

Kahuku Wind Power Habitat Conservation Plan FY-2011 Annual Report- Year 1



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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.



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Executive Summary

A Habitat Conservation Plan for Kahuku Wind Power, LLC has been implemented since approval May 27, 2010. A federal Biological Opinion (2010-F-0190) and a Hawaii State Incidental Take License (ITL-10) were approved in May and June 2010, respectively. The official project commission occurred March 23, 2011.

SWCA Environmental Consultants (SWCA) started conducting weekly searches for downed wildlife when the wind turbine generator (WTG) erection phase began in early September, 2010. During December 2010 and January 2011 SWCA and First Wind (FW) biologists marked fatality monitoring search plots to 64 and 96 meters from the wind turbine generators' centers (50 % and 75 % of the maximum turbine and blade height, respectively) and 40 meters from the permanent meteorological tower (50 % of the tower height). Fatality monitoring followed construction phase protocols up until the first WTG's began testing in early January. SWCA and FW began searching the 50 % and 75 % plots on January 6, 2011. We began the HCP required twice weekly fatality monitoring search schedule on January 18, 2011. The inter-search interval for the 50 and 75 % search plots conducted between January 18 and July 1, 2011 was 3.41 and 14.49 days, respectively.

We did not find any fatalities of the 7 bird and 1 bat species listed in the ITL and Biological Opinion (BiOp) through June 30, 2011. One Wedge-tailed Shearwater, 5 doves of 2 species, and 1 Cattle Egret were found dead either scavenged or intact in FY 2011. We also found 1 Wedge-tailed Shearwater alive without injury and 1 alive but permanently injured Great Frigatebird.

In May and June we conducted 2 carcass retention trials using 8 birds and 8 rats and in June 5 searcher efficiency trials using 1 bird and 4 rats. The mean carcass retention for 8 rats was 1.50 days and for 8 birds was 10.37 days, respectively. The mean searcher efficiency for trials conducted in June and July was 43% of 7 small carcasses on pads, 100% of 2 small carcasses offpad, 100% of 2 medium carcasses on pads and 100% of 1 medium carcass offpad. Twelve Anabats detected 5 Hawaiian Hoary bat passes during 1397 detector nights between January 24 and June 30, 2011.

First Wind biologists issued 24 wildlife education trainings in FY 2011. We observed 10 ducks flying over or sitting in the Kahuku Wind Power site.

Kahuku Wind Power contributed \$92,500 and \$25,000 to DOFAW on December 9, 2010 as part of its waterbird and Pueo mitigation obligations, respectively. A Hawaiian Hoary bat mitigation payment to DOFAW of \$25,000 will occur prior to September 23, 2011. Mitigation for Newell's shearwater will occur either on Kauai or Maui; specific measures are currently undergoing evaluation in consultation with DIOFAW and USFWS.

We continually manage vegetation within all the fatality monitoring plots at a frequency between 2-6 weeks. We are adding a third person to the Kahuku Wind Power HCP program to keep pace with vegetation management.

Considering the first carcass retention trial results and the ongoing inter-search intervals for the fatality monitoring plots we may propose reducing the inter-search interval to every other day and implementing predator trapping. We may also propose substituting sub-sampling of the area between the 50 and 75 % search plot perimeters instead of searching the entire area considering data that indicates only a small percentage of fatalities land at such distances after colliding with wind turbines.

Introduction

This report summarizes the work performed by Kahuku Wind Power under the terms of the Habitat Conservation Plan (HCP) and pursuant to the obligations contained in the project's Incidental Take License (ITL-10) and Biological Opinion (2010-F-0190) at the conclusion of the 2011 State of Hawaii fiscal year (July 2010-June 2011, Year 1).

The BiOp and ITL were issued for the project in May and June, 2010, respectively. The species listed in the ITL and biological opinion are seven federally listed threatened and endangered species and one 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 sandwicensis*), Newell's shearwater or 'a'o (*Puffinus auricularis newelli*), Hawaiian petrel or 'ua'u (*Pterodroma sandwichensis*), Hawaiian hoary bat or 'ope'ape'a (*Lasiurus cinereus semotus*) and the Hawaiian short-eared owl or Pueo (*Asio flammeus sandwichensis*), respectively.

Kahuku Wind Power began construction shortly after the ITL and BiOp issuance, including initiation of monitoring and mitigation measures as prescribed by the HCP. During construction Kahuku Wind Power retained SWCA Environmental Consultants to assist with monitoring and compliance as prescribed under the HCP and consistent with other environmental permit requirements. In December 2010 First Wind hired a Senior Wildlife Biologist (Mitchell Craig), followed by a Wildlife Technician in January 2011 (Matthew Wickey).

SWCA completed pre-construction and construction-phase HCP compliance and environmental oversight on February 22, 2011. Kahuku Wind Power was commissioned for operation on March 23, 2011.

Expenditures

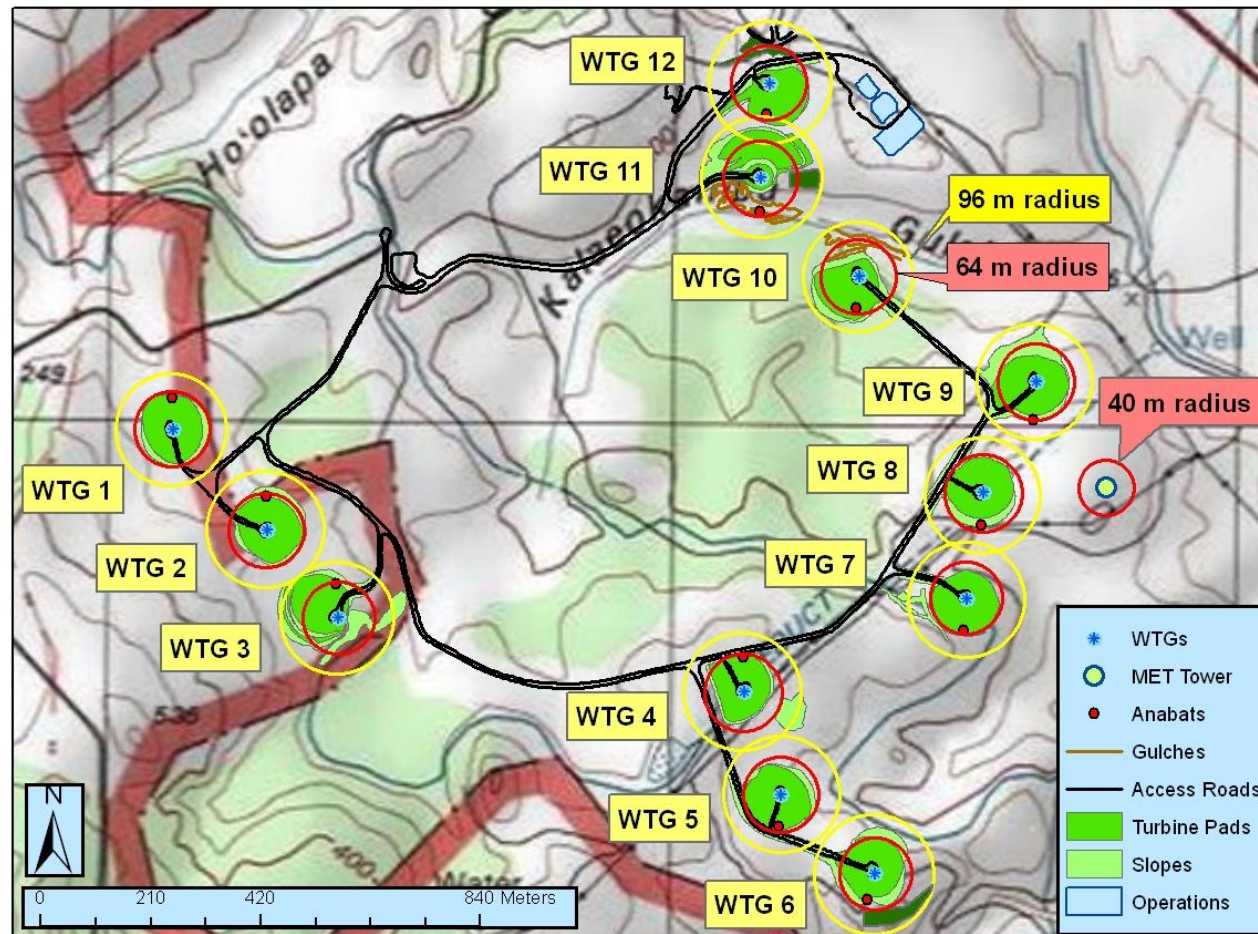
Kahuku Wind Power executed two Letters of Credit (LCs) of \$500,000 each on October 21, 2010 to fulfill the contingency fund requirements under the HCP. Both LCs name the State of Hawaii Division of Forestry and Wildlife (DOFAW) as the beneficiary.

