkbox"/> Incidental
Discovered by:	David Medrano		
Affiliation:	Kaheawa Wind Power		
Species (common name):	Eurasian Skylark		
Time and Date Discovered (HST):	8:47 May 26, 2011		
Time Initially Reported to Agencies (HST):	14:00 May 26, 2011		
Time Responders Arrive / Advise (HST):	16:00 May 26, 2011		
Location Description:	WTG 17		
GPS Coordinates:	20° 48' 23" / -174° 32' 48"		
Date Last Surveyed:	May 19, 2011		
Distance of carcass to base of nearest WTG (m):	26		
Bearing of carcass from base of nearest WTG:	208		
Ground Cover Type (bare, grass, shrub, other)	Bare		
Wind Direction and Speed (mph):	North; 32		
Cloud Cover (%):	40		
Cloud Deck (magl):	>100		
Precipitation:	0		
Temperature (°F):	70		

**Condition of Specimen:** Carcass intact, slightly dried. No signs of scavenging.

**Probable Cause of Injuries and Supportive Evidence:** The carcass was discovered close to turbine, suggesting possible collision with the turbine structure.

**Sequence of Events**

Time (HST May 26, 2011)	Event Summary	Action Taken
08:50	Carcass discovered during routine wildlife fatality monitoring.	Wildlife monitors notify Greg Spencer (Senior Wildlife Biologist, KWP) of the discovery.
09:00 – 09:30	Incident field documentation.	KWP wildlife staff collects data and documentation at the incident site.
14:00	Agency notifications.	Greg notifies USFWS (Dawn Greenlee) and DOFAW (Sandee Hufana) by email.
14:15	Salvage coordination.	Greg contacts Jay Penniman (Maui DOFAW) and coordinates salvage/specimen collection.
16:00 – 16:30 (ETA)	Specimen collection and agency field documentation.	Jay Penniman arrives, gathers field documentation, collects the Skylark carcass, and departs the site.



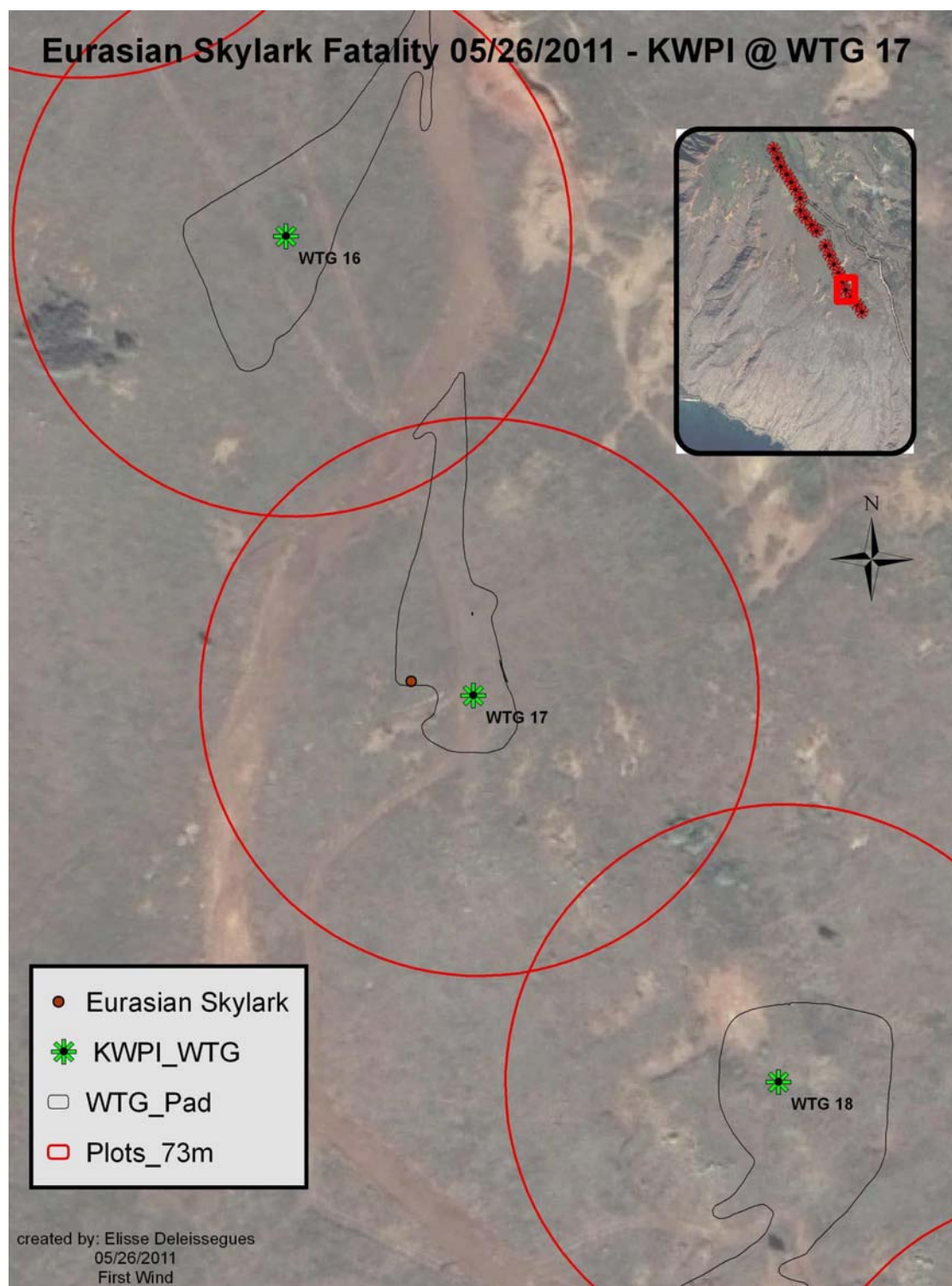


Figure 1 – Map showing the location where a Eurasian Skylark (*Alauda arvensis*) carcass was discovered at the Kaheawa Wind Power facility on Maui, May 26, 2011.



