

# Montague Wind Power Facility: Wildlife Monitoring and Mitigation Plan

[MARCH 2021]

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1 This plan describes wildlife monitoring that the certificate holder shall conduct during  
2 operation of the Montague Wind Power Facility (MWPF).<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 The certificate holder shall use experienced and properly trained personnel (the  
6 “investigators”) to conduct the monitoring required under this plan. For all components of this  
7 plan except the Wildlife Reporting and Handling System, the certificate holder shall hire  
8 independent third party investigators (not employees of the certificate holder) to perform  
9 monitoring tasks.

10 The *Wildlife Monitoring and Mitigation Plan* for the MWPF has the following  
11 components:

- 12 1) Fatality monitoring program including:
  - 13 a) Removal trials
  - 14 b) Searcher efficiency trials
  - 15 c) Fatality search protocol
  - 16 d) Statistical analysis
- 17 2) Raptor nesting surveys
- 18 3) Washington ground squirrel surveys
- 19 4) Wildlife Reporting and Handling System

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

## 26 1. Fatality Monitoring

### 27 (a) Definitions and Methods

#### 28 Seasons

29 This plan uses the following dates for defining seasons:

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<sup>1</sup> This plan is incorporated by reference in the site certificate for the MWPF 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.

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<b>Season</b>	<b>Dates</b>
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

1           Search Plots

2           The investigators shall conduct fatality monitoring within circular search plots, centered  
3 on each sampled turbine, and having a radius of 150 meters (m) which is equal to the maximum  
4 blade tip height of all turbines at the MWPF. The certificate holder shall use the same search  
5 plots for each search conducted during a monitoring year, unless a switch to a road and pad  
6 search methodology is deemed warranted for a portion of the monitoring year (see Road and Pad  
7 Search Methodology section below).

8           Scheduling

9           Fatality monitoring will begin one month after commencement of commercial operation  
10 of the facility. Subsequent monitoring years will follow the same schedule (beginning in the  
11 same calendar month in the subsequent monitoring year).

12           The Certificate Holder will survey each search plot twice per month for the duration of  
13 the one year monitoring period. This is a more frequent search schedule during the summer and  
14 winter seasons than recommended by the previous (August 2017) version of the WMMP, which  
15 prescribed a monthly search interval for summer and winter, and is expected to provide for more  
16 accurate fatality estimation. Given the sensitivity of fatality rates to carcass persistence, the  
17 Certificate Holder may increase or decrease search frequency based on carcass persistence bias  
18 trials over the monitoring period but will do no fewer searches than the twice monthly searches  
19 described in the WMMP. Over the course of one monitoring year, the investigators will conduct  
20 24 searches, as follows:

<b>Season</b>	<b>Frequency</b>
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	2 searches per month (6 searches)
Fall Migration	2 searches per month (5 searches)
Winter	2 searches per month (9 searches)

21           Sample Size

22           The sample size for fatality monitoring is the number of turbines searched per monitoring  
23 year. The investigators shall conduct fatality monitoring during each monitoring year in search  
24 plots at one-half of the turbines that are built.

25           As described in the site certificate, the certificate holder may choose to build the MWPF  
26 using turbine types in two size classes:

- 27           • Small: turbines having a rotor diameter of 82 m or less
- 28           • Large: turbines having a rotor diameter greater than 82 m

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1 MWPF has 56 turbines comprising 51 Vestas V136 with a 68-m rotor radius and 5 Vestas  
2 V126 turbines with a 63-m rotor radius. All Phase I turbines are “large” turbines with rotor  
3 diameters greater than 82 m as defined by the WMMP.

4 The 28 search plots for Phase 1 will be selected using a systematic sampling design that  
5 uses a random starting point, and then selects every other turbine. This provides for a spatial  
6 representation across the entire MWPF. During the second year fatality monitoring at Phase 1,  
7 the sample will comprise the remaining 28 turbines (50%) not searched during the initial year of  
8 monitoring, such that all 56 turbines are searched over the course of the two-year study. All  
9 turbines are located in dryland wheat, so there is not significant difference in vegetative cover  
10 types between the search plots, although some plots may include a portion of non-wheat areas  
11 (e.g. Turbine C3).

