Appendix D-12

Technical Memorandum-Results of Bat Acoustic Surveys

NATURAL RESOURCES ◆ SCIENTIFIC SOLUTIONS

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TECHNICAL MEMORANDUM

Results of
Bat Acoustic Surveys at the
Proposed Alta East Wind Resource Area
Kern County, California

December 13, 2010 – November 1, 2011

Submitted by:
Western EcoSystems Technology, Inc.

January 16, 2012

INTRODUCTION

In December of 2010, on behalf of CH2M HILL Engineers, Inc. and Alta Windpower, LLC (Alta Windpower), Western EcoSystems Technology, Inc. (WEST) initiated a second year of acoustic surveys for bats at the Alta East Wind Resource Area (AEWRA) in Kern County, California. These surveys were designed to supplement an initial year of baseline acoustic monitoring conducted in 2009/2010 (Solick et al. 2010). This second year of the studies involved monitoring bat activity in the southwest corner of the AEWRA (see Figure 1), which was not covered in the previous year of surveys. The results of the current study are consistent with those results from the first year of studies, indicating that a wind energy facility at the AEWRA would not have a significant impact to bats. This memorandum summarizes results for the survey period from December 13, 2010, through November 1, 2011.

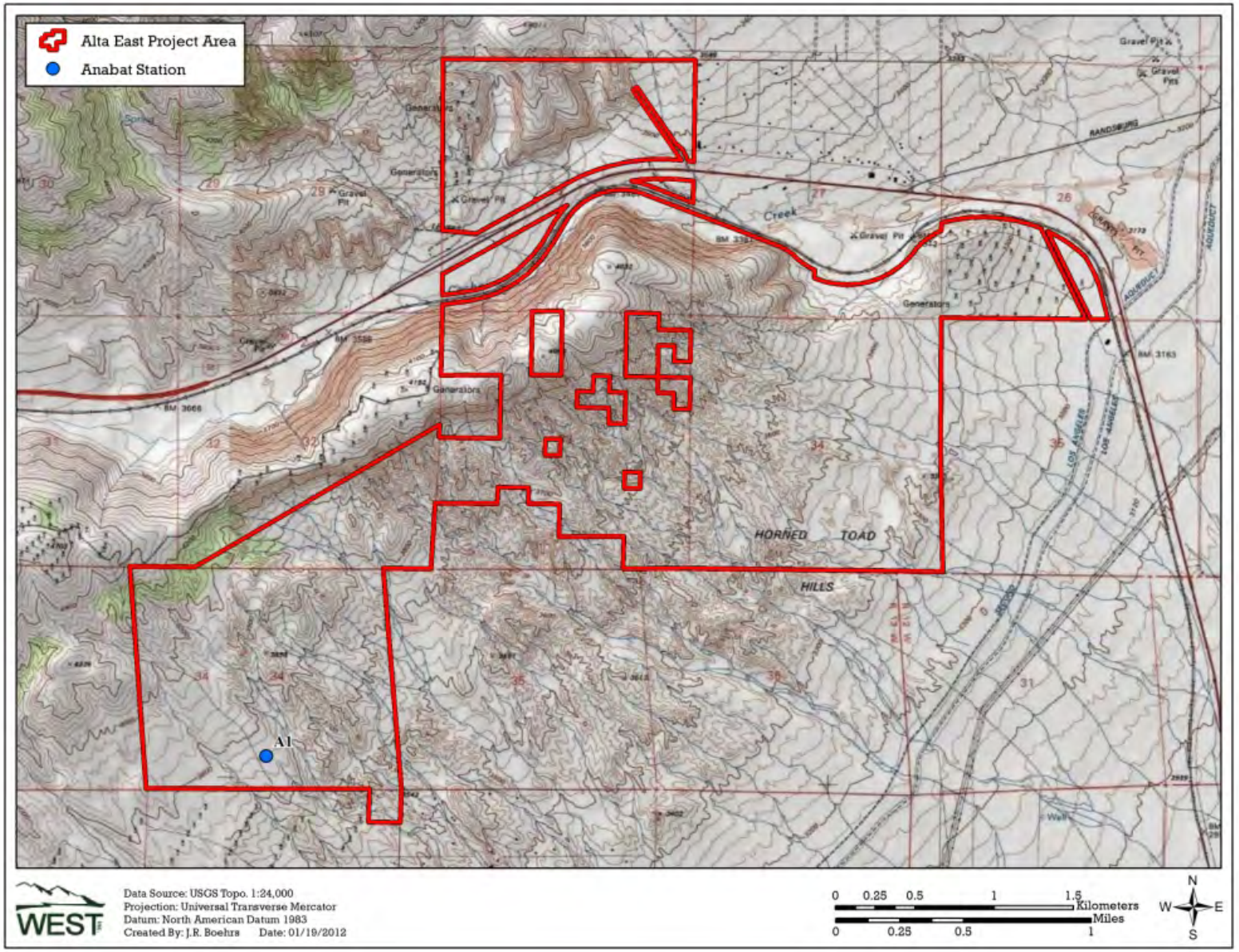

Figure 1. Map of the Alta East Wind Resource Area showing location of the Anabat station.

STUDY AREA

The proposed AEWRA is located in southeastern Kern County, approximately two miles (3.2 kilometers [km]) north-northwest of the unincorporated city of Mojave, and 10 miles (16 km) east of the city of Tehachapi (Figure 1). The study area comprises undeveloped rangeland on a combination of privately-owned land and land administered by the Bureau of Land Management (BLM).

The AEWRA falls within the high desert plains and hills on the western edge of the Mojave Desert. The Tehachapi Mountains are located to the north and west of the study area and transition into Mojave Desert towards the south and east. Elevations within the study area range from approximately 3,100 to 4,200 feet (ft; 940 to 1,280 meters [m]) above sea level, with the highest elevations occurring in the northwestern portion of the study area (Figure 1). The habitat ranges from lowland creosote (*Larrea tridentata*) scrub and Joshua tree (*Yucca brevifolia*) woodland in the southeast to juniper (*Juniperus* spp.) shrubland on the steeper, rocky slopes in the north and west. Water within the AEWRA is limited to a network of ephemeral drainages; there are no perennial surface water sources within the study area. Highway 58 bisects the AEWRA, an underground portion of the Los Angeles Aqueduct runs along the southeast corner of the study area, and a network of dirt roads and off-highway vehicle (OHV) trails run throughout the study area (Figure 1).

METHODS

The protocol used for this study follows guidelines set forth by the California Energy Commission (CEC and CDFG 2007). For Category 2 projects, the guidelines call for continuous monitoring of bat activity at meteorological (met) towers on site for 12 consecutive months. Surveys using passive ultrasonic bat detectors were initiated December 13, 2010, at one met tower located within the southwest corner of the AEWRA (Figure 1). Bat detectors are a recommended method to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts is a primary bat risk assessment tool for baseline wind development surveys (Arnett 2007; Kunz et al. 2007a). A total of two AnaBat™ SD1 bat detectors (Titley™ Scientific, Australia) were deployed at the AEWRA throughout the survey period. One of the detectors was elevated 30 meters (m; 98 feet [ft]) on the met tower, while the other detector was positioned approximately 2 m (6.5 ft) above the ground at the base of the tower. The raised microphone was encased in a Bat-Hat weatherproof housing (EME Systems, Berkeley, California), and attached to a coaxial cable that transmitted ultrasonic sounds to an AnaBat unit at the base of the tower. Detectors were programmed to collect data continuously from 30 minutes (min) before sunset to 30 min after sunrise, the period corresponding to greatest bat activity. A technician checked the detectors every two weeks, collected the data, and replaced power supplies.

Both detectors were deployed on December 13, 2010. On September 8, 2011, after approximately nine months of continuous data collection, fieldwork associated with the AEWRA

was suspended per request by Alta Windpower. At this time, both AnaBat detectors were left in the field but were no longer serviced. The ground-based AnaBat continued to collect data through September 12, 2011, until the storage capacity of the memory card was exceeded, while the raised detector continued to collect data through November 1, 2011. As a result, the sampling period for each detector varies slightly.

AnaBat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of eight was used for the study. Bat echolocation detectors also detect other ultrasonic sounds, such as those sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise, as this level of sensitivity is optimal for removing noise while still recording the majority of bat calls within range (Brooks and Ford 2005). Calls were recorded to a compact flash memory card with large storage capacity. The detection range of AnaBat detectors depends on a number of factors (e.g., echolocation call characteristics, microphone sensitivity, habitat, the orientation of the bat, atmospheric conditions; Limpens and McCracken 2004), but is generally less than 30 m (98 ft) due to atmospheric absorption (attenuation) of echolocation pulses (Fenton 1991). To ensure similar detection ranges among detectors, microphone sensitivities were calibrated using a BatChirp (Tony Messina, Las Vegas, Nevada) ultrasonic emitter as described in Larson and Hayes (2000).

The units of bat activity were number of bat passes (Hayes 1997). A pass was defined as a continuous series of two or more call notes produced by an individual bat with no pauses between call notes of more than one second (White and Gehrt 2001, Gannon et al. 2003). The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights. For each station, bat passes were sorted into three groups, based on their minimum frequency, that correspond roughly to species groups of interest. For example, species such as western red bat (*Lasiurus blossevellii*) and most species in the genus *Myotis* generally echolocate at frequencies at or above 40 kilohertz (kHz), while species such as little brown bat (*Myotis lucifigus*) and western yellow bat (*Lasiurus xanthinus*) produce calls between 30 and 40 kHz, and silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*) have echolocation frequencies that fall between 15 and 35 kHz. Therefore, passes were classified as either high-frequency (HF; greater than or equal to 40 kHz), mid-frequency (MF; between 30 and 40 kHz), and low-frequency (LF; below 30 kHz) passes. To establish which species may have produced passes in each category, a list of species expected to occur in the study area was compiled from range maps (Table 1; Harvey et al. 1999, BCI 2012). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis.

