



Oregon

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To: Oregon Energy Facility Siting Council

From: Sarah Esterson, Senior Policy Advisor

Date: August 17, 2023

Subject: Stateline Wind Project – Annual Monitoring for Wildlife Monitoring and Mitigation Plan (Condition 93)

Attachments: Amended Wildlife Monitoring and Mitigation Plan (November 28, 2022)
Annual Wildlife Monitoring Report (2022)

Purpose

The Oregon Department of Energy (Department) prepared this staff report for the Energy Facility Siting Council to summarize the results of ongoing wildlife monitoring and results at the Stateline Wind Project. The Department is required to make available the actual results and allow for public comment. This staff report supports both Council and the public’s understanding of the results and of their opportunity to review and comment.

Wildlife Monitoring and Mitigation Plan Overview

Stateline Wind Project is a wind energy generation facility consisting of two units – Stateline 1&2 and Vansycle II (formerly Stateline 3). Stateline 1&2 consists of 186 turbines and has a peak generating capacity of 123 megawatts (MW). Vansycle II consists of 43 turbines with a peak generating capacity of 101.9 MW. The facility is located in Umatilla County. The Council issued a site certificate for the facility in 2001, and subsequently has approved and granted issuance of eight amendments of the site certificate (as of December 2022).

Condition 93 of the site certificate states that,

“The certificate holder shall conduct wildlife monitoring as described in the Wildlife Monitoring and Mitigation Plan (WMMP), included in the Final Order on Amendment #6 as Attachment F and revised from time to time. Subject to approval by the Department of Energy as to professional qualifications, the certificate holder shall hire qualified wildlife consultants to carry out the monitoring.

The certificate holder shall conduct 1-year of post-construction fatality monitoring in accordance with the protocol included in the WMMP following completion of construction activities for the Vansycle II facility modifications, as approved in the Final Order on Amendment #6. Additional fatality monitoring studies and necessity of additional mitigation shall be determined based on the results of the 1-year post construction fatality monitoring study..”

The WMMP includes requirements that applied following construction completion of the original facility (Stateline I and 2 became operational in 2005, Vansycle II became operational in 2009), and includes requirements that apply post-repower (Vansycle II repower was completed in 2023). The requirements that applied following construction completion of the original facility included short- and long-term wildlife monitoring during facility operation. Short-term wildlife monitoring requirements included a 2-year post construction Bird and Bat Fatality Monitoring Program, Burrowing Owl Surveys, Avian Use Surveys, and Raptor Nesting Surveys; these wildlife monitoring activities were completed for Stateline 1&2 and Vansycle II between 2006 and 2013. The requirements that apply following completion of the Vansycle II repower include a 1-year post construction Bird and Bat Fatality Monitoring Program. Year-1 of the Vansycle II repower fatality study will be reported to the Department in 2023.

Based on results of the original post-construction Bird and Bat Fatality Monitoring Program, a threshold of concern was exceeded for raptors. The certificate holder was required to, among several additional mitigation measures, install and monitor artificial nest structures (ANS) for 10 years. During the 10 year monitoring period, the ANS’s were determined unsuccessful in attracting use by the affected raptor species – Ferruginous hawk. As a result, the certificate holder re-located and installed 5 ANS’s in specific areas with suitable habitat identified as having a higher probability of attracting the affected species. On-going long-term wildlife monitoring requirements include monitoring the use of the ANS’s by the affected species every five years from 2021, to evaluate mitigation success, and the Wildlife Response and Reporting System.

Artificial Nest Structures

A summary of the ANS monitoring and maintenance activities from 2017-2021 is presented below.

- In 2017, ANS4 and 5 had stick maintenance needs and were refreshed. Only 1 ANS was observed being used by a red-tailed hawk.
- In 2018, the 5 ANS were checked for use 1-3 times. Only 1 ANS was observed being used by a red-tailed hawk.
- In 2019 and 2020 a pair of ferruginous hawks successfully nested on ANS1. One or two young were assumed to have fledged in 2019 and 2020 based on viewing maturing young present in the nest observed from a distance in mid-June. No other ANS were successfully used in 2019 or 2020.
- In 2021, all five ANS were monitored for maintenance needs. None of the nesting structures needed to be refreshed with new sticks or needed repairs. Fresh nest material was noted in ANS4 and 5, but further observations on May 20, 2021 indicated they did not nest on the platform, but likely elsewhere.

The 2021 monitoring season was the last year of required annual monitoring after which monitoring will occur every 5 years. The next monitoring will occur in 2026.

Wildlife Response and Reporting System

Monitoring activities during 2022 for this facility include the ongoing Wildlife Response and Reporting System, a program for responding to and handling avian and bat casualties found by personnel at the site during routine maintenance operations. In April 2022, the certificate holder reported two avian carcasses (European Starling). The certificate holder is obligated to notify USFWS and ODFW in the event that any federal or state endangered or threatened species are killed or injured onsite.

Public Comments on Wildlife Monitoring Results

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

The Department received the annual monitoring results for the facility on April 27, 2023. In accordance with the terms of the WMMP, the Department provides a copy of the 2022 monitoring results for the Stateline Wind Project to the Council for review (attached) and posted a copy to the Department’s project website at: <http://www.oregon.gov/energy/facilities-safety/facilities/Pages/SWP.aspx> and has established 60-day timeframe to accept public comments.

Comments are due within 60-days of posting, or **October 13, 2023 at 5:00 p.m.** and may be submitted to Sarah Esterson at sarah.esterson@energy.oregon.gov

Attachments: Amended Wildlife Monitoring and Mitigation Plan (November 28, 2022)
Annual Wildlife Monitoring Report (2022)

Wildlife Monitoring and Mitigation Plan (November 28, 2022)

Stateline Wind Project: Draft Amended Wildlife Monitoring and Mitigation Plan [Amended November 28, 2022]

This plan describes wildlife monitoring the certificate holders shall conduct during operation¹ of the Stateline Wind Project (SWP) facility in Oregon. The monitoring objectives are to determine whether the facility causes significant fatalities of birds and bats and to determine whether the facility results in a loss of habitat quality. This plan addresses the facility as permitted under the Oregon site certificate, as amended and includes updated information for the future years of the raptor artificial nest structures (ANS) requirement as of November 30, 2016.

The SWP facility² consists of two parts:

- Stateline 1&2: 186 Vestas V47-660-kilowatt (kW) wind turbines, six permanent meteorological (met) towers, access roads and other related or supporting facilities.³
- Stateline 3: Up to 67 GE 1.5-MW wind turbines or up to 43 Siemens 2.3-MW wind turbines, access roads, a 230-kV transmission line, a substation, an operations and maintenance building and other related or supporting facilities.

Wildlife monitoring is necessary to determine whether operation of the facility results in a net loss of habitat quality. For raptors, this will require that the certificate holders obtain a reasonable estimate of the effect of the project on raptors in the context of local raptor populations.

The certificate holders shall use properly trained personnel to conduct this monitoring, subject to approval by the Oregon Department of Energy (Department) as to professional qualifications. For all monitoring except FPL's Wildlife Response and Reporting System (described below), the certificate holders shall hire independent third party investigators (not employees of the certificate holder) to perform monitoring tasks.

The Wildlife Monitoring and Mitigation Plan for the SWP includes the following components:

- 1) Fatality monitoring program involving:
 - a. Removal trials
 - b. Searcher efficiency trials
 - c. Fatality search protocol

¹ This plan does not address pre-construction wildlife surveys that FPL Energy carried out in support of its application for a site certificate for the Stateline project.

² As used herein, "SWP facility" includes Stateline 1, 2 and 3.

