

Wheatridge Renewable Energy Facility II Wildlife Monitoring and Mitigation Plan

Prepared for
Wheatridge Wind II, LLC

Prepared by



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~~Effective Date: Wheatridge Renewable Energy Facility II Site Certificate Effective Date~~

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1.0 Introduction

This Wildlife Monitoring and Mitigation Plan (WMMP) has been prepared for the Wheatridge Renewable Energy Facility II (WREFII) West ~~(Facility)~~, a 200-megawatt (MW) wind energy facility in Morrow County. Wheatridge Wind II, LLC (Certificate Holder) holds the site certificate for WREFII. ~~This WMMP describes wildlife monitoring that WREFII has areas of overlapping Site Boundary and shared related and supporting facilities with Wheatridge Renewable Energy Facility I (WREFI; Wheatridge Wind Energy, LLC is the Certificate Holder shall conduct during operation of WREFII West certificate holder).~~

~~WREFII West was~~The two facilities were originally permitted as ~~part of a larger one~~ facility, the Wheatridge Wind Energy Facility (WWEF). WWEF was granted approval of a site certificate by the Oregon Department of Energy's (ODOE) Energy Facility Siting Council (EFSC) on April 28, 2017 (EFSC 2017a), consisting of facilities in north Morrow (Wheatridge West) and Umatilla (Wheatridge East) counties¹. Wheatridge West began construction in January 2020.

Prior to operation, but after construction had commenced, WWEF was split into WREFI and WREFII. WREFI is a 100-MW wind energy facility within the Wheatridge West portion of the WWEF. WREF II is a 400-MW wind energy and 150-MW solar energy and battery storage facility within Wheatridge West and Wheatridge East. Of the 400 MW of wind energy in WREFII, 200 MW are located within Wheatridge West and are referred to as WREFII West. ~~This WMMP has been prepared for WREFII West, but reflects the plan prepared for Wheatridge West as part of pre-construction compliance in coordination with, and approved by, ODOE and Morrow County.~~ The Certificate Holder will amend this WMMP or prepare separate WMMPs for the remaining portions of WREFII prior to construction of those facilities.

~~This WMMP has the following components: This WMMP has been prepared for WREFII but reflects the WMMP prepared for Wheatridge West as part of pre-construction compliance in coordination with and as approved by ODOE and the Oregon Department of Fish and Wildlife (ODFW). This WMMP describes wildlife monitoring that the Certificate Holder shall conduct during operation of WREFII and includes the following components:~~

1. Fatality monitoring program, including:
 - a. ~~Standardized carcass searches;~~
 - a.b. ~~Carcass persistence~~Removal trials;
 - b. ~~Searcher efficiency trials;~~
 - c. ~~Fatality search protocol;~~ and
 - d. ~~Data~~Statistical analysis ~~and fatality estimation.~~

¹ The site certificate for the WWEF was amended five times, including the addition of solar energy generation and battery storage components and splitting the facility into WREFI and WREFII (EFSC 2017b, EFSC 2018a, EFSC 2018b, EFSC 2019, EFSC 2020).

2. Wildlife Response and Reporting System (WRRS);

~~2.3.~~ Raptor nesting surveys;

~~3. Wildlife Reporting and Handling System (WRHS);~~

4. Washington ground squirrel monitoring; and
5. Data reporting.

Based on the results of the monitoring program, mitigation of significant impacts may be required. The selection of the mitigation actions should allow for flexibility in creating appropriate responses to monitoring results that cannot be known in advance. If ODOE determines that mitigation is needed, the Certificate Holder shall propose appropriate mitigation actions to ODOE and shall carry out mitigation actions approved by ODOE, subject to review by the EFSC.

2.0 ~~EFSC~~Pre-Construction Compliance

The WMMP addresses the following ~~site certificate~~~~pre-construction~~ conditions of the ~~Fifth~~~~Fourth~~ Amended Site Certificate for ~~WREF I~~~~the Facility~~ (EFSC ~~2020~~~~2019~~):

PRE-FW-02 Prior to construction, the certificate holder shall finalize and implement the Wildlife Monitoring and Mitigation Plan (WMMP) provided in Attachment F of this order, based on the final facility design, as approved by the department in consultation with ODFW.

a. The final WMMP must be submitted and ODOE's concurrence received prior to the beginning of construction. ODOE shall consult with ODFW on the final WMMP. The certificate holder shall implement the requirements of the approved WMMP during all phases of construction and operation of the facility.

b. The WMMP may be amended from time to time by agreement of the certificate holder and the Oregon Energy Facility Siting Council ("Council"). Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of the WMMP agreed to by the Department.

PRE-TE-02 In accordance with Fish and Wildlife Habitat Condition 4, prior to construction, the certificate holder shall finalize and implement the Wildlife Monitoring and Mitigation Plan (WMMP) provided in Attachment F of this order, based on the final facility design, as approved by the department in consultation with ODFW. The final WMMP shall include a program to monitor potential impacts from facility operation on Washington ground squirrel. Monitoring shall be of any known colonies and shall be completed on the same schedule as the raptor nest monitoring for the facility. The monitoring surveys shall include returning to the known colonies to determine occupancy and the extent of the colony as well as a general explanation of the amount of use at the colony. If the colony is not found within the known boundary of the historic location a survey 500 feet out from the known colony will be conducted to determine if

the colony has shifted over time. Any new colonies that are located during other monitoring activities, such as raptor nest monitoring surveys, shall be documented and the extent of those colonies should be delineated as well. These newly discovered colonies shall also be included in any future WGS monitoring activities.