Table 1. Bat species determined from range-maps (Harvey et al. 1999, BCI 2012) as likely to occur at the Alta East Wind Resource Area, sorted by call frequency.

Common Name	State/Federal Status	Scientific Name
High-Frequency (>40 kHz)		
California bat		*Myotis californicus*
California leaf-nosed bat	SSC	*Macrotus californicus*
canyon bat[1]		*Parastrellus hesperus*
cave bat[1]	SSC	*Myotis velifer*
long-legged bat[1]		*Myotis volans*
western red bat[1]	SSC	*Lasiurus blossevillii*
western small-footed bat		*Myotis ciliolabrum*
Yuma bat		*Myotis yumanensis*
Mid-Frequency (30-40 kHz)		
little brown bat[1]		*Myotis lucifugus*
western long-eared bat[1]		*Myotis evotis*
western yellow bat[1]	SSC	*Lasiurus xanthinus*
Low-Frequency (<30 kHz)		
big brown bat[1]		*Eptesicus fuscus*
fringed bat		*Myotis thysanodes*
hoary bat[1,2]		*Lasiurus cinereus*
Mexican free-tailed bat[1,2]		*Tadarida brasiliensis mexicanus*
pallid bat	SSC	*Antrozous pallidus*
pocketed free-tailed bat[1]	SSC	*Nyctinomops femorosaccus*
silver-haired bat[1,2]		*Lasionycteris noctivagans*
Townsend's big-eared bat	SSC	*Corynorhinus townsendii*
spotted bat	SSC	*Euderma maculatum*
western mastiff bat	SSC	*Eumops perotis califonicus*

[1]species known to have been killed at wind energy facilities
[2]long-distance migrant
Species found as fatalities reported in Anderson et al. 2004, Kunz et al. 2007b, Baerwald 2008, Miller 2008, Chatfield et al. 2009, Piorkowski and O'Connell 2010.
SSC = State Species of Special Concern (CDFG 2011)

Several bat species, particularly those belonging to the *Lasiurus* genus (e.g., hoary bat and eastern red bat [*Lasiurus borealis*]), have been found as fatalities in higher proportions than other species (Arnett et al. 2008). Within the high, mid, and low-frequency categories described above, an attempt was made to identify passes made by hoary bat and western red bat. Passes that produced a distinct U-shaped sonogram and that exhibited variability in the minimum frequency across the call sequence were identified as belonging to the *Lasiurus* genus (C. Corben, pers comm.). Hoary and western red bats were distinguished based on minimum frequency; hoary bats typically produce calls with minimum frequencies between 18 and 24 kHz, whereas western red bats typically emit calls with minimum frequencies between 38 and 50 kHz (J. Szewczak, pers comm.). Only sequences containing three or more calls were used for species identification.

RESULTS

During the period December 13, 2010, to November 1, 2012, WEST recorded a total of 124 bat passes during 557 detector-nights, or 0.23 ± 0.13 (mean ± standard error [SE]) bat passes per detector per night (Table 2). AnaBat units were operational for 86.0% of the sampling period (Figure 2).

Spatial Variation

The ground-based AnaBat station, A1g, recorded nearly twice the activity (0.30 ± 0.23 bat passes per detector-night) as the raised station, A1h (0.16 ± 0.07; Table 2, Figure 3).

Species Composition

Passes attributable to LF bats comprised the majority of bat activity (83.9% of all bat passes; Table 2, Figure 3), suggesting greater relative abundance of species such as big brown bat (*Eptesicus fuscus*) and Mexican free-tailed bat (*Tadarida brasiliensis mexicana*; Table 1). Mid-frequency bats comprised a further 15.3% of activity, and HF bats comprised less than 0.1% of total bat activity (Table 2, Figure 3). Included in the LF bat category were five hoary bat passes, with three recorded at the ground station and six recorded at the raised station (Table 2). No western red bat calls were identified. The parameters used to identify hoary and western red bat calls were conservative. Given the high intraspecific variability of bat calls and the number of call files that were too fragmented for proper identification, it is likely that more hoary bat and western red bat calls were recorded during the study than were positively identified.

Table 2. Results of acoustic bat surveys conducted within the Alta East Wind Resource Area from December 13, 2010 to November 1, 2011. Passes are separated by call frequency: high frequency (HF), medium frequency (MF), and low frequency (LF).

AnaBat Stations	Location	# of HF Bat Passes	# of MF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night**
A1g	ground	1	11	59	3	71	234	0.30±0.23
A1h	raised	0	8	45	6	53	323	0.16±0.07
Total		**1**	**19**	**104**	**9**	**124**	**557**	**0.23±0.13**

* hoary bat passes were included in the low-frequency (LF) category numbers.
** ± bootstrapped standard error.

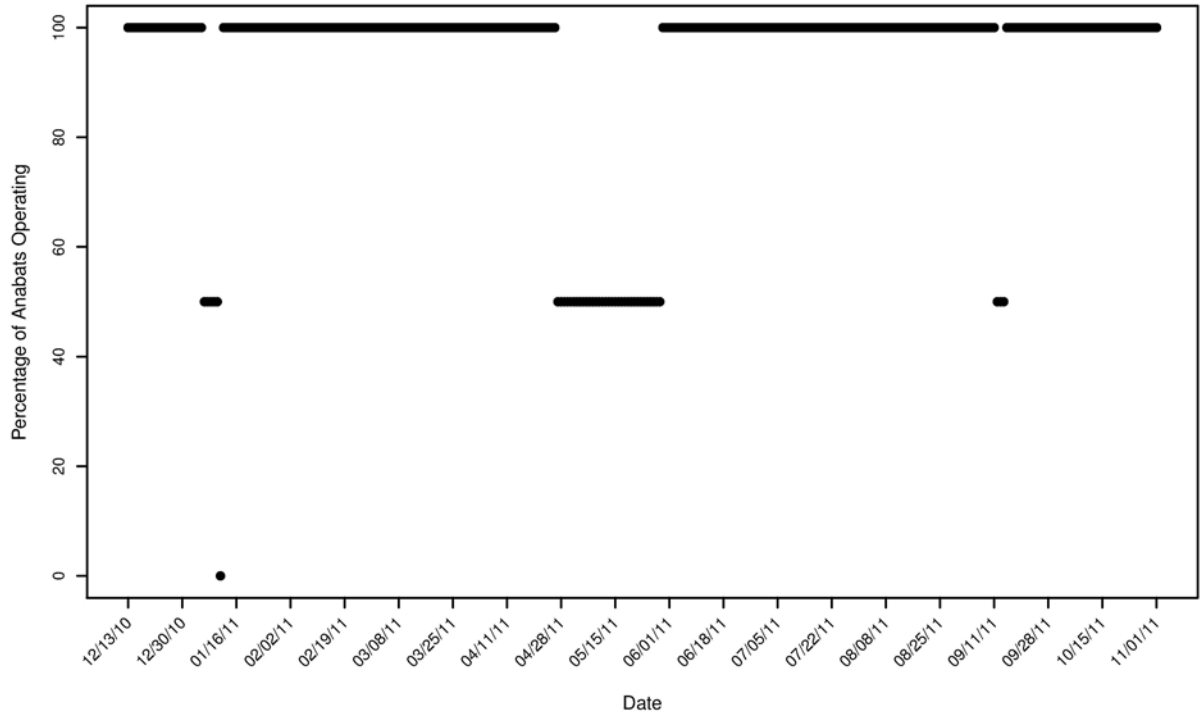

Figure 2. Operational status of AnaBat detectors deployed at the Alta East Wind Resource Area during each night of the study period December 13, 2010 to November 1, 2011.