³ The Final Order on the Application authorized construction of 127 Stateline 1 turbines. However, only 126 were actually built. The Final Order described the four Stateline 1 permanent met towers as "guyed masts set in concrete foundations" (Final Order page 12). However, the certificate holder has built unguyed, concrete met towers for both Stateline 1 and 2. Nevertheless, if any permanent guyed met towers are used in the future, the certificate holder shall comply with the provisions in this plan that address guyed met towers.

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- d. Statistical analysis
 - 2) Established monitoring transect searches
 - 3) Raptor nesting surveys
 - 4) Burrowing owl surveys
 - 5) Avian use surveys
 - 6) FPL’s “Stateline Wind Project Wildlife Response and Reporting System”

1.0 Fatality Monitoring Program

Following is a discussion of the components of the monitoring plan, statistical analysis methods for fatality data and data reporting.

Stateline 1&2

1.1 Definitions and Methods

1.1.1 Seasons

This plan uses the following dates for defining seasons:

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

1.1.2 Search Plot Selection

Stateline 1&2

Certificate holder FPL Energy Vansycle LLC (FPL Vansycle) is responsible for implementing this plan as it applies to Stateline 1&2. The certificate holder shall conduct standardized carcass searches within search plots. The certificate holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW), shall select search plots based on a systematic sampling design (in general, every other plot is sampled in a monitoring year). Turbine strings will be broken into rectangular search plots that contain two to four turbines each. The edge of plots will be no closer than 63 meters from the nearest turbine or, if guyed meteorological (met) towers are used, no closer than 63 meters from the nearest guyed met tower. The certificate holder shall provide maps of the search plots to the Department of Energy before beginning fatality monitoring at the facility.

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The certificate holder shall use the same search plots for each search conducted during a monitoring year.

1.1.3 Scheduling and Sampling Frequency

Certificate holder FPL Vansycle began standardized fatality monitoring in Oregon upon the beginning of operation of the facility. For Stateline 1, the first “monitoring year” commenced January 1, 2002. For Stateline 2, the first monitoring year commenced January 1, 2003. FPL Vansycle completed standardized fatality monitoring for Stateline 1&2 in 2006. For Stateline 3, the first monitoring year will commence in the first calendar month following completion of construction.

Within each monitoring year for Stateline 1 and 2, FPL Vansycle conducted standardized carcass searches at the rates of frequency shown below. Over the course of each monitoring year, FPL Vansycle conducted 16 searches. The total number of searches per season is based on applying the rate to the number of months in the season (as defined above).

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

For Stateline 3, the certificate holder shall conduct one full year of fatality monitoring (16 searches), beginning in the first calendar month following completion of construction.

1.1.4 Sample Size for Standardized Carcass Searches

For the standardized carcass searches described below, the sample size is the number of turbines searched per monitoring year. Because the number of turbines per search plot varies (as described above), the number of search plots will be less than the sample size (total number of turbines searched per year).

The determination of the sample size is based primarily on the expected precision in the fatality estimates for all Stateline wind turbines in Oregon and Washington.

- Stateline 1 sample size: FPL Vansycle searched 64 Stateline 1 turbines during the first monitoring year (plus 60 turbines in Washington) and 63 Stateline 1 during the second monitoring year (plus 60 turbines in Washington). Over the first two monitoring years, all 126 Stateline 1 turbines were searched for at least 12 months. Stateline 1 does not include any guyed met towers.

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- Stateline 2 sample size: FPL Vansycle searched 30 Stateline 2 turbines in 2003 and 16 Stateline 2 turbines in 2006 (plus 23 turbines in Washington). Stateline 2 does not include any guyed met towers.

1.1.5 Duration of Fatality Monitoring

Stateline 1&2: FPL Vansycle completed standardized fatality monitoring for Stateline 1&2 in 2006.

1.2 Removal Trials

The objective of the removal trials is to estimate the length of time avian and bat carcasses remain in the search area. Carcass removal studies will be conducted during each season in the vicinity of the search plots. Estimates of carcass removal will be used to adjust 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.

FPL Vansycle conducted carcass removal trials within each of the seasons defined above for Stateline 1 and 2 during the years in which fatality monitoring was done.⁴ Instead, removal data from Stateline 1 and 2 will be used to adjust carcass counts for removal bias.

1.3 Searcher Efficiency Trials

The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find.

The certificate holder shall conduct searcher efficiency trials in the same area in which carcass searches occur in both grassland/shrub-steppe and cultivated agriculture habitat types. FPL Vansycle conducted searcher efficiency trials in each season for Stateline 1 and 2 in those years in which fatality monitoring was done.⁵

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

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

Efficiency trials will be spread over the entire season to incorporate effects of varying weather and vegetation growth. Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (thrown over the left

⁴ Except that removal trials were not required in 2006 for Stateline 2.

⁵ Except that searcher efficiency trials were not required in 2006 for Stateline 2.

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shoulder), 2) hidden to simulate a crippled bird, and 3) partially hidden. Each carcass will be discreetly secured at its location to discourage removal by scavengers.

Each non-domestic carcass will be discreetly marked so that it can be identified as an efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses found during the 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.

If new searchers are brought into the search team, additional detection trials will be conducted to insure that detection rates incorporate searcher differences.

1.4 Standardized Carcass Searches

The objective of the standardized carcass searches (“fatality monitoring”) is to estimate the number of bird and bat fatalities that are attributable to facility operation. The goal of bird and bat fatality monitoring is to obtain a precise estimate of the fatality rate and associated variances.

The certificate holder 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 whose death appears related to facility operation. All carcasses located within areas surveyed, regardless of species, will be recorded and, if possible, a cause of death determined based on blind necropsy results. The total number of avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias. If the cause of death is not apparent, the mortality will be attributed to facility operation.

FPL Vansycle conducted two years of fatality monitoring for the Stateline 1 area and two years of fatality monitoring for the Stateline 2 area. For Stateline 3, FPL Stateline shall conduct one full year of fatality monitoring. If analysis of the fatality data indicates that a significant impact on wildlife and wildlife habitat has occurred, the certificate holder shall implement appropriate mitigation, subject to the approval of the Department. Mitigation is discussed in Section 12 below.

Personnel trained in proper search techniques (“the searchers”) will conduct the carcass searches by walking parallel transects. The searchers will search rectangular search plots with the long axis of the plot centered on the turbine string. All area within a minimum of 63 meters from turbines or permanent guyed met towers will be searched. Transects will be initially set at 6 meters apart in the area to be searched. A searcher will walk at a rate of approximately 45 to 60 meters per minute along each transect searching both sides out to three meters for casualties. Search area and speed may be adjusted by habitat type after evaluation of the first searcher efficiency trial. It should take approximately 45 to 90 minutes to search each turbine (each search plot contains multiple turbines), depending on the habitat type.

The searchers will record the condition of each carcass found, using the following condition categories:

- Intact – a carcass that is completely intact, is not badly decomposed and shows no sign of being fed upon by a predator or scavenger

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- Scavenged – an entire carcass that shows signs of being fed upon by a predator or scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains, legs, pieces of skin, etc.)
- Feather Spot – 10 or more feathers at one location indicating predation or scavenging

All carcasses (avian and bat) found during the standardized carcass searches will be photographed, recorded and labeled with a unique number. Each carcass will be bagged and frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will be kept with the carcass at all times. For each carcass found, searchers will record species, sex and age when possible, date and time collected, location, condition (e.g., intact, scavenged, feather spot) and any comments that may indicate cause of death. 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. The certificate holder shall coordinate collection of state endangered, threatened or protected species with the ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the U.S. Fish and Wildlife Service (USFWS). The certificate holder shall obtain appropriate collection permits from ODFW and USFWS.