First Wind fulfilled part of its initial mitigation obligation under the HCP with a Memorandum of Agreement and payments made on December 9, 2010 to DOFAW of \$92,500 for waterbird mitigation and of \$25,000 for Pueo research. A payment of \$25,000 will be made prior to September 23, 2011 to support Hawaiian Hoary Bat habitat enhancement at Kahikinui, Maui. Details for HCP expenditures are in Appendix 8.

Fatality Monitoring

SWCA started conducting weekly searches for downed wildlife when the wind turbine generator (WTG) erection phase began in early September, 2010. These searches were on all the graded flat areas (pads) beneath and around the WTG structures and the permanent meteorological tower (MET).

By the end of December 2010 the basic downed wildlife search plot perimeters and transect markers had been established. WTG search plot perimeters measure 64 and 96 meters from the base of the turbines, corresponding to 50 % and 75 % of the maximum rotor-swept height of the WTGs. The permanent meteorological tower (MET) is searched to a distance of 40 meters from the base, which corresponds to 50 % of its height (Figure 1).



Kahuku Wind Power

Figure 1. Kahuku Wind Power roads, operation's buildings, WTG's, MET tower, fatality monitoring plots and Anabat locations.

The fatality monitoring schedule, as stipulated by the HCP, is twice weekly for all WTG's and the MET tower. The full schedule takes two weeks to complete. In both weeks the first weekly search of all WTG's and MET tower plots is only within the 50 % perimeter. The second weekly search for both weeks is of 6 WTG's within the 50 % perimeter and the MET tower and 6 WTG's within the 75 % perimeter. In the second week of the two-week monitoring schedule and during the second weekly search the 6 WTG's that were searched only within the 50 % perimeter the previous week are now searched out to the 75 % perimeter and the 6 WTG's that had been searched out to the 75 % perimeter the previous week are now searched only within the 50 % perimeter. Using this search schedule all 12 WTG's and the MET tower are searched out to at least the 50 % perimeter twice a week and all 12 WTG's are searched out to the 75 % perimeter every 2 weeks.

The marked straight-line transects within the search plots are spaced every 14 meters (Figure 2). When searching plots we follow these transect markers and unmarked transects half way between these markers so that the maximum distance between searched transects is 7 meters. Searching is conducted either by foot or all terrain vehicles (ATVs), by one or two persons. Slopes that are too steep to drive with ATV's are always walked horizontally along the slopes following transects that are also no greater than 7 meters apart.



Figure 2. Transect marking stakes at Kahuku Wind Power WTG 2. Staked rows are 14 meters apart.

Kahuku Wind Power operations began limited testing of WTG's on January 6. At this time First Wind and SWCA biologists began searching plots to 75 % for WTG's that were tested during the previous week. Between January 6 and January 18, WTG's spun intermittently and we did not conduct scheduled searching of a specific WTG if that WTG had not spun since the previous scheduled search. We began the full search schedule of all turbines January 18 (Appendix 1). SWCA biologists had discontinued assisting with fatality plot searches by Feb. 23.

Figure 3 shows inter-search intervals for the 50 % and 75 % search plots for each WTG and the MET tower search plot during the period between January 18 and July 1, 2011. The mean search interval for the 50 % and 75 % plots is 3.41 days and 14.49 days, respectively.

WTG#	50%	75%
1	3.41	14.00
2	3.41	13.92
3	3.41	13.92
4	3.43	14.58
5	3.43	14.58
6	3.41	14.50
7	3.41	14.58
8	3.39	14.58
9	3.39	15.18
10	3.41	15.27
11	3.41	15.27
12	3.41	13.54
MET	3.39	
Mean Interval	3.41	14.49

Figure 3. Inter-search Interval (days) for 50 and 75 % fatality monitoring search plots from January 18 to July 1 at Kahuku Wind Power.

Fatalities and Injuries

We didn't find any fatalities of the 8 species listed in the ITL during FY 2011. A Wedge-tailed Shearwater (WTSH) fledgling was found alive and unharmed next to the operations building November 28, 2010 (Appendix 2). This bird was delivered to a rehabilitation facility located at Sea Life Park on Oahu and subsequently released. A WTSH carcass was found on December 3, 2010 on bare ground 68 meters from the base of WTG 11 (Appendix 3).

Between January 6 and June 30 First Wind biologists found 6 dead birds (Figure 4). These included 5 doves and 1 Cattle Egret (CAEG) (Appendix 3). A local rancher associated with the Kahuku Wind Power land lease found 1 injured Great Frigatebird (GRFR) 168 meters from WTG 1. This GRFR was delivered to a veterinary hospital for care (Appendix 4). Veterinarians deemed this GRFR unreleaseable and the GRFR currently lives at Sea Life Park on Oahu.

Bird Type	Date	Location	Distance from WTG (meters)	Condition
Dove	2/4/11	WTG 9	0.3	Not Scavenged
Dove	2/8/11	WTG 11	1.0	Not Scavenged
Dove	2/11/11	WTG 11	1.0	Scavenged
Cattle Egret	2/24/11	WTG 8	13.0	Not Scavenged
Dove	4/15/11	WTG 9	10.0	Scavenged
Dove	4/22/11	WTG 12	1.5	Not Scavenged

Figure 4. Fatalities found at Kahuku Wind Power between January 6 and June 30, 2011.

