Wheatridge Renewable Energy Facility East

Wildlife Monitoring and Mitigation Plan

(~~Approved at August 19-20, 2020 EFSC Meeting as part of the WREFII Site Certificate~~Updated by the Certificate Holder in May 2025 for pre-operations compliance.)

Prepared for
Wheatridge East Wind, LLC

Prepared by

TETRA TECH

~~October 2020~~May 2025

This page intentionally left blank

Table of Contents

List of Tables

This page intentionally left blank

1.0 Introduction

This Wildlife Monitoring and Mitigation Plan (WMMP) has been prepared for Wheatridge Renewable Energy Facility East (WREFE, or Facility), an approved 200-megawatt (MW) wind facility, with components approved to be located within Morrow and Umatilla counties. Wheatridge East Wind, LLC (Certificate Holder) holds the site certificate for WREFE. This WMMP describes wildlife monitoring that the Certificate Holder will conduct during operation of WREFE.

WREFE was originally permitted as part of a larger facility~~, the Wheatridge Wind Energy Facility (WRW). The WRW site certificate was issued by the Oregon Department of Energy's (ODOE) Energy Facility Siting Council (EFSC) on April 28, 2017~~ (EFSC 2017~~a~~). Following the 2017 original site certificate issuance, ~~the certificate holder received approval of five site certificate amendments from 2017 through 2020, where the fifth amendment split previously approved facility components into two original site certificates for facilities named~~the larger facility has to date been split into Wheatridge Renewable Energy Facility I (WREFI; 100 MW wind), ~~and WREFII. In November 2020, EFSC approved Amendment 1 of the WREFII site certificate, further splitting WREFII into three site certificates including an amended~~ WREFII (200 MW wind), ~~Wheatridge Renewable Energy Facility III (~~WREFIII~~, (~~150 MW solar), and WREFE (200 MW wind). ~~This WMMP applies to the WREFE site certificate.~~Construction of WREFE (71 turbines) commenced in June 2024 and is anticipated to be completed in June 2025. This WMMP was updated in May 2025 as part of pre-operations compliance for WREFE.

This WMMP has the following components:

1. Fatality monitoring program, including:
    a. Standardized carcass searches;
    b. Carcass persistence trials;
    c. Searcher efficiency trials; and
    d. Data analysis and fatality estimation.
2. Wildlife Response and Reporting System (WRRS);
3. Raptor nesting surveys;
4. Washington ground squirrel (*Urocitellus washingtoni*; WAGS) 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 and proportional responses to monitoring results that cannot be known in advance. If the Oregon Department of Energy (ODOE) determines that mitigation is needed, the Certificate Holder will propose appropriate mitigation actions to ODOE and will carry out mitigation actions approved by ODOE, subject to review by the Energy Facility Siting Council (EFSC).

2.0 EFSC Compliance

The WMMP addresses the following site certificate conditions for ~~WREFII~~ the Facility (EFSC 202~~0~~4):

> ***PRE-FW-02*** *Prior to operation, ~~construction,~~ the certificate holder shall finalize ~~and implement~~ the Wildlife Monitoring and Mitigation Plan (WMMP) provided in Attachment F-2 of the Final Order on Request for Amendment ~~5~~1 of the Wheatridge Renewable Energy Facility II Site Certificate (November 2020), ~~based on the final facility design, as approved by the department in consultation with ODFW~~ by updating the thresholds of concern in Section 3.6 of the WMMP in consultation with the Department and 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*** *Prior to beginning operation, ~~I~~in accordance with Condition ~~Fish and Wildlife Habitat Condition 4~~PRE-FW-02, ~~prior to construction,~~ the certificate holder shall finalize and implement the Wildlife Monitoring and Mitigation Plan (WMMP) provided in Attachment G~~F~~ of the Final Order on Amendment 1~~5 (2020)~~ of the Site Certificate for the Wheatridge Renewable Energy Facility East (June 2024), 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 that are attributable to Facility operation. The Certificate Holder will employ qualified and properly trained personnel (investigators) to perform fatality monitoring. The program will 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 Ff~~f~~acility 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 available carcasses detected by investigators; 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 will be followed.

3.1 Standardized Carcass Searches

The objective of standardized carcass searches is to systematically search Facility turbines for bat, small bird, and ~~bat~~large bird fatalities that occur in proximity to Facility infrastructure. Bird size criteria will be in accordance with the American Wind Wildlife Information Center (AWWIC) database determination of small birds, defined as total length ≤ 30 centimeter (AWWI 2020).

