



Kawailoa Wind Power, LLC

61-488 Kamehameha Hwy

Haleiwa, Hawaii 96712

August, 2013

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.

A handwritten signature in black ink, appearing to read "David P. Cowan", written in a cursive style.

David P. Cowan
Vice President, Environmental Affairs
First Wind Energy, LLC

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Executive Summary

Kawailoa Wind Power, LLC (KAW) has been implementing a Habitat Conservation Plan (HCP) since approval October 27, 2011. The HCP supports a Federal Incidental Take Permit (TE-59861A-0) issued December 8, 2011 and a State of Hawaii Incidental Take License (ITL-14) issued January 6, 2012. The project was constructed in late 2011 and throughout 2012, and was commissioned to begin operating (COD) on November 2, 2012. Species covered under the HCP include six threatened and endangered birds and one endangered bat.

KAW submitted a report of progress made on fulfilling the terms of the HCP during Fiscal Year (FY) 2012 to USFWS and DOFAW on August 28, 2012 (Kawailoa Wind Power FY 2012 Progress Report).

Fatality monitoring search plots have been established out to 75 and 113m from the wind turbine generator's (WTG) centers (50 % and 75 % of the maximum turbine and blade height, respectively) and 50m from the permanent meteorological tower (50 % of the tower height). Plots are searched by following parallel transects at 7m intervals. The 50% areas are searched twice per week and the 75% areas are searched every 2 weeks, in accordance with the monitoring protocol prescribed in the HCP. Searches commenced in Q2 of Fiscal Year (FY) 2013. The FY 2013 50 % plot mean and standard deviation in days for search intervals for Q2, Q3 and Q4 were 3.69 (SD = 1.02), 3.47 (SD = 0.82), and 3.48 (SD = 0.71), respectively. The FY 2013 75% plot mean and standard deviation in days for search intervals for Q2, Q3, and Q4 were 13.97 (SD = 0.56) 13.97 (SD = 0.13) and 14.00 days (SD = 0), respectively.

The FY 2013 50 % plot mean and standard deviation for search intervals were 3.55 (SD = 0.86) days. The FY 2013 75% plot mean and standard deviation for search intervals were 14.0 days (SD = 0.1) days.

We found 5 Hawaiian hoary Bat fatalities but no bird species listed in the Incidental Take License (ITL) and Incidental Take Permit (ITP) through June 30, 2013. The FY 2013 fatality estimate is 8.46 adult bats and the indirect take is 1.04 juvenile bats using the Huso Evidence of Absence estimator.

We've conducted carcass retention (CARE) trials using 23 birds and 26 rats and searcher efficiency (SEEF) trials using 53 birds and 69 rats. The mean and standard deviation of CARE in days for 19 rats placed in short vegetation was 8.16 (SD = 6.39) and for 7 rats placed in medium vegetation was 5.43 (SD = 5.16). The mean CARE and standard deviation for 14 birds placed in short vegetation was 12.07 (SD = 4.91) days and for 9 birds placed in medium vegetation was 9.89 (SD = 5.06) days.

The mean SEEF for trials was 64 % (55 of 86) small carcasses in short grass, 37.5 % (3 of 8) small carcasses in medium grass and 61.7 % overall; 100 % of 17 medium carcasses in short grass, 85.7 % (7 of 8) medium carcasses in medium grass, and 96 % overall.

Eighteen Wildlife Acoustics™ ultrasonic microphones that are attached in pairs to 9 Songmeter SM2™ detectors are each located at 1 of 9 WTG monitoring plots and mounted at 6.5 m height. These recorded 142 nights (8.3 %) with Hawaiian hoary bat detections during 1713 detector nights in FY 2013.

A total of 847 site personnel received WEOP trainings during construction and through June 30.

KAW contributed \$12,500 to the Hawaii Wildlife Rehabilitation Center to fulfill Pueo mitigation obligations.

Vegetation is continually managed within all the fatality monitoring plots at a frequency between 2-4 weeks using a combination of turf mowers, large tractor with a 10 or 15 ft. wide bat wing mower, weed-whackers and herbicides.

Two agency site visits occurred, September 15, 2012 and May 1, 2013.

In addition to the FY 2013 annual report, we also provided an annual report for FY 2012 and quarterly reports for FY 2013 Q1, Q2 and Q3.

Introduction

This report summarizes work performed by Kawaihoa Wind Power (KAW) under the terms of the approved Habitat Conservation Plan (HCP) dated October 27, 2011 and pursuant to the obligations contained in the project's Incidental Take License (ITL-14) and Federal Incidental Take Permit (ITP) (TE-59861A-0) at the conclusion of the 2013 State of Hawaii fiscal year (July 2012- June 2013, Year 1).

The ITL and ITP were issued for the project in November 2011 and January 2012, respectively. The ITL and ITP cover 6 federally-listed threatened and endangered species and 1 state-listed endangered species: the Hawaiian stilt or ae'o (*Himantopus mexicanus knudseni*), Hawaiian coot or 'alae ke'oke'o (*Fulica alai*), Hawaiian duck or koloa maoli (*Anas wyvilliana*), Hawaiian moorhen or 'alae 'ula (*Gallinula chloropus sandvicensis*), Newell's shearwater or 'a'o (*Puffinus auricularis newelli*), Hawaiian hoary bat or 'ope'ape'a (*Lasiurus cinereus semotus*) and the Hawaiian short-eared owl or Pueo (*Asio flammeus sandwichensis*), respectively.

KAW began construction shortly after issuance of the ITL and ITP, including initiation of monitoring and mitigation measures as prescribed by the HCP. During construction KAW retained SWCA Environmental Consultants to assist with monitoring and compliance as prescribed under the HCP and consistent with other environmental permit requirements. First Wind hired the Hawaii HCP Compliance Manager in December 2010 (originally at Kahuku Wind Power) followed by a HCP Compliance Supervisor in January 2012 (originally at Kahuku Wind Power) and HCP Compliance Technicians were hired in September, October, and November of 2012 respectively. A Mitigation Scientist was hired on February 2013 and a Canine Compliance Supervisor was hired in June of 2013. KAW was commissioned for operation on November 2, 2012.

Fatality Monitoring

Circular downed wildlife search plots were established at KAW around each WTG and the meteorological towers (MET). WTG search plot perimeters have radii of 75 and 113m from the base of the turbines, corresponding to 50 % and 75 % of the maximum rotor-swept height of the WTGs. The permanent MET towers are searched to a distance of 50m from the base, which corresponds to 50 % of its height (Figure 1).

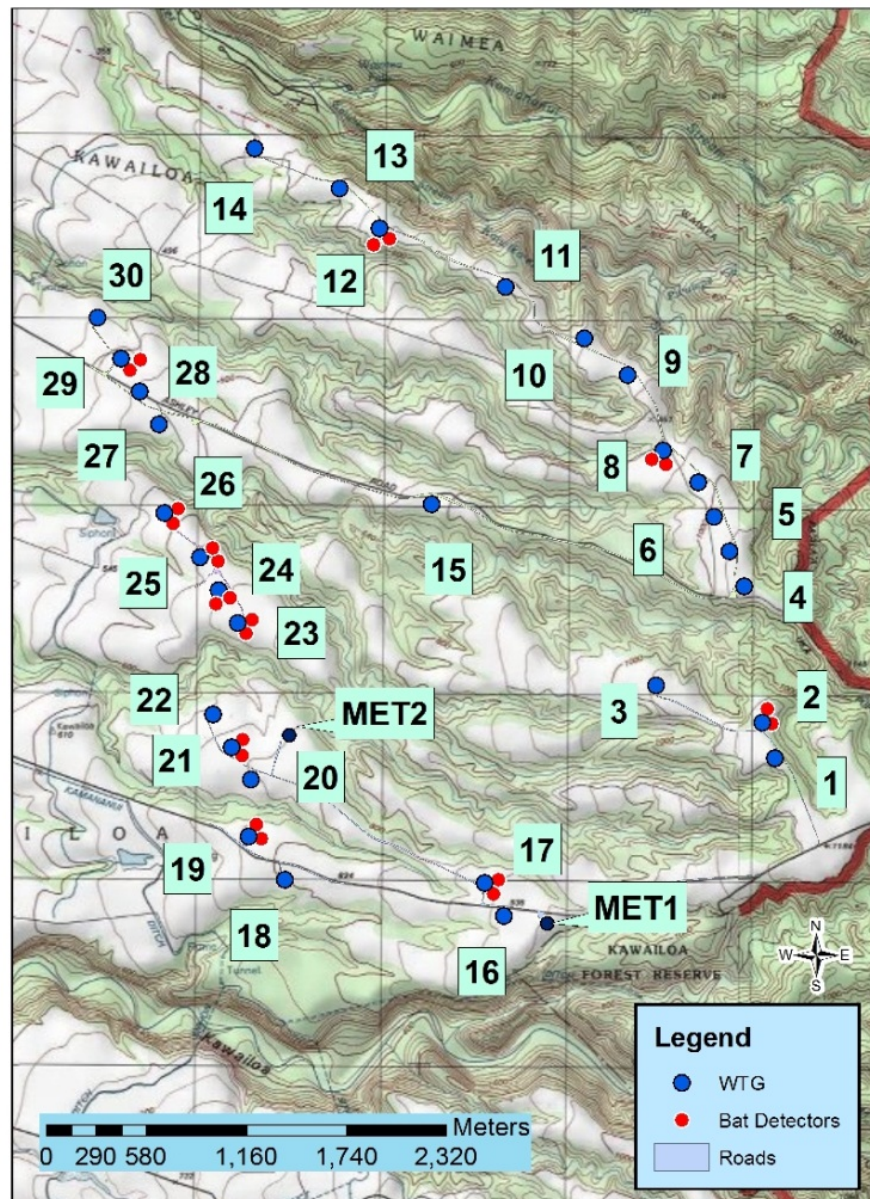


Figure 1. KAW roads, WTGs, MET towers, and bat detector locations.

Searches are conducted within circular plots centered on the WTGs and MET towers. At each WTG two concentric plots are marked: a “50% plot” with a radius equivalent to 50% of the maximum turbine height with the blade extended vertically (75m), and a “75% plot” with a radius equivalent to 75% of the maximum turbine height (113m). Each MET tower has a single circular plot with a radius of 50m (50% of the tower height). The 50% plots are searched twice per week and the 75% plots are searched every two weeks by following parallel transects set at 7m intervals, in accordance with the monitoring protocol prescribed in the HCP. Two rounds of

searches are conducted each week. In the first round, the 50% plots are searched at all 30 WTG's and the 2 MET towers. For the second round the full 75% plots are searched at 15 WTGs, and the 50% plots are searched again at the remaining 15 WTG's and the 2 MET towers. The 15 WTGs searched out to 75% alternate each week, such that the full search protocol takes two weeks to complete.

Parallel transects across the search plots are staked every 14m (Figure 2). Searchers follow these marked transects, as well as unmarked transects half way between, so that the maximum distance between searched transects is 7m. Searching is usually conducted by one person either by foot or all-terrain vehicles (ATV's). Slopes that are too steep to drive with ATV's are walked horizontally along the contours following transects that are no greater than 7m apart.

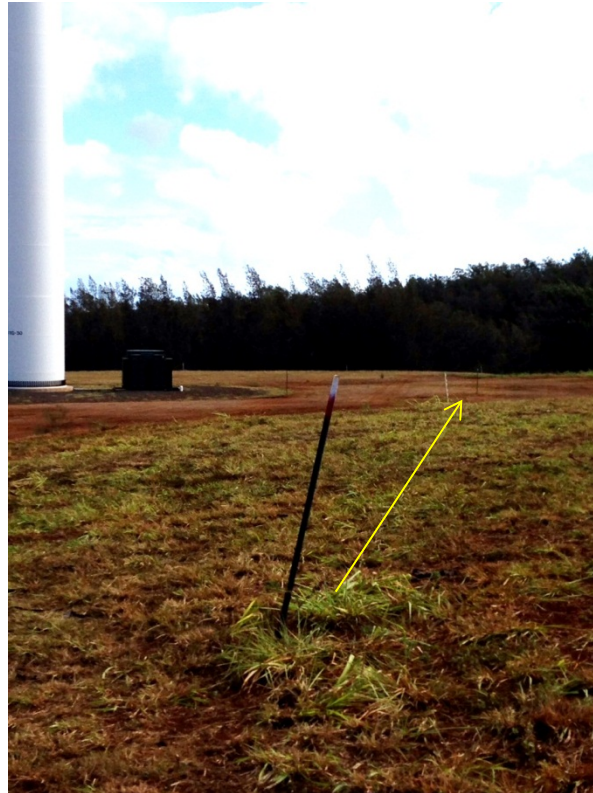


Figure 2. Transect marking stakes at WTG 30. Staked rows are 14m apart. The superimposed yellow arrow shows 3 stakes in line for a marked transect.

All collected data such as searcher information (WTG searched, weather, search time per plot, human or canine searched, etc.), CARE trial status and location, SEEF trial placement, bat detector status and date of download, and trap results is recorded on a field form or a field notebook, digitized as an Microsoft™ EXCEL spreadsheet, QA/QC'd by the originator of the data, the supervisor and finally the report author. CARE trial photos are downloaded, labeled and backed up on a central computer.

Bat detector data is collected on SDHC cards, downloaded to a central computer, backed up on external hard drives, and analyzed with Wildlife Acoustics Kaleidoscope and Songscope software. The HCP supervisor confirms bat detections and detection file data is recorded and summarized on an EXCEL spreadsheet. Final detection numbers and detector nights are determined from the detection files and from the "sensor" file (that shows detector operation times) and QA/QC'd by the HCP supervisor and report author.

We began searching turbines as they were erected; the first search occurred October 1, 2012. The full search schedule of all turbines began October 22, 2012. Appendix 1-3 shows search dates of the 50 % and 75 % search plots for each WTG and the MET towers during each quarter of FY 2013 and Appendix 4 shows the mean and standard deviation for search interval by WTG and quarter during FY 2013. The FY 2013 50 % plot mean and standard deviation for all search intervals were 3.55 (SD = 0.86) days. The FY 2013 75% plot mean and standard deviation for all search intervals were 14.0 days (SD = 0.1) days.