The searchers might discover carcasses incidental to formal carcass searches (e.g., while driving within the project area). If the incidentally discovered carcasses are found at turbines that are not part of the formal search sample, the searchers will identify, photograph and collect the carcasses as is done for carcasses within the formal search sample during scheduled searches. If the incidentally discovered carcasses are within the formal search plots, the searchers will leave the carcasses undisturbed, unless the carcass is a state or federally threatened or endangered species. The certificate holder shall coordinate collection of state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the USFWS. The searchers will record the location of all incidentally discovered carcasses or injured birds on a detailed map of the study area showing the location of wind turbines and associated facilities such as power lines and met towers. Any injured native birds found will be carefully captured by a trained Project Biologist or technician and transported to Blue Mountain Wildlife Center in Pendleton in a timely fashion. The certificate holder shall follow a protocol for handling injured birds that has been developed with Lynn Thompkins of Blue Mountain Wildlife.

2.0 Established Monitoring Transect Surveys

Surveys of grassland transects were conducted for Stateline 1 only. The objective of surveys of established monitoring transects is to determine whether the operation of the facility results in a loss of habitat quality. A reduction in use by grassland/steppe avian species near the facility would indicate a loss of habitat quality.

Stateline 1 and 2

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Stateline 1 transects: FPL Vansycle established 20 transects perpendicular to the turbine strings in non-agricultural grassland steppe and CRP habitats.⁶ The survey protocol for Stateline 1 was described in earlier versions of this plan.⁷ Stateline 2 transects: No additional transects could be established because the turbine strings were located in cultivated land.

3.0 Raptor Nest Surveys

The objectives of raptor nest surveys are to estimate the size of the local breeding populations of tree-nesting raptor species in the vicinity of the facility and to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local populations of “target raptor species”: Swainson’s hawk and ferruginous hawk. Certificate holder FPL Vansycle is responsible for implementing this plan as it applies to Stateline 1&2. Certificate holder FPL Stateline is responsible for implementing this plan as it applies to Stateline 3.

Aerial and ground surveys will be used to gather nest success statistics on active nests, nests with young and young fledged. The certificate holder will share the data with state and federal biologists.

During each survey year, the certificate holder shall conduct at least one helicopter survey and additional surveys as described in this section. All nests will be given identification numbers, and nest locations will be recorded on U.S. Geological Survey 7.5-minute quadrangle maps. Global positioning system coordinates will be recorded for each nest. Locations of inactive nests will also be recorded as they may become occupied during future years. All new nests not previously mapped, whether active or inactive, will be given an identification number and their locations (coordinates) will be recorded. Ground surveys are subject to access.

For Stateline 1, FPL Vansycle conducted aerial surveys between May 5 and 17, 2002, and between June 8 and 28, 2002. Surveys were conducted within a 5-mile buffer of the Stateline 1 turbines. In addition, active ferruginous hawk and Swainson’s hawk nests within two miles of Stateline 1 turbines were surveyed from the ground to determine nesting success.

In 2003, FPL Vansycle conducted an aerial survey within a 2-mile buffer of Stateline 1 and 2 turbines to determine nest occupancy. In addition, FPL Vansycle conducted ground surveys to determine species, number of young and nesting success. “Nesting success” means that the young have successfully fledged (the young are independent of the core nest site). In the ground survey, FPL Vansycle targeted Swainson’s hawk and ferruginous hawk nests and any nests of the target raptor species not observed during the aerial survey.

In 2006, FPL Vansycle conducted an aerial survey to determine nest occupancy and a ground survey to determine species, number of young and nesting success. The survey area was the area

⁶ The original Oregon Wildlife Monitoring Plan (9/14/01) required the certificate holder to survey 24 transects that had been established before construction of Stateline 1. However, due to changes in project layout between the initial monitoring plan and the final layout as shown in the site certificate and changes in habitat due to landowner uses, the number of suitable transects for this survey was reduced to 20.

⁷ See the Oregon Wildlife Monitoring Plan (Revised January 20, 2006).

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within a 2-mile buffer around Stateline 2 turbines. In the ground survey, FPL Vansycle targeted Swainson's hawk and ferruginous hawk nests and any nests of the target raptor species not observed during the aerial survey.

For Stateline 3, FPL Stateline shall conduct an aerial survey within a 1-mile buffer of Stateline 3 turbines to determine nest occupancy by Swainson's hawks and ferruginous hawks. In addition, one known ferruginous hawk nest located more than one mile from Stateline 3 turbines will be surveyed. The certificate holder shall conduct a minimum of one ground survey of Swainson's and ferruginous hawk nests to determine number of young and nesting success.

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

If analysis of the raptor nesting data indicates any reduction in nesting success by the target raptor species within the survey areas, the certificate holder shall implement appropriate mitigation, subject to the approval of the Department. At a minimum, if the surveys reveal that a target raptor species has abandoned a nest or territory within ½ mile of the facility, or has not fledged any young over any two survey years, the certificate holder shall assume the abandonment or unsuccessful fledging is the result of the project unless another cause can be demonstrated conclusively. Based on that assumption, the certificate holder shall implement appropriate mitigation. In addition, if the data indicate clear evidence of displacement or disturbance of target raptor nesting species between beyond ½ mile from the facility, the certificate holder shall implement appropriate mitigation.

For ferruginous hawks, appropriate mitigation may include creation, maintenance and monitoring of nesting platforms; specifically, eight nesting platforms would be created a minimum of 2 miles away from turbines for every ferruginous hawk nest assumed or shown to be affected.

Due to the difficulty in replacing nesting habitat for Swainson's hawks, appropriate mitigation may include determining the status of the tree structures currently supporting Swainson's hawks within three miles of the turbines and, with landowner approval, implementing protection measures to retain those structures and to protect existing nest trees.

This may include fencing to protect existing trees or spraying black locust trees for insect infestation. It may be appropriate to recruit native tree species.

4.0 Burrowing Owl Surveys

The objectives of owl surveys are to estimate the size of the local breeding population of burrowing owls in the vicinity of the facility and to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local burrowing owl population.

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Given the expected small sample size of active burrowing owl nests within 1,000 feet of the facility, impacts may have to be judged based on trends in the data, results from other wind energy facility monitoring studies and literature on what is known regarding the populations in the region. No burrowing owls were observed within 1,000 feet of the proposed Stateline 1 turbines during the 2001 spring pre-construction surveys. Therefore, there is no ability to make any statistical or descriptive inferences on burrowing owl displacement or disturbance impacts to burrowing owls in Oregon.

For Stateline 1 and 2 facilities, FPL Vansycle conducted burrowing owl surveys during the breeding season within suitable grassland habitat in association with the fatality monitoring described above in Section 4. For each monitoring year, FPL Vansycle conducted a minimum of two surveys for burrowing owls to obtain estimates of burrowing owl nest density near the turbines. For these surveys, FPL Vansycle followed a protocol developed in consultation with ODFW. Taped burrowing owl vocalizations were played to enhance the ability to detect burrowing owls. Two historic nest sites within the Oregon project area were checked for use. The burrow and an adjacent 100 meters were surveyed for sign of activity and alternate nest sites. During the burrowing owl surveys, observers recorded and documented detections of Washington ground squirrels (scat, holes and live detections).

For Stateline 3 facilities, FPL Stateline shall conduct a burrowing owl survey in 2010 for known active or historic burrowing owl nests and any newly discovered nests within 1,000 feet of the Stateline 3 wind turbines. In addition to checking all known historic burrowing owl sites, the certificate holder will search a buffer of 1,000 feet around each site to look for auxiliary burrows, new burrows or other signs of activity. Two burrowing owl nests were found within the project boundary during pre-construction in 2008 and will be checked for activity during the construction monitoring in 2009.