3.0 Fatality Monitoring – Wind Facility

~~The objective of fatality monitoring is to estimate the number of bird and bat fatalities of birds and bats, which would indicate a loss in habitat quality. The Certificate Holder shall employ qualified and properly trained personnel (“hire independent third-party investigators”) to perform fatality monitoring.~~

~~The program shall include standardized carcass searches to detect fatalities, methods to adjust for sources of bias inherent in fatality detection, and the estimation of annual fatality rates attributable to facility operation based on these data. Sources of bias will be measured through 1) carcass persistence trials to estimate the mean length of time that a carcass persists and is therefore available for detection; 2) searcher efficiency trials to estimate the proportion of carcasses detected by field technicians; and 3) estimation of the portion of the carcass fall distribution searched. Methods and results of all components of the fatality monitoring program will be reported to ODOE on an annual basis (Section 7.0).~~

~~If an investigator determines that a carcass found at the Facility (during searches or incidentally) is a state or federally threatened or endangered species, reporting timelines specified in Section 7.0 shall be followed.~~

3.1 Standardized Carcass Searches

~~The objective of standardized carcass searches is to systematically search Facility turbines for bird and bat fatalities documented in proximity to Facility infrastructure.~~

~~3.2 Search Plots and Methods~~

~~The following methods may be modified to reflect updated industry standards for performing post-construction fatality monitoring. Any updates to the fatality monitoring study design or data analysis methodology will be approved by ODOE prior to implementation.~~

~~3.2.1 Search Plots~~

~~The investigators shall conduct fatality monitoring within search plots. The Certificate Holder, in consultation with ODFW, shall select search plots based on a systematic sampling design that ensures that the selected search plots are representative of the habitat conditions in different parts of the site. Each search plot will contain one turbine. Search plots will be square or circular. Circular search plots will be centered on the turbine location; radius will be determined with regard to~~

maximum blade tip height and species of concern. Square search plots will be of sufficient size to contain a circular search plot as described above. The Certificate Holder shall provide maps of the search plots to ODOE before beginning fatality monitoring at the facility. The Certificate Holder shall use the same search plots for each search conducted during a monitoring year.

3.2.2 Scheduling

Fatality monitoring will begin one month after commencement of commercial operation of the facility. Subsequent monitoring years will follow the same schedule (beginning in the same calendar month in the subsequent monitoring year). Over the course of one monitoring year, the investigators will conduct 16 searches. The frequency of searches by season is shown in Table 1.

3.1.1 Sample Size

Fatality monitoring shall be conducted within defined search plots, with each search plot containing one turbine. Two types of search plots shall be established at each turbine. Each of the two search plot types employs a unique search strategy aimed toward detection of the target fatality size class. Target fatality size classes include: 1) bats/small birds; and, 2) large birds, including eagles. The search plots differ from each other based on the anticipated fall distribution for each target size class. The first type, “road and pad plots,” will include the graveled pad surrounding the turbine and portions of access roads that extend out to 100 meters from the turbine; the second type, “large bird plots,” will include a circular plot centered on the turbine with a radius of 120 meters extending from the turbine. To ensure a statistically robust sampling design that is representative of the various habitat conditions and turbine types at the Facility, 100 percent of Facility turbines will be searched utilizing both types of search plots. Each search plot type will employ a different search strategy geared towards detection of targeted size classes (See Section 3.1.3; Table 1).

3.1.2 Search Schedule and Interval

Fatality monitoring will begin just prior to the start of the first full season following commencement of commercial operation of the Facility. Fatality monitoring will commence with a “clearance search.” The clearance search serves to identify fatalities that occurred prior to the initiation of the fatality monitoring program and for which a defined time period cannot be assigned (See Section 3.4). After the initial clearance search, standardized carcass searches will begin the first week of the first full season following the commencement of commercial operation.

Standardized carcass searches will be conducted biweekly (every 14 days) in road and pad plots during the spring through fall seasons to capture migration and breeding seasons of birds and bats. The frequency of standardized carcass searches will be reduced to monthly (once every 28 days) in road and pad plots during winter.

Standardized carcass searches will be conducted monthly (every 28 days) in large bird plots to capture anticipated large bird use of the Facility throughout all four seasons (Table 1). The search interval of 28 days is supported by carcass persistence times observed for large birds in the

Northern Rockies avifaunal biome (Figure 7b in AWWI 2019). Over the course of one monitoring year, the investigators will conduct 22 standardized carcass searches (excluding the clearance search) in road and pad plots and 13 standardized carcass searches (excluding the clearance search) in large bird plots. Seasonal timeframes and frequency of searches by season and search plot type are shown in Table 1.