3.1.1 Search Plot Size and Configuration

This mortality monitoring effort focuses on three size classes of fatalities: bats, small birds, and large birds. Turbine-related fatalities are distributed non-uniformly around a turbine (carcass fall distribution). As a result, carcass density is not the same at all distances from a turbine, but typically rises over a short distance and eventually decreases to zero (Huso et al. 2016; Dalthorp 2020). The fall distribution depends on a number of factors including species' size and body mass (e.g., larger, heavier carcasses tend to land farther from turbines than lighter carcasses; Hull and Muir 2010; Huso et al. 2016; Choi et al. 2020), components of a turbine's size (e.g., ground clearance; Garvin et al. 2024), ~~the maximum blade tip height of a turbine~~ and operational speed of the turbines. Therefore, search plot size and configuration selected for standardized carcass searches is intended to minimize bias in fatality estimation by maximizing (1) the spatial coverage of Facility turbines, (2) the visibility of smaller carcasses (Good et al. 2012; Maurer 2017), and (3) the proportion of the fall distribution searched for taxonomic groups of interest. ~~for large birds (Hull and Muir 2010; Hallingstad et al. 2018).~~ Three~~wo~~ types of search plots, and their corresponding ~~search~~ methods, will be utilized at ~~each~~ turbines across the Facility to~~, one that~~ minimize~~s~~ detection bias from any single method ~~for small carcasses and one that does so for large~~

~~bird carcasses~~. The search plots described here are each based on a 100-meter distance from the turbine base.

The first search plot type, "road and pad plots," will focus on detecting bats and small birds. ~~; large birds will also be recorded within the road and pad plot if found. The~~ Rroad and pad plots include~~s~~ the gravel pad surrounding the turbine, portions of ~~all~~ access roads that are within 100 meters of the turbine, and edges of the vegetation along the roadside. ~~Ninety-nine percent of fatalities of small birds and bats are predicted to occur within 100 meters from the base of Facility turbines (based on modeling for large turbines by Hull and Muir [2010]).~~

The second search plot type, "~~large bird~~binocular scan plots," will focus on detecting large birds. Binocular scan plots include a circular plot centered on the turbine with a radius of 1020 meters extending from the turbine. ~~Approximately 85 percent of fatalities of large birds are predicted to occur within 120 meters from the base of Facility turbines (based on modeling for large turbines by Hull and Muir [2010]).~~

The third search plot type, "transect plots," will be used to search for all three size classes. Transect plots include a circular plot centered on the turbine with a radius of 100 meters extending from the turbine. The entirety of this radius will be searched using transects spaced at 6-meter intervals to ensure robust coverage of the plot.

These three search plot sizes and configurations are anticipated to provide coverage of the majority of carcass distribution densities for all target class sizes (i.e., bats, small birds, and large birds; Garvin et al. 2024). The level of effort proposed in this study design has been increased compared to the level of effort historically conducted at projects in the region with the goal of minimizing uncertainty (and thus reducing the need to conduct additional years of monitoring to resolve any uncertainty in the fatality monitoring results).

To ensure a statistically robust sampling design that is representative of the various habitat conditions and turbine types at the Facility, 75 percent of turbines (53 turbines) will be searched utilizing concurrent road and pad and binocular scan plots, while 25 percent of Facility turbines (18 turbines) will be searched using transect plots during spring, summer and fall. In winter, 100 percent of Facility turbines (71 turbines) will be searched utilizing ~~both types of search plots~~concurrent road and pad and binocular scan plots. Thus, between all plot types, 100 percent of Facility turbines will be searched with a method intended to maximize detection probability for each size class.

3.1.2 Search Schedule and Interval

Fatality monitoring will begin within six months of ~~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 the ~~time~~ period of occurrence cannot be assigned (see Section 3.4). ~~After t~~The initial clearance search will immediately precede the~~,~~ standardized carcass searches which will begin the first week of the ~~first full~~ season ~~following the commencement of commercial operation~~.

Standardized carcass searches will occur in each season, ~~be~~ conducted ~~biweekly (every 14 days)~~weekly in ~~both~~ all three search plot types during the spring, summer, and fall seasons to capture migration and breeding seasons of birds and bats. In winter, ~~T~~the frequency and methods used for ~~of~~ standardized carcass searches will ~~be reduced~~change to a monthly schedule (once every 28 days) using just road and pad and binocular scans based on anticipated taxonomic group risk in that season~~in both plot types during winter~~. Over the course of one monitoring year, the investigators will conduct a total of 38 ~~22~~ standardized carcass searches (excluding the clearance search) ~~in road and pad plots and 22 standardized carcass searches (excluding the clearance search) in large bird plots~~across plot types. Seasonal timeframes and frequency of searches by season and search plot type are shown in Table 1.

