

## MINUTES

### MEETING OF THE TECHNICAL COMMITTEE ESTABLISHED BY THE NEW HAMPSHIRE SITE EVALUATION COMMITTEE IN DOCKET NO. 2006-01: APPLICATION OF LEMPSTER WIND, LLC ORDER AND DECISION ISSUED JUNE 28, 2007

March 29, 2011

The Lempster Wind, LLC Technical Committee meeting began at 1:00 pm. on Tuesday, March 29, 2011. The following Committee members were present: New Hampshire Audubon Society (represented by Carol Foss); New Hampshire Fish and Game Department (represented by Carol Henderson); United States Fish and Wildlife Service (represented by Maria Tur); Iberdrola Renewables (represented by Kristen Goland and Jerry Roppe); Public Service Company of New Hampshire (represented by Kevin Bemis and Richard Dumore); and New Hampshire Office of Energy and Planning (represented by Joseph Broyles)<sup>1</sup>. New Hampshire Office of the Attorney General (represented by Evan Mulholland) was available via telephone. David Tidhar of WEST was also present. The following matters were discussed.

**1. Introduction.** Kristen Goland convened the meeting and reviewed the agenda. Carol Foss requested a copy of the “spring 2007 avian survey reports” noted in condition 1b of the condition agreement between NHOAG and Lempster Wind. Kristen was unaware of the specific study and noted, to the extent one exists, it will be provided to the members of the Technical Committee (TC). Kristen noted that formal comments from TC members were received via written correspondence and David would address any comment/recommendation that he is able to correct, and the discussion today was primarily to compare the two years. Maria Tur requested time to discuss specific comments she received that morning from Susi vonOettingen. Kristen noted that the 2010 report is not a combined report and that she expects WEST to write a 2009/2010 summary memorandum which is comprised of information presented to the TC at this meeting. Jerry Roppe discussed the originations and context for the Iberdrola Renewables Avian and Bat Protection Plan (ABPP) as a larger systems approach to environmental management (which Lempster Wind is subject to).

**2. Study Comparisons and Discussion.** David Tidhar presented a powerpoint presentation which summarized and compared the results of the 2009 and 2010 studies. A copy of the presentation is attached to the meeting minutes<sup>2</sup>. David Tidhar reviewed the similarities and differences between the two study years. The primary differences between the searches (weekly vs. daily intervals/ four vs. twelve sites) and 2009 containing a weather and visibility index, which was not repeated in 2010 due to difficulty in obtaining results in 2009. David reported that bird species found as fatalities in both years were common on a statewide and regional basis, with some common on a global basis. Bird species were also commonly detected as wind-energy fatalities at other facilities. No sensitive bird species were recorded as fatalities at the Lempster site during either study year. The majority of bat casualties were recorded during the fall migration

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<sup>1</sup> Joe announced that he will be retiring within a month. The TC wishes him the best of luck.

<sup>2</sup> The attached presentation has been modified slightly from the original meeting to reflect small typographical errors noted and discussed during the meeting.

season and the most commonly recorded bat species were long-distance migrant, tree-roosting species (silver-haired bat and hoary bat). For both years the vast majority of bird and bat fatalities were located within 40 meters of the turbines and the majority of the fatalities occurred during fall migration. This pattern is similar to other projects in the region. David discussed the similarity of results for searcher efficiency between the two study years as well as consistency within each study year in terms of effort as well as detection rates, indicating that searcher fatigue was not an issue. David concluded his presentation with a matrix of impacts noting that no matter how each study year fatality was analyzed (per MW, per turbine, or per facility) the results for the two survey years were very consistent.

Carol Foss was interested in the age and sex of the fatalities found. David noted that, to the extent that they could be identified they were. David has initiated a query of the results from the Lempster study and will provide additional information in the technical memorandum. Jerry Roppe suggested that the question of demographic composition of bird fatalities could be brought up to the American Wind and Wildlife Institute (AWWI) as a suggested research topic. Kristen said that she is in possession of all of the datasheets and would make them available to the TC should they have interest in looking at more specific data.

Kevin Bemis asked what was the significance of discussing fatality data by megawatt (MW). David said that it is a highly used metric which allows for comparison between other project sites, which may have different turbine type (size) and roughly correlated with rotor swept area.

Carol suggested that the fatality estimates be graphically depicted in a bar graph for the eastern region. David will provide revised regional figures in the final 2010 report.

Joe Broyles and Dick Dumore noted that by annualizing the result, it results in an overestimation of fatalities. David agreed and noted that not many industries have to estimate fatalities and the wind industry has felt it important to demonstrate a “worst case scenario” but noted that the USFWS (2002) and other sources (e.g. Erickson et al 2003) have noted that there are far worse collision impacts for birds, i.e. buildings, communication towers, automobiles etc., which are estimated without such scientific rigor. Jerry Roppe noted that it is important that the studies be defensible and that information exchange be transparent, thus an overestimation is expected. For the Lempster project, it has been conservatively estimated that over two years 150 birds comprised of 11 species have been killed. David Tidhar and Dick discussed the importance of putting the low level of fatality estimated at the Lempster Wind Farm into perspective through public education.

**3. 2010 Report Discussion.** Carol Foss, Joe Broyles, and Mike Marchand submitted written comments in advance of the meeting. Maria Tur was verbally prepared with several comments from the USFWS. All USFWS comments were discussed. The answers to the majority of the comments will be incorporated in the 2010 report with the exception of a request for an estimated annual fatality by species, which is being evaluated for statistical viability. David indicated that he believed the sample size was too small to come up with any meaningful estimate but that he would discuss with

statisticians. David reviewed individual written comments and discussed corrections/additions to the 2010 analysis. It would not be appropriate for the report authors to characterize the importance of fatality rates as requested in comment MM5. MM18 suggests a “high” scavenging rate. The scavenging rate was adjusted for within the fatality estimate. Members of the TC concurred.