Table 1. PCFM Standardized Carcass Search Parameters~~Frequency of Fatality Monitoring~~
Searches by Season ~~Sample Size~~

Season	Dates	Frequency
Spring Migration	March 16 to May 15	2 searches per month (4 searches)
Summer/Breeding	May 16 to August 15	1 search per month (3 searches)
Fall Migration	August 16 to October 31	2 searches per month (5 searches)
Winter	November 1 to March 15	1 search per month (4 searches)

Season	Dates	Search Interval ¹	Search Plot Parameters	Target Size Class	Search Strategy	Number of Survey Periods per Season
Spring	March 16 to May 31	14 Days	Road and pad plot out to 100 meters	Bats/small birds and large birds	Walk	6
		28 Days	120-meter radius centered on turbine	Large birds	Binocular Scans from turbine base	3
Summer	June 1 to August 15	14 Days	Road and pads plot out to 100 meters	Bats/small birds and large birds	Walk	5
		28 Days	120-meter radius centered on turbine	Large birds	Binocular Scans from turbine base	3
Fall	August 16 to November 15	14 Days	Road and pad plot out to 100 meters	Bats/small birds and large birds	Walk	7
		28 Days	120-meter radius centered on turbine	Large birds	Binocular Scans from turbine base	3
Winter	November 16 to March 15	28 Days	Road and pad plot out to 100 meters AND 120-meter radius centered on turbine	Small birds and large birds	Walk; binocular Scans from turbine base	4

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Season	Dates	Search Interval ¹	Search Plot Parameters	Target Size Class	Search Strategy	Number of Survey Periods per Season
¹ Search interval <u>for 28 days</u> based on <u>carcass persistence data for the Northern Rockies avifauna biome (in which the project is located)</u> carcass persistence data (in which the project is located) (AWWI 2019)						

The Certificate Holder, in consultation with ODFW, may update the frequency of these searches to reflect considerations for specific species of concern and conditions at the Facility (e.g., probability of a carcass persisting from one search to the next).

Search Strategy and The sample size for fatality monitoring is the number of turbines searched per monitoring year. The investigators shall conduct fatality monitoring during each monitoring year in search plots at one-third of the turbines that are built or 50 turbines, whichever is greater. If fewer than 50 turbines are built, the Certificate Holder shall search all turbines.

3.2.3.1.3 Duration of Fatality Documentation Monitoring

Searches conducted in road and pad plots shall follow the configuration that covers a portion of the access road out to 100 meters from the turbine and the gravel area around the turbine base. Searchers will walk along one side of the access road to the turbine, search around the turbine pad and return on the other side of the access road searching for fatalities (Good et al 2012; Maurer et al 2017). Searches in large bird plots will involve binocular scans made from the turbine base in each of the cardinal directions to the extent of the 120-meter circular search plot. Areas within the search plot not visible from the turbine will be mapped as “unsearchable areas” and will be excluded from the “portion of the carcass fall distribution searched” in the fatality estimations (Hallingstad 2018). Search area and speed may be adjusted for habitat types and search methods after evaluation of the first searcher efficiency trial (See Section 3.3).

Searchers shall flag all bird or bat carcasses discovered. Carcasses are defined as a complete carcass or body part, three or more primary flight feathers, five or more tail feathers, or 10 or more feathers of any type concentrated together in an area 3 meters square or smaller. When parts of carcasses and feathers from the same species are found within a search plot, searchers shall make note of the relative positions and assess whether these are from the same fatality.

All carcasses (bird and bat) found during the standardized carcass searches will be photographed, recorded and labeled with a unique number. Searchers will record the location of the carcass using a global positioning system (GPS)-enabled device. Data collected per carcass found shall include the date, the turbine number, the distance from and bearing from the nearest turbine, the species, age and sex of the carcass when possible, the extent to which the carcass is intact, the estimated time since death, the habitat in which the carcass was found, whether the carcass was collected or left in place, and whether the carcass was found during a standardized carcass search or incidentally. Additional measurements may be required to identify the species of bat carcasses. Searchers shall describe all evidence that might assist in determination of cause of death, such as evidence of electrocution, vehicular strike, wire strike, predation, or disease.

If the necessary collection permits are not acquired by the Certificate Holder, all carcasses will be discreetly marked so as to avoid double counting and will be left in place.

3.1.4 Duration

The investigators shall perform one ~~complete monitoring cycle during the first~~ full year of fatality monitoring starting in the first year of facility operation (Year 1). ~~When Year 1~~At the end of the first

~~year of monitoring at the Facility has been completed, the raw data will be compiled by the investigators and the Certificate Holder in a comprehensive will report, which will include fatality estimates (see Section 7.0). The the results will be compared for joint evaluation by ODOE, the Certificate Holder, and ODFW. In the evaluation, the Certificate Holder shall compare the results for the Facility with the thresholds of concern described in Section 3.7 of this plan and with comparable data from other wind energypower facilities in the Columbia Basin, as available. The investigators will perform an additional year of monitoring in the fifth year of operations (Year 5) regardless of the results of the Year 1 study.~~

~~region.~~ If fatality rates for the first year of monitoring at the Facility ~~materially~~ exceed any of the thresholds of concern (see Section 3.6) or the range of fatality rates found at other wind power facilities in the region (as available), the Certificate Holder shall consult with ODOE and ODFW regarding potential mitigation. If mitigation is deemed appropriate, the Certificate Holder shall propose ~~appropriate~~additional mitigation for ODOE and ODFW review within 6 months after reporting the fatality rates to the ODOE. Alternatively, the Certificate Holder may opt to conduct a second year of fatality monitoring ~~consecutive to the first year~~immediately if the ~~Certificate Holder certificate holder~~ believes that the results of Year 1 monitoring were anomalous. ~~If the Certificate Holder takes this option, the investigators still must perform the monitoring in Year 5 of operations as described above.~~

~~Removal~~The investigators will perform an additional year of monitoring in the fifth year of operations (Year 5) regardless of the results of the Year 1 study.