~~Table 1. Post-Construction Fatality Monitoring Standardized Carcass Search Parameters~~

~~Season~~	~~Dates[1]~~	~~Search Interval[2]~~	~~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~~
		~~14 Days~~	~~120-meter radius centered on turbine~~	~~Large birds~~	~~Binocular Scans from turbine base~~	~~6~~
~~Summer~~	~~June 1 to August 15~~	~~14 Days~~	~~Road and pads plot out to 100 meters~~	~~Bats/small birds and large birds~~	~~Walk~~	~~5~~
		~~14 Days~~	~~120 meter radius centered on turbine~~	~~Large birds~~	~~Binocular Scans from turbine base~~	~~5~~
~~Fall~~	~~August 16 to November 15~~	~~14 Days~~	~~Road and pad plot out to 100 meters~~	~~Bats/small birds and large birds~~	~~Walk~~	~~7~~
		~~14 Days~~	~~120-meter radius centered on turbine~~	~~Large birds~~	~~Binocular Scans from turbine base~~	~~7~~
~~Winter~~		~~28 Days~~	~~Road and pad plot out to 100 meters~~	~~Bats/small birds and large birds~~	~~Walk~~	~~4~~

~~Season~~	~~Dates[1]~~	~~Search Interval[2]~~	~~Search Plot Parameters~~	~~Target Size Class~~	~~Search Strategy~~	~~Number of Survey Periods per Season~~
	~~November 16 to March 15~~	~~28 Days~~	~~120-meter radius centered on turbine~~	~~Large birds~~	~~Binocular Scans from turbine base~~	~~4~~

~~1. Seasonal demarcation dates may be shifted slightly to accommodate a full search interval in any given season.~~

~~2. Search interval for 28 days based on carcass persistence data for the Northern Rockies avifauna biome (in which the project is located) (AWWI 2019).~~

The Certificate Holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW) and ODOE, may adjust 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).

3.1.3 Search Strategy and Fatality Documentation

Searching road and pad plots involves walking the turbine and the gravel area around the turbine base and walking along the extent of access roads that occurs within 100 meters of the turbine. Investigators will search for fatalities by walking along one side of all access roads within 100 meters of the turbine, searching the road and bare ground to the vegetation line, walking toward the turbine, searching around the turbine pad, and returning to the starting location on the opposite side of the access road (Good et al. 2012; Maurer et al. 2017). This search strategy covers a portion of the carcass fall distribution around the turbine; a correction factor is applied during fatality estimation to account for the unsearched area (Section 3.5). When conducting road and pad plot searches, small bird and bat fatalities detected outside of the road and pad search area will be considered incidental.

Table 1. Standardized Carcass Search Parameters

Season	Dates	Search Interval	Search Method and Plot Parameters	Target Size Class	Number of Turbines	Number of Survey Periods	Searcher Efficiency Trial Carcasses	Carcass Persistence Trial Carcasses
Spring	March 16 to May 31	7 Days	Walk road and pad out to 100 meters	Bats/small birds	53	11	12 small bird, 12 bat	10 small bird, 10 bat, 10 large bird
			Binocular scans in 100-meter radius circular plot around turbine (includes road and pad)	Large birds	53		12 large bird	
			Transects spaced 6 meters apart in 100-meter radius circular plots	All classes	18		12 small bird, 12 bat, 12 large bird	
Summer	June 1 to Aug. 15	7 Days	Walk road and pad out to 100 meters	Bats/small birds	53	11	12 small bird, 12 bat	10 small bird, 10 bat, 10 large bird
			Binocular scans in 100-meter radius circular plot around turbine (includes road and pad)	Large birds	53		12 large bird	
			Transects spaced 6 meters apart in 100-meter radius circular plots	All classes	18		12 small bird, 12 bat, 12 large bird	
Fall	Aug. 16 to Oct. 31	7 Days	Walk road and pad out to 100 meters	Bats/small birds	53	11	12 small bird, 12 bat	10 small bird, 10 bat, 10 large bird
			Binocular scans in 100-meter radius circular plot around turbine (includes road and pad)	Large birds	53		12 large bird	
			Transects spaced 6 meters apart in 100-meter radius circular plots	All classes	18		12 small bird, 12 bat, 12 large bird	
Winter	Nov. 1 to March 15	28 Days	Walk road and pad out to 100 meters	Small birds	71	5	12 small bird	10 small bird, 10 large bird
			Binocular scans in 100-meter radius circular plot around turbine (includes road and pad)	Large birds	71		12 large bird	

