



# Oregon

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**To:** Oregon Energy Facility Siting Council

**From:** Duane Kilsdonk, Compliance Officer

**Date:** August 19, 2021

**Subject:** Leaning Juniper IIA Wind Power Facility – 2021 Updates to Annual Monitoring Reporting for Wildlife Monitoring and Mitigation Plan (Condition 87)

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## Wildlife Monitoring and Mitigation Plan Overview

Leaning Juniper IIA Wind Power Facility is a wind energy generation facility consisting of 43 wind turbines, with a peak generating capacity of 90.3 megawatts (MW). The facility is located in Gilliam County. The Council issued a site certificate for the facility in 2007.

Condition 87 of the site certificate states that, “The certificate shall conduct wildlife monitoring as described in the Wildlife Monitoring and Mitigation Plan (WMMP) that is incorporated in the Final Order on Amendment #2 for LJF as Attachment D and as amended from time to time.”

The WMMP requires that the certificate holder implement short- and long-term wildlife monitoring during facility operation. Short-term wildlife monitoring requirements include a 2-year post construction Bird and Bat Fatality Monitoring Program and a Grassland Bird Study; these wildlife monitoring activities were completed in 2012-13. On-going long-term wildlife monitoring requirements include:

- Washington Ground Squirrel Surveys (Every 3-years for operational life of facility; 2014, 2017, 2020, etc.)
- Long-Term Raptor Nesting Surveys (Every 5-years for operational life of facility; 2015, 2020, 2025, etc.)
- Wildlife Monitoring and Reporting System (Ongoing)

## **August 2021 Updates Washington Ground Squirrel and Long-Term Raptor Nesting Surveys**

### **Washington Ground Squirrel Surveys**

The WMMP requires that the certificate holder conducts long-term monitoring for areas of previous use by Washington Ground Squirrel (WGS). The most recent long-term survey was completed in 2017, as reported in 2018. In the 2017 Annual Report, the certificate holder reported that there was no WGS activity detected at any of the nine survey areas. In general, the survey areas have seen an increase in vegetative density resulting in less suitable habitat for WGS occupancy. No wildlife monitoring was completed in 2020. Washington ground squirrel surveys planned for 2020 did not occur due to survey disruptions related to COVID-19 travel restrictions in the spring of 2020. Instead, the Certificate Holder completed these surveys in the spring (Mid-April and Mid-May) of 2021.

In August 2021, the certificate holder submitted the survey report for the WGS surveys conducted in Spring 2021. Ground squirrel surveys consisted of pedestrian transect surveys at historic 'areas of use' and 500 ft (152 m) buffers at nine sites at LJIA and 10 sites at LJIB. Overlap of adjacent 500-ft buffers resulted in six areas of use in LJIA and four areas of use in LJIB. Survey observations documented no changes from 2017 habitat suitability conditions, noting no new disturbances or erosion. No findings were reported for surveys conducted within the LJIA survey areas.

### **Long-Term Raptor Nesting Surveys**

The WMMP requires that the certificate holder conduct long term raptor nesting surveys every 5 years for the operational life of the facility, starting in 2015, scheduled for 2020, 2025, etc). The certificate holder reported that no long-term raptor nesting surveys were performed in 2020, due to Covid 19 survey disruptions. Instead, the Certificate Holder completed these surveys in the spring of 2021.

In August of 2021, the Certificate Holder submitted aerial survey data, obtained from Oregon Department of Fish and Wildlife (ODFW), of raptor nest location survey results from 2020 and 2021. No field surveys were reported, and no additional report was submitted with these maps.

### **Wildlife Monitoring and Reporting System**

Monitoring activities during 2020 for this facility include the ongoing Wildlife Monitoring and Reporting System, a program for responding to and handling avian and bat casualties found by personnel at the site during routine maintenance operations. No observations were reported for 2020. The certificate holder is obligated to notify USFWS and ODFW in the event that any federal or state endangered or threatened species are killed or injured onsite. No updates were reported in the August 2021 updates submitted by the Certificate Holder.

## **Public Comments on Wildlife Monitoring Results**

Section 5 of the WMMP, Data Reporting, establishes an opportunity for the public to review and comment on monitoring results. Specifically, the WMMP states, “The public will have an opportunity to receive information about monitoring results and to offer comment. Within 30 days after receiving the annual report of monitoring results, the Department will make the report available to the public on its website and will specify a time in which the public may submit comments to the Department.”

The Department received the annual monitoring results for the facility on August 5, 2021. In accordance with the terms of the WMMP, the Department provides a copy of the updated 2021 monitoring results for the Leaning Juniper IIA Wind Power Facility to the Council for review (attached) and posted a copy to the Department’s project website at: <http://www.oregon.gov/energy/facilities-safety/facilities/Pages/LJA.aspx> and has established 60-day timeframe to accept public comments.

Public comments are due **October 20, 2021**. and may be submitted to Duane Kilsdonk at [duane.kilsdonk@oregon.gov](mailto:duane.kilsdonk@oregon.gov)

Attachments: Wildlife Monitoring and Mitigation Plan (November 6, 2015)  
2021 Monitoring Updates (August 5, 2021)





## ENVIRONMENTAL & STATISTICAL CONSULTANTS

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**DATE:** July 30, 2021

**TO:** Matt Hutchison and Brant Ivey, Avangrid Renewables, LLC

**FROM:** Erik Jansen and Joshua Parrot, WEST, Inc.

**RE:** Final 2021 Washington Ground Squirrel (*Urocitellus washingtoni*) Survey Report for the Leaning Juniper IIA and IIB Wind Power Facility, Gilliam County, Oregon.

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### Introduction

Leaning Juniper Wind Power II, LLC (LJWP), a wholly owned subsidiary of Avangrid Renewables, LLC operates the Leaning Juniper IIA and IIB Wind Power Facility (Project; LJIIA or LJIIB) in Gilliam County, Oregon. Western Ecosystems Technology, Inc. (WEST) was contracted by LJWP to conduct Washington ground squirrel (*Urocitellus washingtoni*; ground squirrel) surveys per conditions in the Wildlife Monitoring and Mitigation Plan (WMMP) that was included in the 2009 Site Certificate, as amended (EFSC 2015). Starting in 2017, the amended WMMP required periodic monitoring of historic Washington ground squirrel colonies every three years for the life of the Project. Monitoring resumed in 2021 after postponed in 2020 due to the health and safety concerns and travel restrictions related to the COVID-19 pandemic. This memorandum describes the survey methodology and associated monitoring results in compliance with Permit Conditions #87 and #88 of the Final Order of the Site Certificate, and WMMP, as amended (LJWP 2009, EFSC 2015).

### Status and Natural History

A small rodent endemic to the Columbia Plateau, the Washington ground squirrel is no longer considered a federal candidate for listing, but is a state endangered species<sup>1</sup> in Oregon due to the reduced number of historic sites and distribution within the state (USFWS 2016, ODFW 2021).

Washington ground squirrels have an annual cycle characterized by a relatively short active period when all foraging, social, and reproductive activity takes place (Soto 2012). This period is followed by a longer period of dormancy, when animals live off accumulated fat reserves while hibernating in underground burrows (estivation). In Oregon, adult squirrels begin to emerge from winter hibernation between late January and early February (Sherman 2000). Young emerge from natal burrows as early as mid-March (Sherman 1999). The peak activity period is estimated to occur from the second week of April through the first week of May (Goodman 2003). Some sites may be noticeably active before and after these dates. Site-specific differences in chronology of activity levels do occur even among sites close in proximity (Goodman 2003). Peak activity occurs after the young have emerged. Active sites are most

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<sup>1</sup> Oregon Administrative Rule 635-100-0105

obvious at this time because of heightened visual and audio detections, fresh digging, and/or fresh droppings (Goodman 2003). Typically, if the survey is conducted during peak activity periods, vocalizations can be expected if the site is active, although squirrels in small dispersed sites may not always be vocal (Goodman 2003). Estivation is initiated at many sites by early June and accurate site delineation becomes impractical. Soil type is an important component of habitat selection and burrow integrity (Finger et al. 2007). Shrub-steppe habitat over deep silty loam soils, particularly Warden and Sagehill soils, are typically used (Rickart and Yensen 1991, Marr 2001, Morgan 2002, Marr 2004). Surveys at the Montague Wind Facility, adjacent to the Project and the Boardman Bombing Range, located further east, found associations with Warden, Sagehill, Willis and Olex soils and dense sagebrush cover (Greene et al. 2009, Kronner 2009).

### Survey Methods

To facilitate the 2021 survey effort, spatial data from previous survey efforts were obtained and mapped (Gritski et al. 2008, Gritski 2010 Downes et al. 2012, Downes and Gritski 2014, Gritski and Kronner 2017).

Ground squirrel surveys consisted of pedestrian transect surveys at historic 'areas of use' and 500 ft (152 m) buffers at nine sites at LJIIA and 10 sites at LJIIB (Survey Area; Gerhardt and Kronner 2017). Overlap of adjacent 500-ft buffers resulted in six areas of use in LJIIA and four areas of use in LJIIB (Figure 1). The term 'area of use' is analogous to a group of burrows that form a colony or site. Consistent with prior monitoring in 2017, biologists determined the current habitat suitability for ground squirrels at each Survey Area and recorded land use activity along with any evidence of Project-related conditions that might increase erosion or result in a decline in vegetation quality, thus adversely affecting a ground squirrel colony or its activity (LJWP11 2009, EFSC 2015). Habitat within areas of use that were converted from shrub-steppe to dryland wheat and classified as unsuitable ground squirrel habitat in 2017 were excluded from 2021 surveys.

The survey protocol followed guidance within the WMMP and methods outlined by Morgan and Nugent (1999) who describe sample techniques in areas where squirrel occupancy is unknown, and Goodman (2003) which is used in areas of known historical sites. Two rounds of surveys were conducted in mid-April and mid-May 2021. In the field, one biologist walked parallel meandering transects spaced approximately 164 ft (50 m) apart. To enhance the likelihood of detection, transects were oriented north-south the first round and east-west the second round. If an active burrow, historic burrow, or sign of squirrel was detected (see Active Site, below), the area within a 49-ft (15-m) radius of the point was searched for additional sign. If no sign was detected within the 49-ft radius area, radial transects spaced approximately 49 ft apart from the initial burrow entrance were surveyed to the edge of the Survey Area, marking all burrows detected. The process continued until the outer-most burrows were identified, thus delineating the furthest extent of the area of use. When documentation of all burrows was complete, parallel surveys continued along the same direction as before. Squirrel activity at the burrow followed Finger et al. (2007) and was defined as follows:

- Active Site – Confirmation of ground squirrel activity that includes observation of adults or juveniles, hearing alarm calls or other vocalizations, droppings outside of a freshly

used burrow. Tracks or disturbed soil at burrow entrance, clipped vegetation, fresh droppings, absence of spider webs at the burrow entrance, or intact burrow walls were all signs indicative of freshly used burrows.

- Inactive Site – During both rounds of surveys, transects were completed in the colony and no sign of individuals or evidence of burrows were observed.
- Unconfirmed Site – No ground squirrel activity was confirmed during transect surveys; however, typical ground-squirrel sized burrows occur at the site that ranged between 2.25–2.75 inches (5.7–7.0 centimeters) in diameter.

Surveys were conducted from sunrise until early afternoon, after which time aboveground squirrel activity typically diminishes (Morgan and Nugent 1999). Surveys were postponed if wind gusts exceeded 20 miles per hour (32 km per hour) due to issues with audio detection.

To delineate areas of use, burrow locations were imported into a GIS and each of the burrows was buffered by 15 meters and connected to form a polygon. The area of the polygon was calculated and the level of use at a site was classified according to the density of active burrows as described by Gerhardt and Kronner (2017) and implemented during pre-construction studies:

- Absent = No active burrows detected during either survey round,
- Very Low Use = less than one active burrow per hectare,
- Low Use = 1–5 active burrow(s) per hectare,
- Medium Use = 5–25 active burrows per hectare, or
- High Use = 25 or more active burrows per hectare,
- Very High Use = 250 or more active burrows per hectare.

## Results

Biologists conducted two rounds of pedestrian transect surveys within Survey Areas over six days total on April 17–19 and May 17–19, 2021. Habitat suitability for ground squirrels within the 500-ft buffer of the areas of use were similar to 2017 conditions; no additional disturbances that might increase erosion or result in a decline in vegetation quality were noted. Areas with unsuitable land cover (e.g., 13, 14, 15 in LJIB) that were excluded from 2017 survey were verified as cropland and excluded from 2021 surveys.

Approximately 76 ground squirrel burrows were documented within Survey Area 16-17 at LJIB (Figure 4). Of the 76 burrows, droppings, tracks, fresh excavation, or calls were heard at 68 burrows (Photos 1-3). Consistent with the approach described by Gerhardt and Kronner (2017), each burrow was buffered by 15 m, resulting in a 2.81 ac (1.14 ha) area of use which is classified as a High area of use (approximately 60 burrows per hectare). Burrows within the area of use are embedded along the berm on either side of a dirt two-track, extending approximately 18 m perpendicular from the two-track at a straight length of 0.28 mi from end to end (Figure 4). The majority of soils within the area of interest consisted of Olex gravelly silt loam followed by Willis silt loam (Natural Resources Conservation Service 2021).

## Literature Cited

- Downes, S. and B. Gritski. 2014. Leaning Juniper II Wind Power Facility 2014 Wildlife Monitoring. Prepared for Leaning Juniper II, LLC, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.
- Downes, S., B. Gritski, B. Anderson and S. Zielin. 2012. Leaning Juniper II Wind Power Facility Wildlife Monitoring Study Annual Report. March 2011–July 2012. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.
- Energy Facility Siting Council (EFSC). 2015. Leaning Juniper IIA and IIB Wind Projects: Ongoing Wildlife Monitoring and Mitigation Plan. November 6. Available online: <https://www.oregon.gov/energy/facilities-safety/facilities/Pages/LJA.aspx>
- Finger, R., G. J. Wiles, J. Tabor, and E. Cummins. 2007. Washington ground squirrel surveys in Adams, Douglas, and Grant Counties, Washington, 2004. Washington Department of Fish and Wildlife, Olympia. June.
- Gerhardt, R. and K. Kronner. 2017. Leaning Juniper II Wind Power Facility 2017 Washington Ground Squirrel Monitoring. Prepared for Leaning Juniper II, LLC, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.
- Goodman, S. 2003. 2003 protocol for Washington ground squirrel surveys. Washington Department of Fish and Wildlife. Olympia.
- Greene, E. R. G. Anthony, V. Marr, and R. Morgan. 2009. Abundance and Habitat Associations of Washington Ground Squirrels in the Columbian Basin, Oregon. *The American Midland Naturalist* 162(1), 29-42.
- Gritski, B. K. Kronner, and S. Downes. 2008. Leaning Juniper Phase I Wind Power Project, 2006–2008. Wildlife Monitoring Final Report. Prepared for PacifiCorp Energy, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.
- Gritski, B. 2010. 2010 Leaning Juniper Washington Ground Squirrel Monitoring of 2005 Sites for ODFW-issued Incidental Take Permit Requirements. Prepared for PacifiCorp Energy, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.
- Kronner, K. 2009. Unpublished field notes for surveys conducted from 2001-2009 in the vicinity of the Montague Wind Facility. Northwest Wildlife Consultants, Goldendale, WA. In Montague Wind Power Facility Application for Site Certificate. Exhibit Q threatened and Endangered Plant and Animal species.
- Leaning Juniper Wind Power II (LJWP), LLC. 2009. Leaning Juniper II Wind Project: Wildlife Monitoring and Mitigation Plan. November 20, 2009. Oregon Energy Facility Siting Council of the State of Oregon, Final Order on Amendment #1-Attachment A. First Amended Site Certificate for the Leaning Juniper II Wind Power Facility.
- Marr, V. 2001. Effects of 1998 wildfire on Washington ground squirrels and their habitat at Naval Weapons Systems Training Facility, Boardman, Oregon. Unpublished report for Oregon Department of Fish and Wildlife, Heppner, Oregon.
- Marr, V. 2004. Washington ground squirrel monitoring. Boardman Conservation Area, 2004. Oregon Department of Fish and Wildlife, Salem, Oregon.