3.3.2 Carcass Persistence Trials

~~Carcass persistence is defined as probability that a carcass will persist in the study area for a given amount of time (e.g., until the next survey), and accounts for carcass removal bias. Carcasses may be removed from the survey plot due to scavenging or other means (e.g., decomposition, farming practices). Carcass persistence is measured by the number of days a carcass remains within the search plot before it is no longer detectable by a searcher within a given search interval. It is assumed that carcass removal occurs at a constant rate and does not depend on the time since death of the organism. The objective of carcass persistence the removal trials is to estimate the length of time birdavian and bat carcasses remain withinin the search area and available to be detected by searchers. Estimates of carcass persistenceremoval rates will be used to adjust raw carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from the search area due to predation, scavenging, or other means, such as farming activity.~~

The investigators shall conduct a carcass ~~persistence trial~~removal trials within each ~~season~~of the ~~seasons~~ defined in Table 1 during ~~a the first year of~~fatality monitoring year. A minimum of 10. ~~For each of large bird, small bird, and bat surrogate trial carcasses shall be placed each season. The trial,~~ the investigators shall ~~select~~use 10 to 15 carcasses of small- and large-bodied species ~~with the same coloration and size attributes as species expected to occur at or near the Facility, if possible.~~ Trial carcass species may include legally obtained domestic species (e.g., ring-necked pheasants, juvenile Japanese quail), unprotected species (e.g. European starling, house sparrows) and dark mice as a

~~surrogate for bat carcasses shall be distributed within habitat categories and subtypes in proportion to their amounts within search plots.~~

~~After the first year of fatality monitoring, the investigators may reduce the number of removal trials and the number of removal trial carcasses during any subsequent year of fatality monitoring, subject to the approval of ODOE. The investigators must show that the reduction is justified based on a comparison of the first year removal data with published removal data from nearby wind energy facilities.~~

~~The investigators shall use game birds or other legal sources of avian species as test carcasses for the removal trials. The investigators shall select species with the same coloration and size attributes as species found within the site boundary. If suitable trial carcasses are available, trials during the fall season will include several small brown birds or dark colored mice to simulate bat carcasses. Legally obtained bat carcasses will be used if available.~~

~~Trial carcasses will be marked discreetly for recognition by searchers and other personnel. The trial carcasses~~ Carcasses will be placed ~~at randomly generated locations within the search plots. Small~~ in a variety of postures to simulate a range of conditions. For example, birds ~~and bat surrogates~~ will be:

- ~~1. Placed in an exposed posture (e.g., thrown over the shoulder);~~
- ~~2. Hidden to simulate a crippled bird (e.g., placed within the road and pad plots and large bird beneath a shrub or tuft of grass); or~~
- ~~3. Partially hidden.~~

~~The trial carcasses will be placed randomly within the large bird fatality monitoring search plots on day 0 of the trial.~~ Trial carcasses will be left in place until the end of the carcass persistence trial.

An approximate schedule for assessing ~~removal persistence~~ status is once daily for the first 4 days, and on days 7, 10, 14, 21, 28 and 35. This schedule may be ~~extended to include longer persistence times after initial placement (e.g., 60 or 90 days) to capture potentially longer large bird persistence times. This schedule may also be~~ adjusted depending on actual carcass persistence rates, weather conditions, and coordination with the other survey work. The condition of scavenged carcasses will be documented during each assessment, and at the end of the trial all traces of the carcasses will be removed from the site. Scavenger or other activity could result in complete removal of all traces of a carcass in a location or distribution of feathers and carcass parts to several locations. This ~~feather~~ distribution will not constitute ~~complete~~ carcass removal if evidence of the carcass remains within an area similar in size to a search plot and if the evidence would be ~~detectable~~ discernable to a searcher during a normal survey.

~~Before beginning carcass persistence trials for any subsequent year of fatality monitoring, the Certificate Holder shall report the results of the first year of carcass persistence trials to ODOE and ODFW. In the report, the Certificate Holder shall analyze whether four carcass persistence trials per year, as described above, provide sufficient data to accurately estimate adjustment factors for~~

carcass removal. The number of carcass persistence trials may be adjusted up or down, subject to the approval of ODOE.

3.43.3 Searcher Efficiency Trials

Searcher efficiency is defined as the probability that searchers will find a carcass that is available to be found within the search plot. Several factors influence searcher efficiency, including observer experience, vegetation conditions within a search plot, and characteristics of individual carcasses (e.g., size, color). The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. ~~The investigators shall conduct searcher efficiency trials on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated agriculture habitat types. A pooled estimate of searcher efficiency may be used—if sample sizes are too small for some habitat types—to adjust carcass counts for detection bias.~~

The investigators shall conduct searcher efficiency trials within each of the seasons defined in Table 1 during the years in which the fatality monitoring occurs. ~~A minimum of 12 each of large bird, small bird, and bat surrogate~~ Each trial will involve approximately 4 to 15 carcasses shall be placed in the spring, summer and fall seasons within the road and pad plots, while a minimum of an additional 12 large birds will be placed just in the large bird plots per spring, summer and fall seasons. In winter, when bat fatalities are not anticipated, a minimum of 12 each of large bird and small bird carcasses shall be placed in road and pad plots, while a minimum of 12 large birds will be placed in large bird plots. Searchers will not ~~. The searchers will not~~ be notified of carcass placement or test dates. The investigators shall vary the number of trials per season ~~to capture seasonal variation in site conditions that may affect the ability to detect fatalities,~~ and the number of carcasses per trial so that the searchers will not know the total number of trial carcasses being used in any trial. ~~Similar to carcass persistence trials, searcher efficiency~~ In total, approximately 80 carcasses will be used per year, or approximately 15 to 25 per season.