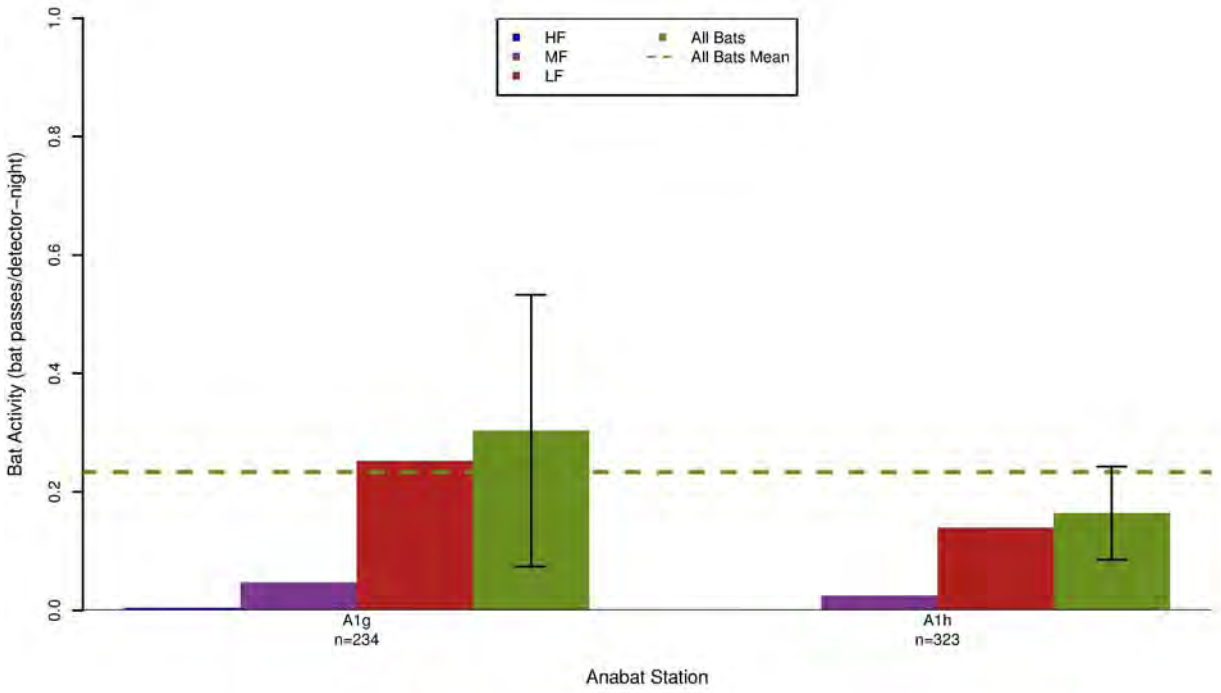

Figure 3. Number of high-frequency (HF), mid-frequency (MF), and low-frequency (LF) bat passes per detector-night recorded at AnaBat stations in the Alta East Wind Resource Area from December 13, 2010 to November 1, 2011. The bootstrapped standard errors are represented by the black error bars on the 'All Bats' columns.

Temporal Variation

Overall, bat activity was greatest in the winter of 2010/2011 (0.64 ± 0.52 passes per detector-night), followed by the fall of 2011 (0.13 ± 0.04; Table 3). Average bat activity during the spring and summer was relatively very low (0.01 ± 0.01 and 0.03 ± 0.02 passes per detector-night, respectively; Table 3, Figure 4). Among individual detectors, the highest seasonal activity rates were also recorded in the winter (0.90 passes per detector-night at A1g, and 0.38 at A1h), with the majority (81.3%) of activity at each station attributed to LF bats (Table 3, Figure 4).

On a weekly basis, bat activity was highest during the first week of the study period (December 13 -19, 2010), with an average of 5.71 bat passes per detector-night, comprised primarily by LF bats (Figure 5). Very low levels of activity were recorded throughout the remainder of the winter, spring, and summer (Figure 5). A second, much smaller peak in activity occurred during early- to mid-September (Figure 5).

Table 3. The number of bat passes per detector-night recorded at the Alta East Wind Resource Area during each season from December 13, 2010 to November 1, 2011 separated by call frequency: high-frequency (HF), medium-frequency (MF), low-frequency (LF), and all bats (AB).

Station	Call Frequency	Winter Dec 13, 2010 – Feb 28, 2011	Spring Mar 1, 2011 – May 31, 2011	Summer Jun 1, 2011 – July 14, 2011	Fall July 15, 2011 – Nov 1, 2011	Fall Migration Jul 30 – Oct 14
A1g	LF	0.76	0	0.02	0.05	0.02
	MF	0.14	0	0	0.02	0.02
	HF		0	0	0.02	0.02
	AB	0.9	0	0.02	0.08	0.07
A1h	LF	0.29	0.02	0.05	0.17	0.18
	MF	0.09	0	0	0.01	0.01
	HF		0	0	0	0
	AB	0.38	0.02	0.05	0.18	0.19
Overall	**LF**	**0.52±0.41**	**0.01±0.01**	**0.03±0.02**	**0.11±0.04**	**0.10±0.05**
	MF	**0.11±0.11**	**0.00±0.00**	**0.00±0.00**	**0.01±0.01**	**0.02±0.02**
	HF	**0.00±0.00**	**0.00±0.00**	**0.00±0.00**	**0.01±0.01**	**0.01±0.01**
	AB	**0.64±0.52**	**0.01±0.01**	**0.03±0.02**	**0.13±0.04**	**0.13±0.06**

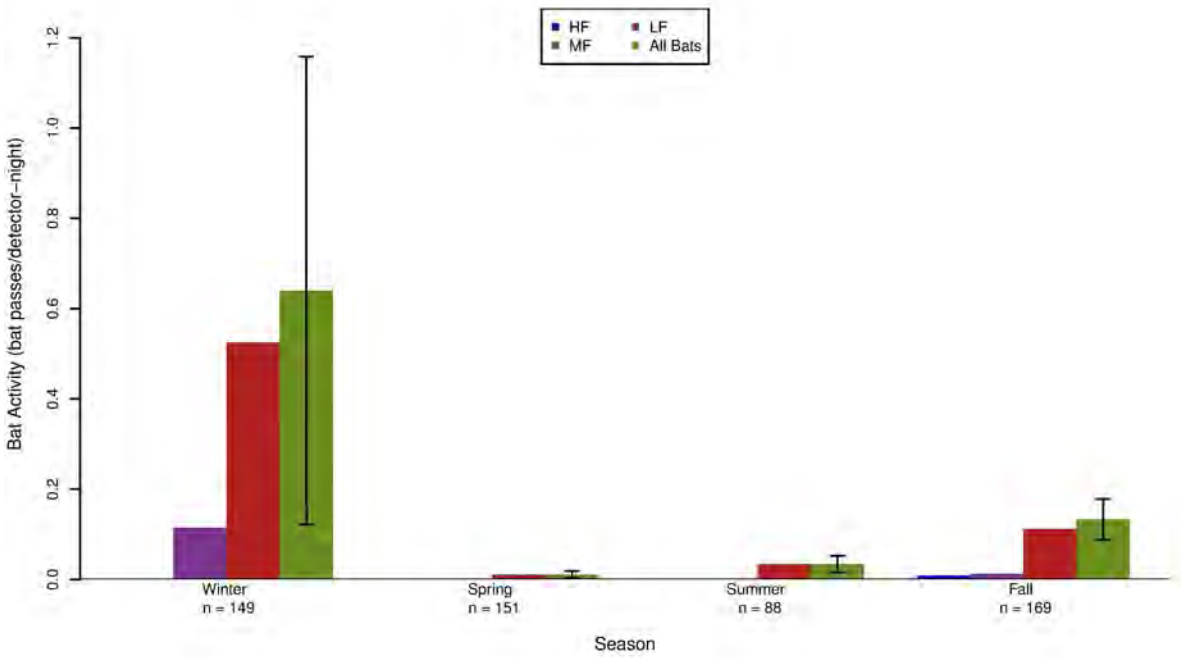

Figure 4. Seasonal bat activity by high-frequency (HF), mid-frequency (MF), low-frequency (LF), and all bats at the Alta East Wind Resource Area from December 13, 2010 to November 1, 2011. The bootstrapped standard errors are represented on the 'All Bats' columns.

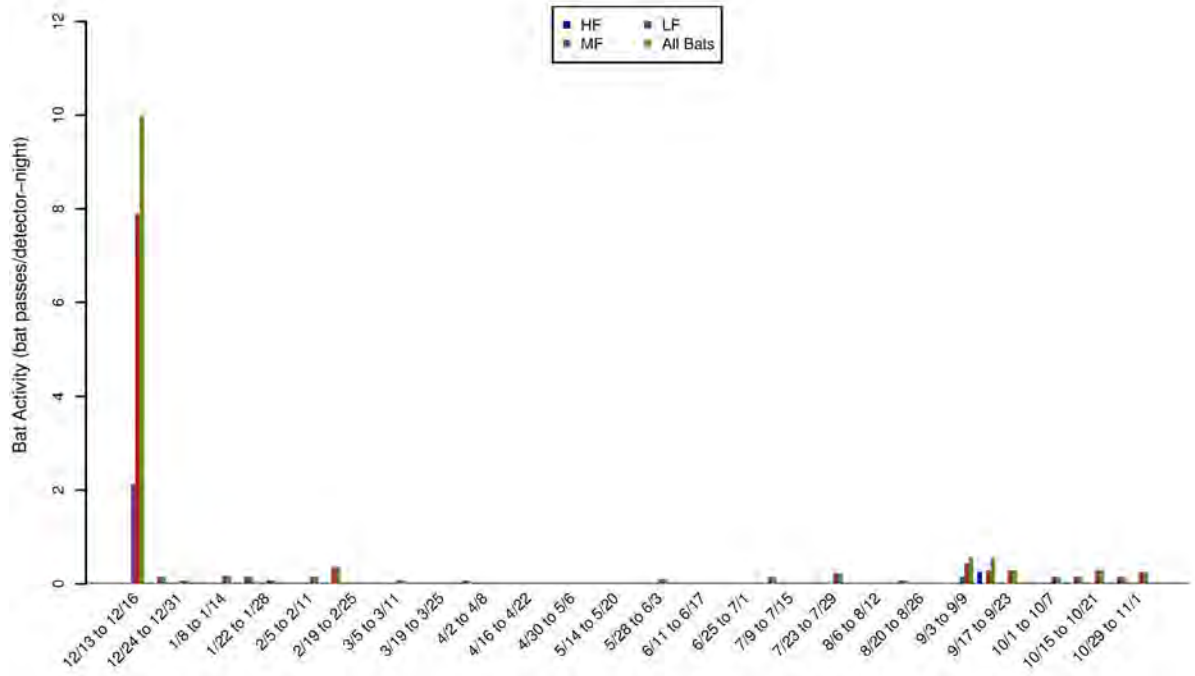

Figure 5. Weekly patterns of bat activity by high-frequency (HF), mid-frequency (MF), low-frequency (LF), and all bats at the Alta East Wind Resource Area for the study period December 13, 2010 to November 1, 2011.