**4. ABPP presentation.** Jerry Roppe discussed implementation of operational post-construction monitoring through the Iberdrola Renewables ABPP and Wildlife Monitoring and Reporting System (WMRS) and how it will be carried out at the Lempster facility with three levels of monitoring including incidental observations found during daily activities, monthly at each turbine combined with the Environmental Health and Safety SPCC Inspections, and seasonal (spring and fall) weekly inspections at a number of select turbines. Jerry explained that by using the WMRS incident data, IRI will be able to determine overall trends (e.g. fatality numbers and species composition) for the project which allows for investigations of adaptive management long after formal post-construction monitoring has occurred. Carol Henderson requested a copy of the yearly USFWS reporting which Kristen Goland said she would forward when available.

**4. Next Steps.** Members of the TC discussed the summary memorandum WEST will prepare comparing results of the two years. The TC agreed to review the memorandum and reply with comments via e-mail so a formal meeting would not be necessary. During the meeting Kristen called Evan Mulholland of NHOAG to discuss proper protocol and procedure for the TC approving the final work product. Evan replied that the TC is not subject to the NH “Right to Know” law and a face to face meeting is not required. WEST will complete the 2010 report, per TC recommendations and prepare a brief findings summary comparing the two years. Once the TC has reviewed the findings summary all documents will be submitted to the SEC.

It is not anticipated that there will be another meeting of the Lempster Technical Committee. The Committee has indicated that (per condition 1e) additional investigations are not warranted. Kristen thanked the Technical Committee for all their assistance of the past two years and noted that their door is always open to the TC should they have any questions regarding the ongoing ABPP efforts with Lempster or other projects.

The meeting was adjourned at 3:30 p.m.

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Submitted by Kristen Goland and circulated to the Technical Committee on April 5, 2011. Corrections are required not later than close of business on April 8, 2011. Please submit all corrections via e-mail to Kristen Goland and cc the entire Technical Committee.

# Post-construction Monitoring for the Lempster Wind Project, Lempster New Hampshire

Prepared for the  
Lempster Wind Project Technical Committee  
Concord, New Hampshire

March 29, 2011



*Specializing in Ecological Field Studies*

# Agenda

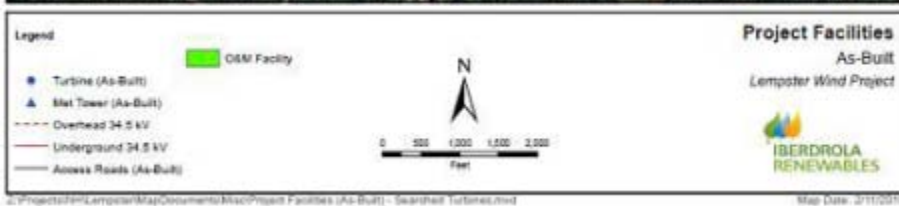
- Introductions
- Review results of 2010 study
- Review comparison of 2009 and 2010 results
- Questions

# Lempster Wind Farm

12 x 2.0 MW Gamesa G87 WTGs arrayed along a forested ridgeline ~300 – 500 meters apart

1 x 80 m meteorological (met) tower  
1 project O&M facility

Operational since November 2008  
PCM studies completed 2009 & 2010









# 2009 and 2010 PCM Study

## Objectives

1. To estimate bird and bat mortality attributable to the project
2. To provide a general understanding of the factors associated with the timing, extent, species composition, distribution, and location of the fatalities found.

## Study Components

- Standardized carcass searches
- Bias trials to estimate scavenger removal and searcher efficiency
- Adjusted fatality estimates for birds and bats calculated using the results from searcher efficiency and carcass removal trials.
- Completed: Spring April 15 – June 1 & Fall July 15 – October 31

# Inter-year Comparison 2009 & 2010

## Similarities

1. Objectives
2. Sampling period
3. Searchers
4. Field protocols
5. No. of carcass searches of met tower
6. Trials
7. Fatality estimator



## Differences

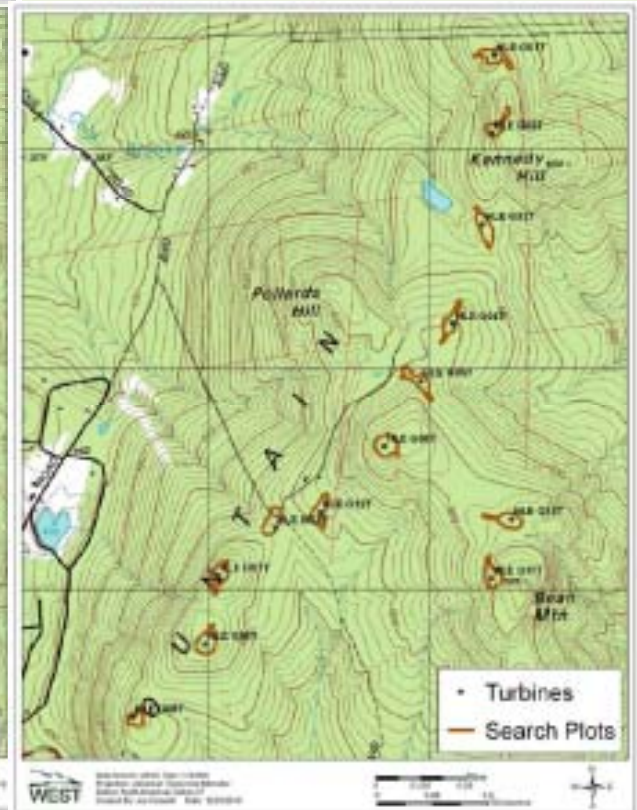
1. Turbine Search Plots  
2009 = 4 Daily ; 2010 = 12 Weekly
2. Analysis of weather and visibility index (only completed during 2009)

# 2009/2010 Effort

Component	2009	2010
# Scheduled Carcass Searches	598	289
# Searcher Efficiency Trial Carcasses	191	174
# Scavenger Removal Trial Carcasses	136	179



**Difference search effort**  
**Similarity trial effort**



# 2009/2010 Scheduled Carcass Search Results

Fatalities	Spring 2009	Spring 2010	Fall 2009	Fall 2010	2009	2010
# Birds	3	2	10	9	13	11
# Bats	1	0	9	14	10	14