Figure 2 – Eurasian Skylark discovered 26 m SW of WTG-17 on the bare ground turbine pad, Kaheawa Wind Power, May 26, 2011.





Figure 3 – Detail of a Eurasian Skylark carcass discovered at Kaheawa Wind Power on Maui.

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan (ITL-08) Downed Wildlife Incident Documentation and Reporting Form

Observer Name	David Medrano (Wildlife Monitor)
Date	September 16, 2010
Species (common name)	Great Frigatebird (female)
Time Observed (HST)	11:00am
Time Initially Reported (HST)	Same
Time Responders Arrive (HST)	Same
Location	WTG 17
GPS Coordinates (specify units and datum)	LAT: 20° 48' 22" LONG: 156° 32' 48"
Date Last Surveyed	September 10, 2010
Distance to Base of nearest WTG (m)	30 – Body / 39.5 – Wing
Bearing from Base of nearest WTG	SSW
Ground Cover Type	Bare Ground
Wind Direction and Speed (mph)	NNE 15-25
Cloud Cover (%)	30
Cloud Deck (magl)	>500
Precipitation	0%
Temperature (°F)	72

**Condition of Specimen:** During routine searches, wildlife monitors discovered the carcass and severed wing of a Great Frigatebird (*Fregata minor*) just south of WTG-17. The bird appeared to have head trauma and the wing was completely separated from the main carcass.

**Probable Cause of Injuries and Supportive Evidence:** Based on the appearance of the carcass and severed wing, turbine collision appears likely. There were no eye-witness accounts of the incident; although the condition of the carcass and time interval since the area was last searched suggests the carcass may have been 3-5 days post-mortem. Trade winds were strong for several days prior to the incident.

**Action Taken:** Wildlife monitors immediately called and left a voice message with the Senior Biologist (Greg Spencer). Monitors then called and reported the incident to Maui DOFAW. On the morning of Friday, September 17<sup>th</sup> Mr. Spencer notified USFWS (James Kwon) and DOFAW (Sandee Hufana) in Honolulu by phone. At the time the incident was initially reported, monitors documented the incident and obtained photos. The incident site was marked and all materials were left in place at the incident site. KWP will monitor their condition daily in an effort to reduce scavenging until the materials can be collected by DOFAW. Maui DOFAW officials have indicated they will collect the remains on Monday, September 20, 2010.

For additional information or clarification, please contact:

Gregory Spencer, Kaheawa Wind Power



Figure 1. Map showing the location (red dot) of the Great Frigatebird carcass discovered by wildlife monitors at the Kaheawa Wind Power facility, September 16, 2010.





Figure 2. Carcass of a female Great Frigatebird discovered at Kaheawa Wind Power on September 16, 2010.





Figure 3. Wing section of a Great Frigatebird discovered near WTG-17 Kaheawa Wind Power on September 16, 2010.





Figure 4. Looking toward the base of WTG-17 and the downed wildlife incident area; the wing section is visible in the foreground while a wildlife monitor inspects the main carcass.

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan Downed Wildlife Incident Documentation and Reporting Form

Observer Name	Greg Spencer (Wildlife Biologist, KWP)
Date	November 22, 2010
Species (common name)	BLFR
Time Observed (HST)	14:00
Time Initially Reported (HST)	15:30
Time Responders Arrive (HST)	N/A
Location	WTG 07
GPS Coordinates (specify units and datum)	20°49'6" N, 156°33'9" W NAD83
Date Last Surveyed	November 16, 2010
Distance to Base of nearest WTG (m)	5.5
Bearing from Base of nearest WTG	320°
Ground Cover Type	Bare-gravel
Wind Direction and Speed (mph)	SW 2
Cloud Cover (%)	90
Cloud Deck (magl)	200
Precipitation (%)	0
Temperature (°F)	75

**Condition of Specimen:**

Freshly killed. Feathers were missing across the anterior dorsal area.

**Probable Cause of Injuries and Supportive Evidence:**

Greg Spencer observed the bird strike WTG 07 after it flushed from the grass ahead of searchers and flew into the rotor tip. The bird carcass came to rest on the bare turbine pad and was immediately examined closely to confirm visual observations. Winds were variable 5-10 mph at the time of the incident.

**Action Taken:** After inspecting the carcass, Greg Spencer called DOFAW HCP Coordinator Sandee Hufana and left a recorded notification for James Kwon at the Pacific Islands Fish and Wildlife Office in Honolulu. Documentation and photos of the incident were obtained and the carcass was collected, labeled, and frozen at KWP.

For additional information or clarification on this incident, please contact:

Gregory Spencer, Environmental Affairs  
Kaheawa Wind Power, LLC



Figure 1 – Map of the incident area showing the location where an immature Black francolin was observed following collision with a wind turbine rotor at Kaheawa Wind Power, West Maui, Hawaii.





Figure 2 – Fresh carcass of a Black francolin observed 5.5 meters from the base of WTG 07 at the Kaheawa Wind Power facility on the island of Maui, November 22, 2010.





Figure 3 – The Black francolin is seen clearly near the base of WTG 07.

## Kaheawa Wind Power, LLC

### Habitat Conservation Plan Downed Wildlife Incident Documentation and Reporting Form

Date:	February 22, 2011	
Type of Discovery (shade one):	Routine Search	Incidental
Discovered by:	David Medrano	
Affiliation:	First Wind, Kaheawa Wind Power	
Species (common name):	Japanese White-eye	
Time Discovered (HST):	8:56am	
Time Initially Reported to Agencies (HST):	N/A	
Time Responders Arrive /Advise (HST):	N/A	
Location Description:	WTG - 01	
GPS Coordinates:	20° 49' 28.5" N, 156° 33' 21.8" W	
Date Last Surveyed:	February 14, 2011	
Distance of carcass to base of nearest WTG (m):	27.8m	
Bearing of carcass from base of nearest WTG:	165° (SSE)	
Ground Cover Type (bare, grass, shrub, other)	Bare	
Wind Direction and Speed (mph):	S, 1.6mph	
Cloud Cover (%):	50	
Cloud Deck (magl):	>500	
Precipitation:	0	
Temperature (°F):	65	

**Condition of Specimen:**

Carcass was found 27.8m downhill and to the SSE from WTG - 01. The carcass had flies and ants on it.