12 *Duration of Fatality Monitoring*

13 The investigators shall perform fatality monitoring during the first full two years of  
14 facility operation (Year 1 and Year 2). At the end of each full year of monitoring, the certificate  
15 holder will report the results for joint evaluation by the Department, the certificate holder and  
16 ODFW. In the evaluation, the certificate holder shall compare the results for the MWPF with the  
17 thresholds of concern described in Section 1(g) of this plan and with comparable data from other  
18 wind power facilities in the Columbia Basin, as available. For the purpose of determining  
19 whether a threshold has been exceeded, the certificate holder shall calculate the average annual  
20 fatality rates for the species groups after the initial two years of monitoring. If fatality rates for  
21 the combined first two years of monitoring at the MWPF exceed any of the thresholds of concern  
22 or exceed the range of fatality rates found at other wind power facilities in the region, the  
23 certificate holder shall propose additional mitigation for Department and ODFW review within 6  
24 months after reporting the fatality rates to the Department.

25 *Use of Road and Pad Sampling Methodology*

26 The certificate holder requests the ability to use a road and pad (R&P) sampling method  
27 as an alternative to full plot (FP) searches if tall vegetation (i.e., wheat) results in poor searcher  
28 efficiency. Tall wheat can obscure detection of bird and bat carcasses and result in low carcass  
29 detection, and consequently the fatality estimates are skewed upward to account for potentially  
30 missed carcasses. A R&P method defines the search plot as the high visibility areas within 150 m  
31 of each turbine (typically graveled areas along roads and turbine bases), and excludes areas with  
32 low visibility (tall wheat). The search area at each turbine will be less for the road and pad  
33 searches, however, a larger sample of turbines will be searched to make up for the lost search  
34 area. While the amount of high visibility area for each R&P search plot will vary between  
35 turbines, it is estimated that the search area will comprise between 20% and 40% of the area  
36 encompassed by the full 150-m radius plot (Figure 2). For the R&P method, the number of  
37 fatalities found will be adjusted to account for fatalities potentially occurring in the unsearched  
38 (low visibility) portions of the 150-m radius plots, and therefore, missed by searchers. Huso and  
39 Dalthorp (2014) present one such method of adjusting fatality estimates to account for  
40 unsearched portions of the sampling plot. Their method uses models relating carcass density to  
41 distance from turbine to estimate the proportion of carcasses expected to fall in searched areas  
42 and evaluates the statistical costs of restricting searches to high visibility areas (Huso and  
43 Dalthorp 2014). A R&P sampling methodology is often employed at certain times of the year  
44 during PCFM studies conducted at facilities within agricultural landscapes, particularly in the

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1 Midwest, when crops become too tall or dense to effectively detect carcasses. Other PCFM  
2 studies have used a similar method to adjust for areas not searched due to dangerous terrain or  
3 impenetrable brush/forest within portions of the search plots.

4  
5 At MWPF, a road and pad sampling method would only be used within sampling plots  
6 containing cropland, and only if/when vegetation becomes tall enough to impede detection of  
7 fatalities. The certificate holder is negotiating with landowners to not plant wheat in the sample  
8 plots during the one year monitoring period but some landowners may not agree as the sample  
9 plots are large and typically located the middle of fields. For example, for one land owner the  
10 sample plots represent 137 acres of their property that could not be farmed during the monitoring  
11 period.

12 (b) Removal Trials

13 The objective of the removal trials is to estimate the length of time avian and bat  
14 carcasses remain in the search area. Estimates of carcass removal rates will be used to adjust  
15 carcass counts for removal bias. “Carcass removal” is the disappearance of a carcass from the  
16 search area due to predation, scavenging or other means such as farming activity.

17 The investigators shall conduct carcass removal trials within each of the seasons defined  
18 above during the first year of fatality monitoring. For each trial, the investigators shall use 10 to  
19 15 carcasses of small- and large-bodied species. After the first year of fatality monitoring, the  
20 investigators may reduce the number of removal trials and the number of removal trial carcasses  
21 during any subsequent year of fatality monitoring, subject to the approval of the Department. The  
22 investigators must show that the reduction is justified based on a comparison of the first-year  
23 removal data with published removal data from nearby wind energy facilities.