~~Searches in large bird~~Binocular scan plot searches will involve binocular scans ~~made~~ from the turbine base and one to three topographical high points within the search plot, as appropriate. From the turbine base, the investigators will scan 90 degrees from each of the four cardinal directions out to the extent of the 1~~2~~00-meter circular search plot. Additionally, to address any portions of the large bird plot that are not visible from the base of the turbine due to topographical or other features, investigators will walk out to points in the plot where those areas become visible. Areas within the search plot that cannot be searched will be mapped as unsearchable areas (Hallingstad et al. 2018). Examples of unsearchable areas may include a wetland, cliff face, ~~high~~ barbed wire fence, tall or dense vegetation~~, private property boundary~~, or any area that precludes visibility through the binocular scan method. Searchable areas and time spent scanning may be adjusted for habitat types and search methods after evaluation of the first searcher efficiency trial (see Section 3.3). As previously noted, binocular scans will occur during the same turbine visit as the road and pad plot search. All large birds discovered within 100 meters of the turbine will be attributed to binocular scan plots, regardless of how or where it was found within the plot (i.e., while searching road and pads, or while scanning with binoculars). Small bird and bat fatalities detected within the binocular scan search area but outside of the road and pad search area will be considered incidental.

Searches in transect plots will involve walking 6-meter spaced transects within the 100-meter search radius centered on the turbine. Areas within the transect plot that cannot be searched will be mapped as unsearchable areas (Huso and Dalthorp 2014). Examples of unsearchable areas may include a wetland, cliff face, barbed wire fencing, tall or dense vegetation or any circumstance within an area that precludes a searcher from safely conducting their search. Any carcass found outside the transect plots will be considered incidental.

Investigators will flag all bird and 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, investigators will 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. Investigators will record the location of the carcass using a global positioning system (GPS)-enabled device. Data collected per carcass found will 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. Investigators will 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 (U.S. Fish and Wildlife Service [USFWS]

Special Purpose Utility Permit), by the third-party monitor (ODFW Wildlife Scientific Taking Permit), or some combination herein, all carcasses will be discreetly marked so as to avoid double counting and will be left in place.

3.1.4 Duration

The investigators will perform one full year of fatality monitoring starting in the first year of facility operation (Year 1). When Year 1 of monitoring at the Facility has been completed, the raw data will be compiled by the investigators and the Certificate Holder in a comprehensive report, which will include fatality estimates (see Section 7.0). The results will be compared with ~~other~~ comparable wind energy facilities in the region (including WREFII). If fatality rates for the first year of monitoring at the Facility 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 will consult with ODOE and ODFW regarding potential mitigation. If mitigation is deemed appropriate, the Certificate Holder will propose appropriate 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 if the Certificate Holder believes that the results of Year 1 monitoring were anomalous.~~ 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.

3.2 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 an investigator 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 trials is to estimate the length of time bird and bat carcasses remain within the search area and available to be detected by investigators. Estimates of carcass persistence will be used to adjust raw carcass counts for removal bias.

The investigators will conduct a carcass persistence trial within each season defined in Table 1 during a fatality monitoring year. A minimum of 10 each of large bird, small bird, and bat surrogate trial carcasses will be placed ~~each season~~ spring, summer, and fall; however, in winter, when bats are not anticipated to be at risk of collision, a minimum of 10 large and small birds only (i.e., no bats) will be placed. ~~The investigators will select 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~~chukar), legally obtained raptor species to the extent available, unprotected species (e.g. European starling, house sparrows) and dark mice as a surrogate for bats if insufficient bat carcasses are available. Additionally, as gamebirds often make for poor raptor surrogates

(Hallingstad et al. 2023), detected raptor fatalities that are fully intact and estimated to be less than 5 days old will be used as opportunistic trial carcasses, with the initial check date set to correlate with the estimated time of death of the carcass. Trial carcasses will be marked discreetly for recognition by investigators and other personnel. Carcasses will be placed at randomly generated locations within the search plots. Small birds and bat surrogates will be placed within the road and pad and transect plots, and large bird carcasses will be placed within the ~~large bird~~binocular scan plots on day 0 of the trial.

To minimize overseeding the site with carcasses available to scavengers or creating an unnatural attractant to potential scavengers, the Certificate Holder will use the results from large bird carcasses placed within the binocular scan plots as correction for all large bird fatalities detected, regardless of plot type. Random carcass locations will be stratified to include placement within all plot types as binocular scan plots encompass the configuration of each of the other plot types.

