Exhibit P

Fish and Wildlife Habitats and Species

Wheatridge Renewable Energy Facility East
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Prepared for
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Table of Contents

1.0 Introduction 1
2.0 Analysis Area 2
3.0 Agency Consultation 2
4.0 Description of Biological and Botanical Surveys Performed – OAR 345-021-0010(1)(p)(A) 3
4.1 Information Review 4
4.2 Field Surveys 4
4.2.1 Habitat Categorization Surveys 7
4.2.2 Special Status Wildlife Species Surveys 9
4.2.3 Special Status Plant Species Surveys 10
4.2.4 Avian Use Surveys 11
4.2.5 Raptor-Nest Surveys 12
4.2.6 Bat Acoustic Surveys 14
4.2.7 Wetlands and Waters Delineation 14
5.0 Identification and Description of Habitat – OAR 345-021-0010(1)(p)(B)(C) 14
5.1 Habitat Categorization 15
5.2 Description of Fish and Wildlife Habitat in the Analysis Area 17
5.2.1 Category 1 Habitat 17
5.2.2 Category 2 Habitat 18
5.2.3 Category 3 Habitat 22
5.2.4 Category 4 Habitat 24
5.2.5 Category 6 Habitat 26
6.0 Identification of State Sensitive Species and Site-Specific ODFW Issues – OAR 345-021-0010(1)(p)(D) 27
6.1 Identification of State Sensitive Species 27
7.0 Baseline Survey of Habitat Use by State Sensitive Species – OAR 345-021-0010(1)(p)(E) 32
7.1 Results of Field Surveys 32
7.1.1 Special Status Wildlife Species Surveys 32
7.1.2 Special status Plant Species Surveys 34
7.1.3 Avian Use Surveys 34
7.1.4 Raptor-Nest Surveys 36
7.1.5 Golden Eagle Nest Monitoring 38

7.1.6 Bat Acoustic Surveys 38
8.0 Description of Potential Adverse Impacts – OAR 345-021-0010(1)(p)(F) 39
8.1 Potential Impacts to Fish and Wildlife Habitat 39
8.2 Potential Impacts to State Sensitive Species 41
8.2.1 Birds 41
8.2.2 Mammals 58
8.2.3 Reptiles 66
8.2.4 Fish 66
9.0 Measures to Avoid, Reduce, or Mitigate Impacts – OAR 345-021-0010(1)(p)(G) 66
9.1 Avoidance and Minimization 67
9.1.1 During Facility Design and Micrositing 67
9.1.2 Prior to Construction 67
9.1.3 During Construction 68
9.1.4 During Operation 69
9.2 Mitigation 69
10.0 Monitoring Program – OAR 345-021-0010(1)(p)(H) 70
11.0 Conclusion 70
12.0 References 71

List of Tables

Table P-1. Summary of Field Surveys Conducted within the Analysis Area 2011–2023 5
Table P-2. Habitat Categorization 15
Table P-3. Habitat Categories, Types, and Subtypes within the Analysis Area and Amended Site Boundary 15
Table P-4. State Sensitive Species with Known and Potential Occurrence within the Analysis Area 28
Table P-5. State Sensitive and Eagle Species Observed During Special Status Species Surveys within the Analysis Area 2011-2023 32
Table P-6. Impacts by Habitat Category and Subtype 40

List of Figures

Figure P-1. Analysis Area for Fish and Wildlife Habitat

Figure P-2. Habitat and Wildlife Survey Areas

Figure P-3a. 2019-2022 Special Status Raptor Nests **(Confidential–provided under separate cover)**

Figure P-3b. 2023 Special Status Raptor Nests **(Confidential–provided under separate cover)**

Figure P-4. Avian Use and Bat Detector Survey Locations (2011-2023)

Figure P-5. Habitat Types in the Analysis Area

Figure P-6. Habitat Categories in the Analysis Area

Figure P-7. Detections of Special Status Wildlife Species (2011-2023)

Figure P-8. Special Habitat Features

List of Attachments

Attachment P-1. Biological Survey Reports

Attachment P-2. Draft Habitat Mitigation Plan

Attachment P-3. Draft Noxious Weed Control Plan

Attachment P-4. Draft Revegetation Plan

Attachment P-5. Wildlife Monitoring and Mitigation Plan

Acronyms and Abbreviations

ASC	Application for Site Certificate
BCR	Great Basin Bird Conservation Region
Certificate Holder	Wheatridge East Wind, LLC
CPE	Columbia Plateau Ecoregion
Facility	Wheatridge Renewable Energy Facility East
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ORBIC	Oregon Biodiversity Information Center
RFA	Request for Amendment
USFWS	U.S. Fish and Wildlife Service
WAGS	Washington ground squirrels
WDFW	Washington Department of Fish and Wildlife
WMMP	Wildlife Monitoring and Mitigation Plan
WNS	white-nose syndrome
WREFE	Wheatridge Renewable Energy Facility East
WREFI	Wheatridge Renewable Energy Facility I
WREFII	Wheatridge Renewable Energy Facility II
WREFIII	Wheatridge Renewable Energy Facility III

1.0 Introduction

The Wheatridge Renewable Energy Facility East (Facility) is an approved, but not yet constructed, wind energy generation facility consisting of up to 66 turbines and related or supporting facilities with a peak generating capacity of up to 200 megawatts, to be located in an Approved Site Boundary of approximately 4,582 acres on over 42,000 acres of leased land in Morrow and Umatilla counties, Oregon. As part of Request for Amendment (RFA) 1 to the Facility Site Certificate, Wheatridge East Wind, LLC (Certificate Holder) is proposing to expand wind power generation at the Facility to provide the opportunity for increased power capacity and availability. This includes expanding the Site Boundary and micrositing corridors, increasing the peak generating capacity by adding more and newer turbines, changing the intraconnection routes, and extending the construction date. See the RFA 1's Division 27 document (*Request for Amendment #1 for the Wheatridge Renewable Energy Facility East*) for a more detailed summary of the proposed changes.

This Exhibit P was prepared to meet the submittal requirements in Oregon Administrative Rules (OAR) 345-021-0010(1)(p). Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy Final Orders to demonstrate that the Facility, as modified by RFA 1, continues to comply with applicable Site Certificate conditions[1] and the approval standard in OAR 345-022-0060. Revisions to Site Certificate conditions PRE-FW-01 and PRE-TE-01 are proposed in the Division 27 document to clarify survey needs; these revisions were developed in coordination with the Oregon Department of Fish and Wildlife (ODFW) and the Oregon Department of Energy (ODOE) as described in Section 3.0. This Exhibit P provides information about the fish and wildlife habitats and species that could be affected by the Facility, other than the species addressed in Exhibit Q.

[1] GEN-FW-01 Speed limit requirement
GEN-FW-02 Avian protection
PRE-FW-01 Confirmation of habitat categories, nests via habitat survey
PRE-FW-02 Implementation of Wildlife Monitoring and Mitigation Plan
PRE-FW-03 Flagging of environmentally sensitive areas
PRE-FW-04 Approval of Habitat Mitigation Plan
PRE-FW-05 Approval of Revegetation Plan
CON-FW-01 Cease construction in winter within Mule Deer Winter Range
CON-FW-02 Buffer zones for nest sites
CON-FW-03 Environmental training by professional
CON-FW-04 Appointment of on-site environmental inspector

2.0 Analysis Area

In accordance with OAR 345-001-0010(35)(c), the Analysis Area for fish and wildlife habitat and species consists of the Amended Site Boundary and the area 0.5 miles from the Amended Site Boundary (Figure P-1). Portions of the Amended Site Boundary are designated as the amended wind micrositing corridors, where Facility components may be located.

3.0 Agency Consultation

Consultation and communication with personnel from ODFW and the U.S. Fish and Wildlife Service (USFWS) prior to the ASC regarding sensitive species' presence on and use of the Facility can be found in the ASC's Exhibit P (Wheatridge 2015). Consultation and coordination with ODFW and ODOE concerning Facility modifications proposed in RFA 1 included a conference call on April 12, 2022, as summarized below:

- Tetra Tech, Inc. (Tetra Tech) provided a summary of the anticipated RFA 1 to Steve Cherry (ODFW) and Sarah Esterson (ODOE) and described the biological surveys planned for 2022 associated with the Approved Site Boundary expansion.
- The timing and protocols for botanical surveys, raptor nest surveys, avian and eagle use surveys, and bat-acoustic monitoring (conducted in 2011) were described with no comment from ODOE or ODFW.
- Tetra Tech described the timing and protocol for habitat and general wildlife surveys. ODOE asked ODFW if it was necessary to survey the non-agricultural lands in the areas mapped by ODFW as Big Game Winter Range (i.e., Elk Winter Range and Mule Deer Winter Range) because these areas are classified as Category 2 habitat regardless of their condition. ODFW indicated that while determining the condition of habitat within these areas was not necessary, there may be value in determining the quality of habitat aside from their value to big game if NextEra planned to consider the habitat condition in Category 2 habitat mitigation.
- NextEra stated that while the southern area of the Facility is Category 2 habitat, it was unclear whether a complete, field-based habitat assessment to capture incidental sightings of wildlife would be required. Additionally, Tetra Tech asked if dedicated wildlife surveys were required, and ODFW indicated that they were not. The totality of surveys being conducted at the site (including extensive ground-based transect surveys for Washington ground squirrels [*Urocitellus washingtoni*; WAGS], addressed in Exhibit Q) were deemed sufficient to capture wildlife observations; therefore, a targeted habitat survey in ODFW Big Game Winter Range would not be needed.
- ODOE asked NextEra to take a closer look at the agricultural lands at the Facility to provide more detail in the RFA regarding existing agricultural uses (e.g., irrigated vs. dryland wheat,

crop type, grazing, etc.). ODOE also asked whether aerial spraying was commonly employed at the Facility; NextEra responded that they did not think so.

Additional coordination with ODFW and ODOE regarding wildlife surveys and proposed Site Certificate condition changes was conducted during a February 16, 2023, conference call, as summarized below:

- Tetra Tech provided a summary of the anticipated spring 2023 biological surveys to Steve Cherry and Lindsay Somers (ODFW) and Christopher Clark and Chase McVeigh-Walker (ODOE) as well as an updated schedule for the NextEra's submittal of Exhibits P and Q of RFA 1.
- ODFW confirmed the timing of WAGS surveys in Site Certificate condition PRE-TE-01 of March 1 to May 31 was appropriate, with a recommendation that surveys start at the lower elevation portions of the survey area.
- ODFW confirmed that habitat surveys were only needed in areas outside of Mule Deer Winter Range (which is Category 2 habitat regardless of condition where not cultivated or developed). Revisions to site certificate condition PRE-FW-01 were made to clarify this approach and concurrence on these changes was received from ODFW.
- In areas surveyed in 2022 for WAGS, ODFW confirmed that surveys should consist of revisiting colonies mapped in 2022 to identify any colony movement (i.e., confirm presence and map any changes in colony boundaries or locations). Revisions to Site Certificate Condition PRE-TE-01 were made to clarify this approach and concurrence on these changes was received from ODFW.

Additional coordination with ODFW regarding wildlife survey results and Site Certificate condition compliance was conducted during a September 1, 2023, phone call, as summarized below:

- ODFW provided guidance that the boundaries of colonies depicted in this RFA should consist of the cumulative mapping from 2022 and 2023 (i.e., the 2022 boundary for colonies with no activity in 2023, and the combined 2022 and 2023 boundary for colonies active in both years) because WAGS survey results are valid for 3 years (Site Certificate Condition PRE-TE-01).

Ongoing coordination with the Oregon Department of Agriculture (ODA) is described in Exhibit Q.

4.0 Description of Biological and Botanical Surveys Performed – OAR 345-021-0010(1)(p)(A)

OAR 345-021-0010(1)(p) Information about the fish and wildlife habitat and the fish and wildlife species, other than the species addressed in subsection (q) that could be affected by the proposed facility, providing evidence to support a finding by the Council as required by OAR 345-022-0060. The applicant must include:

OAR 345-021-0010(1)(p)(A) A description of biological and botanical surveys performed that support the information in this exhibit, including a discussion of the timing and scope of each survey.

4.1 Information Review

Prior to conducting 2022 surveys, the Certificate Holder conducted a desktop review to verify and update the status and occurrence of sensitive wildlife that may occur in the Analysis Area. Information reviewed included federal and state endangered, threatened, proposed, and candidate species; species of concern; birds of conservation concern; and sensitive and sensitive-critical species (OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2022a, ORBIC 2022b, USFWS 2021, USFWS 2022a, Wheatridge 2015, Wheatridge 2019, Wheatridge East 2022, StreamNet 2022).

The Certificate Holder reviewed habitat and range information for special status fish and wildlife species known to occur in Morrow and Umatilla Counties and the Columbia Plateau to develop the list of special status wildlife species that could potentially occur within the Analysis Area. Species were eliminated from consideration if their habitat was absent from the Analysis Area, or their range did not overlap the Analysis Area. The Certificate Holder also reviewed special status species information recorded during surveys at the adjacent Wheatridge Renewable Energy Facilities I, II, and III (WREF I, WREF II, and WREF III, respectively) and at the proposed Wagon Trail Solar Project due to the overlap of the Amended Site Boundary with these projects (Wheatridge 2015, Wheatridge 2019, Wheatridge East 2022) (see Figure 1 in the Division 27 document).

In addition to reviewing publicly available sources, the Certificate Holder submitted requests to the Oregon Biodiversity Information Center (ORBIC) to obtain site-specific records of special status species occurrences and sensitive habitats within 10 miles of the Amended Site Boundary prior to surveys and again during development of this Request for Amendment (ORBIC 2022a, ORBIC 2022b). The Certificate Holder reviewed aerial photographs, National Wetlands Inventory data, the National Hydrography Dataset, and ODFW Big Game Winter Range spatial data to identify any potential changes to habitat within the Analysis Area since the ASC was submitted (ODFW 2013a, USFWS 2022b, USGS 2018). The Certificate Holder also reviewed habitat mapped during surveys for the adjacent WREF I, WREF II, and WREF III Facilities, and the Wagon Trail Solar Project, as these surveys partially overlap with the Facility location (Wheatridge 2015, Wheatridge 2019, Wheatridge East 2022).

4.2 Field Surveys

The Certificate Holder has conducted biological and botanical surveys in the vicinity of the Facility since 2011 (Table P-1). Methods for the original surveys (2011 to 2014) can be found in the ASC's Exhibit P (Wheatridge 2015). Avian use and bat-acoustic monitoring methods and locations described in the ASC are summarized in this exhibit in relation to the Amended Site Boundary. Methods for surveys conducted in 2018 can be found in the Final Request for Amendment #4 to the Site Certificate for the Wheatridge Wind Energy Facility (Wheatridge 2019). Methods for surveys

conducted from 2019 to 2021 can be found in the Application for the Site Certificate for the Wagon Trail Solar Project (Wheatridge East 2022).

The Certificate Holder conducted a biological survey within the 2022 Habitat Categorization Survey Area, which is a subset of the amended wind micrositing corridors, from May 18 to 27, 2022 (Figure P-2). The objective of this survey was to map and classify habitat according to ODFW guidelines set forth in Oregon Administrative Rule 635-415-0025, and to update and supplement surveys completed for the ASC (Table P-1). Special status wildlife surveys occurred concurrently with the habitat categorization survey, and the WAGS surveys were conducted during April and May 2022, as described in Exhibit Q. Survey methods for the 2022 habitat categorization and special status species surveys are described in Attachment P-1 and summarized below. Areas were added to the Amended Site Boundary and amended wind micrositing corridors after the 2022 field surveys were completed. These areas were subsequently surveyed in spring 2023 in compliance with Condition PRE-FW-01[2]. Figure P-2 shows the extent of select habitat and special status species surveys within the Analysis Area from 2011 to 2023, as indicated in Table P-1; Figures P-3a and P-3b show the extent of raptor nest surveys conducted within the Analysis Area since 2019; Figure P-4 shows the location of avian use and bat acoustic monitoring locations within the Analysis Area since 2011.