Fatalities

Of the 7 species listed in the ITL we documented take of only the Hawaiian hoary bat during FY 2013 (Table 1). Five Hawaiian hoary bat fatalities have been found at the site since operations began through June 30.

Between October 1, 2012 and June 30, 2013 First Wind biologists found 38 carcasses of bird species, none listed as state or federally endangered or threatened (Appendix 5). These included five individuals of Migratory Bird Treaty Act listed species: 3 White-Tailed Tropicbirds, 1 Cattle Egret and 1 Cook's Petrel. Other fatalities comprised non-native introduced species, including 3 Common Mynas, 3 Common Waxbills, 1 Red-vented bulbul, 1 Red-crested Cardinal, 3 Spotted Dove, twelve Zebra Dove, 7 African Silverbills, and 2 Nutmeg Mannikins.

Age	Sex	Date Found	WTG	Distance from WTG (m)	Direction from WTG (°)
A	F	11/27/2012	25	44	261
A	M	2/14/2013	13	51	240
A	F	2/26/2013	26	73	245
U	M	6/13/2013	15	27	332
A	M	6/29/2013	3	99	199

Table 1. Hawaiian hoary bat fatalities at KAW through June 30, 2013.

Hawaiian Hoary Bat Take Estimation

The mean estimated adjusted take for the 5 Hawaiian hoary Bat fatalities found between October 1, 2012 and June 30, 2013 using Huso's Evidence of Absence estimator software (Huso 2013) is 8.46 adult bats and the indirect take is 1.04 juvenile bats (Appendix 6). The 5-year Tier 1 take allowed under the ITL is 16 adult and 8 juvenile bats.

This adjusted take estimate used a mean search interval of 3.55 days, searcher proficiency of 0.626, span of 302 days, a Weibull persistence distribution (alpha = 0.8502, beta = 9), a uniform arrival function (alpha and beta = NA), and a negative binomial prior distribution (alpha = 2.5 and beta = 0.22). We chose the persistence distribution to approximate the extinction curve made using the CARE data for rat trials (Appendix 7).

Carcass Retention Trials

For Carcass Retention Trials (CARE) and Searcher Efficiency Trials (SEEF) we assign carcasses to 2 size classes, small and medium. Rats are used as surrogates for bats and represent the small size class. Wedge-tail Shearwaters (WTSH's) are medium size surrogates for Hawaiian Coots, Moorhens, Newell's Shearwaters, Hawaiian Petrels, Hawaiian Owl and Hawaiian duck. WTSH carcasses are generally deceased fledglings delivered to Sea Life Park on Oahu that have been found by the public. We possess state and federal wildlife collection permits for KAW, numbers WL 13-11 and MB40087A-1, respectively. Rat carcasses came from Layne Laboratories, Inc. in California, a pet food company. These rats are brown and/or black and in the Layne Laboratory "Small" size category (approximately 11.3 cm in body length) and were chosen to mimic body size of Hawaiian hoary bats (Figure 3).



Figure 3. Hawaiian hoary bat and rat surrogate for CARE and SEEF trials.

We conducted CARE trials in FY 2013 (Appendices 8 through 12) using a total of 26 rats and 23 WTSH's. The mean and standard deviation in days of retention period for 19 rats placed in short vegetation was 8.16 days (SD = 6.39) (Table 2). The mean and standard deviation in days of retention period for 7 rats placed in medium vegetation was 5.43 (SD = 5.14). The mean and standard deviation in days of retention period for rats in all vegetation types was 7.42 (SD = 6.11).

We considered an avian carcass "present" until < 10 of its body feathers and < 2 of its wing feathers remained (Young et al, 2012). The mean and standard deviation in days of retention period for 14 birds placed in short vegetation was 12.07 (SD = 4.91). The mean and standard deviation in days of retention period for 9 birds placed in medium vegetation was 9.89 (SD = 5.06). The overall mean and standard deviation in days of retention period for birds in all vegetation types was 11.22 (SD = 4.97).

Veg Type	Carcass Type			
	Rat		Bird	
	Mean (d)	SD (d)	Mean (d)	SD (d)
Short	8.16	6.39	12.07	4.91
Medium	5.43	5.14	9.89	5.06
All	7.42	6.11	11.22	4.97

Table 2. Mean and standard deviation of Carcass Retention.

Scavenger Trapping

Trapping for Mongoose and cats began in February 2013. We deployed 135 Goodnature™ LLC model A24 self-resetting traps around all 30 fatality monitoring plots to trap Mongoose (Figure 4). Twenty-two Mongoose were killed using this trap type (Table 3).

We also more intensively trapped 4 specific plots (WTG's 23-26) from May 30 through June 28. In this trial 10 A24 self-resetting traps and 10 Conibear #110 body-grip traps were placed in pairs using the same bait in each for comparison. During this 4 week intensive trapping, 10 Mongoose were killed with the Conibear traps but none with the A24 trap. Game cameras were also placed on 4 of these pairs of traps. Mongoose approached the A24 traps but did not put their heads inside. We've tried different bait combinations with varying success (Table 3).

We placed 13 Hav-a-hart live traps around plots WTG's 23-30 to target feral cats. Most cats were caught near the O&M building (nearest to WTG 27) and 1 was caught at WTG 24. These cats were given food, water and shade until the Hawaii Humane Society retrieved them. From February 18 through June 30 we trapped 31 Mongoose and 10 cats (Table 4).



Figure 4. Mongoose killed by Goodnature Ltd A24 self-resetting trap.

Bait	Bait Change Dates	WTG Trapped	Animals Trapped	
			Mongoose	Mice
Cat Food	2/14/2013	1-30	0	0
Fish oil over Cat food	2/20/2013	1-30	18	7
Fish Sauce/drip	3/29/2013	1-30	0	0
Fish grease over Cat food	4/23/2013	1-15	2	2
Fish oil over Cat food	4/24/2013	16-30	2	1

Table 3. Summary of Goodnature Ltd A-24 trap success with different bait types.

Trap Type	Mongoose	Cats	Days Active	Trap Qty.
A24	22	0	136	135
Conibear 110	10	0	30	9
Hav-a-hart	3	10	30	13

Table 4. Summary of Mongoose and cats caught in all traps at KAW during FY 2013.

Searcher Efficiency Trials

SEEF trials at KAW are proctored by staffs that do not search fatality monitoring plots. SWCA Environmental Consultants generated a total of 200 random GPS point locations that are distributed within all WTG search plots for each vegetation class to direct carcass placement. Vegetation classes are short and medium. Short vegetation generally covers the flat, graded areas (pads) immediately around the WTG's that are consistently mowed every 2-3 weeks to maintain grass as short as 5 cm. The gravel and dirt roads are included in the short vegetation class. Medium vegetation covers all other areas outside the graded pads including graded slopes leading away from the pads and all other ungraded areas within the full plots. Medium vegetation ranges from 10 to 50 cm when mowed consistently. Rainfall at KAW is consistent and the grasses off the pads can grow as much as 25 cm a week.

Proctors place carcasses (see CARE above) in random locations on-site in the early morning before KAW HCP Compliance Technicians and Manager arrive. On a trial day a searcher may have multiple carcasses on the plots they search or none at all. When a carcass is found the searcher sends a text message to the proctor indicating the WTG number and approximate location. After searches are complete for the day proctors verify that carcasses are still in place. If a carcass is missing that trial is not counted.

In FY 2013 the SEEF for bat surrogate (rat) trials in short vegetation was 65.5 % (59 of 90) and 33.3 % (3 of 9) in medium vegetation and 62.6 % overall. The SEEF for bird surrogate (WTSH) trials in short vegetation was 100 % (16 of 16) and 87.5 % (7 of 8) in medium vegetation and 95.8 % overall (Appendix 13).

Hawaiian Hoary Bat Monitoring

KAW biologists have deployed 18 Wildlife Acoustics™ ultrasonic microphones at 6.5m height connected in pairs by 50m cables to 9 Songmeter detectors located at 9 different WTG monitoring plots (Figure 1). Each pair of detector mics are approximately 75m from each WTG facing west attached on metal poles (Figure 5). The mics in each pair are 80-100m apart. Hawaiian hoary bat detections were recorded on 142 of 1713 detector nights (8.3 %) at all 9 locations between December 2012 and June 2013 (Figure 6) (Appendix 14). Percentage of nights with detections increased in May and June to 7-10 times the percentage in April (Figure 7).



Figure 5. Wildlife Acoustics Songmeter SM2 mic on a 6.5m pole.

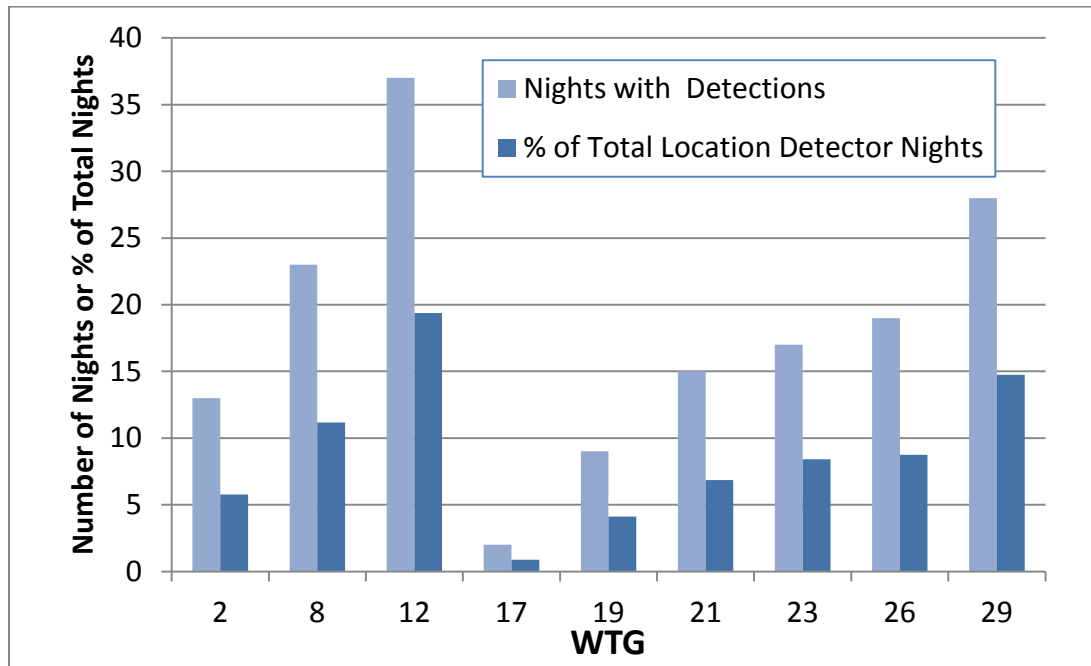


Figure 6. Hawaiian hoary bat nights with detections at 9 WTG's at KAW.

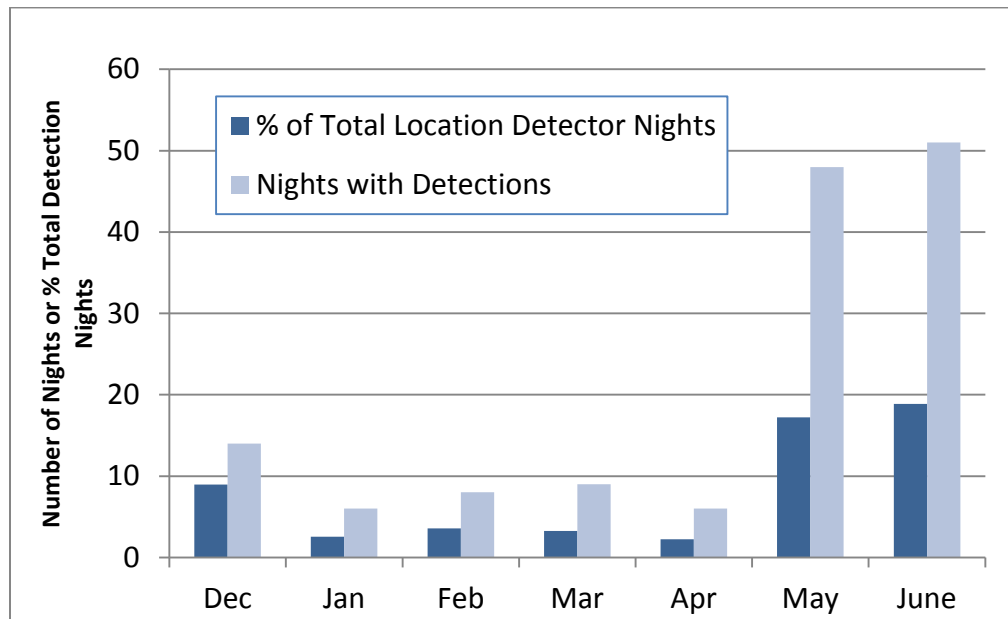


Figure 7. Hawaiian hoary bat rate of nights with detections by month at KAW in FY 2013.

Wildlife Education and Observation Program

SWCA Environmental Consultants and First Wind biologists began implementing Wildlife Education and Observation (WEOP) trainings on February 14, 2012 for all permanent or transient personnel on site. 127 WEOP training orientations have been administered in FY 2013. A total of 847 staff, contractors and were trained in

these sessions. First Wind HCP Compliance staff issued 11 of these wildlife education trainings between March and June 2013.

Vegetation Management

The HCP for KAW stipulates that the fatality monitoring plots around the WTG's and MET tower be mowed every month. Areas around the WTG's that are well-graded and flat (pads) are mowed every 2-3 weeks to 5 to 8 cm (Short vegetation class) using a 60 inch Scag Turf Tiger™ zero turn mower (Figure 8). Rock lined swales that cannot be mowed are weed-whacked to 8 cm and sprayed with herbicides to reduce frequency of weed-whacking to 3 times per year (Figure 8). Other areas outside the pads and graded slopes are mowed to 12 cm (Medium vegetation class) every 2 to 3 weeks with either a Scag Turf Tiger™ at 8-12 cm or a Case Farmall™ 95U tractor pulling either a Woods Batwing™ 10 or 15 ft. mower.