5.0 Avian Use Surveys

During each standardized carcass search, as described in Section 4 above, observers will record birds detected in a ten-minute period at approximately one-third of the turbines within the carcass search plots (e.g., one point count station per carcass search plot which may consist of two to four turbines) using standard variable circular plot point count survey methods. Additional observations of species of concern (State and federally listed threatened and endangered species and State Sensitive Species listed under OAR 635-100-0040) will be recorded if observed during the carcass searches, but collecting this information is secondary to the actual searching for carcasses so the searchers are not distracted from their main task of finding carcasses.

For Stateline 3, while on site during carcass searches (including during travel between search plots), observers shall record observations of special status birds and mammals within the facility site. Observers shall record observations of birds perching on aboveground transmission line conductors and support structures in the vicinity of the turbines being searched. Observers shall report any fatalities observed below or near transmission lines.

6.0 FPL’s Stateline Wind Project Wildlife Response and Reporting System

FPL’s “Stateline Wind Project Wildlife Response and Reporting System” is a monitoring program set up for searching for and handling avian and bat casualties found by maintenance personnel. A description of this system and associated data forms used for the Vansycle Ridge Wind Project are found in FPL’s application for a site certificate (Attachment P-6, Appendices B and C).

Construction and maintenance personnel will be trained in the methods. This monitoring program includes both reporting of carcasses discovered incidental to construction and maintenance operations (“incidental finds”) and reporting of carcasses discovered under a standardized search protocol for an area within approximately 50 meters of the turbines, measured from the base of the tower (“protocol searches”).

For Stateline 1, a sample of approximately 45 turbines not included in the standardized carcass searches was chosen to be included in protocol searches in each Stateline 1 monitoring year. FPL Vansycle selected this sample from the overall Stateline Wind Project in Oregon and Washington, with at least 13 of the sampled turbines located in Oregon.

For Stateline 2, FPL Vansycle selected a sample of seven Stateline 2 turbines not included in the standardized carcass searches to include in protocol searches in each Stateline 2 monitoring year.

For Stateline 3, FPL Stateline shall select a sample of approximately 15 percent of the Stateline 3 turbines that are not included in the standardized carcass searches.

All carcasses discovered by maintenance personnel will be photographed and recorded. If maintenance personnel find carcasses within the search plots for protocol searches, they will notify a project biologist who will collect the carcasses. If maintenance personnel discover incidental finds at turbines that are not within search plots for the standardized carcass searches described in Section 4, they will notify a project biologist who will collect the carcasses. If maintenance personnel discover carcasses within search plots for the standardized carcass searches described in Section 4, they will leave the carcasses undisturbed, unless the carcass is a state or federally threatened or endangered or otherwise protected species. The certificate holder shall coordinate collection of state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the USFWS.

7.0 Statistical Analysis Methods for Fatality Data

The certificate holder shall calculate fatality rates using the statistical methods described below, except that the certificate holder may use different notation and methods that are mathematically equivalent with prior approval of the Department.

- 1) Observed number of carcasses found during standardized carcass searches for which the cause of death is either unknown or is attributed to the facility.

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- 2) Searcher efficiency expressed as the proportion of planted carcasses found by searchers
- 3) Non-removal rates expressed as the length of time a carcass is expected to remain in the study area and be available for detection by the searchers

7.1 Definition of Variables

The following variables are used in the equations below:

C_i	the number of carcasses detected at plot i for the study period of interest for which the cause of death is either unknown or is attributed to the facility
n	the number of search plots
k	the number of turbines searched (includes the turbines centered within each search plot and a proportion of the number of turbines adjacent to search plots to account for the effect of adjacent turbines on the search plot buffer area)
\bar{c}	the average number of carcasses observed per turbine per year
s	the number of carcasses used in removal trials
s_c	the number of carcasses in removal trials that remain in the study area after 40 days
se	standard error (square of the sample variance of the mean)
t_i	the time (days) a carcass remains in the study area before it is removed
\bar{t}	the average time (days) a carcass remains in the study area before it is removed
d	the total number of carcasses placed in searcher efficiency trials
p	the estimated proportion of detectable carcasses found by searchers
I	the interval between searches in days
$\hat{\pi}_i$	the estimated probability that a carcass is both available to be found during a search and is found ($i = 1$ and 2 ; two estimators)
m_i	the estimated annual average number of fatalities per turbine per year, adjusted for removal and observer detection bias ($i = 1$ and 2 ; two estimators)

7.2 Observed Number of Carcasses

The estimated average number of carcasses (\bar{c}) observed per turbine (or guyed met tower) is:

$$\bar{c} = \frac{\sum_{i=1}^n C_i}{k}$$

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The final estimate of \bar{c} and its standard error are to be calculated using bootstrapping (Manly et al. 1997).⁸ Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances and confidence intervals for complicated test statistics. The certificate holder shall calculate the mean of at least 5000 bootstrap estimates. The standard deviation of the bootstrap estimates of \bar{c} is the estimated standard error of \bar{c} (that is, $se(\bar{c})$).

7.3 Estimation of Carcass Removal

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

$$\bar{t} = \frac{\sum_{i=1}^s t_i}{s - s_c}$$

This estimator is the maximum likelihood estimator assuming that the removal times follow an exponential distribution and that there is right-censoring of data. Any trial carcasses still remaining at 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are removed before the end of the trial, then s_c is 0, and \bar{t} is just the arithmetic average of the removal times.

The certificate holder shall use bootstrapping to calculate the final estimate of \bar{t} , the estimated standard error and 90% confidence limits. At least 5000 bootstrap iterations will be used. The standard deviation of the bootstrap estimates of \bar{t} is the estimated standard error of \bar{t} (that is, $se(\bar{t})$). Removal rates will be estimated by major habitat, carcass size (large and small) and season.

7.4 Estimation of Searcher Efficiency

Searcher efficiency rates (that is, the rate of observer detection) are expressed as p , the proportion of trial carcasses that are detected by searchers. The standard error (square of variance of mean) and 90% confidence limits will be calculated by bootstrapping. At least 5,000 bootstrap iterations will be used. Observer detection rates will be estimated by major habitat, carcass size and season.

7.5 Estimation of Total Number of Facility-Related Fatalities

The certificate holder shall provide two estimators for the mean number of fatalities per turbine per year. Both estimators adjust the observed number of fatalities by dividing the number of observed carcasses by an estimate of the probability that a carcass is available to be picked up during a fatality search (i.e., the probability the carcass is not removed by a scavenger) and is observed (the probability of detection).

⁸ Manly, B.F.J., Randomization, Bootstrap and Monte Carlo Methods in Biology (2nd edition), Chapman and Hall, New York (1997).

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The first estimator of total number of annual facility-related fatalities (m_1) is calculated by:

$$m_1 = \frac{\bar{c}}{\hat{\pi}_1}$$

where

$$\hat{\pi}_1 = \begin{cases} \frac{t_- * p}{I} & \text{if } I > t_- \\ p & \text{if } I < \bar{t} \end{cases}$$

This first estimator appears to provide an underestimate of true mortality when the interval between searches is similar to the mean carcass removal time. For this reason, the certificate holder shall calculate the mean number of fatalities per turbine per year using a second estimator, as follows:

$$m_2 = \frac{\bar{c}}{\hat{\pi}_2} \quad \text{where } \hat{\pi}_2$$

where $\hat{\pi}_2$ includes adjustments for both observer detection and scavenging bias and assuming that the carcass removal times t_i follow an exponential distribution.