- Morgan, R. L. 2002. Status and habitat use of the Washington ground squirrel *Spermophilus washingtoni* on Bureau of Land Management lands, Horn Butte, Oregon in 2001. Oregon Department of Fish and Wildlife, Salem, Oregon.
- Morgan, R. L., and M. Nugent. 1999. Status and habitat use of the Washington ground squirrel (*Spermophilus washingtoni*) on State of Oregon Lands, South Boeing, Oregon in 1999. Report to the Oregon Department of Fish and Wildlife.
- Multi-Resolution Land Characteristics (MRLC). 2019. National Land Cover Database (NLCD) 2016. Multi-Resolution Land Characteristics (MRLC) Consortium. US Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center, MRLC Project, Sioux Falls, South Dakota. May 10, 2019. Information online: <https://www.mrlc.gov/data>
- Natural Resources Conservation Service. 2021. Web Soil Survey. Available online: <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>
- Oregon Department of Fish and Wildlife. 2021. Threatened, Endangered and Candidate Fish and Wildlife Species. Available online: [https://www.dfw.state.or.us/wildlife/diversity/species/threatened\\_endangered\\_candidate\\_list.asp](https://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp). Accessed July 17, 2021.
- Rickart, E. A. and E. Yensen. 1991. *Spermophilus washingtoni*. Mammalian Species 371:1–5.
- Sherman, P. W. 1999. Behavioral ecology of Washington ground squirrels (*Spermophilus washingtoni*). Annual Report of Scientific Permittee. Cornell University, Ithaca, New York.
- Sherman, P. W. 2000. Distribution and behavior of Washington ground squirrels (*Spermophilus washingtoni*) in central Washington. Annual Report of Scientific Permittee. (#00-027) Cornell University, Ithaca, New York.
- U.S. Fish and Wildlife Service. 2016. Endangered and threatened wildlife and plants; 12-month findings on petitions to list nine species and endangered or threatened species. Federal Register 81:64843–64857.

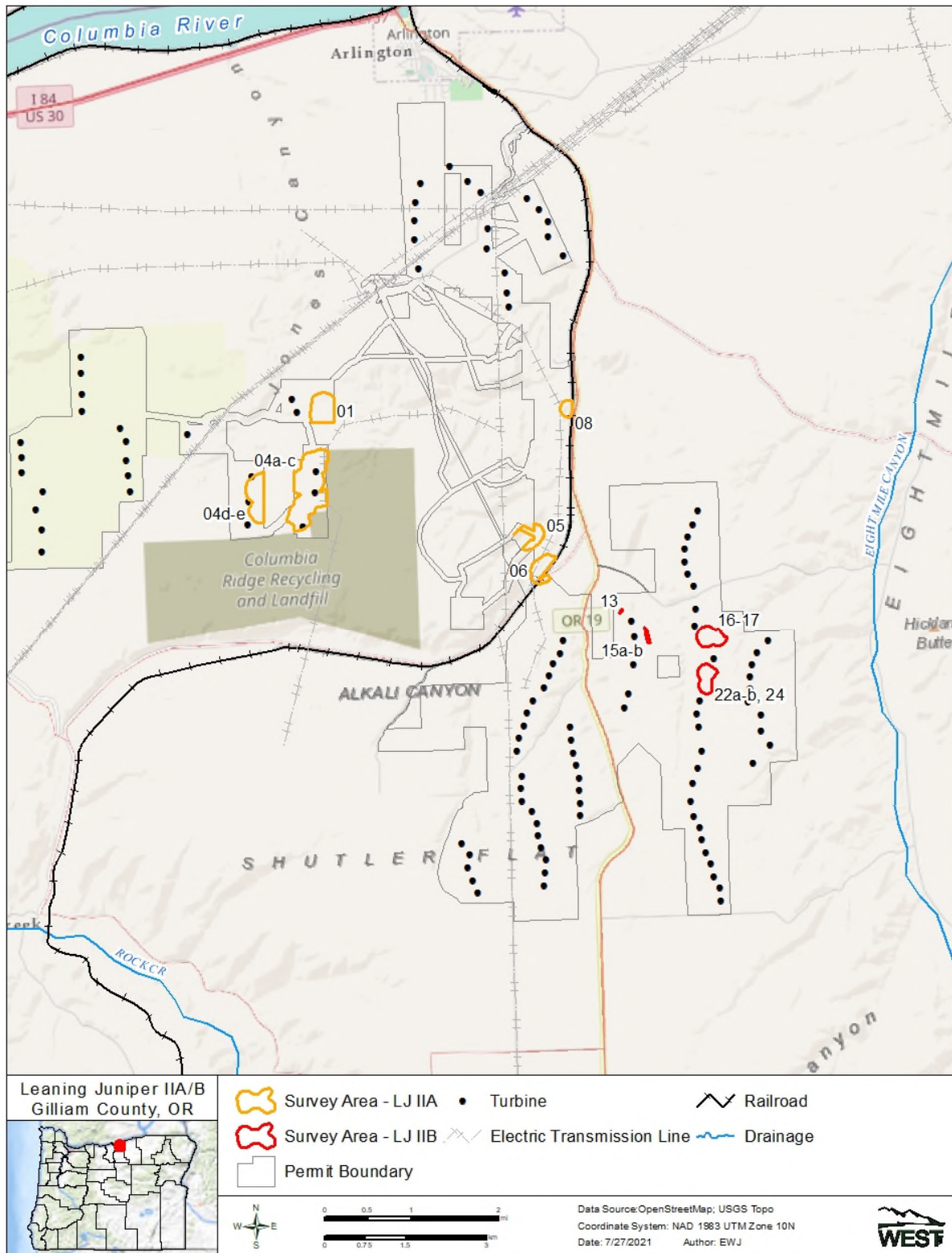


Figure 1. Vicinity map of the Washington ground squirrel Survey Areas at the Leaning Juniper IIA and IIB Wind Power Facility in Gilliam County, Oregon.

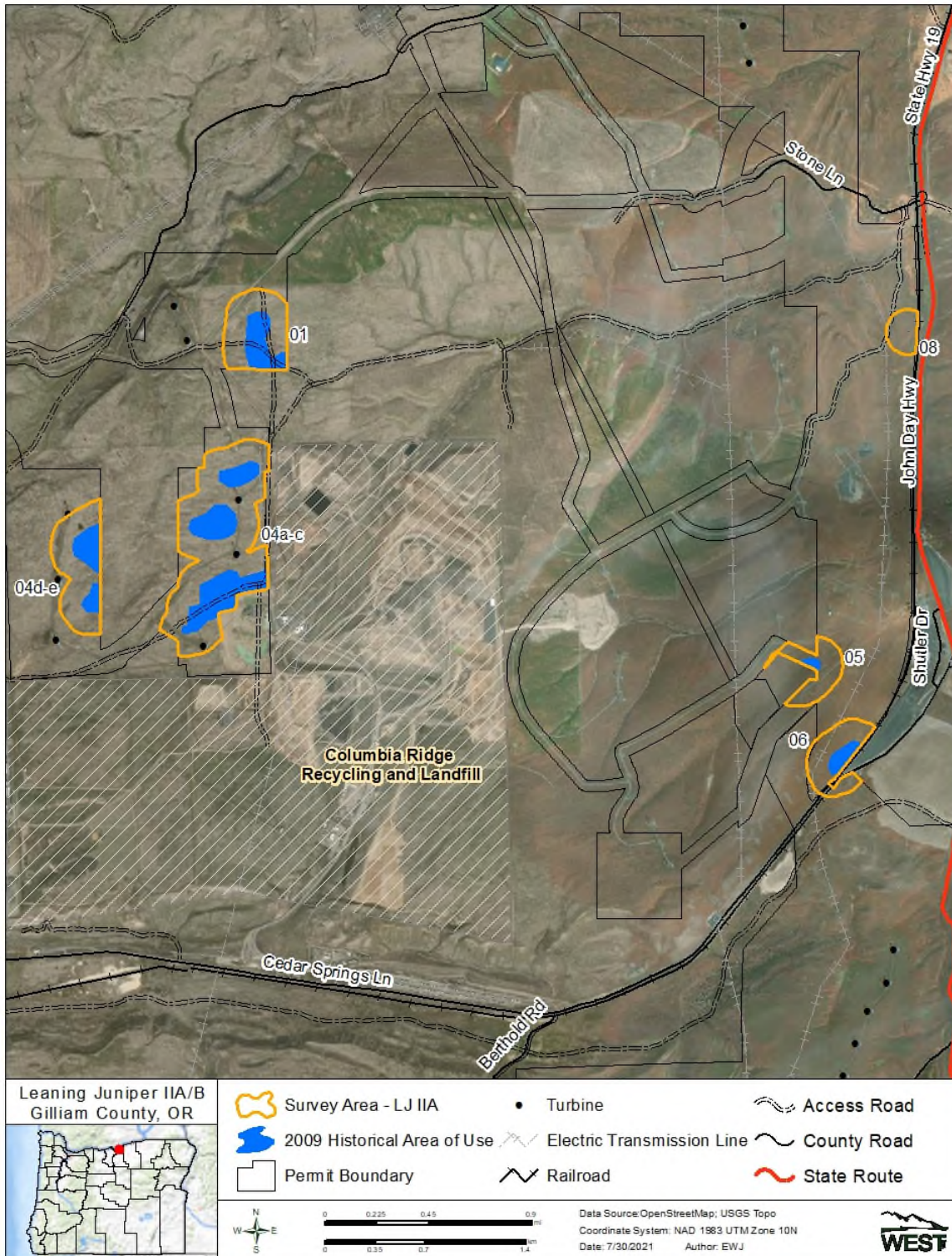


Figure 2. Washington ground squirrel Survey Areas and historical areas of use documented pre-construction at the Leaning Juniper IIA Wind Power Facility in Gilliam County, Oregon.

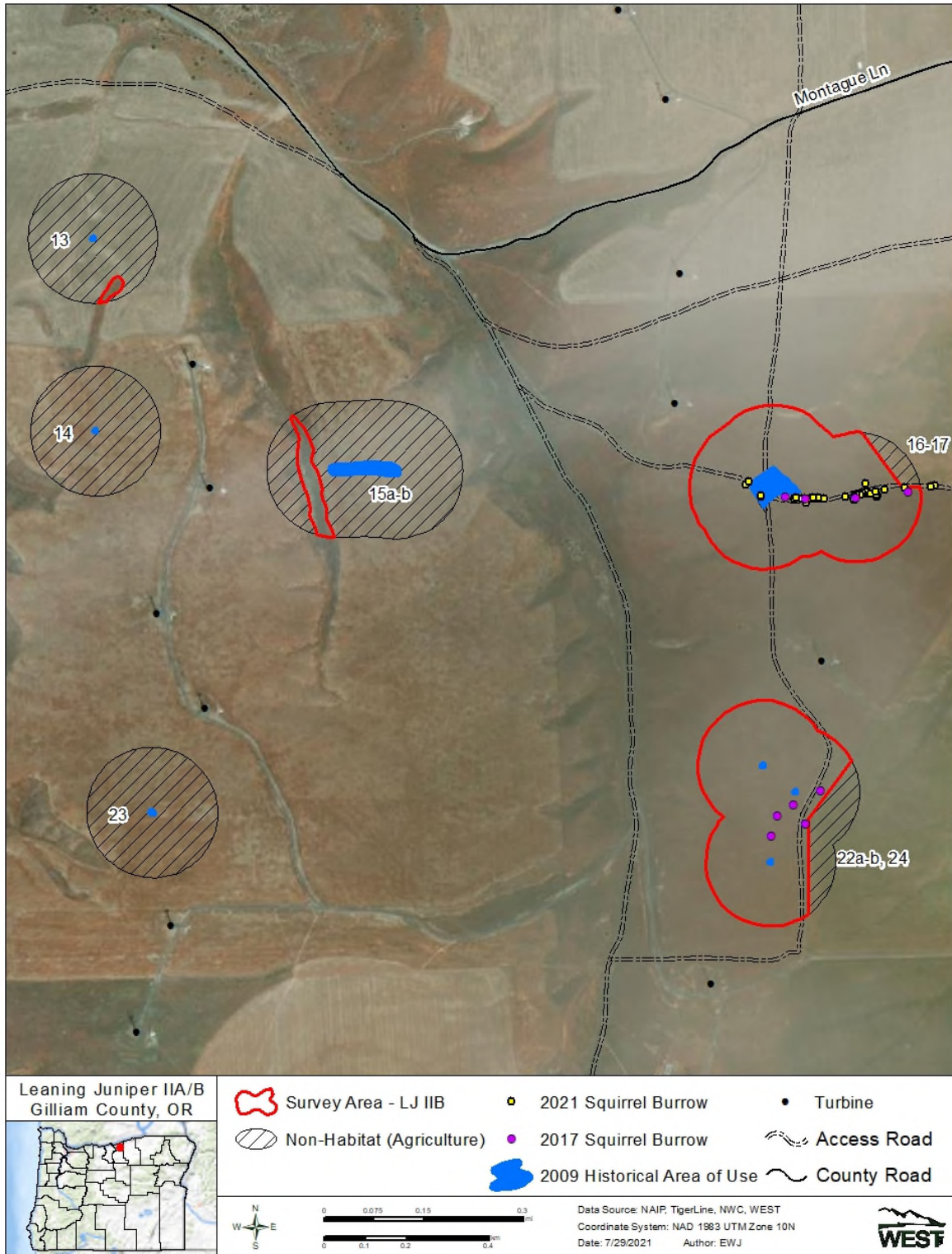


Figure 3. Washington ground squirrel Survey Areas, historical areas of use and contemporary detections at the Leaning Juniper IIB Wind Power Facility in Gilliam County, Oregon.

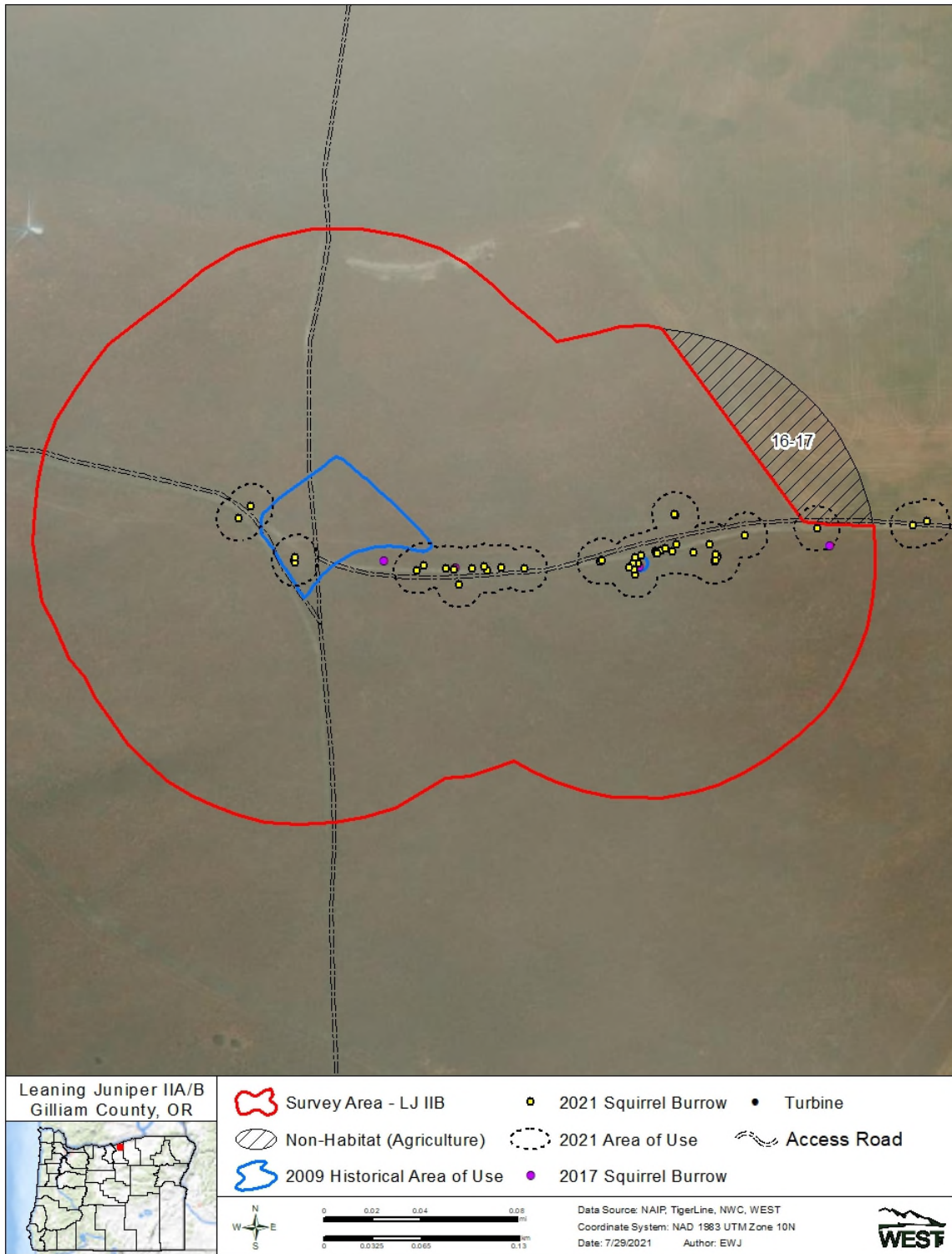


Figure 4. Burrows and corresponding area of use documented in 2021 compared to results from previous surveys at Survey Area 16-17 at the Leaning Juniper IIB Wind Power Facility in Gilliam County, Oregon.