Trial carcasses will be left in place until the end of the carcass persistence trial. An approximate schedule for assessing removal status is once daily for the first 4 days, and on days 7, 10, 14, 21, 28, and 35. This check schedule may be extended to include the possibility of longer persistence times after initial placement (e.g., 60 or 90 days) to capture potentially longer large bird persistence times. This check 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 to a searcher during a normal survey.

3.3 Searcher Efficiency Trials

Searcher efficiency is defined as the probability that investigators will find a carcass that is available to be found within the search plot. Several factors influence searcher efficiency, including investigator 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 investigators ~~are able to~~can find.

Searcher efficiency will be tested for each search method utilized and for each targeted size class. A trained Searcher Efficiency Proctor will conduct searcher efficiency trials within each of the seasons defined in Table 1 during the year~~s~~ in which the fatality monitoring occurs. Within the road and pad plots, a minimum of 12 each of small bird and bat surrogate trial carcasses will be placed in the spring, summer, and fall seasons. In these three seasons, a minimum of 12 large birds will be placed in the binocular scan plots which encompass the road and pad search areas. In the transect plots, a minimum of 12 of each size class will be placed in spring, summer, and fall.

~~A minimum of 12 each of large bird, small bird, and bat surrogate trial carcasses will 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 in the 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 will be placed in road and pad plots, and ~~while~~ a minimum of 12 large birds will be placed in ~~large bird~~binocular scan plots (i.e., no bats will be placed).

Investigators will not be notified of carcass placement or test dates. The Searcher Efficiency Proctor will place trial ~~vary the number of trial~~carcasses throughout ~~per~~a 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 investigators will not know the total number of trial carcasses being used in any trial. Similar to carcass persistence trials, searcher efficiency trial carcass species may include legally obtained domestic species (e.g., ring-necked pheasants, ~~juvenile Japanese quail~~chukar), unprotected species (e.g. European starling, house sparrows), raptor carcasses (as necessary collection permits allow), and dark mice as a surrogate for bats if insufficient bat carcasses are available.

The Searcher Efficiency Proctor will mark the trial carcasses to differentiate them from other carcasses that might be found within the search plot and in a manner that does not increase carcass visibility. On the day of a standardized carcass search before the beginning of the search, the Searcher Efficiency Proctor will place trial carcasses at randomly generated locations within search plots (one to three trial carcasses per search plot). The number and location of 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 Searcher Efficiency Proctor. Following the standardized carcass search, all traces of searcher efficiency trial carcasses will be removed from the site. If new investigators are brought into the search team, additional searcher efficiency trials will be conducted to ensure that detection rates incorporate investigator differences. The Certificate Holder will include a discussion of any changes in investigators 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 will report the results of the first-year searcher efficiency trials to ODOE and ODFW. In the report, the Certificate Holder will 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, subject to the approval of ODOE.~~

3.4 Incidental Finds and Injured ~~Birds~~Wildlife

Incidental finds are carcasses that are detected outside the parameters of standardized carcass searches. Investigators may discover carcasses in areas surrounding the turbines but outside of the road and pad, ~~or large bird~~binocular scan, or transect plots, while completing carcass persistence checks, or while moving through the Facility. Additionally, carcasses detected during clearance surveys do not have an associated timeframe for fatality occurrence and therefore are considered incidental finds. For each incidental find, the searcher will identify, photograph, record data, and

collect the carcass as would be done for carcasses detected during standardized carcass searches. If the incidental find is located in a search plot within a reasonable timeframe from when that plot was to be 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~~ designated search plot or search time, the data will be reported separately and excluded from statistical analysis.

The Certificate Holder will contact a qualified wildlife rehabilitation specialist approved by ODOE[1] to respond to injured wildlife. The Certificate Holder will pay costs, if any, charged for time and expenses related to care and rehabilitation of injured native birds and bats found on the site~~, unless the cause of injury is clearly demonstrated to be unrelated to the Facility operations~~. Injured birds and bats found during standardized searches will be considered fatalities for the purposes of data analysis and fatality estimation unless the cause of injury is clearly demonstrated to be unrelated to the Facility operations.

3.5 Fatality Estimation

Estimated annual fatality rates for the Facility will be calculated at the end of ~~each~~the monitoring year. Annual fatality rates will be estimated by adjusting raw fatality counts for sources of bias including carcass persistence, searcher efficiency, and the proportion of the fall distribution that was searched for each size class (Huso and Dalthorp 2014).