**Probable Cause of Injuries and Supportive Evidence:**

Based on what appears to be a slight fracture on the skull, turbine tower collision seems probable.

**Sequence of Events**

8:56 am	David Medrano found a Japanese White-eye during normal downed monitor searching at WTG - 01; Danielle Fujii-Doe called Greg Spencer to inform him of the carcass.
9:10 am	Elisse Deleissegues recorded GPS, bearing, weather information, and other pertinent data; specimen was collected and placed in the site freezer.



## **Summary and Discussion**

The Japanese White-Eye was found during normal downed wildlife monitoring by wildlife monitoring technicians, Danielle Fujii-Doe, Elisse Deleissegues and David Medrano. Greg Spencer was notified by phone while photos and other documentation were gathered. Shortly thereafter, Elisse Deleissegues placed the carcass in the site specimen freezer.

### **For additional information or clarification, please contact:**

Gregory Spencer, Senior Wildlife Biologist  
Kaheawa Wind Power, Environmental Affairs



Figure 1 – Japanese White-Eye carcass discovered near the base of WTG - 01.





Figure 2 – Japanese White-Eye carcass discovered 27.8 meters SSE of WTG – 01 on bare ground at the Kaheawa Wind Power facility, island of Maui, February 22, 2011.

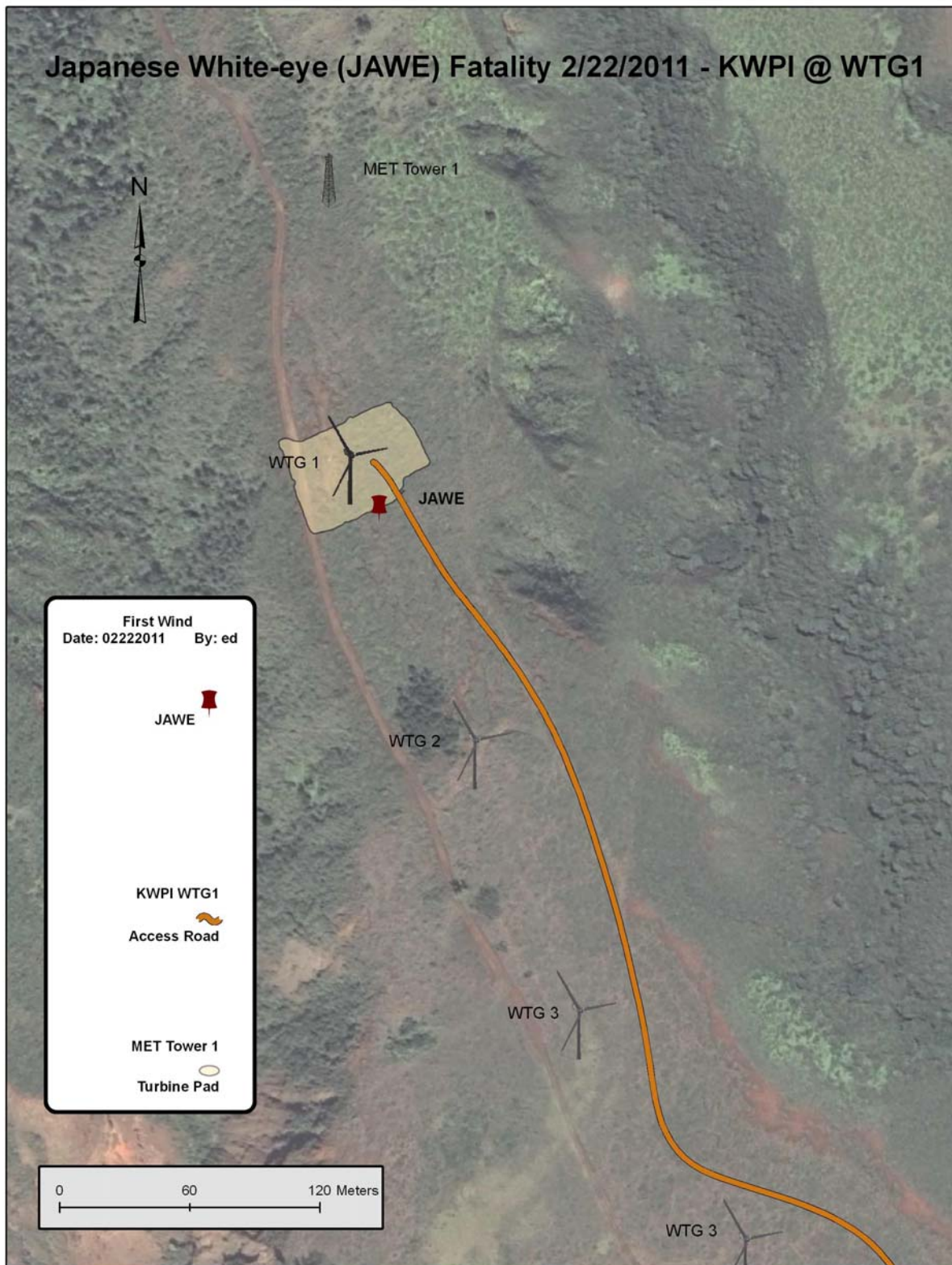


Figure 3 – Map showing the location of the Japanese White-eye (JAWE) carcass.