Table P-1. Summary of Field Surveys Conducted within the Analysis Area 2011–2023

Year	Survey	Reference	Extent
2023	Raptor nest surveys	Attachment P-1	Amended Site Boundary plus 2-mile buffer; Figure P-3b
2023	Habitat categorization surveys	Attachment P-1	Habitat Categorization Survey Area; Figure P-2
2023	Special status wildlife species surveys	Attachment P-1	Washington Ground Squirrel Survey Area; Figure P-2
2022	Habitat categorization surveys	Attachment P-1	Habitat Categorization Survey Area; Figure P-2
2022	Special status wildlife species surveys	Attachment P-1	Washington Ground Squirrel Survey Area; Figure P-2
2022	Botanical surveys	Attachment P-1	Botanical Survey Area; Figure P-2
2022	Raptor nest surveys	Attachment P-1	Facility lease boundary (Dated 3/11/2022 and 5/12/2022) plus 2 to 4-mile buffer; Raptor Nest Survey Area; Figure P-3a
2022	Golden eagle nest watch survey	Attachment P-1	Observation points near four known and three potential golden eagle nests
2022 - 2023	Wetlands and waters surveys	Attachment J-1	Amended wind micrositing corridors, as accessible
2022 - 2023	Avian use surveys	Attachment P-1	Amended Site Boundary; Avian Use Points; Figure P-4

[2] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

Year	Survey	Reference	Extent
2022	Bat activity survey	Attachment P-1	WREFE Amended Site Boundary; Bat Detector Locations (2022); Figure P-4
2021	Wildlife habitat mapping and categorization surveys	Wheatridge East 2022	Wagon Trail Solar Project Habitat and Special Status Wildlife Survey Area; Figure P-2
2021	Special status wildlife species surveys	Wheatridge East 2022	Wagon Trail Solar Project Habitat and Special Status Wildlife Survey Area + Washington Ground Squirrel Survey Area; Figure P-2
2020	Wildlife habitat mapping and categorization surveys	Wheatridge East 2022	Wagon Trail Solar Project Habitat and Special Status Wildlife Survey Area; Figure P-2
2020	Wildlife habitat mapping and categorization surveys	Tetra Tech 2021a	WREF III Site Boundary; WREF III Habitat and Special Status Wildlife Survey Area; Figure P-2
2020	Special status wildlife species surveys	Tetra Tech 2021a	WREF III Site Boundary; WREF III Habitat and Special Status Wildlife Survey Area; Figure P-2
2020	Special status wildlife species surveys	Wheatridge East 2022	Wagon Trail Solar Project Habitat and Special Status Wildlife Survey Area + Washington Ground Squirrel Survey Area; Figure P-2
2020	Raptor nest surveys	Tetra Tech 2021b	WREF III site boundary + 0.5-mile buffer; Wheatridge Renewable Energy Facility III Preconstruction Survey Area; Figure P-3a
2020	Raptor nest monitoring	Tetra Tech 2020b	Three active nests within WREF I & WREF II site boundaries + 0.25-mile buffer
2019	Wildlife habitat mapping and categorization surveys	Tetra Tech 2020a	WREF I & WREF II Micrositing Corridor
2019	Raptor nest surveys	Gerhardt and Kronner 2019	WREFI & WREFII Micrositing Corridor + 2-mile buffer; Wheatridge Renewable Energy Facilities I & II Preconstruction Survey Area; Figure P-3a
2019	Special Status Plant Surveys	Tetra Tech 2019	100 foot buffer on WREF I & WREF II Facility components + WREFIII Site Boundary; Botanical Survey Area; Figure P-2
2018	Wildlife habitat mapping and categorization surveys	Wheatridge 2019	WREFIII Site Boundary, minus additional areas added after surveys conducted in 2018; Biological Reconnaissance Survey Area; Figure P-2
2018	Special status wildlife species surveys	Wheatridge 2019	WREFIII Site Boundary, minus additional areas added after surveys conducted in 2018; Biological Reconnaissance Survey Area; Figure P-2

Year	Survey	Reference	Extent
2018	Special status plant surveys	Wheatridge 2019	WREFIII Site Boundary, minus additional areas added after surveys conducted in 2018; Biological Reconnaissance Survey Area; Figure P-2
2012, 2013, 2014	Golden eagle nest surveys/monitoring	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundary + 10-mile buffer
2012, 2013	Special status wildlife species surveys, supplemental	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries; 2011-2013 Surveys; Figure P-2
2012, 2013	Special status plant surveys, supplemental	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries; 2011-2013 Surveys; Figure P-2
2012, 2013	Raptor nest surveys, supplemental	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries + 2-mile buffer
2011	Wildlife habitat mapping and categorization surveys	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries + 1,000-foot buffer, limited to Project lease boundary[1]; 2011-2013 Surveys; Figure P-2
2011	Special status wildlife species surveys	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries + 1,000-foot boundary, limited to Project lease boundary[1]; 2011-2013 Surveys; Figure P-2
2011	Special status plant surveys	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries + 1,000-foot buffer; 2011-2013 Surveys; Figure P-2
2011 - 2012	Avian use surveys	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries [2]; Wheatridge East Avian Use Survey Plots + Wheatridge West Avian Use Survey Plots; Figure P-4
2011	Raptor nest surveys	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries + 2-mile buffer
2011	Bat acoustic surveys	Wheatridge 2015	WREFI, WREFII, and WREFE Approved Site Boundaries [3]; Bat Detector Locations (2011); Figure P-4

1. Project lease boundary: ASC habitat and wildlife field survey extents were limited to the "Project boundary" per ASC Exhibit P, which is the area leased by the Certificate Holder.
2. Twenty-four, 800-meter plot circles surveyed, distributed throughout WREFE, WREFI, WREFII Approved Site Boundaries.
3. Twelve acoustic monitoring sites distributed throughout WREFE, WREFI, WREFII Approved Site Boundaries.

4.2.1 Habitat Categorization Surveys

The Certificate Holder surveyed an approximately 2,568-acre Habitat Categorization Survey Area in 2022 which encompassed the amended wind micrositing corridors that were under consideration at the time (spring 2022). The surveys were limited to areas accessible at the time of the survey. Prior to beginning the field surveys, the Certificate Holder conducted a desktop assessment of

habitat in the Habitat Categorization Survey Area using aerial photography, topographic maps, surveys previously performed for the Facility (Gerhardt and Anderson 2014), and ODFW Big Game Winter Range data (ODFW 2013a). With these desktop sources, preliminary habitat polygons were identified within the Habitat Categorization Survey Area. The polygons were either confirmed or re-delineated in the field.

The Certificate Holder conducted a habitat categorization survey within the 2022 Habitat Categorization Survey Area from May 18 to 27, 2022, concurrent with special status wildlife surveys, and from April 19 to May 30, 2022, during WAGS surveys, as described in Attachment P-1. Most of the 2022 Habitat Categorization Survey Area overlaps with ODFW mapped Mule Deer Winter Range. Based on consultation with ODFW prior to surveys, the Certificate Holder mapped areas of ODFW-designated Mule Deer Winter Range (ODFW 2013a) as Category 2 habitat at a minimum, except for cultivated cropland and developed land, which is Category 6 habitat (ODFW 2013b). ODFW indicated that determining the condition of habitat in areas overlapping Mule Deer Winter Range was not necessary (pers. comm. Steve Cherry, ODFW, April 12, 2022). The Certificate Holder determined habitat type and subtype in these areas using a combination of habitat-categorization data collected during WAGS surveys, targeted field-based habitat categorization surveys, and post-field desktop delineation via aerial imagery.

Additional areas were added to the amended wind micrositing corridors after 2022 field surveys were complete, and therefore were not field surveyed in 2022. These areas, as well as habitat beyond the 2022 Habitat Categorization Survey Area but within the 0.5-mile Analysis Area, were initially categorized in this Exhibit P based on desktop review and prior field investigations described in the ASC, the Request for Amendment #4, the Wagon Trail Solar ASC, and the 2022 Habitat Categorization and Special Status Wildlife Survey Report (Wheatridge 2015, Wheatridge 2019, Wheatridge East 2022, Attachment P-1).

Additional habitat categorization surveys were conducted in 2023. According to Site Certificate Condition PRE-FW-01, field-based habitat surveys are required prior to construction to confirm habitat categories of areas that will be affected by construction. Therefore, the 2023 Habitat Categorization Survey Area consisted of the amended wind micrositing corridors that were under consideration at the time of surveys (i.e., during the spring of 2023) plus one string of potential turbines not contained within the amended wind micrositing corridors (15,947 acres; see Attachment P-1). Based on consultation with ODFW, habitat categorization surveys are not required within Mule Deer Winter Range except for confirming areas of Category 6 habitat (e.g., cultivated cropland and developed areas), which was completed during surveys for WAGS (see Attachment P-1) to define that species' survey area. Therefore, habitat categorization surveys in 2023 focused on areas outside of Mule Deer Winter Range but also included spot checks within Mule Deer Winter Range to confirm the habitat type and extent of Category 6 habitat mapped during WAGS surveys, and to confirm habitat types with broader implications for Facility mitigation needs (e.g., riparian habitat). Within previously surveyed areas, biologists used Esri FieldMaps software in the field to confirm or recategorize areas of relatively homogenous vegetation and characterized the composition and structure. In areas not previously surveyed, biologists confirmed

or updated the extents of desktop-delineated polygons, categorized areas of relatively homogenous vegetation, and characterized the composition and structure on the field datasheets.

The habitat categorization definitions employed in the field are consistent with the category, type, and subtype definitions in Gerhardt and Anderson (2014), with overlays for Mule Deer Winter Range and WAGS colonies as applicable. For habitats not defined in Gerhardt and Anderson (2014), such as Cliffs, Caves, and Talus, habitat definitions adapted from *Wildlife-Habitat Relationships in Oregon and Washington* were used (Johnson and O'Neil 2001).

The extent of the surveys conducted from 2011 to 2023 are summarized in Table P-1 and shown in Figure P-2. Results of combined desktop analyses and field surveys from 2011 to 2023 are detailed in Section 5.0.

4.2.2 Special Status Wildlife Species Surveys

Special status wildlife surveys occurred concurrently with the habitat categorization survey and during targeted surveys for WAGS, in April and May 2022, covering approximately 9,188 acres (Attachment P-1, Figure P-2). Surveyors scanned the landscape, the sky, and the ground looking for special status wildlife species and recognizable sign, focusing on non-cultivated areas likely to support special status wildlife species. Areas unlikely to support special status species, like cultivated lands and developed areas, were surveyed primarily from field vehicles driving on paved roads, gravel roads and two-tracks. These areas were surveyed on foot if the full extent was not visible from the vehicle, or if areas of potential habitat or nesting opportunities for special status species were identified. Surveyors recorded the location of special status wildlife species (or recognizable sign), the number of individuals, and their behavior. Surveyors also kept a running list of all wildlife species observed during 2022 surveys at the Facility and documented special habitats and unique features such as raptor nests, cliffs, rimrock, rock outcrops, and talus slopes, if encountered. Following field surveys, the digitized data were downloaded and processed using GIS software and reviewed for quality control and assurance. Wildlife surveys targeted special status species that had the potential to occur in the Analysis Area, including federal and state endangered, threatened, proposed, and candidate species; species of concern; birds of conservation concern; sensitive; and sensitive-critical species (Attachment P-1).

Special status wildlife species surveys in 2023 occurred primarily during surveys for WAGS, in March, April, and May 2023, but also during habitat categorization surveys in June 2023. In both 2022 and 2023, special status species survey methods were designed specifically to verify the presence or absence of WAGS, a state-endangered species; however, they are also effective at documenting other diurnal special status species, if present. The surveys generally followed methodology developed in the *Status and Habitat Use of the WAGS on State of Oregon Lands, South Boeing, Oregon* (Morgan and Nugent 1999), as addressed in Exhibit Q. The WAGS protocol requires two phases of surveys to increase the likelihood of detecting their presence. WAGS surveys occurred between April and May 2022, and between March and May 2023, in two phases each year, spaced at least 2 weeks apart. The timing of these surveys also coincided with the period of highest

biological activity of neotropical migrant and breeding birds, foraging and breeding animal species, and other taxa.

The extent of surveys conducted from 2011 to 2023 are summarized in Table P-1 and Figure P-2. Approximately 2,528 acres within 1,000 feet of the amended micrositing corridor including approximately 1,320 acres within the amended micrositing corridor were not surveyed for WAGS in 2022 or 2023, primarily north of Big Butter Creek Lane but also associated with areas not accessible during WAGS surveys in 2023 (see Attachment P-1). The Certificate Holder will continue to conduct surveys as needed prior to ground disturbance within 1,000 feet of these areas that have not been surveyed and consult with ODOE and ODFW on approach for addressing areas beyond the Certificate Holder's access control. For complete survey methods employed, see the ASC (Wheatridge 2015) and Attachment P-1 to this RFA. Documented occurrences of sensitive species reported from 2011 to 2023 within the Analysis Area are summarized in Section 7.1.1.

4.2.3 Special Status Plant Species Surveys

The Certificate Holder surveyed an approximately 2,028-acre Botanical Survey Area in 2022, which encompassed the amended wind micrositing corridors that were under consideration at the time (summer 2022). The botanical surveys were limited to areas that were accessible at the time of the surveys, suitable for rare plants (i.e., not cultivated), and that could be surveyed within the target species' identification period in 2022 (through the end of July) (see Attachment P-1). The Certificate Holder conducted botanical field surveys using the Intuitive Controlled survey method; a standard and commonly accepted survey protocol (USFS and BLM 1998). This method uses meandering transects to traverse the survey area, targeting a full array of major vegetation types, aspects, topographical features, habitats, and substrate types. Surveyors followed the transects, searching for target species, and in areas of high-potential habitat (as defined in the pre-field review or encountered during the field visit), they conducted complete surveys for the target species. Complete surveys include an examination of 100 percent of the habitat.

During surveys, the botanists maintained a list of common vascular plant species encountered (Attachment P-1) and made informal collections of unknown species for later identification. Identification was verified using appropriate plant keys; in particular, *Flora of the Pacific Northwest* (Hitchcock and Cronquist 2018).

Additional botanical surveys were conducted in 2023 using generally the same methods that were employed in 2022. The 9,169-acre Botanical Survey Area in 2023 consisted of the Facility's micrositing corridors at the time of surveys (summer 2023) excluding active agricultural fields and areas surveyed in 2022 (Attachment P-1). One string of potential turbines not currently contained within the Facility's micrositing corridors was also surveyed in 2023. Surveys were conducted from June through mid-August (Attachment P-1).

The extent of surveys conducted from 2011 to 2023 are summarized in Table P-1. Approximately 330 acres within the amended micrositing corridors were not surveyed for Laurence's milkvetch in 2022 or 2023, primarily in areas associated with transmission line routes no longer under

consideration but also associated with areas added to the micrositing corridor following surveys in 2023. As a result, up to approximately 31 acres within 100 feet of proposed temporary and permanent impacts (the area requiring surveys per Site Certificate Condition PRE-TE-03) were not surveyed in 2022 or 2023. The Certificate Holder will continue to conduct surveys as needed prior to ground disturbance in these areas and consult with ODOE and ODA on approach for addressing areas beyond the Certificate Holder's access control. For complete survey methods, see the ASC (Wheatridge 2015) and Attachment P-1 to this RFA. Survey findings within the Amended Site Boundary from 2022 and 2023 are summarized in Section 7.1.2.

4.2.4 Avian Use Surveys

Avian use surveys were initially conducted at the Facility between January 2011 and February 2012, in support of the ASC. Surveys were conducted during diurnal hours using a variable circular-plot method to obtain information on species composition, the relative abundance of birds (Reynolds et al. 1980), and flight altitudes. Each plot was surveyed for an entire year, and the results were analyzed by season (Gerhardt and Anderson 2014).

The survey included 800-meter radius study plots distributed to provide good coverage of the habitat types and variations in topography at the Facility, including the locations of turbine strings proposed in the ASC. During these surveys, 24 plots were surveyed. Fifteen plots overlap with the Analysis Area (0.5-mile buffer of the Amended Site Boundary; Figure P-4). Plots E, H, I, J, N, O, and P are associated with Wheatridge West as defined in the ASC, and Plots A, B, C, D, E, F, G, and H are associated with Wheatridge East as defined in the ASC (Gerhardt and Anderson 2014). The survey results are addressed in Section 7.1.3.

Survey dates for each season were as follows:

- Winter: January 30 to March 12, 2011, and October 30 to February 11, 2012;
- Spring: March 13 to May 28, 2011;
- Summer: May 29 to August 13, 2011; and
- Fall: August 14 to October 29, 2011.

For complete survey methods, see the ASC (Wheatridge 2015).

Additional avian use surveys at the Facility were conducted once per month between April 2022 and March 2023. Surveys ran for one year for small birds (small-bird surveys) and are ongoing to cover two years for large birds (large-bird surveys), particularly eagles. The large- and small-bird surveys were conducted (and the large-bird surveys are ongoing, anticipated to conclude in March 2024 and be completed prior to construction) at the same 35 points within the Amended Site Boundary (Figure P-4). Each point was centered on a circular plot with an 800-meter radius for large birds and a 100-meter radius for small birds. Each large-bird survey was conducted for 60 minutes, and each small-bird survey was conducted for 10 minutes. Mean use (the average number of birds observed per plot per survey) was calculated for both small and large birds. Eagle minutes were defined as the number of minutes an eagle was observed in flight within the risk cylinder

during a large bird survey. The risk cylinder was defined as the area within 800 meters of the survey point up to 200 meters above ground level. Results from the first year of surveys are provided in Section 7.1.3.

4.2.5 Raptor-Nest Surveys

Raptor-nest surveys were performed by the Certificate Holder in 2011, 2012, 2013, 2014, 2019, 2020, 2022, and 2023 (Table P-1). Surveys conducted between 2011 and 2014 are addressed in detail in the ASC (Wheatridge 2015). Surveys performed in 2019, 2020, 2022, and 2023, after the ASC for the Facility was submitted, are summarized below. Although the Amended Site Boundary was expanded after the 2022 surveys were completed, the 2019, 2020, and 2022 surveys covered the entire Amended Site Boundary (Figure P-3a). Surveys in 2023 covered a 2-mile buffer of the Amended Site Boundary (Figure P-3b).

In 2019, raptor-nest surveys were performed within 2 miles of the adjacent WREF I and WREF II facilities (Figure P-3a; Gerhard and Kronner 2019). The 2019 raptor-nest survey area encompassed 161 square miles (416 square kilometers), of which 3 square miles (7 square kilometers) overlapped the Amended Site Boundary not covered by the 2022 raptor-nest surveys (Figure P-3a). An aerial survey was conducted on May 15, 2019, and in addition, personnel recorded active raptor and corvid nests observed within the 2019 raptor-nest survey area during ground-based WAGS surveys that began in early April 2019. All potential nesting substrate was examined, including trees, rock formations, transmission towers, and old water-pumper windmills. All nests were recorded using hand-held GPS units. Nest status (active or inactive) was determined using a combination of visual clues such as adult behavior and presence or absence of eggs, young, or whitewash. Consistent with monitoring methods for ferruginous hawk (*Buteo regalis*) nests in prior years, the 2019 active ferruginous hawk nests were monitored for outcome on June 25.

In 2020, a raptor-nest survey was performed within 0.5 miles of WREF III for preconstruction compliance (Figure P-3a; Tetra Tech 2021b). The 2020 raptor-nest survey area encompassed 12 square miles (30 square kilometers), of which 1 square mile (3 square kilometers) overlapped the Amended Site Boundary not covered by the 2022 raptor-nest surveys (Figure P-3a). The survey was conducted from the ground in May 2020. All previously documented nest locations were visited, and all potential nesting substrate in the survey area was examined, including habitat potentially suitable for Western burrowing owls (*Athene cunicularia hypugaea*; burrowing owl). The surveyor used binoculars and a spotting scope, driving accessible two-tracks and public roads within the survey area. Periodic stops were made to check previously identified nests and to scan suitable habitat for new nests. All potential suitable burrowing owl habitat was surveyed on foot. To aid in navigation and data recording, the surveyor used a tablet computer with built-in topographic and aerial maps, and a GPS for electronic data collection. Nest status (active or inactive) was determined using a combination of visual clues such as adult behavior, evidence of recent nest tending or decoration, and the presence or absence of eggs, young, or whitewash.

Additional construction monitoring at WREF I and WREF II in 2020 included special status species raptor-nest monitoring within 0.25 miles of construction activities, spanning the entire breeding season for these species (March 15 to August 15; Tetra Tech 2020b).