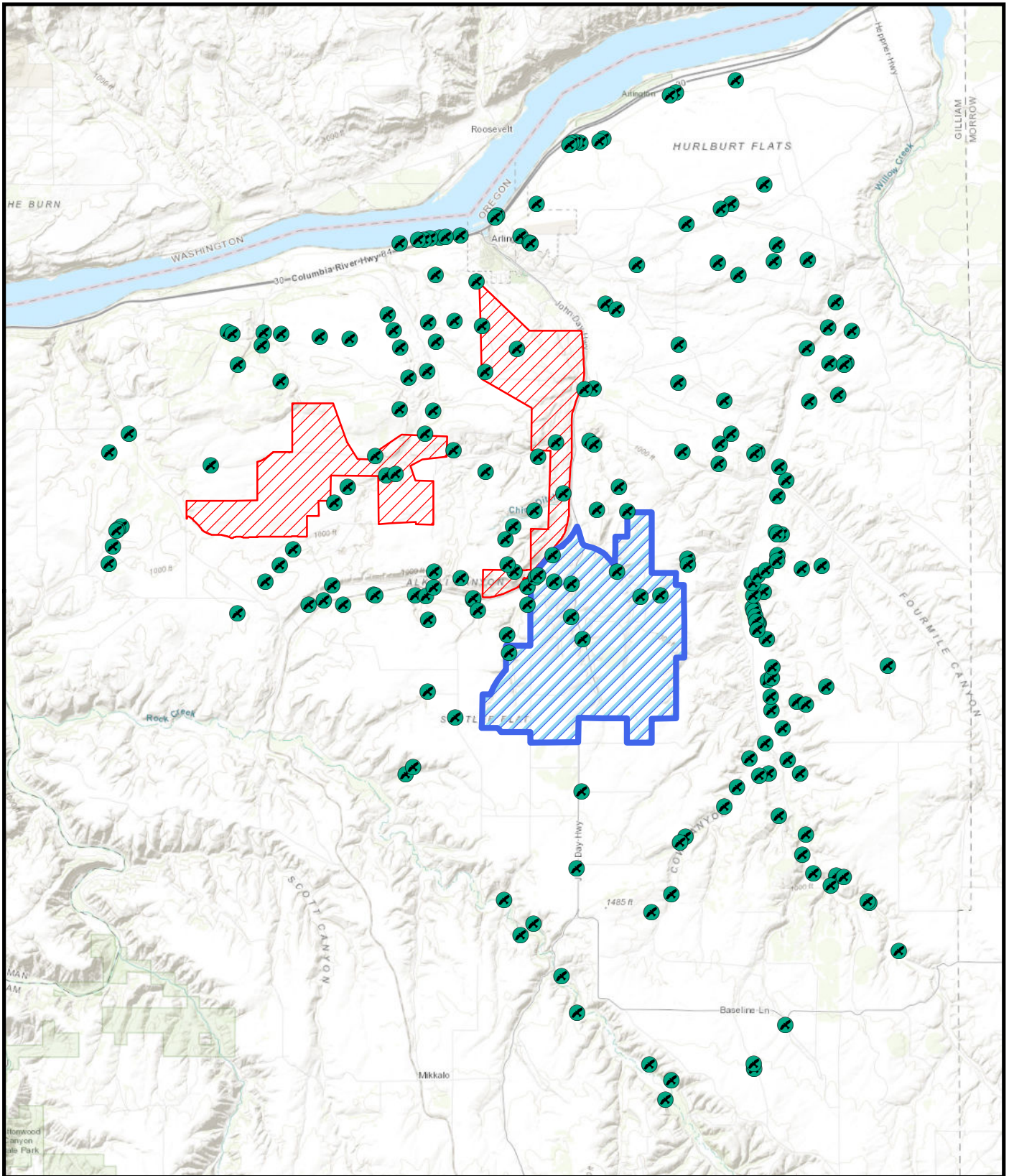
**Photo 1. Facing south into the Project from Survey Area 16-17 where the majority of burrows were located at the Leaning Juniper IIB Wind Power Facility in Gilliam County, Oregon.**



**Photo 2. Facing north into the Project from Survey Area 16-17 where there was comparatively less vegetation cover and ground squirrel burrow at the Leaning Juniper IIB Wind Power Facility in Gilliam County, Oregon.**



**Photo 3. Active Washington ground squirrel burrow at Survey Area 16-17, Leaning Juniper IIB Wind Power Facility in Gilliam County, Oregon.**

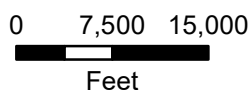


 Nest Location

**Project Boundary**

 Leaning Juniper IIa

 Leaning Juniper IIb



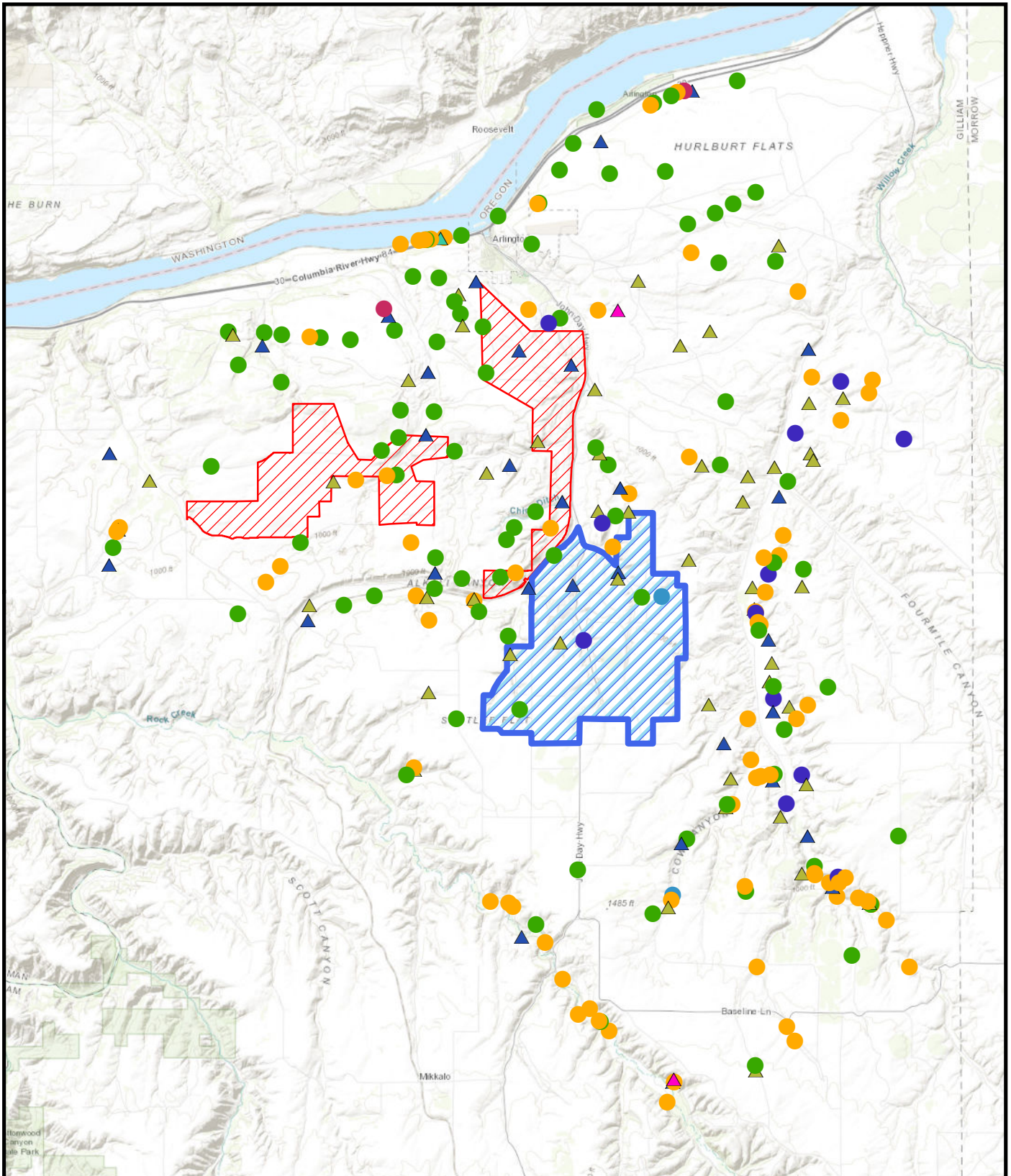
**Nest Data 2020**  
**Leaning Juniper IIA and IIB**














<b>Project Boundary</b>		<b>Species</b>		● IA	N ▲	<b>Nest Data 2021</b> <b>Leaning Juniper IIA and IIB</b>
	Leaning Juniper IIA	● BNOW	▲ PEFA	▲ PRFA		
	Leaning Juniper IIB	● CORA	▲ RTHA	▲ SWHA	0 7,500 15,000 Feet	
		● FEHA				
		● GHOW				

## **Leaning Juniper IIA Wind Project: Wildlife Monitoring and Mitigation Plan** **[JUNE 11, 2015]**

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1           This plan describes wildlife monitoring that the certificate holder shall conduct during  
2 operation of the Leaning Juniper IIA Wind Power Facility.<sup>1</sup> The monitoring objectives are to  
3 determine whether the facility causes significant fatalities of birds and bats and to determine  
4 whether the facility results in a loss of habitat quality.

5           Per Amendment 2 to Leaning Juniper II Wind Power Facility (LJF), the facility was  
6 divided into two separate facilities with LJIIA and LJIIB each receiving its own site certificate.  
7 However, the site certificate holders agreed to share mitigation and environmental  
8 responsibilities. Therefore, the requirements for the facility as a whole, including both LJIIA and  
9 LJIIB, remain in this Wildlife Monitoring and Mitigation Plan (WMMP) and each individual site  
10 certificate holder remains bound by its terms.

11           LJF consists of up to 117 wind turbines, four non-guyed meteorological (met) towers and  
12 other related or supporting facilities as described in the site certificate. The permanent facility  
13 components occupy approximately 111 acres, of which up to 52 acres is Category 5 wildlife  
14 habitat or better, based on the Oregon Department of Fish and Wildlife (ODFW) standards (OAR  
15 635-415-0025).<sup>2</sup>

16           The certificate holder shall use experienced personnel to implement the monitoring  
17 required under this plan and properly trained personnel to conduct the monitoring, subject to  
18 approval by the Oregon Department of Energy (Department) as to professional qualifications.  
19 For all components of this plan except the Wildlife Monitoring and Reporting System (WMRS),  
20 the certificate holder shall hire an independent third party (not employees of the certificate  
21 holder) to perform monitoring tasks.

22           The Wildlife Monitoring and Mitigation Plan for the facility has the following  
23 components:

- 24           1) Fatality monitoring program including:
  - 25                   a) Removal trials
  - 26                   b) Searcher efficiency trials
  - 27                   c) Fatality search protocol
  - 28                   d) Statistical analysis
- 29           2) Raptor nesting surveys
- 30           3) Washington ground squirrel surveys
- 31           4) Grassland bird study
- 32           5) Wildlife Monitoring and Reporting System

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<sup>1</sup> This plan is incorporated by reference in the site certificate for the LJF and must be understood in that context. It is not a “stand-alone” document. This plan does not contain all mitigation required of the certificate holder.

<sup>2</sup> A more complete description of the habitat areas affected by the each facility, LJIIA and LJIIB, is provided in the Final Order on Amendment #1, Section IV.4(b), which expanded the site boundary to include LJIIB

**Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan**  
[JUNE 11, 2015]

1 Based on the results of the monitoring programs, mitigation of significant impacts may be  
2 required. The selection of the mitigation actions should allow for flexibility in creating  
3 appropriate responses to monitoring results that cannot be known in advance. If the Department  
4 determines that mitigation is needed, the certificate holder shall propose appropriate mitigation  
5 actions to the Department and shall carry out mitigation actions approved by the Department,  
6 subject to review by the Oregon Energy Facility Council (Council).

7 **1. Fatality Monitoring**

8 The certificate holder shall conduct two years of post-construction fatality monitoring starting  
9 following substantial completion or commercial operations date (COD) of LJIIA reflecting  
10 operating impacts on wildlife.

11 (a) Definitions and Methods

12 • Seasons

13 This plan uses the following dates for defining seasons:

Season	Dates
Spring Migration	March 16 to May 15
Summer/Breeding	May 16 to August 15
Fall Migration	August 16 to October 31
Winter	November 1 to March 15

14 • Search Plots

15 The certificate holder shall conduct fatality monitoring within search plots. The  
16 certificate holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW),  
17 shall select search plots based on a systematic sampling design that ensures that the selected  
18 search plots are representative of the habitat conditions in different parts of the site. Each search  
19 plot will contain one turbine. Search plots will be square or circular. Circular search plots will be  
20 centered on the turbine location and will have a radius equal to the maximum blade tip height of  
21 the turbine contained within the plot. “Maximum blade tip height” is the turbine hub-height plus  
22 one-half the rotor diameter. Square search plots will be of sufficient size to contain a circular  
23 search plot as described above. The certificate holder shall provide maps of the search plots to  
24 the Department before beginning fatality monitoring at the facility. The certificate holder shall  
25 use the same search plots for each search conducted during a monitoring year.

26 • Scheduling

27 In each monitoring year, the certificate holder shall conduct fatality monitoring searches  
28 at the rates of frequency shown below. Over the course of one monitoring year, the certificate  
29 holder would conduct 16 searches, as follows:

Season	Frequency
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	1 search per month (3 searches)
Fall Migration	2 searches per month (5 searches)
Winter	1 search per month (4 searches)

## Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

1           • Sample Size

2           The sample size for fatality monitoring is the number of turbines searched per monitoring  
3 year. During each monitoring year, the certificate holder shall search a minimum of 50 turbines.  
4 If fewer than 50 turbines are built, the certificate holder shall search all turbines.

5           As described in the site certificate, the certificate holder may choose to build the LJF  
6 using turbine types in two size classes:

- 7           • Small: turbines having a rotor diameter of 82 meters or less
- 8           • Large: turbines having a rotor diameter greater than 82 meters

9           If the final design of the facility includes both small and large turbines, the certificate  
10 holder shall consult with an independent expert with experience in statistical analysis of avian  
11 fatality data to determine whether it would be possible to design a 50-turbine sample with a  
12 sufficient number of turbines in each size class to allow a statistical comparison of fatality rates  
13 for all birds as a group. The certificate holder shall submit the expert's written analysis to the  
14 Department. If the expert's analysis shows that a comparison study is possible and if the  
15 Department approves, the certificate holder shall sample the appropriate number of turbines in  
16 each class and conduct the comparison study. The certificate holder may choose to sample more  
17 than 50 turbines in each monitoring year, if a larger sample size would allow the comparison  
18 study to be done.

19 (b) Removal Trials

20           The objective of the removal trials is to estimate the length of time avian and bat  
21 carcasses remain in the search area. Carcass removal studies will be conducted during each  
22 season in the vicinity of the search plots. Estimates of carcass removal rates will be used to  
23 adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from  
24 the search area due to predation, scavenging or other means such as farming activity. Removal  
25 rates will be estimated by size class, habitat type and season.

26           The certificate holder shall conduct carcass removal trials within each of the seasons  
27 defined above during the years in which fatality monitoring occurs. During the first year in  
28 which fatality monitoring occurs, the certificate holder shall conduct one removal trial per season  
29 (four removal trials per year). For each trial, at least 10 small bird carcasses and at least 10 large  
30 bird carcasses will be distributed throughout the project area (approximately 80 trial carcasses  
31 per year).