There are gulches that overlap portions of nearly every search area at KAW (Figure 8). Gulches can be very deep with steep sides. Buffers have been established to prevent erosion and for safety while mowing and searching. Gulches and their associated buffer zones are considered unsearchable if they are within the search plots. Adjustments to take of covered species are made to account for fatalities that may occur but are not recovered from this unsearchable area.



Figure 8. WTG 15 with gulch nearby. Medium vegetation class in the foreground and Short vegetation class on the pad around the WTG.

Mitigation

Newell's Shearwater and Hawaiian Petrel

Tier 1 mitigation for Newell's Shearwater (NESH) consists of, (1) providing funding for adapting a resetting trap for use on feral cats, (2) field testing traps at a suitable location in Hawaii where cats are known to occur, and (3) supporting a one-year pilot study to provide localized control of cats in an area where NESH are known to be breeding. In accordance with the HCP KAW provided US\$130K to Goodnature™, Ltd. of Wellington, New Zealand in 2011 and 2012 to develop a self-resetting cat trap by adapting their existing pest-control trap. Following the development phase, in spring of 2013, KAW worked with Goodnature to deploy 19 prototype traps at Kahoolawe Island for 6 weeks. Bait first was Marmite™ and a wet meaty mixture of tuna, mackerel, salted rabbit, tuna oil and sorbitol; and then dry fish stick (cornmeal and tuna). We attached the traps to trees and broadcast cat sounds (Figure 9). We also deployed game cameras and track pads. Although cats approached the traps no cats were killed. We will continue to test and deploy these traps at Ukoa Wetland and at KAW Wind Power.



Figure 9. Goodnature Ltd self-resetting cat trap at Kahoolawe.

In early FY 2014 the DOFAW Kauai Endangered Seabird Project will deploy Wildlife Acoustic™ Songmeters at 4 or more locations on Kauai to determine activity (Appendix 15). Once suitable sites are confirmed, colony protection funded by KAW and Kahuku Wind Power is expected to begin next year.

Waterbirds

Ukoa Wetland near Haleiwa on Oahu is the site for waterbird mitigation (Figure 10). A 4 ft. high ungulate fence with mesh skirting at the base that encloses 135 acres (including the wetland) was completed in July, 2013 (Figure 11). Eradicating predators (pigs, cats, Mongoose and rats) from within this fenced area is the next stage of mitigation. The waterbird mitigation plan is currently being edited for final approval following agency review and discussion over the last several months. Predator removal for waterbirds (trapping pigs, cats, Mongoose and rats) will commence in Q1 FY 2014. Vegetation management to remove invasive species (primarily water hyacinth and California grass) to create open water and shallow mud flats will begin in Q2 or Q3 FY 2014.



Figure 10. Ukoa Wetland, May 1, 2013. The open water to the left is currently completely covered with water hyacinth. Management proposed for FY 2014 will remove hyacinth as well as California grass to expose open water and shallow mud flats.



Figure 11. Ungulate fence completed around Ukoa Wetland.

Pueo

In December, 2012 KAW provided \$12,500 to the Hawaii Wildlife Rehabilitation Center in fulfillment of the Pueo mitigation obligation.

Hawaiian Hoary Bat

Bat activity assessment using Wildlife Acoustics™ Songmeter SM2's began in April 2012 and will continue at least 3 more years at Ukoa Wetland. The first of three 2-week long periods for mist-netting bats began on June 20, 2013. At the end of this 2-week period HT Harvey Ecological Consultants (HTH) bat specialists captured a lactating adult female, attached bands and a radio, and gathered a wing punch for genetic analysis. HTH and KAW biologists tracked this bat to her roost in an Ironwood tree just north of Waimea Gulch and also sighted two bat pups she had been attending (Appendix 16). She was also tracked in the area of the KAW, near WTG 30. The Hawaiian hoary bat mitigation plan is currently being finalized for approval following agency review and comments over the last several months. In Q2 FY 2014 HTH will analyze and model bat activity records relative to weather and habitat conditions.

Following Q1 FY 2014 (the end of the pre-restoration assessment period) removal of non-native predators that may compete with bats for food resources (bullfrogs, toads, and mosquitofish) and habitat modification (creating open tree lanes and revealing more surface water) will begin.

In fulfillment of the research requirement under Tier 1 bat mitigation KAW is supporting a cooperative study of Hawaiian hoary bats with the U. S. Geological Survey (USGS) and Bat Conservation International (BCI). On May 15 the USGS began an intensive bat activity assessment at four WTGs (23-26) using thermal and near-infrared video cameras. Concurrently BCI began daily searches of fatality monitoring plots around these WTG's (Figure 12).



Figure 12. Thermal video image of WTG 25 at night.

First Wind also deployed Wildlife Acoustics Songmeter™ SM2's in each nacelle with mics facing backward behind the nacelle (Figure 13) and down beneath the rear of the nacelle (Figure 14



Figure 13. WTG nacelle rear-mounted Wildlife Acoustics Songmeter SM2 bat detector mic at end of PVC pole.

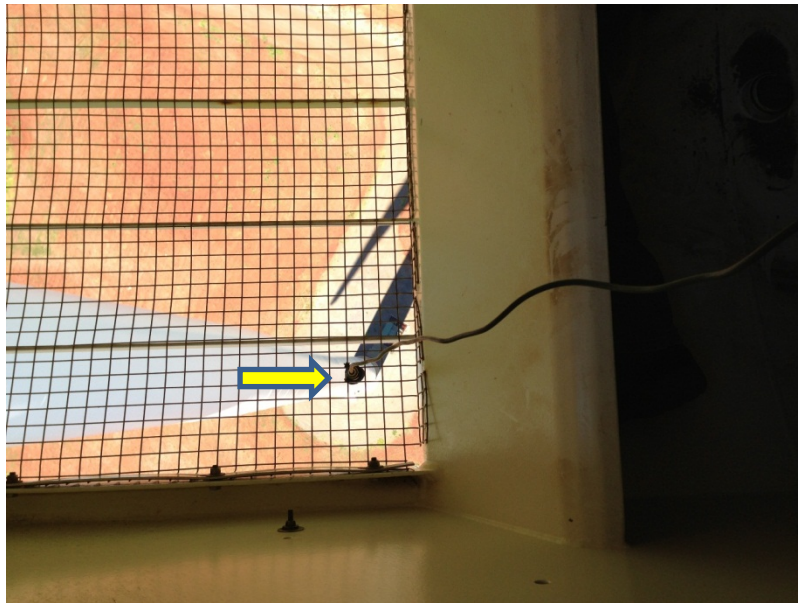


Figure 14. WTG nacelle bottom mounted Wildlife Acoustics Songmeter bat detector mic attached to grate.

Adaptive Management

After the bat fatality on November 27, 2012 KAW elected to continue low wind speed curtailment (LWSC) at 5 m/s through the winter months. The HCP prescribes LWSC initially only from March through November.

Agency Site Visits and Reporting

Representatives from the USFWS and DOFAW visited KAW on September 15, 2012 and May 1, 2013. Kathryn Stanaway and Jason Misaki (DOFAW); and Aaron Nadig (USFWS) visited September 15, 2012 to retrieve the Cook's Petrel fatality. Loyal Mehrhoff, Aaron Nadig, Dawn Bruns, Ken Foote and Diane Hoobler (USFWS) visited May 1, 2013.

We provided quarterly reports for FY 2013 Q2 and Q3.

Expenditures

KAW executed 2 Letters of Credit (LCs) totaling \$ 1,500,000 to fulfill the contingency fund requirements under the HCP. Both LCs name the State of Hawaii Division of Forestry and Wildlife (DOFAW) as the beneficiary. Details for all other HCP expenditures are in Appendix 17.

Canine Assisted Fatality Monitoring

On June 20, 2013 three specially-trained search dogs arrived at KAW. Emma, Solo and Murphy are yellow labs that had been in training in California at Mountain View Dog Training since October 2012. On July 1, 2013 Sheila McKee, the primary trainer at Mountain View Dog Training, began 2 weeks of on-site handler

training. KAW expects to begin searching monitoring plots with these dogs starting in Q1 FY 2014, which will have the combined benefits of reducing human effort, increasing our SEEF relative to humans alone, and reducing somewhat the need for constant mowing (Figure 15).



Figure 15. Sheila McKee training Aaron Ungerleider how to search for downed wildlife with Emma.

Citations

Huso¹, M. M. , D. Dalthorp. 2013. Evidence of Absence User's Guide: U.S. Geological Survey Data Series, Unpublished.

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Appendix 1.

Fatality Monitoring Plot Search Dates at KAW in FY 2013 Q2 (10/1 through 12/31/12) for turbines 1-16. The black colored dates are searches within the 50% perimeter, **red** are within the 75% perimeter (full plots).

WTG																																		
1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16				
								10/1	d	10/1	d											10/1	d					10/1	d					
								10/4	3	10/4	3	10/4	d	10/4	d	10/4	d	10/4	d	10/4	d	10/4	3	10/4	d	10/4	d	10/4	3					
						10/9	d	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5	10/9	5					
						10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3	10/12	3					
						10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3	10/15	3					
10/18	d	10/18				10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4	10/19	4					
10/22	4	10/22	4	10/22	d	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/22	3	10/18	d	
10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/25	3	10/23	5	
10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/29	4	10/26	3	
11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	11/1	3	10/30	4	
11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/5	4	11/2	3	
11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/8	3	11/6	4	
11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/12	4	11/9	3	
11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/15	3	11/13	4	
11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/19	4	11/16	3	
11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/26	7	11/20	4	
11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/29	3	11/27	7	
12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	12/3	4	11/30	3	
12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/6	3	12/4	4	
12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/10	4	12/7	3	
12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/13	3	12/11	4	
12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/17	4	12/14	3	
12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/20	3	12/18	4	
12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/24	4	12/21	3	
12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/27	3	12/26	5	
12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/31	4	12/28	2	

Appendix 1 cont.

Fatality Monitoring Plot Search Dates at KAW in FY 2013 Q2 (10/1 through 12/31/12) for turbines 1-16. The black colored dates are searches within the 50% perimeter, **red** are within the 75% perimeter (full plots).

WTG																								MET							
17		18		19		20		21		22		23		24		25		26		27		28		29		30		1		2	
												10/1	d	10/1	d	10/1	d	10/1	d	10/1	d	10/1	d	10/1	d	10/1	d				
												10/3	2	10/3	2	10/3	2	10/3	2	10/3	2	10/3	2	10/3	2	10/3	2				
												10/9	6	10/9	6	10/9	6	10/9	6	10/9	6	10/9	6	10/9	6	10/9	6				
		10/11	d	10/11	d	10/11	d					10/11	2	10/11	2	10/11	2	10/11	2	10/11	2	10/11	2	10/11	2	10/11	2				
		10/15	4	10/15	4	10/15	4					10/15	4	10/15	4	10/15	4	10/15	4	10/15	4	10/15	4	10/15	4	10/15	4				
10/18	d	10/18	3	10/18	3	10/18	3	10/18	d	10/18	d	10/18	3	10/18	3	10/18	3	10/18	3	10/18	3	10/18	3	10/18	3	10/18	3	10/18	d	10/18	d
10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5	10/23	5
10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3	10/26	3
10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4	10/30	4
11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3	11/2	3
11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4	11/6	4
11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3	11/9	3
11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4	11/13	4
11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3	11/16	3
11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4	11/20	4
11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7	11/27	7
11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3	11/30	3
12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4	12/4	4
12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3	12/7	3
12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4	12/11	4
12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3	12/14	3
12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4	12/18	4
12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3	12/21	3
12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5	12/26	5
12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2	12/28	2

Appendix 2.

Fatality Monitoring Plot Search Dates at KAW in FY 2013 Q3 (1/2 through 3/29/13) for turbines 1-16. The black colored dates are searches within the 50% perimeter, **red** are within the 75% perimeter (full plots).

WTG																															
1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16	
																													1/2	d	
1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/3	d	1/4	2
1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/7	4	1/8	4
1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/10	3	1/11	3
1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/14	4	1/15	4
1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/17	3	1/18	3
1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/22	5	1/23	5
1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/24	2	1/25	2
1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/28	4	1/29	4
1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	1/31	3	2/1	3
2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/4	4	2/5	4
2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/7	3	2/8	3
2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/11	4	2/12	4
2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/14	3	2/15	3
2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/19	5	2/20	5
2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/21	2	2/22	2
2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/25	4	2/26	4
2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	2/28	3	3/1	3
3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/4	4	3/5	4
3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/7	3	3/8	3
3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/11	4	3/12	4
3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/14	3	3/15	3
3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/18	4	3/19	4
3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/21	3	3/22	3
3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/25	4	3/26	4
3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/28	3	3/29	3

Appendix 2 cont.

Fatality Monitoring Plot Search Dates at KAW in FY 2013 Q3 (1/2 through 3/29/13) for turbines 17-30 and Met 1 & 2. The black colored dates are searches within the 50% perimeter, **red** are within the 75% perimeter (full plots).

WTG																								Met							
17		18		19		20		21		22		23		24		25		26		27		28		29		30		1		2	
1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d	1/2	d
1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2	1/4	2
1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4	1/8	4
1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3	1/11	3
1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4	1/15	4
1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3	1/18	3
1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5	1/23	5
1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2	1/25	2
1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4	1/29	4
2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3	2/1	3
2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4	2/5	4
2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3	2/8	3
2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4	2/12	4
2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3	2/15	3
2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5	2/20	5
2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2	2/22	2
2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4	2/26	4
3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3	3/1	3
3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4	3/5	4
3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3	3/8	3
3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4	3/12	4
3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3	3/15	3
3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4	3/19	4
3/21	2	3/22	3	3/22	3	3/21	2	3/21	2	3/21	2	3/22	3	3/22	3	3/22	3	3/22	3	3/21	2	3/22	3	3/22	3	3/22	3	3/22	3	3/21	2
3/26	5	3/26	4	3/26	4	3/26	5	3/26	5	3/26	5	3/26	4	3/26	4	3/26	4	3/26	4	3/26	5	3/26	4	3/26	4	3/26	4	3/26	4	3/26	5
3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3	3/29	3

Appendix 3.