24 The investigators shall use game birds or other legal sources of avian species as test  
25 carcasses for the removal trials, and the investigators may use fresh avian carcasses found in  
26 fatality monitoring searches. The investigators shall select species with approximately the same  
27 coloration and size attributes as species found within the site boundary. If suitable trial carcasses  
28 are available, trials during the spring, summer, and fall season will include small brown birds or  
29 brown mice to simulate bat carcasses. Legally obtained bat carcasses, or bat carcasses  
30 encountered during fatality monitoring, will be used if available.

31 Trial carcasses will be marked discreetly for recognition by searchers and other  
32 personnel. Carcasses will be placed in a variety of postures to simulate a range of conditions. For  
33 example, birds will be: (1) placed in an exposed posture (e.g., thrown over the shoulder), (2)  
34 hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) or (3) partially  
35 hidden. The trial carcasses will be placed randomly within the carcass removal trial plots. Trial  
36 carcasses will be left in place until the end of the carcass removal trial.

37 An approximate schedule for assessing removal status is once daily for the first 4 days,  
38 and on days 7, 10, 14, 21, 28 and 35. This schedule may be adjusted depending on actual carcass  
39 removal rates, weather conditions and coordination with the other survey work. The condition of  
40 scavenged carcasses will be documented during each assessment, and at the end of the trial all  
41 traces of the carcasses will be removed from the site. Scavenger or other activity could result in  
42 complete removal of all traces of a carcass in a location or distribution of feathers and carcass  
43 parts to several locations. This distribution will not constitute removal if evidence of the carcass

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1 remains within an area similar in size to a search plot and if the evidence would be discernable to  
2 a searcher during a normal survey.

3 Before beginning removal trials for any subsequent year of fatality monitoring, the  
4 certificate holder shall report the results of the first-year removal trials to the Department and  
5 ODFW. In the report, the certificate holder shall analyze whether four removal trials per year, as  
6 described above, provide sufficient data to accurately estimate adjustment factors for carcass  
7 removal. The number of removal trials may be adjusted up or down, subject to the approval of  
8 the Department.

9 (c) Searcher Efficiency Trials

10 The objective of searcher efficiency trials is to estimate the percentage of bird and bat  
11 fatalities that searchers are able to find. The investigators shall conduct searcher efficiency trials  
12 on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated agriculture  
13 habitat types. A pooled estimate of searcher efficiency will be used to adjust carcass counts for  
14 detection bias.

15 The investigators shall conduct searcher efficiency trials within each of the seasons  
16 defined above during the years in which the fatality monitoring occurs. Each trial will involve  
17 approximately 4 to 15 carcasses. The searchers will not be notified of carcass placement or test  
18 dates. The investigators shall vary the number of trials per season and the number of carcasses  
19 per trial so that the searchers will not know the total number of trial carcasses being used in any  
20 trial. In total, approximately 120 carcasses will be used per year, or approximately 30 per season.

21 For each trial, the investigators shall use small- and large-bodied species. The  
22 investigators shall use game birds or other legal sources of avian species as test carcasses for the  
23 efficiency trials. The investigators shall select species with approximately the same coloration  
24 and size attributes as species found within the site boundary. If suitable test carcasses are  
25 available, trials during the fall season will include several small brown birds or brown mice to  
26 simulate bat carcasses. Legally obtained bat carcasses, or bat carcasses encountered during  
27 fatality monitoring searches, will be used if available. The investigators shall mark the test  
28 carcasses to differentiate them from other carcasses that might be found within the search plot  
29 and shall use methods similar to those used to mark removal test carcasses as long as the  
30 procedure is sufficiently discreet and does not increase carcass visibility.

31 The investigators shall distribute trial carcasses in varied habitat in rough proportion to  
32 the habitat types within the facility site. On the day of a standardized fatality monitoring search  
33 (described below) but before the beginning of the search, investigators will place efficiency trial  
34 carcasses randomly within search plots (one to three trial carcasses per search plot) within areas  
35 to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be  
36 distributed before dawn.

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

41 The number and location of the efficiency trial carcasses found during the carcass search  
42 will be recorded. The number of efficiency trial carcasses available for detection during each

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1 trial will be determined immediately after the trial by the person responsible for distributing the  
2 carcasses. Following plot searches, all traces of test carcasses will be removed from the site.