Carcass Retention Trials

We possess state and federal wildlife collection permits for Kahuku, numbers WL13-02 and MB40087A-0, respectively. For Carcass Retention Trials (CARE) and Searcher Efficiency Trials (SEEF) we assign carcasses to three size classes; small, medium, and large. Rats are used as surrogates for bats and represent the small size class. WTSH's and small chickens represent Coots, Moorhens, Shearwaters and Petrels in the medium size class. Ducks such as Scaups and Mallards represent Pueo and Hawaiian/Mallard Ducks in the large size class. WTSH carcasses originally came from Sea Life Park on Oahu. Rats came from Layne Laboratories, Inc. in California, a pet food company. We specifically request rats from Layne Labs that are brown and/or black and the small size category (40 grams in mass and 4.5 inches in length) to approximate the body size and weight of Hawaiian Hoary Bats. Various species of ducks were provided by the USDA-APHIS in Alaska and small black chickens are obtained locally for use in future trials.

We conducted 2 CARE trials in May and June (Appendices 5 and 6). Each trial consisted of 4 birds and 4 rats. The mean CARE result for 8 rats was 1.50 days and for 8 birds was 10.37 days (Figure 5). We considered an avian carcass "present" until < 10 of its body feathers or < 2 of its wing feathers remained.

Carcass Type	Rat	Birds
Retention (days)	3	14
	2	14
	1	14
	2	13
	2	9
	0	0
	2	5
	0	14
Mean Retention (days)	1.50	10.37

Figure 5. Carcass Retention Trials at Kahuku Wind Power in May and June.

We use two motion sensing cameras (Moultrie Digital Game Cameras) during CARE trials in an attempt to record carcass scavenging. Photos taken at night show a mongoose and a cat scavenging trial carcasses (Figures 6 and 7). A Common mynah was photographed during the day in a swooping posture that suggested it was about to scavenge a rat visible in the foreground of the image (Figure 8). The rat was not seen in photos recorded 5 minutes later (or found anywhere in the vicinity in a subsequent search of the area) suggesting the mynah completely removed the rat. Cattle Egrets have also been recorded in photos near carcasses.



Figure 6. A mongoose visiting a CARE trial carcass near WTG 3 at Kahuku Wind Power.



Figure 7. A feral cat eating a WTSH carcass near WTG 4 at Kahuku Wind Power.



Figure 8. A Common mynah visiting a rat carcass (in the foreground) near WTG 1 at Kahuku Wind Power.

Searcher Efficiency Trials

SWCA has been contracted to independently conduct SEEF trials at Kahuku. SWCA generated random locations within all WTG and MET tower search plots for carcass placement in 2 vegetation classes, Pads and Offpads (Figure 1). Pads are the flat, graded areas immediately around the WTG's that are consistently mowed every 2-3 weeks to maintain grass as short as 2.25 inches. Offpads are all other areas outside the pads including graded slopes leading away from the pads and all other ungraded but managed areas also outside the pads. The vegetation in the offpad areas ranges from 3 inches to 4 feet tall.

SWCA personnel place carcasses in the pre-selected random locations on site in the morning before First Wind biologists arrive. First Wind operations personnel verify that carcasses are still in place after fatality searches are complete and provide SWCA with this information. First Wind operations personnel are also directed to place carcasses according to the GPS locations provided by SWCA. We are attempting to use 20 carcasses per year in each of the 6 vegetation/size class combinations for a total of 120 carcasses each year.

In June and July, 14 small and medium carcasses were placed in the 2 vegetation types. Although July is in FY 2012 we include those results now. Two rats (small carcasses) had been scavenged before the proctor returned to confirm the rats were present during the trial and therefore were removed from the trials. Searchers and non-searchers found 3 of 7 small carcasses on Pads (43%), 2 of 2 small carcasses Offpad (100%), 2 of 2 medium carcasses on Pads (100%) and 1 of 1 medium carcass Offpad (100%) (Appendix 7).

Hawaiian Hoary Bat Monitoring

Kahuku Wind Power biologists have deployed 12 Titley Scientific Anabat ultrasonic bat detectors (models SD1 and SD2) on site since January 2011 (locations shown in Figure 1). Each detector is approximately 55 meters from each WTG either north (facing southwest) or south (facing northwest) attached on wood or

metal poles and positioned 2 meters from the ground. Five passes were detected at four of these 12 locations, all in June (Figure 9).

Anabat Location (WTG)	Date Range		Passes	Detector Nights	Passes per Detector Night
1	1/24	6/30		108	
2	1/23	6/30		147	
3	3/6	6/30		117	
4	1/26	6/30		133	
5	2/20	5/12		47	
6	2/18	6/22		113	
7	2/20	6/30	1	131	0.008
8	2/18	6/30	2	134	0.015
9	2/20	6/30		128	
10	3/8	6/28	1	54	0.019
11	1/26	6/30		129	
12	1/26	6/30	1	156	0.006
Total			5	1397	0.004

Figure 9. Hawaiian Hoary Bat passes at Kahuku Wind Power in 2011.

In late August, 2011 Kahuku Wind Power will host a USGS team from the Pacific Islands Ecosystem Research Center that will be testing a newly developed near infrared motion detecting video surveillance system (NIRV). Each system consists of two near infrared (NIR) lights illuminating a specific WTG's rotor swept zone (RSZ) and a video camera placed about 100 meters away on the ground pointing into the NIR-illuminated RSZ. This video uses filters for NIR light and constantly records images to a computer. These images are then subjected to motion detecting software designed to trace and determine direction and velocity of any moving objects other than the WTG blades or twinkling stars. This NIRV testing is in partial fulfillment of the HCP compliance requirement that Kahuku Wind Power use some form of infrared monitoring to develop a better understanding of bat presence in the RSZ, interaction probability, behavior, and whether additional measures may further minimize risk.

Wildlife Education and Observation Program

Prior to First Wind taking over full-time monitoring and compliance duties at Kahuku, SWCA provided Wildlife Education and Observation Program (WEOP) training to all personnel involved in the construction and early pre-operational phases of the project. First Wind biologists began implementing WEOP trainings on February 15 for all permanent or transient personnel on site. Twenty-four WEOP training orientations have been administered since that time.

On 3 occasions Mitchell Craig observed ducks transiting or visiting portions of the site; January 28 (3 flying), February 21 (5 flying), and March 22 (2 resting in ephemeral puddle at WTG 8). The ducks observed on

March 22 were probably attracted to the standing water after a period of heavy rainfall saturated most of Oahu. Other than the Anabat detections, no other HCP- or ITL-covered species were documented at the Kahuku Wind Power site during this reporting period.

Mitigation

Newell's Shearwater

According to the HCP, mitigation options for Newell's shearwaters include participation in the colony-based protection and/or social attraction project at Makamaka'ole on West Maui, or colony-based protection and management measures on Kauai, possibly in conjunction with the island-wide HCP. A dog-assisted seabird nesting burrow search effort was performed at Makamaka'ole, West Maui in July, 2011. Results from the survey are being assembled alongside a substantial body of information and findings concerning the Makamaka'ole site and incorporated into a mitigation plan for review by the ESRC in September, 2011. However, recent discussions with USFWS and DOFAW suggest that the Makamaka'ole site may be dedicated to providing mitigation for KWP and KWP II, and that mitigation for Kahuku will occur on Kauai. With this in mind, Kahuku Wind Power has initiated discussions with The Nature Conservancy (TNC) and a private landowner on Kauai regarding cooperative management to benefit a known Newell's shearwater colony located within an area currently being managed by TNC for watershed and native plant community protection. Initial indications are positive and a formal proposal is currently in review.