32           Before beginning removal trials for the second year of fatality monitoring, the certificate  
33 holder shall report the results of the first year removal trials to the Department and ODFW. In the  
34 report, the certificate holder shall analyze whether four removal trials per year, as described  
35 above, provides sufficient data to accurately estimate adjustment factors for carcass removal. The  
36 number of removal trials for the second year of fatality monitoring may be adjusted up or down,  
37 subject to the approval of the Department.

38           The "small bird" size class will use carcasses of house sparrows, starlings, commercially  
39 available game bird chicks or legally obtained native birds to simulate passerines. The "large  
40 bird" size class will use carcasses of raptors provided by agencies, commercially available adult  
41 game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If  
42 fresh bat carcasses are available, they may also be used.

## Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

1 To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in  
2 fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots  
3 but not so near as to attract scavengers to the search plots. The planted carcasses will be located  
4 randomly within the carcass removal trial plots.

5 Carcasses will be placed in a variety of postures to simulate a range of conditions. For  
6 example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2)  
7 hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) or 3) partially  
8 hidden. Trial carcasses will be marked discreetly for recognition by searchers and other  
9 personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.

10 It is expected that carcasses will be checked as follows, although actual intervals may  
11 vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be  
12 checked approximately every day for the first 4 days, and then on day 7, day 10, day 14, day 20,  
13 day 30 and day 40. This schedule may vary depending on weather and coordination with the  
14 other survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will  
15 be removed.

### 16 (c) Searcher Efficiency Trials

17 The objective of searcher efficiency trials is to estimate the percentage of bird and bat  
18 fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency  
19 trials on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated  
20 agriculture habitat types. Searcher efficiency will be estimated by size class, habitat type and  
21 season. A pooled estimate of searcher efficiency will be used to adjust carcass counts for  
22 detection bias.

23 The certificate holder shall conduct searcher efficiency trials within each of the seasons  
24 defined above during the years in which the fatality monitoring occurs. During each season of  
25 the years in which fatality monitoring occurs, the certificate holder shall use approximately 25  
26 carcasses for searcher efficiency trials (approximately 100 carcasses per year). The certificate  
27 holder shall vary the number of trials per season and the number of carcasses per trial so that the  
28 searchers will not know the total number of trial carcasses being used in any trial. The certificate  
29 holder shall distribute trial carcasses in varied habitat in rough proportion to the habitat types  
30 within the facility site. During each season, both small bird and large bird carcasses will be used  
31 in approximately equal numbers. "Small bird" and "large bird" size classes and carcass selection  
32 are as described above for the removal trials.

33 Before beginning searcher efficiency trials for the second year of fatality monitoring, the  
34 certificate holder shall report the results of the first year efficiency trials to the Department and  
35 ODFW. In the report, the certificate holder shall analyze whether the efficiency trials as  
36 described above (using approximately 100 carcasses per year) provides sufficient data to  
37 accurately estimate adjustment factors for carcass removal. The number of removal trials for the  
38 second year of fatality monitoring may be adjusted up or down, subject to the approval of the  
39 Department.

40 Personnel conducting searches will not know in advance when trials are conducted; nor  
41 will they know the location of the trial carcasses. If suitable trial carcasses are available, trials  
42 during the fall season will include several small brown birds to simulate bat carcasses. Legally  
43 obtained bat carcasses will be used if available.

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1 On the day of a standardized fatality monitoring search (described below) but before the  
2 beginning of the search, efficiency trial carcasses will be placed at random locations within areas  
3 to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be  
4 distributed before dawn.

5 Efficiency trials will be spread over the entire season to incorporate effects of varying  
6 weather and vegetation growth. Carcasses will be placed in a variety of postures to simulate a  
7 range of conditions. For example, birds will be: 1) placed in an exposed posture (thrown over the  
8 shoulder), 2) hidden to simulate a crippled bird or 3) partially hidden.

9 Each non-domestic carcass will be discreetly marked so that it can be identified as an  
10 efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses  
11 found during the carcass search will be recorded. The number of efficiency trial carcasses  
12 available for detection during each trial will be determined immediately after the trial by the  
13 person responsible for distributing the carcasses.

14 If new searchers are brought into the search team, additional searcher efficiency trials  
15 will be conducted to ensure that detection rates incorporate searcher differences. The certificate  
16 holder shall include a discussion of any changes in search personnel and any additional detection  
17 trials in the reporting required under Section 6 of this plan.

### 18 (d) Fatality Monitoring Search Protocol

19 The objective fatality monitoring is to estimate the number of bird and bat fatalities that  
20 are attributable to facility operation as an indicator of the impact of the facility on habitat quality.  
21 The goal of bird and bat fatality monitoring is to estimate fatality rates and associated variances.  
22 The certificate holder shall conduct fatality monitoring using standardized carcass searches. For  
23 each phase of the facility, the certificate holder shall conduct fatality monitoring for two years  
24 (32 searches), beginning one month after the start of commercial operation of that phase.

25 The certificate holder shall use a worst-case analysis to resolve any uncertainty in the  
26 results and to determine whether the data indicate that additional mitigation should be  
27 considered. The Department may require additional, targeted monitoring if the data indicate the  
28 potential for significant impacts that cannot be addressed by worst-case analysis and appropriate  
29 mitigation.

30 The certificate holder shall calculate fatality rates using the statistical methods described  
31 in Section (e). On an annual basis, the certificate holder shall report an estimate of fatalities in  
32 eight categories: 1) all birds, 2) small birds, 3) large birds, 4) raptors, 5) grassland birds, 6)  
33 nocturnal migrants, 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats.

34 If the sample size is large enough to conduct a comparison study of large and small  
35 turbines and the Department approves, the certificate holder shall compare the fatality rates in  
36 the “all birds” category for each of the turbine size classes. In proposing a comparison study of  
37 large and small turbines, the certificate holder may include available data collected at other wind  
38 energy facilities in similar habitat areas, if the data are based on comparable survey protocols and  
39 are appropriately adjusted for removal and searcher efficiency bias.

40 The certificate holder shall estimate the number of avian and bat fatalities attributable to  
41 operation of the facility based on the number of avian and bat fatalities found at the facility site.  
42 All carcasses located within areas surveyed, regardless of species, will be recorded and, if  
43 possible, a cause of death determined based on blind necropsy results. If a different cause of



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1 death is not apparent, the fatality will be attributed to facility operation. The total number of  
2 avian and bat fatalities will be estimated by adjusting for removal and searcher efficiency bias.

3 Personnel trained in proper search techniques (“the searchers”) will conduct the carcass  
4 searches by walking parallel transects within the search plots.<sup>3</sup> Transects will be initially set at 6  
5 meters apart in the area to be searched. A searcher will walk at a rate of approximately 45 to 60  
6 meters per minute along each transect searching both sides out to three meters for casualties.  
7 Search area and speed may be adjusted by habitat type after evaluation of the first searcher  
8 efficiency trial. The searchers will record the condition of each carcass found, using the  
9 following condition categories:

- 10       ▪ Intact – a carcass that is completely intact, is not badly decomposed and shows no  
11       sign of being fed upon by a predator or scavenger
- 12       ▪ Scavenged – an entire carcass that shows signs of being fed upon by a predator or  
13       scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains,  
14       legs, pieces of skin, etc.)
- 15       ▪ Feather Spot – 10 or more feathers at one location indicating predation or  
16       scavenging or 2 or more primary feathers

17 All carcasses (avian and bat) found during the standardized carcass searches will be  
18 photographed, recorded and labeled with a unique number. Each carcass will be bagged and  
19 frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will  
20 be kept with the carcass at all times. For each carcass found, searchers will record species, sex  
21 and age when possible, date and time collected, location, condition (e.g., intact, scavenged,  
22 feather spot) and any comments that may indicate cause of death. Searchers will photograph each  
23 carcass as found and will map the find on a detailed map of the search area showing the location  
24 of the wind turbines and associated facilities. The certificate holder shall coordinate collection of  
25 state endangered, threatened, sensitive or other state protected species with ODFW. The  
26 certificate holder shall coordinate collection of federally-listed endangered or threatened species  
27 and Migratory Bird Treaty Act protected avian species with the U.S. Fish and Wildlife Service  
28 (USFWS). The certificate holder shall obtain appropriate collection permits from ODFW and  
29 USFWS.

30 The searchers might discover carcasses incidental to formal carcass searches (e.g., while  
31 driving within the project area). For each incidentally discovered carcass, the searcher shall  
32 identify, photograph, record data and collect the carcass as would be done for carcasses within  
33 the formal search sample during scheduled searches. If the incidentally discovered carcass is  
34 found within a formal search plot, the fatality data will be included in the calculation of fatality  
35 rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be  
36 reported separately. The certificate holder shall coordinate collection of incidentally discovered  
37 state endangered, threatened, sensitive, or other state protected species with ODFW. The  
38 certificate holder shall coordinate collection of incidentally discovered federally-listed  
39 endangered or threatened species and Migratory Bird Treaty Act protected avian species with the  
40 USFWS.

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<sup>3</sup> Where search plots are adjacent, the search area may be rectangular.

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1 The certificate holder shall develop and follow a protocol for handling injured birds. Any  
2 injured native birds found on the facility site will be carefully captured by a trained project  
3 biologist or technician and transported to a qualified rehabilitation specialist approved by the  
4 Department.<sup>4</sup> The certificate holder shall pay costs, if any, charged for time and expenses related  
5 to care and rehabilitation of injured native birds found on the site, unless the cause of injury is  
6 clearly demonstrated to be unrelated to the facility operations.

### 7 (e) Statistical Methods for Fatality Estimates

8 The estimate of the total number of wind facility-related fatalities is based on:

- 9 (1) The observed number of carcasses found during standardized searches during the  
10 two monitoring years for which the cause of death is attributed to the facility.<sup>5</sup>
- 11 (2) Searcher efficiency expressed as the proportion of planted carcasses found by  
12 searchers.
- 13 (3) Removal rates expressed as the estimated average probability a carcass is expected  
14 to remain in the study area and be available for detection by the searchers during  
15 the entire survey period.

### 16 Definition of Variables

17 The following variables are used in the equations below:

- 18  $c_i$  the number of carcasses detected at plot  $i$  for the study period of interest (e.g., one  
19 year) for which the cause of death is either unknown or is attributed to the facility
- 20  $n$  the number of search plots
- 21  $k$  the number of turbines searched (includes the turbines centered within each  
22 search plot and a proportion of the number of turbines adjacent to search plots to  
23 account for the effect of adjacent turbines on the search plot buffer area)
- 24  $\bar{c}$  the average number of carcasses observed per turbine per year
- 25  $s$  the number of carcasses used in removal trials
- 26  $s_c$  the number of carcasses in removal trials that remain in the study area after 40  
27 days
- 28  $se$  standard error (square of the sample variance of the mean)
- 29  $t_i$  the time (days) a carcass remains in the study area before it is removed
- 30  $\bar{t}$  the average time (days) a carcass remains in the study area before it is removed
- 31  $d$  the total number of carcasses placed in searcher efficiency trials
- 32  $p$  the estimated proportion of detectable carcasses found by searchers
- 33  $I$  the average interval between searches in days

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<sup>4</sup> Approved specialists include Lynn Tompkins (wildlife rehabilitator) of Blue Mountain Wildlife, a wildlife rehabilitation center in Pendleton, and the Audubon Bird Care Center in Portland. The certificate holder must obtain Department approval before using other specialists.

<sup>5</sup> If a different cause of death is not apparent, the fatality will be attributed to facility operation.

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- 1  $\hat{\pi}$  the estimated probability that a carcass is both available to be found during a  
2 search and is found
- 3  $m_t$  the estimated annual average number of fatalities per turbine per year, adjusted  
4 for removal and observer detection bias
- 5 C nameplate energy output of turbine in megawatts (MW)

### 6 Observed Number of Carcasses

7 The estimated average number of carcasses ( $\bar{c}$ ) observed per turbine per year is:

8 
$$\bar{c} = \frac{\sum_{i=1}^n c_i}{k} . \quad (1)$$

### 9 Estimation of Carcass Removal

10 Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean carcass  
11 removal time ( $\bar{t}$ ) is the average length of time a carcass remains at the site before it is removed:

12 
$$\bar{t} = \frac{\sum_{i=1}^s t_i}{s - s_c} . \quad (2)$$

13 This estimator is the maximum likelihood estimator assuming the removal times follow an  
14 exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at  
15 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are  
16 removed before the end of the trial, then  $s_c$  is 0, and  $\bar{t}$  is just the arithmetic average of the  
17 removal times. Removal rates will be estimated by carcass size (small and large), habitat type  
18 and season.

### 19 Estimation of Observer Detection Rates

20 Observer detection rates (i.e., searcher efficiency rates) are expressed as  $p$ , the proportion  
21 of trial carcasses that are detected by searchers. Observer detection rates will be estimated by  
22 carcass size, habitat type and season.

### 23 Estimation of Facility-Related Fatality Rates

24 The estimated per turbine annual fatality rate ( $m_t$ ) is calculated by:

25 
$$m_t = \frac{\bar{c}}{\hat{\pi}} , \quad (3)$$

26 where  $\hat{\pi}$  includes adjustments for both carcass removal (from scavenging and other means) and  
27 observer detection bias assuming that the carcass removal times  $t_i$  follow an exponential  
28 distribution. Under these assumptions, this detection probability is estimated by:

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$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[ \frac{\exp\left(\frac{I}{\bar{t}}\right) - 1}{\exp\left(\frac{I}{\bar{t}}\right) - 1 + p} \right]. \quad (4)$$

The estimated per MW annual fatality rate ( $m$ ) is calculated by:

$$m = \frac{m_t}{C}. \quad (5)$$

The certificate holder shall calculate fatality estimates for: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6) nocturnal migrants 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats. If the sample size is large enough to conduct a comparison study of large and small turbines and the Department approves, the certificate holder shall compare the fatality rates in the “all birds” category for each of the turbine size classes. The final reported estimates of  $m$ , associated standard errors and 90% confidence intervals will be calculated using bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances and confidence intervals for complicated test statistics. For each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be sampled with replacement and  $\bar{c}$ ,  $\bar{t}$ ,  $p$ ,  $\hat{\pi}$  and  $m$  will be calculated. A total of 5,000 bootstrap iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates. The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5<sup>th</sup> and upper 95<sup>th</sup> percentiles of the 5000 bootstrap estimates are estimates of the lower limit and upper limit of 90% confidence intervals.

### Nocturnal Migrant and Bat Fatalities

Differences in observed nocturnal migrant and bat fatality rates for lit turbines, unlit turbines that are adjacent to lit turbines and unlit turbines that are not adjacent to lit turbines will be compared graphically and statistically.

### (f) Mitigation

Mitigation may be appropriate if fatality rates exceed a “threshold of concern.” For the purpose of determining whether a threshold has been exceeded, the certificate holder shall calculate the average annual fatality rates for species groups after two years of monitoring. Based on current knowledge of the species that are likely to use the habitat in the area of the facility, the following thresholds apply to the facility:

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<b>Species Group</b>	<b>Threshold of Concern</b> (fatalities per MW)
Raptors (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.)	0.06
Grassland species (All native bird species that rely on grassland habitat and are either resident species occurring year round or species that nests in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.2
Bat species as a group	2.5

1           If the data show that a threshold of concern for a species group has been exceeded, the  
2 certificate holder shall implement additional mitigation if the Department determines that  
3 mitigation is appropriate based on analysis of the data, consultation with ODFW and  
4 consideration of any other significant information available at the time. In addition, the  
5 Department may determine that mitigation is appropriate if fatality rates for individual avian or  
6 bat species (especially State Sensitive Species) are higher than expected and at a level of  
7 biological concern. If the Department determines that mitigation is appropriate, the certificate  
8 holder, in consultation with the Department and ODFW, shall propose mitigation measures  
9 designed to benefit the affected species. The certificate holder shall implement mitigation as  
10 approved by the Council. The Department may recommend additional, targeted data collection if  
11 the need for mitigation is unclear based on the information available at the time. The certificate  
12 holder shall implement such data collection as approved by the Council.

13           Mitigation should be designed to benefit the affected species group. Mitigation may  
14 include, but is not limited to, protection of nesting habitat for the affected group of native species  
15 through a conservation easement or similar agreement. Tracts of land that are intact and  
16 functional for wildlife are preferable to degraded habitat areas. Preference should be given to  
17 protection of land that would otherwise be subject to development or use that would diminish the  
18 wildlife value of the land. In addition, mitigation measures might include: enhancement of the  
19 protected tract by weed removal and control; increasing the diversity of native grasses and forbs;  
20 planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for  
21 raptors; improving wildfire response; and conducting or making a contribution to research that  
22 will aid in understanding more about the affected species and its conservation needs in the  
23 region.