3 If new searchers are brought into the search team, additional searcher efficiency trials  
4 will be conducted to ensure that detection rates incorporate searcher differences. The certificate  
5 holder shall include a discussion of any changes in search personnel and any additional detection  
6 trials in the reporting required under Section 5 of this plan.

7 Before beginning searcher efficiency trials for any subsequent year of fatality monitoring,  
8 the certificate holder shall report the results of the first-year efficiency trials to the Department  
9 and ODFW. In the report, the certificate holder shall analyze whether the efficiency trials as  
10 described above provide sufficient data to accurately estimate adjustment factors for searcher  
11 efficiency. The number of searcher efficiency trials for any subsequent year of fatality  
12 monitoring may be adjusted up or down, subject to the approval of the Department.

13 (d) Fatality Monitoring Search Protocol

14 The objective of fatality monitoring is to estimate the number of bird and bat fatalities  
15 that are attributable to facility operation as an indicator of the impact of the facility on habitat  
16 quality. The goal of bird and bat fatality monitoring is to estimate fatality rates and associated  
17 variances. The investigators shall perform fatality monitoring using standardized carcass  
18 searches according to the schedule described above.

19 Personnel trained in proper search techniques (“the searchers”) will conduct the carcass  
20 searches by walking parallel transects approximately 6 meters apart within the search plots. A  
21 searcher will walk at a rate of approximately 45 to 60 meters per minute along each transect,  
22 searching both sides out to 3 meters for casualties. Search area and speed may be adjusted by  
23 habitat type after evaluation of the first searcher efficiency trial.

24 Searchers shall flag all avian or bat carcasses discovered. Carcasses are defined as a  
25 complete carcass or body part, 10 or more feathers or three or more primary feathers in one  
26 location. When parts of carcasses and feathers from the same species are found within a search  
27 plot, searchers shall make note of the relative positions and assess whether or not these are from  
28 the same fatality.

29 All carcasses (avian and bat) found during the standardized carcass searches will be  
30 photographed, recorded and labeled with a unique number. Searchers shall make note of the  
31 nearest two or three structures (turbine, power pole, fence, building or overhead line) and the  
32 approximate distance from the carcass to these structures. The species and age of the carcass will  
33 be determined when possible. Searchers shall note the extent to which the carcass is intact and  
34 estimate time since death. Searchers shall describe all evidence that might assist in determination  
35 of cause of death, such as evidence of electrocution, vehicular strike, wire strike, predation or  
36 disease. While the certificate holder does not currently hold a federal SPUT Permit to allow  
37 collection of most native bird carcasses, the investigators conducting the fatality monitoring  
38 study possess an ODFW Scientific Taking Permit to allow salvage of bat carcasses found during  
39 the study. Each bat carcass will be bagged and frozen (assuming the necessary permits have been  
40 acquired) for future reference and possible necropsy or (if the carcass is fresh and whole) for use  
41 in trials. A copy of the data sheet for each bat carcass will be kept with the carcass at all times.

42 For each bird or bat carcass found, searchers will record species, sex, and age when  
43 possible, date and time collected, location, condition (e.g., intact, scavenged, feather spot) and

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1 any comments that may indicate cause of death. Searchers will photograph each carcass as found  
2 and will map the find on a detailed map of the search area showing the location of the wind  
3 turbines and associated facilities. The certificate holder shall coordinate collection of state  
4 endangered, threatened, sensitive or other state protected species with ODFW. The certificate  
5 holder shall coordinate collection of federally listed endangered or threatened species with the  
6 U.S. Fish and Wildlife Service (USFWS).

7 The investigators shall calculate fatality rates using the statistical methods described in  
8 Section (f), except that the investigators may use different notation or methods that are  
9 mathematically equivalent with prior approval of the Department. In making these calculations,  
10 the investigators may exclude carcass data from the first search of each turbine plot (to eliminate  
11 possible counting of carcasses that were present before the turbine was operating).