**Similarity between results**



# 2009/2010 Bird Fatalities

## 2009 7 species – scheduled searches and incidentally

Species	Scheduled Searches		Total with Incidental	
	Total	% Composition	Total	% Composition
Magnolia warbler	2	22.2	2	15.4
Swainson's thrush	2	22.2	2	15.4
<del>Common yellowthroat</del>	1	11.1	1	7.7
Golden-crowned kinglet	1	11.1	3	23.1
<del>Ovenbird</del>	1	11.1	1	7.7
Red-eyed vireo	1	11.1	2	15.4
Unidentified flycatcher	1	11.1	2	15.4
<b>Overall</b>	<b>9</b>	<b>100</b>	<b>13</b>	<b>100</b>

## 2010 6 species – SC, no incidentals

Species	Standardized Searches	
	Number	% Composition
red-eyed vireo	4	36.4
blackpoll warbler	3	27.3
American crow	1	9.1
<del>eastern wood-pewee</del>	1	9.1
golden-crowned kinglet	1	9.1
mourning dove	1	9.1
<b>Overall</b>	<b>11</b>	<b>100</b>



**Common species both years**  
**No unusual or sensitive species found**

# 2009/2010 Bat Fatalities

## 2009 – 4 species

Species	Scheduled Searches		Total	
	Total	Percent Composition	Total	Percent Composition
Silver-haired bat	4	40.0	6	43.0
Hoary bat	3	30.0	3	21.5
Big-brown bat	2	20.0	2	14.0
Little brown bat	1	10.0	3	21.5
<b>Overall</b>	<b>10</b>	<b>100</b>	<b>14</b>	<b>100</b>

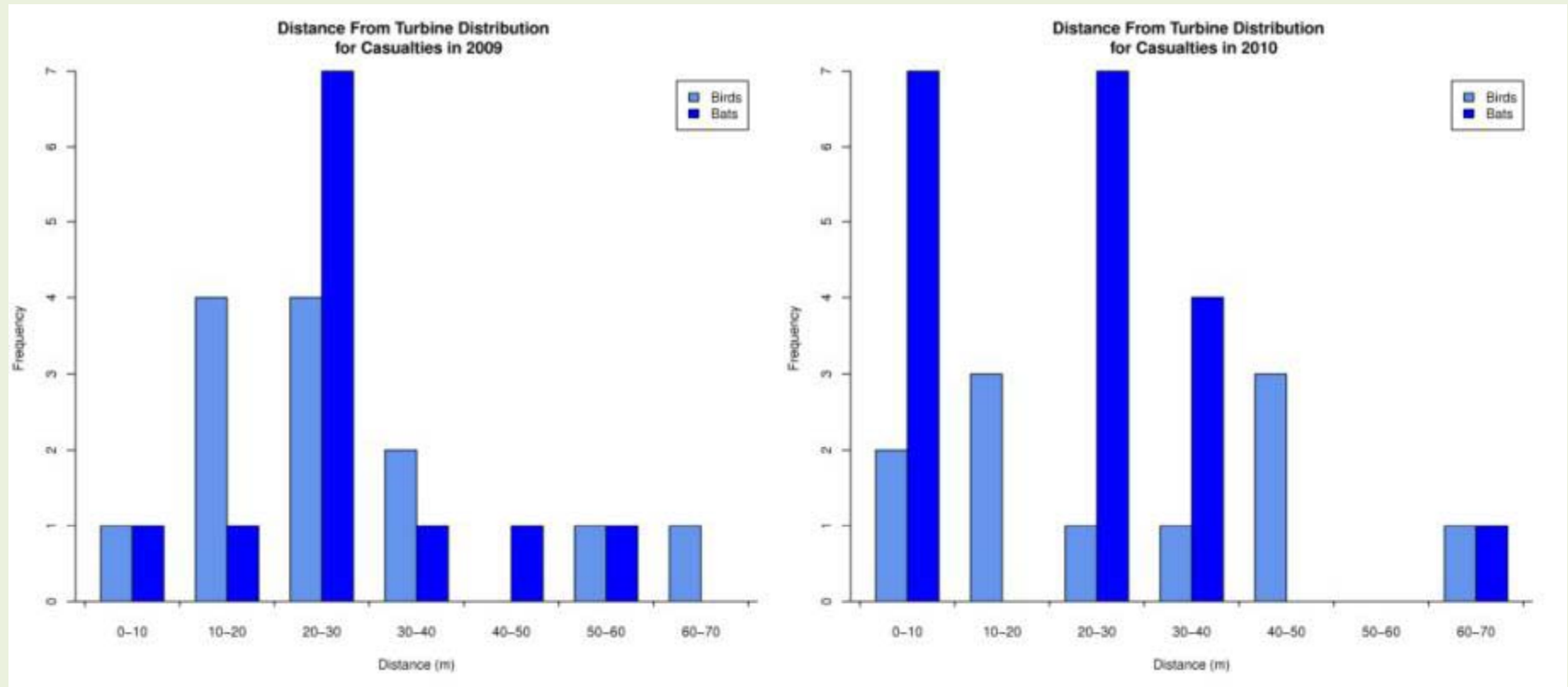
## 2010 – 4 species

Species	Scheduled Searches		Total	
	Total	Percent Composition	Total	Percent Composition
hoary bat	8	57.1	11	57.9
silver-haired bat	3	21.4	5	26.3
eastern red bat	2	14.3	2	10.5
tricolored bat	1	7.1	1	5.3
<b>Overall</b>	<b>14</b>	<b>100</b>	<b>19</b>	<b>100</b>

## Similarity between results



# 2009/2010 Distance



**Similarity between results**  
**Most birds and bats found between 0 to 40-m**

# 2009/2010 Periodicity

## Similarity between results

**Most birds found during fall migration period**

**Most birds found during September during 2009 and 2010**

**Few birds during spring**

**Most bats found during fall migration period**

**Few (2009) to no bats found during spring**





# 2009/2010 Searcher Efficiency

**2009**

Season	Carcass Type	Number Placed	Number Available	Number Found	Percent Available	Percent Found
Spring	Small bird	51	47	26	92.2	55.3
	Large bird	18	18	14	100	77.8
	Bat	0	-	-	-	-
Fall	Small bird	78	68	36	87.2	52.9
	Large bird	36	35	27	97.2	77.1
	Bat	8	7	4	87.5	57.1
<b>Overall</b>	<b>Small bird</b>	<b>129</b>	<b>115</b>	<b>62</b>	<b>89.1</b>	<b>53.9</b>
	<b>Large bird</b>	<b>54</b>	<b>53</b>	<b>41</b>	<b>98.1</b>	<b>77.4</b>
	<b>Bat</b>	<b>8</b>	<b>7</b>	<b>4</b>	<b>87.5</b>	<b>57.1</b>

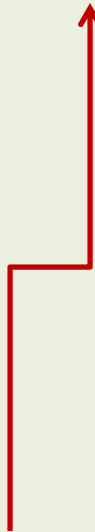
**2010**

Table 5.2-1. Summary of searcher efficiency trials conducted within the Lempster Wind Power Project in 2010.