Hawaiian Petrel

The first option for Hawaiian petrel mitigation according to the HCP is likewise closely tied to the mitigation program being developed at Makamaka'ole on the island of Maui. Depending on the capacity of the site this may still be an option. In the event it is not, Kahuku Wind Power has confirmed with the National Park Service that there is still a need for predator control in petrel nesting areas that are currently beyond the Park's capacity to manage.

Waterbirds

In December 2010, Kahuku Wind Power made the first funding disbursement of \$92,500 to DOFAW to provide support for the first of 3 years of waterbird mitigation funding as outlined in the HCP. A portion of these funds were used by DOFAW in July, 2011 to hire a biologist that will conduct waterbird population monitoring, manage vegetation, and control predators at Hamakua Marsh State Wildlife Sanctuary (Jason Misaki, pers. comm.).

Pueo

In December, 2010 Kahuku Wind Power provided \$25,000 in funding to DOFAW to initiate pueo research, as outlined in the HCP. DOFAW indicates that no pueo research has been conducted as of this writing (Santee Hufana, pers. comm.).

Hawaiian Hoary Bat

There has been no bat habitat restoration milestones reported from the Kahikinui mitigation area. DOFAW has indicated that the maximum bat mitigation funding Kahuku Wind Power has agreed to provide

(\$150,000) will be required (Santee Hufana, pers. comm.). Kahuku Wind Power will provide \$25,000 that will be paid to DOFAW prior to September 23, 2011. Assuming Kahikinui continues to be the preferred bat mitigation site, the remaining \$125,000 will be paid in Q3 of FY 2012 (after January 1, 2012).

Vegetation Management

The HCP for Kahuku Wind Power stipulates that the fatality monitoring plots around the WTG's and MET tower be mowed every month. Monitoring staff have acquired 2 commercial turf mowers, a Caterpillar Compact Track Loader (CTL) with a brush cutter attachment, and commercial weed trimmers that facilitate meeting this obligation. Areas around the WTG's that are well-graded and flat (Pads) are mowed every 2-3 weeks to 2.25 inches (Figure 10). Graded slopes that cannot be mowed are weed trimmed to 2-3 inches. Other areas outside the pads and graded slopes (Offpads) are mowed with the turf-mower at 2.25 to 4 inches and /or brush cut-mowed with the CTL to 2 to 5 inches every 3 to 6 weeks. Herbicides (glyphosate) have also been used to retard growth.



Figure 10. WTG 1 pad, slope and offpad at Kahuku Wind Power.

Prior to the end of construction, most trees (primarily Koa Haole, Ironwood, and Christmasberry) were mulched within the fatality plots. Areas with trees remaining post-construction have been gradually removed and chipped over subsequent weeks, with the goal of ultimately making it possible to manage all vegetation within the search plots. The Kalaheokahipu Gulch that passes through the WTG 10 and 11 fatality monitoring plots is considered unmanageable and adjustments to take of covered species will be made to account for fatalities that may occur but are not recovered from this unsearchable area (Figure 11).



Figure 11. Kalaheokahipu gulch near WTG 11 at Kahuku Wind Power.

Adaptive Management:

Considering the low CARE trial results for small carcasses and our current inter-search interval of 3.41 days for the 50 % perimeter fatality monitoring plots, we are considering whether it may be necessary to increase the search frequency even further. Current plans are to conduct at least 2 more CARE trials, then evaluate results and determine whether this may be warranted. If increasing the search frequency is chosen as a way of increasing confidence in monitoring efficiency, then we may propose that all 12 WTG's and the MET tower should be searched within the 50 % perimeter every other day during the monitoring week (Monday, Wednesday and Friday). If CARE trial results for small carcasses continue to be less than the inter-search interval we may also begin predator control efforts with the aim of reducing the numbers and densities of scavengers within some as-yet-undetermined buffer adjacent to the search areas. We assume that by reducing scavenger

population levels in the vicinity of the site, retention times derived from CARE trials may increase, eventually enabling the search interval to be adjusted accordingly.

We may also propose to reduce search effort in the fatality search plots between the 50 % and the 75% search plot perimeters, that is, the area within the fatality monitoring plots that is outside the 50 % perimeter area. Data from wind turbine related fatalities in Hawaii and at other US wind energy sites indicate a relatively small percentage (as low as 10 %) of total WTG fatalities occur outside the 50 % maximum RSZ height. We also propose that by exercising diligent vegetation maintenance in a few smaller sections of the area between the 50 % and the 75% perimeters at each WTG, i.e. sample plots, higher searcher efficiencies can be maintained as opposed to managing the entire outer search area. By this approach the number of fatalities occurring in the area between the 50 % and the 75% perimeters would be estimated from the actual number occurring within the sample plots.

Conclusion

The 20-year wind energy project at Kahuku Wind Power has begun. The downed wildlife search plots have been established at all 12 WTG's and the MET tower. The vegetation around these plots is being maintained regularly and the remaining trees in a few plots are being removed. So far no species listed in the ITL-10 have been found dead or injured. A small number of fatalities of other bird species have been detected.

Bat detectors are in place and an infrared detection system will soon be tested at Kahuku in the near future. Bat detections so far are low relative to the First Wind KWP project on Maui.

Appropriate expenditures have been made to DOFAW for waterbird and Pueo mitigation compliance. Waterbird mitigation activity has begun on Oahu. Mitigation activity for bats, owls, and seabirds has not begun. Appropriate expenditures for bats will be made in FY-2012 quarters 1 and 2, respectively. Seabird mitigation options are being investigated and are expected to be determined by the end of the 2011 calendar year.

Scavenger activity at the Kahuku Wind Power site appears to be heavy and is affecting carcass retention times such that scavenger control and increased searching frequency will likely be implemented to increase recovery rates of any fatalities.

Vegetation management to an extent that constantly allows high search efficiency for the full 75 % of maximum RSZ height search plots is very labor intensive. Considering the likelihood that only a small percentage of fatalities actually fall in between the 50 % and the 75 % search plot perimeters, searching sample plots in this outer area or not searching this area at all and adjusting take accordingly, may be a practical alternative to intensive vegetation maintenance in this outer area.

Appendix 1.

Fatality Monitoring Plot Search Dates at Kahuku Wind Power in 2011 (black colored dates are searches within the 50% perimeter, red are within the 75% perimeter).

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

Appendix 2.