12 The investigators shall estimate the number of avian and bat fatalities attributable to  
13 operation of the facility based on the number of avian and bat fatalities found at the facility site.  
14 All carcasses located within areas surveyed, regardless of species, will be recorded and, if  
15 possible, a cause of death determined based on blind necropsy results. If a different cause of  
16 death is not apparent, the fatality will be attributed to facility operation. The total number of  
17 avian and bat fatalities will be estimated by adjusting for removal and searcher efficiency bias.

18 On an annual basis, the certificate holder shall report an estimate of fatalities in eight  
19 categories: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6)  
20 nocturnal migrants, (7) state and federally listed threatened and endangered species and State  
21 Sensitive Species listed under OAR 635-100-0040 and (8) bats. The certificate holder shall  
22 report annual fatality rates on both a per-MW and per-turbine basis.

23 (e) Incidental Finds and Injured Birds

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

34 The certificate holder shall develop and follow a protocol for handling injured birds. Any  
35 injured native birds found on the facility site will be carefully captured by a qualified  
36 rehabilitation specialist approved by the Department.<sup>2</sup> The certificate holder shall pay costs, if  
37 any, charged for time and expenses related to care and rehabilitation of injured native birds found  
38 on the site, unless the cause of injury is clearly demonstrated to be unrelated to the facility  
39 operations.

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<sup>2</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.

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1 (f) Statistical Methods for Fatality Estimates

2 Carcasses included in the fatality rate estimation will include those found within the  
3 search areas and with an estimated time of death within the study period. Fatality estimates, on  
4 both a per-MW and a per-turbine basis, will be calculated for the following categories: (1) all  
5 birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6) nocturnal migrants, (7)  
6 state and federally listed threatened and endangered species and State Sensitive Species listed  
7 under OAR 635-100-0040 and (8) bats. Consistent with current industry standards, fatality rates  
8 will be estimated using GenEst (a generalized estimator of fatality; Dalthorp et al. 2018, Simonis  
9 et al. 2018). The GenEst software, available as an open source R-package, was developed  
10 through a collaborative effort led by US Geological Survey to specifically estimate the number  
11 of bird and bat fatalities at wind and solar energy facilities. GenEst estimates the size of an open  
12 population (bird and bat fatalities) when detection probabilities (searcher efficiency and carcass  
13 persistence) and search coverages are less than one. To obtain an overall estimate of mortality,  
14 each carcass included in the analysis will be adjusted for searcher efficiency, carcass persistence,  
15 and search area. Additionally, to account for the change in searcher efficiency between  
16 successive searches, GenEst requires input of a detection reduction factor ( $k$ ). A value for  $k$  of  
17 0.67 has been estimated for bats (Huso et al. 2017), and this value will be assumed for both bird  
18 and bats for this study (i.e., searcher efficiency is reduced by 33% for each successive search).  
19 Fatality estimates and confidence intervals will be calculated using a parametric bootstrap  
20 (Dalthorp et al. 2018) for each individual category listed above, assuming more than five  
21 fatalities within each category are detected.

22 (g) Mitigation

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

28 Mitigation may be appropriate if fatality rates exceed a “threshold of concern.”<sup>4</sup> For the  
29 purpose of determining whether a threshold has been exceeded, the certificate holder shall  
30 calculate the average annual fatality rates for species groups after the initial two years of  
31 monitoring. Based on current knowledge of the species that are likely to use the habitat in the  
32 area of the facility, the following thresholds apply to the MWPF:

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<sup>4</sup> The Council adopted “thresholds of concern” for raptors, grassland species, and state sensitive avian species in the Final Order on the Application for the Klondike III Wind Project (June 30, 2006) and for bats in the Final Order on the Application for the Biglow Canyon Wind Farm (June 30, 2006). As explained in the Klondike III order: “Although the threshold numbers provide a rough measure for deciding whether the Council should be concerned about observed fatality rates, the thresholds have a very limited scientific basis. The exceeding of a threshold, by itself, would not be a scientific indicator that operation of the facility would result in range-wide population level declines of any of the species affected. The thresholds are provided in the Wildlife Monitoring and Mitigation Plan to guide consideration of additional mitigation based on two years of monitoring data.”



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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. This may take into consideration whether the mitigation  
10 required or provided in conjunction with raptor nest monitoring, habitat mitigation, or other  
11 components of the *Wildlife Monitoring and Mitigation Plan* or *Habitat Mitigation Plan*, would  
12 also benefit the affected species.