~~For each trial carcass, the investigators shall use small- and large-bodied species may include legally obtained domestic. The investigators shall use game birds or other legal sources of avian species (e.g., ring-necked pheasants, juvenile Japanese quail), unprotected as test carcasses for the efficiency trials, and the investigators may use carcasses found in fatality monitoring searches. The investigators shall select species (e.g. European starling, house sparrows) and with the same coloration and size attributes as species found within the site boundary. If suitable test carcasses are available, trials during the fall season will include several small brown birds or dark mice as a surrogate for bats. to simulate bat carcasses.~~

~~The Legally obtained bat carcasses will be used if available. The~~ investigators shall mark the ~~trial~~ test carcasses to differentiate them from other carcasses that might be found within the search plot and in a manner that shall use methods similar to those used to mark removal test carcasses as long as the procedure is sufficiently discreet and does not increase carcass visibility.

~~The Certificate Holder shall distribute trial carcasses in varied habitat in rough proportion to the habitat types within the facility site. On the day of a standardized carcass fatality monitoring search (described below) but before the beginning of the search, investigators will place efficiency trial~~

carcasses ~~at randomly generated locations~~ within search plots (one to three trial carcasses per search plot). ~~.) within areas to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be distributed before dawn.~~

~~Searcher efficiency trials will be spread over the entire season to incorporate effects of varying weather and vegetation growth.~~

The number and location of ~~the efficiency~~ trial carcasses found during the standardized carcass search will be recorded. The number of efficiency trial carcasses available for detection during each trial will be determined immediately after the trial by the person responsible for distributing the carcasses. Following ~~the standardized carcass search~~ plot searches, all traces of searcher efficiency trial ~~test~~ carcasses will be removed from the site. If new searchers are brought into the search team, additional searcher efficiency trials will be conducted to ensure that detection rates incorporate searcher differences. The Certificate Holder shall include a discussion of any changes in search personnel and any additional detection trials in the reporting required under Section 7.0 of this plan.

Before beginning searcher efficiency trials for any subsequent year of fatality monitoring, the Certificate Holder shall report the results of the first-year searcher efficiency trials to ODOE and ODFW. In the report, the Certificate Holder shall analyze whether the searcher efficiency trials as described above provide sufficient data to accurately estimate adjustment factors for searcher efficiency. The number of searcher efficiency trials for any subsequent year of fatality monitoring may be adjusted up ~~or down~~, subject to the approval of ODOE.

~~3.5 Fatality Monitoring Search Protocol~~

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

~~Personnel trained in proper search techniques (“the searchers”) will conduct the carcass searches by walking concentric or parallel transects (with transect width determined by the species of concern) within search plots. Search area and speed may be adjusted by habitat type after evaluation of the first searcher efficiency trial.~~

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

~~All carcasses (avian and bat) found during the standardized carcass searches will be photographed, recorded and labeled with a unique number. Searchers shall make note of the nearest turbine and the approximate distance from the carcass to the turbine. The species and age of the carcass will be determined when possible. Searchers shall note the extent to which the carcass is intact and~~

~~estimate time since death. Searchers shall describe all evidence that might assist in determination of cause of death, such as evidence of electrocution, vehicular strike, wire strike, predation or disease. Searchers will photograph each carcass as found and will map the find on a detailed map of the search area showing the location of the wind turbines and associated facilities.~~

~~If the necessary permits have been acquired through appropriate state and federal wildlife agencies, each carcass will be bagged and frozen for future reference or (if the carcass is fresh and whole) for use in trials. A copy of the data sheet for each carcass will be kept with the carcass at all times. When assessment of the carcass is complete, all traces of it will be removed from the site. If permits are not acquired by the Certificate Holder, the carcass will be left as found.~~

~~The investigators shall calculate fatality rates using the statistical methods described in Section 3.6. If the Certificate Holder or their investigators determines that a different statistical method is more appropriate, those methods shall be reviewed and approved by ODOE. In making these calculations, the investigators may exclude carcass data from the first search (clearance survey) of each turbine plot to eliminate possible counting of carcasses that were present before the turbine was operating.~~

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

~~On an annual basis, the Certificate Holder shall report an estimate of fatalities in nine categories, provided a sufficient number of detections are available to accurately determine estimates for each. The Certificate Holder shall report annual fatality rates on both a per-MW and per-turbine basis. The nine categories are:~~

- ~~1. All birds;~~
- ~~2. Small birds;~~
- ~~3. Large birds;~~
- ~~4.1. Raptors;~~
- ~~5.1. Raptor species of special concern;~~
- ~~6. Grassland species;~~
- ~~7. Nocturnal migrants;~~
- ~~8. State and federally listed threatened and endangered species and State Sensitive Species listed under OAR 635-100-0040; and~~
- ~~9. Bats.~~

3-63.4 Incidental Finds and Injured Birds

~~Incidental finds are carcasses that are detected outside the parameters of standardized carcass searches. Searchers may~~~~The searchers might~~ discover carcasses in areas surrounding the turbines but outside of the road and pad or large bird plots, while completing carcass persistence checks, or while moving incidental to formal carcass searches (incidental finds), such as when driving through the Facility. Additionally, carcasses detected during clearance surveys do not have an associated timeframe for fatality occurrence and therefore are considered incidental finds.~~project area.~~ For each incidental find, the searcher shall identify, photograph, record data and collect the carcass ~~(or leave as-is)~~ as would be done for carcasses ~~detected within the formal search sample~~ during ~~standardized carcass scheduled~~ searches. If the incidental find is located in a ~~formal~~ search plot within a reasonable timeframe from when that plot was ~~to be officially~~ searched (e.g., while placing searcher efficiency carcasses on the same day as the search), the fatality data will be included in the calculation of fatality rates. If the incidental find is found outside a formal search plot ~~or search time~~, the data will be reported separately and excluded from statistical analysis.