Kahuku Wind Power, LLC Habitat Conservation Plan – Downed Wildlife Incident Documentation Form:

Wedge-tailed Shearwater 11-28-10

Observer Name:	Ron Magargee
Date:	11/28/2010
Species (common name):	Wedge-tailed Shearwater (fledgling)
Time Observed (HST):	12:00 11/28/2010
Time Initially Reported (HST):	13:00 11/28/2010
Time Responders Arrive (HST):	13:00 11/29/2010
Time of Arrival at Rehabilitation (HST):	15:30 11/29/2010
Location:	Battery Energy Storage System (BESS) facility
GPS Coordinates (specify units and datum):	21° 41.223' N 157° 58.312' W
Date Last Surveyed:	N/A
Distance to nearest light source (m):	Approximately 46 to lights at substation
Ground Cover Type:	Bare ground
Wind Direction and Speed (mph):	East 5-10
Cloud Cover (%):	Partially cloudy
Cloud Deck (magl):	
Precipitation:	0
Temperature (°F):	77

Condition of Specimen: No injuries, apparently in good condition. The bird was hiding in a shaded corner out of direct sunlight behind some PVC pipes on the south-west facing side of the BESS building (Fig. 1).

Probable Cause of Injuries and Supportive Evidence: The location where the shearwater was discovered adjacent to the substation facility suggests the shearwater may have been downed due to light attraction (Fig. 2). Work was in progress at the adjacent substation on Saturday night, 11/27/2010 and lights were on for the duration of work (entire night) and some rain was reported. No birds were observed by the workers in the area.

Action Taken: Contract engineers working at the substation and BESS facilities reported that they first noticed the bird on Sunday, 11/28/2010, in the location the bird was later recovered (Fig. 3). The supervisor on site, Marty Masters (RMT, Inc.) reported the shearwater to Kahuku Wind Power officials Sunday afternoon by leaving a verbal message at the construction office. He also reported the observation to the on-site environmental consultant, SWCA biologist Ling Ong, on Monday afternoon at 1:00 pm, 11/29/2010. All of the Kahuku Wind Power staff and contractor personnel receive training and orientation to the HCP along with written material describing downed wildlife response procedures, and which contain phone numbers of key environmental personnel. SWCA immediately contacted Kahuku Wind Power biologists and agency notifications proceeded. Sandee Hufana (DOFAW) and James Kwon (USFWS) were notified of the incident by phone on Monday afternoon at 1:30 pm. A short time later, at the direction of Scott Fretz (Wildlife Program Manager, DOFAW), SWCA biologists carefully placed the Wedge-tailed shearwater in a well ventilated box and transported the bird to Sea Life Park, where it was received and examined by trained wildlife rehabilitators at 3:30 pm. The Team Leader for Seabird Rehabilitation at Sea Life Park, Sandra Bingham determined that the bird had no injuries and was in good condition. The bird was retained by Sea Life Park officials overnight and released the following morning on 11/30/2010.



Figure 1. Wedge tailed Shearwater.

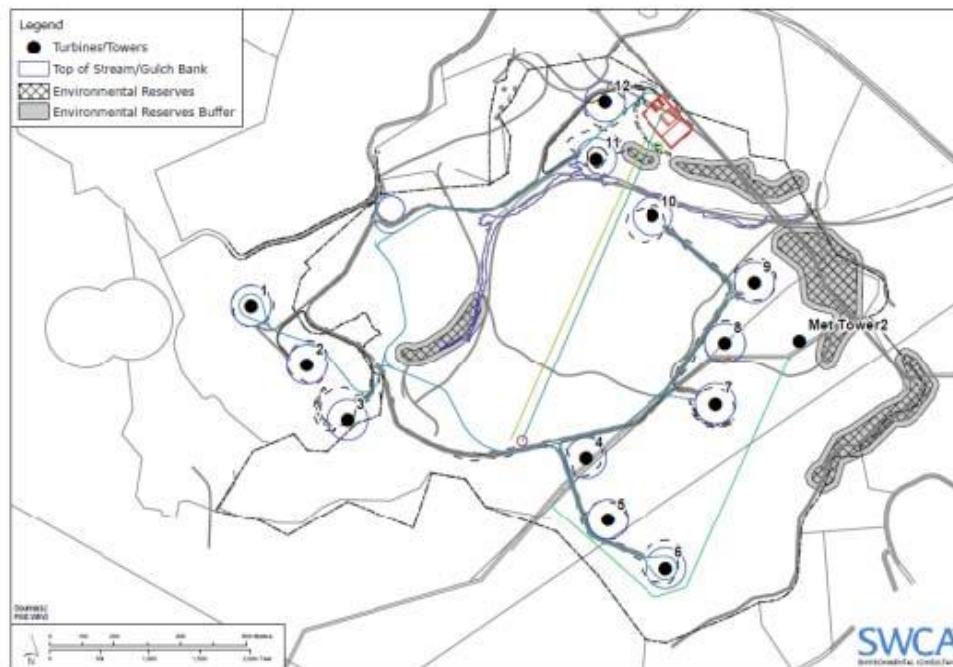
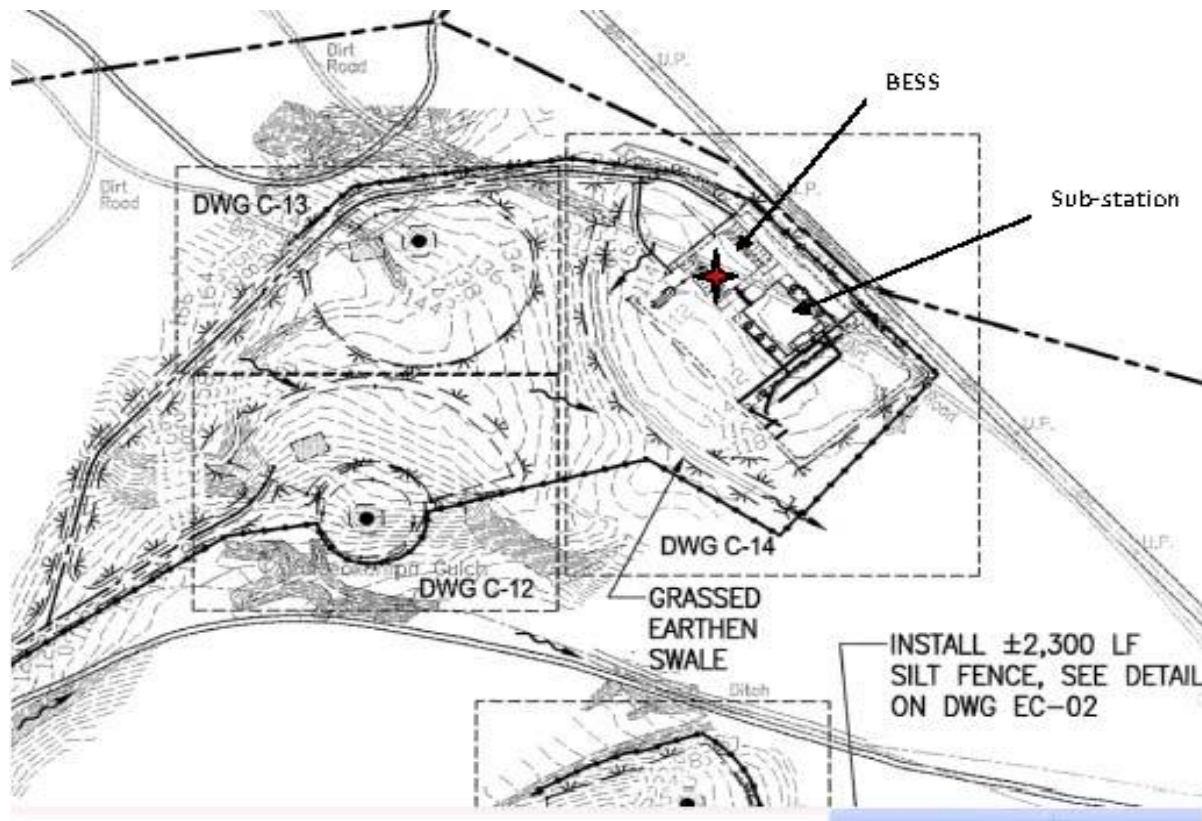


Figure 2. Kahuku Wind Power Site map.