DISCUSSION

Potential Bat Impacts

Assessing the potential impacts of wind energy development to bats at the AEWRA is complicated because the proximate and ultimate causes of bat fatalities at turbines are poorly understood (Kunz et al. 2007a, 2007b; Baerwald et al. 2008; Cryan and Barclay 2009; Long et al. 2010a, 2010b) and monitoring elusive, night-flying animals is inherently difficult (O'Shea et al. 2003). Although installed capacity for wind energy has increased rapidly in recent years, release of study results from these existing wind energy facilities has lagged the influx of newly proposed facilities (Kunz et al. 2007b); therefore, it is often the case that information gleaned from existing wind energy facilities is not available to inform assessments at proposed facilities. To date, post-construction monitoring studies of wind energy facilities suggest that:

1) Bat fatality shows a rough positive correlation with bat activity (Kunz et al. 2007b);

2) The majority of fatalities occur during the post-breeding or fall migration season (August and September; Johnson 2005, Arnett et al. 2008);

3) Migratory tree-roosting species (e.g., western red, hoary, and silver-haired bats) compose approximately 75% of reported bats killed (Arnett et al. 2008, Gruver et al. 2009, 2011), and;

4) The level of bat fatalities depends on many variables, including local environmental characteristics and specific weather conditions, but no single predictive factor has yet been identified. However, some of the highest reported bat fatality rates recorded to date have occurred at wind energy facilities located along forested ridge tops in the eastern and northeastern US and at some wind energy facilities in agricultural regions of the Midwest (Table 4).

Based on these patterns, current guidance to estimate potential fatality levels at a proposed wind energy facility involves evaluation of on-site acoustic monitoring data in terms of activity levels, seasonal variation, and species composition (Kunz et al. 2007b), as well as comparison to regional fatality patterns.

Overall Bat Activity

To date, relatively few studies of wind energy facilities have recorded both bat passes per detector-night and bat fatality rates (Table 4). Although it has been assumed that an association may exist for pre-construction activity and post-construction fatalities, to date such a relationship has not been established empirically due to insufficient data.

For the studies that have measured both activity and fatalities and are used here for comparison (Table 4), most data were collected during the fall using AnaBat detectors placed near the ground and none of the detectors were located near features attractive to bats. Therefore, this report relies on the mean bat activity from the ground-based detector recorded at the AEWRA

during the fall migration period of 2011 (0.07 passes per detector-night), as well as fall data from the 2009/2010 study (0.06; Solick et al. 2010), to assess potential risk of bat fatality at the AEWRA relative to other studies with similar data.

While inconsistencies among studies (e.g., differences in study period length and timing, type of equipment, placement of equipment, and presentation of data) do not allow for direct comparison across studies, some generalizations can be made. For facilities that have estimated pre-construction activity and post-construction fatality rates, the highest (38.3) and one of the lowest (0.3) mean bat passes per detector night generally corresponded with the highest (31.69) and lowest (1.4) bat fatalities/megawatt (MW)/year, but this relationship in bat activity and bat fatalities is not consistent across all studies (Table 4). For example, fatalities were relatively low (7.16 fatalities/MW/study period; Jain 2005) at the Top of Iowa Wind Farm in 2003 despite relatively high activity (35.7 bat passes/detector-night; Jain 2005), and lower bat activity at the Blue Sky Green Field, Wisconsin Wind Energy Center (7.7 bat passes/detector-night; Gruver 2008) corresponded with a relatively high fatality estimate (24.57 fatalities/MW/study period; Gruver et al. 2009; Table 4).

Additionally, it is unclear whether monitoring bat activity near ground level accurately indexes activity at all heights of interest (e.g., hub height), or whether it is an effective method for estimating bat fatality rates. Some of the studies in Table 4 show a general correlation between bat activity and fatalities; however, some researchers have suggested that bat activity near the ground may not adequately predict bat fatality rates (Baerwald and Barclay 2009), and this may be due to differences in species ecologies (e.g., Norberg and Rayner 1987). For example, Hayes and Gruver (2000) found that activity by *Myotis* bats was more common in the lower canopy and activity by LF bats was more common in the upper canopy in the Pacific Northwest. This pattern is consistent with the observations that LF species are more often found as fatatities at wind energy projects than Myotids and other HF bats (Arnett et al. 2008), assuming that flying at greater heights leads to increased risk of turbine-related fatality. In 2011, fall bat activity recorded by the raised detector at the AEWRA (0.16 ± 0.07; Table 2) was nearly half of that recorded by the ground-based detector (0.30 ± 0.23) and may provide a more accurate estimate of potential bat risk. However, data to support this supposition are currently lacking.

Temporal Variation

The highest bat activity rates were recorded during the first week of the study period, December 13-19, 2010, with much lower activity levels recorded throughout the remainder of the study period (Figures 4 and 5). The relatively large spike in activity in December may represent foraging by resident LF species, such as big brown bats, Mexican free-tailed bats, and pallid bats (*Antrozous pallidus*). Due to their larger body size, these species are able to withstand harsher temperatures in the late fall and early winter as they forage throughout the study area in preparation for hibernation. The comparatively very low levels of bat activity in February, March, and April likely indicate that most bats had left the area for winter hibernacula or warmer climates. The much smaller peak in activity in September, particularly by LF species, may represent migration of bats through the area.

Most bat fatality studies at wind energy facilities in the US have shown a peak in fatality in August and September (the fall migration period), generally lower mortality earlier in the summer and very low mortality during the spring (Johnson 2005, Arnett et al. 2008). While the survey effort varied among the different studies, a general association between the timing of increased bat call rates and mortality was suggested in the studies that combine AnaBat and fatality surveys, with call rates and fatalities both peaking during the fall migration period. Based on the available data on timing of fatalities, it is expected that bat fatalities at the AEWRA will be highest in late summer through early fall; however, based on the data collected during this study, fatalities during the winter months are also a possibility.

Species Composition

Twelve of the 21 bat species likely to occur in the AEWRA are known as fatalities at wind energy facilities in North America (Table 1). Acoustic surveys using AnaBat detectors enable bat analysts to classify bat calls to frequency groups and, in some cases, to species. Approximately 84% of passes recorded during the study were from LF bats, suggesting greater relative abundance of species such as Mexican free-tailed bat, hoary bat, and big brown bat (Table 1). These results are consistent with those from the initial year of bat surveys at the AEWRA during which LF species comprised nearly all (99%) of the total bat activity (Solick et al. 2010).

Some low-frequency species, such as hoary bat and silver-haired bat, have been found as fatalities in higher proportions than other species (Arnett et al. 2008). Both species are likely migrants through the AEWRA and will likely have a higher risk of collision risk with project turbines than other species that were detected at the site.

Potential Bat Fatality Rates

Bat fatality rates from studies at wind energy facilities across North America have ranged from 0.16 (Gritski et al. 2009b, Derby et al. 2010b) to 39.70 bat fatalities/MW/year (Fiedler et al. 2007; Table 4). In general, fatality rates have been highest in the northeast, the Midwest, and the southeast, and lowest in the Pacific Northwest and California, although a high degree of variation in fatality rates is present for most regions. To date, some of the highest levels of bat fatalities have been reported from turbines set on forested Appalachian ridges (Arnett et al. 2008), but relatively high rates have also been reported from agricultural regions in the Midwest (e.g., Cedar Ridge [BHE Environmental 2010, 2011] and Blue Sky Green Field [Gruver et al. 2009]). Bat fatality studies have been conducted at four wind energy facilities located in California. However, no corresponding pre-construction activity rates exist for these facilities. Thus far, bat fatality rates at wind energy facilities in California have ranged from 0.24 to 3.92 bats/MW/year (Table 4).

Overall bat activity recorded at the AEWRA during this study (0.23 ± 0.13 bat passes per detector-night) is very low, and is consistent with bat activity recorded during the previous year of study at the AEWRA (0.22 ± 0.03 bat passes per detector-night; Solick et al. 2010; Table 3). Likewise, for purposes of comparison with other studies across the US, fall activity rates recorded by ground-based detectors at the AEWRA was similar between the two years of study (0.07 passes per detector-night in 2010/2011 and 0.06 in 2009/2010; Table 4). Based on reported fatality rates at wind energy facilities in California and the Pacific Northwest regions of

the US, the bat activity observed at the AEWRA during two years of study, as well as the habitats within the study area, it is expected that the potential risk to bats from turbine operations to be lower than or similar to the rates observed at other western facilities, and not nearly as high as the rates observed at eastern ridgeline facilities. As well, comparatively very few bat mortalities have been found during post-construction fatality surveys at existing wind energy facilities in the immediate vicinity (see Anderson et al. 2004, M.H. Wolfe and Associates 2008, BRC 2010, Chatfield et al. 2010), further suggesting that fatality rates at the AEWRA will be relatively low.

Table 4. Wind energy facilities in North America with activity and fatality data for bats, grouped by geographic region.