A correction factor (density weighted proportion; DWP) will be used to adjust for the proportion of the fall distribution that was searched for ~~each size class~~small birds and bats within the road and pad search plot, for large birds ~~search plots and for large birds~~ within the ~~large bird search~~binocular scan plot, and for all three size classes within the transect search plots. F~~Therefore, f~~or ~~both~~ each individual search plot type~~s~~, the DWP will be calculated as the product of the percentage of a 10-meter annulus that is covered by the searched area within the plot and the proportion of the fall distribution of a given size class that overlaps that 10-meter annulus. The product of these values for each 10-meter annulus that overlaps the search plot will be summed to calculate the overall proportion of the fall distribution searched for each size class within the respective search plot type. Calculations will utilize the Dalthorp et al. (2024) DWP program as allowed by sample size, the ballistic modeling results presented in Hull and Muir (2010), or fit carcass densities (Garvin et al., 2024) for small birds and bats, and Hallingstad (2018) for large birds. Other peer-reviewed models that update the state of the science may be utilized if they become available within the duration of the monitoring period.

Annual fatality rates will be estimated for nine categories, provided a sufficient sample size (n≥3) has been reached to allow estimation. The nine categories are:

1. All birds;

[1] Approved specialists include ~~of~~ Blue Mountain Wildlife, a wildlife rehabilitation center in Pendleton, and the Bird Alliance of Oregon (formerly Audubon) ~~Bird~~Wildlife Care Center in Portland. The Certificate Holder must obtain ODOE approval before using other specialists.

2. Small birds;
3. Large birds;
4. All bats;
5. Migratory tree-dwelling bats;
6. Raptors;
7. Raptor species of special concern;
8. Grassland species; and
9. State and federally listed threatened and endangered species and State Sensitive Species listed under Oregon Administrative Rules (OAR) 635-100-0040.

~~In 2018, the U.S. Geological Survey released a fatality estimator program, GenEst (Dalthorp et al. 2018).~~ GenEst estimation software provides the most current state-of-the-science software for 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.

The estimation of annual fatality rates will account for:

1. The search interval;
2. The number of carcasses detected during standardized carcass searches within the monitoring period where the cause of death is assumed to be the operation of the Facility;
3. 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 tri~~a~~ils;
4. Searcher efficiency expressed as the probability that an available trial carcass is found by investigators during searcher efficiency trials; and
5. The portion of the fall distribution that was searched at the Facility (DWP) for the given size class and search plot type.

3.6 Mitigation

The Certificate Holder will use best available science to resolve any uncertainty in the fatality monitoring results and to determine whether the results 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 analysis and appropriate mitigation.

Mitigation may be appropriate if fatality rates exceed a "threshold of concern" (Table 2). For the purpose of determining whether a threshold has been exceeded, the Certificate Holder will

determine the median~~an~~ estimated annual fatality rate for species groups after each year of monitoring (provided three or more 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, the thresholds of concern established by EFSC (Table 2) will be used (with additional context provided by the~~in conjunction with~~ most current regional fatality rates) ~~published by the American Wind and Wildlife Institute~~ to evaluate the fatality rates associated with the Facility and guide discussions on appropriate mitigation.

The Certificate Holder has made no changes to the historic thresholds in Table 2 due to insufficient information available to identify appropriate updated thresholds of concern. The historic thresholds were based on mean fatality rates of facilities with completed monitoring and were not contextualized by the relative impacts of wind facility-related mortality on those groups. Whereas there are now more current data available on species population trends, and there is an abundance of data on wind facility-related mortality, there are no data suggesting there is a correlation or causal relationship between the two for the taxonomic groups of interest. In the case of bats, wind facility-related mortality likely influences population trends of certain species (e.g., hoary bat) but is not the primary threat for all bat species. Thus, there is insufficient evidence to define levels of wind facility-related mortality of the designated taxonomic groups of interest that are likely to cause population-level impacts at the species level.

Table 2. Fatality Thresholds of Concern by Species Group

Species Group	Threshold of Concern[1,2] (Fatalities per MW)
Raptors[2] (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.)	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.)	0.20
Bats[3]	2.50

1. 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.

2. Historic thresholds; no changes proposed by Certificate Holder.

~~2. 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.~~

~~3. 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).~~

If the data from ~~a given y~~Year 1 of monitoring show that a threshold of concern for a species group or individual state sensitive bird species (assuming a minimum sample size of three individuals) has been exceeded, the Certificate Holder will consult with ODOE and ODFW to determine if mitigation is appropriate based on analysis of the data and consideration of any other significant information available at the time. ODFW, ODOE, and the Certificate Holder may review fatality data on a per turbine basis to aid in discussions. If mitigation is determined to be necessary, the Certificate Holder will propose mitigation measures designed to benefit the affected species or species group. 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 any such additional data collection, ODOE determines that mitigation is required, the Certificate Holder will propose 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~~ contributi~~o~~ng 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 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 or provided in other Facility plans would also benefit 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 to the site manager within 24 hours.
- An incident report will be completed and include photographs.
- The Certificate Holder's wildlife program manager will 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 ~~U.S. Fish and Wildlife Service (~~USFWS~~)~~ Region 1 Field Office of the discovery within 48 hours of identification.
- If a state endangered or threatened species is found dead or injured at the site, the Certificate Holder will ~~immediately~~ notify ODFW of the discovery within 48 hours of identification.