In 2022, two rounds of aerial surveys were performed within the Facility lease boundary at the time of surveys plus a buffer of 2 to 4 miles, which encompassed a minimum 2-mile buffer around the turbine locations as proposed in this RFA (Attachment P-1). The 2022 raptor-nest survey area encompassed 280 square miles (725 square kilometers; Figure P-3a). The surveys were designed in accordance with the voluntary USFWS Land-based Wind Energy Guidelines (USFWS 2012), Stage 2 of the Eagle Conservation Plan Guidance (USFWS 2013), the 2016 Eagle Rule (USFWS 2016a), the April 2020 Eagle Survey Memo (USFWS 2020a), Condition PRE-FW-01, and in coordination with ODFW. The initial survey was conducted on April 9 and 10, 2022, and the second survey was conducted between June 4 and 6, 2022. The helicopter flew north-to-south-oriented transects spaced 1 mile apart over the survey area. The helicopter deviated from the transects for closer inspection of high quality nesting habitat as needed. During both survey rounds the surveyors checked the status of known raptor nests and searched for new, previously unidentified raptor nests. The surveyors documented all raptor nests, raven nests, concentrations of eagle prey resources (e.g., herds of big game, carrion, etc.) and incidental observations of eagles. Common raven (*Corvus corax*) nests were also documented because they could be used by nesting raptors during subsequent breeding seasons. A tablet computer with ArcGIS mapping software and electronic data forms was used during the surveys to aid in navigation and record data.

Additional golden eagle (*Aquila chrysaetos*) nest monitoring was performed by the Certificate Holder in 2022 for preconstruction compliance (Attachment P-1). Nest watches were conducted from the ground at four known and three potential golden eagle nests identified during the 2022 aerial raptor-nest surveys. The four known golden eagle nests were all unoccupied (alternate) during both aerial survey rounds. The three potential golden eagle nests were all large nests that may have originally been constructed by golden eagles but had an inactive or undetermined status during the aerial surveys. The potential golden eagle nests included two large, inactive nests, and one large nest with unknown species determination (during the first aerial survey there were eggs present but no adults, and during the second aerial survey the nest was empty). All other large nests detected during the aerial surveys were occupied or located outside the Facility lease boundary. The nest watches were conducted between June 15 and 17, 2022, by biologists equipped with binoculars and spotting scopes. Each nest watch consisted of a 4-hour observation period within sight of a known nest or territory.

In 2023, two rounds of aerial surveys were performed within the Amended Site Boundary plus a 2-mile buffer (Attachment P-1). The 2023 raptor nest survey area encompassed 310 square miles (802 square kilometers; Figure P-3b). The initial survey was conducted from March 4 to 6, 2023, and the second survey was conducted from May 10 to 12, 2023. Survey methods followed those used during the 2022 raptor nest surveys described above. Additional ground-based assessments of three stick nests documented during the spring 2023 raptor nest surveys were conducted on August 1 and 2, 2023 (Attachment P-1).

4.2.6 Bat Acoustic Surveys

Field investigations for the ASC were conducted between the first week of July and the last week of October 2011 (Wheatridge 2015). Seven stations were located within 0.5 miles of the Amended Site Boundary (Figure P-4). Results within the Analysis Area are highlighted in Section 7.1.6.

The Certificate Holder additionally conducted bat activity surveys within the Analysis Area from June 7 – November 8, 2022 at three fixed survey stations. All three ultrasonic acoustic detectors were deployed in open grassland habitats representative of future turbine locations (Figure P-4, Attachment P-1). Each detector was deployed with one weatherproof microphone raised to approximately 10 feet (3 meters) above ground level. For each station, bat passes were sorted into three groups based on their minimum call frequency: high frequency bats, such as the little brown bat (*Myotis lucifugus*) and canyon bat (*Parastrellus hesperus*), low frequency bats, such as the big brown bat (E*ptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*), and very low frequency bats, such as the spotted bat (*Euderma maculatum*). The number of bat passes per detector-night was used as an index of bat activity. Using detector-nights as a metric for calculating bat activity controlled for differences in sampling effort among individual detectors and provided unbiased estimates for the deployed nights (Attachment P-1).

4.2.7 Wetlands and Waters Delineation

The Certificate Holder completed wetlands and waters surveys on July 21, 2022; October 17 to 28, 2022; November 7 to 17, 2022; and March 27 to 29, 2023 (see Wetland Delineation Report, Attachment J-1 to Exhibit J). Surveys were conducted within the amended wind micrositing corridors, where accessible at the time of surveys. The Certificate Holder determined wetland presence per the methods in the Wetlands Delineation Manual, Technical Report Y-87-1 (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008). Data collected during wetlands and waters surveys informed the habitat categorization and determination of state sensitive species presence described in this exhibit.

5.0 Identification and Description of Habitat – OAR 345-021-0010(1)(p)(B)(C)

OAR 345-021-0010(1)(p)(B) Identification of all fish and wildlife habitat in the analysis area, classified by the general fish and wildlife habitat categories as set forth in OAR 635-415-0025 and the sage-grouse specific habitats described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through 635-140-0025 (core, low density, and general habitats), and a description of the characteristics and condition of that habitat in the analysis area, including a table of the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and subtype.

OAR 345-021-0010(1)(p)(C) A map showing the locations of the habitat identified in (B).

5.1 Habitat Categorization

The ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0025) provides a framework for assigning one of six categories to habitats based on the relative importance of these habitats to fish and wildlife species. The definition of each habitat category is shown in Table P-2.

Table P-2. Habitat Categorization

Habitat Category	ODFW Fish and Wildlife Habitat Mitigation Policy Definition[1]
1	Irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population or unique assemblage.
2	Essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage.
3	Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.
4	Important habitat for fish and wildlife species.
5	Habitat for fish and wildlife having high potential to become either essential or important habitat.
6	Habitat that has low potential to become essential or important habitat for fish and wildlife.
1. Source: OAR 635-415-0025.	

ASC-delineated habitat types and categories are shown in the ASC (Wheatridge 2015). Updated assessments, including within the Amended Site Boundary from surveys in 2022 and 2023, are shown in Figures P-5 and P-6. Section 5.2 contains descriptions of habitat types delineated at the Facility by habitat category. No Category 5 habitat was found within the Analysis Area. Acreage calculations for habitat types and categories are shown in Table P-3.

Table P-3. Habitat Categories, Types, and Subtypes within the Analysis Area and Amended Site Boundary

Habitat Category	Habitat Type-Subtype	Acres within Analysis Area	Acres within Amended Site Boundary [1]
1	Grassland-Exotic Annual	343	263
	Grassland-Native Perennial	951	945
	Shrub-steppe-Rabbitbrush/Snakeweed	25	25
Category 1 Total		1,320	1,234

Habitat Category	Habitat Type-Subtype	Acres within Analysis Area	Acres within Amended Site Boundary [1]
2	Grassland-Exotic Annual	5,398	4,017
	Grassland-Native Perennial	61,700	49,626
	Shrub-steppe-Basin Big Sagebrush	610	594
	Shrub-steppe-Rabbitbrush/Snakeweed	2,649	2,416
	Cliffs, Caves, and Talus	1	1
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	457	295
	Developed-Revegetated or Other Planted Grassland	6,925	5,064
	Open Water – Lakes, Rivers, Streams-Permanent Ponds/Lakes	8	8
	Open Water – Lakes, Rivers, Streams-Seasonal Ponds	5	4
	Open Water – Lakes, Rivers, Streams-Perennial Streams	42	31
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	348	287
	Wetlands-Riverine Wetlands	30	30
	Wetlands-Emergent Wetlands	133	103
	Wetlands-Scrub-shrub Wetlands	24	8
Category 2 Total		**78,329**	**62,484**
3	Grassland-Native Perennial	4,503	1,678
	Shrub-steppe-Basin Big Sagebrush	588	497
	Shrub-steppe-Rabbitbrush/Snakeweed	<1	<1
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	50	8
	Developed-Revegetated or Other Planted Grassland	870	6
	Open Water – Lakes, Rivers, Streams-Perennial Streams	<1	<1
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	2	1
	Wetlands-Riverine Wetlands	1	1
	Wetlands-Emergent Wetlands	8	3
Category 3 Total		**6,023**	**2,196**
4	Grassland-Exotic Annual	5,166	2,460
	Grassland-Native Perennial	131	101
	Shrub-steppe-Rabbitbrush/Snakeweed	745	522
	Open Water – Lakes, Rivers, Streams-Permanent Ponds/Lakes	1	1
	Open Water – Lakes, Rivers, Streams-Perennial Streams	1	<1

Habitat Category	Habitat Type-Subtype	Acres within Analysis Area	Acres within Amended Site Boundary [1]
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	78	28
	Open Water – Lakes, Rivers, Streams-Seasonal Ponds	1	<1
Category 4 Total		**6,122**	**3,112**
6	Developed-Dryland Wheat	17,213	8,965
	Developed-Irrigated Agriculture	2,666	606
	Developed-Other	909	389
Category 6 Total		**20,787**	**9,960**
Grand Total		**112,580**	**78,985**
1. Totals in this table may not sum correctly due to rounding.			

5.2 Description of Fish and Wildlife Habitat in the Analysis Area

Habitat types and categories of all leased parcels falling within the Approved Site Boundary are described in the ASC and summarized in the Final Order of the Application (Wheatridge 2015)[3]. Results from the 2022 and 2023 habitat categorization survey within the Amended Site Boundary are included in the descriptions below and shown in Figures P-5 and P-6. Some habitat types described in the ASC are not present in the Amended Site Boundary. All habitat within the Amended Site Boundary is described below.

5.2.1 Category 1 Habitat

WAGS colonies and suitable WAGS habitat within a 785-foot buffer of an identified colony are considered Category 1 habitat. The 785-foot buffer can be truncated by habitat breaks which have no burrowing or food value to WAGS, such as tilled field edges or unvegetated, continuous vertical drop-rim rock. The Certificate Holder has microsited facilities to avoid impacts to Category 1 habitat. The Certificate Holder will continue to avoid Category 1 habitat during final design, including any WAGS Category 1 habitat identified following any additional WAGS surveys.

Twenty-three WAGS colonies were delineated within the Amended Site Boundary during surveys conducted in 2022 and 2023. These colonies and their associated Category 1 habitat within the Amended Site Boundary were located in Grassland: Native Perennial (945 acres), Grassland: Exotic Annual (263 acres), and Shrub-steppe: Rabbitbrush/Snakeweed (25 acres; Table P-3). The process of survey, detection, and delineation was used to ensure that all Facility components were subsequently

[3] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

sited to avoid Category 1 habitat. This habitat is described below, but none is proposed to be permanently or temporarily impacted by the Facility.

Grassland

- Category 1 Native Perennial Grasslands identified within the Amended Site Boundary are similar in vegetative cover and ecological condition to Native Perennial Grassland present elsewhere within the Amended Site Boundary (see below). Category 1 designations of this habitat type are due only to the presence of WAGS.
- Category 1 Exotic Annual Grasslands identified within the Amended Site Boundary are similar in vegetative cover and ecological condition to Exotic Annual Grassland present elsewhere within the Amended Site Boundary (see below). Category 1 designations of this habitat type are due only to the presence of WAGS.

Shrub-steppe

- Category 1 Rabbitbrush/Snakeweed Shrub-steppe identified within the Amended Site Boundary are similar in vegetative cover and ecological condition to Rabbitbrush/Snakeweed Shrub-steppe present elsewhere within the Amended Site Boundary (see below). Category 1 designations of this habitat type are due only to the presence of WAGS.

5.2.2 Category 2 Habitat

A 4,136-foot buffer beyond WAGS colonies and their associated Category 1 habitat is considered Category 2 habitat, except where there are barriers to dispersal such as paved roads or agricultural fields. Within the Amended Site Boundary, there are 19,290 acres of Category 2 habitat due to the presence of WAGS (based on 2022 and 2023 surveys), and 62,484 acres of Category 2 habitat overall, considering overlap with ODFW-mapped Mule Deer Winter Range and WAGS presence (Table P-3). Areas of WAGS Category 2 habitat are located both within and outside Big Game Winter Range. Outside of Big Game Winter Range and WAGS Category 2 habitat, three habitat types were identified as Category 2 habitat: Shrub-steppe–Basin Big Sagebrush, Open Water–Lakes, Rivers, Streams-Perennial Streams, and Open Water–Lakes, Rivers, Streams-Intermittent and Ephemeral Streams.

Shrub-steppe

- Category 2 Basin Big Sagebrush consists of an overstory of mature (large structure) patches of basin big sagebrush (*Artemisia tridentata*). Understory plants consist of a mix of native bunchgrasses and exotic annual grasses depending largely on level of impact from disturbance. Common grasses are Sandberg bluegrass (*Poa secunda*), bluebunch wheatgrass (*Pseudoroegneria spicata*), cheatgrass (*Bromus tectorum*), and bulbous bluegrass (*Poa bulbosa*). Category 2 Basin Big Sagebrush Shrub-steppe has a higher shrub density and greater plant health than similar but lesser quality Category 3 Basin Big Sagebrush Shrub-

steppe habitat. This habitat subtype is found on deep soils in portions of the Facility, usually on slopes or in draws that prevent agricultural use. Category 2 Basin Big Sagebrush Shrub-steppe offers high quality breeding habitat for shrub-obligate species including loggerhead shrike (*Lanius ludovicianus*) and may support WAGS. Sagebrush lizard (*Sceloporus graciosus graciosus*) may be found in areas where more sandy soils are present. Basin Big Sagebrush Shrub-steppe is an ODFW conservation strategy habitat (OCS 2006).

Open Water–Lakes, Rivers, Streams

- Category 2 Perennial Streams within the Analysis Area consist of perennial reaches of Big Butter Creek due to the presence of resident and migratory native fish (redband trout; *Oncorhynchus mykiss* subsp.; ORBIC 2022b, StreamNet 2022).
- Category 2 Intermittent or Ephemeral Streams within the Analysis Area consist of intermittent reaches of Little Butter Creek due to the presence of resident and migratory native fish (redband trout; ORBIC 2022b, StreamNet 2022).

Other habitat types and subtypes are deemed Category 2 solely by their location within Big Game Winter Range. Upland habitat types include the following: Grassland-Exotic Annual, Grassland-Native Perennial, Shrub-steppe-Rabbitbrush/Snakeweed, Cliffs, Caves and Talus, Natural Forests and Riparian Complexes-Eastside (Interior) Riparian, and Developed-Revegetated/Other Planted Grassland. The characteristics of these habitat subtypes are described below.

Grassland

- Category 2 Exotic Annual Grasslands within the Amended Site Boundary are categorized as such based on their location within ODFW Winter Range. These grasslands are composed of zero to 49 percent native species. Dominant species are cheatgrass, bulbous bluegrass, tumble mustard (*Sisymbrium altissimum)*, fiddleneck (*Amsinckia,* sp.), yarrow (*Achillea millefolium*), and storksbill (*Erodium cicutarium*). In some areas, patches of cereal rye (*Secale cereale*) occur in monocultures. Subdominant species include Sandberg bluegrass, blue flax (*Linum lewisii*), common mullein (*Verbascum thapsus*), and brodiaea (*Brodiaea* sp.). Traces of green rabbitbrush (*Chrysothamnus viscidiflorus*), gray rabbitbrush *(Ericameria nauseosa*), and horsebrush (*Tetradymia* sp.) occur. Disturbances include grazing, invasive plants, dirt roads, row crops, residences, farms, and gravel roads. During special status species surveys, Swainson's hawks (*Buteo swainsoni*) and a golden eagle were observed in this habitat.
- Category 2 Native Perennial Grasslands within the Amended Site Boundary are categorized as such based on their location within ODFW Winter Range. Native Perennial Grasslands within the Amended Site Boundary are a mosaic of two plant communities—one associated with thin, rocky soils, usually on hilltops that sometimes include rock outcrops. These areas are composed of a high percentage of native plant species, ranging from 55 to 100 percent native composition, meeting the definition of high-quality Category 3 habitat without consideration for Big Game Winter Range. The dominant grass species observed is

Sandberg's bluegrass, with a diverse forb community including multiple species of buckwheat (*Eriogonum* sp.), balsamroot (*Balsamorhiza* sp.), woollypod milkvetch (*Astragalus purshii*), woolly plantain (*Plantago patagonica*), wavyleaf thistle (*Cirsium undulatum*), lomatium species (*Lomatium* sp.), pussytoes (*Antennaria* sp.), phlox species (*Phlox* sp.), storksbill, clasping pepperweed (*Lepidium perfoliatum*), and occasional, low-density areas of cheatgrass. In areas closer to rock outcrops, bitterroot (*Lewisia rediviva*) is present and the percent composition of mosses, lichens, and cryptobiotic crust increases.

Farther away from rock outcrops but still within these areas of thin soil, bluebunch wheatgrass can increase to near co-dominance with Sandberg's bluegrass. In areas of deeper soils where bedrock is not visible, the forb layer is less diverse and includes more non-native species, including tumble mustard, prickly lettuce (*Lactuca serriola*), salsify (*Tragopogon* sp.), mariposa/sego lily (*Calochortus* sp.), brodiaea, yarrow, lomatium species, balsamroot, and storksbill. A mix of grasses are co-dominant (bluebunch wheatgrass, Sandberg's bluegrass, cheatgrass). These areas can include small areas with rock outcrops and talus. These areas meet the definition for a range of habitat qualities (Category 3 and 4) without consideration for Winter Range. Disturbances include grazing, invasive plants, dirt roads, and gravel roads. During special status species surveys, ferruginous hawks, grasshopper sparrows (*Ammodramus savannarum*), long-billed curlews (*Numenius americanus*), Swainson's hawks, and a loggerhead shrike were observed in this habitat.

Shrub-steppe

- Category 2 Rabbitbrush/ Snakeweed within the Amended Site Boundary are categorized as such based on their location within ODFW Winter Range. Dominant shrub species are green and gray rabbitbrush with traces of basin big sagebrush. The understory is composed of a mix of native and non-native species including foxtail barley (*Hordeum jubatum*), tumble mustard, storksbill, yarrow, thistle species, bulbous bluegrass, milkvetch species (*Astragalus* sp.), lomatium species, cheatgrass, cat's eye species (*Cryptantha* sp.), phlox species, and Idaho fescue (*Festuca idahoensis*). These areas meet the definition for a range of habitat qualities (Category 3 and 4) without consideration for Big Game Winter Range. Disturbances include grazing, invasive plants, dirt roads, and gravel roads. During special status species surveys, several grasshopper sparrows and a burrowing owl were observed in this habitat.

Cliffs, Caves and Talus

- Category 2 Cliffs, Caves and Talus identified within the Amended Site Boundary are sparsely vegetated with a mix of annual and perennial native and non-native grasses with some green and gray rabbitbrush. This habitat provides nesting opportunities for raptors (both for species that use stick nests, and for cavity-nesting raptor species), and may provide roosting habitat for bats. During 2022 habitat categorization surveys, 1.2 acres of this habitat was mapped within the Habitat Categorization Survey Area (Attachment P-1). Habitat and wildlife surveyors also noted rock outcrops incidentally, in addition to the

special status species depicted in Figure P-7, and the results of the 2022 raptor-nest survey indicated that 52 of 161 nests were located on cliff substrate, primarily along Big Butter Creek and south of the creek in the eastern portion of the Facility (Figure P-8, Attachment P-1).