Fatality Monitoring Plot Search Dates at KAW in FY 2013 Q4 (4/1 through 6/28/13) for turbines 1-16. The black colored dates are searches within the 50% perimeter, **red** are within the 75% perimeter (full plots).

WTG																									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16										
4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/1	d	4/2	d
4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/4	3	4/5	3
4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/8	4	4/9	4
4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/11	3	4/12	3
4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/15	4	4/16	4
4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/18	3	4/19	3
4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/22	4	4/23	4
4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/25	3	4/26	3
4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/29	4	4/30	4
5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/2	3	5/3	3
5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/6	4	5/7	4
5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/9	3	5/10	3
5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/13	4	5/14	4
5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/16	3	5/17	3
5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/20	4	5/21	4
5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/23	3	5/24	3
5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/28	5	5/29	5
5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/30	2	5/31	2
6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/3	4	6/4	4
6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/6	3	6/7	3
6/10	4	6/10	4	6/10	4	6/10	5	6/10	5	6/10	5	6/10	5	6/10	4	6/10	4	6/10	4	6/10	4	6/10	5	6/11	4
6/12	2	6/12	2	6/12	2	6/13	3	6/13	3	6/13	3	6/13	3	6/13	3	6/13	3	6/13	3	6/13	3	6/13	3	6/14	3
6/17	5	6/17	5	6/17	5	6/17	4	6/17	4	6/17	4	6/17	4	6/17	4	6/17	4	6/17	4	6/17	4	6/17	4	6/18	4
6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/20	3	6/21	3
6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/24	4	6/25	4
6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/27	3	6/28	3

Appendix 3 cont.

Fatality Monitoring Plot Search Dates at KAW in FY 2013 Q4 (4/1 through 6/28/13) for turbines 17-30 and Met 1 & 2. The black colored dates are searches within the 50% perimeter, **red** are within the 75% perimeter (full plots).

WTG																										MET					
17		18		19		20		21		22		23		24		25		26		27		28		29		30		1		2	
4/2	d	4/2	d	4/2	d	4/2	d	4/2	d	4/2	d	4/2	d	4/2	d	4/2	d	4/2	d	4/2		4/2	d	4/2	d	4/2	d	4/2	d	4/2	d
4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3	4/5	3
4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4	4/9	4
4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3	4/12	3
4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4	4/16	4
4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3	4/19	3
4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4	4/23	4
4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3	4/26	3
4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4	4/30	4
5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3	5/3	3
5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4	5/7	4
5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3	5/10	3
5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4	5/14	4
5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3	5/17	3
5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4	5/21	4
5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3	5/24	3
5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5	5/29	5
5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2	5/31	2
6/4	4	6/4	4	6/4	4	6/5	5	6/5	5	6/5	5	6/4	4	6/4	4	6/4	4	6/4	4	6/4	4	6/4	4	6/4	4	6/4	4	6/4	4	6/5	5
6/7	3	6/7	3	6/7	3	6/7	2	6/7	2	6/7	2	6/7	3	6/7	3	6/7	3	6/7	3	6/7	3	6/7	3	6/7	3	6/7	3	6/7	3	6/7	2
6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4	6/11	4
6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3	6/14	3
6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4	6/18	4
6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3	6/21	3
6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4	6/25	4
6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3	6/28	3

Appendix 4. Mean and standard deviation of search interval (in days) by quarters for 50 and 75 % fatality monitoring search plots in FY 2013 at KAW.

		WTG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FY 2013 Q2	50%	Mean	3.7	3.7	3.68	3.61	3.64	3.64	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.64	3.75
		StdDev	0.92	0.92	0.95	0.89	0.91	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.92	0.92	0.91	1.07
	75%	Mean	14.00	14.00	14.00	13.80	14.00	14.00	13.80	13.80	13.80	13.80	13.80	14.00	13.80	13.80	14.00	13.00
		StdDev	0.00	0.00	0.00	0.84	0.63	0.63	0.84	0.84	0.84	0.84	0.84	0.63	0.45	0.45	0.63	2.16
FY 2013 Q3	50%	Mean	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.44
		StdDev	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.82
	75%	Mean	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
		StdDev	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
FY 2013 Q4	50%	Mean	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48
		StdDev	0.77	0.77	0.77	0.65	0.77	0.77	0.77	0.77	0.65	0.65	0.65	0.65	0.65	0.65	0.77	0.65
	75%	Mean	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
		StdDev	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
		WTG	17	18	19	20	21	22	23	24	25	26	27	28	29	30	MET 1	MET2
FY 2013 Q2	50%	Mean	3.75	3.73	3.73	3.73	3.75	3.75	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.75	3.75
		StdDev	1.07	1.03	1.03	1.03	1.07	1.07	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.07	1.07
	75%	Mean	13.00	14.00	14.00	14.00	14.00	14.00	14.33	14.33	14.33	14.33	14.33	14.33	14.33	14.33		
		StdDev	2.16	0.00	0.00	0.00	0.00	0.00	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52		
FY 2013 Q3	50%	Mean	3.44	3.44	3.48	3.48	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44
		StdDev	0.92	0.82	0.82	0.92	0.92	0.92	0.82	0.82	0.82	0.82	0.92	0.82	0.82	0.82	0.92	0.92
	75%	Mean	14.00	13.83	13.83	13.83	13.83	13.83	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00		
		StdDev	1.00	0.41	0.41	0.41	0.41	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
FY 2013 Q4	50%	Mean	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48
		StdDev	0.77	0.77	0.77	0.65	0.77	0.77	0.77	0.77	0.65	0.65	0.65	0.65	0.65	0.65	0.77	0.65
	75%	Mean	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00		
		StdDev	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

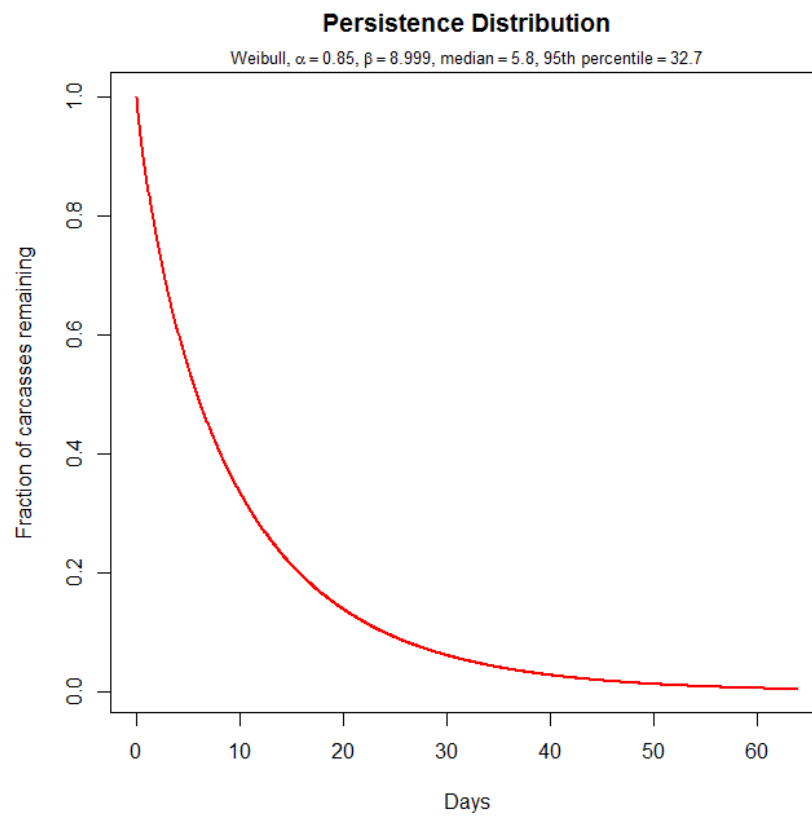
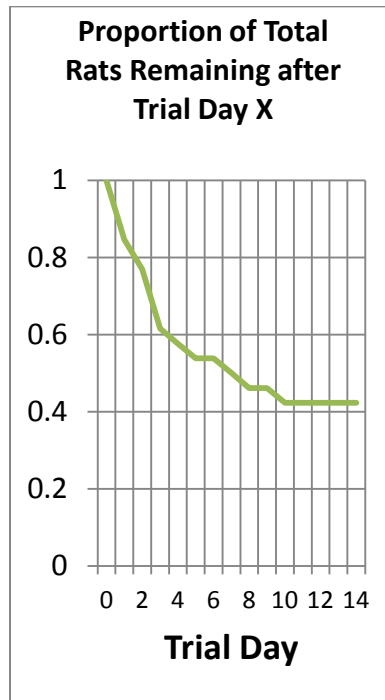
Appendix 5. Bird fatalities documented at KAW in FY 2013.

Species	Date	WTG	Distance from WTG (m)	Direction from WTG (degree)	Condition
Cook's Petrel	9/18/2012	26	37.5	261	Not Scavenged
Zebra Dove	11/16/2012	22	36.4	310	Scavenged
Zebra Dove	11/26/2012	2	1	94	Not Scavenged
African Silverbill	11/27/2012	25	4	340	Not Scavenged
African Silverbill	11/27/2012	25	8	317	Not Scavenged
African Silverbill	11/27/2012	25	41.4	29	Not Scavenged
African Silverbill	11/27/2012	25	39.6	278	Not Scavenged
Zebra Dove	11/29/2012	28	41	176	On road
African Silverbill	11/30/2012	25	38	64	Scavenged by insects
Common Waxbill	12/3/2012	9	3	183	Not Scavenged
Common Waxbill	12/6/2012	14	2	192	Not Scavenged
Zebra Dove	12/20/2012	3	2	170	Not Scavenged
Zebra Dove	12/21/2012	18	30	308	Not Scavenged
Zebra Dove	12/21/2012	19	41	125	Not Scavenged
Spotted Dove	12/24/2012	7	2	15	Not Scavenged
Common Waxbill	12/26/2012	29	1	220	Not Scavenged
Zebra Dove	12/27/2012	6	2	94	Not Scavenged
Zebra Dove	12/28/2012	17	42	275	Not Scavenged
African Silverbill	12/28/2012	26	90	45	Scavenged
Zebra Dove	1/2/2013	18	57	270	Not Scavenged
Nutmeg Mannikin	1/3/2013	5	27	92	Not Scavenged
African Silverbill	1/4/2013	24	78	290	Not Scavenged
White Tailed Tropicbird	1/15/2013	22	50	307	Not Scavenged
Spotted Dove	2/1/2013	25	0.5	144	Not Scavenged
Zebra Dove	2/26/2013	18	1.5	100	Not Scavenged
White Tailed Tropicbird	3/7/2013	13	43	258	Not Scavenged
Red-crested Cardinal	4/2/2013	29	1.8	59	Not Scavenged
Zebra Dove	4/5/2013	27	4.8	316	Not Scavenged
Zebra Dove	4/15/2013	15	15	211	Not Scavenged
Nutmeg Mannikin	4/26/2013	21	22	338	Not Scavenged
Spotted Dove	4/12/2013	17	3	356	Not Scavenged
Cattle Egret	5/6/2013	3	64	214	Not Scavenged
Common Myna	5/14/2013	19	3	270	Not Scavenged
Red-vented Bulbul	5/23/2013	15	2	0	Not Scavenged
Common Myna	5/17/2013	26	1	90	Not Scavenged
Common Myna	6/2/2013	26	2.8	90	Not Scavenged
White Tailed Tropicbird	6/14/2013	29	67	302	Not Scavenged
Common Myna	6/28/2013	25	2.8	90	Not Scavenged

Appendix 6. Estimation of Hawaiian hoary bat fatalities at KAW in FY 2013 (cite Huso).

Carcass Count (X)	5	Sampling Dates	Prior distribution		Posterior Distribution			
Sampling coverage (phi)	0.9	0	m	P(M = m)	Mean	8.457		
searcher proficiency (f)	0.626	3.55	0	0.022718	P(observe arrive)	0.594165		
k	1	7.1	1	0.044301	95th percentile	13		
Sampling dates	Formula	10.65	2	0.06047	m	P(M = m)	1-accum.P	% Confidence
interval	3.55	14.2	3	0.07075	0	0	1	0
span	302	17.75	4	0.07588	1	0	1.000	0.00
persistence distribution	Weibull	21.3	5	0.076942	2	0	1.000	0.00
a	0.8502	24.85	6	0.075018	3	0	1.000	0.00
b	9	28.4	7	0.071053	4	0	1.000	0.00
arrival function	Uniform	31.95	8	0.065813	5	0.057674	0.942	5.77
a	NA	35.5	9	0.05989	6	0.136926	0.805	19.46
b	NA	39.05	10	0.053721	7	0.184212	0.621	37.88
prior distribution	Negative Binomial	42.6	11	0.047616	8	0.184656	0.437	56.35
a	2.5	46.15	12	0.041783	9	0.153439	0.283	71.69
b	0.22	49.7	13	0.036352	10	0.111714	0.171	82.86
		53.25	14	0.031392	11	0.073674	0.098	90.23
		56.8	15	0.026935	12	0.044977	0.053	94.73
		60.35	16	0.022979	13	0.025806	0.027	97.31
		63.9	17	0.019505	14	0.014068	0.013	98.71
		67.45	18	0.016481	15	0.007348	0.006	99.45
		71	19	0.01387	16	0.003701	0.002	99.82
		74.55	20	0.01163	17	0.001806	0.000	100.00

Appendix 7. Extinction curve from bat CARE data and from Evidence of Absence Estimator with indicated parameters.