Wind Energy Facility	Bat Activity Estimate[A]	Fatality Estimate[B]	No. of Turbines	Total MW
Alta East, CA (2010/2011; this study)	**0.07**			
Alta East, CA (2009/2010)	0.06			
California				
Shiloh I, CA		3.92	100	150
High Winds, CA (2004)		2.51	90	162
Dillon, CA		2.17	45	45
High Winds, CA (2005)		1.52	90	162
Alite, CA		0.24	8	24
Pacific Northwest				
Biglow Canyon, OR (Phase II; 2009/2010)		2.71	65	150
Nine Canyon, WA		2.47	37	48.1
Stateline, OR/WA 2003		2.29	454	263
Biglow Canyon, OR (Phase I; 2008)		1.99	76	125.4
Leaning Juniper, OR		1.98	67	100.5
Big Horn, WA		1.90	133	199.5
Combine Hills, OR		1.88	41	41
Pebble Springs, OR		1.55	47	98.7
Hopkins Ridge, WA (2008)		1.39	87	156.6
Elkhorn, OR (2008)		1.26	61	101
Vansycle, OR		1.12	38	24.9
Klondike III, OR		1.11	122	375
Stateline, OR/WA 2002		1.09	454	263
Tuolumne (Windy Point I), WA		0.94	62	136.6
Klondike, OR		0.77	16	24
Hopkins Ridge, WA (2006)		0.63	83	150
Biglow Canyon, OR (Phase I; 2009)		0.58	76	125.4
Hay Canyon, OR		0.53	48	100.8
Klondike II, OR		0.41	50	75
Wild Horse, WA		0.39	127	229
Goodnoe, WA		0.34	47	94
Marengo II, WA (2009)		0.27	39	70.2
Marengo I, WA (2009)		0.17	39	70.2
Klondike IIIa, OR		0.16	125	375

Table 4. Wind energy facilities in North America with activity and fatality data for bats, grouped by geographic region.

Wind Energy Facility	Bat Activity Estimate[A]	Fatality Estimate[B]	No. of Turbines	Total MW
Rocky Mountains				
Summerview, Alb. (2008)	5.3[C]	11.42	39	70.2
Judith Gap, MT		8.93	90	135
Foote Creek Rim, WY (Phase I; 1999)		3.97	69	41.4
Foote Creek Rim, WY (Phase I; 2001-2002)		1.57	69	41.4
Foote Creek Rim, WY (Phase I; 2000)	2.2[C,D]	1.05	69	41.4
Southwest				
Dry Lake, AZ	6.9	4.29	30	63
Midwest				
Cedar Ridge, WI (2009)	9.97[C,D,E,F]	30.61	41	67.6
Blue Sky Green Field, WI	7.7[F]	24.57	88	145
Cedar Ridge, WI (2010)	9.97[C,D,E,F]	24.12	41	68
Forward Energy Center, WI		18.17	86	129
Top of Iowa, IA (2004)	35.7[C]	10.27	89	80
Crystal Lake II, IA		7.42	80	200
Top of Iowa, IA (2003)	35.7[C]	7.16	89	80
Kewaunee County, WI		6.45	31	20.46
Ripley, Ont. (2008)		4.67	38	76
Winnebago, IA		4.54	10	20
Buffalo Ridge, MN (Phase II; 2001/Lake Benton I)	1.9[C]	4.35	143	107.25
Buffalo Ridge, MN (Phase III; 2001/Lake Benton II)	1.9[C]	3.71	138	103.5
Crescent Ridge, IL		3.27	33	54.45
Buffalo Ridge, MN (Phase III; 1999)		2.72	138	103.5
Buffalo Ridge, MN (Phase II; 1999)		2.59	143	107.25
Morraine II, MN		2.42	33	49.5
Buffalo Ridge, MN (Phase II; 1998)		2.16	143	107.25
Prairie Winds (Minot), ND		2.13	80	115.5
Grand Ridge, IL		2.10	66	99
Buffalo Ridge, MN (Phase III; 2002/Lake Benton II)	2.2[C]	1.81	138	103.5
Buffalo Ridge, MN (Phase II; 2002/Lake Benton I)	2.2[C]	1.64	143	107.25
Elm Creek, MN		1.49	67	100
Wessington Springs, SD		1.48	34	51
NPPD Ainsworth, NE		1.16	36	20.5
Buffalo Ridge, MN (Phase I; 1999)		0.74	73	25
Buffalo Ridge I, SD (2010)		0.16	24	50.4
Southern Plains				
Barton Chapel, TX		3.06	60	120
Southeast				
Buffalo Mountain, TN (2005)		39.70	18	28.98
Buffalo Mountain, TN (2000-2003)	23.7[D]	31.54	3	1.98

Table 4. Wind energy facilities in North America with activity and fatality data for bats, grouped by geographic region.

Wind Energy Facility	Bat Activity Estimate[A]	Fatality Estimate[B]	No. of Turbines	Total MW
Northeast				
Mountaineer, WV	38.3[D]	31.69	44	68
Mount Storm, WV (2009)		24.32	132	264
Mount Storm, WV (2010)		15.18	132	264
Casselman, PA (Spring & Fall 2008)		12.61	23	34.5
Maple Ridge, NY (2006)		11.21	120	198
Maple Ridge, NY (2007)		9.42	195	321.75
Cohocton/Dutch Hill, NY (2009)		8.62	50	125
Noble Bliss, NY (2008)		7.80	67	100
Mount Storm, WV (Fall 2008)	35.2	6.62	82	164
Wolfe Island, Ont (July-December 2009)		6.42	86	197.8
Maple Ridge, NY (2008)		4.96	195	321.75
Noble Clinton, NY (2009)		4.50	67	100
Noble Ellenburg, NY (2009)		3.91	54	80
Noble Bliss, NY (2009)		3.85	67	100
Lempster, NH (2010)		3.57	12	24
Noble Ellenburg, NY (2008)		3.46	54	80
Noble Clinton, NY (2008)		3.14	67	100
Lempster, NH (2009)		3.08	12	24
Mars Hill, ME (2007)		2.91	28	42
Munnsville, NY (2008)		1.93	23	34.5
Stetson Mountain, ME (2009)	0.3[G]	1.40	38	57
Mars Hill, ME (2008)		0.45	28	42

A = Bat passes per detector-night
B = Number of fatalities/MW/year
C = Activity rate was averaged across phases and/or years
D = Activity rate calculated by WEST from data presented in referenced report
E = Activity rate based on data collected at various heights all other activity rates are from ground-based units only
F = Activity rate based on pre-construction monitoring; data for all other activity and fatality rates were collected concurrently
G = Activity rate from one unit placed on a nacelle

Table 4 (*continued*). Wind energy facilities in North America with comparable fatality data for bats, grouped by geographic region.

Data from the following sources:

Project, Location	Activity Reference	Fatality Reference	Project, Location	Activity Reference	Fatality Reference
Alite, CA		Chatfield et al. 2010	Klondike II, OR		NWC and WEST 2007
Barton Chapel, TX		WEST 2011	Klondike III, OR		Gritski et al. 2009a
Big Horn, WA		Kronner et al. 2008	Klondike IIIa, OR		Gritski et al. 2009b
Biglow Canyon, OR (Phase I; 2008)		Jeffrey et al. 2009a	Leaning Juniper, OR		Kronner et al. 2007
Biglow Canyon, OR (Phase I; 2009)		Enk et al. 2010	Lempster, NH (2009)		Tidhar et al. 2010
Biglow Canyon, OR (Phase II; 2009/2010)		Enk et al. 2011	Lempster, NH (2010)		Tidhar et al. 2011
Blue Sky Green Field, WI	Gruver 2008	Gruver et al. 2009	Maple Ridge, NY (2006)		Jain et al. 2007
Buffalo Mountain, TN (2000-2003)	Fiedler 2004	Nicholson et al. 2005	Maple Ridge, NY (2007)		Jain et al. 2009a
Buffalo Mountain, TN (2005)		Fiedler et al. 2007	Maple Ridge, NY (2008)		Jain et al. 2009d
Buffalo Ridge, MN (Phase I; 1999)		Johnson et al. 2000	Marengo I, WA (2009)		URS Corporation 2010b
Buffalo Ridge, MN (Phase II; 1998)		Johnson et al. 2000	Marengo II, WA (2009)		URS Corporation 2010c
Buffalo Ridge, MN (Phase II; 1999)		Johnson et al. 2000	Mars Hill, ME (2007)		Stantec 2008
Buffalo Ridge, MN (Phase II; 2001/Lake Benton I)	Johnson et al. 2004	Johnson et al. 2004	Mars Hill, ME (2008)		Stantec 2009a
Buffalo Ridge, MN (Phase II; 2002/Lake Benton I)	Johnson et al. 2004	Johnson et al. 2004	Moraine II, MN		Derby et al. 2010d
Buffalo Ridge, MN (Phase III; 1999)		Johnson et al. 2000	Mount Storm, WV (Fall 2008)	Young et al. 2009b	Young et al. 2009b
Buffalo Ridge, MN (Phase III; 2001/Lake Benton II)	Johnson et al. 2004	Johnson et al. 2004	Mount Storm, WV (2009)		Young et al. 2009a, 2010a
Buffalo Ridge, MN (Phase III; 2002/Lake Benton II)	Johnson et al. 2004	Johnson et al. 2004	Mount Storm, WV (2010)		Young et al. 2010b, 2011
Buffalo Ridge I, SD (2010)		Derby et al. 2010b	Mountaineer, WV	Arnett et al. 2005, Arnett pers. comm.	Arnett et al. 2005
Casselman, PA (Spring & Fall 2008)		Arnett et al. 2009	Munnsville, NY (2008)		Stantec 2009b
Cedar Ridge, WI (2009)	BHE Environmental 2008	BHE Environmental 2010	Nine Canyon, WA		Erickson et al. 2003
Cedar Ridge, WI (2010)	BHE Environmental 2008	BHE Environmental 2011	Noble Bliss, NY (2008)		Jain et al. 2009e
Cohocton/Dutch Hill, NY (2009)		Stantec 2010	Noble Bliss, NY (2009)		Jain et al. 2010a
Combine Hills, OR		Young et al. 2006	Noble Clinton, NY (2008)		Jain et al. 2009c
Crescent Ridge, IL		Kerlinger et al. 2007	Noble Clinton, NY (2009)		Jain et al. 2010b
Crystal Lake II, IA		Derby et al. 2010a	Noble Ellenburg, NY (2008)		Jain et al. 2009b
Dillon, CA		Chatfield et al. 2009	Noble Ellenburg, NY (2009)		Jain et al. 2010c
Dry Lake, AZ	Thompson et al. 2011	Thompson et al. 2011	NPPD Ainsworth, NE		Derby et al. 2007
Elkhorn, OR (2008)		Jeffrey et al. 2009b	Pebble Springs, OR		Gritski and Kronner 2010b
Elm Creek, MN		Derby et al. 2010c	Prairie Winds (Minot), ND		Derby et al. 2011
Foote Creek Rim, WY (Phase I; 1999)		Young et al. 2003	Ripley, Ont (2008)		Jacques Whitford 2009
Foote Creek Rim, WY (Phase I; 2000)	Gruver 2002	Young et al. 2003	Shiloh I, CA		Kerlinger et al. 2010
Foote Creek Rim, WY (Phase I; 2001-2002)		Young et al. 2003	Stateline, OR/WA 2002		Erickson et al. 2004
Forward Energy Center, WI		Grodsky and Drake 2011	Stateline, OR/WA 2003		Erickson et al. 2004
Goodnoe, WA		URS Corporation 2010a	Stetson Mountain, ME (2009)	Stantec 2009c	Stantec 2009c
Grand Ridge, IL		Derby et al. 2010g	Summerview, Alb (2008)	Baerwald 2008	Baerwald 2008
Hay Canyon, OR		Gritski and Kronner 2010a	Top of Iowa, IA (2003)	Jain 2005	Jain 2005
High Winds, CA (2004)		Kerlinger et al. 2006	Top of Iowa, IA (2004)	Jain 2005	Jain 2005
High Winds, CA (2005)		Kerlinger et al. 2006	Tuolumne (Windy Point I), WA		Enz and Bay 2010
Hopkins Ridge, WA (2006)		Young et al. 2007	Vansycle, OR		Erickson et al. 2000
Hopkins Ridge, WA (2008)		Young et al. 2009c	Wessington Springs, SD		Derby et al. 2010f
Judith Gap, MT		TRC 2008	Wild Horse, WA		Erickson et al. 2008
Kewaunee County, WI		Howe et al. 2002	Winnebago, IA		Derby et al. 2010e
Klondike, OR		Johnson et al. 2003	Wolfe Island, Ont (July-December 2009)		Stantec Ltd. 2010b