Riparian Forest and Natural Shrubland Complexes

- Category 2 Eastside (Interior) Riparian within the Amended Site Boundary are categorized based on their location within ODFW Winter Range and are primarily associated with Big Butter Creek and its tributaries. Tree species include elderberry (*Sambucus* sp.), alder (*Alnus* sp.), coyote willow (*Salix exigua*), hawthorne (*Crataegus* sp.), golden currant (*Ribes aureum*), and occasionally black cottonwood (*Populus balsamifera* ssp. *trichocarpa*). In some areas, basin wildrye (*Leymus cinereus*) forms thickets above cut banks, interspersed with areas of smooth brome (*Bromus inermis*), rush species (*Juncus* sp.), stinging nettle (*Urtica dioica*), bull thistle (*Cirsium vulgare*), Fuller's teasel (*Dipsacus fullonum*), barley species (*Hordeum* sp.), bur chervil (*Anthriscus caucalis*), clematis species (*Clematis* sp.), and cheatgrass. Overall, these areas are approximately 20 to 25 percent native. These areas meet the definition for a range of habitat qualities (Category 3 and 4) without consideration for Big Game Winter Range. Disturbances include grazing, invasive plants, paved roads, dirt roads, and gravel roads. Riparian habitats within the Amended Site Boundary are often dominated by herbaceous vegetation and shrubs, and located adjacent to riverine wetlands.

Developed

- Category 2 Revegetated/Other Planted Grasslands are planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. During 2022 surveys, all Revegetated/Other Planted Grasslands were identified within Big Game Winter Range in the western portion of the Facility. These areas are terraced and appear to have been planted more than five years ago, as surrounding native and non-native vegetation have colonized these former agricultural fields. Dominant species observed in these areas are tall wheatgrass (*Thinopyrum ponticum*), vetch species (*Vicia* sp.), cheatgrass, Sandberg's bluegrass, storksbill, with a lesser percent composition of yarrow, smooth brome, mustard species (*Brassica* sp.), fiddleneck, and blue flax. The overall native composition in these areas ranged from 5 to 25 percent. Native vegetation in these areas is sparse, not well-developed, and has a significant component of annual grasses and weeds. During special status species surveys, grasshopper sparrows and long-billed curlews were observed in this habitat.

In addition to the habitat subtypes described above, several wetland and water features occur within the Analysis Area that are classified as Wetlands and Open Water–Lakes, Rivers, Streams, and designated as Category 2 habitat based on their location within Big Game Winter Range (Table P-3). As described in Section 4.0, these were not mapped during habitat categorization surveys, but were determined based on the results of the wetlands and waters surveys for the Facility, where available, and the National Wetlands Inventory and the National Hydrography Dataset data

elsewhere in the Analysis Area. Three waters habitat subtypes (Permanent Ponds/Lakes, Seasonal Ponds Perennial Streams, and Intermittent or Ephemeral Streams) and three Wetlands subtypes (Riverine Wetlands, Emergent Wetlands, and Scrub-shrub Wetlands) were mapped within Big Game Winter Range within the Analysis Area and are considered Category 2 habitat based solely on this overlap. Wetlands and waters are further described in Exhibit J and the Wetland Delineation Report (Attachment J-1), where wetlands and waters surveys have been conducted, and below under Category 3 and 4 habitat descriptions where these habitats occur outside of Big Game Winter Range.

5.2.3 Category 3 Habitat

Nine habitat subtypes were identified as Category 3 within the Amended Site Boundary. These are addressed below.

Grassland

Category 3 Grasslands provide essential or important foraging and nesting habitat for special status birds and mammals as well as for common native and non-native avian species. A single Category 3 grassland habitat subtype, Native Perennial Grassland, is identified within the Amended Site Boundary.

- Category 3 Native Perennial Grasslands are dominated by native perennial grasses such as Sandberg bluegrass, bluebunch wheatgrass, Idaho fescue, western needlegrass (*Eriocoma occidentalis*), and needle-and-thread grass (*Hesperostipa comata*). Various native forbs and low shrubs such as gray rabbitbrush and, to a lesser extent, green rabbitbrush are present but are an inconspicuous amount. Native vascular plants are diverse, and a variety of invertebrates can be found utilizing the plants throughout the growing season. These habitats have been altered through land use or wildfires and generally contain a significant component of non-native vegetation (broad-leaf weeds and annual grasses). Category 3 Native Perennial Grasslands generally occur on sites with shallow soils and harsh exposures, or in areas that have experienced livestock grazing or frequent fires. Native Perennial Grasslands provide essential foraging habitat to a variety of common resident and migratory birds, and common mammals. State sensitive species typically associated with this habitat include long-billed curlew, burrowing owl, and grasshopper sparrow. Native grasses and forbs provide forage for mule deer. Native Perennial Grassland is an ODFW conservation strategy habitat (OCS 2016). During special status species surveys, grasshopper sparrows, long-billed curlews, and Swainson's hawks were observed in this habitat.

Shrub-steppe

- Category 3 Basin Big Sagebrush Shrub-steppe within the Amended Site Boundary consists of basin big sagebrush at a mature stage. Patches of Category 3 Basin Big Sagebrush Shrub-steppe lack the density and plant health of Category 2 Basin Big Sagebrush Shrub-steppe or are in patches of limited size. The overstory sagebrush in this habitat type is often decadent or lacks full foliage. Understory vegetation in Category 3 Basin Big Sagebrush Shrub-steppe often tends toward annual grasses and low weeds. These areas were historically higher quality habitats but are experiencing degradation due to land-use practices or frequent fires. However, the mature shrub cover provides escape and resting cover for common wildlife and is limited in the immediate area and the region. Basin Big Sagebrush Shrub-steppe offers high-quality breeding habitat for shrub-obligate species including loggerhead shrike and may support WAGS. Sagebrush lizard may be found in areas where more sandy soils are present. Basin Big Sagebrush Shrub-steppe is an ODFW conservation strategy habitat (OCS 2006).
- Category 3 Rabbitbrush/ Snakeweed Shrub-steppe within the Amended Site Boundary is characterized by rubber rabbitbrush, green rabbitbrush, and other low-stature plants such as broom snakeweed (*Gutierrezia sarothrae*) and various buckwheat species. The understory is native Sandberg bluegrass, non-native cheatgrass, bulbous bluegrass, and tumble mustard. Patches of native perennial grasses, such as bluebunch wheatgrass and needle-and-thread grass, are present. This habitat subtype may contain small patches of basin big sagebrush that are less than one acre in size. Category 3 Rabbitbrush/Snakeweed Shrub-steppe provides foraging, cover, and/or nesting habitat for grasshopper sparrows, as well as for common species such as horned lark (*Eremophila alpestris*) and western meadowlark (*Sturnella neglecta*).

Riparian Forest and Natural Shrubland Complexes

- Category 3 Eastside (Interior) Riparian habitat within the Amended Site Boundary consists of typical mid-seral riparian vegetation that provides wildlife habitat. These areas are associated with Big and Little Butter Creek outside of Big Game Winter Range and are similar to the Eastside (Interior) Riparian habitat described above under Category 2 habitat that overlap with Big Game Winter Range.

Developed

- Category 3 Revegetated/Other Planted Grasslands are planted grasslands on previously farmed or otherwise disturbed lands that may be enrolled in the Conservation Reserve Program. This habitat subtype is comprised mainly of native or native-like grasses. Native vegetation in Category 3 Revegetated/Other Planted Grasslands may be sparse and not well-developed and may have a significant component of annual grasses and weeds. State sensitive species with the potential to occur in this habitat include long-billed curlew, burrowing owl, and grasshopper sparrow.

Open Water–Lakes, Rivers, Streams

- Category 3 Perennial Streams within the Amended Site Boundary consist of streams mapped by the US Geological Survey (USGS) as having permanent (year-round) flow that are non-fish-bearing, natural stream channels which drain into fish-bearing streams based on StreamNet data (StreamNet 2022). This consists of a tributary to Little Butter Creek.
- Category 3 Intermittent or Ephemeral Streams within the Amended Site Boundary consist of streams mapped by USGS as intermittent or mapped during Facility field surveys as intermittent or ephemeral that are non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data (StreamNet 2022).

Wetlands

- Category 3 Riverine Wetlands within the Amended Site Boundary consist of wetlands contained within a channel and not dominated by trees, shrubs, or emergent vegetation. Dominant species, where vegetation is present, include reed canary grass (*Phalaris arundinacea*), American-brooklime (*Veronica americana*), watercress (*Nasturtium officinale*) and annual rabbit's-foot grass (*Polypogon monspeliensis*). These wetlands were mapped during surveys in 2022 and 2023 and are further described in Exhibit J.
- Category 3 Emergent Wetlands within the Amended Site Boundary consist of freshwater wetlands with herbaceous vegetation that includes a mixture of native and nonnative plant species and low to moderate disturbance. Dominant species include watercress and annual rabbit's-foot grass.

5.2.4 Category 4 Habitat

Seven habitat subtypes were identified as Category 4 within the Amended Site Boundary. These are addressed below.

Grassland

Category 4 Grasslands provide important but non-essential, not-limited foraging and nesting habitat for special status birds and mammals as well as for common native and non-native avian species.

- Category 4 Exotic Annual Grassland found within the Amended Site Boundary are non-native grasslands with a very high weed component and disturbed or less nutrient-rich soils. The forb component is composed primarily of non-native weeds, such as cheatgrass, bulbous bluegrass, cereal rye, tumble mustard, and Russian thistle (*Salsola* sp.), with occasional patches of native bunchgrass, primarily Sandberg bluegrass. Category 4 Exotic Annual Grassland provides important habitat to common species like savannah sparrow (*Passerculus sandwichensis*) and horned lark, but the dense weed cover and lack of native grasses limit the ability of most wildlife species to use these areas for forage or cover. In addition, the weed cover, often dominated by annuals such as cheatgrass, makes the slopes

in this area more susceptible to erosion and soil damage from grazing because of a lack of the robust root structure found in perennial species, such as the native bunchgrasses. With sufficient time and appropriate livestock-grazing practices, however, these areas could become suitable habitat for some native wildlife species. This habitat is commonly found throughout the Columbia Plateau Ecoregion (CPE). State sensitive species typically associated with this habitat include burrowing owls, grasshopper sparrows, and long-billed curlews. During special status species surveys, a Brewer's sparrow, burrowing owls, grasshopper sparrows, long-billed curlews, and Swainson's hawks were observed in this habitat.

- Category 4 Native Perennial Grassland occurs in small patches within the Amended Site Boundary. Category 4 Native Perennial Grassland is ecologically similar to Category 3 Native Perennial Grassland but is classified as Category 4 because its small size and isolated nature limit its value to wildlife. Native Perennial Grasslands provide important foraging habitat to a variety of common resident and migratory birds, and common mammals. Burrowing owl and grasshopper sparrow use this habitat. Native grasses and forbs provide forage for mule deer. Native Perennial Grassland is an ODFW conservation strategy habitat (OCS 2006).

Shrub-steppe

- Category 4 Rabbitbrush/ Snakeweed Shrub-steppe habitats within the Amended Site Boundary are similar to Category 3 Shrub-steppe-Rabbitbrush/Snakeweed habitats described above, but with a lower native component and higher non-native annual grass and forb component. This habitat can provide nesting and/or foraging habitat for common species such as horned lark and western meadowlark.

Open Water–Lakes, Rivers, Streams

- Category 4 Permanent Ponds/Lakes within the Amended Site Boundary consist of highly degraded open water areas dominated by non-native vegetation or no vegetation around the margins, such as highly degraded stock ponds.
- Category 4 Lakes, Rivers, Streams-Seasonal Ponds within the Amended Site Boundary consist highly degraded open water areas that contain water part of the year, with a higher proportion of non-native vegetation or no vegetation around the margins, such as a seasonal stock pond.
- Category 4 Perennial Streams within the Amended Site Boundary consist of streams mapped by USGS as having permanent (year-round) flow that are non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams. These streams are located within Sand Hollow, in the western portion of the Amended Site Boundary (StreamNet 2022).
- Category 4 Intermittent or Ephemeral Streams within the Amended Site Boundary consist of streams mapped by the USGS as intermittent or mapped during Facility field surveys as

intermittent or ephemeral that are non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams (StreamNet 2022).

5.2.5 Category 6 Habitat

Category 6 habitat is nonessential wildlife habitat with low potential to become important or essential. There is one type of Category 6 habitat, Developed, within the Amended Site Boundary.

Developed

There are three Category 6 Developed habitat subtypes within the Amended Site Boundary: Dryland Wheat, Irrigated Agriculture, and Other. All three of these subtypes were mapped during 2022 surveys and verified during 2023 surveys.

- Category 6 Dryland Wheat habitat consists of agricultural fields that are currently in small grain production or fallow. Swainson's hawks hunt for prey in wheat stubble fields. During special status species surveys, a long-billed curlew was observed in this habitat.
- Category 6 Irrigated Agriculture habitat consists of agricultural fields that are irrigated and primarily includes circle-pivot irrigation fields and irrigated lowland along Big Butter Creek, Little Butter Creek, and Sand Hollow. The most common irrigated agriculture crop noted during 2022 surveys was alfalfa.
- Category 6 Other habitat includes farming/ranching home and shop sites, corrals, structures, feedlots, active and inactive gravel quarries, non-irrigated pastures, graveled and paved roads, rights-of-way, and waste areas associated with ongoing human activities. Although some areas have deciduous tree landscaping that attracts some native and non-native passerines, these Developed-Other areas are not considered to have significant value to wildlife species. Because of the high level of disturbance, few special status/sensitive species are known or expected to occur with regularity in the Category 6 habitats, and these areas have low potential to become essential or important wildlife habitat in the foreseeable future. However, common nighthawks (*Chordeiles minor*) tend to roost and nest on bare ground, including gravel roads (Brigham et al. 2020). During special status species surveys, a ferruginous hawk, a Swainson's hawk, and a loggerhead shrike were observed in this habitat (i.e., along a road) adjacent to non-Developed habitat, which likely reflects the surveyor vantage point provided by the road rather that the species use of this habitat.

6.0 Identification of State Sensitive Species and Site-Specific ODFW Issues – OAR 345-021-0010(1)(p)(D)

OAR 345-021-0010(1)(p)(D) Based on consultation with the Oregon Department of Fish and Wildlife (ODFW) and appropriate field study and literature review, identification of all State Sensitive Species that might be present in the analysis area and a discussion of any site-specific issues of concern to ODFW.

6.1 Identification of State Sensitive Species

The literature reviews (described in Section 4.1) led to the development of a list that contained all the state sensitive species with the potential to occur within the Analysis Area. State endangered and threatened species are addressed in Exhibit Q. State sensitive species and eagles deemed to have potential for occurrence within 0.5 miles of the Amended Site Boundary are detailed in Table P-4. Even though eagles are not state sensitive species, they are addressed briefly in this document as a species of concern protected under the Bald and Golden Eagle Protection Act (BGEPA). The Certificate Holder's request for information from ORBIC identified golden eagle nesting locations within the Analysis Area; the ORBIC query did not return occurrences of any other species addressed in this Exhibit P.

Results of the query of the StreamNet database and the Certificate Holder's request for information from ORBIC did not identify any state sensitive fish species with potential to occur in the Analysis Area. Therefore, no fish are included in Table P-4 below or addressed in this Exhibit P.

Table P-4. State Sensitive Species with Known and Potential Occurrence within the Analysis Area

Common name	Scientific name	Columbia Plateau Ecoregion ODFW Status[1]	Occurrence within Amended Site Boundary[2]	Occurrence within Analysis Area
Birds				
Bald eagle	*Haliaeetus leucocephalus*	None[3]	Documented: 2023 Special Status Species Surveys, ASC Avian Use Survey, 2022-2023 Avian Use Survey, 2023 Raptor Nest Survey	Documented: 2023 Special Status Species Surveys, ASC Avian Use Survey, 2022-2023 Avian Use Survey, 2023 Raptor Nest Survey
Brewer's sparrow	*Spizella breweri*	S	Documented: 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey	Documented: 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey
Burrowing owl (Western)	*Athene cunicularia hypugaea*	SC	Documented: 2023 Habitat Categorization Survey, 2023 Special Status Species Surveys, 2022-2023 Avian Use Survey (incidentally), 2022 Special Status Wildlife Surveys, ASC Special Status Wildlife Surveys	Documented: 2023 Habitat Categorization Survey, 2023 Special Status Species Surveys, 2022-2023 Avian Use Survey (incidentally), 2022 Special Status Wildlife Surveys, ASC Avian Use Survey, ASC Special Status Wildlife Surveys
Common nighthawk	*Chordeiles minor*	S	Documented: 2023 Habitat Categorization Survey, 2022-2023 Avian Use Survey	Documented: 2023 Habitat Categorization Survey, 2022-2023 Avian Use Survey, ASC Avian Use Survey (presumed; location unknown)
Ferruginous hawk	*Buteo regalis*	SC	Documented: 2023 Raptor Nest Survey, 2023 Special Status Species Surveys, 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, ASC Avian Use Survey, 2022-2023 Avian Use Survey, 2018 Special Status Wildlife Surveys	Documented: 2023 Raptor Nest Survey, 2023 Special Status Species Surveys, 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, 2018 Special Status Wildlife Surveys, ASC Raptor Nest Surveys, ASC Avian Use Survey

Common name	Scientific name	Columbia Plateau Ecoregion ODFW Status[1]	Occurrence within Amended Site Boundary[2]	Occurrence within Analysis Area
Golden eagle	*Aquila chrysaetos*	None[3]	Documented: 2023 Habitat Categorization Survey, 2023 Raptor Nest Survey, 2023 Special Status Species Surveys, 2022 Raptor Nest Survey, 2022-2023 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, ASC Avian Use Survey	Documented: 2023 Habitat Categorization Survey, 2023 Raptor Nest Survey, 2023 Special Status Species Surveys, 2022 Raptor Nest Survey, 2022 Golden Eagle Nest Monitoring, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, ASC Avian Use Survey, ASC Eagle Nest Survey, ASC Golden Eagle Nest Monitoring
Grasshopper sparrow	*Ammodramus savannarum*	S	Documented: 2023 Special Status Species Surveys, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, 2020 Wagon Trail Special Status Wildlife Surveys, ASC Avian Use Survey, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys	Documented: 2023 Special Status Species Surveys, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, 2020 Wagon Trail Special Status Wildlife Surveys, ASC Avian Use Survey, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys
Lewis' woodpecker	*Melanerpes lewis*	SC	None	None
Loggerhead shrike	*Lanius ludovicianus*	S	Documented: 2023 Special Status Species Surveys, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey	Documented: 2023 Special Status Species Surveys, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, ASC Avian Use Survey, ASC Special Status Wildlife Surveys

Common name	Scientific name	Columbia Plateau Ecoregion ODFW Status[1]	Occurrence within Amended Site Boundary[2]	Occurrence within Analysis Area
Long-billed curlew	*Numenius americanus*	SC	Documented: 2023 Habitat Categorization Survey, 2023 Special Status Species Surveys, 2022-2023 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, ASC Avian Use Survey, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys	Documented: 2023 Habitat Categorization Survey, 2023 Special Status Species Surveys, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, ASC Avian Use Survey, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys
Sagebrush sparrow	*Artemisiospiza nevadensis*	SC	2023 Special Status Species Surveys	2023 Special Status Species Surveys
Swainson's hawk	*Buteo swainsoni*	S	Documented: 2023 Raptor Nest Survey, 2023 Special Status Species Surveys, 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, ASC Avian Use Survey, 2018 Special Status Wildlife Surveys	Documented: 2023 Raptor Nest Survey, 2023 Special Status Species Surveys, 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022-2023 Avian Use Survey, 2020 Wagon Trail Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys, ASC Avian Use Survey, ASC Raptor Nest Surveys
Mammals				
Hoary bat	*Lasiurus cinereus*	S	Documented: ASC Bat Acoustic Surveys, 2022 Bat Activity Survey	Documented: ASC Bat Acoustic Surveys, 2022 Bat Activity Survey
Pallid bat	*Antrozous pallidis*	S	Documented: 2022 Bat Activity Survey	Documented: 2022 Bat Activity Survey
Silver-haired bat	*Lasionycteris noctivagans*	S	Documented: ASC Bat Acoustic Surveys, 2022 Bat Activity Survey	Documented: ASC Bat Acoustic Surveys, 2022 Bat Activity Survey
Spotted bat	*Euderma maculatum*	S	None	None
Townsend's big-eared bat	*Corynorhinus townsendii*	SC	None	None

Common name	Scientific name	Columbia Plateau Ecoregion ODFW Status[1]	Occurrence within Amended Site Boundary[2]	Occurrence within Analysis Area
Reptiles				
Sagebrush lizard (Northern)	*Sceloporus graciosus graciosus*	S	None	None
Western painted turtle	*Chrysemys picta*	SC	None	None

Species and status: OCS 2016, ODFW 2021a, ORBIC 2019, Wheatridge 2015, Wheatridge 2019, Wheatridge East 2022, StreamNet 2022.