Season	Carcass Type	Number Placed	Number Available	Number Found	Percent Found
Spring	Small bird	36	33	18	54.5
	Large bird	18	18	15	83.3
	Mouse	18	16	6	37.5
Fall	Small bird	42	38	22	57.9
	Large bird	18	17	11	64.7
	Mouse	42	36	17	47.2
<b>Overall</b>	<b>Small bird</b>	<b>78</b>	<b>71</b>	<b>40</b>	<b>56.3</b>
	<b>Large bird</b>	<b>36</b>	<b>35</b>	<b>26</b>	<b>74.3</b>
	<b>Mouse</b>	<b>60</b>	<b>52</b>	<b>23</b>	<b>44.2</b>



**Similarity between results**



# 2009/2010 Fatality Estimates

## Summary

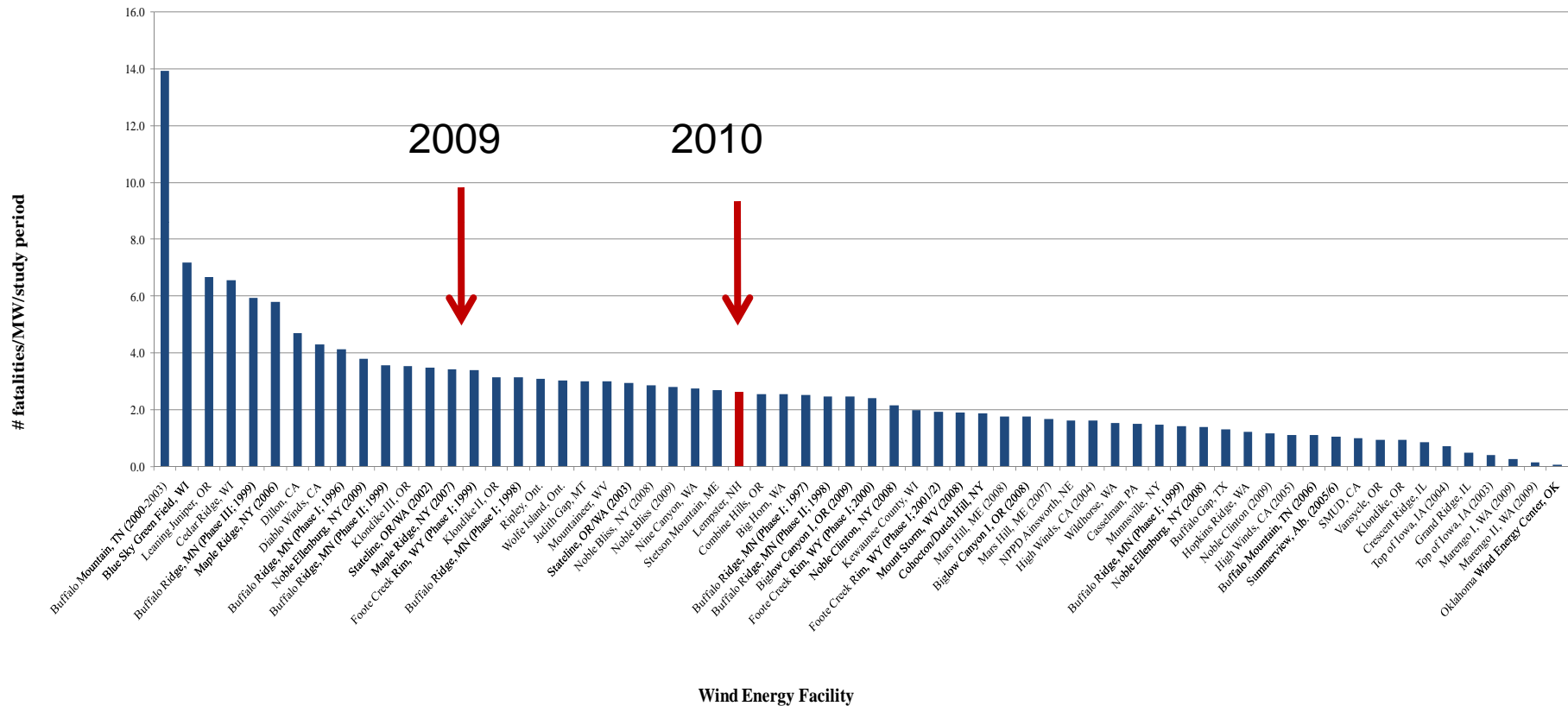
Year	Birds/turbine/Year	Birds/MW/Year	# Birds/Facility/Year	Bats/turbine/Year	Bats/MW/Year	# Bats/Facility/Year
2009	6.75	3.38	81.12	6.21	3.08	73.92
2010	5.27	2.64	63.24	7.13	3.57	85.56