13            The certificate holder shall implement mitigation as approved by the Department, subject  
14 to review by the Council. The Department may recommend additional, targeted data collection if  
15 the need for mitigation is unclear based on the information available at the time. The certificate  
16 holder shall implement such data collection as approved by the Council.

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

28            If the data show that the threshold of concern for bat species as a group has been  
29 exceeded, the certificate holder shall implement additional mitigation if the Department

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1 determines that mitigation is appropriate based on analysis of the data, consultation with ODFW  
2 and consideration of any other significant information available at the time. For example, if the  
3 threshold for bat species as a group is exceeded, the certificate holder may contribute to Bat  
4 Conservation International or to a Pacific Northwest bat conservation group to fund new or  
5 ongoing research in the Pacific Northwest to better understand wind facility impacts to bat  
6 species and to develop possible ways to reduce impacts to the affected species.

7 **2. Raptor Nest Surveys**

8 The objectives of raptor nest surveys are: (1) to estimate the size of the local breeding  
9 populations of raptor species that nest on the ground or aboveground in trees or other  
10 aboveground nest locations in the vicinity of the facility; and (2) to determine whether operation  
11 of the facility results in a reduction of nesting activity or nesting success in the local populations  
12 of the following raptor species: Swainson’s hawk, golden eagle, ferruginous hawk, and  
13 burrowing owl.

14 The certificate holder shall conduct short-term and long-term monitoring. The  
15 investigators will use ground surveys to evaluate nest success by gathering data on active nests,  
16 on nests with young and on young fledged. The investigators will analyze the data as described  
17 in Section 3(c) and will share the data with state and federal biologists.

18 (a) Short-Term Monitoring

19 Short-term monitoring will be done in two monitoring seasons. The first monitoring  
20 season will be in the first raptor nesting season after completion of construction of the facility.  
21 The second monitoring season will be in the fourth year after construction is completed. The  
22 certificate holder shall provide a summary of the first-year results in the monitoring report  
23 described in Section 5. After the second monitoring season, the investigators will analyze two  
24 years of data compared to the baseline data.

25 *For Raptor Species that Nest Aboveground*

26 During each monitoring season, the investigators will conduct a minimum of one aerial  
27 and one ground survey for raptor nests in late May or early June and additional surveys as  
28 described in this section. The survey area is the area within the facility site and a 2-mile buffer  
29 zone around the site. For the ground surveys while checking for nesting *success* (conducted  
30 within the facility site and up to a maximum of ½ mile from the facility site), nests outside the  
31 leased project boundary will be checked from an appropriate distance where feasible, depending  
32 on permission from the landowner for access.

33 All nests discovered during pre-construction surveys and any nests discovered during  
34 post-construction surveys, whether active or inactive, will be given identification numbers. Nest  
35 locations will be recorded on U.S. Geological Survey 7.5-minute quadrangle maps. Global  
36 positioning system (GPS) coordinates will be recorded for each nest. Locations of inactive nests  
37 will be recorded because they could become occupied during future years.

38 Determining nest *occupancy* may require one or two visits to each nest. Aerial surveys  
39 for nest occupancy will be conducted within the facility site and a 2-mile buffer. For occupied  
40 nests, the certificate holder will determine nesting *success* by a minimum of one ground visit to  
41 determine the species, number of young and young fledged within the facility site and up to ½

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1 mile from the facility site. “Nesting success” means that the young have successfully fledged  
2 (the young are independent of the core nest site).

3 *For Burrowing Owls*

4 If burrowing owl nest sites are discovered, the investigators will monitor them according  
5 to the following protocol. This species is not easily detected during aerial raptor nest surveys.  
6 The investigators shall record active burrowing owl nest sites in the vicinity of the facility as  
7 they are discovered during other wildlife monitoring tasks. Any nests discovered during post-  
8 construction surveys, whether active or showing signs of intermittent use by the species, will be  
9 given identification numbers. Nest locations will be recorded on U.S. Geological Survey  
10 7.5-minute quadrangle maps. Global positioning system coordinates will be recorded for each  
11 nest site. Coordinates for ancillary burrows used by one nesting pair or a group of nesting pairs  
12 will also be recorded. Locations of inactive nests will be recorded because they could become  
13 occupied during future years.