Appendix 8. CARE A at KAW in FY 2013.

CARE A 2012	1			2			3			4			5			6			7			8			9			10		
Carcass Type	Bird			Rat			Bird			Rat			Bird			Rat			Bird			Rat			Bird			Rat		
WTG	T1			T4			T7			T10			T13			T16			T19			T22			T25			T28		
Vegetation type	short			short			short			short			short			short			short			short			short			short		
Distance (m)	41			41			41			41			41			41			41			41			41			41		
	P/A	Date	Notes	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N
day 0	P	12/12		P	12/12		P	12/12		P	12/12		P	12/12		P	12/12		P	12/12		P	12/12		P	12/12		P	12/12	
day 1	P	12/13		P	12/13	L	P	12/13		P	12/13	A,L	P	12/13		P	12/13		P	12/13		P	12/13	L	P	12/13		P	12/13	L
day 2	P	12/14	A	P	12/14		P	12/14		P	12/14		P	12/14	L	P	12/14	L	P	12/14		P	12/14		P	12/14		P	12/14	
day 3	P	12/15		P	12/15		P	12/15	L	P	12/15		P	12/15		P	12/15		P	12/15	L	P	12/15		P	12/15	L	P	12/15	
day 4	P	12/16	L	P	12/16		P	12/16		P	12/16	L,H	P	12/16	L,M	P	12/16	L,H	P	12/16		P	12/16		P	12/16		P	12/16	L,H
day 5	P	12/17		P	12/17		P	12/17		P	12/17	A,L	P	12/17		P	12/17		P	12/17		P	12/17		P	12/17		P	12/17	
day 6	P	12/18		P	12/18	L	P	12/18		P	12/18	L	P	12/18		P	12/18		P	12/18		P	12/18		P	12/18		P	12/18	
day 7	P	12/19		P	12/19		P	12/19		P	12/19		P	12/19		P	12/19		P	12/19	L	P	12/19		P	12/19		P	12/19	
day 8	P	12/20		P	12/20		P	12/20		P	12/20		P	12/20	L	P	12/20		P	12/20		P	12/20		P	12/20		P	12/20	
day 9	P	12/21		P	12/21		P	12/21		P	12/21	L	P	12/21		P	12/21		P	12/21		P	12/21		P	12/21		P	12/21	
day 10	P	12/22	L	P	12/22		P	12/22		P	12/22		P	12/22		P	12/22		P	12/22		P	12/22	L,S	P	12/22		P	12/22	L
day 11	P	12/23		P	12/23		P	12/23		P	12/23		P	12/23		P	12/23		P	12/23		P	12/23		P	12/23		P	12/23	
day 12	P	12/24	A,L	P	12/24		P	12/24		P	12/24		P	12/24	L	P	12/24		P	12/24	L	P	12/24		P	12/24		P	12/24	
day 13	P	12/25		P	12/25		P	12/25		P	12/25		P	12/25		P	12/25		P	12/25		P	12/25		P	12/25		P	12/25	
day 14	P	12/26		P	12/26		P	12/26		P	12/26		P	12/26		P	12/26		P	12/26	W	P	12/26		P	12/26		P	12/26	
day 21	A	1/2		P	1/2	S	P	1/2		P	1/2	S	P	1/2		P	1/2		P	1/2		P	1/2	S	P	1/2		P	1/2	S
day 28	A	1/9		P	1/9		P	1/9		P	1/9		P	1/9		P	1/9		P	1/9		P	1/9		P	1/9		P	1/9	
Retention (days)	14			14			14			14			14			14			14			14			14			14		

Appendix 9. CARE B at KAW in FY 2013.

CARE B 2013	1			2			3			4			5			6			7			8			9			10		
Carcass Type	Bird			Rat			Bird			Rat			Bird			Rat			Bird			Rat			Bird			Rat		
WTG	T2			T5			T8			T11			T14			T17			T20			T23			T26			T29		
Vegetation type	short			short			short			short			short			short			short			short			short			short		
Distance (m)	13			13			13			13			13			13			13			13			13			13		
	P/A	Date	Notes	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N
day 0	P	1/23		P	1/23		P	1/23		P	1/23		P	1/23		P	1/23		P	1/23		P	1/23		P	1/23		P	1/23	
day 1	P	1/24		P	1/24		P	1/24		A	1/24	pig	P	1/24	M	P	1/24		P	1/24		P	1/24		P	1/24		P	1/24	
day 2	P	1/25		P	1/25		P	1/25			1/25	track	P	1/25		P	1/25		P	1/25		P	1/25		P	1/25		P	1/25	
day 3	P	1/26		P	1/26		P	1/26			1/26		P	1/26		P	1/26	L	P	1/26	L	P	1/26	H,L	P	1/26	H,L	P	1/26	L
day 4	P	1/27	M	P	1/27		P	1/27			1/27		P	1/27	L	P	1/27	H	P	1/27		P	1/27		P	1/27		P	1/27	
day 5	P	1/28		P	1/28		P	1/28			1/28		P	1/28		P	1/28		P	1/28		P	1/28		P	1/28		P	1/28	
day 6	P	1/29		P	1/29		P	1/29			1/29		P	1/29	I	P	1/29		P	1/29		P	1/29	H	P	1/29	H	P	1/29	H
day 7	P	1/30		P	1/30	L	P	1/30	I		1/30		P	1/30		P	1/30	L	P	1/30		P	1/30	D	P	1/30	D	P	1/30	D
day 8	P	1/31		P	1/31		P	1/31	F,M		1/31		P	1/31		P	1/31	H	P	1/31	L	P	1/31		P	1/31		P	1/31	
day 9	P	2/1	I	P	2/1		P	2/1			2/1		P	2/1	L	P	2/1		P	2/1		P	2/1		P	2/1		P	2/1	
day 10	P	2/2	S	P	2/2		P	2/2			2/2		P	2/2		P	2/2	D	P	2/2		P	2/2		P	2/2		P	2/2	
day 11	P	2/3		P	2/3		P	2/3			2/3		P	2/3		P	2/3		P	2/3		P	2/3		P	2/3		P	2/3	
day 12	P	2/4		P	2/4		P	2/4			2/4		P	2/4	F,M	P	2/4		P	2/4		P	2/4		P	2/4		P	2/4	
day 13	P	2/5		P	2/5		P	2/5			2/5		P	2/5		P	2/5	D,H	P	2/5		P	2/5		P	2/5		P	2/5	
day 14	P	2/6		P	2/6		P	2/6	F		2/6		P	2/6		P	2/6		P	2/6		P	2/6	S,D	P	2/6	S,D	P	2/6	S,D
day 21	P	2/13	M,S	P	2/13	D	P	2/13	B		2/13		A	2/13		P	2/13	S	P	2/13		P	2/13		P	2/13		P	2/13	
day 28	P	2/20	S,F	P	2/20	D	P	2/20			2/20		A	2/20		P	2/20	S,D	P	2/20	M,S	P	2/20		P	2/20		P	2/20	
Retention (days)	14			14			14			0			14			14			14			14			14			14		

Appendix 10. CARE C at KAW in FY 2013.

CARE C 2013	1			2			3			4			5			6			7			8			9			10			
Carcass Type WTG	Bird T3			Rat T6			Bird T9			Rat T12			Bird T15			Rat T18			Bird T21			Rat T24			Bird T27			Rat T30			
Vegetation type	medium			medium			medium			medium			medium			medium			medium			medium			medium			medium			
Distance (m)	69			69			69			69			69			69			69			69			69			69			
	P/A	Date	Notes	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	
day 0	P	3/6		P	3/6		P	3/6		P	3/6		P	3/6		P	3/6		P	3/6		P	3/6		P	3/6		P	3/6		
day 1	P	3/7		P	3/7		P	3/7	F	P	3/7	F	P	3/7	F,M	P	3/7	F	P	3/7		P	3/7	F	P	3/7		P	3/7	F	
day 2	P	3/8	F	P	3/8	F	P	3/8		P	3/8		P	3/8		P	3/8		P	3/8	F	P	3/8		P	3/8	F	P 3/8		M	
day 3	P	3/9		P	3/9		P	3/9		P	3/9	M	P	3/9		P	3/9	M	P	3/9		P	3/9		P	3/9		A	3/9	Mong	
day 4	P	3/10		P	3/10		P	3/10		P	3/10	H	P	3/10		P	3/10	H,S	P	3/10		P	3/10		P	3/10			3/10	oose	
day 5	P	3/11		P	3/11		P	3/11		P	3/11		P	3/11		P	3/11		P	3/11		P	3/11		P	3/11			3/11	on	
day 6	P	3/12		P	3/12		P	3/12		P	3/12		P	3/12		P 3/12		P	3/12		P	3/12		P	3/12			3/12	game		
day 7	P	3/13		P	3/13		P	3/13		P	3/13		P	3/13		A	3/13		P 3/13		P 3/13		P	3/13			3/13	cam			
day 8	P	3/14	M,B	P	3/14		P	3/14		P	3/14		P	3/14	M		3/14		A	3/14		A	3/14		P	3/14			3/14		
day 9	P	3/15		P	3/15	M	P	3/15		P 3/15		P	3/15	M		3/15			3/15			3/15		P	3/15			3/15			
day 10	P	3/16		P	3/16		P	3/16		A	3/16		P	3/16			3/16			3/16			3/16		P	3/16			3/16		
day 11	P	3/17		P	3/17		P	3/17			3/17		P	3/17			3/17			3/17			3/17		P	3/17			3/17		
day 12	P	3/18		P	3/18		P	3/18			3/18		P	3/18			3/18			3/18			3/18		P	3/18			3/18		
day 13	P	3/19		P	3/19		P	3/19			3/19		P	3/19			3/19			3/19			3/19		P	3/19			3/19		
day 14	P	3/20		P 3/20		P	3/20			3/20		P	3/20			3/20			3/20			3/20		P 3/20			3/20				
day 21	P	3/27		A	3/27		P	3/27			3/27		P 3/27			3/27			3/27			3/27			3/27		A	3/27		3/27	
day 28	P 4/3				4/3		P 4/3			4/3		A	4/3			4/3			4/3			4/3			4/3			4/3			
Retention (days)	14			14			14			9			14			6			7			7			14			2			

Appendix 11. CARE D at KAW in FY 2013.

CARE D 2013	1			2			3			4			5			6		
Carcass Type WTG	Rat T6			Rat T5 (South)			Rat T5 (North)			Rat T7			Bird T8			Bird T25		
Vegetation	short			short			short			short			short			medium		
Distance (m)	13			10			49			80			14			78		
	P/A	Date	Notes	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N
day 0	P	4/15		P	4/18		P	4/18		P	4/18		P	4/18		P	4/18	
day 1	P	4/16		P	4/19	L	P	4/19	L	P	4/19	L	A	4/19	L	P	4/19	
day 2	P	4/17	L	P	4/20		P	4/20		P	4/20			4/20		P	4/20	L
day 3	A	4/18		A	4/21		A	4/21		P	4/21	H		4/21		A	4/21	
day 4		4/19			4/22			4/22		A	4/22			4/22			4/22	
day 5		4/20			4/23			4/23			4/23			4/23			4/23	
day 6		4/21			4/24			4/24			4/24			4/24			4/24	
day 7		4/22			4/25			4/25			4/25			4/25			4/25	
day 8		4/23			4/26			4/26			4/26			4/26			4/26	
day 9		4/24			4/27			4/27			4/27			4/27			4/27	
day 10		4/25			4/28			4/28			4/28			4/28			4/28	
day 11		4/26			4/29			4/29			4/29			4/29			4/29	
day 12		4/27			4/30			4/30			4/30			4/30			4/30	
day 13		4/28			5/1			5/1			5/1			5/1			5/1	
day 14		4/29			5/2			5/2			5/2			5/2			5/2	
day 21		5/6			5/9			5/9			5/9			5/9			5/9	
day 28		5/13			5/16			5/16			5/16			5/16			5/16	
Retention (d)	2			2			2			3			0			2		
CARE D 2013	7			8			9			10			11			12		
Carcass Type WTG	Bird T11			Bird T7			Rat T25			Rat T27			Bird T24			Rat T21		
Vegetation	short			short			short			short			medium			short		
Distance (m)	23			89			36			112			3			62		
	P/A	Date	Notes	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N	P/A	Date	N
day 0	P	4/25		P	4/25		P	5/3		P	5/3		P	5/3		P	5/3	
day 1	P	4/26	L	P	4/26	L	P	5/4	L	P	5/4	L	P	5/4	L	A	5/4	
day 2	P	4/27		P	4/27		A	5/5		P	5/5	S	P	5/5			5/5	
day 3	P	4/28		P	4/28			5/6		P	5/6	D	P	5/6			5/6	
day 4	P	4/29	M	P	4/29			5/7		P	5/7		P	5/7	Cam		5/7	
day 5	P	4/30	M	P	4/30	Cam		5/8		A	5/8		P	5/8			5/8	
day 6	P	5/1	M	P	5/1			5/9			5/9		P	5/9			5/9	
day 7	P	5/2	M,W	P	5/2			5/10			5/10		A	5/10			5/10	
day 8	P	5/3		P	5/3			5/11			5/11			5/11			5/11	
day 9	P	5/4		P	5/4	M		5/12			5/12			5/12			5/12	
day 10	P	5/5		P	5/5			5/13			5/13			5/13			5/13	
day 11	P	5/6		P	5/6			5/14			5/14			5/14			5/14	
day 12	P	5/7		P	5/7	M,W		5/15			5/15			5/15			5/15	
day 13	P	5/8		P	5/8			5/16			5/16			5/16			5/16	
day 14	P	5/9		P	5/9			5/17			5/17			5/17			5/17	
day 21	P	5/16	M	P	5/16			5/24			5/24			5/24			5/24	
day 28	P	5/23		A	5/23			5/31			5/31			5/31			5/31	
Retention (d)	14			14			1			4			6			0		

Appendix 12. CARE E at KAW in FY 2013.