1. ODFW Status: S = State Sensitive; SC = State Sensitive—Critical

2. Documented occurrence:

- ASC Avian Use Survey— Wheatridge 2015, Exhibit P, Section 4.2.1
- ASC Bat Acoustic Surveys— Wheatridge 2015, Exhibit P, Section 4.2.6
- ASC Eagle Nest Survey, Monitoring— Wheatridge 2015, Exhibit P, Sections 4.2.3, 4.2.4
- ASC Raptor Nest Surveys— Wheatridge 2015, Exhibit P, Section 4.2.2
- ASC Special Status Wildlife Surveys— Wheatridge 2015, Exhibit P, Section 4.2.5
- 2018 Special Status Wildlife Surveys— Wheatridge 2019,
- 2020 Wagon Trail Special Status Wildlife Surveys—Wheatridge East 2022
- 2022 Bat Activity Survey – Attachment P-1
- 2022 Special Status Wildlife Surveys – Attachment P-1
- 2022-2023 Avian Use Survey— Attachment P-1
- 2022 Raptor Nest Survey Memo – Attachment P-1
- 2022 Golden Eagle Nest Watch Memo – Attachment P-1
- 2023 Raptor Nest Survey Report – Attachment P-1
- 2023 Special Status Wildlife Surveys, Attachment P-1
- 2023 Habitat Categorization Survey Report –Attachment P-1

3. Protected by the Bald and Golden Eagle Protection Act (BGEPA)

7.0 Baseline Survey of Habitat Use by State Sensitive Species – OAR 345-021-0010(1)(p)(E)

OAR 345-021-0010(1)(p)(E) A baseline survey of the use of habitat in the analysis area by species identified in (D) performed according to a protocol approved by the Department and ODFW.

7.1 Results of Field Surveys

7.1.1 Special Status Wildlife Species Surveys

During 2022 and 2023 surveys within the Amended Site Boundary, biologists observed 11 state threatened, endangered, or sensitive wildlife species and eagles: WAGS (endangered; addressed in Exhibit Q), bald eagle (BGEPA), Brewer's sparrow (sensitive), burrowing owl (sensitive-critical), ferruginous hawk (sensitive-critical), golden eagle (BGEPA), grasshopper sparrow (sensitive), loggerhead shrike (sensitive), long-billed curlew (sensitive-critical), sagebrush sparrow (sensitive-critical), and Swainson's hawk (sensitive) (Attachment P-1). Additionally, during 2023 habitat categorization surveys, four common nighthawks (sensitive) were observed incidentally. Figure P-7 shows the location of all observations of state sensitive species and eagles within 0.5 miles of the Amended Site Boundary during special status wildlife surveys from 2011 to 2023. Documented occurrences of species reported from 2011 to 2023 are summarized below in Table P-5, with a focus on observations during the 2022 and 2023 special status wildlife species surveys.

Table P-5. State Sensitive and Eagle Species Observed During Special Status Species Surveys within the Analysis Area 2011-2023

Common name	Scientific name	Observation Notes
Bald eagle	*Haliaeetus leucocephalus*	Four bald eagles were observed during 2023 surveys.
Brewer's sparrow	*Spizella breweri*	One Brewer's sparrow was observed during 2022 special status species surveys, in the spring, in the northern portion of the Amended Site Boundary.
Burrowing owl (Western)	*Athene cunicularia hypugaea*	In 2022, burrowing owls were observed in the north and western portions of the Amended Site Boundary during special status species surveys. In 2023, 22 burrowing owls were observed during special status species surveys. Nearly all of the owls (20 of 22) were observed in the northern portion of the Amended Site Boundary. Information about documented occurrences of active burrowing owl burrows recorded during the 2022 and 2023 special status species surveys and 2023 habitat categorization survey is provided in Section 7.1.
Common nighthawk	*Chordeiles minor*	During habitat categorization surveys in 2023, four common nighthawks were observed flying near Big Butter Creek.

Common name	Scientific name	Observation Notes
Ferruginous hawk	*Buteo regalis*	Three ferruginous hawks were observed within the Amended Site Boundary during 2022 special status species surveys, all in the vicinity of Big Butter Creek Lane. Two were observed flying and the third was hunting. During 2018 special status species surveys, an adult ferruginous hawk was observed interacting with a Swainson's hawk near OR-207, within the Amended Site Boundary. Three individuals were also observed during 2023 surveys; two were seen within the Analysis Area, including one outside the Amended Site Boundary, and the third was not within the Site Boundary or Analysis Area.
Golden eagle	*Aquila chrysaetos*	One golden eagle was observed during 2022 special status species surveys, in the western portion of the Amended Site Boundary, in the spring. Observations of golden eagle individuals during other surveys in 2022, including raptor -nest surveys and eagle monitoring, are shown on Figure P-7 and described below under those survey headings. One individual was also seen during 2023 surveys, within both the Analysis Area as well as the Amended Site Boundary. Additionally, one individual was observed during 2023 habitat categorization surveys.
Grasshopper sparrow	*Ammodramus savannarum*	Grasshopper sparrows have been observed throughout the Amended Site Boundary during special status species surveys conducted since 2011, including 112 observations of one to two individuals during surveys in 2022, as well as 117 observations during 2023 surveys.
Loggerhead shrike	*Lanius ludovicianus*	Two and nine loggerhead shrikes were observed during 2022 and 2023 special status species surveys, respectfully. During 2022 surveys, one was in the southern portion of the Amended Site Boundary and one was in the western portion of the Amended Site Boundary. One of the detections during special status species surveys conducted between 2011 and 2013 for the ASC was within the Analysis Area, outside the Amended Site Boundary.
Long-billed curlew	*Numenius americanus*	Long-billed curlew have been observed throughout the Amended Site Boundary during special status species surveys conducted since 2011, including 36 observations of one to three individuals during surveys conducted in 2022. Individuals, pairs, and one group of three curlews were observed flying, singing, and perching, including flying and perched individuals associated with nests, and flying individuals and pairs chasing after a red-tailed hawk and common raven. During 2023 surveys, 141 curlews were observed. Additionally, 108 individuals were also seen during habitat categorization surveys, including two large flocks of approximately 42 and 60 individuals in the northern section of the Analysis Area.
Sagebrush sparrow	*Artemisiospiza nevadensis*	Three sagebrush sparrows were observed during 2023 surveys, within the Amended Site Boundary.

Common name	Scientific name	Observation Notes
Swainson's hawk	*Buteo swainsoni*	Swainson's hawks were documented at eight locations during special status species surveys in 2022, including seven locations with one individual and one location with two individuals. Individuals were observed flying and hunting, including diving at a red-tailed hawk and a common raven. Five detections of Swainson's hawks documented during 2018 special status species surveys and two detections documented during 2020 special status species surveys were within the Analysis Area. During 2023 surveys, a total of five Swainson's hawks were observed, all within the Amended Site Boundary as well as the Analysis Area.

7.1.2 Special status Plant Species Surveys

The Certificate Holder documented 14 occurrences of Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) within the Amended Site Boundary in 2022 and 2023; multiple plant groupings recorded within one kilometer of each other were assigned to the same occurrence (Attachment P-1). The 14 Laurence's milkvetch occurrences covered between less than 0.1 and 209.1 acres within the 2022 and 2023 Botanical Survey Areas and were located primarily in the southeastern portion of the Amended Site Boundary. Laurence's milkvetch is discussed in Exhibit Q. The Certificate Holder recorded 21 noxious weeds during surveys in 2022, including 20 Oregon Department of Agriculture-listed noxious weed species, 17 Morrow County-listed weeds, and 16 Umatilla County-listed weeds (Attachment P-1). In 2023, the Certificate Holder recorded confirmed observations of 14 noxious weed species during surveys (plus one observation of a potential ODA A-list noxious weed that could not be identified to species), 14 Morrow County listed weeds, and 12 Umatilla County listed weeds.

7.1.3 Avian Use Surveys

Complete results of avian use surveys conducted in 2011 are available in the ASC, including species observations and avian use by season and plot (Gerhardt and Anderson 2014, Wheatridge 2015). Six state sensitive bird species were detected within 15 plots that overlap the Amended Site Boundary. Sensitive species detected during the avian use surveys included burrowing owl, ferruginous hawk, grasshopper sparrow, loggerhead shrike, long-billed curlew, and Swainson's hawk. Bald and golden eagles, which are not state sensitive species but are protected by BGEPA, were also detected within plots that overlap the Amended Site Boundary. Common nighthawk (sensitive) was detected during the summer avian use surveys at Wheatridge West, but it was not designated as a state sensitive species at the time. Only a single individual was detected during the surveys. It was presumed that the common nighthawk was detected at one of the plots that overlap the Amended Site Boundary, but the exact location of the detection is unknown. Long-billed curlew and Swainson's hawk were the most frequently detected sensitive species (311 individuals at 11 survey plots and 140 individuals at 15 survey plots, respectively).

Seasonal information regarding each species can best be understood by the timing of these sightings across all 15 survey points. Each of these species are known to breed in the CPE but most are migratory, dispersing away from their breeding grounds to spend the non-breeding season in other areas. Aside from the golden eagle and burrowing owl, most observations occurred during spring and summer seasons. Only the ferruginous hawk and golden eagle were observed year-round. The Swainson's hawk was detected during the spring, summer, and fall seasons. Long-billed curlew, grasshopped sparrow, and loggerhead shrike detections were limited to spring and summer seasons. The lone burrowing owl detection occurred during the fall season.

A total of 31 golden eagles were detected during the surveys. Golden eagles were observed at 12 of the 15 plots that overlap the Amended Site Boundary (all except for Plot B at Wheatridge East and E and O at Wheatridge West). Golden eagles were detected during all survey seasons, but most detections were in winter, with 17 detections at the Wheatridge East plots and seven detections at the Wheatridge West plots. The one bald eagle detected during the surveys was detected at Plot N of Wheatridge West during the winter.

Avian use surveys were conducted at the Facility in all months between April 19, 2022, and March 13, 2023 (Attachment P-1). Survey effort was lower during the summer season compared to the other seasons because of land access issues resulting from landowner concerns over fire danger. The objective of the surveys was to document the species' composition and spatial and temporal use patterns of large and small birds, with a particular focus on bald and golden eagles, other raptors, and species of concern. Overall, 25 large bird species were recorded during 363 large bird use surveys, and 27 small bird species were recorded during 364 small bird use surveys conducted across 37 survey points (Figure P-4). Large bird species richness was highest during spring (20 species) and lowest during fall and winter (12 species each), while small bird species richness was highest during fall (16 species) and lowest during winter (12 species). Three species (horned lark, European starling [*Sturnus vulgaris*], and western meadowlark) accounted for 83 percent of all recorded small bird observations. Of the 25 large bird species, 11 were diurnal raptors (including bald and golden eagles), four were upland gamebirds, three were waterfowl, two were waterbirds, two were doves/pigeons, two were large corvids, one was a shorebird, and one was a nightjar.

Diurnal raptors were detected at nearly all survey locations and were observed year-round but showed seasonal shifts in species composition. Of 11 diurnal raptor species observed during surveys, red-tailed hawk, Swainson's hawk, and northern harrier accounted for 65 percent of observations, with northern harrier the most abundant raptor species observed in fall and winter, Swainson's hawk in spring, and red-tailed hawk in summer.

Seven sensitive species were recorded during the 2022-2023 avian use survey: Brewer's sparrow, common nighthawk, ferruginous hawk, grasshopper sparrow, loggerhead shrike, long-billed curlew, and Swainson's hawk. Additionally, burrowing owl was incidentally observed outside of the standardized avian use surveys. The sensitive species detected during the 2022-2023 avian use surveys were similar to those detected during the 2011 and 2012 avian use surveys, but Brewer's sparrow was not detected during the 2011 and 2012 surveys.

Like the 2011 and 2012 surveys, the most abundant sensitive bird species observed during the 2022-2023 surveys were the long-billed curlew and Swainson's hawk (51 individuals observed at 12 survey points and 44 individuals observed at 12 survey points, respectively). The common nighthawk was detected more frequently in 2022-2023 than in 2011 and 2012 (22 individuals versus one individual, respectively). Bald eagles (*Haliaeetus leucocephalus*) and golden eagles, which are not state sensitive species but are protected by BGEPA, were also detected during the 2022-2023 avian use survey. Three bald eagle observations were recorded in spring and winter; however, all three observations were recorded at flight heights above the turbine risk cylinder resulting in zero recorded bald eagle minutes. Eight golden eagle observations were recorded during spring, fall, and winter; no golden eagles were observed in summer. Of the eight golden eagle observations, five were observed within the turbine risk cylinder for a total of 11 golden eagle minutes. Bald and golden eagle activity was only recorded in the southern half of the Amended Site Boundary, south of Big Butter Creek.

7.1.4 Raptor-Nest Surveys

The results from raptor nest surveys performed in 2019, 2020, and 2022 (Figure P-3a), and 2023 (Figure P-3b) and summarized here only include active (in-use) nests of sensitive species. The entire Analysis Area was surveyed during the 2023 surveys as well as during a combination of the 2019, 2020, and 2022 surveys (Figures P-3a and P-3b). Most of the Analysis Area was covered during the 2022 surveys, the remainder was covered during the 2019 and 2020 surveys (Figure P-3a). Only 2019 and 2020 nests that were inside the Analysis Area but outside the 2022 Raptor-Nest Survey Area are displayed in Figure P-3a. Complete results, including active nests of common raptors and inactive nests of sensitive species and eagles, can be found in the individual reports (Gerhardt and Kronner 2019, Tetra Tech 2020b, Attachment P-1).

In 2019 and 2020, two Swainson's hawk nests were found within the Analysis Area (Gerhardt and Kronner 2019, Tetra Tech 2020b, Figure P-3a). In 2020, both nests were monitored to identify and minimize disturbance from construction activities at WREF I and WREF II. At the time the 2020 report was prepared (June 2020), both Swainson's hawk nests were active. Based on estimated nesting chronology, young at the nests were expected to fledge in mid to late July (Tetra Tech 2020b).

In 2022, a total of 17 active nests of sensitive raptors and eagles were found during the surveys, including 11 Swainson's hawk nests, three ferruginous hawk nests, two burrowing owl nest burrows, and one golden eagle nest (Attachment P-1). Ten of these nests were found within the Analysis Area, including five Swainson's hawk nests, two ferruginous hawk nests, two burrowing owl nest burrows, and one golden eagle nest (Figure P-3a). The burrowing owl nest burrows were documented during special status wildlife species surveys performed from the ground in May 2022 (Attachment P-1); all other nests were found during aerial surveys. A data review performed prior to the 2022 raptor nest surveys identified 13 previously known golden eagle nest records within the 2022 raptor nest survey area, one of which was located within the Facility lease boundary at the time of the aerial surveys (Attachment P-1). Of the 13 previously known golden eagle nest records

within the survey area, one was active (in-use), four were alternate (unoccupied) and eight were no longer present in 2022 (Attachment P-1). The active golden eagle nest and two of the alternate golden eagle nests were located within the Amended Site Boundary.

Four golden eagles were observed incidentally during the 2022 aerial surveys: two during the initial survey and two during the second survey. Four golden eagles were observed incidentally during the aerial surveys: two during the initial survey and two during the second survey. Three of the golden eagles were observed within the Analysis Area and two were observed within the Amended Site Boundary (Figure P-7). Two of the golden eagles were located about 0.5 miles from alternate (inactive) golden eagle nests. Golden eagle prey concentrations observed during the surveys included 20 mule deer herds with 3 to 50 individuals, eight elk herds with 2 to 50 individuals, and one cow carcass (Attachment P-1).

In 2023, a total of 42 active nests of sensitive raptors and eagles were found during the surveys, including 20 burrowing owl burrows, 10 ferruginous hawk nests, nine Swainson's hawk nests, and three golden eagle nests (Attachment P-1). Thirty-four of these nests were found within the Analysis Area, including 20 burrowing owl burrows, six ferruginous hawk nests, six Swainson's hawk nests, and two golden eagle nests (Figure P-3b). Nineteen of the active burrowing owl burrows and one of the ferruginous hawk nests were documented during 2023 special status wildlife surveys, and one of the active burrowing owl burrows was found during the 2023 habitat categorization surveys (Attachment P-1); all other nests were found during aerial surveys. Another potentially active burrowing owl burrow was recorded during 2023 special status wildlife surveys. However, it was not revisited later in the season to determine if owls were actively using it because that area was dropped from further consideration for development.