The Certificate Holder shall contact a qualified rehabilitation specialist approved by ODOE² to respond to injured wildlife. The Certificate Holder shall pay costs, if any, charged for time and expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to the ~~Facility~~~~facility~~ operations.

3-73.5 Statistical Methods for Fatality Estimation ~~Estimates (Shoenfeld Estimator)~~

~~The investigators shall determine estimated annual fatality rates for the Facility. Estimated annual fatality rates will be modelled by adjusting raw fatality counts for sources of bias including carcass persistence times, searcher efficiency, and the portion of the carcass fall distribution that was searched. Estimated annual fatality rates will be determined for eight categories, provided a sufficient sample size has been reached to accurately determine estimates for each. The eight categories are:~~

1. All birds;
2. Small birds;
3. Large birds;
4. Bats;

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

5. ~~The observed~~ Raptors;
6. Raptor species of special concern;

² Approved specialists include of Blue Mountain Wildlife, a wildlife rehabilitation center in Pendleton, and the Audubon Bird Care Center in Portland. The Certificate Holder must obtain ODOE approval before using other specialists.

7. Grassland species; and

8. State and federally listed threatened and endangered species and State Sensitive Species listed under OAR 635-100-0040.

In 2018, the U.S. Geological Survey released a new fatality estimator program, GenEst (Dalthorp et al. 2018). GenEst provides the most current state-of-the-science fatality estimation by minimizing biases associated with fatality estimation and allowing users to select the most appropriate methods and assumptions for project-specific circumstances. Rigorous testing of the performance of GenEst compared to other estimators using simulated data has shown GenEst to be the least biased, enabling more precise fatality estimation and reliable comparison of fatality estimates among projects (Simonis et al. 2018). Additionally, GenEst allows for fatality estimates to be split into subcategories which allows for estimates to be parsed by parameters such as season, year, or turbine type.

Estimated annual fatality rates will consider:

1. The search interval;
2. The number of carcasses ~~detected~~found during standardized carcass searches ~~within~~during the ~~two~~-monitoring period ~~where~~years for which the cause of death is ~~assumed~~attributed to be the operation of the Facility;
 1. Carcass persistence expressed as the probability that a carcass remains in the study area (persists) and is available for detection by the investigators during persistence trials;facility.³
 2. Searcher efficiency expressed as the probability that a trial carcass is found by investigators during searcher efficiency trials; and~~proportion of planted carcasses found by searchers.~~
 - ~~3. Removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during the entire survey period.~~

3.7.1 Definition of Variables

The following variables are used in the equations below:

e_i —the number of carcasses detected at plot i for the study period of interest (e.g., one year) for which the cause of death is either unknown or is attributed to the facility

n —the number of search plots

³If a different cause of death is not apparent, the fatality will be attributed to facility operation.

~~3.8—the number of turbines searched (includes the turbines centered within each search plot and a proportion of the carcass fall distribution that was searched at the Facility.~~

~~3.8.1—Estimation of Observer Detection Rates~~

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

~~3.8.2—Estimation of Facility-Related Fatality Rates~~

~~Estimated annual fatality rates will be developed for the eight categories named above as sample size allows. Estimated annual fatality rates will be expressed as fatalities per turbine per year and fatalities per MW per year, with corresponding 90 percent confidence intervals. The 90 percent confidence interval represents the upper and lower bounds of the range of fatality rates that have a 90 percent probability of containing the true fatality rate. The 90 percent confidence interval is useful in a management context as a means of assessing the range of fatality rates that are probable given the number of carcasses that were detected. Fatality estimators become inherently unstable if the number of detections in a subcategory (e.g., size class, species) are small (Korner Nievergelt et al. 2011; Huso et al. 2016). When few detections are found in a particular category, the estimate can suffer from bias, which makes confidence intervals large and results difficult to interpret. The Certificate Holder shall therefore provide estimates only for groups with three or more detections.~~

3.93.6 Mitigation

The Certificate Holder shall use best available science to resolve any uncertainty in the fatality monitoring results and to determine whether the ~~results~~~~data~~ indicate that additional mitigation should be considered. ODOE may require additional, targeted monitoring if the data indicate the potential for significant impacts that cannot be addressed by ~~worst-case~~ analysis and appropriate mitigation.

Mitigation may be appropriate if fatality rates exceed a “threshold of concern” (Table 2).⁴ For the purpose of determining whether a threshold has been exceeded, the Certificate Holder shall ~~determine~~~~calculate~~ the mean estimated average annual fatality ~~rate~~~~rates~~ for species groups after

⁴The 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.”

each year of monitoring (~~provided~~ three or more a sufficient number of detections within any of the species groups listed in Table 2 are available to accurately determine estimates for these groups). Based on current knowledge of the species that are likely to use the habitat in the area of the ~~Facility~~ facility, the thresholds of concern established by EFSC (Table 2) will be used in conjunction with most current regional fatality rates published by the American Wind and Wildlife Instituteshown in Table 2 apply to evaluate the fatality rates associated with the Facility and guide discussions on appropriate mitigationthe Facility.