14 The investigators shall conduct burrowing owl monitoring in the same years as the raptor  
15 nest surveys described above. For occupied nests, the investigators shall determine nesting  
16 *success* by a minimum of one ground visit to determine species, number of young and young  
17 fledged. “Nesting success” means that the young have successfully fledged (the young may or  
18 may not be independent of the core nest site). Three visits to the nest sites may be necessary to  
19 determine outcome. Nests that cannot be monitored due to the landowner denying access will be  
20 checked from a distance where feasible.

21 If burrowing owl nests are discovered during the first year of post-construction raptor  
22 nest surveys (the first raptor nesting season after construction is completed), the investigators  
23 shall monitor those nest locations during the second year of surveys in the fourth year after  
24 construction is completed. Thereafter, the investigators shall monitor all known burrowing owl  
25 nest locations as a part of the long-term raptor nest monitoring program described in Section 2(b)  
26 below.

27 (b) Long-Term Monitoring

28 In addition to the two years of post-construction raptor nest surveys described in Section  
29 2(a), the investigators shall conduct long-term raptor nest surveys at 5-year intervals for the life  
30 of the facility.<sup>5</sup> Investigators will conduct the first long-term raptor nest survey in the first raptor  
31 nesting season that is at least 5 years after the completion of construction and is in a year that is  
32 divisible by five (i.e., 2025, 2030, 2035); and will repeat the survey at 5-year intervals thereafter.  
33 In conducting long-term surveys, the investigators will follow the same survey protocols as  
34 described above in Section 2(a) unless the investigators propose alternative protocols that are  
35 approved by the Department. In developing an alternative protocol, the investigators will consult  
36 with ODFW and will take into consideration other monitoring conducted in adjacent areas. The  
37 investigators will analyze the data and report after each year of long-term raptor nest surveys.

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<sup>5</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 (c) Analysis

2 The investigators will analyze the raptor nesting data to determine whether a reduction in  
3 either nesting success or nest use has occurred in the survey area. If the analysis indicates a  
4 reduction in nesting success or nest use by Swainson’s hawks, ferruginous hawks, or burrowing  
5 owls, then the certificate holder will propose appropriate mitigation for the affected species as  
6 described in Section 2(d) and will implement mitigation as approved by the Department, subject  
7 to review by the Council.

8 Reductions in nesting success or nest use could be due to operation of the MWPF,  
9 operation of another wind facility in the vicinity or some other cause. The investigators shall  
10 attribute the reduction to operation of the MWPF if the wind turbine closest to the affected nest  
11 site is an MWPF turbine, unless the certificate holder demonstrates, and the Department agrees,  
12 that the reduction was due to a different cause. At a minimum, if the analysis shows that a  
13 Swainson’s hawk, ferruginous hawk or burrowing owl has abandoned a nest territory within the  
14 facility site or within ½ mile of the facility site or has not fledged any young over two successive  
15 surveys within that same area, the investigators will assume the abandonment or unsuccessful  
16 fledging is due to operation of the facility unless another cause can be demonstrated  
17 convincingly.

18 Given the low raptor nesting densities in the area and the presence of other wind energy  
19 facilities nearby, statistical power to detect a relationship between distance from an MWPF wind  
20 turbine and nesting parameters (e.g., number of fledglings per reproductive pair) will be very  
21 low. Therefore, impacts may have to be judged based on trends in the data, results from other  
22 wind energy facility monitoring studies and literature on what is known regarding the  
23 populations in the region.

24 (d) Mitigation

25 If the analysis shows a reduction in nesting success or nest use, the certificate holder shall  
26 implement mitigation if the Department determines that mitigation is appropriate. The certificate  
27 holder shall propose mitigation for the affected species in consultation with the Department and  
28 ODFW and shall implement mitigation as approved by the Council. In proposing appropriate  
29 mitigation, the certificate holder shall advise the Department if any other wind project in the area  
30 is obligated to provide mitigation for a reduction in raptor nesting success at the same nest site.  
31 Mitigation should be designed to benefit the affected species or contribute to overall scientific  
32 knowledge and understanding of what causes nest abandonment or nest failure. Mitigation may  
33 be designed to proceed in phases over several years. It may include, but is not limited to,  
34 additional raptor nest monitoring, protection of natural nest sites from human disturbance or  
35 cattle activity (preferably within the general area of the facility) or participation in research  
36 projects designed to improve scientific understanding of the needs of the affected species.  
37 Mitigation may take into consideration whether the mitigation required or provided in  
38 conjunction with other components of the *Wildlife Monitoring and Mitigation Plan* or *Habitat*  
39 *Mitigation Plan* would also benefit the raptor species whose nesting success was adversely  
40 affected.