A data review performed prior to the 2023 raptor nest surveys identified 12 previously known golden eagle nest records within the 2023 raptor nest survey area. Of these 12 nests, two were active, three were alternate, and seven were no longer present in 2023 (Attachment P-1). Additionally, one new active golden eagle nest was documented in 2023. Two of the active golden eagle nests and two of the alternate golden eagle nests recorded in 2023 were located within the Amended Site Boundary (Attachment P-1).

Eighteen golden eagles and 10 bald eagles were incidentally observed during the 2023 surveys. Most of the eagles were observed within the southcentral and southeastern portions of the survey area. Sixteen of the golden eagles were observed during the initial survey and two were observed during the second survey. All 10 bald eagles were observed during the initial survey, indicating those eagles were probably migrants. Eight of the golden eagles and eight of the bald eagles were observed within the Analysis Area (Figure P-7). Five of the golden eagles and eight of the bald eagles were observed within the Amended Site Boundary (Figure P-7). Four of the golden eagles were observed flying to the south of two alternate nests in the southern portion of the Amended Site Boundary but were closer to the location of three historical golden eagle nest records confirmed to no longer be present during the surveys. Golden eagle prey concentrations observed incidentally during the surveys consisted of herds of elk and mule deer. A total 78 elk (four herds of

four to 40 individuals) and 492 mule deer (30 herds of two to 45 individuals) were observed during the surveys (Attachment P-1).

7.1.5 Golden Eagle Nest Monitoring

No nesting golden eagles were observed during the 2022 nest watches, and all the territories were determined to be unoccupied. Although the biologists were unable to view two of the nests from accessible areas, the observation points provided a view of the territory such that eagle activity in the vicinity of the nests would have been observed, if present. All the nests were present but unoccupied during the second aerial survey which occurred about 10 days before the nest watches, providing further evidence that the nests were not active.

One individual golden eagle was observed during the nest watches. The bird was a second year subadult observed along a ridge east of the Amended Site Boundary (Attachment P-1; Figure P-7). Because most golden eagles do not acquire a nesting territory until they are at least four years old (Katzner et al. 2020), it was assumed that this eagle was not associated with any of the nests in the area.

7.1.6 Bat Acoustic Surveys

In 2011, eight bat species were detected at one or more of the 12 acoustic monitoring sites (i.e., stations; Wheatridge 2015). Seven stations were located within 0.5 miles of the Amended Site Boundary (stations 2A, 4A, 4B, 5A, 5B, 7A, and 7B), and are considered here (Figure P-4). All eight bat species were detected at stations within the Analysis Area (Gerhardt and Anderson 2014). Two species that are state sensitive in the Columbia Plateau were detected: hoary bat (detected at two of the seven stations within the Analysis Area) and silver-haired bat (detected at six of the seven stations within the Analysis Area). Other species detected within the Analysis Area included California myotis (*Myotis californicus*; one station), small-footed myotis (*Myotis ciliolabrum*; four stations), long-eared myotis (*Myotis evotis*: one station), little brown bat (three stations), long-legged myotis (*Myotis volans*: one station) and canyon bat (three stations).

Hoary bat was detected at station 5A and 7B, north and south of Big Butter Creek Lane, respectively (Figure P-4). Station 5A was on a met tower in Exotic Annual Grassland approximately 2 miles north of Big Butter Creek Lane. Station 7B was on a fencepost next to a tree in Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian habitat 0.2 miles south of Big Butter Creek Lane.

Silver-haired bat was detected at stations 2A, 4A, 4B, 5A, 7A, and 7B. Station 2A was along Sand Hollow Road, in the western portion of the Amended Site Boundary, on a dead tree over a creek in Sagebrush Shrub-steppe habitat. Station 4A and 4B were in Native Perennial Grassland on an old windmill and Exotic Annual Grassland on a fence post, respectively, approximately 5 miles north of Big Butter Creek Lane. Station 7A was located on a willow near a creek in Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian habitat, approximately 1 mile south of Big Butter Creek Lane.

In 2022, nine bat species were detected at one or more of the three bat detector locations (Attachment P-1). Three species that are state sensitive in the Columbia Plateau were detected: hoary bat (three stations; 37 percent of all identifiable low frequency bat calls), silver-haired bat (three stations; 54 percent of all identifiable low frequency bat calls), and pallid bat (*Antrozous pallidis*; one station; 2.2 percent of all identifiable low frequency bat calls). Other species detected included California myotis (one station), long-eared myotis (one station), little brown bat (two stations), long-legged myotis (two stations), canyon bat (one station), and big brown bat (two stations).

Overall, bat activity was highest at station WR2 (0.97 ± 0.17 bat passes per detector-night), located south of Big Butter Creek and east of Little Butter Creek, compared to the other two stations (WR1 and WR3; 0.41 ± 0.06 and 0.30 ± 0.07, respectively; Attachment P-1). Overall bat activity at the survey stations was similar across the fall (0.57 ± 0.08 bat passes per detector-night) and summer (0.64 ± 0.12) seasons (Attachment P-1). Bat activity was slightly higher (0.69 ± 0.09) at stations during the fall migration period, defined as July 30 – October 14. Weekly acoustic activity, driven by high frequency bat activity, was highest in early to mid-June, followed by a decrease in activity that stayed relatively low through the remainder of the survey period (Attachment P-1). Low frequency bat (including hoary bat and silver-haired bat) activity was higher in the fall, peaking near the end of September at 1.0 bat passes/ detector night (Attachment P-1). No very low frequency bat calls were detected.

8.0 Description of Potential Adverse Impacts – OAR 345-021-0010(1)(p)(F)

OAR 345-021-0010(1)(p)(F) A description of the nature, extent and duration of potential adverse impacts on the habitat identified in (B) and species identified in (D) that could result from construction, operation and retirement of the proposed facility.

8.1 Potential Impacts to Fish and Wildlife Habitat

As described in the Final Order, construction and operation of the Facility will result in permanent and temporary loss of wildlife habitat[4]. Impact calculations in this RFA include permanent and temporary impact acreages as defined in the Division 27 document (Table P-6).

[4] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

Table P-6. Impacts by Habitat Category and Subtype

Habitat Category	Habitat Type-Subtype	Impacts (acres)	
		Permanent	Temporary
2	Grassland-Exotic Annual	12.9	120.1
	Grassland-Native Perennial	80.3	603.6
	Shrub-steppe-Basin Big Sagebrush	1.2	8.8
	Shrub-steppe-Rabbitbrush/Snakeweed	5.2	34.8
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	<0.1	0.6
	Developed-Revegetated/Other Planted Grassland	11.6	70.3
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	0.2
	Wetlands-Riverine Wetlands	<0.1	0.5
	Wetlands-Emergent Wetlands	-	0.1
Total		111.3	838.8
3	Grassland-Native Perennial	2.7	18.4
	Shrub-steppe-Basin Big Sagebrush	0.6	5.3
	Developed-Revegetated/Other Planted Grassland	-	<0.1
	Wetlands-Emergent Wetlands	<0.1	<0.1
Total		**3.4**	**23.8**
4	Grassland-Exotic Annual	6.9	51.4
	Shrub-steppe-Rabbitbrush/Snakeweed	3.0	11.3
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	<0.1
Total		**9.9**	**62.7**
6	Developed-Dryland Wheat	39.0	178.2
	Developed-Irrigated Agriculture	<0.1	0.9
	Developed-Other	1.4	16.7
Total		**40.5**	**195.8**
Grand Total		**165.0**	**1,121.1**

Total impacts within the Amended Site Boundary are up to 1,286.1 acres, including 1,121.1 acres of temporary and 165.0 acres of permanent impact. The majority of the Amended Site Boundary overlaps with Mule Deer Winter Range; therefore, the majority of impacts (74 percent) are within Category 2 habitat (ODFW 2013a).

8.2 Potential Impacts to State Sensitive Species

As described in the ASC, potential construction-related impacts to state sensitive species include permanent and temporary loss of habitat, direct fatalities due to construction equipment and vehicles, loss of nesting structures, and disturbance during critical life stages (e.g., breeding season for birds) (Wheatridge 2015). Most of these potential impacts have been or will be avoided or minimized through micrositing, timing of construction, and other conditions described in the ASC or in the sections below (Wheatridge 2015).

The primary potential impact of the operation of the Facility is expected to be direct fatality of birds and bats through collision with rotating turbine blades, which is addressed in the ASC (Wheatridge 2015). Secondary potential impacts from the operation of the Facility include collision with vehicles and displacement from otherwise suitable habitat. Impacts specific to state sensitive species from construction and operation of the Facility are presented here, along with relevant updates to information since the ASC (e.g., Facility-specific detections and regional species updates). Specifically for birds and bats, potential impacts from the Facility are presented here based on each species' known or expected occurrence at the Facility (as detailed above and summarized below based on field survey and desktop review), and their known relative risk of collision based on nationwide and regional estimated ranges of fatality rates for the species or taxonomic group. Known estimated fatality rates were used as a predictor of collision risk at the Facility and reviewed in conjunction with population estimates and trends, where available, to determine the potential for adverse population-level effects as a result of turbine collision at the Facility.

8.2.1 Birds

Eight state sensitive bird species and two eagle species have been detected within the Analysis Area (Table P-4). This section describes potential impacts to birds in general from construction and operation of the Facility, including displacement, disturbance, electrocution, and collision, then summarizes anticipated impacts to sensitive species and eagles based on the results of field surveys and collision risk based on estimated national and regional fatality rate ranges and population estimates and trends.

8.2.1.1 Displacement and Disturbance

Construction and operation of the Facility will result in some temporary and permanent impacts to habitat, which could displace nesting and foraging birds. Birds using habitat within the proposed impact areas are expected to relocate to other comparable habitat in the Analysis Area and the greater vicinity of the Facility. Displacement may negatively impact breeding and foraging birds. Habitat mitigation as described in the Draft Habitat Mitigation Plan (see Attachment P-2) will provide mitigation for habitat impacts to grassland birds. Raptors nesting within the Amended Site Boundary could be disturbed during construction. Therefore, prior to construction, the Certificate Holder will perform surveys to identify active nests and will not conduct ground-disturbing activities within species-specific buffer distances of active raptor nests during the nesting season, as described in Section 9.

8.2.1.2 Power Line Electrocution and Collision

Interactions with overhead electrical systems have the potential to negatively affect birds, especially raptors, primarily through electrocutions and collisions. Electrocution on overhead electric systems is a primary cause of anthropogenic mortality for golden eagles in North America (Dwyer et al. 2020). Power line collisions appear to be a less frequent source of mortality for raptors compared to electrocutions (Loss et al. 2014). Collisions with power lines are unlikely because most collection lines associated with the Facility will be buried, and transmission lines will be constructed following the APLIC recommendations for collision avoidance (APLIC 2012). Powerline electrocution is not expected at the Facility because all collector and transmission lines will be constructed following the latest APLIC design standards (APLIC 2012)[5], as specified in Site Certification Condition GEN-FW-02. The risk of collision with vehicles will be minimized by the implementation of speed limits on Facility roads (Section 9.0).

8.2.1.3 National and Regional Turbine Collision Trends – All Birds

Avian mortality at the Facility due to collision with turbines is anticipated. The Renewable Energy Wildlife Institute (REWI [formerly American Wind Wildlife Institute, or AWWI; 2020a]) reviewed existing public and private data on avian mortality at operational wind facilities nationwide. These data included 275 studies from 196 wind projects and are used here to anticipate potential impacts at the Facility from collision, while also considering the Facility's regional location, habitat, and the results of pre-construction surveys. Additionally, Jansen (2023) assessed data from 55 post-construction fatality monitoring studies conducted between 1999 and 2020 in the CPE where the Facility is located. Regional mortality data is a good predictor of mortality at a new project, and we expect that the fatality patterns of these two studies are representative of the expected pattern at the Facility, and provide context for understanding the potential for Facility-related impacts to birds.

AWWI (2020a) found that the timing of all-bird fatalities nationally exhibited two distinct seasonal peaks associated with spring and fall migration. Fatality timing for passerines displayed spring and fall fatality peaks, while there was a more uniform distribution of raptor fatalities throughout the year (AWWI 2020a). Seasonal peaks varied among biomes, but there was no discernable seasonality in bird fatalities in the Northern Rockies biome (derived from Bird Conservation Regions; includes eastern Oregon where the Facility is located). Jansen (2023) did not evaluate temporal patterns in bird fatalities.

In AWWI (2020a), small passerines constituted the largest percentage of fatalities, followed by doves/pigeons, diurnal raptors, and upland gamebirds. In the 46 available studies reviewed by AWWI (2020a) in the Northern Rockies avifaunal biome (derived from Bird Conservation Regions; includes eastern Oregon), small passerines accounted for 62 percent of fatalities, followed by upland game birds at 9 percent of fatalities, and diurnal raptors and doves/pigeons at 5 percent of fatalities each (AWWI 2020a). Waterfowl accounted for 4 percent of fatalities in the Northern

[5] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

Rockies, and the remaining bird groups (excluding unidentified birds) accounted for approximately 2 percent of fatalities or less.

Jansen (2023) summarized a total of 3,073 bird fatalities documented at 42 wind energy facilities during 55 studies in the CPE. Passerines composed the majority of all fatalities (61 percent), followed by upland game birds (11 percent), unidentified birds (9 percent), and diurnal raptors (8 percent). Collectively, owls and vultures composed less than 2 percent of all fatalities. The remaining 11 percent of species included the doves/pigeons group and other species' groups that had comparatively fewer fatalities. Species commonly associated with aquatic habitats (gulls/terns, loons/grebes, rails/coots, shorebirds, waterbirds, waterfowl) comprised approximately 2 percent of the total fatalities. Mean fatalities/MW/year estimated in Jansen (2023) included 2.57 birds/MW/year for all birds (excluding raptors), 0.12 birds/MW/year for raptors, and 1.08 bats/MW/year for bats. Mean fatalities/MW/year were estimated at 2.69 birds/MW/year for all birds including raptors (Jansen 2023).

As described in AWWI (2020a), the most common species reported as fatalities nationwide included horned lark (13 percent of fatalities), followed by mourning dove (*Zenaida macroura*; 6 percent), and red-eyed vireo (*Vireo olivaceus*) and western meadowlark (4 percent each). According to Jansen (2023), the most common species reported as fatalities within the CPE were the horned lark (30 percent of fatalities), followed by unidentified bird (6 percent), gray partridge (*Perdix perdix*; 5 percent), and golden-crowned kinglet (*Regulus satrapa*; 4 percent). Nationwide, the mean fatality rate for all birds was 1.83 birds/MW/year (AWWI 2020a). The Northern Rockies avifaunal biome had the smallest number of estimated of bird fatalities per megawatt per year (1.22 birds per megawatt per year) compared to other biomes (AWWI 2020a). The mean fatality rate for small birds, large birds, and raptors in the Northern Rockies avifaunal biome was 1.44, 0.25 and 0.8 birds per megawatt per year, respectively (AWWI 2020a).

8.2.1.4 Facility Impacts – All Birds

The most informative predictors of facility-specific estimated annual fatality rates are established estimated annual fatality rates from wind facilities in the vicinity of a facility and regional assessments of cumulative mortality. As a result of this, and considering the results of field surveys at the Facility, similar trends in species and species group fatalities to those observed regionally and nationally are anticipated at the Facility. Mean use at the Facility was dominated by passerines across all seasons (Wheatridge 2015). Passerine species commonly observed included horned lark, western meadowlark, European starling, and common raven, all of which have been observed as fatalities at wind projects (AWWI 2020a). Based on their known use at the Facility and documented fatalities at other wind projects, it is reasonable to expect that passerines, in particular horned larks, will make up the largest proportion of fatalities. Monitoring for bird and bat fatalities, including of state sensitive birds, will be conducted as part of Wildlife Monitoring and Mitigation Plan (WMMP) implementation, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

Wind energy is one of the fastest growing renewable energy sources in the United States and there are concerns that that there may be cumulative impacts of wind energy facilities on wildlife populations (Frick et al. 2017, Schippers et al. 2020, Lloyd et al. 2022). Cumulative effects can be additive and can negatively affect habitat use and selection, survival, and reproduction of wildlife to a greater extent than an effect from a single wind facility (Carrete et al. 2009). In addition to summarizing fatality rates for taxonomic bird groups from studies conducted from 1999–2020 in the CPE, Jansen (2023) assessed the cumulative effects of renewable energy development on birds in the CPE based on population estimates and anticipated wind energy development. Results of the analysis suggested no significant population-level effects are likely associated with bird species most often found during post-construction fatality monitoring (passerines and upland game birds) based on the small proportion of the robust populations affected (Jansen 2023). However, long-lived species with low reproductive rates, such as raptors and bats, are likely to be more sensitive to an increase in adult mortality and less able to compensate by increasing reproduction (Saether and Bakke 2000, Diffendorfer et al. 2021).

8.2.1.5 National and Regional Turbine Collision Trends – Raptors

Because of their life history attributes of low adult mortality and reproductive potential, the impact of collisions on raptors are of concern at wind projects. Diurnal raptor fatalities represented 7 percent of fatalities nationwide, and 5 percent of fatalities in the Northern Rockies avifaunal biome (AWWI 2020a). The American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*) were in the top ten most frequently reported bird fatalities nationwide (AWWI 2020a). Diurnal raptor fatalities represented 8 percent of fatalities in the CPE (Jansen 2023).

8.2.1.6 Facility Impacts – Raptors

A total of 16 raptor species were observed at the Facility during the 2011 to 2012 avian use surveys (15 at Wheatridge East and 10 at Wheatridge West), including three state sensitive species (burrowing owl, ferruginous hawk, and Swainson's hawk) and two eagle species (bald eagle and golden eagle; Wheatridge 2015). Rough-legged hawk (*Buteo lagopus*), northern harrier (*Circus hudsonius*), Swainson's hawk, and red-tailed hawk were the most frequently observed raptors at both Wheatridge East and Wheatridge West, though a much higher number of raptors were observed at Wheatridge West (1,847 individuals at Wheatridge West versus 238 at Wheatridge East; Wheatridge 2015). At Wheatridge West, raptor mean use values were highest during winter season (2.73 birds/20 minutes) when raptor use consisted mainly of rough-legged hawk (1.3 birds/20 minutes) and northern harrier (0.89 birds/20 minutes). At Wheatridge East, raptor mean use values were highest during spring season (0.90 birds/20 minutes) when raptor use was comprised mainly of rough-legged hawk and northern harrier (0.23 birds/20 minutes each) and red-tailed hawk (0.22 birds/20 minutes).