Table 2. Fatality Thresholds of Concern by Species Group

Species Group	Threshold of Concern ¹ (Fatalities per MW)
Raptors ² (All eagles, hawks, falcons and owls, including burrowing owls.)	0.12 <u>0.09</u>
Raptor species of special concern (Swainson’s hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl.)	0.06
Grassland species ³ (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.)	<u>0.2</u>
Bat species as a groups ⁴	<u>2.5</u>
¹ <u>EFSC adopted the concept of “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). 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.</u>	
² <u>Regionally, the median fatality rate for all raptors in the Northern Rockies avifaunal biome (includes eastern Oregon; 22 studies) was 0.10 birds/MW/year (AWWI 2019). 75 percent of studies in the Northern Rockies reporting raptor estimates reported approximately 0.12 birds/MW/year.</u>	
³ <u>Regionally, the USFWS Pacific Region (includes Oregon; 35 studies) had a range of 0.0 to 4.2 bat/MW/year, with a median of 0.7 bats/MW/year (AWWI 2018).</u>	

If the data from a given year of monitoring show that a threshold of concern for ~~an avian~~ species group or individual state sensitive bird species has been exceeded, the Certificate Holder shall consult with ODOE and ODFW to determine if ~~implement~~ mitigation is if ODOE determines that mitigation is appropriate based on analysis of the data, ~~consultation with ODFW~~, and consideration of any other significant information available at the time. If mitigation is determined to be necessary ~~In addition, ODOE may determine that mitigation is appropriate if fatality rates for individual avian or bat species (especially State Sensitive Species) are higher than expected and at a level of biological concern. If ODOE determines that mitigation is appropriate,~~ the Certificate Holder, ~~in consultation with ODOE and ODFW~~, shall propose mitigation measures designed to benefit the affected species or species group. ~~Acceptable mitigation may include, but is not limited~~

~~to, contributions to wildlife rehabilitators, funding of research by third parties on local raptor populations, or habitat mitigation. This may take into consideration whether the mitigation required or provided in conjunction with raptor nest monitoring, habitat mitigation, or other components of the Wildlife Monitoring and Mitigation Plan or Habitat Mitigation Plan, would also benefit the affected species.~~

~~The Certificate Holder shall implement mitigation as approved by ODOE, subject to review by EFSC. ODOE may recommend additional, targeted data collection if the need for mitigation is unclear based on the information available at the time. If, following consultation and anyThe Certificate Holder shall implement such additional data collection, ODOE determines that mitigation is required, the as approved by EFSC.~~

~~The~~ Certificate Holder shall ~~propose~~design mitigation measures designed to benefit the affected species or species group, commensurate with the level of impact.

Acceptable mitigation may include, but is not limited to, contributions to wildlife rehabilitators, conducting or making a contribution to research that will aid in understanding more about the affected species or species group and its conservation needs in the region, improving wildfire response, constructing and maintaining artificial nest structures for raptors, or habitat mitigation. ~~Habitat mitigation~~group. Mitigation may include, but is not limited to, protection of nesting, foraging, or roosting habitat for the affected species or group of native species through a conservation easement or similar agreement. Tracts of land that are intact and functional for wildlife are preferable to degraded habitat areas. Preference should be given to protection of land that would otherwise be subject to development or use that would diminish the wildlife value of the land. In addition, habitat mitigation measures might include: enhancement of the protected tract by weed removal and control; increasing the diversity of native grasses and forbs; and planting sagebrush or other shrubs. This may take into consideration whether the mitigation required; constructing and maintaining artificial nest structures for raptors; improving wildfire response; and conducting or provided~~making a contribution to research that will aid in other Facility plans would also benefit~~understanding more about the affected species ~~and its conservation needs in the region.~~

~~If the data show that the threshold of concern for bat species as a group has been exceeded, the Certificate Holder shall implement mitigation if ODOE determines that mitigation is appropriate based on analysis of the data, consultation with ODFW, and consideration of any other significant information available at the time. For example, if the threshold for bat species as a group is exceeded, the Certificate Holder may contribute to Bat Conservation International or to a Pacific Northwest bat conservation group to fund new or ongoing research in the Pacific Northwest to better understand wind facility impacts to bat species and to develop possible ways to reduce impacts to the affected species.~~

4.0 Wildlife Response and Reporting System

The Certificate Holder has voluntarily developed a Wildlife Response and Reporting System (WRRS) as a proactive method of monitoring and recording birds and bats that are impacted by turbines at its facilities. This system has a specific set of processes, procedures, and training for monitoring, responding to, and reporting bird and bat injuries and fatalities at wind turbines that are tailored to each facility. The Certificate Holder has developed a WRRS Manual, which gives details of the program, and will be the manual by which operations personnel implement the WRRS program. The manual's purpose is to standardize the actions in response to any wildlife fatalities and/or injuries found within the Certificate Holder's facilities, regardless of their cause. The main points of the system are as follows:

- Any livestock or wildlife injury or fatality discovered within the facility boundaries will be reported within 24 hours immediately.
- An incident report will be completed and include photographs.
- The Certificate Holder's wildlife program manager shall be notified, and further actions may be taken based on the species and circumstances surrounding the incident.
- If a federally endangered or threatened species is found dead or injured at the site, the Certificate Holder will immediately notify the USFWS-Region 1 Field Office of the discovery.
- If a state endangered or threatened species is found dead or injured at the site, the Certificate Holder will immediately notify the ODFW of the discovery.