## **APPENDIX 10**

### **VEGETATION MANAGEMENT PROJECT SUMMARY**

**SUBMITTED TO HAWAII DLNR  
DIVISION of CONSERVATION and RESOURCE ENFORCEMENT**

**Kaheawa Wind Power  
Habitat Conservation Plan**

**Year 5 Annual Report**

*Incidental Take License No. ITL-08 and Incidental Take Permit No. TE118901-0*







## Kaheawa Wind Power – Habitat Conservation Plan

**Project Summary Statement:** Managing Vegetation and Ground Cover to enhance  
Downed Wildlife Monitoring at Kaheawa Wind Power, Maui

### ***Project Background***

In June 2006 Kaheawa Wind Power, LLC (KWP) began operating the island of Maui's first commercial wind energy generation facility in the Kaheawa Pastures area of West Maui. The State Board of Land and Natural Resources approved an amended Conservation District Use Permit (CDUP MA-3103) for the proposed facility, which is situated on State conservation lands in June 2005. Pursuant to Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended, and under a similar program, Chapter 195-D, Hawai'i Revised Statutes, KWP developed a project-specific Habitat Conservation Plan (HCP) in cooperation with the USFWS, DLNR and the Hawai'i Endangered Species Recovery Committee (ESRC). Upon final approval of the HCP, the federal ITP (TE-118901-0) and state ITL (ITL-08) were issued in January 2006. Both permits have a duration of twenty (20) years.

The HCP anticipates that the incidental take of four listed species (Hawaiian Petrel, Newell's Shearwater, Nene, and Hawaiian Hoary Bat) may potentially occur as a result of the operation of the wind farm. No other listed, proposed or candidate species are known or believed to be present in the project area.

An important provision of the HCP, Downed Wildlife Monitoring, consists of performing weekly searches of the 20 wind turbine (WTG) monitoring plots to document wildlife fatalities on a year-round basis. Each plot is 73 meters in radius measured from the base of each turbine. There are 3 gaged meteorological towers that are also searched weekly. Monitoring has been ongoing since the facility became operational in June, 2006. The efficiency of searchers in the field is believed to be proportional to the type of vegetation and its stature in the search plots, which until recently has been unmanaged and is dominated by invasive weeds, dense non-native grasses (Molasses Grass, Kikuyu), shrubs (Lantana and Christmasberry), and trees (Christmasberry, Silky Oak, and Ironwood).

In 2010, KWP submitted a Vegetation Management Plan as part of its Year 4 Annual HCP Report (Appendix 9 – attached) that outlined the methods and rationale for managing the vegetation and ground cover in a condition that would improve carcass detection probability for searchers conducting monitoring under the HCP. Because of the sensitivities associated with area use by Nene and the occurrence of several native plant species in the project area, the Hawaii Division of Forestry and Wildlife (DOFAW) expressed interest in conducting a site assessment to evaluate the proposed plan. Sandee Hufana (Conservation Initiatives Coordinator, DOFAW) and Greg Spencer (Senior Wildlife Biologist, KWP) conducted a field assessment on October 28, 2010 that entailed visiting several of the proposed management areas. The objectives of the site assessment included discussing the specific methods proposed for removing large, dense stands of invasive trees and shrubs and performing brush cutting and mowing using a small track-loader and mower attachment in the areas of grass that dominate significant portions of the monitoring plots (and surrounding region). In addition, ways to minimize impacts to native plants were also discussed, and it was concluded that some limited native species impacts could be expected, but that measures to minimize this impact would be implemented

on a site-specific basis throughout the operation. It was agreed that extra diligence would be required in the WTG 1-3 sites where sensitive native plant species are more predominant.

On November 15, 2010 DOFAW provided written approval for the proposed vegetation management plan effective immediately (attached).

### ***Project Implementation – Mowing***

In January, 2011 KWP initiated the first phase of the plan by contracting a local team (Makala Construction) to conduct mowing and brush cutting of the WTG 4-20 sites, where practicable given terrain and other constraints. The initial round of mowing was performed using a Bobcat and mower attachment (Fig. 1). We found the Bobcat to be capable of reaching most areas and maneuverable enough to avoid areas with high native species cover. Roughly 70% of the “mowable” area was treated in this manner over the course of 4-5 days. While some plots are dominated by mostly homogeneous stands of grass and were easily mowed (Fig. 2), others were more difficult to access with the Bobcat and were left for subsequent treatment. Each day prior to initiating work, KWP wildlife staff surveyed the proposed work area to document the presence of Nene or Nene nesting activity. If Nene or Nene nesting activity was documented, the area was avoided entirely and another area well removed from Nene activity and presence was selected for treatment. Two active nests were discovered on the KWP site during January and were carefully avoided and closely monitored for any indication of disturbance or adverse behavioral response of attending adults. There were no apparent disturbances documented and both nests are believed to have successfully hatched young and the family groups dispersed. The contract mowing team was accompanied throughout by wildlife staff in order to ensure avoidance of Nene interaction and/or disturbance during the operation.



Figure 1 – Bobcat and mower attachment at work maneuvering among native shrubs (WTG-4).



Figure 2 – Freshly mowed section of the WTG 5/6 search plots dominated by invasive grasses.



### ***Project Implementation – Removal of Large Trees and Shrubs***

In late March, 2011 KWP initiated a second round of vegetation management at Kaheawa. This next effort was intended to focus on the removal of large trees and shrubs on several of the search plots. Mowing is also a component of this round of management, but is expected to follow the cutting and removal of the large woody debris from the site. The same contractor (Makala Construction) was chosen for the second round of clearing. Makala possesses site familiarity and, like all of our contractors, have received several site sensitivity trainings and project-specific refreshers that highlight the wildlife, cultural, and native resource sensitivities that need to be considered while working at Kaheawa.

Contractors were provided a full work site orientation in which all the specific stands were pointed out and special provisions for minimizing impacts to nearby and surrounding native species were described in advance. The limits of the plot areas were clearly flagged and discussed with Makala personnel. The areas inside the WTG 1-3 plots were highlighted as especially sensitive and a walk through was performed to identify the specific ironwood and Christmasberry stands that were to be cut and removed. An orientation to the common native plant species found in each area was provided to enhance worker recognition.