✦ Location of Wedge-tailed shearwater

Figure 3. Location of downed bird.

Subsequent Follow-up Actions

The HCP prescribes, under Avoidance and Minimization Measures that, where feasible, minimizing night-time construction activities to avoid the use of lighting that could attract seabirds and possibly bats and, use of minimal on-site lighting at buildings and using shielded fixtures that will be utilized only on infrequent occasions when workers are at the site at night. Kahuku Wind Power biologists are working with the construction team to determine whether additional shielding or fixtures can be employed to reduce light attraction risk at site facilities including the substation and BESS.

Construction engineers have indicated that additional night work may be necessary near the substation over the next 1-2 weeks. Prior to commencing further night work potential sources of light attraction will be evaluated to ensure that shielding is adequate and unnecessary lights removed from service. As prescribed in the HCP, a biologist will be present during night work that may require lighting in order to document the presence of birds and/or bats, and to issue lights out notification to work crews if necessary.

Appendix 3.

Kahuku Wind Power LLC Habitat Conservation Plan – Downed Wildlife Incident Documentation Form:
 Wedged-tailed Shearwater 12-3-2010

Date:	12/3/2010
Type of Discovery:	Incidental
Discovered by:	Steve Yoshida
Affiliation:	Siemens Engineering (contractor)
Species (Common name):	Wedge-tailed Shearwater (fledgling)
Time Discovered (HST):	21:00 12/3/2010
Time Initially Reported to Agencies (HST):	11:00 12/4/2010
Time Agency Responders Arrive/Advise (HST):	12:40 12/4/2010
Location Description:	In the middle of the access road to WTG 11
GPS Coordinates:	21° 41.171' N 157° 58.471' W
Date Last Surveyed:	11/30/2010
Distance of Carcass to Base of Nearest WTG:	68 m (WTG 11)
Bearing of Carcass from Base of Nearest WTG:	272°
Ground Cover Type:	Bare ground
Wind Direction and Speed (mph):	East 15-20
Cloud Cover (%):	10
Cloud Deck (magl):	-
Precipitation:	0
Temperature: (°F)	78
Condition of Specimen: Recently dead; no evidence of insects or decomposition. No external trauma or broken tissue observed (Fig. 1).	
Probable Cause of Injuries and Supportive Evidence: The location of the WTSH directly downwind of WTG 11 suggests it may have collided with the stationary turbine. Limited construction work lights were on from 18:30 to 20:30 on 12/3/2010 around the base of the overhead transmission line poles where work was being conducted (Fig. 2). It is possible the bird may have been attracted to the vicinity by these lights. SWCA biologists were on site for the duration of the night work and no birds or bats were observed around the lights.	

Sequence of Events: • Steve Yoshida (Siemens employee) found the shearwater at 21:00 on 12/3/2010. He called Ron MacGargee (RMT construction employee) at 21:30 12/3/2010; • Ron reported it at the POD (plan of the day meeting) the next day (12/4/2010) at 06:30 to Pat Ringler (RMT construction supervisor), who notified Jon Johnson (First Wind construction manager) and SWCA (environmental compliance consultant); • Ling Ong (SWCA) was emailed by Jon at 07:30 and also called by Pat around 08:20; • Ling arrived on site and began gathering documentation of the incident at 12:30; • Ling contacted Jason Misaki (DOFAW biologist) by phone at 12:40. Jason directed Ling to collect the shearwater carcass and place it in the on-site freezer until further notice; • Ling subsequently inspected each of the WTG pads and facilities at Kahuku and did not find any other birds; • Night work was suspended at the Kahuku site for the next two nights, all lights off and gates locked during that time. Indoor night work only was subsequently allowed to proceed, with all outdoor lighting turned off.



Figure 1. Downed Wedge-tailed Shearwater.

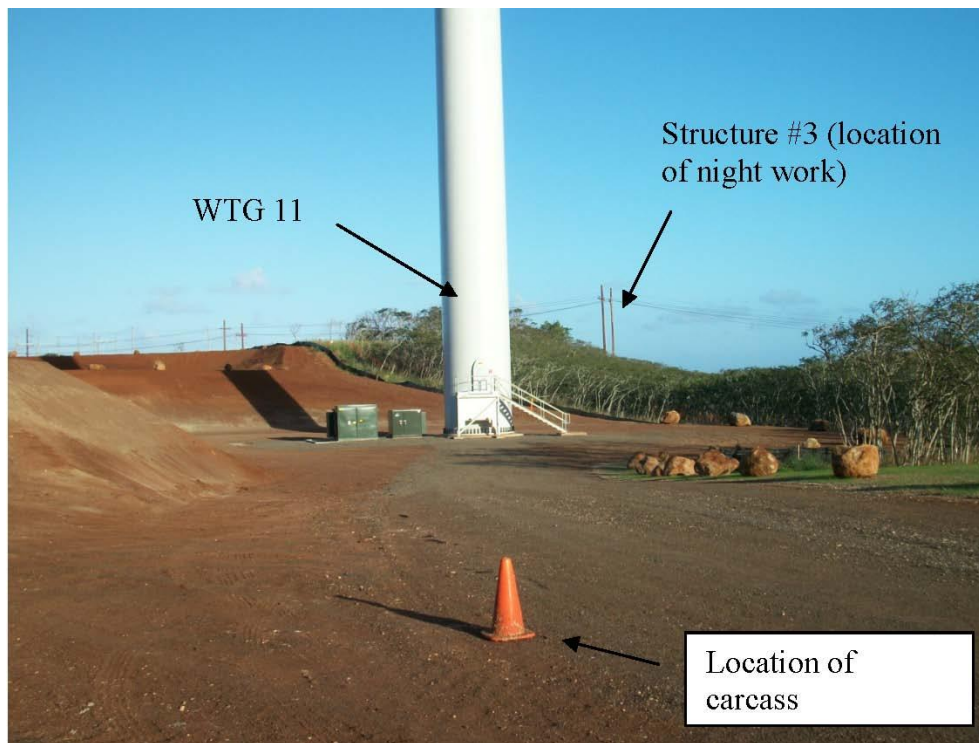


Figure 2. Photo of the carcass location looking ESE relative to light source and WTG 11.