### 24    **2. Raptor Nest Surveys**

25           The objectives of raptor nest surveys are: (1) to estimate the size of the local breeding  
26 populations of raptor species that nest on the ground or aboveground in trees or other  
27 aboveground nest locations in the vicinity of the facility; and (2) to determine whether operation  
28 of the facility results in a reduction of nesting activity or nesting success in the local populations

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1 of the following raptor species: Swainson’s hawk, golden eagle, ferruginous hawk and burrowing  
2 owl.

### 3 (a) Survey Protocol

#### 4 • For Raptor Species that Nest Aboveground

5 The certificate holder shall use aerial and ground surveys to evaluate nest success by  
6 gathering data on active nests, on nests with young and on young fledged. The certificate holder  
7 will share the data with state and federal biologists. For each phase of the facility, the certificate  
8 holder shall conduct the first year of post-construction raptor nest surveys in the first raptor  
9 nesting season after construction of that phase is completed. The second year of surveys will be  
10 done in 2015. Thereafter, the certificate holder shall conduct raptor nest surveys as described in  
11 Section 2(d) below.

12 During each survey year, the certificate holder will conduct aerial surveys to determine  
13 nest occupancy in late May or early June within the site and a 2-mile buffer around the site (as  
14 identified in Downes et al., 2012, Leaning Juniper II Wildlife Monitoring Report for 2011–  
15 2012). Two helicopter visits to each nest may be required to determine *occupancy*. These surveys  
16 may be coordinated with adjacent wind facilities. All nests discovered during pre-construction  
17 surveys and any nests discovered during post-construction surveys, whether active or inactive,  
18 will be given identification numbers. Nest locations will be recorded on U.S. Geological Survey  
19 7.5-minute quadrangle maps. Global positioning system coordinates will be recorded for each  
20 nest. Locations of inactive nests will be recorded because they could become occupied during  
21 future years.

22 For occupied nests, the certificate holder shall determine nesting *success* by a minimum  
23 of one ground visit to determine species, number of young and young fledged. “Nesting success”  
24 means that the young have successfully fledged (reach advanced stage of development, the  
25 young are capable of independent movements). Nests that cannot be monitored due to the  
26 landowner denying aerial or ground access will be checked from a distance where feasible.

#### 27 • For Burrowing Owls

28 The certificate holder will monitor burrowing owl nest sites discovered during pre- and  
29 post-construction surveys (as identified in Downes et al., 2012, Leaning Juniper II Wildlife  
30 Monitoring Report for 2011–2012). This species is not easily detected during aerial raptor nest  
31 surveys. The certificate holder recorded active burrowing owl nest sites in the vicinity of the  
32 LJII-A as they are discovered during other wildlife monitoring tasks. Any nests discovered  
33 during future post-construction surveys, whether active or showing signs of intermittent use by  
34 the species, will be given identification numbers and monitored. Nest locations will be recorded  
35 on U.S. Geological Survey 7.5-minute quadrangle maps. Global positioning system coordinates  
36 will be recorded for each nest site. Coordinates for ancillary burrows used by one nesting pair or  
37 a group of nesting pairs will also be recorded. Locations of inactive nests will be recorded  
38 because they could become occupied during future years.

39 The certificate holder shall conduct burrowing owl monitoring in the same years as the  
40 raptor nest surveys described above. For occupied nests, the certificate holder shall determine  
41 nesting *success* by a minimum of one ground visit to determine species, number of young and  
42 young fledged. “Nesting success” means that the young have successfully fledged (the young are  
43 capable of independent movements, reached and advanced stage of development). Up to three

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1 visits to the nest sites may be necessary to determine outcome. Nests that cannot be monitored  
2 due to the landowner denying access will be checked from a distance where feasible.

3 The certificate holder shall monitor burrowing owl nests discovered during the first year  
4 of post-construction raptor nest surveys (the first raptor nesting season after construction is  
5 completed) and in 2015. Thereafter, the certificate holder shall monitor all known burrowing owl  
6 nest locations as a part of the long-term raptor nest monitoring program described in Section 2(d)  
7 below.

### 8 (b) Analysis

9 For each phase of the facility, the certificate holder shall analyze the raptor nesting data  
10 collected after two survey years to determine whether a reduction in either nesting success or  
11 nest use has occurred in the vicinity of the facility. If the analysis indicates a reduction in nesting  
12 success or nest use by Swainson's hawks, golden eagles, ferruginous hawks or burrowing owls  
13 within the facility site or within 2 miles of the facility site, then the certificate holder shall  
14 propose appropriate mitigation for the affected species as described in Section 2 and shall  
15 implement mitigation as approved by the Council. At a minimum, if the analysis shows that any  
16 raptors of these species have abandoned a nest territory within the facility site or within ½ mile  
17 of the facility site or has not fledged any young over the two survey years within that same area,  
18 the certificate holder shall assume the abandonment or unsuccessful fledging is due to operation  
19 of the facility unless another cause can be demonstrated convincingly.

20 Any reduction in nesting success or nest use could be due to operation of the facility,  
21 operation of another wind facility in the vicinity or some other cause. The certificate holder shall  
22 attribute the reduction to operation of the facility if the wind turbine closest to the affected nest  
23 site is a turbine of the facility, unless the certificate holder demonstrates, and the Department  
24 agrees, that the reduction was due to a different cause.

25 Given the low raptor nesting densities in the area and the presence of other wind energy  
26 facilities nearby, statistical power to detect a relationship between distances from a wind turbine  
27 and nesting parameters (e.g., number of fledglings per reproductive pair) will be very low.  
28 Therefore, impacts may have to be judged based on trends in the data, results from other wind  
29 energy facility monitoring studies and literature on what is known regarding the populations in  
30 the region.

### 31 (c) Mitigation

32 The certificate holder shall propose mitigation for the affected species in consultation  
33 with the Department and ODFW and shall implement mitigation as approved by the Council. In  
34 proposing appropriate mitigation, the certificate holder shall advise the Department if any other  
35 wind project in the area is obligated to provide mitigation for a reduction in raptor nesting  
36 success at the same nest site. Mitigation should be designed to benefit the affected species or  
37 contribute to overall scientific knowledge and understanding of what causes nest abandonment or  
38 nest failure. Mitigation may be designed to proceed in phases over several years. It may include,  
39 but is not limited to, additional raptor nest monitoring, protection of natural nest sites from  
40 human disturbance or cattle activity (preferably within the general area of the facility) or  
41 participation in research projects designed to improve scientific understanding of the needs of the  
42 affected species.

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### 1 (d) Long-term Raptor Nest Monitoring and Mitigation Plan

2 In addition to the two years of post-construction raptor nest surveys described in Section  
3 2(a), the certificate holder shall conduct long-term raptor nest surveys at five-year intervals for  
4 the life of the facility.<sup>6</sup> The certificate holder shall conduct the first long-term raptor nest survey  
5 in 2020.. In conducting long-term surveys, the certificate holder shall follow the same survey  
6 protocols as described above in Section 2(a) unless the certificate holder proposes an alternative  
7 protocol that is approved by the Department. In developing an alternative protocol, the certificate  
8 holder shall consult with ODFW.

9 The certificate holder shall analyze the raptor nesting data collected after each year of  
10 long-term raptor nest surveys to determine whether a reduction in either nesting success or nest  
11 use has occurred in the vicinity of the facility. If the analysis indicates a reduction in nesting  
12 success or nest use by Swainson’s hawks, golden eagles, ferruginous hawks or burrowing owls  
13 within the facility site or within 2 miles of the facility site, then the certificate holder shall  
14 propose appropriate mitigation for the affected species as described in Section 2(a) and shall  
15 implement mitigation as approved by the Council. At a minimum, if the analysis shows that any  
16 raptors of these species have abandoned a nest territory within the facility site or within ½ mile  
17 of the facility site or has not fledged any young over the two survey years within that same area,  
18 the certificate holder shall assume the abandonment or unsuccessful fledging is due to operation  
19 of the facility unless another cause can be demonstrated convincingly.

20 Any reduction in nesting success or nest use could be due to operation of the facility,  
21 operation of another wind facility in the vicinity or some other cause, including changes in land  
22 use patterns after construction of the facility. The certificate holder shall attribute the reduction  
23 to operation of LJIIA if the wind turbine closest to the affected nest site is an LJIIA turbine  
24 unless the certificate holder demonstrates, and the Department agrees, that the reduction was due  
25 to a different cause.

26 Given the low raptor nesting densities in the area and the presence of other wind energy  
27 facilities nearby, statistical power to detect a relationship between distances from a wind turbine  
28 and nesting parameters (e.g., number of fledglings per reproductive pair) will be very low.  
29 Therefore, impacts may have to be judged based on trends in the data, results from other wind  
30 energy facility monitoring studies and literature on what is known regarding the populations in  
31 the region.

### 32 **3. Washington Ground Squirrel Surveys**

33 For the LJIIA area, the certificate holder shall conduct long-term post-construction  
34 surveys to collect data on Washington ground squirrel (WGS) activity within the lease  
35 boundary. A qualified professional biologist will monitor the WGS sites in the facility identified  
36 during the pre-construction surveys (2005 through 2007) and the buffer area within 500 feet in  
37 all directions from the identified WGS sites in suitable habitat. The sites include the historic  
38 areas at LJIIA (as identified in Downes and Gritski 2014 LJII Wildlife Monitoring Report).  
39 These surveys may be coordinated with adjacent wind facilities to enhance data collection and  
40 analysis of WGS activity in the area.

41 The certificate holder shall conduct surveys at LJII-A during the year following

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<sup>6</sup> As used in this plan, “life of the facility” means continuously until the facility site is restored and the site certificate is terminated in accordance with OAR 345-027-0110.



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1 construction (2011) and every three years thereafter for the life of the facility (2014, 2017,  
2 2020...). Post-construction WGS monitoring for the LJIA areas will assess the status  
3 (occurrence) and use (extent) of colonies. Surveyors will conduct standard recording protocols  
4 (level of use, notes on natal sites and physical extent of the sites) during meandering pedestrian  
5 (40-60 m spacing) surveys of the identified sites and suitable habitat within 500 ft. buffer twice  
6 between late March and late May, during the active WGS periods. The biologist will also  
7 record incidental observations (including mapping and dates of observation) during other  
8 survey activities on the facility sites. These observations shall also include current land use and  
9 any land use or project-caused conditions (erosion, declines in vegetation quality) that may  
10 adversely affect WGS sites. This monitoring will be consistent with the Incidental Take Permit  
11 (ITP) application for LJIA as set forth in Attachment E of the Final Order on the Application.

### 12 **4. Grassland Bird Study**

13 The grassland bird study is a 2-year, post-construction evaluation of grassland bird use in  
14 the LJF area. Parts of the facility occupy native habitat suitable for various ground-nesting bird  
15 species that nest in grassland or open low shrub habitat. Grassland birds that were documented  
16 on-site during baseline surveys conducted in 2006 included long-billed curlew, grasshopper  
17 sparrow, savannah sparrow, Western meadowlark and horned lark. These species are likely to  
18 nest on-site. Loggerhead shrikes may be present in the area but were not observed.

19 During the 2006 pre-construction surveys of the northern area of the, the applicant  
20 surveyed 57 transects. The transects were approximately 60-meters wide. They were searched  
21 twice during the peak period of activity for the target species (March through May). Locations of  
22 territorial male grasshopper sparrows were recorded with a GPS unit. GPS locations of  
23 (assumed) paired long-billed curlews or approximate location of the pair's primary activity area  
24 and locations of curlew nests were also recorded. Surveyors made notes on the general location  
25 of special status grassland bird species observed in the area and on any observed behavior (for  
26 example, nesting, staging, courtship, non-breeders foraging in loose groups).<sup>7</sup> The surveyors  
27 noted detections of common species in blocks of areas surveyed (several transects combined) but  
28 did not record GPS locations or count the number of individuals present.

29 The objective of the post-construction grassland bird study is to determine if there are  
30 noticeable changes in the presence and overall use by special status grassland bird species  
31 compared to pre-construction data collected in 2006. By surveying a large area that includes the  
32 undisturbed area between turbine strings, the study could provide information on whether  
33 operation of the facility discourages use of the area by two indicator species: grasshopper  
34 sparrows and long-billed curlews. In addition to focusing on the two indicator species, the post-  
35 construction surveys will include observations of common species such as western meadowlark,  
36 savannah sparrow and horned lark to provide information on the presence and distribution of  
37 these species within the study area and their behavior relative to turbine locations. The phrase  
38 "behavior relative to turbine locations" is intended to address observations of behavior that is  
39 different near turbines compared behavior away from turbines.

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<sup>7</sup> As used in this section, "special status grassland bird species" means grasshopper sparrows, long-billed curlews, loggerhead shrikes and burrowing owls.

## Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

### 1 (a) Study Area

2 The study area is located within the LJIIA area and covers approximately 1,362 acres.<sup>8</sup>  
3 For purposes of this discussion, the area north of Rattlesnake Road is referred to as the “north  
4 study area,” and the area south of the road is referred to as the “south study area.”

5 The north study area is bounded by the lease boundary on the northeast and west sides  
6 and by Rattlesnake Road on the southeast side. The south study area is bounded by an existing  
7 power line on the west and natural topography on the other sides. The north study area contains  
8 two proposed turbine strings of up to eight turbines and associated access roads and transmission  
9 components. The south study area contains proposed access roads and five turbines. The south  
10 study area might include burrowing owl dens, but no confirmed nests were discovered in the  
11 baseline surveys. The habitat in the north study area is primarily shrub-steppe with grassland-like  
12 vegetation in a recovery stage (it is assumed that fire disturbance has removed areas of mature  
13 shrubs). The south study area includes relatively flat ground with some gentle slopes and a dry  
14 drainage. The habitat in the south study area is similar to the habitat in the north study area and is  
15 relatively open grassland with some shrubs. Habitat for both the north and south study areas is  
16 not highly variable and is representative of a large portion of the remainder of the North lease  
17 area. Areas containing laydown areas and unsuitable habitat will not be studied.

18 The study areas were selected because they are somewhat removed from human activity  
19 (except low traffic use on facility access roads and one county road) and contain a large area of  
20 grassland/shrub-steppe habitat (mapped as habitat sub-type “SSB”) that is not proposed to be  
21 altered during project construction or operations.

### 22 (b) Survey Protocol

23 After completion of construction of the facility, the certificate holder shall survey the 57  
24 transects that were searched before construction in 2006. Surveyors will collect data on the  
25 indicator species (grasshopper sparrows and long-billed curlews) and other special status  
26 grassland bird species. For all special status grassland bird species observed, the surveyors will  
27 record the number of observations of these species and their GPS locations, using the same  
28 methodology used in 2006. Special status grassland bird species that fly readily in the surveyor’s  
29 presence will be tracked visually to attempt to determine defended territories and to limit  
30 potential double-counting of individuals. Surveyors will record notes on the general location and  
31 behavior of special status grassland bird species (for example, defensive responses, nesting,  
32 staging, courtship, non-breeders foraging in loose groups). This plotted data will provide  
33 information on the location of special status grassland bird species at distances near and far from  
34 turbines and other facilities.

35 Surveyors will record notes on the location and abundance of common species. Abundant  
36 common species that fly readily in the surveyor’s presence will be tracked visually to avoid  
37 double counting. Horned lark observations will be totaled for each survey area completed in one  
38 survey day. The data on the relative abundance and distribution of common species will provide  
39 information on the location of common species at distances near and far from turbines and other  
40 facilities.

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<sup>8</sup> The study area and its underlying habitat types are shown on “Figure 1: Areas to be studied for Grassland Birds during Operations Phase” (Response to Additional RAI, Attachment 2, October 2, 2009).

## Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

1 The certificate holder shall conduct the first year of post-construction grassland surveys  
2 in the first spring following the beginning of commercial operation of the facility. The certificate  
3 holder shall conduct a second year of grassland surveys two to five years after the first survey.  
4 The certificate holder will determine when the second survey will be done, in consultation with  
5 ODFW and subject to approval by the Department, based on the restoration of grassland cover in  
6 areas disturbed during facility construction.

7 In each survey year, surveyors will complete two walking transect surveys of the north  
8 and south study areas (one in April and one in May). A third visit to specific potential burrowing  
9 owl dens (based on 2006 data and any newly discovered sites) will be conducted during the  
10 period from late May to early July, if the surveyor determines a third visit is needed to confirm  
11 use by burrowing owls. The April and May time period includes the seasonal period of staging  
12 (pre-nesting) of long-billed curlews (April), the major period of territorial calling of grasshopper  
13 sparrows (May) and the nesting period for long-billed curlews and other species (May).