This second estimator does not underestimate true mortality when the mean removal time is similar to or larger than the interval between searches. This estimator will be used when comparisons are made to determine if mitigation should be implemented as described in Section 12.

For Stateline 3, the certificate holder shall calculate and report fatality rates (per turbine and per megawatt) for each of eight categories: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) bats, (6) grassland birds, (7) nocturnal migrants, and (8) State and federally listed threatened and endangered species and State Sensitive Species listed under OAR 635-100-0040.⁹ The certificate holder shall calculate the “all birds” estimate and the “small birds” estimate for all species and, separately, for only those species protected by law. Modifications to these estimates will be made to incorporate the varying search efforts by season (monthly in winter and summer, twice monthly in fall and spring). In addition, the certificate holder shall estimate the number of facility-related fatalities separately for turbines that are located on land that does not support grassland steppe or low shrub/shrub steppe habitat and for turbines that are located on land that does support grassland steppe or low shrub/shrub steppe habitat. Additional modifications may be made, subject to approval by the Department.

⁹ Grassland nesting species include grasshopper sparrow, savannah sparrow, vesper sparrow, short-eared owl, burrowing owl, northern harrier, horned lark, western meadowlark, long-billed curlew, ring-necked pheasant, Hungarian partridge, chukar partridge, California quail and any other resident grassland nesting bird species that is found in the area.

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The variance of m is difficult to estimate due to the products and ratios of random variables in the equation above. The certificate holder may estimate the variance and confidence intervals using the computer intensive technique of bootstrapping (Manly 1997, Barnard 2000).

8.0 Data Reporting

The certificate holder will report the monitoring data and analysis to the Council. This report may be included in the annual report required under OAR 345-026-0080 or may be submitted as a separate document at the same time the annual report is submitted. In addition, the certificate holder shall provide to the Council any data or record generated in carrying out this monitoring plan upon request by the Council.

The certificate holder shall notify USFWS and ODFW immediately in the event that any federal or state endangered or threatened species are taken. The public will have an opportunity to receive information about monitoring results and to offer comment. Within 30 days after receiving the final annual report of monitoring results, the Department will give reasonable public notice via the Internet and make the report available to the public. The notice will specify a time in which the public may submit comments to the Department. The Technical Advisory Committee established under the Walla Walla County conditional use permit may offer comments about the results of monitoring programs in Oregon.

9.0 Mitigation

The selection of the mitigation actions that the certificate holder may be required to implement under this plan should allow for flexibility in creating appropriate responses to monitoring results that cannot be known in advance. If mitigation is needed, the certificate holder shall propose appropriate mitigation actions to the Department and shall carry out mitigation actions approved by the Department. In addition to mitigation described above, possible mitigation actions include but are not limited to the measures discussed in this section. No later than December 31, 2010, the Department and the certificate holder shall review this plan and assess whether modification of the required mitigation is appropriate.

9.1 Grassland Nesting Species

Grassland nesting species include all native bird species that rely on grassland habitat and that are either resident species occurring year round or species that nest in the area, excluding horned lark, burrowing owl and northern harrier. The certificate holder shall determine significant impact to grassland nesting species based on the fatality monitoring program discussed above. For Stateline 1&2, if the average annual fatality rate is greater than 1.25 fatalities per turbine or guyed met tower per year for all species combined or if the average annual fatality rate is greater than 0.5 fatalities per turbine or guyed met tower per year for a single grassland nesting bird species, then the certificate holder shall assume that a significant impact on habitat has occurred and shall

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implement appropriate mitigation.¹⁰ For Stateline 3, if the average annual fatality rate is greater than the threshold of concern (0.59 fatalities per megawatt) for grassland species as a group, then the certificate holder shall assume that a significant impact on habitat has occurred and shall implement appropriate mitigation.¹¹ The certificate holder shall include in this estimate any grassland nesting species fatality that is observed, even if it is observed during the non-nesting period. The certificate holder shall include in the estimate all carcasses unidentified as to species and for which there is no evidence to rule out the carcass as one of the grassland species listed above.

If the analysis of turbine fatality data indicates that mitigation for grassland nesting species is required, the certificate holder shall enhance sufficient habitat to support the number of grassland nesting birds affected. For Stateline 3, the number of birds affected includes the number of fatalities above the threshold of concern. The certificate holder shall protect that enhanced habitat for the life of the facility. The certificate holder shall propose the amount of habitat enhancement based on expected densities and habitat requirements of these species as described in the literature and studies of the Stateline facility and other wind energy facilities in the Northwest.

For Stateline 3, if the average annual fatality rate for a State Sensitive avian species listed under OAR 635-100-0040 is greater than the threshold of concern (0.2 fatalities per megawatt), the Department may require the certificate holder to implement mitigation for that species.

FPL Vansycle reported the average annual fatality rates for grassland bird species in Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. This report analyzed two years of monitoring data collected between January 1, 2002, and December 31, 2003. Based on the data, the average annual fatality rate for all grassland bird species as a group was 1.28 fatalities per turbine. The average annual fatality rate for horned larks was 0.89 fatalities per turbine, and no other single grassland species had an annual fatality rate greater than 0.13 fatalities per turbine per year. The reported fatality rates exceeded the “all species” mitigation threshold for Stateline 1&2 of 1.25 fatalities per turbine per year and the “single species” threshold of 0.5 fatalities per turbine per year.

As of January 20, 2006, the Council determined that additional mitigation for facility impacts to grassland species was not required pending analysis of additional data from future monitoring. The basis for this determination was that the reported fatality rates were very close to target levels and the most common species affected was horned lark, a species that is abundant in the area and whose survival is not at risk.

¹⁰ The Council adopted “thresholds of concern” for raptors, grassland species and state sensitive avian species in the Final Order on the Application for the Klondike III Wind Project (June 30, 2006) and for bats in the Final Order on the Application for the Biglow Canyon Wind Farm (June 30, 2006). As explained in the Klondike III order: “Although the threshold numbers provide a rough measure for deciding whether the Council should be concerned about observed fatality rates, the thresholds have a very limited scientific basis. The exceeding of a threshold, by itself, would not be a scientific indicator that operation of the facility would result in range-wide population level declines of any of the species affected. The thresholds are provided in the WMMP to guide consideration of additional mitigation based on two years of monitoring data.”

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In 2006, FPL Vansycle conducted fatality monitoring for 16 turbines in the Stateline 2 area and reported the results in *Stateline Wind Project Wildlife Monitoring Annual Report: January - December 2006*. The average annual fatality rate for all grassland bird species as a group was 0.45 fatalities per turbine.¹¹ Single-species fatality rates were not reported.¹² Accordingly, additional mitigation for impacts to grassland species is not warranted as of the date of this plan.

9.2 Raptors

For Stateline 1&2, the certificate holder shall determine significant impact to raptors (excluding burrowing owls, short-eared owls and northern harriers, which are considered under grassland nesting species) based on the fatality monitoring program data and any other raptor fatalities found. If more than an average of two raptor fatalities are found per year, then the certificate holder shall assume that a significant impact on raptor habitat has occurred and shall implement appropriate mitigation.

For Stateline 3, the certificate holder shall determine significant impact to raptors (all eagles, hawks, falcons and owls, including burrowing owls) based on the fatality monitoring program data and any other raptor fatalities found. If the average annual fatality rate for raptors is greater than the threshold of concern (0.09 fatalities per megawatt) or the average annual fatality rate for raptor species of special concern is greater than the threshold of concern (0.06 fatalities per megawatt), then the certificate holder shall assume that a significant impact on raptor habitat has occurred and shall implement appropriate mitigation.¹³

FPL Vansycle reported the number of raptor fatalities in Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. This report analyzed two years of monitoring data collected between January 1, 2002, and December 31, 2003. Seven raptor fatalities were discovered during standardized fatality searches in Oregon and one additional raptor fatality was found in Oregon under the WRRS monitoring program in the two-year period. Therefore, the annual average was four raptor fatalities found per year.