CARE E 2013	1			2			3			4			5			6			7		
Carcass Type WTG	Bird T5			Bird T1			Bird T15			Rat T7			Rat T30			Rat T22			Rat T27		
Vegetation	short			medium			medium			short			short			medium			medium		
Distance (m)																					
	P/A	Date	N	P/A	Date	N	P/A	Date	Notes	P/A	Date	N	P/A	Date	Notes	P/A	Date	N	P/A	Date	N
day 0	P	5/30		P	5/30		A	5/30	TAKEN AT	P	5/30		P	5/31		P	5/31		P	5/31	
day 1	P	5/31		P	5/31			5/31	ONCE	P	5/31		P	6/1	A, D,S	A	6/1		A	6/1	
day 2	A	6/1		P	6/1			6/1		A	6/1		P	6/2			6/2			6/2	
day 3		6/2		P	6/2			6/2			6/2		P	6/3			6/3			6/3	
day 4		6/3		P	6/3			6/3			6/3		P	6/4			6/4			6/4	
day 5		6/4		A	6/4			6/4			6/4		P	6/5			6/5			6/5	
day 6		6/5			6/5			6/5			6/5		P	6/6			6/6			6/6	
day 7		6/6			6/6			6/6			6/6		P	6/7			6/7			6/7	
day 8		6/7			6/7			6/7			6/7		P	6/8			6/8			6/8	
day 9		6/8			6/8			6/8			6/8		P	6/9			6/9			6/9	
day 10		6/9			6/9			6/9			6/9		P	6/10			6/10			6/10	
day 11		6/10			6/10		P	6/10	F,M,found .5m outside 50%		6/10		P	6/11			6/11			6/11	
day 12		6/11			6/11		P	6/11			6/11		P	6/12			6/12			6/12	
day 13		6/12			6/12		P	6/12			6/12		P	6/13			6/13			6/13	
day 14		6/13			6/13		P	6/13			6/13		P	6/14			6/14			6/14	
day 21		6/20			6/20		P	6/20			6/20		P	6/21			6/21			6/21	
day 28		6/27			6/27		P	6/27			6/27		P	6/28			6/28			6/28	
Retention (days)	1			4			14			1			14			0			0		

Appendix 13. SEEF Trials at KAW in FY 2013.

Trial date	Point ID	WTG	Veg type	Carcass type	Found-Short Veg	Found-Medium veg	Searcher Initial	Proctor
11/29/2012		15	short	Rat	0		AU	MPC
11/29/2012		8	short	Rat	1		AU	MPC
11/29/2012		15	short	Rat	1		AU	MPC
11/29/2012		4	short	Rat	0		CP	MPC
11/29/2012		4	short	Rat	0		CP	MPC
11/29/2012		11	short	Rat	1		JD	MPC
11/29/2012		13	short	Rat	1		LF	MPC
11/29/2012		13	short	Rat	1		LF	MPC
11/29/2012		14	short	Rat	1		LF	MPC
12/7/2012		28	short	Rat	0		AU	MPC
12/7/2012		30	short	Rat	0		AU	MPC
12/7/2012		30	short	Rat	1		AU	MPC
12/7/2012		27	short	Rat	0		CP	MPC
12/7/2012		26	short	Rat	1		CP	MPC
12/7/2012		26	short	Rat	1		CP	MPC
12/7/2012		20	short	Rat	1		JD	MPC
12/7/2012		22	short	Rat	1		JD	MPC
12/7/2012		19	short	Rat	1		LF	MPC
12/11/2012		25	short	Rat	1		AU	MPC
12/11/2012		26	short	Rat	1		AU	MPC
12/11/2012		21	short	Rat	0		CP	MPC
12/11/2012		17	short	Rat	1		CP	MPC
12/11/2012		20	short	Rat	1		CP	MPC
12/11/2012		18	short	Rat	0		JD	MPC
12/11/2012		20	short	Rat	0		JD	MPC
12/11/2012		18	short	Rat	1		JD	MPC
12/11/2012		18	short	Rat	1		JD	MPC
1/10/2013	18	10	short	Rat	0		AL	MPC
1/10/2013	2	2	short	Rat	0		AU	MPC
1/10/2013	14	1	short	Rat	1		AU	MPC
1/10/2013	3	9	short	Rat	1		CP	MPC
1/10/2013	7	14	short	Rat	1		LF	MPC

Appendix 13 (cont.)

Trial date	Point ID	WTG	Veg type	Carcass type	Found-Short Veg	Found-Medium veg	Searcher Initial	Proctor
2/1/2013	24	19	medium	Rat		1	AL	MPC
2/1/2013	12	27	short	Rat	1		CP	MPC
2/1/2013	8	20	short	Rat	0		LF	MPC
2/1/2013	9	22	short	Rat	1		LF	MPC
2/1/2013	10	21	short	Rat	0		LF	MPC
2/1/2013	11	21	short	Rat	1		LF	MPC
2/1/2013	4	16	medium	Rat	Discard- not retrieved			MPC
2/14/2013	20	11	short	Rat	1		AU	MPC
2/14/2013	25	10	short	Rat	1		AU	MPC
2/14/2013	27	8	short	Rat	Discard- not retrieved			MPC
2/14/2013	53	13	short	Rat	1		SS	MPC
2/14/2013	54	12	short	Rat	1		SS	MPC
2/20/2013	29	21	short	Rat	0		JD	MPC
2/20/2013	72	21	short	Rat	0		JD	MPC
2/20/2013	84	17	short	Rat	1		JD	MPC
2/20/2013	39	18	short	Rat	0		LF	MPC
2/20/2013	41	16	short	Rat	0		LF	MPC
2/20/2013	22	29	short	Rat	0		SS	MPC
2/20/2013	63	30	short	Rat	0		SS	MPC
2/22/2013	22	29	short	Rat	0		JD	MPC
2/22/2013	63	30	short	Rat	1		JD	MPC
2/22/2013	39	18	short	Rat	0		LF	MPC
2/22/2013	41	16	short	Rat	1		LF	MPC
2/22/2013	29	21	short	Rat	0		SS	MPC
2/22/2013	72	21	short	Rat	0		SS	MPC
2/26/2013	22	29	short	Rat	1		JD	MPC
2/26/2013	39	18	short	Rat	1		LF	MPC
2/26/2013	29	21	short	Rat	1		SS	MPC
2/26/2013	72	21	short	Rat	1		SS	MPC
3/15/2013	32	27	short	Rat	1		AL	MPC
3/15/2013	40	18	short	Rat	1		CP	MPC
3/15/2013	50	16	short	Rat	1		CP	MPC
3/15/2013	33	26	short	Rat	1		LF	MPC
3/15/2013	42	25	short	Rat	1		LF	MPC
3/15/2013	38	23	short	Rat	1		SS	MPC
3/28/2013	14	14	medium	Rat		1	AL	MPC
3/28/2013	12	14	medium	Rat		0	AU	MPC

Appendix 13 (cont.).

Trial date	Point ID	WTG	Veg type	Carcass type	Found-Short Veg	Found-Medium veg	Searcher Initial	Proctor
4/4/2013	52	1	medium	Rat		0	AU	MPC
4/4/2013	22	5	medium	Rat		1	JD	MPC
4/4/2013	47	5	medium	Rat		0	JD	MPC
4/9/2013	60	22	short	Rat	0		AU	MPC
4/9/2013	57	16	short	Rat	1		JD	MPC
4/9/2013	17	23	short	Rat	0		LF	MPC
4/12/2013	60	22	short	Rat	1		LF	MPC
4/15/2013	21	6	short	Rat	1		LF	MPC
4/15/2013	37	15	short	Rat	Discard- not retrieved			MPC
4/18/2013	14	1	short	Rat	0		CP	MPC
4/18/2013	26	5	short	Rat	1		JD	MPC
4/18/2013	28	7	short	Rat	1		JD	MPC
4/18/2013	30	5	short	Rat	1		JD	MPC
5/3/2013	52	25	short	Rat	1		JD	MPC
5/3/2013	79	21	medium	Rat	Discard- not retrieved			MPC
5/14/2013	76	16	short	Rat	0		AL	SES
5/14/2013	59	23	short	Rat	1		LF	SES
5/14/2013	36	26	short	Rat	1		LF	SES
5/24/2013	87	18	Short	Rat	1		AL	MPC
5/24/2013	56	29	short	Rat	0		LF	MPC
5/29/2013	56	29	short	Rat	0		LF	MPC
5/30/2013	43	7	short	Rat	1		AL	SES
5/31/2013	89	22	medium	Rat		0	AL	SES
5/31/2013	56	29	short	Rat	1		CP	SES
5/31/2013	90	27	medium	Rat		0	CP	SES
5/31/2013	88	30	short	Rat	1		LF	SES
6/13/2013	46	15	short	Rat	0		JD	MPC
6/13/2013	51	15	short	Rat	1		JD	MPC
6/13/2013	27	8	short	Rat	0		JD	MPC
6/17/2013	27	8	short	Rat	1		JD	SES
6/21/2013	45	27	short	Rat	1		JD	SES
6/21/2013	47	18	short	Rat	1		AU	SES
6/21/2013	93	19	medium	Rat		0	AU	SES
6/21/2013	97	30	short	Rat	1		JD	SES

Appendix 13 (cont.).

Trial date	Point ID	WTG	Veg type	Carcass type	Found-Short Veg	Found-Medium Veg	Searcher Initial	Proctor
12/27/2012		15	short	WTSH	1		JD	MPC
12/27/2012		8	short	WTSH	1		JD	MPC
12/27/2012		5	short	WTSH	1		LF	MPC
12/27/2012		5	short	WTSH	1		LF	MPC
12/27/2012		12	short	WTSH	1		AL	MPC
1/10/2013	1	12	short	WTSH	1		LF	MPC
1/10/2013	5	15	short	WTSH	1		CP	MPC
1/10/2013	6	6	short	WTSH	1		AL	MPC
1/10/2013	13	2	short	WTSH	1		AU	MPC
1/10/2013	16	4	short	WTSH	1		JD	MPC
1/29/2013	6	22	medium	WTSH		1	CP	MPC
1/29/2013	8	22	medium	WTSH		1	CP	MPC
1/29/2013	2	19	short	WTSH	Discard- not retrieved			MPC
2/1/2013	16	27	short	WTSH	1		CP	MPC
2/12/2013	19	19	short	WTSH	1		CP	MPC
2/12/2013	24	19	short	WTSH	1		CP	MPC
2/12/2013	15	20	short	WTSH	1		LF	MPC
3/28/2013	1	7	medium	WTSH		1	AL	MPC
3/28/2013	14	14	medium	WTSH	Discard- not retrieved			MPC
4/19/2013	5	25	medium	WTSH		1	AU	MPC
4/18/2013	31	8	short	WTSH	1		LF	MPC
5/3/2013	19	24	medium	WTSH		1	AU	MPC
5/14/2013	9	17	medium	WTSH		0	JD	SES
5/24/2013	80	21	medium	WTSH		1	JD	MPC
5/30/2013	37	5	short	WTSH	1		AL	SES
5/30/2013	3	1	medium	WTSH		1	JD	SES
5/30/2013	4	15	medium	WTSH	Discard- not retrieved			SES

Appendix 14. Hawaiian hoary bat nights with detections and total detection nights at KAW in FY 2013.

Detector Location (WTG)	Start Date	Detector Nights with Activity	Total Detector Nights	Detector Nights with Activity/Total Detector-Nights
2	12/4/2012	11	205	0.054
8	12/21/2012	18	186	0.097
12	12/5/2012	34	171	0.199
17	12/4/2012	2	205	0.010
19	12/5/2012	8	198	0.040
21	12/5/2012	15	199	0.075
23	12/4/2012	16	182	0.088
26	12/12/2012	16	197	0.081
29	12/22/2012	22	170	0.129
Total		142	1713	0.083

Scope of Work for Feral Cat and Barn Owl control in Newell's Shearwater colonies: Year One

Four areas have been identified for potential introduced predator control work – North Fork Wailua, Kalaheo, Sleeping Giant and Moalepe.

Auditory surveys by the Kauai Endangered Seabird Recovery Project (KESRP) in 2011 to 2013 have confirmed that these sites all currently contain Newell's Shearwater *Puffinus newelli* colonies. North Fork Wailua and Kalaheo are also all known as historical breeding sites for Newell's Shearwater. The Kalaheo colony in particular was intensively studied in 1993 and 1994, with 57 burrows located on two main ridge lines identified (Ainley et al, 1995). Currently, there is no management in any of these areas for seabird conservation.

Predation of endangered seabirds by non-native mammals and owls exist through-out these areas. Feral cats *Felis catus*, rats (likely both Black *Rattus rattus* and Polynesian *Rattus exulans*), Barn owls *Tyto alba* and feral pigs *Sus scrofa* are all non-native predators that are potentially limiting the breeding success of birds within these colonies. Predation by all of the above predators has been documented on Newell's Shearwater and Hawaiian Petrel in Kaua'i. Arguably one of the most serious introduced predators on threatened seabirds in Kaua'i is the feral cat. Feral cat predation at the Kalaheo colony in particular has been identified as one of the main reasons why this colony is now reduced to a handful of breeding pairs.

This SOW addresses the need to reduce overall predation rates within these identified seabird colonies, specifically related to feral cats and Barn Owl. Management for these species at known colonies is expected to increase the survival rates of both adult birds and fledglings. In the longer term, this work could expand to include other introduced predators (through additional funding sources) and management of the areas to reduce other forms of mortality (such as power lines and invasive plant species).

The activities that DOFAW (through KESRP) will conduct during 2013 will entail the creation of a baseline activity level of Newell's Shearwater at four potential control sites using song meters. Song meters are proving to be an important component of colony level monitoring on Kauai, with work currently focusing on relating the change in calling rates to actual colony-level change over time. Song meters are currently being used for this purpose in Upper Limahuli Preserve and Hono o Na Pali NARS. Song meters are deployed and run by KESRP. Song meter analysis is currently being conducted by Conservation Metrics Inc.