4.05.0 Raptor Nest Surveys

The objectives of raptor nest surveys are: (1) to count raptor nests on the ground or aboveground in trees or other aboveground nest locations in the vicinity of the Facility facility; and (2) to determine whether there are noticeable changes in nesting activity or nesting success in the local populations of the following raptor species: Swainson's hawk (*Buteo swainsoni*), golden eagle (*Aquila chrysaetos*), and ferruginous hawk (*Buteo regalis*).

The Certificate Holder shall conduct short-term and long-term monitoring. The investigators will use aerial and ground surveys to evaluate nest success by gathering data on active nests, on nests with young, and on young fledged. The Certificate Holder shall hire independent third-party investigators to perform raptor nest surveys.

4.15.1 Short-Term Monitoring

Short-term monitoring will be done in two monitoring seasons. The first monitoring season will be in the first raptor nesting season after completion of construction of the facility. The second monitoring season will be in the fourth year after construction is completed. The Certificate Holder

shall provide a summary of the first-year results in the monitoring report described in Section 76.0. After the second monitoring season, the investigators will analyze two years of data compared to the baseline data.

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

All nests discovered during pre-construction surveys and any nests discovered during post-construction surveys, whether active or inactive, will be given identification numbers. Global positioning system (GPS) coordinates will be recorded for each nest. Locations of inactive nests will be recorded because they could become occupied during future years.

Determining nest occupancy may require one or two visits to each nest. Aerial surveys for nest occupancy will be conducted within the Facilityfacility site and a 2-mile buffer. For occupied nests, the Certificate Holder will determine nesting success by a minimum of one ground visit to determine the species, number of young and young fledged within the Facilityfacility site and up to 0.5 miles from the facility site. “Nesting success” means that the young have successfully fledged (i.e., the young are independent of the core nest site).

4.25.2 Long-Term Monitoring

In addition to the two years of post-construction short-term raptor nest surveys described in Section 4.1, the investigators shall conduct long-term raptor nest surveys at 5-year intervals for the life of the facility.⁵ Investigators will conduct the first long-term raptor nest survey in the raptor nesting season of the ninth year after construction is completed and will repeat the survey at 5-year intervals thereafter. In conducting long-term surveys, the investigators will follow the same survey protocols as described in Section 4.1 unless the investigators propose alternative protocols that are approved by ODOE. In developing an alternative protocol, the investigators will consult with ODFW and will take into consideration other raptor nest monitoring conducted in adjacent areas. The investigators will analyze the data—as a way of determining trends in the number of raptor breeding attempts the facility supports and the success of those attempts—and will submit a report after each year of long-term raptor nest surveys.

⁵ 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.

~~5.01.0 Wildlife Response and Reporting System~~

~~The Certificate Holder has voluntarily developed a Wildlife Response and Reporting System (WRRS) as a proactive method of monitoring and recording birds and bats that are impacted by turbines at its facilities. This system has a specific set of processes, procedures, and training for monitoring, responding to, and reporting bird and bat injuries and fatalities at wind turbines that are tailored to each facility. The Certificate Holder has developed a WRRS Manual, which gives details of the program, and will be the manual by which operations personnel~~ **the WRRS program.** ~~The manual's purpose is to standardize the actions in response to any wildlife fatalities and/or injuries found within the Certificate Holder's facilities, regardless of their cause. The main points of the system are as follows:~~

- ~~Any livestock or wildlife injury or fatality discovered within the facility boundaries will be reported immediately~~ **to the on-duty Site Supervisor.**
- ~~The lead or supervisor shall complete an incident report and take photographs.~~
- ~~Wind Fleet Wildlife Program Manager shall be notified, and further actions will be determined at that time based on the species and circumstances surrounding the incident.~~
- ~~If an endangered or threatened species is found dead or injured at the site, the Certificate Holder will immediately notify the USFWS Region 1 Field Office of the discovery.~~

6.0 Washington Ground Squirrel Monitoring

In compliance with the pre-construction condition PRE-TE-02, Washington ground squirrel (*Urocitellus washingtoni*) pre-construction surveys were performed to determine operations monitoring requirements. No Washington ground squirrel colonies were identified during pre-construction surveys; therefore, no monitoring is planned at this time. However, if new colonies are located during other monitoring activities or incidentally during operations, the Certificate Holder shall document and delineate the colonies, and shall amend the WMMP with a Washington ground squirrel monitoring program in consultation with ODOE. Observations of Washington ground squirrels in agricultural habitat shall be reported to ODOE, but such observations do not warrant mitigation or monitoring.

7.0 Data Reporting

The Certificate Holder will report wildlife monitoring data and analysis to ODOE for each calendar year in which wildlife monitoring occurs. Monitoring data include fatality monitoring program data, WRRS data and raptor nest survey data, ~~and WRHS 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 ODOE any data or record generated in carrying out this monitoring plan upon request by ODOE.

The Certificate Holder shall notify USFWS and ODFW if any federal or state endangered or threatened species are killed or injured on the ~~Facility~~ site within 24 hours of species identification.

8.0 Amendment of the Plan

This WMMP may be amended ~~from time to time~~ by agreement of the Certificate Holder and EFSC. Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this plan and to mitigation actions that may be required under this plan. ODOE shall notify EFSC of all amendments and mitigation actions, and EFSC retains the authority to approve, reject or modify any amendment of this plan or mitigation action agreed to by ODOE.

9.0 References

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