Several heavy stands of ironwood were cut by hand using chainsaws at WTG 2/3, 4, 5, 6, 11, 12, 15, 19, and 20. Debris was fallen at each site, cut into smaller sections, and removed both by hand and with the assistance of a mechanized loader equipped with a bucket. At the time of this writing, several of the sites have been completely cleared of cut debris and the material is stockpiled on the bare road and/or turbine pad adjacent to the work site (Fig. 3).



Figure 3 – Ironwood debris stockpiled for removal from site at WTG-4.

In most cases the fallen ironwood and Christmasberry debris were loaded and hauled the short distance to the road or turbine pad with minimal earth and native plant disturbance, given the predominantly grassy nature of most areas, and ample room to avoid native species where they occur. The loader provided a safe and practical means to remove the cut debris quickly and efficiently in order to minimize the amount of time that the debris would have the potential to interfere with monitoring activities in these areas. In fact, due to the efficient capacity of the loader and ground crew, the debris has been removed from most search areas and should facilitate subsequent mowing (Fig. 4 and 5).



Figure 4 – Cleared area following removal of ironwood stand at WTG-15 search plot.



Figure 5 – Ironwood slash piled on the WTG-15 pad for removal.

A substantial amount of woody debris composed of ironwood and Christmasberry have been cut and removed from the search areas at KWP. However, some material that has been cut remains in place where it was fallen inside the plots and awaits removal. One site in particular adjacent to WTG-11 contains large material and is likely to require mechanized support or the use of cables and power blocks to remove (Fig. 6). Use of the loader should have minimal impact since the ground cover is dominated by >90% non-native grasses and low shrubs. These areas are expected to be cleared of debris upon review and confirmation of approved methods by DOCARE and DOFAW (see below).

### ***Response to the report of Road Installation at the WTG-2/3 Ironwood Clearing***

On Tuesday morning, April 12, 2011 KWP personnel received notification from the Maui District Land office of an alleged violation of our CDUP based on photos depicting an alleged unauthorized road installation between turbine towers 2 and 3 and harm to native plants in the area. The report prompted a response from the Office of Conservation and Coastal Lands (OCCL) and DOFAW that included assigning the Division of Conservation and Resource Enforcement (DOCARE) to investigate. DOCARE officers on Maui were dispatched to the KWP site on Thursday, April 14 and met with Greg Spencer for a site inspection to determine whether a breach in compliance had taken place.





Figure 6 – Heavy woody debris from an ironwood cutting at the WTG-11 search plot awaiting removal and off-site disposal.

The area in question and the alleged “road” were adjacent to one of the large ironwood stands that was cleared to improve searcher efficiency in the plots. The surrounding area is composed of scattered native shrubs of low and moderate stature, with a non-native grass understory. Portions of the ironwood stand fell toward the road and probably smothered some native shrubs. In addition to manual removal, the loader was used to load and remove the large, difficult-to-manage ironwood debris from the plot. This process created a more pronounced “skid track” than evidenced at the other sites, and some additional native shrubs were impacted as a result (Fig. 7). Two common native plant species appeared to be impacted during the cutting and removal of ironwood material at this site: Ohia and Pukiawe, both widespread native species in the area. Because native plants are fairly well distributed in this area, impact appeared minimal and not likely to cause a permanent loss of diversity or disruption of native cover in the immediate area.

DOCARE Officers R. Cahill and J. Rezentes described concerns about the impact to the area resulting from the use of the loader and offered guidance on whether the actions were within the scope of the work plan and letter of approval. They also questioned whether the term “road installation” was applicable to the skid track used to remove the woody debris, and after some discussion it was agreed it was not applicable. Nonetheless, Greg Spencer agreed with both officers that it may be prudent to consider replanting the skid track using native species representative of those that may have been impacted, and that this could be implemented in the coming weeks. Replanting the skid track with

these native species was agreed to be an appropriate way to mitigate for the loss or damage to the native plants that were present in the affected area. Based on an assessment in the field, 40-50 native plants appeared an adequate number for replanting the skid track.



Figure 7 – Skid track and ironwood debris pile removed from the WTG-2/3 search plot and assembled along the site access road at KWP.

### ***Looking Ahead***

As of this writing, more work remains to be done to remove and dispose of the large woody debris that remains in the field. Most of the debris has already been removed from the cleared areas, but some still needs to be hauled out and assembled for loading on the bare pads and roads to facilitate removal from the site. Areas yet to be completely cleared of large woody debris following cutting include the WTG 11 and 12 search plots. Little or no impact to native plants is anticipated because both plots are dominated by invasive grasses on greater than 90% of the plot area. We are asking for DOFAW clarification and/or amendment to the 2010 approval that authorizes the use of the loader to facilitate removal at these sites.

In addition, the mowing that was initially anticipated to follow the clearing of invasive trees and shrubs will be postponed until after the Nene breeding season has elapsed in June, 2011. This decision has been made to avoid the potential for disturbance or disruption of social behavior and habitat use during the sensitive “flocking” period when adults are completing their annual molting cycle and fledgling juveniles prepare to disperse.

The clearing of large non-native trees and shrubs at KWP represents an important step that is expected to increase confidence in the results of monitoring. Present estimates are that close to 3,000 cubic feet





of material has been removed to date. Especially in the case of ironwood, this represents a substantial reduction in the wildland fire fuel load in the area. This is considered an additional benefit given the propensity of wildfires in the region and the considerable cost of recurring wildland fire suppression.

We expect to complete the debris removal soon, followed by the second round of site mowing and brush clearing following the Nene breeding season in June, 2011. Coordination with Maui DOFAW and Land Division officials will be important to ensuring adequate transparency and information exchange throughout the completion of the current phase of the project and going forward. We welcome the input and recommendations of managers and agency officials to ensure this work is accomplished according to plan, meets project objectives, is well-documented, and so that issues and alternatives are addressed in advance and/or as they arise.