REFERENCES

Anderson, R., N. Neuman, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area, California. Period of Performance: October 2, 1996 - May 27, 1998. NREL/SR-500-36416. National Renewable Energy Laboratory, Golden, Colorado. September 2004. http://www.nrel.gov/docs/fy04osti/36416.pdf

Arnett, E. 2007. Report from the Bats and Wind Energy Cooperative (BWEC) on Collaborative Work and Plans. Presentation at the National Wind Coordinating Collaborative (NWCC) Wildlife Workgroup Meeting, Boulder Colorado. Conservation International. November 14th, 2007. Information available at www.nationalwind.org

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Final Report. Prepared for Bats and Wind Energy Cooperative, Bat Conservation International, Austin, Texas. June 2005.

Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley, Jr. 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America. Journal of Wildlife Management 72(1): 61-78.

Arnett, E.B., M.R. Schirmacher, M.M.P. Huso, and J.P. Hayes. 2009. Patterns of Bat Fatality at the Casselman Wind Project in South-Central Pennsylvania. 2008 Annual Report. Annual report prepared for the Bats and Wind Energy Cooperative (BWEC) and the Pennsylvania Game Commission. Bat Conservation International (BCI), Austin, Texas. June 2009. Available online at: http://www.batsandwind.org/pdf/2008%20Casselman%20Fatality%20Report.pdf

Baerwald, E.F. 2008. Variation in the Activity and Fatality of Migratory Bats at Wind Energy Facilities in Southern Alberta: Causes and Consequences. Thesis. University of Calgary, Calgary, Alberta, Canada.

Baerwald, E.F. and R.M.R. Barclay. 2009. Geographic Variation in Activity and Fatality of Migratory Bats at Wind Energy Facilities. Journal of Mammalogy 90(6): 1341–1349.

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma Is a Significant Cause of Bat Fatalities at Wind Turbines. Current Biology 18(16): R695-R696.

Bat Conservation International (BCI). 2012. Bat Species: US Bats. BCI website. BCI, Inc., Austin, Texas. Range GIS data from 2009. Homepage: http://www.batcon.org; Species profiles available online at: http://batcon.org/index.php/all-about-bats/species-profiles.html

BHE Environmental, Inc. (BHE). 2008. Investigations of Bat Activity and Bat Species Richness at the Proposed Cedar Ridge Wind Farm in Fond Du Lac County, Wisconsin. Interim Report prepared for Wisconsin Power and Light.

BHE Environmental, Inc. (BHE). 2010. Post-Construction Bird and Bat Mortality Study: Cedar Ridge Wind Farm, Fond Du Lac County, Wisconsin. Interim Report prepared for Wisconsin Power and Light, Madison, Wisconsin. Prepared by BHE Environmental, Inc. Cincinnati, Ohio. February 2010.

BHE Environmental, Inc. (BHE). 2011. Post-Construction Bird and Bat Mortality Study: Cedar Ridge Wind Farm, Fond Du Lac County, Wisconsin. Final Report. Prepared for Wisconsin Power and Light, Madison, Wisconsin. Prepared by BHE Environmental, Inc. Cincinnati, Ohio. February 2011.

BioResource Consultants, Inc. (BRC). 2010. 2009/2010 Annual Report: Bird and Bat Mortality Monitoring, Pine Tree Wind Farm, Kern County, California. To the Los Angeles Department of Water and Power, from AECOM, Irvine, California. Report prepared by Bioresource Consultants, Inc., Ojai, California. October 14, 2010.

Brooks, R.T. and W.M. Ford. 2005. Bat Activity in a Forest Landscape of Central Massachusetts. Northeastern Naturalist 12(4): 447-462.

California Department of Fish and Game (CDFG). 2011. Special Animals (898 Taxa). State of California Natural Resources Agency, Biogeographic Data Branch, California Natural Diversity Database (CNNDB). January 2011. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf

California Energy Commission (CEC) and California Department of Fish and Game (CDFG). 2007. California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development. . Commission Final Report. California Energy Commission, Renewables Committee, and Energy Facilities Siting Division, and California Department of Fish and Game, Resources Management and Policy Division. CEC-700-2007-008-CMF.

Chatfield, A., W. Erickson, and K. Bay. 2009. Avian and Bat Fatality Study, Dillon Wind-Energy Facility, Riverside County, California. Final Report: March 26, 2008 - March 26, 2009. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 3, 2009.

Chatfield, A., W.P. Erickson, and K. Bay. 2010. Final Report: Avian and Bat Fatality Study at the Alite Wind-Energy Facility, Kern County, California. Final Report: June 15, 2009 – June 15, 2010. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. Prepared for CH2M HILL, Oakland, California.

Cryan, P.M. and R.M.R. Barclay. 2009. Causes of Bat Fatalities at Wind Turbines: Hypotheses and Predictions. Journal of Mammalogy 90(6): 1330-1340.

Derby, C., A. Dahl, W. Erickson, K. Bay, and J. Hoban. 2007. Post-Construction Monitoring Report for Avian and Bat Mortality at the NPPD Ainsworth Wind Farm. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for the Nebraska Public Power District.

Derby, C., K. Chodachek, and K. Bay. 2010a. Post-Construction Bat and Bird Fatality Study Crystal Lake II Wind Energy Center, Hancock and Winnebago Counties, Iowa. Final Report: April 2009-October 2009. Prepared for NextEra Energy Resources, Juno Beach, Florida. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. June 2, 2010.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010b. Post-Construction Fatality Survey for the Buffalo Ridge I Wind Project. May 2009 - May 2010. Prepared for Iberdrola Renewables, Inc., Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010c. Post-Construction Fatality Surveys for the Elm Creek Wind Project: March 2009- February 2010. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010d. Post-Construction Fatality Surveys for the Moraine II Wind Project: March - December 2009. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., K. Chodachek, K. Bay, and A. Merrill. 2010e. Post-Construction Fatality Surveys for the Winnebago Wind Project: March 2009- February 2010. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Derby, C., A. Dahl, A. Merrill, and K. Bay. 2010f. 2009 Post-Construction Monitoring Results for the Wessington Springs Wind-Energy Facility, South Dakota. Final Report. Prepared for Wessington Wind Energy Center, LLC, Juno Beach, Florida. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. August 19, 2010.

Derby, C., J. Ritzert, and K. Bay. 2010g. Bird and Bat Fatality Study, Grand Ridge Wind Resource Area, Lasalle County, Illinois. January 2009 - January 2010. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. July 13, 2010. Revised January 2011.