**Results quantitatively and qualitatively similar**



# 2009/2010 Fatality Estimates

All Bird Fatality Rates

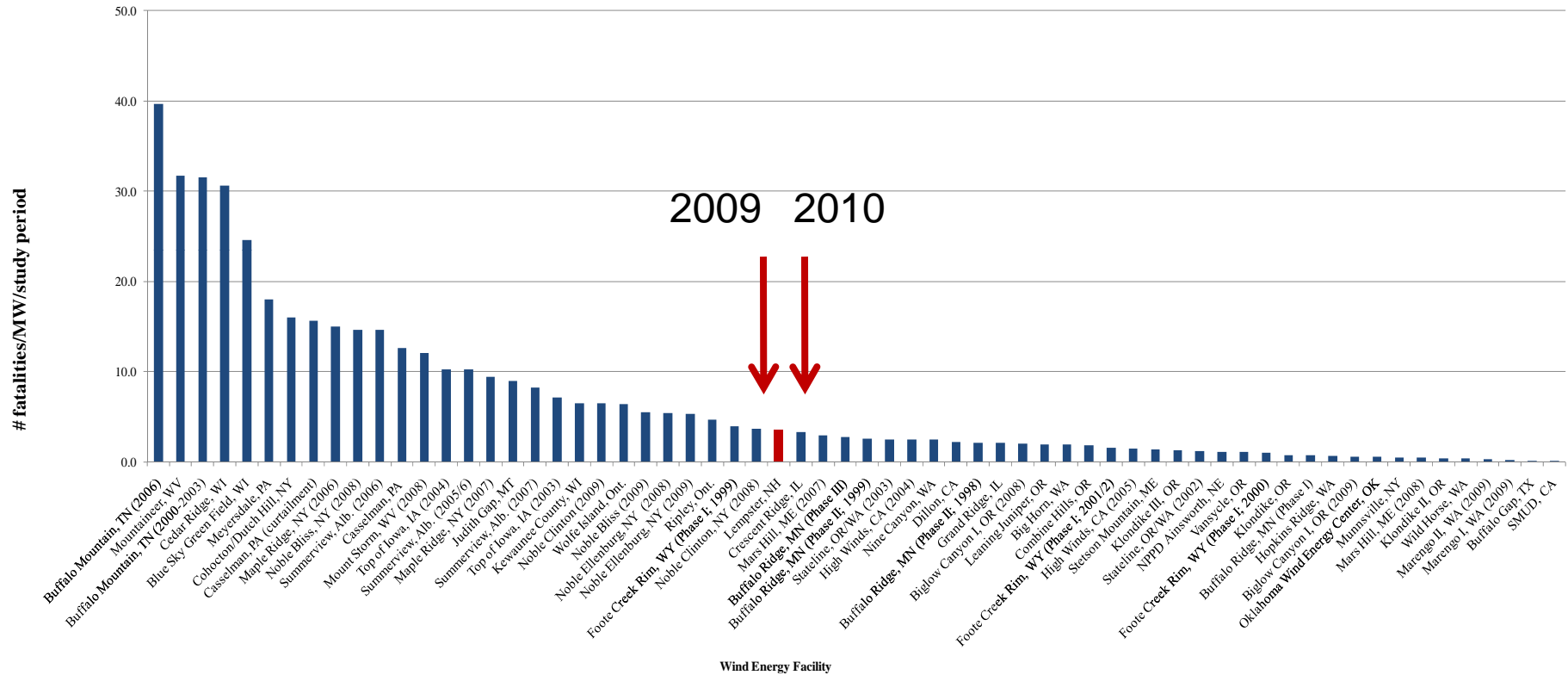


Similarity between results



# 2009/2010 Fatality Estimates

Bat Fatality Rates



Similarity between results



# Conclusions

## Similar

### Methods and metrics

Field methods and personnel

Searcher Efficiency and Scavenger Removal Trials

### Species Composition

Common species

No state or federally listed species

### Seasonal Use

Bird and bat

### Fatality Rates

Bird and bat

### Regional/National Patterns

Bird and bat



# Questions?

## Contact Information:

David Tidhar

[dtidhar@west-inc.com](mailto:dtidhar@west-inc.com)

802.244.1755





**IBERDROLA**  
**RENEWABLES**

# Compliance Management System (CMS) Project/ ABPP Overview

Jerry Roppe – Wildlife Compliance Manager, Iberdrola Renewables  
March 2011

## CMS-ABPP Overview

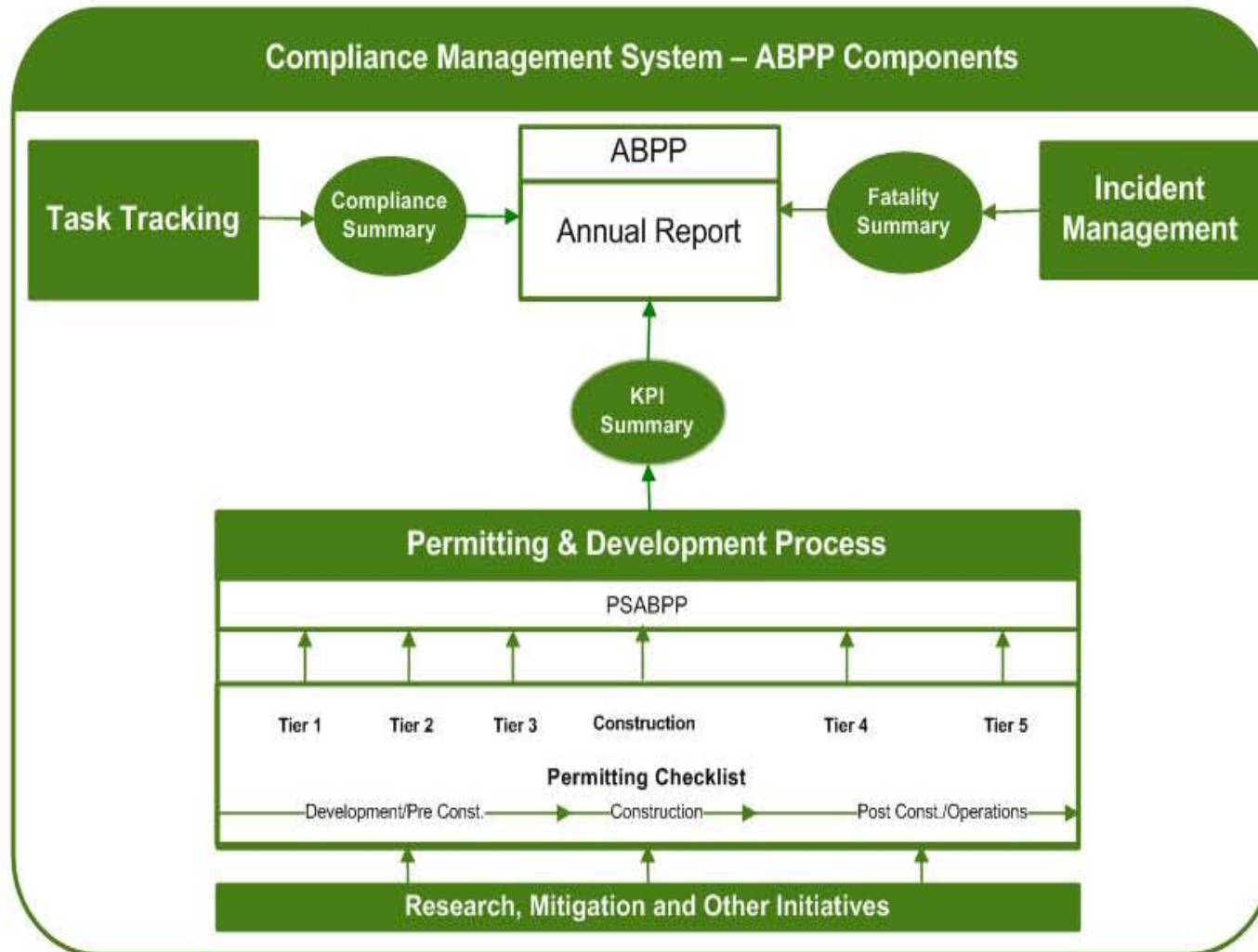
- Project Background/Scope
- Key Components
  - Permitting Process (KPI Summary)
  - Task Tracking (Performance Summary)
  - Incident Management/WMRS (Fatality Summary)