Prepared by: Gregory Spencer  
Senior Wildlife Biologist  
Kaheawa Wind Power – Environmental Affairs  
[REDACTED]

Submitted to: Maui DOCARE (Officers R. Cahill and J. Rezentes)

Cc: DOFAW, Wildlife Program Manager  
DOFAW, Conservation Initiatives Coordinator  
First Wind – Environmental Affairs













## **APPENDIX 11**

### **YEARS 1-5 BUDGET AND EXPENDITURES**

Kaheawa Wind Power  
Habitat Conservation Plan

Year 5 Annual Report

Appendix 11. Annual Expenditures and Budget Structure  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report  
Incidental Take License No. ITL-08

Baseline Scenario assumes actual take is as expected	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals		Notes
	HCP Budget	Expenditures Aug 2005 – June 2007 (Previously Reported)	HCP Budget	Expenditures July 2007 – June 2008 (Previously Reported)	HCP Budget	Expenditures July 2008 - June 2009 (Previously Reported)	HCP Budget	Expenditures July 2009 – June 2010 (Previously Reported)	HCP Budget	Expenditures July 2010-June 2011	HCP Budgeted Amounts	Actual Expenditures	
General Measures													
Annual vegetation management, mowing around turbines to facilitate searches	\$ 500.00		\$ 500.00		\$ 500.00		\$ 500.00		\$ 500.00		\$ 2,500.00		
KWP Staff										\$ 5,000.00		\$ 5,000.00	Project coordination and management of contract operations
Landscape maintenance contractor (Makala Construction)										\$ 12,000.00		\$ 12,000.00	Contract mowing and brush clearing in search plot management areas
Wildlife Education and Observation Program (WEOP) and Downed Wildlife Protocol	\$ 3,000.00		\$ 500.00		\$ 500.00		\$ 500.00		\$ 500.00		\$ 5,000		
KWP Biologist (Greg Spencer)		\$ 5,000.00		\$ 2,000.00		\$ 1,000.00		\$ 1,000.00		\$ 1,000.00		\$ 10,000.00	Performing on-site outreach and wildlife sensitivity orientations.
Consultant (Eric Nishibayashi)		\$ 1,000.00										\$ 1,000.00	Pre-construction surveys and outreach
KWP Staff (Ian Bordenave, David Medrano, Mitch Craig)		\$ 800.00		\$ 1,000.00		\$ 500.00		\$ 1,000.00		\$ 1,000.00		\$ 4,300.00	Assist in presentation of orientation materials.
KWP Staff (D. Fujii-Doe and E. Deleissegues)													
Wildlife Conservation signage		\$ 600.00		\$ 300.00								\$ 900.00	Posted cautionary and wildlife conservation awareness signage as necessary throughout site.
General Subtotal	\$ 3,500.00	\$ 7,400.00	\$ 1,000.00	\$ 3,300.00	\$ 1,000.00	\$ 1,500.00	\$ 1,000.00	\$ 2,000.00	\$ 1,000.00	\$ 19,000.00	\$ 7,500.00	\$ 33,200.00	



Appendix 11. Annual Expenditures and Budget Structure  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report  
Incidental Take License No. ITL-08

Baseline Scenario assumes actual take is as expected	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals		Notes
	HCP Budget	Expenditures Aug 2005 – June 2007 (Previously Reported)	HCP Budget	Expenditures July 2007 – June 2008 (Previously Reported)	HCP Budget	Expenditures July 2008 - June 2009 (Previously Reported)	HCP Budget	Expenditures July 2009 – June 2010 (Previously Reported)	HCP Budget	Expenditures July 2010-June 2011	HCP Budgeted Amounts	Actual Expenditures	
Nene: Potential take of 3 per year, no greater than 8 in a given fiscal year													
Pre-construction surveys	\$ 8,000.00										\$ 8,000.00		Combined with next item.
On-site full-time/on-call environmental inspector during construction	\$ 25,000.00										\$ 25,000.00		
KWP Biologist(s)		\$ 15,000.00										\$ 15,000.00	
Consultant (Eric Nishibayashi)		\$ 24,000.00										\$ 24,000.00	Construction-phase consultation.
Spotting Scope and Accessories		\$ 200.00										\$ 200.00	
Regular on-site observations of nene response to turbines - staff biologist/intern	\$ 10,000.00										\$ 10,000.00		
KWP Staff (Greg Spencer)												\$ 7,500.00	Survey effort
KWP Staff (Ian Bordenave)												\$ 4,500.00	Survey effort
Construction of new release pen (DOFAW)	\$ 50,000.00			\$ 50,000.00							\$ 50,000.00	\$ 50,000.00	One-time payment to DOFAW
New DOFAW truck	\$ 9,000.00			\$ 9,000.00							\$ 9,000.00	\$ 9,000.00	One-time payment to DOFAW
Labor for maintenance and predator control plus \$1000 for helicopter logistics	\$ 16,000.00		16,000.00	16,000.00	\$ 16,000.00	16,000.00	\$ 16,000.00	\$ 32,000.00	\$ 16,000.00	\$ 16,000.00	\$ 80,000.00	\$ 80,000.00	Double payment made in February, 2010.
Cost of propagating 10 chicks/yr yrs 1-5, 4 chicks every 2 years thereafter	\$ 25,000.00		\$ 25,000.00	\$ 25,000.00	\$ 25,000.00	\$ 25,000.00	\$ 25,000.00	\$ 50,000.00	\$ 25,000.00	\$ 25,000.00	\$ 125,000.00	\$ 125,000.00	Double payment made in February, 2010.
Nene Subtotal	\$143,000.00	\$39,200.00	\$ 41,000.00	\$ 100,000.00	\$ 41,000.00	\$ 41,000.00	\$ 41,000.00	\$ 82,000.00	\$ 41,000.00	\$ 41,000.00	\$ 307,000.00	\$ 315,200.00	