On January 20, 2006, the Council determined that additional mitigation was appropriate. To mitigate the effects of the facility on raptors, the certificate holder shall implement the following:

- a) Artificial nest structures (ANS) for ferruginous hawks: FPL Vansycle provided funding for the construction, monitoring and maintenance of not less than three ANS. FPL Vansycle, in consultation with ODFW and the Department, determined suitable locations for the ANS and obtained landowner permission to construct the ANS. Suitable locations are locations within the Columbia Basin Physiographic Province in proximity to the Stateline project and on land that is expected to remain in stable ownership for the life of the Stateline facility.

¹¹ Stateline Wind Project Wildlife Monitoring Annual Report: January - December 2006 (September 4, 2007), Table 5.

¹² Horned lark fatalities accounted for 50-percent of fatalities found in the Oregon survey area in 2006. The "all- birds" fatality rate was 0.81 fatalities per turbine. Thus, the single-species threshold of 0.5 fatalities/turbine/year was not exceeded.

¹³ Raptor species of special concern include Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.

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Suitable locations are locations that have adequate prey base for ferruginous hawks and that are remote from human activity. If the site chosen for an ANS is on public land or land managed by The Nature Conservancy, FPL Vansycle shall work out an appropriate agreement with the land management entity for the maintenance and monitoring of the site.

FPL Vansycle completed construction of the three ANS, using a design appropriate to attract ferruginous hawks, in early 2007. If an ANS is vandalized or destroyed (by fire or other cause) during the first five years after construction, FPL Vansycle shall pay the full cost of replacement. The Department shall determine the need for ongoing maintenance of the ANS beyond the first five years based on the monitoring data on the success of the ANS in attracting raptor use.

FPL Vansycle shall monitor the ANS and report annually to the Department regarding the actual use of the ANS by raptor species. Annual monitoring of all ANS shall continue for at least 10 years after construction of the ANS in 2006. If there has been no use of an ANS by raptors during the first five years, the Department may require FPL Vansycle to relocate the ANS or construct an ANS at an alternative suitable site.

In November 2016 FPL Vansycle and the Department (with input from ODFW) agreed on an amendment of this mitigation measure, due to historic low use of the three ANS, from 2007 through 2015.¹⁴ By March 1, 2017 FPL Vansycle will establish three new ANS in locations of suitable habitat within the approved parcels. Two of the three original ANS (ANS1 and ANS3) will be maintained. Due to the lack of suitable foraging habitat in the general area of ANS2, ANS2 will be removed and no longer be part of this mitigation measure. The new sites (ANS 4, 5, 6) are located in Umatilla County on private land with willing landowners and habitat highly likely to remain suitable, at a minimum for the period 2017–2021. Persistence of suitable habitat is likely to continue due to the extensive grasslands onsite that are enrolled in the federal Conservation Reserve Program (CRP). ANS1 and ANS3 will be inspected for maintenance needs and refreshed with sticks prior to the 2017 ferruginous hawk nesting period. These five ANS locations (ANS1, ANS3, ANS4, ANS5, ANS6) will be monitored annually for the first five years and then every five years for the life of the Stateline 1&2 facility. During the first five-year period, all five ANS will be refreshed with sticks on an as-needed basis and when the nest is not occupied by avian species. Annual reporting will be the same as described in lines 29 and 30 above. No additional mitigation will be required for the raptor mitigation requirement.

- b) Riparian and upland habitat fencing: FPL Vansycle contributed \$9,000 to the Birch Creek Project for fencing of riparian and upland habitat. The Birch Creek project is a partnership between a private landowner and other interested organizations to improve upland and riparian wildlife habitat at a site that is within the Columbia Basin Physiographic Province about 30 miles south of the Stateline facility. The project site is near an area of historic

¹⁴ The certificate holder submitted a draft proposal identifying the proposed new ANS locations, siting selection methodology and criteria, monitoring, and maintenance activities on October 3, 2016 and a final proposal, as approved by ODOE in consultation with ODFW, on October 28, 2016.

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nesting sites for ferruginous hawks, and it is likely that improved range conditions may enhance foraging habitat quality for the species, especially during the nesting and juvenile dispersal period. It is expected that other raptor species will benefit as well, including red-tailed hawks and American kestrels that may nest in deciduous or coniferous trees and forage in the uplands. FPL Vansycle shall provide periodic reports to the Department on the progress of the Birch Creek project. At a minimum, the certificate holder shall report on the project in the annual reports on the Stateline facility.

The Birch Creek project enclosed about 5,000 acres of Columbia Basin grassland and riparian and upper Birch Creek conifer/grassland. Approximately 15 miles of new high-tensile, wildlife-friendly fencing were built. The goal is to exclude cattle from riparian zones and upland habitats so the areas can recover from past grazing pressure. The fencing encloses uplands for raptor foraging and deciduous trees and shrubs for potential raptor nesting, perching and roosting.

- c) Contributions to the Blue Mountain Wildlife Rehabilitation Center: The Blue Mountain Wildlife Rehabilitation Center near Pendleton is a non-profit organization that provides treatment and care to orphaned, injured or sick native wildlife to enable their return to their natural habitat. To support the work of the Center in the rehabilitation of raptors, FPL Vansycle contributed \$3,000 to the Center in 2006 and \$1,500 in 2007 and 2008. The certificate holders shall make annual contributions of \$1,500 each in 2009 and 2010. The certificate holders shall request that the funds be dedicated to paying for food and other supplies necessary for raptor rehabilitation. FPL Vansycle and the Department shall assess ongoing mitigation activities no later than December 31, 2010, and shall determine the amount of further contributions to the Center.

FPL Vansycle reported four raptor fatalities in Oregon in 2006.¹⁵ This result matched the annual average of four raptor fatalities per year, based on the data for 2002 and 2003. If Stateline 3 turbines are built, the certificate holder will conduct standardized searches for one year in the Stateline 3 area. The Wildlife Response and Reporting System will be in place for the life of the facility and will include reporting of any incidental raptor fatalities found by maintenance personnel. If the threshold of concern is not exceeded but fatalities of a sensitive raptor species, such as ferruginous hawk or Swainson's hawk are at a level of concern, the Department may require the certificate holder to implement mitigation for that species.

9.3 Other Bird Species and Bats

Mitigation measures for grassland nesting birds and for raptors, if implemented, would also benefit other bird species and bats. For Stateline 1&2, there was no mitigation threshold for these species. For Stateline 3, the threshold of concern for bats as a group is 2.5 fatalities per megawatt. If fatalities to these species exceed the threshold of concern or are higher than expected and are at a

¹⁵ Stateline Wind Project Wildlife Monitoring Annual Report: January - December 2006 (September 4, 2007), Table 2.

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level of biological concern, the Department may require the certificate holder to implement mitigation for these species.

The monitoring data presented in Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003 show that fatality rates for other bird species and bats were not higher than expected. The overall bat fatality rate was 1.7 fatalities per megawatt, which is below the U.S. average rate of 2.1 fatalities per megawatt.¹⁶ The data collected in 2006 on turbines in the Stateline 2 area resulted in lower fatality rates for both birds and bats, compared to the larger Stateline sample studied in 2002 and 2003.¹⁷ Pending analysis of additional data from future monitoring, the Council determined that additional mitigation for facility impacts to other bird species and bats was not required as of January 20, 2006.