## ABBP - Project Background

- ABPP signed Oct 2008, implemented for 2009/2010 projects.
- Permitting is tasked with implementing the ABPP.
- ABPP encompasses project development (FAC Tier 1-5)
- Avian and bat BMPs with other environmental issues.
- Scope evolved to include aspects of wetland, vegetation, other wildlife, and land management ('non-EHS environmental compliance').
- Implementing compliance requires task tracking, incident management, and KPI monitoring.

# CMS: Components and Process

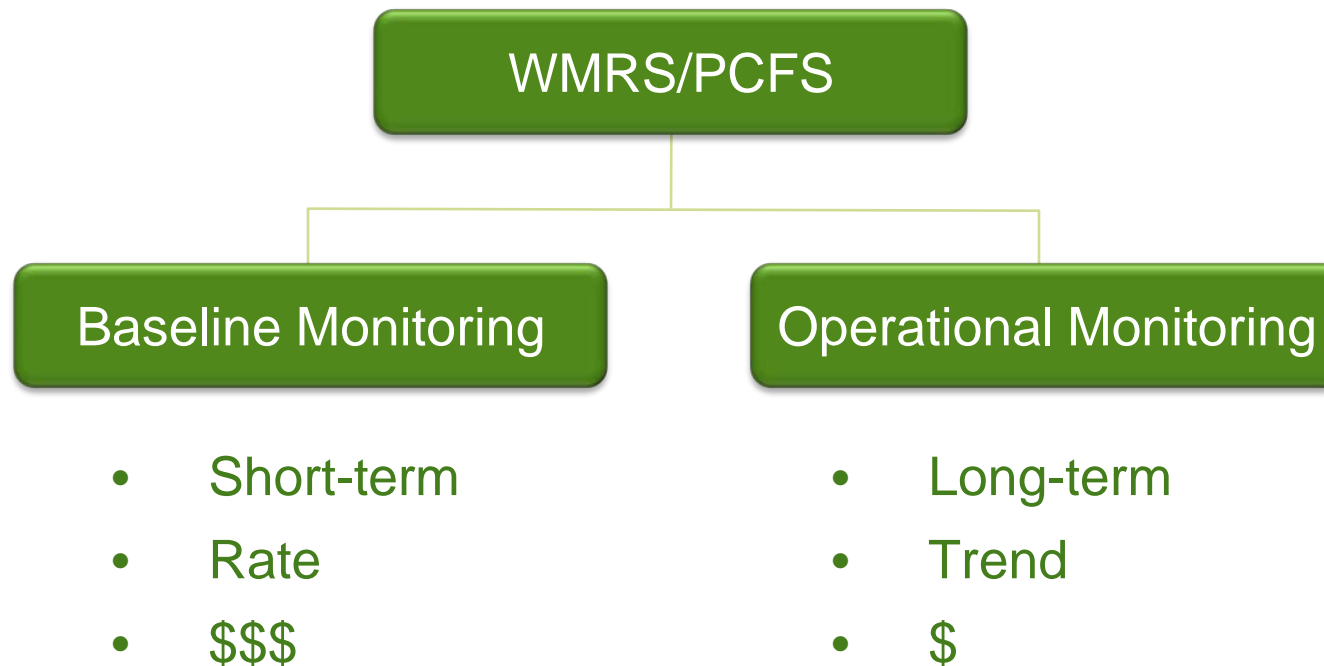


# Incident Management (Fatality Summary)



## Wildlife Monitoring and Reporting System (WMRS)

Post-construction fatality surveys (PCFS)





## ABBP - Project Background

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- Implementing compliance requires task tracking, incident management, and KPI monitoring.