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Baseline Scenario assumes actual take is as expected	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals		Notes
	HCP Budget	Expenditures Aug 2005 – June 2007 (Previously Reported)	HCP Budget	Expenditures July 2007 – June 2008 (Previously Reported)	HCP Budget	Expenditures July 2008 - June 2009 (Previously Reported)	HCP Budget	Expenditures July 2009 – June 2010 (Previously Reported)	HCP Budget	Expenditures July 2010-June 2011	HCP Budgeted Amounts	Actual Expenditures	
Seabirds: Potential take of 1.5 per year of each species, no greater than 5 in a given fiscal year													
Vehicle, radar, night-vision and related survey equipment, including training	\$ 50,000.00										\$ 50,000.00		
2001 Ford F-150 4x4		\$ 23,530.00										\$ 23,530.00	incl. annual licensing, taxes, maintenance, fees
Furuno Radar (cost-share 50%)		\$ 8,100.00										\$ 8,100.00	
IR Night-vision goggles		\$ 3,500.00										\$ 3,500.00	
Miscellaneous support equip + supplies		\$ 500.00										\$ 500.00	
Conduct on-site radar and night-vision/thermal surveys to document seabird interaction and response to turbines	\$ 16,000.00										\$ 16,000.00		Two surveys in June and October using staff biologist and assistant
KWP Biologist (Greg Spencer)		\$ 8,000.00										\$ 8,000.00	Staff time on surveys, set-up, and logistics (2 surveys)
KWP Staff (Ian Bordenave)		\$ 4,000.00										\$ 4,000.00	Staff time on surveys, set-up, and logistics (2 surveys)
Conduct searches for West Maui seabird colonies; implement protection and management measures to reduce threats and increase productivity	\$ 60,000.00		\$ 60,000.00		\$ 15,000.00		\$ 15,000.00		\$ 15,000.00		\$ 165,000.00		Assumes colonies found in first two years by staff biologist and intern
KWP Biologist (Greg Spencer)		\$ 20,000.00		\$ 20,000.00		\$ 10,000.00		\$ 10,000.00		\$ 20,000.00		\$ 80,000.00	Includes coordinating logistics, field studies, and reporting
KWP Staff (Ian Bordenave)		\$ 8,000.00		\$ 15,000.00		\$ 5,000.00		\$ 7,000.00				\$ 35,000.00	Assist field studies and logistics
KWP Staff (David Medrano)								\$ 5,000.00				\$ 5,000.00	Assist field studies and logistics
KWP Staff (Mitch Craig)								\$ 3,000.00				\$ 3,000.00	Assist field studies and logistics

Appendix 11. Annual Expenditures and Budget Structure  
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Year 5 Annual Report  
Incidental Take License No. ITL-08

Baseline Scenario assumes actual take is as expected	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals		Notes
	HCP Budget	Expenditures Aug 2005 – June 2007 (Previously Reported)	HCP Budget	Expenditures July 2007 – June 2008 (Previously Reported)	HCP Budget	Expenditures July 2008 - June 2009 (Previously Reported)	HCP Budget	Expenditures July 2009 – June 2010 (Previously Reported)	HCP Budget	Expenditures July 2010- June 2011	HCP Budgeted Amounts	Actual Expenditures	
Seabirds: Potential take of 1.5 per year of each species, no greater than 5 in a given fiscal year													
KWP Staff (H. Oppenheimer)		\$ 4,500.00										\$ 4,500.00	Early field surveys, reference material compilation
Radar surveys in West Maui						\$ 1,500.00		\$ 3,000.00				\$ 4,500.00	Survey equipment rental and purchase, staff effort conducting surveys
Camping and Field Equipment		\$ 5,000.00		\$ 200.00						\$ 500.00		\$ 5,700.00	Tents, food, supplies
Flight Equipment		\$ 900.00		\$ 500.00								\$ 1,400.00	Flight suits, gloves, boots, PPE
Helicopter flights		\$ 10,000.00		\$ 2,000.00						\$ 5,000.00		\$ 17,000.00	
Outreach and Collaboration		\$ 4,500.00				\$ 3,000.00		\$ 3,000.00		\$ 3,000.00			Informal exchange with experts and collaboration building
Predator traps, fence marking supplies						\$ 1,500.00							
Canine-assisted nesting burrow surveys										\$ 78,000.00		\$ 78,000.00	Ecoworks New Zealand consulting fees
Population modeling										\$ 15,000.00		\$ 15,000.00	H.T. Harvey and Associates/PRBO consulting fees
Seabird Subtotal	\$126,000.00	\$100,530.00	\$ 60,000.00	\$ 37,700.00	\$ 15,000.00	\$ 21,000.00	\$ 15,000.00	\$ 31,000.00	\$ 15,000.00	\$ 121,500.00	\$ 181,000.00	\$ 311,730.00	

Appendix 11. Annual Expenditures and Budget Structure  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report  
Incidental Take License No. ITL-08

Baseline Scenario assumes actual take is as expected	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals		Notes
	HCP Budget	Expenditures Aug 2005 – June 2007 (Previously Reported)	HCP Budget	Expenditures July 2007 – June 2008 (Previously Reported)	HCP Budget	Expenditures July 2008 - June 2009 (Previously Reported)	HCP Budget	Expenditures July 2009 – June 2010 (Previously Reported)	HCP Budget	Expenditures July 2010-June 2011	HCP Budgeted Amounts	Actual Expenditures	
Hawaiian Hoary Bat: Potential take of 1 per year, not to exceed 2 in a given fiscal year.													
Conduct monthly 2-night surveys - staff biologists	\$ 10,000.00										\$ 10,000.00		Visual during crepuscular and IR NVG-aided nocturnal site-wide
KWP Biologist (Greg Spencer)		\$ 7,000.00										\$ 7,000.00	Actual cost of survey effort, logistics, etc.
KWP Staff (Ian Bordenave)		\$ 5,000.00										\$ 5,000.00	Actual cost of survey effort, logistics, etc.
Up-front contribution to bat research cooperative	\$ 20,000.00	\$ 20,000.00									\$ 20,000.00	\$ 20,000.00	One-time payment for research
Bat Subtotal	\$ 30,000.00	\$ 32,000.00									\$ 30,000.00	\$ 32,000.00	