Annual Reporting Requirements

By December 20th a report (via Conservation Metrics) will be produced. This will outline the results of the song meter analysis for all song meters deployed during the latter part of the 2013 breeding season.

By January 1st 2014, KESRP will produce a work plan and associated budget for predator control and seabird monitoring to be undertaken within one or more of the colonies outlined above during the 2014 breeding season.

Budget

The budget presented below is for two months of song meter work carried out at four colonies in August and September 2013. Analysis of data will be conducted by Conservation Metrics Inc, who have been analysing song meter data for KESRP for several years and have been proven to be reliable and efficient.

Item	Unit	Cost	Total Cost
WAGES			
Seabird monitoring			
Biological co-ordinator (co-ordination and report writing)			\$2,125
GIS support (mapping and planning)			\$1,650
2 x field tech (2 week each, field work)			\$2,153
Fringe Benefits for above staff time			\$1,991
Per diems (\$20/day when in field, 2 weeks, 4 days a week)			\$320
HELICOPTER			
Helicopter flights to deploy and recover song meters	8	\$1,000	\$8,000
SEABIRD MONITORING EQUIPMENT			
Garmin Rino Lithium-Ion Battery	2	\$69.99	\$140
Garmin Rino 650	2	\$449.99	\$900
Go Pro Camera (HERO3:Black Edition)	1	\$399.99	\$400
HERO3 Rechargeable battery	1	\$19.99	\$20
Song meters - SM2 (3 per site, 2 for Sleeping Giant)	11	490	\$5,390
Microphone for SM2 (2 per unit)	22	70	\$1,540
32GB SD cards for SM2 (2 per unit)	22	20.69	\$455
Song Meter - D batteries (4 per unit*2 months)	88	0.92	\$81
Analysis of song meter data by Conservation Metrics (NESH & HAPE)			\$12,371
SUB-TOTAL			\$37,536
Contingency (10%)			\$3,754
PCSU Overhead (16%)			\$6,606
GRAND TOTAL			\$47,896

(Note budget cost would be reduced significantly if First Wind purchases the equipment and pays for helicopter directly as this will negate the 16% PCSU overhead. If that was the case, total would come to **\$42,608**. Also note that helicopter costs are an estimate based on previous work with roving units.)

Kawailoa Bat Mitigation Project at Ukoa Wetland

Capture and Tracking of a Female Hawaiian Hoary Bat from 'Uko'a Wetland June 28, 2013 – July 5, 2013

On 12 June 2013 we started our first of three 15-day Hawaiian Hoary bat mist netting sessions at the Ukoa Wetlands, on the North Shore of Oahu.

Nets and Site Selection

Each night HT Harvey Ecological Consultants and First Wind HCP personnel set up 5 nets at one of 5 locations to sample the perimeter of the Wetland (Figure 1). We deployed a combination of 4 different net sizes: 2.6m x 6m, 2.6m x 9m, and 2.6m x 12m, as well as one 6m x 15m net. Each location had 5 nets placed in suspected flyways to capture bats as they flew along roads or corridors. One of the 5 nets was a 2.6m x 12m net with an Avisoft Ultrasoundgate ultrasonic speaker placed near it broadcasting social calls to lure bats.



Figure 1 - Net and Capture Sites

Each night we opened mist nets at approximately sunset and closed nets 4 hours later. At the net with social call playback, we started broadcasting calls approximately half an hour after sunset and continued until the nets are closed.

Bat Capture

On June 28, 2013 at 22:58 we captured a lactating female Hawaiian Hoary bat at the call playback net at site G, along Kamehameha highway (Figure 1).

After removing it from the net we measured it, took hair and tissue samples, banded it with 3 split bands, attached a radio transmitter and LED light to her back, released her and tracked her very briefly.

Day 1: June 29, 2013

We were able to find her during the day at her roost site (Figure 2). The roost site is located in a small gulch situated between Pupukea and Alapio Roads near Waimea Valley. The gulch had steep walls and consisted of large ironwood trees (*Casuarina equisetifolia*). We were not able to pin point the exact tree that night, but we were able to see her leave the roost area and then tracked her throughout that night. Please note – for all the maps the pins are the location where we were standing when receiving her radio signal. This does not mean that bat was at the exact point, but rather in the area in a known direction from the point.

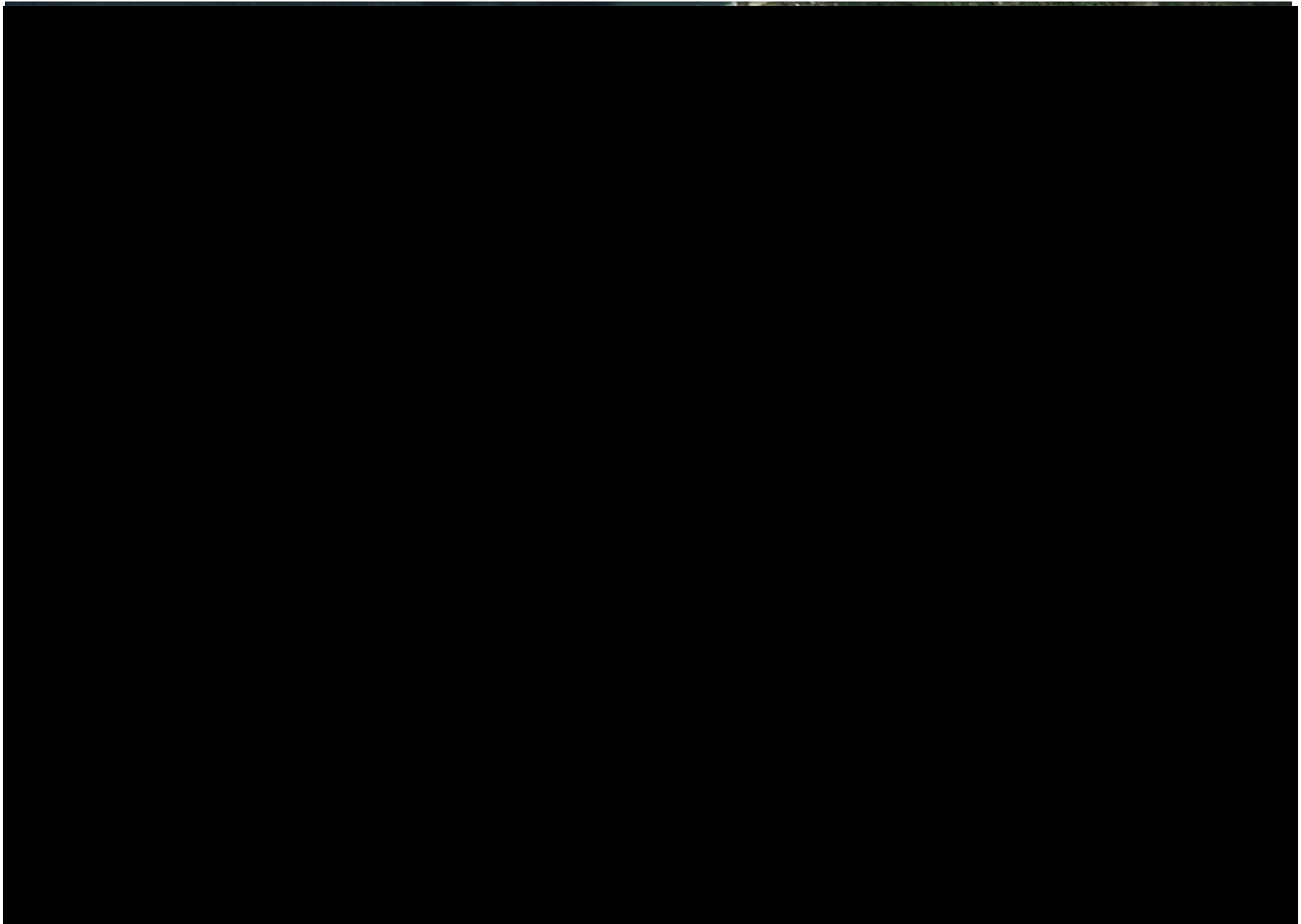


Figure 2 – Activity for night of 6/29

Between 10:48 and midnight she was detected flying near the wind farm probably somewhere between towers 14 and 30. Then she started to fly east. We next found her roosting at the previous day roost tree and determined that she was not actively flying, ending tracking for that.

Day 2: June 30, 2013

We returned to the day roost tree to search for her and her babies and characterize the habitat. We were unable to spot her, but she appeared to start flying at 7:28 pm. She appeared to fly back and forth along the gulch until around 9:00 pm. We weren't getting any movement after 9:00 pm and decided at 10:00 pm that the transmitter must have fallen off.

Day 3: July 1, 2013

We were able to locate her in the day roost tree and see her two pups. They were between 30 to 35 m up a large ironwood tree (35 to 40 m tall) on a small branch that extended to the west. There was not a dense overhead canopy cover as has been found in mainland hoary bat roosts. We then tracked her throughout the night (Figure 3).

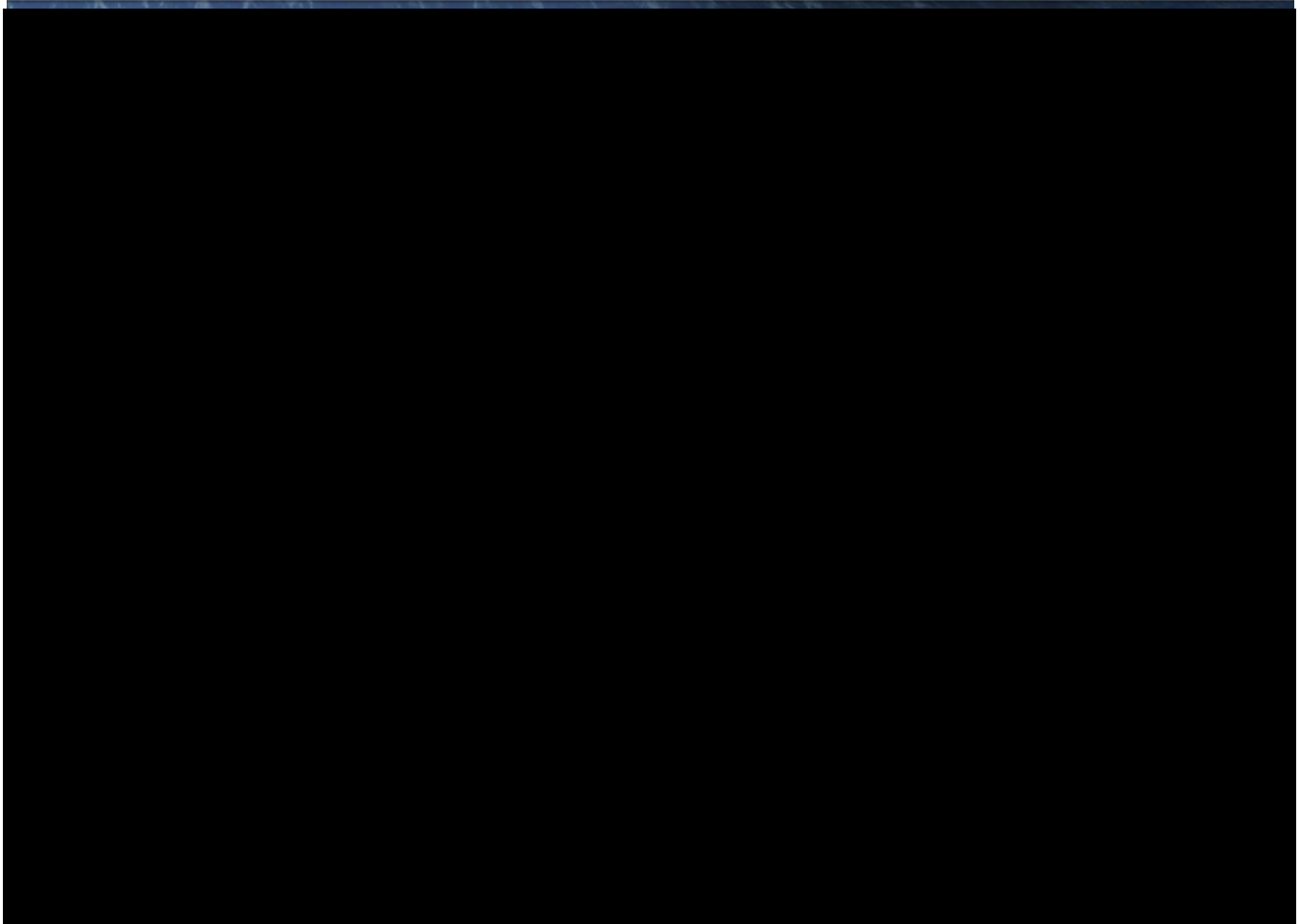


Figure 3 - Activity for night of 7/1/13

We tracked her again to near the Kawailoa wind farm while the winds were very strong. She appeared to be flying low and may have been in one of the gulches for a long time. At 11:49 pm the signal faded and we found her next at midnight at her day roost tree.

Day 4: July 2, 2013

We detected her flying at 7:30 pm and saw her flying over the trees at 7:35 pm (Figure 4). At 7:45 pm we lost the signal and searched for her. We located her at 10:42 pm at the opening to Waimea Valley. Here both tracking teams attempted to triangulate her position. She was flying back and forth along the opening to the valley until 11:40 pm. We were unable to locate the signal again anywhere we checked, including the day roost tree and stopped searching at 12:40 pm.