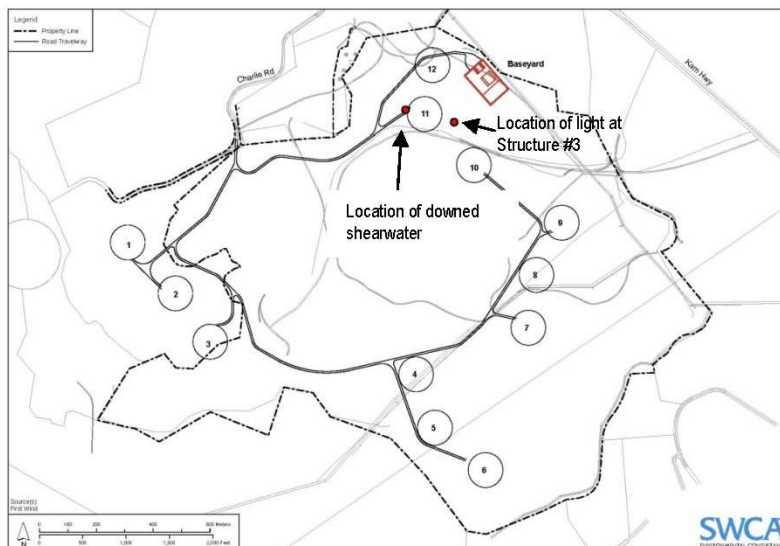


Figure 3. Site map showing the locations of key features.

Additional information relevant to the incident

This incident occurred just 2 days after an earlier incident involving a downed, but uninjured, Wedge-tailed shearwater. Light attraction was considered a possible factor in the previous incident due to ongoing night work in the vicinity of the substation facility. First Wind immediately advised all contractors that night-time work would be limited to time-critical activities and outdoor lighting be restricted to the minimum necessary, and directed downward. In addition, SWCA biologists were assigned to monitor all activities associated with night work. During the time the incident occurring no birds or bats were observed in the immediate or surrounding area while work was underway.

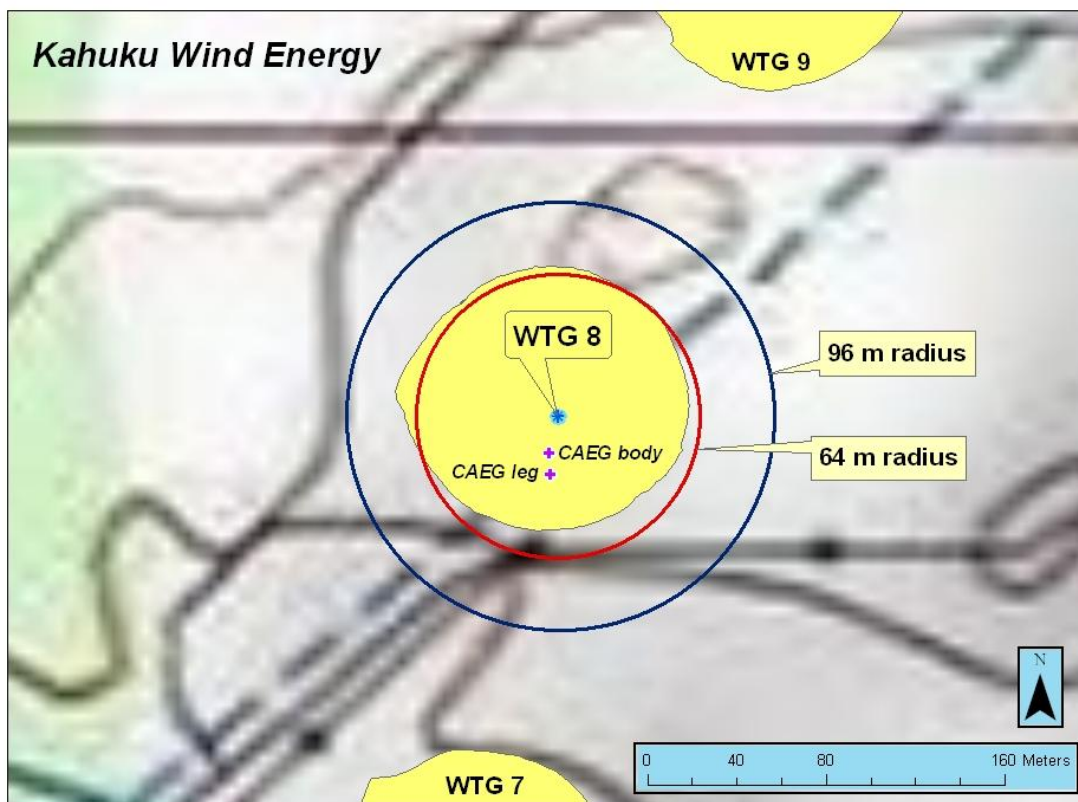
Wedge-tailed shearwaters on Oahu are currently fledging and numerous birds are taking their first flight from breeding colonies on the North Shore. At the same time, the Hawaiian Islands have been experiencing unusually strong NE (onshore) trade winds coincident with a new moon. Under these circumstances, fledglings departing the colonies are getting blown onshore where they become more susceptible to light attraction and downing. Indeed, in the course of three days during the period in which both these incidents occurred, over 100 downed Wedge-tailed shearwater fledglings were recovered by members of the community and delivered alive to Sea Life Park, where the majority of birds received care and were subsequently released (S. Bingham, pers. comm.).

Night work was suspended at Kahuku for the next two nights following the second incident, and all lights were turned off and gates locked during that time. Night work has subsequently been allowed to proceed **indoors only**, with all outdoor lighting turned off.

Appendix 4.

Kahuku Wind Power, LLC Habitat Conservation Plan. Downed Wildlife Incident Reporting Form –
Cattle Egret 2-24-11

Observer Name	Paul Crossland
Date	February 24, 2011
Species (common name)	Cattle Egret
Time Observed (HST)	09:30
Time Initially Reported (HST)	
Time Responders Arrive (HST)	
Location	WTG 8
GPS Coordinates (specify units and datum)	21° 40'51" N, 157°58'12" W WGS84/UTM
Date Last Surveyed	February 23, 2011
Distance to Base of nearest WTG (m)	13
Bearing from Base of nearest WTG	South
Ground Cover Type	Bare
Wind Direction and Speed (mph)	South, 5-10
Cloud Cover (%)	10
Cloud Deck (magl)	>1000
Precipitation	0
Temperature (°F)	75
Condition of Specimen: Fresh. One leg was completely severed. The severed leg was 10 meters from the body (23 m from the turbine base).	
Probable Cause of Injuries and Supportive Evidence: Contact with turbine blade- severed limb.	
Action Taken: First Wind construction manager Paul Crossland found this carcass and immediately reported to Mitchell Craig at 09:30, February 24, 2011.	



Cattle Egret fatality at WTG 8, 02-24-11

Figure 1. Location of the Cattle Egret.



Figure 2. Dead Cattle Egret at WTG 8.



Figure 3. Cattle Egret leg severed.

Appendix 5.