Derby, C., K. Chodachek, T. Thorn, K. Bay, and S. Nomani. 2011. Post-Construction Fatality Surveys for the Prairiewinds ND1 Wind Facility, Basin Electric Power Cooperative, March - November 2010. Prepared for Basin Electric Power Cooperative, Bismarck, North Dakota. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. August 2, 2011.

Enk, T., K. Bay, M. Sonnenberg, J. Baker, M. Kesterke, J. Boehrs, and A. Palochak. 2010. Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring Second Annual Report, Sherman County, Oregon. January 26, 2009 - December 11, 2009. Prepared for Portland General Electric Company, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc.(WEST) Cheyenne, Wyoming, and Walla Walla, Washington. April 2010.

Enk, T., K. Bay, M. Sonnenberg, J. Flaig, J.R. Boehrs, and A. Palochak. 2011. Year 1 Post-Construction Avian and Bat Monitoring Report: Biglow Canyon Wind Farm Phase II, Sherman County, Oregon. September 10, 2009 - September 12, 2010. Prepared for Portland General Electric Company, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington. January 7, 2011.

Enz, T. and K. Bay. 2010. Post-Construction Avian and Bat Fatality Monitoring Study, Tuolumne Wind Project, Klickitat County, Washington. Final Report: April 20, 2009 - April 7, 2010. Prepared for Turlock Irrigation District, Turlock, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 6, 2010.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year. Final report prepared for Umatilla County Department of Resource Services and Development, Pendleton, Oregon. February 7, 2000.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Annual Report. July 2001 - December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee. Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. December 2004.

Erickson, W.P., K. Kronner, and R. Gritski. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington. Prepared for Puget Sound Energy, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 2008.

ESRI. 2011. Geographic Information Services (GIS). Producers of ArcGIS software. ESRI, Redlands, California.

Fenton, M.B. 1991. Seeing in the Dark. BATS (Bat Conservation International) 9(2): 9-13.

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. M.S. Thesis. University of Tennessee, Knoxville, Tennessee. August, 2004. http://www.tva.gov/environment/bmw_report/bat_mortality_bmw.pdf

Fiedler, J.K., T.H. Henry, R.D. Tankersley, and C.P. Nicholson. 2007. Results of Bat and Bird Mortality Monitoring at the Expanded Buffalo Mountain Windfarm, 2005. Tennessee Valley Authority. June 28, 2007.

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gritski, R., S. Downes, and K. Kronner. 2009a. Klondike III (Phase 1) Wind Power Project Wildlife Monitoring Year One Summary, October 2007-October 2008. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. April 3, 2009. Available online at: http://www.oregon.gov/ENERGY/SITING/docs/KWPWildlifeReport040309.pdf

Gritski, R., S. Downes, and K. Kronner. 2009b. Klondike IIIa (Phase 2) Wind Power Project, Wildlife Monitoring Year One Summary, August 2008 - August 2009. Prepared for Iberdrola Renewables, Klondike Wind Power III LLC, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. November 13, 2009. Available online at: http://www.oregon.gov/ENERGY/SITING/docs/KWPWildlifeReport111309.pdf

Gritski, R. and K. Kronner. 2010a. Hay Canyon Wind Power Project Wildlife Monitoring Study: May 2009 - May 2010. Prepared for Iberdrola Renewables, Inc. (IRI), Hay Canyon Wind Power Project LLC. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. September 20, 2010.

Gritski, R. and K. Kronner. 2010b. Pebble Springs Wind Power Project Wildlife Monitoring Study: January 2009 - January 2010. Prepared for Iberdrola Renewables, Inc. (IRI), and the Pebble Springs Advisory Committee. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. April 20, 2010.

Grodsky, S.M. and D. Drake. 2011. Assessing Bird and Bat Mortality at the Forward Energy Center. Final Report. Public Service Commission (PSC) of Wisconsin. PSC REF#:152052. Prepared for Forward Energy LLC. Prepared by Department of Forest and Wildlife Ecology, University of Wisconsin-Madison, Madison, Wisconsin. August 2011.

Gruver, J. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming. 149 pp.

Gruver, J. 2008. Bat Acoustic Studies for the Blue Sky Green Field Wind Project, Fond Du Lac County, Wisconsin. Final Report: July 24 - October 29, 2007. Prepared for We Energies, Milwaukee, Wisconsin. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 26, 2008.

Gruver, J., M. Sonnenburg, K. Bay, and W. Erickson. 2009. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond Du Lac County, Wisconsin July 21 - October 31, 2008 and March 15 - June 4, 2009. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. December 17, 2009.

Gruver, J., K. Bay, M. Kesterke, W. Erickson, K. Murray, and M. Ritzert. 2011. A Summary of Bat Studies and Fatalities from Wind Energy Facilities in the United States with an Emphasis on the Midwest. Oral Presentation (*invited*) given to the 2nd Joint Meeting Northeastern Bat Working Group, Midwest Bat Working Group, Southeastern Bat Diversity Network, and 21st Colloquium on the Conservation of Mammals in the Eastern United States, Louisville, Kentucky. February 23-25, 2011.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game and Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Hayes, J.P. and J.C. Gruver. 2000. Vertical Stratification of Activity of Bats in an Old-Growth Forest in Western Washington. Northwest Science 74(2): 102-108.

Howe, R.W., W. Evans, and A.T. Wolf. 2002. Effects of Wind Turbines on Birds and Bats in Northeastern Wisconsin. Prepared by University of Wisconsin-Green Bay, for Wisconsin Public Service Corporation and Madison Gas and Electric Company, Madison, Wisconsin. November 21, 2002. 104 pp.

Jacques Whitford Stantec Limited (Jacques Whitford). 2009. Ripley Wind Power Project Postconstruction Monitoring Report. Project No. 1037529.01. Report to Suncor Energy Products Inc., Calgary, Alberta, and Acciona Energy Products Inc., Calgary, Alberta. Prepared for the Ripley Wind Power Project Post-Construction Monitoring Program. Prepared by Jacques Whitford, Markham, Ontario. April 30, 2009. www.jacqueswhitford.com

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2007. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study – 2006. Final Report. Prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2009a. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study - 2007. Final report prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study. May 6, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, A. Fuerst, and C. Hansen. 2009b. Annual Report for the Noble Ellenburg Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Histed, and J. Meacham. 2009c. Annual Report for the Noble Clinton Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, and M. Lehman. 2009d. Maple Ridge Wind Power Avian and Bat Fatality Study Report - 2008. Annual Report for the Maple Ridge Wind Power Project, Post-construction Bird and Bat Fatality Study - 2008. Prepared for Iberdrola Renewables, Inc, Horizon Energy, and the Technical Advisory Committee (TAC) for the Maple Ridge Project Study. Prepared by Curry and Kerlinger, LLC. May 14, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Quant, and D. Pursell. 2009e. Annual Report for the Noble Bliss Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, L. Slobodnik, R. Curry, A. Fuerst, and A. Harte. 2010a. Annual Report for the Noble Bliss Windpark, LLC: Postconstruction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC. Prepared by Curry and Kerlinger, LLC, Cape May, New Jersey. March 9, 2010.

Jain, A., P. Kerlinger, L. Slobodnik, R. Curry, and K. Russell. 2010b. Annual Report for the Noble Clinton Windpark, LLC: Postconstruction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC. Prepared by Curry and Kerlinger, LLC, Cape May, New Jersey. March 9, 2010.

Jain, A., P. Kerlinger, L. Slobodnik, R. Curry, and K. Russell. 2010c. Annual Report for the Noble Ellenburg Windpark, LLC: Postconstruction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC. Prepared by Curry and Kerlinger, LLC, Cape May, New Jersey. March 14, 2010.

Jeffrey, J.D., K. Bay, W.P. Erickson, M. Sonneberg, J. Baker, M. Kesterke, J. Boehrs, and A. Palochak. 2009a. Portland General Electric Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring First Annual Report, Sherman County, Oregon. January 2008 - December 2008. Technical report prepared for Portland General Electric Company, Portland, Oregon. Prepared by Western EcoSystems Technology (WEST) Inc., Cheyenne, Wyoming, and Walla Walla, Washington. April 29, 2009.

Jeffrey, J.D., W.P. Erickson, K. Bay, M. Sonneberg, J. Baker, JR Boehrs, and A. Palochak. 2009b. Horizon Wind Energy, Elkhorn Valley Wind Project, Post-Construction Avian and Bat Monitoring, First Annual Report, January-December 2008. Technical report prepared for Telocaset Wind Power Partners, a subsidiary of Horizon Wind Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc., Cheyenne, Wyoming, and Walla Walla, Washington. May 4, 2009.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 2003. http://www.west-inc.com

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32(4): 1278-1288.

Kerlinger, P., R. Curry, L. Culp, A. Hasch, and A. Jain. 2010. Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California. Final Report: October 2009. Third Year Report (Revised). Prepared for Iberdrola Renewables, Inc. (IRI). Prepared by Curry and Kilinger, LLC., McLean, Virginia.

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 2007. Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Kronner, K., R. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Fatality Monitoring Study: 2006−2007. Final report prepared for PPM Energy and the Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc. (NWC), Mid-Columbia Field Office, Goldendale, Washington. June 1, 2008.

Kronner, K., R. Gritski, Z. Ruhlen, and T. Ruhlen. 2007. Leaning Juniper Phase I Wind Power Project, 2006-2007: Wildlife Monitoring Annual Report. Unpublished report prepared by Northwest Wildlife Consultants, Inc. for PacifiCorp Energy, Portland, Oregon.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007a. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71(8): 2449-2486.