5.0 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; 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 will 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 will hire independent third-party investigators to perform raptor nest surveys.

5.1 Short-Term Monitoring

Short-term monitoring will be done in two monitoring seasons. The first monitoring season will be in the first full raptor nesting season after completion of construction of the Facility, which will be in Spring 2026 following the completion of construction in Spring/Summer 2025. The second monitoring season will be in the fourth year after construction is completed (i.e., in 2029). The Certificate Holder will provide a summary of the first-year results in the monitoring report described in Section 7.0. 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 Facility site (i.e., turbine locations) and a 2-mile buffer zone around the site. For the ground surveys while checking for nesting success (conducted within the Facility site and up to a maximum of 0.5 miles from the Facility site), nests outside of parcels that are under a lease agreement with the Certificate Holder will be checked from public roads, if feasible.

All nests discovered during pre-construction surveys and any nests discovered during post-construction surveys, whether active or inactive, will be given identification numbers. 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 Facility 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 Facility site and up to 0.5 miles from the ~~f~~Facility site. "Nesting success" means that the young have successfully fledged (i.e., the young are independent of the core nest site).

5.2 Long-Term Monitoring

In addition to the two years of post-construction short-term raptor nest surveys described in Section 5.1, the investigators will conduct long-term raptor nest surveys at 5-year intervals for the life of the F~~f~~acility.[2] Investigators will conduct a ~~the first~~ long-term raptor nest survey in the raptor

[2] 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.

nesting season every 5 years after the second short-term monitoring season in years ~~of the ninth year after construction is completed and will repeat the survey at 5-year intervals thereafter~~divisible by five. This will result in a greater than 5-year period between the second short-term monitoring season and the first long-term monitoring season (e.g., the second short-term monitoring season is 2029 and the first long-term monitoring season will be 2035 rather than 2034). In conducting long-term surveys, the investigators will follow the same survey protocols as described in Section 5.1 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~~ Facility supports and the success of those attempts—and will submit a report after each year of long-term raptor nest surveys.

6.0 Washington Ground Squirrel Monitoring

In compliance with the pre-construction condition PRE-TE-02, ~~Washington ground squirrel~~WAGS ~~(*Urocitellus washingtoni*)~~ pre-construction surveys were performed to determine construction constraints and operations monitoring requirements. ~~No Washington ground squirrel~~WAGS colonies were identified during pre-construction surveys; therefore, the ~~no monitoring is planned at this time.~~ Certificate Holder shall conduct long-term post-construction WAGS monitoring in compliance with condition PRE-TE-02. Monitoring shall be of any known colonies and shall be completed on the same schedule as the raptor nest monitoring for the Facility, described above in Section 5.0. 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 WAGS monitoring activities.~~However, if new colonies are located during other monitoring activities or incidentally during operations, the Certificate Holder will document and delineate the colonies, and will amend the WMMP with a Washington ground squirrel monitoring program in consultation with ODOE. Observations of Washington ground squirrels in agricultural habitat will 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 WAGS monitoring 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 will provide to ODOE any data or record generated in carrying out this monitoring plan upon request by ODOE.

The Certificate Holder will notify USFWS and ODFW, respectively, 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 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 will 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

AWWI (American Wind Wildlife Institute). 2020. AWWI Technical Report: 2nd Edition: Summary of Bird Fatality Monitoring Data Contained in AWWIC. Washington, DC. Available at www.awwi.org~~2018. A Summary of Bat Fatality Data in a Nationwide Database. July 25, 2018. Available online at: https://awwi.org/wp-content/uploads/2019/02/AWWI-Bat-Technical-Report_07_25_18_FINAL.pdf~~

~~AWWI. 2019. A Summary of Bird Fatality Data in a Nationwide Database. February 25, 2019. Available online at: https://awwi.org/wp-content/uploads/2019/02/AWWI-Bird-Technical-Report-02_25_19.pdf~~

Choi, D.Y., T.W. Wittig, and B.M. Kluever. 2020. An evaluation of bird and bat mortality at wind turbines in the Northeastern United States. PLoS ONE 15(8): e0238034. https://doi.org/10.1371/journal.pone.0238034

Dalthorp, D., M. Huso, M. Dalthorp, and J. Mintz. 2024. Accounting for the fraction of carcasses outside the searched area in the estimation of bird and bat fatalities at wind energy facilities: U.S. Geological Survey Techniques and Methods, book 7, chap. A3, 104 p., https://doi.org/10.3133/tm7A3.