# Wildlife Monitoring and Reporting System (WMRS)

- Systematic/methodical for Operations
- Assesses impacts of operations on birds and bats
- Proactive monitoring
- Leads to appropriate steps to reduce wildlife and habitat impacts

# Operational Monitoring

Document occurrence of **species of concern** and overall **species composition** of fatalities

Document with high probability **large mortality events**

Objectives:

Determine **trends** in fatality for bats, birds, and species of concern

**Demonstrate** ongoing permit and policy **compliance** with Federal and State regulations and guidelines

# Incident Reporting: Ops Monitoring



## Incidental Observations

- All personnel while you work

## Turbine Checks

- EHS Coordinator
- Conducted during monthly SPCC Inspections



## EC Inspections

- Environmental Coordinator (EC)
- Conducted weekly/seasonally





# Incident Management (Fatality Summary)

## – Ops Monitoring



### Wildlife Monitoring and Reporting System Incident Reporting Form

<b>FIND</b> A dead or injured bird, bat or other wildlife species, or sight a live species of concern...	<b>STOP</b> DO NOT handle, collect, or move the wildlife and...	<b>CALL</b> Your designated Environmental Coordinator or Plant Manager AND contact Wildlife Reporting: phone (503) 796-7168 fax (503) 796-6907 email <a href="mailto:wildlife.reporting@iberdrolaren.com">wildlife.reporting@iberdrolaren.com</a>
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**Complete form for any sighted, injured, or dead wildlife.**

**WHO** found: \_\_\_\_\_ **WHEN** found (date/time): \_\_\_\_\_

**WHAT** found (check box below):

Fatality/Carcass/Feathers	Injured Wildlife	Sighted Concerned Species
<input type="checkbox"/> Bird (describe): _____	<input type="checkbox"/> Bird (describe): _____	<input type="checkbox"/> Bird (describe): _____
<input type="checkbox"/> Bat (describe): _____	<input type="checkbox"/> Bat (describe): _____	<input type="checkbox"/> Bat (describe): _____
<input type="checkbox"/> Other (describe): _____	<input type="checkbox"/> Other (describe): _____	<input type="checkbox"/> Other (describe): _____
Remarks: _____	Remarks: _____	Remarks: _____

**WHERE** found/sighted (describe): \_\_\_\_\_

Project/Turbine no./Landmark: \_\_\_\_\_

Direction/distance (from turbine): \_\_\_\_\_

Remarks: \_\_\_\_\_

**COMMENTS:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**YOU MUST** mark or flag site if wildlife is dead or injured

**PHOTOGRAPH** discovery/sighting, if possible, and provide copy or file with submittal of form.

**HOW to notify:**

1. Contact Plant manager immediately
2. Call the wildlife reporting number (503) 796-7168
3. Email to [wildlife.reporting@iberdrolaren.com](mailto:wildlife.reporting@iberdrolaren.com) or fax to (503) 796-6907

**Reporting Support:**

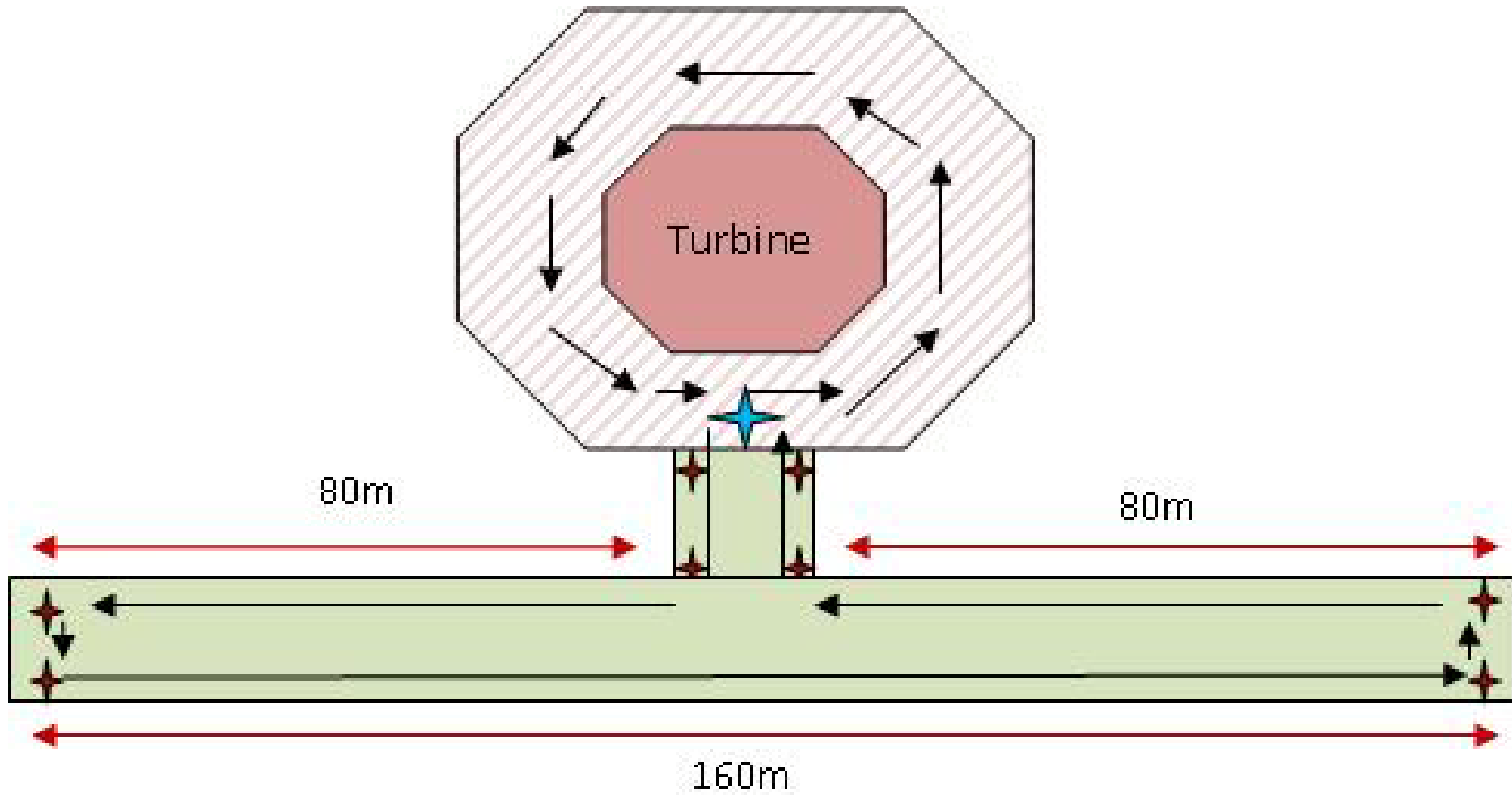
**Permitting Administrator**  
Tina Bartunek (503) 796-6941

**Wind Operations Wildlife**  
Permitting Compliance Manager  
Jerry Roppe (503) 796-6939

Permitting Administrator: Add Gensuite Tracking ID number: \_\_\_\_\_



# Inspections/Turbine Checks



# Evaluation of operations personnel for long-term monitoring of bird and bat fatalities



Jerry A. Roppe – Iberdrola Renewables, Portland, OR  
Wally Erickson/Clayton Derby – WEST Inc., Cheyenne, WY / Bismarck, N.D.