During the 2022–2023 avian use surveys, raptors were observed in all seasons and throughout the Amended Site Boundary (Attachment P-1). Eleven diurnal raptor species were observed during

surveys, including two state sensitive species (ferruginous hawk and Swainson's hawk). One other state sensitive raptor (burrowing owl) was recorded incidentally, and not during standardized surveys. Mean use values for diurnal raptors was highest during summer (0.97 birds/20 minutes) and spring (0.86 birds/20 minutes) when raptor use was composed mainly of red-tailed hawk, Swainson's hawk, and northern harrier. Red-tailed hawk, Swainson's hawk, and northern harrier were the most frequently observed raptors, with northern harrier most abundant in fall and winter, Swainson's hawk in spring, and red-tailed hawk in summer. Combined, these three species accounted for 65 percent of all diurnal raptor observations.

Aerial surveys conducted in 2022 and 2023 identified active nests belonging to seven raptor species visible from aircraft, including two state sensitive and one eagle species (i.e., ferruginous hawk, Swainson's hawk, and golden eagle; Attachment P-1). Red-tailed hawk and Swainson's hawk were the most common nesting species observed during the 2022 aerial surveys (24 and 11 active nests, respectively) and red-tailed hawk, ferruginous hawk, Swainson's hawk, and great horned owl were the most common nesting species observed during the 2023 aerial surveys (45, 10, nine, and nine active nests, respectively). Active nests of one other state sensitive raptor species, burrowing owl, which are not readily detectable from the air, were found during special status wildlife species surveys performed in 2022 and 2023. Each of these species have been observed as fatalities at wind farms (AWWI 2020a, Jansen 2023).

Although the relationship between use and mortality is not well understood (Ferrer et al. 2012), there is some potential risk of collision for any raptor species observed at the Facility. Fatality rates are likely to fall within the range seen in other studies conducted at wind energy projects within the region, as summarized in Section 8.2.1.3, above (Watson et al. 2018). Exposure to turbines may play an important role in determining mortality of raptors. Raptors nesting closest to turbines are likely to be impacted from disturbance or from collision with turbines. The Certificate Holder will implement buffer zones around sensitive raptor species nest sites, as required by condition PRE-FW-01[6]. Most of the raptor nests within the Amended Site Boundary were located in riparian areas or on cliff habitat along hillsides, below the hilltops where most of the turbines will be constructed. Raptors are known to take advantage of wind currents created by ridge tops, upwind sides of slopes, and canyons that are favorable for local and migratory movements (Katzner et al. 2012, Marques et al. 2020). Raptors are likely more at risk when turbines are placed in areas where there is an abundance of prey, particularly small mammals. Therefore, collision risk at the Facility may be somewhat dependent on whether raptors search for food on the hilltops near the turbines. To reduce raptor collision mortality, the Certificate Holder will avoid constructing turbines near areas of high prey density (e.g., WAGS colonies) to the extent feasible.

[6] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017), see Section 9

8.2.1.7 Species-specific Impacts

As described in Table P-4, 10 state sensitive bird species and two eagle species could potentially occur within the Analysis Area. Impacts specific to these bird species with the potential to occur within the Amended Site Boundary are addressed below.

As summarized above, the following information was used to assess potential impacts from the Facility, including the likelihood of population-level effects:

- occurrence within the Analysis Area;
- geographic range, associated habitat, threats, and life history traits;
- fatality estimates from wind energy studies nationally and in the region; and
- estimated population size and trend.

Measures described in Section 9.0 will be used to minimize or avoid these potential impacts.

Bald eagle (no state status, BGEPA-protected)

Bald eagles were observed within the Amended Site Boundary during avian use studies, special status wildlife surveys, and raptor nest surveys (Table P-4). Three bald eagles were recorded in the spring and winter season of the 2022–2023 avian use surveys. Bald eagle activity was only recorded in the southern half of the Amended Site Boundary, south of Big Butter Creek. Overall bald eagle mean use was less than 0.01 birds/plot/60-minute survey. All three observations were recorded at flight heights above the turbine risk cylinder resulting in zero recorded bald eagle minutes. A single bald eagle was observed during the 2011 to 2012 avian use studies. The observation occurred in winter. Four bald eagles were observed during special status wildlife surveys in 2023. No suitable nesting habitat for bald eagles exists at the Facility, and no bald eagle nests were found to occur in the Amended Site Boundary during raptor-nest surveys (Wheatridge 2015; Attachment P-1). Ten bald eagles were observed incidentally during the 2023 raptor nest surveys. All 10 bald eagles were observed during the initial survey, indicating those eagles were probably migrants. As noted in the ASC, use of the area by bald eagles is expected to be limited to migration and winter, when the species sometimes feeds on carrion (Wheatridge 2015, Buehler 2022).

Fatality rates reported for bald eagles have been low. Two bald eagle fatalities were documented at 337 wind projects nationwide (i.e., 0.1 percent of fatality incidents; AWWI 2020a); however, it is important to note that data submission to the American Wind Wildlife Information Center (AWWIC) database, upon which AWWI (2020a) is based, is voluntary and may not present a complete picture for this species. Within the CPE, Jansen (2023) reported one bald eagle fatality during post-construction fatality monitoring at wind energy facilities from 1999–2020 (i.e., 0.33 percent of 3,073 bird fatalities).

Bald eagle populations in the region and nationwide have been increasing rapidly in recent years. The estimated bald eagle population in the lower 48 states quadrupled from 72,000 individual bald

eagles in 2009, to 316,000 in 2019 (USFWS 2020b). Because of the increasing population trends, few fatality detections at operating wind facilities, and limited bald eagle activity recorded during avian surveys at the Facility, impacts to bald eagles from the construction and operation of the Facility are expected to be limited, and population-level impacts are not anticipated.

Brewer's Sparrow (sensitive species)

Relatively low numbers of Brewer's sparrows were observed in the Analysis Area during special status wildlife surveys and avian use studies (Table P-4). Brewer's sparrow was detected twice during the 2022-2023 avian use studies and once during the 2022 special-status wildlife surveys. There are no records of this species during the surveys from 2011 to 2012, as presented in the ASC. Brewer's sparrows are sagebrush obligates, generally occurring in sagebrush shrublands with a canopy height greater than 5 feet (OCS 2016, Rotenberry et al. 2020). They nest in thick crowns, or low in brush or clumps of grass. The Brewer's sparrow breeding season extends from mid-April to early August. Following the breeding season, adults and young often congregate into large, wandering flocks (Csuti et al. 2001). Potential adverse impacts to this species due to the construction and operation of the Facility include habitat loss, potential nesting disturbance, and collision with turbine blades. Less than 2 acres of Category 2 and 3 Basin Big Sagebrush Shrub-steppe habitat is expected to be permanently impacted by the construction of the Facility (Table P-6).

Sixteen Brewer's sparrow fatality incidents have been documented at wind projects nationwide (i.e., 0.2 percent of fatality incidents based on 337 studies) (AWWI 2020a), and this species represented 0.46 percent of bird fatalities in the CPE (i.e., 14 Brewer's sparrow fatalities out of 3,073 bird fatalities) as analyzed by Jansen (2023). Brewer's sparrow has a fairly large range in western North America but has experienced widespread long-term decline due to fragmentation and loss of sagebrush shrublands and shrub-steppe habitats. The Brewer's sparrow population in the Great Basin Bird Conservation Region (BCR) which overlaps the Facility, is 9,600,000 individuals, about 56 percent of the U.S. population (17,000,000; PIF 2020). Breeding Bird Survey (BBS) data indicate significant declines throughout its range during the last 50 years. Brewer sparrow population trend estimates in the Great Basin BCR indicate an annual decline of 2.74 percent (95 percent Confidence Interval [CI]: -4.06—1.44) from 1968–2019 (Pardieck et al. 2020). Based on the low incidence of collision with turbines, low use of the Amended Site Boundary, and minimization of Facility construction within Basin Big Sagebrush Shrub-steppe habitats, construction and operation of the Facility are not expected to adversely impact Brewer's sparrows. Therefore, despite population declines, population-level impacts are not expected.

Burrowing Owl (sensitive-critical species)

Burrowing owls have been observed within the Analysis Area during special status wildlife surveys and avian use studies (Table P-4.). Three burrowing owls were recorded as incidental observations during the 2022-2023 avian use studies. In 2023, 22 burrowing owls were observed during special status species surveys, primarily north of Big Butter Creek. A single burrowing owl was observed during the 2011-2012 avian use survey conducted for the ASC, in the fall. This species breeds in

burrows excavated by other animals in open areas with a high proportion of bare ground (OCS 2016, Poulin et al. 2020). Two active burrowing owl burrows were observed within the Amended Site Boundary in 2022 (Figure P-3a) and 20 were observed in 2023 (Figure P-3b), primarily north of Big Butter Creek. An active burrow was also located during the ASC special status wildlife surveys.

Burrowing owls are residents in Eastern Oregon during their breeding season (April to August), but then travel south for warmer climates during the winter. Potential adverse impacts to this species due to the construction and operation of the Facility include habitat loss, potential collapse of burrows and nesting disturbance, and collision with vehicles and turbine blades. This species is not generally susceptible to collision with turbines. According to AWWI (2020a), burrowing owls have been documented in six fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies at 227 wind projects) (AWWI 2020a). While AWWI (2020a) doesn't include burrowing owl fatalities from earlier generation smaller turbines, such as those initially constructed at the Altamont Pass Wind Resource Area where burrowing owl fatalities were common (Smallwood et al. 2007), AWWI (2020a) does provide sufficient data with enough geographic range to identify trends in collision based on modern turbines such as those proposed at the Facility. Jansen (2023) reported one burrowing owl fatality during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.33 percent of 3,073 bird fatalities). To prevent nesting disturbance, the Certificate Holder will implement buffer zones around burrowing owl nest sites as required by condition PRE-FW-01[7].

Burrowing owls have a very widespread distribution that extends from South America to Canada. They are relatively common in appropriate habitat in some areas (i.e., they can have high local abundance) (NatureServe 2023). The burrowing owl population in the Great Basin BCR which overlaps the Facility is 60,000 individuals, about 6 percent of the U.S. population (980,000; PIF 2020). BBS data indicate a relatively stable population trend, but there have been population declines in some areas. Burrowing owl population trend estimates in the Great Basin BCR from 1968–2019 have been generally stable (95 percent CI: -2.96–3.20; Pardieck et al. 2020). Reasons for burrowing owl declines include habitat loss and degradation and eradication of burrowing mammals such as ground squirrels (*Spermophilus* spp., *Urocitellus* sp.), yellow-bellied marmots (*Marmota flaviventris*), and American badgers (*Taxidea taxus*; Conway and Pardieck 2006). Studies have found burrowing owls have a lower potential for population impacts from wind energy development relative to other raptors studied (Diffendorfer et al. 2021, Jansen 2023). Based on the low to moderate use of the Amended Site Boundary, construction and operation of the Facility may impact burrowing owls, but due to the relatively low incidence of collision with turbines and a relatively stable population trend, any effects are not expected to cause population-level impacts. Monitoring for burrowing owl and other sensitive raptor fatalities will be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

[7] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017), see Section 9

Common nighthawk (sensitive species)

During the 2022-2023 avian use survey, 22 common nighthawk individuals were observed, all during the summer. During habitat categorization surveys in 2023, four common nighthawks were observed flying near Big Butter Creek. Additionally, one common nighthawk was observed during avian use survey in the summer of 2011. This is the only known record of the bird during the ASC surveys (from 2011 to 2012). It was not a sensitive-status species at the time of the ASC surveys and therefore, the location of the observation is unknown. This long-distance migrant species is only present in Oregon during its breeding season, from May to August. Common nighthawks tend to roost and nest on bare ground, especially on gravel roads (Brigham et al. 2020). Its nesting habitat is characterized by open landscapes with little ground cover and is most abundant in sagebrush and rocky scablands and rimrock habitats of eastern Oregon (OSC 2016). This bird is an aerial insectivore that feeds in low-light conditions at dusk and dawn, often near water, but also on insects attracted to artificial lights (Brigham et al. 2020). The primary potential impacts to common nighthawks during construction and operation are roosting and nesting disturbance and collision with vehicles and turbine blades.

Thirty-seven common nighthawk fatalities have been reported at 15 wind project studies nationwide (i.e., 0.4 percent of fatality incidents based on 337 studies at 227 wind projects) (AWWI 2020a). Jansen (2023) reported 18 common nighthawk fatalities during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.59 percent of 3,073 bird fatalities). Common nighthawk fatality rates at the Facility are likely to be similar to the fatality rates reported at other wind projects in the region.

The common nighthawk has a large population and wide breeding range mainly in North America. The common nighthawk population in the Great Basin BCR which overlaps the Facility is 3,000,000 individuals, about 15 percent of the U.S. population (PIF 2020). BBS data suggest a long-term slow decline in numbers in the United States, but common nighthawk population trend estimates in the Great Basin BCR from 1968–2019 have been generally stable (95 percent CI: -1.90–0.51; Pardieck et al. 2020). The reasons for the decline in common nighthawk populations have not been determined but changes in land use, overuse of pesticides, and increased predation on nests have likely contributed to the decline. Studies show that wind turbines are not generally a threat to this species (COSEWIC 2018). Therefore, although construction and operation of the Facility may impact common nighthawk based on their documented use of the Amended Site Boundary, any effects are not expected to cause population-level impacts. Monitoring for common nighthawk fatalities will also be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5). Additionally, the risk of common nighthawk collision with vehicles will be minimized by the implementation of a 20-mph speed limit on Facility roads as required by Condition GEN-FW-01, and the risk of common nighthawk collision with Facility buildings will be minimized by the implementation of downward directed lighting as required by Condition GEN-SR-01 (Section 9.0).

Ferruginous hawk (sensitive-critical species)

This species was detected during avian use and special status wildlife surveys for the Facility (Table P-4). Low numbers of ferruginous hawks were distributed throughout the Analysis Area during both the ASC avian use surveys and the 2022-2023 avian use surveys (Wheatridge 2015, Attachment P-1). During the 2022-2023 avian use surveys, ferruginous hawks were detected during the spring and summer only. During the ASC avian use surveys, ferruginous hawks were detected in all seasons, but most observations occurred in the spring and summer (Wheatridge 2015) when the species breeds on the Columbia Plateau (Ng et al. 2020).

This species occurs in grassy areas and shrub-steppe with scattered shrubs or trees for perching and nesting. They can nest in juniper or cottonwood trees near small streams, on rocky sites with an expansive view, on rimrock, or on undisturbed ground (OCS 2016). They hunt larger prey, mainly jackrabbits (*Lepus* sp.), cottontails (*Sylvilagus* sp.), ground squirrels, and prairie dogs (*Cynomys* sp.) where they occur. Like many other raptor species, reproductive success of ferruginous hawks fluctuates according to prey abundance and availability. Ferruginous hawks utilize a variety of hunting strategies from perch-hunting to low-flight to ground-hunting (Ng et al. 2020). Ferruginous hawks can be present in breeding territories as early as late February to early March, and the Oregon breeding season for this species is from April to July (Adamus et al. 2001, Ng et al. 2020).

Four active ferruginous hawk nests were located within the aerial raptor-nest survey area in 2011 (Wheatridge 2015). There were two active ferruginous hawk nests documented within the Analysis Area during surveys for the Facility in 2019, 2020, and 2022, one of which was located within the Amended Site Boundary (Figure P-3a). During the 2023 raptor nest surveys, six active ferruginous hawk nests were documented within the Analysis Area, four of which were located with the Amended Site Boundary (Figure P-3b).

During construction and operation, nesting and foraging disturbance and collisions with turbine blades may adversely impact this species. Potential indirect impacts include habitat loss, fragmentation, and behavioral changes. Ferruginous hawks have been documented in 13 fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies) (AWWI 2020a). Jansen (2023) reported eight ferruginous hawk fatalities during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.26 percent of 3,073 bird fatalities). Jansen (2023) found that although fewer ferruginous hawk fatalities have been documented at wind energy facilities compared to other raptors, ferruginous hawk breeding populations in the CPE are comparatively small with sustained declining populations in some areas (e.g., Washington state) that makes the species more sensitive to increased mortality from any source. In north-central Oregon, nest success and post-fledging survival of ferruginous hawks decreased as the number of wind turbines within the home range buffer (12 miles) increased (Kolar and Bechard 2016).

Ferruginous hawks have a widespread distribution and are relatively common in the appropriate habitat. The ferruginous hawk population in the Great Basin BCR which overlaps the Facility is 18,000 individuals, about 21 percent of the U.S. population (87,000; PIF 2020). Overall population

trends have been stable or slightly increasing despite ongoing loss of nesting and foraging habitat: BBS data for the Great Basin Bird BCR indicate an average annual 1.58 percent population increase (95 percent CI: -0.55–3.86) from 1968–2019 (Pardieck et al. 2020). However, the ferruginous hawk is thought to be declining in several areas of its breeding range, including Washington state where it was recently uplisted to endangered. The loss, degradation, and fragmentation of shrub-steppe and grasslands and associated declines in distribution and abundance of its primary prey (jackrabbits and ground squirrels) are thought to be the primary cause for population declines in Washington (Hayes and Watson 2021).

Although fewer ferruginous hawk fatalities have been documented at wind energy facilities compared to other raptors, there may be greater risk of collision with wind turbines at the Facility given the presence of suitable foraging and breeding habitat for ferruginous hawks. In 2023, 47 ferruginous hawk nests (10 active nests and 37 inactive nests) were documented within 2 miles of the Amended Site Boundary. Additionally, studies have found ferruginous hawks have a higher risk of experiencing population declines from wind energy development compared to other raptors studied (Diffendorfer et al. 2021, Jansen 2023). To reduce raptor collision mortality, the Certificate Holder will avoid constructing turbines near areas of high prey density (e.g., WAGS colonies), to the extent practicable. All turbines have been sited greater than 0.5 miles from active ferruginous hawk nests (Attachment P-1), and the Certificate Holder will not conduct ground disturbing activities within 0.25 miles of active ferruginous hawk nests during the nesting season as described in Section 9. The presence of suitable foraging and breeding habitat and the presence of several ferruginous hawk territories within the vicinity of the Facility indicate there is potential for adverse impacts to ferruginous hawks. However, based on population estimates and trends within the CPE and Oregon, the low mean use recorded within the Amended Site Boundary during avian use studies, and the low incidence of collision with turbines at wind energy facilities, construction and operation of the Facility is not likely to adversely impact ferruginous hawk populations. The WMMP (Attachment P-5) includes short-term and long-term nest monitoring to determine whether there are noticeable changes in nesting activity or nesting success in the local ferruginous hawk population. Monitoring for ferruginous hawks and other sensitive raptor fatalities will also be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

Golden eagle (no state status, BGEPA-protected)

Golden eagles were observed within the Analysis Area during avian use surveys, special status wildlife surveys, and raptor nest surveys (Table P-4). Golden eagle habitat generally includes open to semi-open terrain where they can effectively find and capture prey (Katzner et al. 2020). Typical habitats are often associated with areas containing some topographic relief, such as rolling foothills and mountainous areas, but golden eagles also utilize flatter areas (e.g., sagebrush flats and agricultural fields). Golden eagles most often nest on cliffs or rock outcrops but may also nest in trees or on manmade structures where high-quality cliff sites are limited.