### 14 (c) Data Analysis and Reporting

15 After the first survey year, the certificate holder shall submit a preliminary summary  
16 report to the Department. After the second survey year, the certificate holder shall submit a more  
17 comprehensive final report. The certificate holder shall submit maps for each survey year,  
18 showing transects walked and specific areas of use by the indicator species, other special status  
19 grassland bird species and common species (except horned larks). The certificate holder shall  
20 overlay a grid system on the mapped “as-built” locations of facility components within the study  
21 areas. Using the grid system, the certificate holder shall describe the survey results by area and  
22 distance from turbines.

23 The reports will include a description of vegetation compared to pre-construction  
24 conditions as recorded in 2006, including notes on any changes in land use by the landowner,  
25 wildfire influences and grazing and noting any areas of intense vegetation impact. Vegetation  
26 communities will be sampled by the transect method and a description of plant communities will  
27 be provided for each survey year.

28 The certificate holder shall report on observed changes in use by the indicator species.  
29 For example, the report will compare the locations and numbers of grasshopper sparrows plotted  
30 during the pre-construction surveys in the north study area to the locations and numbers of this  
31 species plotted during the post-construction survey years. The certificate holder shall report on  
32 the location of any burrowing owls observed during the transect searches or subsequent visits  
33 made to confirm use. The certificate holder shall analyze the locations for all special status  
34 grassland bird species (using GPS data) and common species (except horned larks) to calculate  
35 distance from turbines or other facilities.<sup>9</sup>

36 The certificate holder shall evaluate the data to determine if there are changes in the use  
37 of the study areas by the two indicator species before and after construction. In addition, the  
38 certificate holder shall evaluate the data to determine if there is noticeable difference in the  
39 distribution, abundance or behavior of special status grassland bird species or common species  
40 relative to turbine locations.

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<sup>9</sup> Data on common species cannot be compared to preconstruction data because the 2006 surveys did not record the location or abundance of these species by transect line. GPS data will not be collected for common species.

# Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

## 5. Wildlife Monitoring and Reporting System

The Wildlife Monitoring and Reporting System (WMRS) is a monitoring program to report avian and bat casualties found by maintenance personnel during operation of the facility. It consists of weekly Environmental Coordinator (EC) Inspections of selected turbines conducted during both spring and fall migration seasons, monthly SPCC Turbine Checks of every turbine, and Incidental Observations with discovery of bird and bat carcasses and injured wildlife incidental to operations and maintenance. Certificate holder's maintenance personnel will be trained in the methods needed to carry out this program.

All avian and bat carcasses discovered by certificate holder's maintenance personnel will be reported to the on-site EC for same day data recording (species, location, date, conditions) and for photo documentation. This information will be processed within WRMS and reviewed by IR biologists for confirmation of information and identification. If the carcass is suspected to be an eagle or a state or federally- listed endangered or threatened species, certificate holder will contact ODFW and US Fish and Wildlife Service (USFWS) to report and coordinate collection. Certificate holder will secure the carcass (e.g., cover with a container) until, if appropriate, collection is completed. Certificate holder will not handle or transport any bat or bat carcass without a state or federal scientific collection or special use permit (SPUT).

## 6. Data Reporting

The certificate holder will report wildlife monitoring data and analysis to the Department. Monitoring data include fatality monitoring program data; raptor nest survey data; WGS survey data, incidental observation, and assessment reports; grassland bird study data; and WMRS (specifically eagles or state and federally-listed endangered or threatened species) data. The certificate holder may include the reporting of wildlife monitoring data and analysis in the annual report required under OAR 345-026-0080 or submit this information as a separate document at the same time the annual report is submitted. In addition, the certificate holder shall provide to the Department any data or record generated in carrying out this monitoring plan upon request by the Department.

The certificate holder shall notify USFWS and ODFW immediately if any federal or state endangered or threatened species are killed or injured on the facility site.

The public will have an opportunity to receive information about monitoring results and to offer comment. Within 30 days after receiving the final versions of reports that are required under this plan, the Department will make the reports available to the public on its website and will specify a time in which the public may submit comments to the Department.<sup>10</sup>

## 7. Amendment of the Plan

This Wildlife Monitoring and Mitigation Plan may be amended from time to time by agreement of the certificate holder and the Council. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan and to mitigation actions that may be required under this plan. The Department shall notify the Council of all amendments and mitigation actions, and the Council

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<sup>10</sup> The certificate holder may establish a Technical Advisor Committee (TAC) but is not required to do so. If the certificate holder establishes a TAC, the TAC may offer comments to the Council about the results of the monitoring required under this plan.

## **Leaning Juniper IIA Wildlife Monitoring and Mitigation Plan**

[JUNE 11, 2015]

- 1 retains the authority to approve, reject, or modify any amendment of this plan or mitigation
- 2 action agreed to by the Department.

3

# Leaning Juniper IIB Wind Project: Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

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1 This plan describes wildlife monitoring that the certificate holder shall conduct during  
2 operation of the Leaning Juniper IIB Wind Power Facility.<sup>11</sup> The monitoring objectives are to  
3 determine whether the facility causes significant fatalities of birds and bats and to determine  
4 whether the facility results in a loss of habitat quality.

5 Per Amendment 2 to Leaning Juniper II Wind Power Facility (LJF), the facility was  
6 divided into two separate facilities with LJIIA and LJIIB each receiving its own site certificates.  
7 However, the site certificate holders agreed to share mitigation and environmental  
8 responsibilities. Therefore, the requirements for the facility as a whole, including both LJIIA and  
9 LJIIB, remain in this Wildlife Monitoring and Mitigation Plan (WMMP) and each individual site  
10 certificate holder remains bound by its terms.

11 LJF consists of up to 117 wind turbines, four non-guyed meteorological (met) towers and  
12 other related or supporting facilities as described in the site certificate. The permanent facility  
13 components occupy approximately 111 acres, of which up to 52 acres is Category 5 wildlife  
14 habitat or better, based on the Oregon Department of Fish and Wildlife (ODFW) standards (OAR  
15 635-415-0025).<sup>12</sup> The certificate holder shall use experienced personnel to implement the  
16 monitoring required under this plan and properly trained personnel to conduct the monitoring,  
17 subject to approval by the Oregon Department of Energy (Department) as to professional  
18 qualifications. For all components of this plan except the Wildlife Monitoring and Reporting  
19 System, the certificate holder shall hire an independent third party (not employees of the  
20 certificate holder) to perform monitoring tasks.

21 The Wildlife Monitoring and Mitigation Plan for the facilities has the following  
22 components:

23 1) Fatality monitoring program including:

- 24 a) Removal trials
- 25 b) Searcher efficiency trials
- 26 c) Fatality search protocol
- 27 d) Statistical analysis

28 2) Raptor nesting surveys

29 3) Washington ground squirrel surveys

30 4) Grassland bird study

31 5) Wildlife Monitoring and Reporting System

32 Based on the results of the monitoring programs, mitigation of significant impacts may be  
33 required. The selection of the mitigation actions should allow for flexibility in creating  
34 appropriate responses to monitoring results that cannot be known in advance. If the Department

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<sup>11</sup> This plan is incorporated by reference in the site certificate for the LJF and must be understood in that context. It is not a “stand-alone” document. This plan does not contain all mitigation required of the certificate holder.

<sup>12</sup> A more complete description of the habitat areas affected by each facility, LJIIA and LJIB, is provided in the Final Order on Amendment #1, Section IV.4(b), which expanded the site boundary to include LJIIB

# Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

1 determines that mitigation is needed, the certificate holder shall propose appropriate mitigation  
2 actions to the Department and shall carry out mitigation actions approved by the Department,  
3 subject to review by the Oregon Energy Facility Council (Council).

## 4 **1. Fatality Monitoring**

5 The certificate holder shall conduct two years of post-construction fatality monitoring starting  
6 following substantial completion or commercial operations date (COD) of LJIIB reflecting  
7 operating impacts on wildlife.

### 8 (a) Definitions and Methods

- 9 • Seasons

10 This plan uses the following dates for defining seasons:

Season	Dates
Spring Migration	March 16 to May 15
Summer/Breeding	May 16 to August 15
Fall Migration	August 16 to October 31
Winter	November 1 to March 15

- 11 • Search Plots

12 The certificate holder shall conduct fatality monitoring within search plots. The  
13 certificate holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW),  
14 shall select search plots based on a systematic sampling design that ensures that the selected  
15 search plots are representative of the habitat conditions in different parts of the site. Each search  
16 plot will contain one turbine. Search plots will be square or circular. Circular search plots will be  
17 centered on the turbine location and will have a radius equal to the maximum blade tip height of  
18 the turbine contained within the plot. “Maximum blade tip height” is the turbine hub-height plus  
19 one-half the rotor diameter. Square search plots will be of sufficient size to contain a circular  
20 search plot as described above. The certificate holder shall provide maps of the search plots to  
21 the Department before beginning fatality monitoring at the facility. The certificate holder shall  
22 use the same search plots for each search conducted during a monitoring year.

- 23 • Scheduling

24 In each monitoring year, the certificate holder shall conduct fatality monitoring searches  
25 at the rates of frequency shown below. Over the course of one monitoring year, the certificate  
26 holder would conduct 16 searches, as follows:

Season	Frequency
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	1 search per month (3 searches)
Fall Migration	2 searches per month (5 searches)
Winter	1 search per month (4 searches)

## Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

1           • Sample Size

2           The sample size for fatality monitoring is the number of turbines searched per monitoring  
3 year. During each monitoring year, the certificate holder shall search a minimum of 50 turbines.  
4 If fewer than 50 turbines are built, the certificate holder shall search all turbines.

5           As described in the site certificate, the certificate holder may choose to build the using  
6 turbine types in two size classes:

- 7           • Small: turbines having a rotor diameter of 82 meters or less
- 8           • Large: turbines having a rotor diameter greater than 82 meters

9           If the final design of the LJF facility includes both small and large turbines, the  
10 certificate holder shall consult with an independent expert with experience in statistical analysis  
11 of avian fatality data to determine whether it would be possible to design a 50-turbine sample  
12 with a sufficient number of turbines in each size class to allow a statistical comparison of fatality  
13 rates for all birds as a group. The certificate holder shall submit the expert's written analysis to  
14 the Department. If the expert's analysis shows that a comparison study is possible and if the  
15 Department approves, the certificate holder shall sample the appropriate number of turbines in  
16 each class and conduct the comparison study. The certificate holder may choose to sample more  
17 than 50 turbines in each monitoring year, if a larger sample size would allow the comparison  
18 study to be done.

19 (b) Removal Trials

20           The objective of the removal trials is to estimate the length of time avian and bat  
21 carcasses remain in the search area. Carcass removal studies will be conducted during each  
22 season in the vicinity of the search plots. Estimates of carcass removal rates will be used to  
23 adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from  
24 the search area due to predation, scavenging or other means such as farming activity. Removal  
25 rates will be estimated by size class, habitat type and season.

26           The certificate holder shall conduct carcass removal trials within each of the seasons  
27 defined above during the years in which fatality monitoring occurs. During the first year in  
28 which fatality monitoring occurs, the certificate holder shall conduct one removal trial per season  
29 (four removal trials per year). For each trial, at least 10 small bird carcasses and at least 10 large  
30 bird carcasses will be distributed throughout the project area (approximately 80 trial carcasses  
31 per year).

32           Before beginning removal trials for the second year of fatality monitoring, the certificate  
33 holder shall report the results of the first year removal trials to the Department and ODFW. In the  
34 report, the certificate holder shall analyze whether four removal trials per year, as described  
35 above, provides sufficient data to accurately estimate adjustment factors for carcass removal. The  
36 number of removal trials for the second year of fatality monitoring may be adjusted up or down,  
37 subject to the approval of the Department.

38           The "small bird" size class will use carcasses of house sparrows, starlings, commercially  
39 available game bird chicks or legally obtained native birds to simulate passerines. The "large  
40 bird" size class will use carcasses of raptors provided by agencies, commercially available adult  
41 game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If  
42 fresh bat carcasses are available, they may also be used.



## Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan

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1 To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in  
2 fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots  
3 but not so near as to attract scavengers to the search plots. The planted carcasses will be located  
4 randomly within the carcass removal trial plots.

5 Carcasses will be placed in a variety of postures to simulate a range of conditions. For  
6 example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2)  
7 hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) or 3) partially  
8 hidden. Trial carcasses will be marked discreetly for recognition by searchers and other  
9 personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.

10 It is expected that carcasses will be checked as follows, although actual intervals may  
11 vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be  
12 checked approximately every day for the first 4 days, and then on day 7, day 10, day 14, day 20,  
13 day 30 and day 40. This schedule may vary depending on weather and coordination with the  
14 other survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will  
15 be removed.

### 16 (c) Searcher Efficiency Trials

17 The objective of searcher efficiency trials is to estimate the percentage of bird and bat  
18 fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency  
19 trials on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated  
20 agriculture habitat types. Searcher efficiency will be estimated by size class, habitat type and  
21 season. A pooled estimate of searcher efficiency will be used to adjust carcass counts for  
22 detection bias.

23 The certificate holder shall conduct searcher efficiency trials within each of the seasons  
24 defined above during the years in which the fatality monitoring occurs. During each season of  
25 the years in which fatality monitoring occurs, the certificate holder shall use approximately 25  
26 carcasses for searcher efficiency trials (approximately 100 carcasses per year). The certificate  
27 holder shall vary the number of trials per season and the number of carcasses per trial so that the  
28 searchers will not know the total number of trial carcasses being used in any trial. The certificate  
29 holder shall distribute trial carcasses in varied habitat in rough proportion to the habitat types  
30 within the facility site. During each season, both small bird and large bird carcasses will be used  
31 in approximately equal numbers. "Small bird" and "large bird" size classes and carcass selection  
32 are as described above for the removal trials.

33 Before beginning searcher efficiency trials for the second year of fatality monitoring, the  
34 certificate holder shall report the results of the first year efficiency trials to the Department and  
35 ODFW. In the report, the certificate holder shall analyze whether the efficiency trials as  
36 described above (using approximately 100 carcasses per year) provides sufficient data to  
37 accurately estimate adjustment factors for carcass removal. The number of removal trials for the  
38 second year of fatality monitoring may be adjusted up or down, subject to the approval of the  
39 Department.

40 Personnel conducting searches will not know in advance when trials are conducted; nor  
41 will they know the location of the trial carcasses. If suitable trial carcasses are available, trials  
42 during the fall season will include several small brown birds to simulate bat carcasses. Legally  
43 obtained bat carcasses will be used if available.

## Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan

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1 On the day of a standardized fatality monitoring search (described below) but before the  
2 beginning of the search, efficiency trial carcasses will be placed at random locations within areas  
3 to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be  
4 distributed before dawn.

5 Efficiency trials will be spread over the entire season to incorporate effects of varying  
6 weather and vegetation growth. Carcasses will be placed in a variety of postures to simulate a  
7 range of conditions. For example, birds will be: 1) placed in an exposed posture (thrown over the  
8 shoulder), 2) hidden to simulate a crippled bird or 3) partially hidden.

9 Each non-domestic carcass will be discreetly marked so that it can be identified as an  
10 efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses  
11 found during the carcass search will be recorded. The number of efficiency trial carcasses  
12 available for detection during each trial will be determined immediately after the trial by the  
13 person responsible for distributing the carcasses.

14 If new searchers are brought into the search team, additional searcher efficiency trials  
15 will be conducted to ensure that detection rates incorporate searcher differences. The certificate  
16 holder shall include a discussion of any changes in search personnel and any additional detection  
17 trials in the reporting required under Section 6 of this plan.

### 18 (d) Fatality Monitoring Search Protocol

19 The objective fatality monitoring is to estimate the number of bird and bat fatalities that  
20 are attributable to facility operation as an indicator of the impact of the facility on habitat quality.  
21 The goal of bird and bat fatality monitoring is to estimate fatality rates and associated variances.  
22 The certificate holder shall conduct fatality monitoring using standardized carcass searches. For  
23 each phase of the facility, the certificate holder shall conduct fatality monitoring for two years  
24 (32 searches), beginning one month after the start of commercial operation of that phase.