41 **3. Washington ground squirrel surveys**

42 The certificate holder shall conduct long-term post-construction surveys to collect data on  
43 Washington ground squirrel (WGS) activity within the site boundary. Qualified professional

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1 biologists will monitor the locations within the facility site where WGS were detected in pre-  
2 construction surveys (beginning in 2017). The survey area includes the identified burrow areas  
3 and the buffer areas within 785 feet in suitable habitat. The investigators will walk standard  
4 protocol-level transects twice between late March and late May and record level of use, notes on  
5 natal sites, physical extent of the sites and any noticeable land use or habitat changes that may  
6 have occurred since the preconstruction survey in 2017. The investigators shall report any new  
7 WGS detections.

8 The certificate holder shall conduct surveys during the year following construction and  
9 every three years thereafter for the life of the facility. After each survey, the certificate holder  
10 shall report the results to ODFW and to the Department and shall include maps of the areas  
11 surveyed and detection locations.

12 **4. Wildlife Reporting and Handling System**

13 The Wildlife Reporting and Handling System (WRHS) is a monitoring program to search  
14 for and handle avian and bat casualties found by maintenance personnel during operation of the  
15 facility. Maintenance personnel will be trained in the methods needed to carry out this program.  
16 This monitoring program includes the initial response, handling, and reporting of bird and bat  
17 carcasses discovered incidental to maintenance operations (“incidental finds”).

18 All avian and bat carcasses discovered by maintenance personnel will be photographed  
19 and data will be recorded as would be done for carcasses within the formal search sample during  
20 scheduled searches. If maintenance personnel discover incidental finds, the maintenance  
21 personnel will notify a project biologist.

22 During the years in which fatality monitoring occurs, if maintenance personnel discover  
23 incidental finds outside the search plots for the fatality monitoring searches, the data will be  
24 reported separately from fatality monitoring data. If maintenance personnel discover carcasses  
25 within search plots, the data will be included in the calculation of fatality rates. The maintenance  
26 personnel will notify a project biologist. The certificate holder shall coordinate collection of state  
27 endangered, threatened, sensitive or other state protected species with ODFW. The certificate  
28 holder shall coordinate collection of federally-listed endangered or threatened with the USFWS.

29 **5. Data Reporting**

30 The certificate holder will report wildlife monitoring data and analysis to the Department  
31 for each calendar year in which wildlife monitoring occurs. Monitoring data include fatality  
32 monitoring program data, raptor nest survey data, WGS survey data, WGS incidental observation  
33 and assessment reports, and WRHS data. The certificate holder may include the reporting of  
34 wildlife monitoring data and analysis in the annual report required under OAR 345-026-0080 or  
35 submit this information as a separate document at the same time the annual report is submitted.  
36 In addition, the certificate holder shall provide to the Department any data or record generated in  
37 carrying out this monitoring plan upon request by the Department.

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

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1           Within 30 days after receiving the final versions of reports that are required under this  
2 plan, the Department will make the reports available to the public on its website and will specify  
3 a time in which the public may submit comments to the Department.<sup>6</sup>

4 **6. Amendment of the Plan**

5           This *Wildlife Monitoring and Mitigation Plan* may be amended from time to time by  
6 agreement of the certificate holder and the Council. Such amendments may be made without  
7 amendment of the site certificate. The Council authorizes the Department to agree to  
8 amendments to this plan and to mitigation actions that may be required under this plan. The  
9 Department shall notify the Council of all amendments and mitigation actions, and the Council  
10 retains the authority to approve, reject or modify any amendment of this plan or mitigation action  
11 agreed to by the Department.

12  
13 **7. Literature Cited**

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<sup>6</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.

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