## Introduction and Goals

Iberdrola Renewables, Inc. is implementing a Wildlife Monitoring and Reporting System (WMRS), as part of the corporate Avian and Bat Protection Plan (ABPP) to systematically survey post-construction bird and bat fatalities by using a designated onsite Environmental Coordinator (EC). Unlike "Baseline monitoring", which consists of short-term intensive surveys involving standardized carcass searches and bias trials for searcher efficiency and carcass removal conducted by trained biologists, operational monitoring by the EC is a series of long-term standardized surveys using Operations personnel.

A key factor of validating the operational monitoring is testing the ability of the EC to detect bird or bat carcasses. The primary objective of the testing was to determine detection levels of bird and bat fatalities by the EC and assess application to long-term monitoring. The information collected during operational monitoring can act as a trigger to identify if additional monitoring or mitigation measures should be implemented.

## Study Sites

Carcass detection testing (searcher efficiency trials) was tested at wind projects located in Pennsylvania, Iowa, Texas, and Oregon (Figure 1).

The study sites were selected across the country to provide a variety of conditions and personnel for the testing. Site conditions ranged from forested ridge tops to cropland (corn, wheat).



Figure 1: 2010 Pilot Projects

## Methods

Detection testing (searcher efficiency trials) was conducted to evaluate the efficacy of EC (operations personnel) to detect fatalities at the 4 study sites. All the ECs received specific desktop and field training on conducting systematic searches along transects (access roads and turbine pads) at turbines

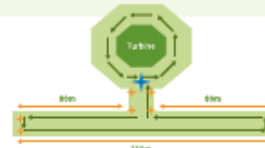


Figure 2: EC Search Transect

selected for survey. The survey routes were a series of search strips that started at the gravel turbine base and extended 80 meters either side of a turbine along existing access roads (Figure 2). To facilitate data entry, the EC used a GPS/PDA electronic data recorder using a Gensuite software module to collect field information (e.g., bird group, test markings, condition,



photos, location) on each survey and carcass. Three to seven days of "blind" testing were done at the study sites between March and September with a consulting biologist dropping carcasses for the EC. On a test day, 3 to 21 carcasses were randomly dropped at search turbines selected for testing. A total of 18 to 47 carcasses were placed at search turbines. Test carcasses at the sites included 18 to 37 small birds (starling, house sparrows) or bats and 0 to

10 large birds (waterfowl, upland gamebirds). No birds were used for testing at the Pennsylvania site due to permit restrictions. Detection levels were calculated for each EC based on the total number of carcasses and for each size category and reported with descriptive statistics.

**Acknowledgements:** Supporter and contributors to the surveys: ECs: Cory Pryor, Clayton Kienek, Kody Koster, and Jason Standridge  
Consulting Biologists: Trent Tainart, TEXSA; Michael Schirrmacher, BC; Kristan Chodachek, WEST; Tim Pitt, NWC  
Plant Managers and Tina Bartunek, Iberdrola Renewables

## Results

The ECs found 105 of 139 carcasses for an overall detection level for all carcasses of 76% (Table 1) with variation between 65% to 89% at the four test sites. For large bird carcasses, the overall detection level was 88% (22 of 25) and ranged from 57% to 88%. For small birds and bats, the overall detection level was 73% (83 of 114) and ranged from 65% to 86%. In addition to detection levels, reviews of field processing of carcasses and data entries indicated conformance to procedures. Field records were complete with downloads of information allowing appropriate follow up (e.g., identification) and data management.

Test Sites	Large Bird Carcasses			Small Bird / Bat Carcasses			Total Carcasses		
	Found	Available	%Found	Found	Available	%Found	Found	Available	%Found
Iowa	10	10	100%	24	37	65%	34	47	72%
Oregon	8	8	100%	8	10	80%	16	18	89%
Pennsylvania	-	-	-	20	31	65%	20	31	65%
Texas	4	7	57%	31	36	86%	35	43	81%
<b>Total</b>	<b>22</b>	<b>25</b>	<b>88%</b>	<b>83</b>	<b>114</b>	<b>73%</b>	<b>105</b>	<b>139</b>	<b>76%</b>

## Implications

Long-term monitoring of bird and bat fatalities by operations personnel provides a potential cost-effective approach to monitoring project impacts. Based on the high detection levels and conformance to survey protocols, the use of trained onsite personnel presents a valid option for long-term monitoring of post-construction bird and bat fatalities. Implications from the testing included the following:

- Visually unobstructed search areas with clearly delineated survey routes (graveled access roads) aided detection and safety.
- Use of access roads may introduce various biases (e.g., road kills and vehicle collisions versus turbine strikes).
- Training including desktop and field instructional sessions, detailed job aids (SOPs), ongoing coaching and mentoring with on-call support (e.g., consulting biologist) is essential for operation personnel understanding and awareness.
- Tools and equipment, including pre-programmed data field recorder with GPS and built-in camera, simplified and streamlined surveys, Gensuite data forms provided, required drop down fields with automated down loads to data warehouse and staff notification.
- Permitting restrictions limit the ability to handle or collect specimens and increase potential for misidentification of species.
- Ongoing training and audits need to be conducted to ensure conformance to WMRS protocol and confirm validity of approach.
- The Environmental Coordinator trained in bird and bat fatality monitoring also provides a potential onsite resource for other wildlife and environmental aspects for a project.
- Value in these methods are increased by consistency in implementation across multiple sites in multiple regions.
- Value in methods are realized after multiple years of implementation are numerous sites.



# Wildlife Monitoring and Reporting System (WMRS)

- Commenced operational monitoring Jan 1 2011
  - Incidental Observations
  - Turbine Checks
- Planned implementation of inspections with EC April 1, 2011
  - Audits
  - Training
  - Reporting