25 The certificate holder shall use a worst-case analysis to resolve any uncertainty in the  
26 results and to determine whether the data indicate that additional mitigation should be  
27 considered. The Department may require additional, targeted monitoring if the data indicate the  
28 potential for significant impacts that cannot be addressed by worst-case analysis and appropriate  
29 mitigation.

30 The certificate holder shall calculate fatality rates using the statistical methods described  
31 in Section (e). On an annual basis, the certificate holder shall report an estimate of fatalities in  
32 eight categories: 1) all birds, 2) small birds, 3) large birds, 4) raptors, 5) grassland birds, 6)  
33 nocturnal migrants, 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats.

34 If the sample size is large enough to conduct a comparison study of large and small  
35 turbines and the Department approves, the certificate holder shall compare the fatality rates in  
36 the “all birds” category for each of the turbine size classes. In proposing a comparison study of  
37 large and small turbines, the certificate holder may include available data collected at other wind  
38 energy facilities in similar habitat areas, if the data are based on comparable survey protocols and  
39 are appropriately adjusted for removal and searcher efficiency bias.

40 The certificate holder shall estimate the number of avian and bat fatalities attributable to  
41 operation of the facility based on the number of avian and bat fatalities found at the facility site.  
42 All carcasses located within areas surveyed, regardless of species, will be recorded and, if  
43 possible, a cause of death determined based on blind necropsy results. If a different cause of

## Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan

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1 death is not apparent, the fatality will be attributed to facility operation. The total number of  
2 avian and bat fatalities will be estimated by adjusting for removal and searcher efficiency bias.

3 Personnel trained in proper search techniques (“the searchers”) will conduct the carcass  
4 searches by walking parallel transects within the search plots.<sup>13</sup> Transects will be initially set at 6  
5 meters apart in the area to be searched. A searcher will walk at a rate of approximately 45 to 60  
6 meters per minute along each transect searching both sides out to three meters for casualties.  
7 Search area and speed may be adjusted by habitat type after evaluation of the first searcher  
8 efficiency trial. The searchers will record the condition of each carcass found, using the  
9 following condition categories:

- 10       ▪ Intact – a carcass that is completely intact, is not badly decomposed and shows no  
11       sign of being fed upon by a predator or scavenger
- 12       ▪ Scavenged – an entire carcass that shows signs of being fed upon by a predator or  
13       scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains,  
14       legs, pieces of skin, etc.)
- 15       ▪ Feather Spot – 10 or more feathers at one location indicating predation or  
16       scavenging or 2 or more primary feathers

17 All carcasses (avian and bat) found during the standardized carcass searches will be  
18 photographed, recorded and labeled with a unique number. Each carcass will be bagged and  
19 frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will  
20 be kept with the carcass at all times. For each carcass found, searchers will record species, sex  
21 and age when possible, date and time collected, location, condition (e.g., intact, scavenged,  
22 feather spot) and any comments that may indicate cause of death. Searchers will photograph each  
23 carcass as found and will map the find on a detailed map of the search area showing the location  
24 of the wind turbines and associated facilities. The certificate holder shall coordinate collection of  
25 state endangered, threatened, sensitive or other state protected species with ODFW. The  
26 certificate holder shall coordinate collection of federally-listed endangered or threatened species  
27 and Migratory Bird Treaty Act protected avian species with the U.S. Fish and Wildlife Service  
28 (USFWS). The certificate holder shall obtain appropriate collection permits from ODFW and  
29 USFWS.

30 The searchers might discover carcasses incidental to formal carcass searches (e.g., while  
31 driving within the project area). For each incidentally discovered carcass, the searcher shall  
32 identify, photograph, record data and collect the carcass as would be done for carcasses within  
33 the formal search sample during scheduled searches. If the incidentally discovered carcass is  
34 found within a formal search plot, the fatality data will be included in the calculation of fatality  
35 rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be  
36 reported separately. The certificate holder shall coordinate collection of incidentally discovered  
37 state endangered, threatened, sensitive, or other state protected species with ODFW. The  
38 certificate holder shall coordinate collection of incidentally discovered federally-listed  
39 endangered or threatened species and Migratory Bird Treaty Act protected avian species with the  
40 USFWS.

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<sup>13</sup> Where search plots are adjacent, the search area may be rectangular.

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1 The certificate holder shall develop and follow a protocol for handling injured birds. Any  
2 injured native birds found on the facility site will be carefully captured by a trained project  
3 biologist or technician and transported to a qualified rehabilitation specialist approved by the  
4 Department.<sup>14</sup> The certificate holder shall pay costs, if any, charged for time and expenses  
5 related to care and rehabilitation of injured native birds found on the site, unless the cause of  
6 injury is clearly demonstrated to be unrelated to the facility operations.

i) 7 (e) Statistical Methods for Fatality Estimates

ii) 8

iii) 9 The estimate of the total number of wind facility-related fatalities is based on:

iv) 10

- 11 (1) The observed number of carcasses found during standardized searches during the  
12 two monitoring years for which the cause of death is attributed to the facility.<sup>15</sup>  
13 (2) Searcher efficiency expressed as the proportion of planted carcasses found by  
14 searchers.  
15 (3) Removal rates expressed as the estimated average probability a carcass is  
16 expected to remain in the study area and be available for detection by the  
17 searchers during the entire survey period.

### 18 Definition of Variables

19 The following variables are used in the equations below:

- 20  $c_i$  the number of carcasses detected at plot  $i$  for the study period of interest (e.g., one  
21 year) for which the cause of death is either unknown or is attributed to the facility  
22  $n$  the number of search plots  
23  $k$  the number of turbines searched (includes the turbines centered within each  
24 search plot and a proportion of the number of turbines adjacent to search plots to  
25 account for the effect of adjacent turbines on the search plot buffer area)  
26  $\bar{c}$  the average number of carcasses observed per turbine per year  
27  $s$  the number of carcasses used in removal trials  
28  $s_c$  the number of carcasses in removal trials that remain in the study area after 40  
29 days  
30  $se$  standard error (square of the sample variance of the mean)  
31  $t_i$  the time (days) a carcass remains in the study area before it is removed  
32  $\bar{t}$  the average time (days) a carcass remains in the study area before it is removed  
33  $d$  the total number of carcasses placed in searcher efficiency trials  
34  $p$  the estimated proportion of detectable carcasses found by searchers  
35  $I$  the average interval between searches in days

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<sup>14</sup> Approved specialists include Lynn Tompkins (wildlife rehabilitator) of Blue Mountain Wildlife, a wildlife rehabilitation center in Pendleton, and the Audubon Bird Care Center in Portland. The certificate holder must obtain Department approval before using other specialists.

<sup>15</sup> If a different cause of death is not apparent, the fatality will be attributed to facility operation.

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- 1  $\hat{\pi}$  the estimated probability that a carcass is both available to be found during a  
2 search and is found
- 3  $m_t$  the estimated annual average number of fatalities per turbine per year, adjusted  
4 for removal and observer detection bias
- 5 C nameplate energy output of turbine in megawatts (MW)

### 6 Observed Number of Carcasses

7 The estimated average number of carcasses ( $\bar{c}$ ) observed per turbine per year is:

8 
$$\bar{c} = \frac{\sum_{i=1}^n c_i}{k} . \quad (1)$$

### 9 Estimation of Carcass Removal

10 Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean carcass  
11 removal time ( $\bar{t}$ ) is the average length of time a carcass remains at the site before it is removed:

12 
$$\bar{t} = \frac{\sum_{i=1}^s t_i}{s - s_c} . \quad (2)$$

13 This estimator is the maximum likelihood estimator assuming the removal times follow an  
14 exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at  
15 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are  
16 removed before the end of the trial, then  $s_c$  is 0, and  $\bar{t}$  is just the arithmetic average of the  
17 removal times. Removal rates will be estimated by carcass size (small and large), habitat type  
18 and season.

### 19 Estimation of Observer Detection Rates

20 Observer detection rates (i.e., searcher efficiency rates) are expressed as  $p$ , the proportion  
21 of trial carcasses that are detected by searchers. Observer detection rates will be estimated by  
22 carcass size, habitat type and season.

### 23 Estimation of Facility-Related Fatality Rates

24 The estimated per turbine annual fatality rate ( $m_t$ ) is calculated by:

25 
$$m_t = \frac{\bar{c}}{\hat{\pi}} , \quad (3)$$

26 where  $\hat{\pi}$  includes adjustments for both carcass removal (from scavenging and other means) and  
27 observer detection bias assuming that the carcass removal times  $t_i$  follow an exponential  
28 distribution. Under these assumptions, this detection probability is estimated by:

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$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[ \frac{\exp\left(\frac{I}{\bar{t}}\right) - 1}{\exp\left(\frac{I}{\bar{t}}\right) - 1 + p} \right]. \quad (4)$$

The estimated per MW annual fatality rate ( $m$ ) is calculated by:

$$m = \frac{m_t}{C}. \quad (5)$$

The certificate holder shall calculate fatality estimates for: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6) nocturnal migrants 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats. If the sample size is large enough to conduct a comparison study of large and small turbines and the Department approves, the certificate holder shall compare the fatality rates in the “all birds” category for each of the turbine size classes. The final reported estimates of  $m$ , associated standard errors and 90% confidence intervals will be calculated using bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances and confidence intervals for complicated test statistics. For each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be sampled with replacement and  $\bar{c}$ ,  $\bar{t}$ ,  $p$ ,  $\hat{\pi}$  and  $m$  will be calculated. A total of 5,000 bootstrap iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates. The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5<sup>th</sup> and upper 95<sup>th</sup> percentiles of the 5000 bootstrap estimates are estimates of the lower limit and upper limit of 90% confidence intervals.

### Nocturnal Migrant and Bat Fatalities

Differences in observed nocturnal migrant and bat fatality rates for lit turbines, unlit turbines that are adjacent to lit turbines and unlit turbines that are not adjacent to lit turbines will be compared graphically and statistically.

### (f) Mitigation

Mitigation may be appropriate if fatality rates exceed a “threshold of concern.” For the purpose of determining whether a threshold has been exceeded, the certificate holder shall calculate the average annual fatality rates for species groups after two years of monitoring. Based on current knowledge of the species that are likely to use the habitat in the area of the facility, the following thresholds apply to the facility:

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<b>Species Group</b>	<b>Threshold of Concern</b> (fatalities per MW)
Raptors (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.)	0.06
Grassland species (All native bird species that rely on grassland habitat and are either resident species occurring year round or species that nest in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.2
Bat species as a group	2.5

1           If the data show that a threshold of concern for a species group has been exceeded, the  
2 certificate holder shall implement additional mitigation if the Department determines that  
3 mitigation is appropriate based on analysis of the data, consultation with ODFW and  
4 consideration of any other significant information available at the time. In addition, the  
5 Department may determine that mitigation is appropriate if fatality rates for individual avian or  
6 bat species (especially State Sensitive Species) are higher than expected and at a level of  
7 biological concern. If the Department determines that mitigation is appropriate, the certificate  
8 holder, in consultation with the Department and ODFW, shall propose mitigation measures  
9 designed to benefit the affected species. The certificate holder shall implement mitigation as  
10 approved by the Council. The Department may recommend additional, targeted data collection if  
11 the need for mitigation is unclear based on the information available at the time. The certificate  
12 holder shall implement such data collection as approved by the Council.

13           Mitigation should be designed to benefit the affected species group. Mitigation may  
14 include, but is not limited to, protection of nesting habitat for the affected group of native species  
15 through a conservation easement or similar agreement. Tracts of land that are intact and  
16 functional for wildlife are preferable to degraded habitat areas. Preference should be given to  
17 protection of land that would otherwise be subject to development or use that would diminish the  
18 wildlife value of the land. In addition, mitigation measures might include: enhancement of the  
19 protected tract by weed removal and control; increasing the diversity of native grasses and forbs;  
20 planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for  
21 raptors; improving wildfire response; and conducting or making a contribution to research that  
22 will aid in understanding more about the affected species and its conservation needs in the  
23 region.

## 24 **2. Raptor Nest Surveys**

25           The objectives of raptor nest surveys are: (1) to estimate the size of the local breeding  
26 populations of raptor species that nest on the ground or aboveground in trees or other  
27 aboveground nest locations in the vicinity of the facility; and (2) to determine whether operation  
28 of the facility results in a reduction of nesting activity or nesting success in the local populations

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1 of the following raptor species: Swainson’s hawk, golden eagle, ferruginous hawk and burrowing  
2 owl.

3 (a) Survey Protocol

4 • For Raptor Species that Nest Aboveground

5 The certificate holder shall use aerial and ground surveys to evaluate nest success by  
6 gathering data on active nests, on nests with young and on young fledged. The certificate holder  
7 will share the data with state and federal biologists. For each phase of the facility, the certificate  
8 holder shall conduct the first year of post-construction raptor nest surveys in the first raptor  
9 nesting season after construction of that phase is completed. The second year of surveys will be  
10 done in 2015. Thereafter, the certificate holder shall conduct raptor nest surveys as described in  
11 Section 2(d) below.

12 During each survey year, the certificate holder will conduct aerial surveys to determine  
13 nest occupancy in late May or early June within the site and a 2-mile buffer around the site (as  
14 identified in Downes et al., 2012, Leaning Juniper II Wildlife Monitoring Report for 2011–  
15 2012). Two helicopter visits to each nest may be required to determine *occupancy*. These surveys  
16 may be coordinated with adjacent wind facilities. All nests discovered during pre-construction  
17 surveys and any nests discovered during post-construction surveys, whether active or inactive,  
18 will be given identification numbers. Nest locations will be recorded on U.S. Geological Survey  
19 7.5-minute quadrangle maps. Global positioning system coordinates will be recorded for each  
20 nest. Locations of inactive nests will be recorded because they could become occupied during  
21 future years.

22 For occupied nests, the certificate holder shall determine nesting *success* by a minimum  
23 of one ground visit to determine species, number of young and young fledged. “Nesting success”  
24 means that the young have successfully fledged (reached advanced stage of development, the  
25 young are capable of independent movement). Nests that cannot be monitored due to the  
26 landowner denying aerial or ground access will be checked from a distance where feasible.

27 • For Burrowing Owls

28 The certificate holder will monitor burrowing owl nest sites discovered during pre-and  
29 post-construction surveys (as identified in Downes et al., 2012, Leaning Juniper II Wildlife  
30 Monitoring Report for 2011–2012). . This species is not easily detected during aerial raptor nest  
31 surveys. The certificate holder recorded active burrowing owl nest sites in the vicinity of the  
32 facility as they are discovered during other wildlife monitoring tasks. Any nests discovered  
33 during future post-construction surveys, whether active or showing signs of intermittent use by  
34 the species, will be given identification numbers. Nest locations will be recorded on U.S.  
35 Geological Survey 7.5-minute quadrangle maps and monitored. Global positioning system  
36 coordinates will be recorded for each nest site. Coordinates for ancillary burrows used by one  
37 nesting pair or a group of nesting pairs will also be recorded. Locations of inactive nests will be  
38 recorded because they could become occupied during future years.

39 The certificate holder shall conduct burrowing owl monitoring in the same years as the  
40 raptor nest surveys described above. For occupied nests, the certificate holder shall determine  
41 nesting *success* by a minimum of one ground visit to determine species, number of young and  
42 young fledged. “Nesting success” means that the young have successfully fledged (the young are



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1 capable of independent movements). Up to three visits to the nest sites may be necessary to  
2 determine outcome. Nests that cannot be monitored due to the landowner denying aerial or  
3 ground access will be checked from a distance where feasible.

4 The certificate holder shall monitor burrowing owl nests discovered during the first year  
5 of post-construction raptor nest surveys (the first raptor nesting season after construction is  
6 completed) and in 2015. Thereafter, the certificate holder shall monitor all known burrowing owl  
7 nest locations as a part of the long-term raptor nest monitoring program described in Section 2(d)  
8 below.

### 9 (b) Analysis

10 For each phase of the facility, the certificate holder shall analyze the raptor nesting data  
11 collected after two survey years to determine whether a reduction in either nesting success or  
12 nest use has occurred in the vicinity of the facility. If the analysis indicates a reduction in nesting  
13 success or nest use by Swainson's hawks, golden eagles, ferruginous hawks or burrowing owls  
14 within the facility site or within 2 miles of the facility site, then the certificate holder shall  
15 propose appropriate mitigation for the affected species as described in Section 2 and shall  
16 implement mitigation as approved by the Council. At a minimum, if the analysis shows that any  
17 raptors of these species have abandoned a nest territory within the facility site or within ½ mile  
18 of the facility site or has not fledged any young over the two survey years within that same area,  
19 the certificate holder shall assume the abandonment or unsuccessful fledging is due to operation  
20 of the facility unless another cause can be demonstrated convincingly.