Kunz, T.H., E.B. Arnett, W.P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5(6): 315-324.

Larson, D.J. and J.P. Hayes. 2000. Variability in Sensitivity of Anabat II Detectors and a Method of Calibration. Acta Chiropterologica 2: 209-213.

Limpens, H.J.G.A. and G.F. McCracken. 2004. Choosing a Bat Detector: Theoretical and Practical Aspects. *In*: Bat Echolocation Research: Tools, Techniques, and Analysis. R. M. Brigham, E. K. V. Kalko, G. Jones, S. Parsons, and H. J. G. A. Limpens, eds. Bat Conservation International, Austin, Texas. Pp. 28-37.

Long, C., J. Flint, and P. Lepper. 2010a. Insect Attraction to Wind Turbines: Does Colour Play a Role? European Journal of Wildlife Research: 1-9.

Long, C.V., J.A. Flint, and P.A. Lepper. 2010b. Wind Turbines and Bat Mortality: Doppler Shift Profiles and Ultrasonic Bat-Like Pulse Reflection from Moving Turbine Blades. Journal of the Acoustical Society of America 128(4): 2238-2245.

Miller, A. 2008. Patterns of Avian and Bat Mortality at a Utility-Scaled Wind Farm on the Southern High Plains. M.S. Thesis. Texas Tech University, August 2008. Available online at: http://www.batsandwind.org/pdf/Bibliography%20docs/Miller_Amanda_Thesis.pdf

Nicholson, C.P., J. R.D. Tankersley, J.K. Fiedler, and N.S. Nicholas. 2005. Assessment and Prediction of Bird and Bat Mortality at Wind Energy Facilities in the Southeastern United States. Final Report. Tennessee Valley Authority, Knoxville, Tennessee.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia; Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London 316: 335-427.

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. (WEST). 2007. Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, Oregon. Analysis conducted by WEST, Cheyenne, Wyoming. July 17, 2007.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the US and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31: 16-29.

Piorkowski, M.D. and T.J. O'Connell. 2010. Spatial Pattern of Summer Bat Mortality from Collisions with Wind Turbines in Mixed-Grass Prairie. American Midland Naturalist 164: 260-269.

Solick, D., A. Krause, A. Chatfield, and W. Erickson. 2010. Bat Acoustic Studies for the Alta East Wind Resource Area, Kern County, California. Final Report: July 7, 2009 – July 9, 2010. Prepared for CH2M HILL, Oakland, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Stantec Consulting, Inc. (Stantec). 2008. 2007 Spring, Summer, and Fall Post-Construction Bird and Bat Mortality Study at the Mars Hill Wind Farm, Maine. Prepared for UPC Wind Management, LLC, Cumberland, Maine. Prepared by Stantec (formerly Woodlot Alternatives, Inc.), Topsham, Maine. January 2008.

Stantec Consulting, Inc. (Stantec). 2009a. Post-Construction Monitoring at the Mars Hill Wind Farm, Maine - Year 2, 2008. Prepared for First Wind Management, LLC, Portland, Maine. Prepared by Stantec Consulting, Topsham, Maine. January 2009.

Stantec Consulting, Inc. (Stantec). 2009b. Post-Construction Monitoring at the Munnsville Wind Farm, New York: 2008. Prepared for E.ON Climate and Renewables, Austin, Texas. Prepared by Stantec Consulting, Topsham, Maine. January 2009.

Stantec Consulting, Inc. (Stantec). 2009c. Stetson I Mountain Wind Project. Year 1 Post-Construction Monitoring Report, 2009 for the Stetson Mountain Wind Project in Penobscot and Washington Counties, Maine. Prepared for First Wind Management, LLC. Portland, Maine. Prepared by Stantec, Topsham, Maine. January 2009.

Stantec Consulting, Inc. (Stantec). 2010. Cohocton and Dutch Hill Wind Farms Year 1 Post-Construction Monitoring Report, 2009, for the Cohocton and Dutch Hill Wind Farms in Cohocton, New York. Prepared for Canandaigua Power Partners, LLC and Canandaigua Power Partners II, LLC, Portland, Maine. Prepared by Stantec, Topsham, Maine. January 2010.

Stantec Consulting Ltd. (Stantec Ltd.). 2010b. Wolfe Island Ecopower Centre Post-Construction Followup Plan. Bird and Bat Resources Monitoring Report No. 2: July - December 2009. File No. 160960494. Prepared for TransAlta Corporation's wholly owned subsidiary, Canadian Renewable Energy Corporation. Prepared by Stantec Ltd., Guelph, Ontario. May 2010.

Thompson, J., D. Solick, and K. Bay. 2011. Post-Construction Fatality Surveys for the Dry Lake Phase I Wind Project. Iberdrola Renewables: September 2009 - November 2010. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 10, 2011.

Tidhar, D., W. Tidhar, and M. Sonnenberg. 2010. Post-Construction Fatality Surveys for Lempster Wind Project, Iberdrola Renewables. Prepared for Lempster Wind, LLC, Lempster Wind Technical Advisory Committee, and Iberdrola Renewables, Inc. Prepared by Western EcoSystems Technology Inc. (WEST), Waterbury, Vermont. September 30, 2010.

Tidhar, D., W.L. Tidhar, L. McManus, and Z. Courage. 2011. 2010 Post-Construction Fatality Surveys for the Lempster Wind Project, Lempster, New Hampshire. Prepared for Iberdrola Renewables, Inc. and the Lempster Wind Technical Committee. Prepared by Western EcoSystems Technology, Inc., Waterbury, Vermont. May 18, 2011.

TRC Environmental Corporation. 2008. Post-Construction Avian and Bat Fatality Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana. Prepared for Judith Gap Energy, LLC, Chicago, Illinois. TRC Environmental Corporation, Laramie, Wyoming. TRC Project 51883-01 (112416). January 2008. http://www.newwest.net/pdfs/AvianBatFatalityMonitoring.pdf

URS Corporation. 2010a. Final Goodnoe Hills Wind Project Avian Mortality Monitoring Report. Prepared for PacifiCorp, Salt Lake City, Utah. Prepared by URS Corporation, Seattle, Washington. March 16, 2010.

URS Corporation. 2010b. Final Marengo I Wind Project Year One Avian Mortality Monitoring Report. Prepared for PacifiCorp, Salt Lake City, Utah. Prepared by URS Corporation, Seattle, Washington. March 22, 2010.

URS Corporation. 2010c. Final Marengo II Wind Project Year One Avian Mortality Monitoring Report. Prepared for PacifiCorp, Salt Lake City, Utah. Prepared by URS Corporation, Seattle, Washington. March 22, 2010.

US Geological Survey (USGS). 2011. The National Map/US Topo. Last updated March 1, 2011. Homepage available at: http://nationalmap.gov/ustopo/index.html

Western EcoSystems Technology, Inc. (WEST). 2011. Post-Construction Fatality Surveys for the Barton Chapel Wind Project: Iberdrola Renewables. Version: July 2011. Iberdrola Renewables, Portland, Oregon.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002. Prepared for Pacificorp, Inc. Portland, Oregon, SeaWest Windpower Inc. San Diego, California, and Bureau of Land Management, Rawlins District Office, Rawlins, Wyoming.

Young, D.P. Jr., J. Jeffrey, W.P. Erickson, K. Bay, and V.K. Poulton. 2006. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring First Annual Report. Technical report prepared for Eurus Energy America Corporation, San Diego, California, and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Walla Walla, Washington. 25 pp.

Young, D.P. Jr., K. Bay, S. Nomani, and W. Tidhar. 2009a. NedPower Mount Storm Wind Energy Facility, Post-Construction Avian and Bat Monitoring: March - June 2009. Prepared for NedPower Mount Storm, LLC, Houston, Texas. Prepared by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming. August 17, 2009.

Young, D.P. Jr., W.P. Erickson, K. Bay, S. Nomani, and W. Tidhar. 2009b. Mount Storm Wind Energy Facility, Phase 1 Post-Construction Avian and Bat Monitoring, July - October 2008. Prepared for NedPower Mount Storm, LLC, Houston, Texas. Prepared by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming. February 17, 2009.

Young, D.P., Jr., J.D. Jeffrey, K. Bay, and W.P. Erickson. 2009c. Puget Sound Energy Hopkins Ridge Wind Project, Phase 1, Columbia County, Washington. Post-Construction Avian and Bat Monitoring, Second Annual Report: January - December, 2008. Prepared for Puget Sound Energy, Dayton, Washington, and the Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington. May 20, 2009.

Young, D.P. Jr., K. Bay, S. Nomani, and W. Tidhar. 2010a. NedPower Mount Storm Wind Energy Facility, Post-Construction Avian and Bat Monitoring: July - October 2009. Prepared for NedPower Mount Storm, LLC, Houston, Texas. Prepared by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming. February 12, 2010.

Young, D.P. Jr., K. Bay, S. Nomani, and W.L. Tidhar. 2010b. NedPower Mount Storm Wind Energy Facility, Post-Construction Avian and Bat Monitoring: April - July 2010. Prepared for NedPower Mount Storm, LLC, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 27, 2010.

Young, D.P. Jr., S. Nomani, W. Tidhar, and K. Bay. 2011. NedPower Mount Storm Wind Energy Facility, Post-Construction Avian and Bat Monitoring: July - October 2010. Prepared for NedPower Mount Storm, LLC, Houston, Texas. Prepared by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming. February 10, 2011.