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Baseline Scenario assumes actual take is as expected	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals		Notes
	HCP Budget	Expenditures Aug 2005 – June 2007 (Previously Reported)	HCP Budget	Expenditures July 2007 – June 2008 (Previously Reported)	HCP Budget	Expenditures July 2008 - June 2009 (Previously Reported)	HCP Budget	Expenditures July 2009 – June 2010 (Previously Reported)	HCP Budget	Expenditures July 2010- June 2011	HCP Budgeted Amounts	Actual Expenditures	
Wildlife Fatality Monitoring (includes Conducting Searcher Efficiency and Carcass Retention Studies)													
Systematic Searches to Document Downed Wildlife at the Project Site	\$ 65,000.00		\$ 60,000.00		\$ 15,000.00		\$ 15,000.00		\$ 15,000.00		\$ 170,000.0		Assumes 2 years, followed by reduced search effort and annual scavenging calibration
KWP Biologist (Greg Spencer)		\$ 34,000.00		\$ 18,000.00		\$ 5,000.00		\$ 5,000.00		\$ 5,000.00		\$ 67,000.00	
KWP Staff (Ian Bordenave)		\$ 20,000.00		\$ 20,000.00		\$ 15,000.00		\$ 10,000.00				\$ 65,000.00	
KWP Staff (David Medrano)				\$ 15,500.00		\$ 20,000.00		\$ 20,000.00		\$ 15,000.00		\$ 70,000.00	
KWP Staff (Karl Mokross)				\$ 15,500.00		\$ 10,000.00						\$ 25,500.00	
KWP Staff (Mitch Craig)								\$ 10,000.00				\$ 10,000.00	
KWP Staff (D. Fujii-Doe)										\$ 20,000.00		\$ 20,000.00	
KWP Staff (E. Deleissegues)										\$ 20,000.00		\$ 20,000.00	
Support equipment and supplies		\$ 5,000.00		\$ 1,000.00		\$ 300.00		\$ 500.00		\$ 1,000.00		\$ 1,000.00	
Northwest Wildlife Consultants (Training)		\$ 3,200.00											
Fatality Monitoring Subtotal	\$ 65,000.00	\$ 62,200.00	\$ 60,000.00	\$ 70,000.00	\$ 15,000.00	\$ 50,300.00	\$ 15,000.00	\$ 45,500.00	\$ 15,000.00	\$ 61,000.00	\$ 170,000.00	\$ 289,000.00	

Annual HCP Subtotals	Year 1 (FY-2007)		Year 2 (FY-2008)		Year 3 (FY-2009)		Year 4 (FY-2010)		Year 5 (FY-2011)		Years 1-5 Totals	
	Budgeted	Expended	Budgeted	Expended	Budgeted	Expended	Budgeted	Expended	Budgeted	Expended	Budgeted	Expended
	\$ 367,500.00	\$ 241,330.00	\$ 162,000.00	\$ 211,000.00	\$ 72,000.00	\$ 113,800.00	\$ 72,000.00	\$ 160,500.00	\$ 72,000.00	\$ 242,500.00	\$ 695,500.00	\$ 951,250.00

Cumulative HCP Budgeted Amount	<b>\$ 695,500.00</b>
Cumulative Expended for HCP Implementation	<b>\$ 951,250.00</b>

Appendix 11. Annual Expenditures and Budget Structure  
Kaheawa Wind Power, Habitat Conservation Plan

Year 5 Annual Report  
Incidental Take License No. ITL-08

Contingency Bonds (escalating at 2.5%)	Year 1 (FY-2007)	Year 2 (FY-2008)	Year 3 (FY-2009)	Year 4 (FY-2010)	Year 5 (FY-2011)
Nene	\$ 264,000.00	\$ 270,600.00	\$ 277,365.00	\$ 284,299.00	\$ 291,407.00
Seabirds	\$ 100,000.00	\$ 102,500.00	\$ 105,063.00	\$ 107,689.00	\$ 110,381.00
Hawaiian Hoary Bat	\$ 20,000.00	\$ 20,500.00	\$ 21,013.00	\$ 21,538.00	\$ 22,076.00
Mitigation Bond (non-escalating)	\$ 500,000.00	\$ 500,000.00	\$ 500,000.00	\$ 500,000.00	\$ 500,000.00
<b>Total Bond Amount</b>	\$ 884,000.00	\$ 893,600.00	\$ 903,440.00	\$ 913,526.00	\$ 923,864.00
<b>Annual Cost of Bonds</b>	\$ 39,780.00	\$ 40,212.00	\$ 40,655.00	\$ 41,109.00	\$ 41,574.00

Additional Conservation Measures (Non-HCP Budgeted)						
Measures	Year 1 (FY-2007)	Year 2 (FY-2008)	Year 3 (FY-2009)	Year 4 (FY-2010)	Year 5 (FY-2011)	Years 1-5 Totals
Native vegetation reestablishment efforts						
Nursery propagation		\$ 20,000.00	\$ 45,000.00			\$ 65,000.00
Contract outplanting		\$ 15,000.00	\$ 35,000.00			\$ 50,000.00
Project Management (KWP Staff)		\$ 10,000.00	\$ 20,000.00			\$ 30,000.00
<b>Native Revegetation Subtotal</b>		\$ 45,000.00	\$ 100,000.00			\$ 145,000.00
On-site acoustic bat detection monitoring						
Anabat acoustic data loggers			\$ 15,000.00		\$ 5,000.00	\$ 20,000.00
System monitoring and data analysis (KWP Staff)			\$ 8,000.00	\$ 5,000.00	\$ 8,000.00	\$ 21,000.00
Summarizing results (KWP Staff)			\$ 2,000.00	\$ 1,000.00	\$ 3,000.00	\$ 6,000.00
<b>Bat Acoustic Monitoring Subtotal</b>			\$ 25,000.00	\$ 6,000.00	\$ 16,000.00	\$ 47,000.00
<b>Annual Non-HCP Subtotals</b>		\$ 45,000.00	\$ 125,000.00	\$ 6,000.00	\$ 16,000.00	\$ 192,000.00