21 Any reduction in nesting success or nest use could be due to operation of the facility,  
22 operation of another wind facility in the vicinity or some other cause. The certificate holder shall  
23 attribute the reduction to operation of LJIIB if the wind turbine closest to the affected nest site is  
24 an LJIIB turbine, unless the certificate holder demonstrates, and the Department agrees, that the  
25 reduction was due to a different cause.

26 Given the low raptor nesting densities in the area and the presence of other wind energy  
27 facilities nearby, statistical power to detect a relationship between distances from a wind turbine  
28 and nesting parameters (e.g., number of fledglings per reproductive pair) will be very low.  
29 Therefore, impacts may have to be judged based on trends in the data, results from other wind  
30 energy facility monitoring studies and literature on what is known regarding the populations in  
31 the region.

### 32 (c) Mitigation

33 The certificate holder shall propose mitigation for the affected species in consultation  
34 with the Department and ODFW and shall implement mitigation as approved by the Council. In  
35 proposing appropriate mitigation, the certificate holder shall advise the Department if any other  
36 wind project in the area is obligated to provide mitigation for a reduction in raptor nesting  
37 success at the same nest site. Mitigation should be designed to benefit the affected species or  
38 contribute to overall scientific knowledge and understanding of what causes nest abandonment or  
39 nest failure. Mitigation may be designed to proceed in phases over several years. It may include,  
40 but is not limited to, additional raptor nest monitoring, protection of natural nest sites from  
41 human disturbance or cattle activity (preferably within the general area of the facility) or  
42 participation in research projects designed to improve scientific understanding of the needs of the  
43 affected species.

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### 1 (d) Long-term Raptor Nest Monitoring and Mitigation Plan

2 In addition to the two years of post-construction raptor nest surveys described in Section  
3 2(a), the certificate holder shall conduct long-term raptor nest surveys at five-year intervals for  
4 the life of the facility.<sup>16</sup> The certificate holder shall conduct the first long-term raptor nest survey  
5 in 2020. In conducting long-term surveys, the certificate holder shall follow the same survey  
6 protocols as described above in Section 2(a) unless the certificate holder proposes an alternative  
7 protocol that is approved by the Department. In developing an alternative protocol, the certificate  
8 holder shall consult with ODFW.

9 The certificate holder shall analyze the raptor nesting data collected after each year of  
10 long-term raptor nest surveys to determine whether a reduction in either nesting success or nest  
11 use has occurred in the vicinity of the facility. If the analysis indicates a reduction in nesting  
12 success or nest use by Swainson's hawks, golden eagles, ferruginous hawks or burrowing owls  
13 within the facility site or within 2 miles of the facility site, then the certificate holder shall  
14 propose appropriate mitigation for the affected species as described in Section 2(a) and shall  
15 implement mitigation as approved by the Council. At a minimum, if the analysis shows that any  
16 raptors of these species have abandoned a nest territory within the facility site or within ½ mile  
17 of the facility site or has not fledged any young over the two survey years within that same area,  
18 the certificate holder shall assume the abandonment or unsuccessful fledging is due to operation  
19 of the facility unless another cause can be demonstrated convincingly.

20 Any reduction in nesting success or nest use could be due to operation of the facility,  
21 operation of another wind facility in the vicinity or some other cause, including changes in land  
22 use patterns after construction of the facility. The certificate holder shall attribute the reduction  
23 to operation of LJIIB if the wind turbine closest to the affected nest site is a LJIIB turbine unless  
24 the certificate holder demonstrates, and the Department agrees, that the reduction was due to a  
25 different cause.

26 Given the low raptor nesting densities in the area and the presence of other wind energy  
27 facilities nearby, statistical power to detect a relationship between distances from a wind turbine  
28 and nesting parameters (e.g., number of fledglings per reproductive pair) will be very low.  
29 Therefore, impacts may have to be judged based on trends in the data, results from other wind  
30 energy facility monitoring studies and literature on what is known regarding the populations in  
31 the region.

### 32 **3. Washington Ground Squirrel Surveys**

33 For the LJIIB area, the certificate holder shall conduct long-term post-construction  
34 surveys to collect data on Washington ground squirrel (WGS) activity within the lease boundary.  
35 A qualified professional biologist will monitor the WGS sites in the LJIIB areas identified during  
36 the pre-construction surveys (LJIIB 2008-2009) and the buffer area within 500 feet in all  
37 directions from the identified WGS sites in suitable habitat. The sites include historic sites 13,  
38 14, 15a, 15b, 16, 17, 22a, 23, and 24 LJIIB (as identified in Downes and Gritski 2014 LJII  
39 Wildlife Monitoring Report). These surveys may be coordinated with adjacent wind plants to  
40 enhance data collection and analysis of WGS activity in the area. The certificate holder shall

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<sup>16</sup> As used in this plan, "life of the facility" means continuously until the facility site is restored and the site certificate is terminated in accordance with OAR 345-027-0110.

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1 conduct surveys during the year following construction (2011) and every three years thereafter  
2 for the life of the facility (2014, 2017, 2020....). Post-construction WGS monitoring for the LJIB  
3 areas will assess the status (occurrence) and use (extent) of colonies. Surveyors will conduct  
4 standard recording protocols (level of use, notes on natal sites and physical extent of the sites)  
5 during meandering pedestrian (40-60 m spacing) surveys of the identified sites and suitable  
6 habitat within 500 ft buffer twice between late March and late May, during the active WGS  
7 periods. The biologist will also record incidental observations (including mapping and dates of  
8 observation) during other survey activities on the facility sites. These observations shall also  
9 include current land use and any land use or project-caused conditions (erosion, declines in  
10 vegetation quality) that may adversely affect WGS sites.

### 11 12 **4. Grassland Bird Study**

13 The grassland bird study is a 2-year, post-construction evaluation of grassland bird use in  
14 the LJF area. Parts of the facility occupy native habitat suitable for various ground-nesting bird  
15 species that nest in grassland or open low shrub habitat. Grassland birds that were documented  
16 on-site during baseline surveys conducted in 2006 included long-billed curlew, grasshopper  
17 sparrow, savannah sparrow, Western meadowlark and horned lark. These species are likely to  
18 nest on-site. Loggerhead shrikes may be present in the area but were not observed.

19 During the 2006 pre-construction surveys of the northern area of the, the applicant  
20 surveyed 57 transects. The transects were approximately 60-meters wide. They were searched  
21 twice during the peak period of activity for the target species (March through May). Locations of  
22 territorial male grasshopper sparrows were recorded with a GPS unit. GPS locations of  
23 (assumed) paired long-billed curlews or approximate location of the pair's primary activity area  
24 and locations of curlew nests were also recorded. Surveyors made notes on the general location  
25 of special status grassland bird species observed in the area and on any observed behavior (for  
26 example, nesting, staging, courtship, non-breeders foraging in loose groups).<sup>17</sup> The surveyors  
27 noted detections of common species in blocks of areas surveyed (several transects combined) but  
28 did not record GPS locations or count the number of individuals present.

29 The objective of the post-construction grassland bird study is to determine if there are  
30 noticeable changes in the presence and overall use by special status grassland bird species  
31 compared to pre-construction data collected in 2006. By surveying a large area that includes the  
32 undisturbed area between turbine strings, the study could provide information on whether  
33 operation of the facility discourages use of the area by two indicator species: grasshopper  
34 sparrows and long-billed curlews. In addition to focusing on the two indicator species, the post-  
35 construction surveys will include observations of common species such as western meadowlark,  
36 savannah sparrow and horned lark to provide information on the presence and distribution of  
37 these species within the study area and their behavior relative to turbine locations. The phrase  
38 "behavior relative to turbine locations" is intended to address observations of behavior that is  
39 different near turbines compared behavior away from turbines.

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<sup>17</sup> As used in this section, "special status grassland bird species" means grasshopper sparrows, long-billed curlews, loggerhead shrikes and burrowing owls.

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### 1 (a) Study Area

2 The study area is located within the LJIA area and covers approximately 1,362 acres.<sup>18</sup>  
3 For purposes of this discussion, the area north of Rattlesnake Road is referred to as the “north  
4 study area,” and the area south of the road is referred to as the “south study area.”

5 The north study area is bounded by the lease boundary on the northeast and west sides  
6 and by Rattlesnake Road on the southeast side. The south study area is bounded by an existing  
7 power line on the west and natural topography on the other sides. The north study area contains  
8 two proposed turbine strings of up to eight turbines and associated access roads and transmission  
9 components. The south study area contains proposed access roads and five turbines. The south  
10 study area might include burrowing owl dens, but no confirmed nests were discovered in the  
11 baseline surveys. The habitat in the north study area is primarily shrub-steppe with grassland-like  
12 vegetation in a recovery stage (it is assumed that fire disturbance has removed areas of mature  
13 shrubs). The south study area includes relatively flat ground with some gentle slopes and a dry  
14 drainage. The habitat in the south study area is similar to the habitat in the north study area and is  
15 relatively open grassland with some shrubs. Habitat for both the north and south study areas is  
16 not highly variable and is representative of a large portion of the remainder of the North lease  
17 area. Areas containing laydown areas and unsuitable habitat will not be studied.

18 The study areas were selected because they are somewhat removed from human activity  
19 (except low traffic use on facility access roads and one county road) and contain a large area of  
20 grassland/shrub-steppe habitat (mapped as habitat sub-type “SSB”) that is not proposed to be  
21 altered during project construction or operations.

### 22 (b) Survey Protocol

23 After completion of construction of the facility, the certificate holder shall survey the 57  
24 transects that were searched before construction in 2006. Surveyors will collect data on the  
25 indicator species (grasshopper sparrows and long-billed curlews) and other special status  
26 grassland bird species. For all special status grassland bird species observed, the surveyors will  
27 record the number of observations of these species and their GPS locations, using the same  
28 methodology used in 2006. Special status grassland bird species that fly readily in the surveyor’s  
29 presence will be tracked visually to attempt to determine defended territories and to limit  
30 potential double-counting of individuals. Surveyors will record notes on the general location and  
31 behavior of special status grassland bird species (for example, defensive responses, nesting,  
32 staging, courtship, non-breeders foraging in loose groups). This plotted data will provide  
33 information on the location of special status grassland bird species at distances near and far from  
34 turbines and other facilities.

35 Surveyors will record notes on the location and abundance of common species. Abundant  
36 common species that fly readily in the surveyor’s presence will be tracked visually to avoid  
37 double counting. Horned lark observations will be totaled for each survey area completed in one  
38 survey day. The data on the relative abundance and distribution of common species will provide  
39 information on the location of common species at distances near and far from turbines and other  
40 facilities.

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<sup>18</sup> The study area and its underlying habitat types are shown on “Figure 1: Areas to be studied for Grassland Birds during Operations Phase” (Response to Additional RAI, Attachment 2, October 2, 2009).

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1 The certificate holder shall conduct the first year of post-construction grassland surveys  
2 in the first spring following the beginning of commercial operation of the facility. The certificate  
3 holder shall conduct a second year of grassland surveys two to five years after the first survey.  
4 The certificate holder will determine when the second survey will be done, in consultation with  
5 ODFW and subject to approval by the Department, based on the restoration of grassland cover in  
6 areas disturbed during facility construction.

7 In each survey year, surveyors will complete two walking transect surveys of the north  
8 and south study areas (one in April and one in May). A third visit to specific potential burrowing  
9 owl dens (based on 2006 data and any newly discovered sites) will be conducted during the  
10 period from late May to early July, if the surveyor determines a third visit is needed to confirm  
11 use by burrowing owls. The April and May time period includes the seasonal period of staging  
12 (pre-nesting) of long-billed curlews (April), the major period of territorial calling of grasshopper  
13 sparrows (May) and the nesting period for long-billed curlews and other species (May).

### 14 (c) Data Analysis and Reporting

15 After the first survey year, the certificate holder shall submit a preliminary summary  
16 report to the Department. After the second survey year, the certificate holder shall submit a more  
17 comprehensive final report. The certificate holder shall submit maps for each survey year,  
18 showing transects walked and specific areas of use by the indicator species, other special status  
19 grassland bird species and common species (except horned larks). The certificate holder shall  
20 overlay a grid system on the mapped “as-built” locations of facility components within the study  
21 areas. Using the grid system, the certificate holder shall describe the survey results by area and  
22 distance from turbines.

23 The reports will include a description of vegetation compared to pre-construction  
24 conditions as recorded in 2006, including notes on any changes in land use by the landowner,  
25 wildfire influences and grazing and noting any areas of intense vegetation impact. Vegetation  
26 communities will be sampled by the transect method and a description of plant communities will  
27 be provided for each survey year.

28 The certificate holder shall report on observed changes in use by the indicator species.  
29 For example, the report will compare the locations and numbers of grasshopper sparrows plotted  
30 during the pre-construction surveys in the north study area to the locations and numbers of this  
31 species plotted during the post-construction survey years. The certificate holder shall report on  
32 the location of any burrowing owls observed during the transect searches or subsequent visits  
33 made to confirm use. The certificate holder shall analyze the locations for all special status  
34 grassland bird species (using GPS data) and common species (except horned larks) to calculate  
35 distance from turbines or other facilities.<sup>19</sup>

36 The certificate holder shall evaluate the data to determine if there are changes in the use  
37 of the study areas by the two indicator species before and after construction. In addition, the  
38 certificate holder shall evaluate the data to determine if there is noticeable difference in the  
39 distribution, abundance or behavior of special status grassland bird species or common species  
40 relative to turbine locations.

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<sup>19</sup> Data on common species cannot be compared to preconstruction data because the 2006 surveys did not record the location or abundance of these species by transect line. GPS data will not be collected for common species.

# Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan

[JUNE 11, 2015]

## 5. Wildlife Monitoring and Reporting System

The Wildlife Monitoring and Reporting System (WMRS) is a monitoring program to report avian and bat casualties found by maintenance personnel during operation of the facility. It consists of weekly Environmental Coordinator (EC) Inspections of selected turbines conducted during both spring and fall migration seasons, monthly SPCC Turbine Checks of every turbine, and Incidental Observations with discovery of bird and bat carcasses and injured wildlife incidental to operations and maintenance. Certificate holder's maintenance personnel will be trained in the methods needed to carry out this program.

All avian and bat carcasses discovered by maintenance personnel will be reported to the on-site EC for same day data recording (species, location, date, conditions) and for photo documentation. This information will be processed within WRMS and reviewed by certificate holder biologists for confirmation of information and identification. If the carcass is suspected to be an eagle or a state or federally- listed endangered or threatened species, certificate holder will contact ODFW and US Fish and Wildlife Service (USFWS) to report and coordinate collection. Certificate holder will secure the carcass (e.g., cover with a container) until, if appropriate, collection is completed. Certificate holder will not handle or transport any bat or bat carcass without a state or federal scientific collection or special use permit (SPUT).

## 6. Data Reporting

The certificate holder will report wildlife monitoring data and analysis to the Department. Monitoring data include fatality monitoring program data, raptor nest survey data, WGS survey data for the LJIB area, grassland bird study data, and WMRS (specifically eagles or state and federally-listed endangered or threatened species) data. The certificate holder may include the reporting of wildlife monitoring data and analysis in the annual report required under OAR 345-026-0080 or submit this information as a separate document at the same time the annual report is submitted. In addition, the certificate holder shall provide to the Department any data or record generated in carrying out this monitoring plan upon request by the Department.

The certificate holder shall notify USFWS and ODFW immediately if any federal or state endangered or threatened species are killed or injured on the facility site.

The public will have an opportunity to receive information about monitoring results and to offer comment. Within 30 days after receiving the final versions of reports that are required under this plan, the Department will make the reports available to the public on its website and will specify a time in which the public may submit comments to the Department.<sup>20</sup>

## 7. Amendment of the Plan

This Wildlife Monitoring and Mitigation Plan may be amended from time to time by agreement of the certificate holder and the Council. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan and to mitigation actions that may be required under this plan. The

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<sup>20</sup> The certificate holder may establish a Technical Advisor Committee (TAC) but is not required to do so. If the certificate holder establishes a TAC, the TAC may offer comments to the Council about the results of the monitoring required under this plan.

## **Leaning Juniper IIB Wildlife Monitoring and Mitigation Plan**

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- 1 Department shall notify the Council of all amendments and mitigation actions, and the Council
- 2 retains the authority to approve, reject, or modify any amendment of this plan or mitigation
- 3 action agreed to by the Department.

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