10.0 Post-repowering Fatality Monitoring – Vanscyle II

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 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 investigators; and (3) proportion estimation of the carcass fall distribution searched. One full year of fatality monitoring will be performed starting in the first or second full season following completion of the repowering of the Facility; methods and results of all components of the fatality monitoring program will be reported to ODOE at the end of the year-long study.

10.1 Standardized Carcass Searches

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

10.1.1 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 (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

¹⁶ The overall bird fatality rate of 2.9 fatalities per megawatt was “slightly below the average for new generation wind projects in the U.S.” (3.05 fatalities per megawatt). Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003 (December 2004), p. 26.

¹⁷ Stateline Wind Project Wildlife Monitoring Annual Report: January - December 2006 (September 4, 2007), Table 5.

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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), the maximum blade tip height of a turbine and operational speed of the turbine. 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 large birds (Hull and Muir 2010; Hallingstad et al. 2018). Two types of search plots and corresponding search methods will be utilized at each turbine, one that minimizes detection bias for small carcasses and one that does so for large bird carcasses.

The first search plot, "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 road and pad plot includes the gravel pad surrounding the turbine, portions of all access roads that are within 120 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 120 meters from the base of Facility turbines (based on modeling for large turbines by Hull and Muir [2010]).

The second search plot, "large bird plots," will include a circular plot centered on the turbine with a radius of 120 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]).

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.

10.1.2 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 the time period of occurrence 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 large bird plots during the spring, summer and fall seasons. At road and pad plots, standardized carcass searches will be conducted weekly (every 7 days) during the spring, summer and fall. The frequency of standardized carcass searches will be reduced to monthly (once every 28 days) in both plot types during winter. Over the course of one monitoring year, the investigators will conduct 40 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. Seasonal timeframes and frequency of searches by season and search plot type are shown in Table 1.

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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	7 Days	Road and pad plot out to 120 meters	Bats/small birds and large birds	Walk	12
		14 Days	120-meter radius centered on turbine	Large birds	Binocular scans from turbine base	6
Summer	June 1 to August 15	7 Days	Road and pad plot out to 120 meters	Bats/small birds and large birds	Walk	10
		14 Days	120-meter radius centered on turbine	Large birds	Binocular scans from turbine base	5
Fall	August 16 to November 15	7 Days	Road and pad plot out to 120 meters	Bats/small birds and large birds	Walk	14
		14 Days	120-meter radius centered on turbine	Large birds	Binocular scans from turbine base	7
Winter	November 16 to March 15	28 Days	Road and pad plot out to 120 meters	Bats/small birds and large birds	Walk	4
		28 Days	120-meter radius centered on turbine	Large birds	Binocular scans from turbine base	4
<p>1. Seasonal demarcation dates may be shifted slightly to accommodate a full search interval in any given season.</p> <p>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).</p>						

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).

10.1.3 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 10.2).

Searches in large bird plots will involve binocular scans made from the turbine base and one to three topographical high points within the search plot. From the turbine base, the investigators will scan 90 degrees from each of the four cardinal directions out to the extent of the 120-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 fence, 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 5.2.3).

Dense fog and high winds in this region occasionally limit investigators from successfully using binocular scans to search plots. Under these weather conditions, investigators would not perform a search. Investigators will attempt to search the turbine within the survey period window as possible. If weather conditions preclude searches, missed searches will be noted.

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

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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.

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 11.0 will be followed.

10.2 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. 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), unprotected species (e.g. European starling, house sparrows) and dark mice as a surrogate for bats.

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 plots and large bird carcasses will be placed within the large bird plots (inclusive of the road and pad) 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 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, opportunistic trials based on raptor fatality detection, 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.

10.3 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 find.

A trained Searcher Efficiency Proctor will 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 trial carcasses will be placed in the spring, summer, and fall seasons within the road and pad plots, while a minimum of 12 large birds will be placed 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, while a minimum of 12 large birds will be placed in large bird plots.

Investigators will not be notified of carcass placement or test dates. The Searcher Efficiency Proctor will 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 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), unprotected species (e.g. European starling, house sparrows), and dark mice as a surrogate for bats.

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.

10.4 Fatality Estimation

Estimated annual fatality rates for the Facility will be calculated at the end of each 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 within the road and pad search plots and for large birds within the large bird search plot. Therefore, for both search plot types, 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. The DWP module in GenEst will be employed to calculate site specific fall distribution, and proportions searched. If minimum sample sizes required by the DWP module are not met, calculations will utilize ballistic modeling results presented in Hull and Muir (2010) for small birds and bats, and Hallingstad et al. (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 has been reached to allow estimation. The nine categories are:

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

Fatality estimation would be performed using the U.S. Geological Survey's estimator program, GenEst (Dalthorp et al. 2018). GenEst 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 minimize bias, enabling more precise fatality estimation and reliable comparison of fatality estimates among projects (Simonis et al. 2018). Additionally, GenEst allows for fatality

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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 trails;
4. Searcher efficiency expressed as the probability that a trial carcass is found by investigators during searcher efficiency trials; and

The portion of the fall distribution that was searched at the Facility (DWP) for the given size class and search plot type.

10.5 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. Mitigation may be appropriate if fatality rates exceed a “threshold of concern” (below). For the purpose of determining whether a threshold has been exceeded, the certificate holder will determine the mean estimated annual fatality rate inclusive of 90 percent confidence intervals for species groups after each year of monitoring (provided three or more detections within any of the species groups listed below 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 (below) will be used in conjunction with most current regional fatality rates published by the Renewable Energy Wildlife Institute (formerly American Wind and Wildlife Institute [AWWI]) and any other significant information available at the time to evaluate the fatality rates associated with the Facility and guide discussions on appropriate mitigation.

Vansycle II Fatality Thresholds of Concern by Species Group

Species Group	Threshold of Concern¹ (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, golden eagle, bald eagle, burrowing owl.)	0.06

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Species Group	Threshold of Concern¹ (Fatalities per MW)
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
<p>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.</p> <p>3. Regionally, the median fatality rate for all raptors in the Northern Rockies avifaunal biome (includes eastern Oregon; 22 studies) was 0.06 fatalities per MW per year (AWWI 2020a). Within the USFWS Pacific Region (Idaho, Hawaii, Oregon, Washington; 51 studies) the median fatality rate for raptors was 0.10 fatalities per MW per year (West 2021).</p> <p>4. 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). In the updated report with two additional studies, the rate remains similar, with a median at 0.7 bats/MW per year and a mean rate of 1.1 bats/MW/year (AWWI 2020b).</p>	

If the data from a given year of monitoring show that a threshold of concern for a species group or individual state sensitive bird species 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. If mitigation is determined to be necessary, the certificate holder will propose mitigation measures designed to benefit the affected species or species group. 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 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 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.

11.0 Amendment of the Plan

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

12.0 References

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Annual Wildlife Monitoring Report (2022)

ATTACHMENT 5

2022 WRRS Data for Stateline Wind Project

STATELINE (WA)	WA	3/30/2022	3/30/2022	AVIAN	ENE	Hawk, Unidentified	LEFT IN FII DEATH	2022
STATELINE (OR)	OR	4/18/2022	4/18/2022	AVIAN	NORTH	European Starling	LEFT IN FII DEATH	2022
STATELINE (OR)	OR	4/18/2022	4/18/2022	AVIAN	NORTH	European Starling	LEFT IN FII DEATH	2022
STATELINE (WA)	WA	6/15/2022	6/22/2022	AVIAN	NORTH	Crow-Raven, Unidenti	LEFT IN FII DEATH	2022
STATELINE (WA)	WA	7/1/2022	7/1/2022	AVIAN	NORTH	Bird, Unidentified	LEFT IN FII DEATH	2022
STATELINE (WA)	WA	7/20/2022	8/5/2022	BAT	NORTH	Bat, Unknown	LEFT IN FII DEATH	2022

ATTACHMENT 6

STL 1-2 Offsite Artificial Report Nest Structure Monitoring



Northwest
Wildlife
Consultants, Inc.