Carcass Retention Trial A at Kahuku Wind Power (Carcass Type abbreviations: WTSH=Wedge-tailed Shearwater, SPDO=Spotted Dove, CAEG=Cattle Egret, ZEDO=Zebra Dove; Notes abbreviations: F=feathers, W=wing, B=body, M=moved, <>10=less than or greater than 10 body feathers, SCAV 1 or 2= first or second scavenging event).

CARE #		A1		A2	A3		A4	A5	A6	A7	A8
Carcass Type		WTSH		RAT	SPDO		RAT	CAEG	RAT	ZEDO	RAT
WTG#		1		2	4		5	7	8	10	11
Vegetation, Distance from WTG	Pad, 40 m										
day 0	4/15	Present	Notes	Present	Present	Notes	Present	Present	Present	Present	Present
day 1	4/16	Present		Present	Present		Present	Present	Present	Present	Present
day 2	4/17	Present		Present	Present		Present	Present	ABSENT	Present	Present
day 3	4/18	Present		Present	Present		ABSENT	Present		Present	ABSENT
day 4	4/19	Present		ABSENT	SCAV 1	F(WB)		Present		Present	
day 5	4/20	SCAV 1	F(ALL)		Present	F(WB)		Present		Present	
day 6	4/21	SCAV 2	F(WB)		Present	F(WB)		Present		Present	
day 7	4/22	Present	F(WB)		Present	F(WB)		Present		Present	
day 8	4/23	Present	F(WB)		Present	F(B)		Present		Present	
day 9	4/24	Present	F(WB)		Present	F(B)		Present		Present	
day 10	4/25	Present	F(WB)		Present	F(B)		Present		Present	
day 11	4/26	Present	F(WB)		Present	F(B)		Present		Present	
day 12	4/27	Present	F(WB)		Present	F(B)		Present		Present	
day 13	4/28	Present	F(WB)		Present	F(B)		Present		Present	
day 14	4/29	Present	F(W,>10B)		Present	F(>10B)		Present		ABSENT	
Retention (days)		14		3	14		2	14	1	13	2

Appendix 6.

Carcass Retention Trial B at Kahuku Wind Power (Carcass Type Abbreviations: WTSH=Wedge-tailed Shearwater; Notes abbreviations: F=feathers, W=wing, B=body, M=moved, <>10=number of body feathers, SCAV 1 or 2= first or second scavenging event).

CARE #		B1	B2		B3	B4		B5		B6		B7	B8	
Carcass Type		RAT	WTSH		RAT	WTSH		RAT		WTSH		RAT	WTSH	
WTG#		1	3		4	6		8		9		11	12	
Vegetation, Distance from WTG	Off-Pad, 60 m													
day 0	6/7	Present	Present	Notes	Present	Present	Notes	Present	Notes	Present	Notes	Present	Present	Notes
day 1	6/8	Present	Present		ABSENT	SCAV 1, ABSENT	F(<10B)	Present		Present		ABSENT	SCAV 1	F(B), M
day 2	6/9	Present	Present					Present	M	SCAV1	F(B),M		Present	F(B)
day 3	6/10	ABSENT	SCAV 1	F(WB),M				ABSENT		Present	F(B)		Present	F(B)
day 4	6/11		Present	F(WB)						Present	F(B)		Present	F(B)
day 5	6/12		Present	F(WB)						Present	F(B)		Present	F(B)
day 6	6/13		Present	F(WB)						ABSENT	F(<10B)		Present	F(B)
day 7	6/14		Present	F(WB)									Present	F(B)
day 8	6/15		Present	F(WB)									Present	F(B)
day 9	6/16		Present	F(B)									Present	F(B)
day 10	6/17		ABSENT	F(<10B)									Present	F(B)
day 11	6/18												Present	F(B)
day 12	6/19												Present	F(B)
day 13	6/20												Present	F(B)
day 14	6/21												Present	F(>10B)
Retention (days)		2	9		0	0		2		5		0	14	

Appendix 7.

Searcher Efficiency Trials at Kahuku Wind Power conducted in June and July 2011 (Abbreviations: Y=yes, N=no, OL= Ling Ong [SWCA], RP= Ryan Pierce [First Wind Operations], WTSH= Wedged-tail Shearwater, MW=Matt Wickey [First Wind Biologist], MC=Mitch Craig [First Wind Biologist].

Trial Date	Point ID	WTG	Vegetation Type	Carcass Type	Found by searchers? (Name)	Found by non-searchers? (Name)	Retrieved?	Proctor	Comment
6/17	4	5	Pad	RAT	N	N	Y	OL, RP	
6/17	25	7	Pad	WTSH	Y (MW)	N	Y	OL, RP	
6/17	83	11	Pad	RAT	N	N	Y	OL, RP	
6/23	138	2	Off-pad	RAT	Y (MW)	N	Y	RP	
6/23	125	3	Off-pad	RAT	N	N	N	RP	DATA POINT DISCARDED
6/23	1	6	Pad	RAT	Y (MW)	N	Y	RP	
7/7	191	11	Off-pad	WTSH	-	Y(MW)	Y	RP	NON-SEARCH DAY
7/7	92	12	Pad	RAT	-	Y(MC)	Y	RP	NON-SEARCH DAY
7/14	14	4	Pad	RAT	Y (MC)	N	Y	RP	
7/14	194	12	Off-pad	WTSH	Y (MC)	N	Y	RP	
7/14	198	12	Off-pad	RAT	Y (MC)	N	Y	RP	
7/19	174	9	Off-pad	RAT	N	N	N	OL	DATA POINT DISCARDED
7/19	58	8	Pad	RAT	N	N	Y	OL	
7/19	79	10	Pad	RAT	N	N	Y	OL	

Appendix 8.

HCP expenditures for Kahuku Wind Power in FY 2011.

Category	Item	Amount	Notes
Labor	First Wind Labor: 2 persons from December 15, 2010 thru June 2011	73,124	30% Fatality Monitoring, 40% Vegetation Management, 10% Bat Detector Analysis, , 10% Data Management/Reporting, 5% CARE Trials, 5% Machine Maintenance
Equipment	2 All Terrain Vehicles	10,950	
	Mower	11,832	
	Night Vision Goggles	3,649	
	Handheld GPS	4,562	
	Pesticide Sprayer	3,874	
	7 Anabat Bat Detectors	14,910	
	2 Weed Trimmers/ Chainsaw	2,512	
Supplies	Fuel	3,803	Vegetation Maintenance and Truck
	General Supplies	12,181	
	Pesticides	1,556	
Contracts	Vegetation Management	28,333	Weed and Grass Removal, Tree Removal and Chipping with BT Landscaping
	SEEF Trials	5,126	Contract with SWCA
Pre-operations Contracts	Construction	105,507	SWCA Environmental Consultants
	Pre-construction	20,843	SWCA Environmental Consultants
Mitigation	Waterbird Mitigation	92,500	Paid to DOFAW for Hamakua Marsh State Sanctuary
	Waterbird Truck	14,000	
	Owl Research	25,000	
	2 Letters of Credit	26,500	4.5% of \$1,000,000 (October 2010 thru June 2011)