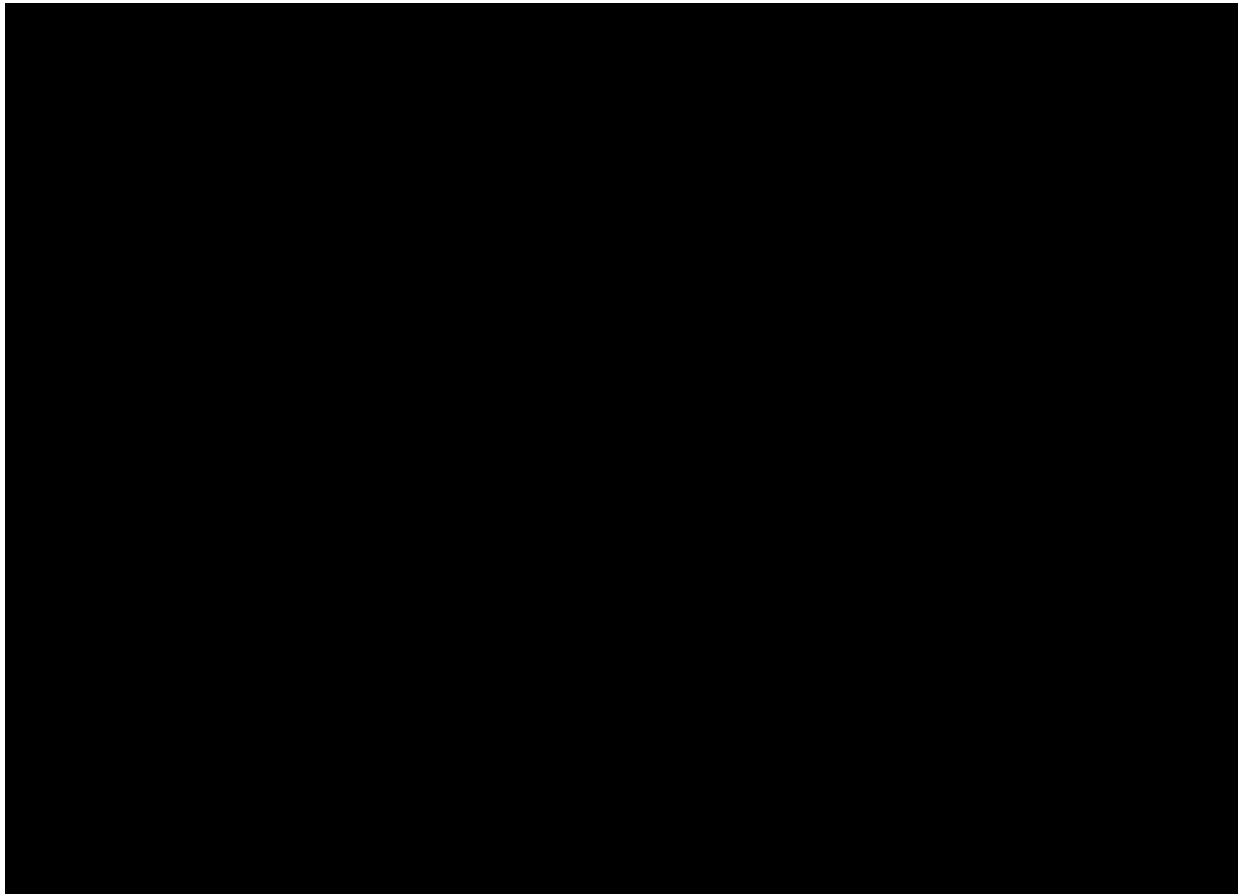
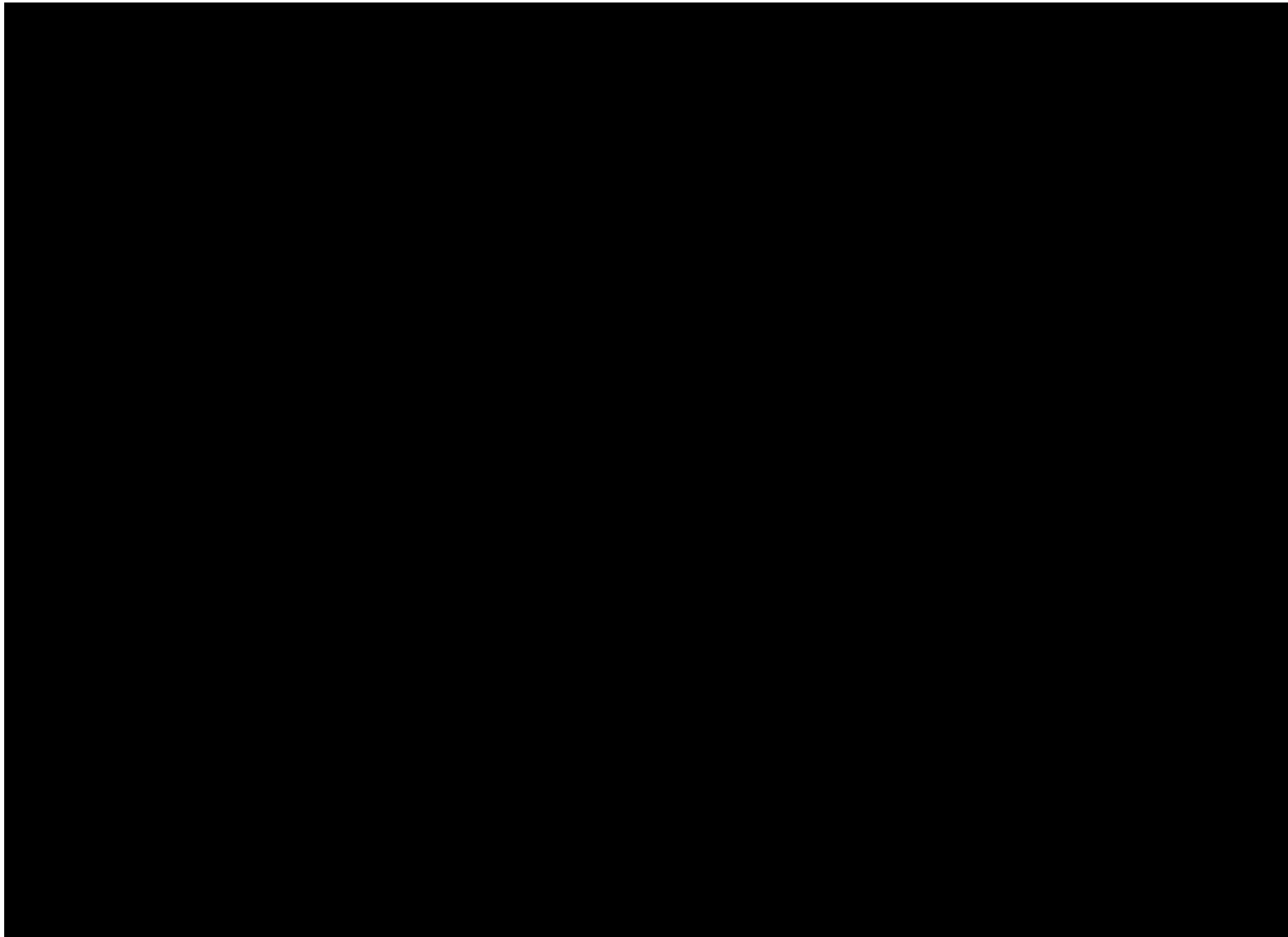


Figure 4 - Activity for night of 7/2/13

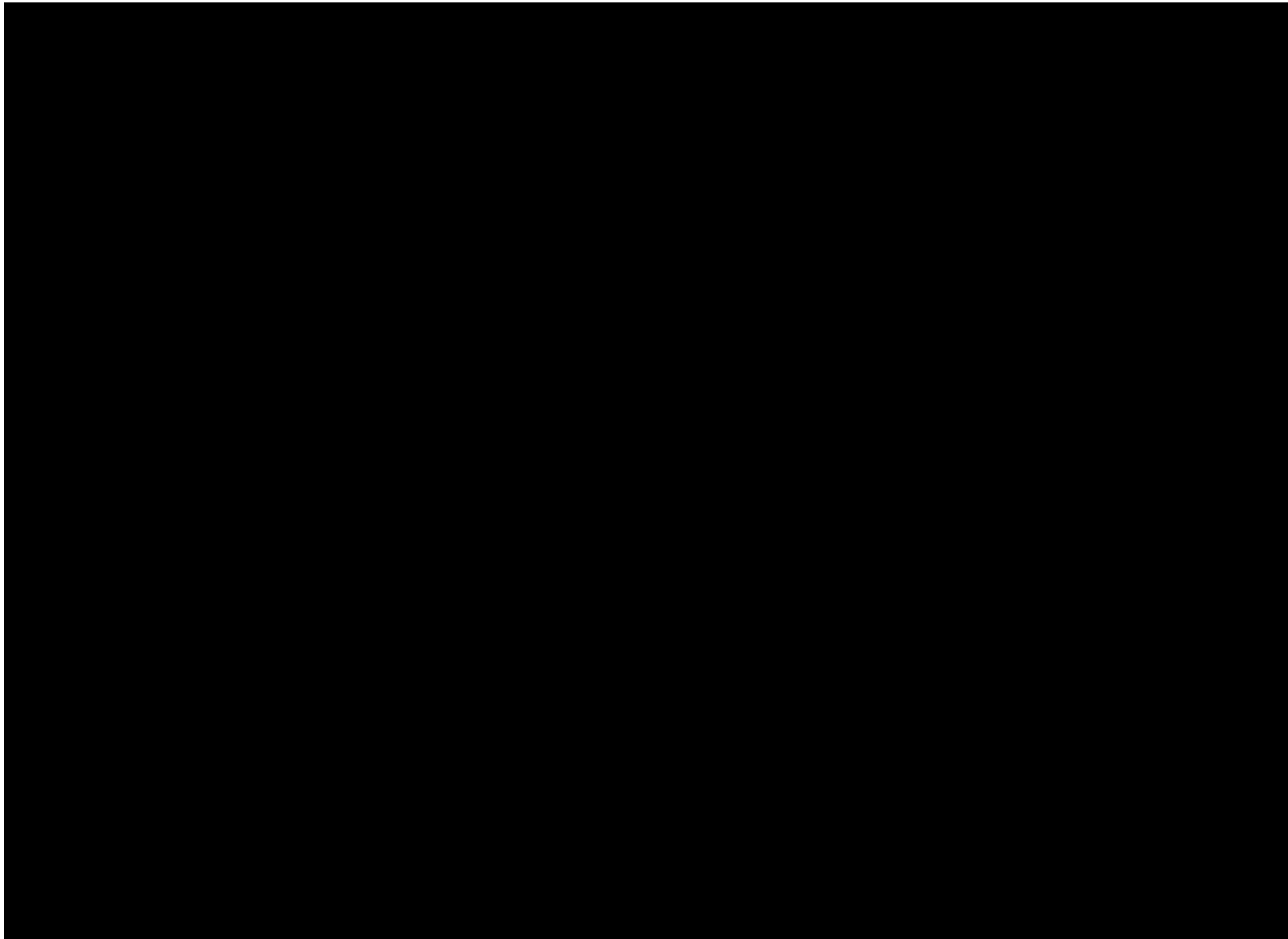
Day 5: July 3, 2013

We returned to the roost at 7:00 pm and were unable to detect a signal. However at 7:30 pm we saw her flying above the roost. The transmitter had finally fallen off which we confirmed with 2 sets of telemetry equipment.

As far as we know, this was the first capture of a bat on Oahu in about 100 years, and the first confirmation that they are breeding on the island. We were able to collect valuable data about her roosting habitat and location, activity patterns, and movement patterns. Below are larger maps of our entire tracking progress from 6/29 – 7/3, and a closer look at the activity near the wind farm.



Map showing capture site, roost site, and tracking efforts from 6-28-13 – 7-2-13. Please note the points are where we were standing at the time of detection. This does not mean the bat was at the exact point, but rather in the area in a particular direction from the point (except for the Roost Site and Capture Site – those both had visual confirmation).



Map of Kawaihoa detections. The pins represent the position of the receiver and the red lines show the direction of reception. Each line is extended to give a better representation of where she might have been based on topography and interference (the longest line stretches 0.5miles).

Appendix 17. Expenditures at KAW in FY 2013.

Category	Item	Amount	Notes
Equipment	4 All-Terrain Vehicles, 1 XUV	63,584	Fatality Monitoring
	1 Tractor, mowers and implements	134,352	Fatality Monitoring
	1 Turf Mower	15,391	Fatality Monitoring
	2 Thermal Video Cameras	17,571	Bat Assessment
	Traps	26,970	Fatality Monitoring
	3 Dog Kennel	13,052	Fatality Monitoring
	Wildlife Acoustics Songmeters	171,916	Fatality Monitoring, Bat Assessment
	Detector supplies	30,000	Bat Assessment
	GPS	3,184	Fatality Monitoring
	NV goggles	3,940	Fatality Monitoring
	Marking posts	13,500	Fatality Monitoring
	Computer for bat data analysis	2,326	Bat Assessment
Contracts	Cat resetting trap payment and Kahoolawe trial	51,145	Goodnature Ltd, Mitigation
	SEEF Trials	500	SWCA, Fatality Monitoring
	Electrofish Permit	2,271	SWCA, Mitigation
	Dog training in California and Oahu	35,750	Mt.View Dog and 3 dog purchase, Fatality Monitoring
	Ukoa Fence and construction	218,480	Pono, materials, Mitigation
	Security for USGS/BCI study	10,000	Haleiwa Yacht Club, Bat Assessment
	Fence quote	2,800	FARE, Mitigation
	DOT fence survey	5,000	Control Point, Mitigation
	DOFAW charge	2,750	Compliance
	Construction compliance	112,511	SWCA, Construction
Supplies	Fuel	20,000	Vegetation Maintenance and Truck
	General Supplies	20,000	Mower parts/repair, bait, signs, PPE, veg man. Supplies, rats, and so much more.
Labor	First Wind Labor	260,000 (salary plus 35% overhead)	for : Fatality Monitoring, Vegetation Management, Scavenger Trapping, Bat Detector Analysis, , Data Management/Reporting, CARE Trials, Machine Maintenance, Overhead
Mitigation	Pueo Mitigation	12,500	Paid to Hawaii Wildlife Rehabilitation Center
Contingency	2 Letters of Credit	67,500	4.5% of \$1,500,000