~~Dalthorp, D.H., J. Simonis, L. Madsen, M.M. Huso, P. Rabie, J.M. Mintz, R. Wolpert, J. Studyvin, and F. Korner-Nievergelt. 2018. Generalized Mortality Estimator (GenEst) - R code & GUI: U.S. Geological Survey Software Release. Available online at: https://doi.org/10.5066/P9O9BATL~~

Dalthorp, D. 2020. GenEst – A Tutorial with Wind Examples. Available online at: https://cran.r-project.org/web/packages/GenEst/vignettes/wind-examples.html

EFSC (Energy Facility Siting Council). 2017~~a~~. Site Certificate for the Wheatridge Wind Energy Facility. Issued April 28, 2017.

~~EFSC. 2017b. First Amended Site Certificate for the Wheatridge Wind Energy Facility. Issued July 27, 2017.~~

~~EFSC. 2018a. Second Amended Site Certificate for the Wheatridge Wind Energy Facility. Issued, November 16, 2018.~~

~~EFSC. 2018b. Third Amended Site Certificate for the Wheatridge Wind Energy Facility. Issued December 14, 2018.~~

~~EFSC. 2019. Fourth Amended Site Certificate for the Wheatridge Wind Energy Facility. Issued November 22, 2019.~~

~~EFSC. 2020. Site Certificate for the Wheatridge Renewable Energy Facility II. Issued May 22, 2020.~~

EFSC. 2024. First Amended Site Certificate for the Wheatridge Renewable Energy Facility East. Issued June 4, 2024.

Garvin, J.C., J.L Simonis, J.L. Taylor. 2024. Does size matter? Investigation of the effect of wind turbine size on bird and bat mortality, Biological Conservation, Volume 291, 110474, ISSN 0006-3207, https://doi.org/10.1016/j.biocon.2024.110474.

Good, R.E., A. Merrill, S. Simon, K. Murray, K. Bay. 2012. Bat Monitoring Studies at the Fowler Ridge Wind Farm, Benton County, Indiana. Final Report: April 1-October 31, 2011. Prepared for the Fowler Ridge Wind Farm, Fowler, Indiana. Prepared by Western Ecosystems Technology, Inc, Bloomington, Indiana.

Hallingstad, E. C., P. Rabie, A. Telander, J. Roppe, L. Nagy. 2018. Developing an efficient protocol for monitoring eagle fatalities at wind energy facilities. PLoS ONE 13(12); e(0208700). http://doi.org/10.1371/journal.pone.0208700

Hallingstad E., D. Riser-Espinoza, S. Brown, P. Rabie, J. Haddock, K. Kosciuch. 2023. Game bird carcasses are less persistent than raptor carcasses, but can predict raptor persistence dynamics. PLoS ONE 18(1): e0279997. https://doi.org/10.1371/journal.pone.0279997

Hull, C. L., and S. Muir. 2010. Search areas for monitoring bird and bat carcasses at wind farms using a Monte-Carlo model. Australian Journal of Environmental Management 17(2):77-87. https://doi.org/10.1080/14486563.2010.9725253

Huso, M., and D. Dalthorp. 2014. Accounting for Unsearched Areas in Estimating Wind Turbine-Caused Fatalities. The Journal of Wildlife Management 78(2):374–358. DOI: 10.1002/jwmg.663

Huso, M., D. Dalthorp, T. J. Miller, and D. Bruns. 2016. Wind energy development: methods to assess bird and bat fatality rates post-construction. Human–Wildlife Interactions 10.

Maurer, Joseph D. 2017. Turbine Induced Bird and Bat Fatalities At Wind Projects: Statistical Methods for Mortality Estimation Using Road and Pad Carcass Surveys. Oregon State University. https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/4m90f1916?locale=en

Simonis, J., D. Dalthorp, M. Huso, J. Mintz, L. Madsen, P. Rabie, and J. Studyvin. 2018. GenEst user guide—Software for a generalized estimator of mortality: U.S. Geological Survey Techniques and Methods, book 7, chap. C19, 72 p., https://doi.org/10.3133/tm7C19

This page intentionally left blank