MEMORANDUM

Date: February 1, 2022

To: Rob Kruger, NextEra Energy Resources, FPL Vansycle

From: Karen Kronner
NWC, Inc.

Subject: Stateline 1 and 2 Wind Project – 2021 Offsite Artificial Raptor Nest Structure Project, 2021 Summary

This memo provides a summary of 2021 activities for the Stateline Wind Project Artificial Nest Structures (ANS) project. Background information and annual reports for the ANS project can be found in prior documents. Requirements for the original three ANS were first generally described in the November 2009 Stateline Wildlife Monitoring and Mitigation Plan (WMMP, pages A-15–A-17). The WMMP was amended January 19, 2017 to address limited use. Text from the current WMMP:

“In November 2016 FPL Vansycle and the Department (with input from ODFW) agreed on an amendment of this mitigation measure, due to historic low use of the three ANS, from 2007 through 2015. By March 1, 2017 FPL Vansycle will establish three new ANS in locations of suitable habitat within the approved parcels. Two of the three original ANS (ANS1 and ANS3) will be maintained. Due to the lack of suitable foraging habitat in the general area of ANS2, ANS2 will be removed and no longer be part of this mitigation measure. The new sites (ANS 4, 5, 6) are located in Umatilla County on private land with willing landowners and habitat highly likely to remain suitable, at a minimum for the period 2017–2021. Persistence of suitable habitat is likely to continue due to the extensive grasslands onsite that are enrolled in the federal Conservation Reserve Program (CRP). ANS1 and ANS3 will be inspected for maintenance needs and refreshed with sticks prior to the 2017 ferruginous hawk nesting period. These five ANS locations (ANS1, ANS3, ANS4, ANS5, ANS6) will be monitored annually for the first five years and then every five years for the life of the Stateline 1&2 facility. During the first five-year period, all five ANS will be refreshed with sticks on an as-needed basis and when the nest is not occupied by avian species. Annual reporting will be the same as described in lines 29 and 30 above. No additional mitigation will be required for the raptor mitigation requirement.”

The last of the annual monitoring was 2021. Monitoring frequency will now be every five years. Any notes reported by landowners will be maintained in the project files.

All the structures are located offsite (Figure 1). There have been no changes to the habitat or ownership for any of the sites hosting the structures. As previously described ANS #2 was removed due to recent extensive habitat. Three new structures were added (#4, 5, 6) on March 31, 2017. As previously described, two ANS, #4 and 5, are close to each other and it is not likely both would be used by nesting raptors in the same year.

All five ANS were monitored for maintenance needs from February 28 to mid-March 2021, none needed repairs or to be refreshed with sticks. All were photographed.

All were checked for bird use from mid-April to early May. One adult red-tailed hawk was observed flying 0.5 mile from ANS #4 and 5. Fresh nest material was noted in both (Photo 1, ANS #4) but further observations on May 20 indicated they did not nest on the platform but likely nested elsewhere. There was no excrement. An unidentifiable hawk was on the ANS #1 on March 30 (too far away to identify) and it quickly flew out of sight. No further activity was noted, it was last checked on June 1 (Photo 2). No other bird use or activity at the other ANS was documented in 2021.

Figure 1. Stateline Artificial Nest Structures

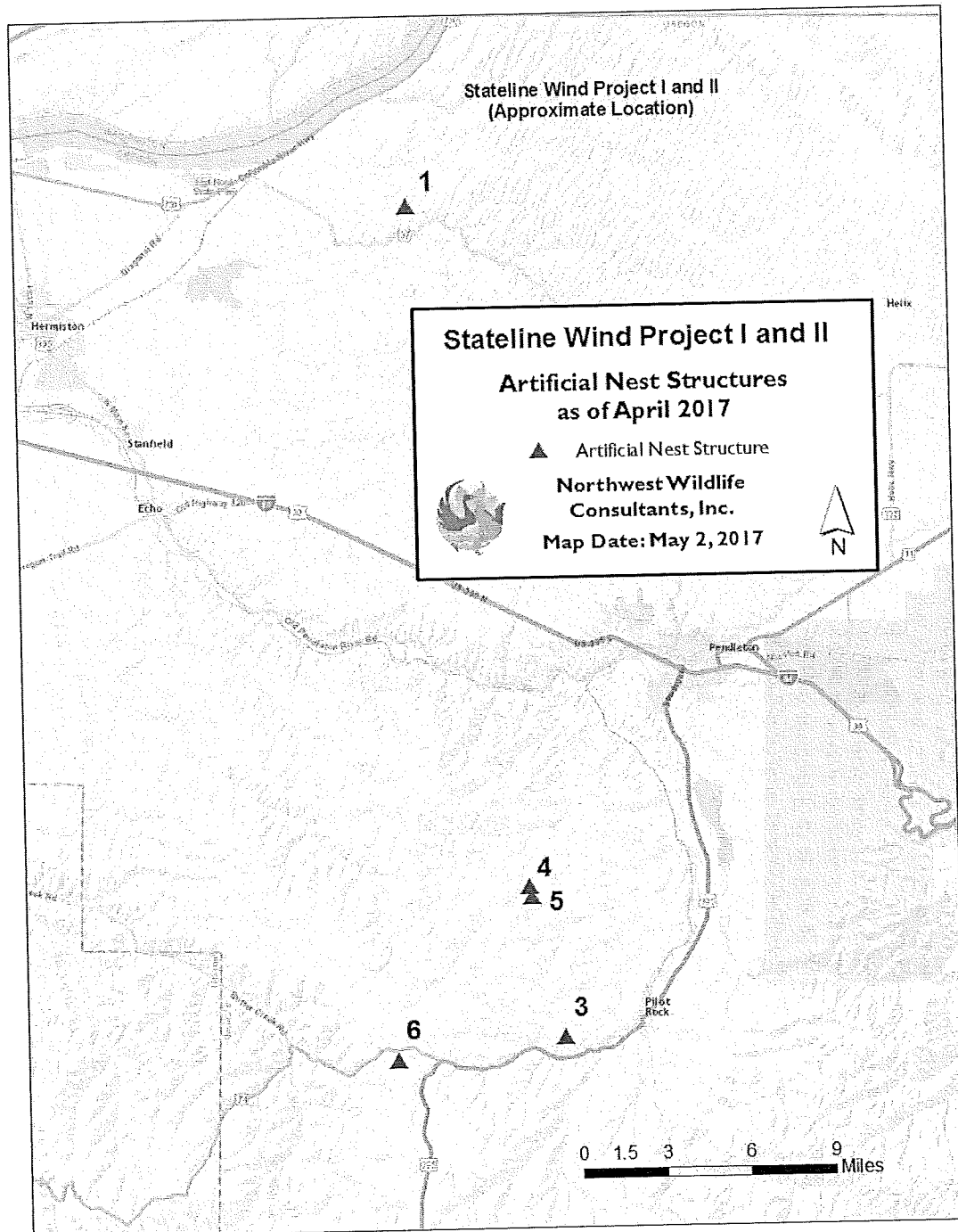


Photo 1. ANS #4 was likely refreshed in 2021 with small sticks by a buteo raptor.



Photo 2. ANS #1, June 1, 2021