During the 2022–2023 avian use surveys, eight golden eagles were recorded during spring, fall, and winter. Golden eagle activity was only recorded in the southern half of the Amended Site Boundary,

south of Butter Creek. Overall golden eagle mean use was low (0.02 birds/plot/60-minute survey). Of the eight golden eagle observations, five were observed within the turbine risk cylinder for a total of 11 golden eagle minutes. Use of the Analysis Area by golden eagles during the ASC avian point surveys was observed year-round but primarily occurred in winter and spring (Wheatridge 2015). The species was observed at 12 of the 15 ASC avian survey plots that overlapped the Analysis Area, indicating potential use throughout the Amended Site Boundary.

Golden eagle nests were detected during the 2022 and 2023 raptor nest surveys. During the 2022 surveys, one in-use (active) golden eagle nest and four alternate (inactive) golden eagle nests were recorded within the raptor-nest survey area (Attachment P-1). There were eight other historical nest records with the raptor nest survey area that were no longer present in 2022 (Attachment P-1). The in-use golden eagle nest and two of the alternate golden eagle nests were located within the Amended Site Boundary. Two of the four golden eagles detected incidentally during the surveys were observed flying in the vicinity of the two alternate nests located outside of the Amended Site Boundary. These nests may have been occupied and failed prior to the aerial surveys. Alternatively, in years when food resources are scarce, it is not uncommon for a pair of eagles to occupy a territory yet never lay eggs. Both of these inactive nests were used by golden eagles in 2023.

During the 2023 raptor nest surveys, three in-use (active) golden eagle nests and three alternate (inactive) golden eagle nests were recorded within the survey area (Attachment P-1). One of the in-use golden eagle nests was a new nest; the other five nests detected during the 2023 surveys were previously known nests. There were seven other historical nest records within the raptor nest survey area that were confirmed to no longer be present in 2023 (Attachment P-1). Two of the in-use golden eagle nests and two of the alternate golden eagle nests were located within the Amended Site Boundary. However, no turbines are sited within 2 miles of the six golden eagle nests recorded in 2023 (Attachment P-1). The nearest nest (alternate nest 7) is 2.04 miles from the nearest turbine.

Golden eagles primarily prey on leporid (e.g., hares and rabbits) and sciurid species (e.g., ground squirrels), but will also take other mammals, birds, and reptiles and can kill larger animals, including deer, bighorn sheep (*Ovis canadensis*), and domestic livestock (Bedrosian et al. 2017, Katzner et al. 2020). Golden eagles are opportunistic feeders and also eat carrion when available (Katzner et al. 2020). Deer and elk (*Cervus canadensis*) carrion can be an important food source for eagles especially in the winter when prey is less available (O'Connell and Kochert 2013). Sources of deer and elk carrion include animals killed by winter exposure and those accidentally killed by motor vehicles, and as well as offal piles left from field dressed animals. The Certificate Holder mapped WAGS colonies within the Amended Site Boundary in 2022 and 2023 (Attachment P-1). Other sources of golden eagle prey noted during the 2022 and 2023 special status wildlife surveys included elk, mule deer (*Odocoileus hemionus*), white-tailed jack rabbits (*Lepus townsendii*), yellow-bellied marmots (*Marmota flaviventris*), Belding's ground squirrel (*Urocitellus beldingi*), and gamebirds (e.g., ring-necked pheasants [*Phasianus colchicus*] and California quail [*Callipepla californica*]). Herds of mule deer and elk were observed during the 2022 and 2023 aerial raptor nest surveys.

The primary potential impacts to golden eagles during construction and operation of the Facility are nesting and foraging disturbance and collision with turbine blades. Fifteen golden eagle fatalities have been reported at 12 wind project studies nationwide (i.e., 0.2 percent of fatality incidents based on 337 studies at 227 wind projects) (AWWI 2020a). Jansen (2023) reported four golden eagle fatalities during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.13 percent of 3,073 bird fatalities). To reduce raptor collision mortality, the Certificate Holder will avoid constructing turbines within 2 miles of known eagle nest locations or near areas of high prey density (e.g., WAGS colonies) to the extent practicable.

Golden eagles have a widespread distribution throughout the Northern Hemisphere. The U.S. population is estimated to be 40,000 individuals (PIF 2020). Golden eagle population estimates for Oregon or the Great Basin BCR which overlaps the Facility were not available from Partners in Flight. However, estimates suggest that the population in the western United States is either stable or undergoing a slight decline, with an average of approximately 31,800 individuals for the last several decades (USFWS 2016b, Millsap et al. 2022). Golden eagle population trend estimates in the Great Basin BCR from 1968–2019 have been generally stable (95 percent CI: -1.47-1.02; Pardieck et al. 2020). Based on the low use of the Amended Site Boundary by golden eagles despite the presence of suitable nesting and foraging habitat, avoidance measures to site turbines away from nests and prey concentrations, the relatively low incidence of collision with turbines and a relatively stable population trend, construction and operation of the Facility are not expected to cause population-level impacts to golden eagles. Furthermore, the WMMP includes short-term and long-term nest monitoring to determine whether there are noticeable changes in nesting activity or nesting success in the local population of golden eagles. Monitoring for golden eagles and sensitive raptor fatalities will also be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

Grasshopper sparrow (sensitive species)

Grasshopper sparrows were observed throughout the Amended Site Boundary during special status wildlife surveys and avian use surveys (Table P-4). The grasshopper sparrow was widely distributed across the Facility throughout most habitat types and was among the most abundant avian species during spring and summer seasons (Wheatridge 2015). Grasshopper sparrows use dry grassland habitat, generally with low to moderate grass height and low percent shrub cover (OCS 2016). Observations within the Amended Site Boundary during the 2011 to 2012 avian use surveys were limited to the spring and summer seasons. Observations during the 2022-2023 avian use surveys were limited to the summer season. Northern populations are migratory, generally arriving in May and leaving in August (Vickery 2020). Though designated a state sensitive species due to conversion of native grassland habitat to agriculture and other development, the grasshopper sparrow is one of the most common avian species in the vicinity of the Facility and within the CPE overall, during the seasons it is present.

Potential impacts from construction and operation of the Facility include the loss of suitable breeding and foraging habitat, nest disturbance, and collision with turbine blades. Grasshopper sparrows have been documented in 31 fatality incidents at wind projects nationwide (i.e., 0.3

percent of fatality incidents based on 337 studies at 227 wind projects) (AWWI 2020a). Jansen (2023) reported one grasshopper sparrow fatality during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.03 percent of 3,073 bird fatalities). As a result, impacts to grasshopper sparrow from collisions with turbine blades are anticipated to be minimal.

Grasshopper sparrow has a large range, extending from southern Canada to northern South America, but there have been significant population declines in North America due to loss, degradation, and incompatible management of grassland habitat. The grasshopper sparrow population in the Great Basin BCR is 410,000 individuals, about 1 percent of the U.S. population (33 million individuals; PIF 2020). BBS data indicate an annual population decline of 2.58 percent (95 percent CI: -4.61 to -0.51) in the Great Basin BCR from 1968–2019 (Pardieck et al. 2020).

In the Dakotas, grasshopper sparrows were displaced 300 meters from suitable breeding habitat in native mixed-grass prairies after wind turbine construction (Shaffer and Buhl 2016). Shaffer and Buhl (2016) found that wind facilities appear to be an additional landscape change not tolerated by grasshopper sparrows, and the construction of additional wind facilities throughout native grasslands could be detrimental to the species. However, grasshopper sparrows may not abandon sites completely; rather, they may relocate away from the turbines and establish territories farther from turbines. Although the risk of collision with turbines appears to be low, there could be reduced use of suitable habitat by breeding grasshoppers in the vicinity of Facility turbines. This species can use a variety of habitat types and as a result, grasshopper sparrows displaced by construction and operation of the Facility are expected to relocate to other comparable habitat in the vicinity. Habitat mitigation as described in the Draft Habitat Mitigation Plan (see Attachment P-2) will benefit grassland birds, including the grasshopper sparrow. Therefore, construction and operation of the Facility are not expected to cause population-level impacts to grasshopper sparrows.

Lewis' woodpecker (sensitive-critical species)

This species was not detected during surveys for the Facility. Lewis' woodpeckers are associated with open forests, often at lower elevations, and nest in woodlands of the river valleys of eastern Oregon (Csuti et al. 2001). This species has the potential to pass through the Facility during migration. No Lewis' woodpecker fatalities were recorded during post-construction fatality monitoring at wind projects nationwide (based on 337 studies at 227 wind projects; AWWI 2020a). Jansen (2023) reported one Lewis' woodpecker fatality during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.03 percent of 3,073 bird fatalities). Based on the lack of use of the Amended Site Boundary and low incidence of collision with turbines, construction and operation of the Facility are not expected to result in population-level impacts to Lewis' woodpeckers.

Loggerhead shrike (sensitive species)

Loggerhead shrikes were detected both during avian use surveys and special status wildlife surveys for the Facility (Table P-4). The species is narrowly distributed and relatively uncommon within the vicinity of the Facility (Wheatridge 2015). The loggerhead shrike was observed once within the Amended Site Boundary during both the 2011 to 2012 and 2022-2023 avian use surveys. This species uses tall sagebrush for nesting and roosting, and forages in open areas with grasses and bare ground (OCS 2016). Most loggerhead shrikes arrive in Oregon in March and depart for fall migration by September, though they are rare but regular in the winter east of the Cascades (Csuti et al. 2001, OCS 2016). Loggerhead shrikes are unusual among songbirds for being largely predatory. Their prey includes grasshoppers, lizards, rodents, and small birds which they often impale on sharp objects such as branches or barbed wire to store for later consumption (Yosef 2020).

Potential adverse impacts on this species due to the construction and operation of the Facility include habitat loss, potential nesting disturbance, and collision with turbine blades. Loggerhead shrikes have been documented in 13 fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies) (AWWI 2020a). No loggerhead shrike fatalities were recorded during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (Jansen 2023). As a result, impacts to loggerhead shrike from collisions with turbine blades are anticipated to be minimal.

The loggerhead shrike ranges throughout most of North America, from southern Canada to southern Mexico. Although widespread, it has an uneven and local distribution. In the northern portion of its range which includes the Facility, it's a short-distance migrant that winters in the southern United States and Mexico. Loggerhead shrikes are fairly numerous, but their populations in some areas have fallen sharply over the past half-century. The loggerhead shrike population in the Great Basin BCR which overlaps the Facility is 710,000 individuals, about 16 percent of the U.S. population (4,400,000 individuals; PIF 2020). BBS data indicate an annual population increase of 0.56 percent (95 percent CI: -1.07 -2.16) in the Great Basin BCR from 1968–2019 (Pardieck et al. 2020). However, the overall population within the United States has declined on average by 1.96 percent each year between 1966 and 2010 (Pardieck et al. 2020). Reasons for population decline are poorly understood but may be related to pesticides and changes in habitat. Population declines in the state of Washington have been linked to the degradation and conversion of native grasslands and arid shrublands to agriculture and urbanization. Despite declining populations, construction and operation of the Facility are not expected cause population-level impacts to loggerhead shrikes based on the low use of the Amended Site Boundary, low incidence of collision with turbines, and relatively stable populations in the Great Basin BCR.

Long-billed curlew (sensitive-critical species)

Long-billed curlews were observed within the Amended Site Boundary during avian use surveys and special status wildlife surveys (Table P-4). The long-billed curlew was the most abundant sensitive bird species observed within the Amended Site Boundary during the both the 2011 to

2012 and 2022-2023 avian use surveys (166 individuals observed at 11 survey points and 51 individuals observed at 12 survey points, respectively). However, long-billed curlew mean use was relatively low (0.45 birds/plot/60-minute survey in the spring, 0.07 birds/plot/60-minute survey in the summer, and 0.00 birds/plot/60-minute survey in the fall and winter; Attachment P-1). Most of the detections occurred in the northern portion of the Amended Site Boundary. This species was not detected during fall or winter, as curlews abandon the breeding grounds in mid-summer to spend the remainder of the year in coastal habitats (Dugger and Dugger 2020). Long-billed curlews prefer open habitat with relatively short grass and little woody vegetation, and can occur in dryland wheat (OCS 2016, Dugger and Dugger 2002).

Potential adverse impacts to this species due to the construction and operation of the Facility include habitat loss, potential nesting disturbance, and collision with turbine blades. Although adaptable to habitats readily available throughout the Columbia Plateau (i.e., grassland and dryland wheat), long-billed curlews are susceptible to human disturbance during the breeding season and may abandon nests if disturbed during construction (Dugger and Dugger 2020). Although Facility construction taking place during the breeding season may adversely affect breeding success, habitat mitigation as described in the Draft Habitat Mitigation Plan (see Attachment P-2) will benefit birds associated with grassland, including the long-billed curlew. Additionally, in compliance with Condition CON-FW-03, all employees and contractors working in the field will be required to attend environmental training prior to working at the Facility. This training will include identification of long-billed curlew nests and the appropriate notifications and flagging procedures to avoid disturbance of active nests.

Long-billed curlews have been documented in 10 fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies) (AWWI 2020a). Jansen (2023) reported a total of nine long-billed curlew fatalities during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.29 percent of 3,073 bird fatalities). As a result, impacts to long-billed curlew from collisions with turbine blades are anticipated to be minimal.

Long-billed curlews occupy a wide range of grassland and agricultural habitats during the breeding season, and an even wider range of habitats during the wintering period. They are not present near the Facility during winter. Population estimates for the long-billed curlew were not available from Partners in Flight. In 2009, the USFWS estimated the population to be 123,400 individuals. Long-billed curlew population trend estimates in the Great Basin BCR from 1968–2019 have been generally stable (95 percent CI: -0.30 to 2.98; Pardieck et al. 2020). Primary threats to the long-billed curlew include the loss of native mixed-grass and shortgrass prairie to agriculture and development on breeding and wintering grounds. Based on the low incidence of collision with turbines, and relatively stable populations in the Great Basin BCR, construction and operation of the Facility are not expected to cause population-level impacts to long-billed curlews.

Sagebrush sparrow (sensitive-critical species)

This species was detected during special status species surveys for the Facility in 2023. This species is found in shrub-steppe habitat with high shrub cover, and is closely associated with big sagebrush communities (OCS 2016). Potential adverse impacts to this species due to the construction and operation of the Facility include habitat loss, potential nesting disturbance, and collision with turbine blades.

Sagebrush sparrows have been documented in only one fatality incident at wind projects nationwide (i.e., less than 0.1 percent of fatality incidents based on 337 studies) (AWWI 2020a). Jansen (2023) also reported one sagebrush sparrow fatality during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e., 0.03 percent of 3,073 bird fatalities). Based on the limited use of the Amended Site Boundary and low incidence of collision with turbines, impacts from construction and operation of the Facility are expected to be minimal, and population-level impacts to sagebrush sparrows are not anticipated.

Swainson's hawk (sensitive species)

This species was detected during avian use and special status wildlife surveys for the Facility (Table P-4). During the 2022–2023 avian use surveys, 31 Swainson's hawks were recorded during spring and summer. During the ASC avian use surveys, Swainson's hawk activity was distributed throughout the Amended Site Boundary, in the spring, summer and fall (Wheatridge 2015). Swainson's hawks are open-country specialists that hunt and forage in grassland, shrub-steppe, and agricultural areas (Bechard et al. 2020). Swainson's hawks have relatively large area requirements (OCS 2016, Bechard et al. 2020). They are often attracted to cultivated lands where the disturbance of agriculture causes concentrations of insects and rodents (Bechard et al. 2020). They hunt both from the ground and air. Nests are frequently in lone trees or isolated shrubs in open country. Swainson's hawks typically establish breeding territories after arriving from South America in April and complete breeding by early August (Csuti et al. 2001). There were 24 active nests located within the aerial raptor nest survey area in 2011 (Wheatridge 2015). Active Swainson's hawk nests were documented at seven locations within the Analysis Area during surveys for the Facility in 2019, 2020, and 2022 (Figure P-3a). Four of these nests were in the Amended Site Boundary. During the 2023 raptor nest surveys, six active Swainson's hawk nests were documented within the Analysis Area, four of which were located with the Amended Site Boundary (Figure P-3b). All turbines have been sited greater than 0.25 miles from active Swainson's hawk nests (Attachment P-1). The nearest nest is 0.37 miles from a turbine.

Construction and operation of the Facility may result in nesting disturbance, habitat loss, and collision with turbine blades. To prevent disturbance to nesting Swainson's hawks, the Certificate Holder will not conduct ground-disturbing activities within 0.25 miles of active Swainson's hawk nests during the nesting season, as described in Section 9. Construction and operation of the Facility may also decrease foraging opportunities for these raptors during spring, summer, and fall, when they are present on the Columbia Plateau. Swainson's hawks have been documented in 52 fatality incidents at wind projects nationwide (i.e., 0.5 percent of fatality incidents based on 337

studies) (AWWI 2020a). Jansen (2023) reported 33 Swainson's hawk fatalities during post-construction fatality monitoring at wind energy facilities within the CPE from 1999–2020 (i.e.,1.07 percent of 3,073 bird fatalities).

In the 1990s, Swainson's hawks showed an alarming decline in the western United States, which was traced to pesticide misuse in its wintering grounds of Argentina. Since then, Swainson's hawk numbers have stabilized, but loss of prey and elimination of nesting sites and winter foraging habitat remains a concern for this species. The Swainson's hawk population in the Great Basin BCR which overlaps the Facility is 640,000 individuals, about 15 percent of the U.S. population (640,000 individuals; PIF 2020). BBS data indicate an annual population increase of 3.68 percent (95 percent CI: 2.32 -5.09) in the Great Basin BCR from 1968–2019 (Pardieck et al. 2020).

Based on their known use within the Analysis Area, and documented fatalities at other wind projects, Swainson's hawks are anticipated as potential fatalities at the Facility during migration or the breeding season. However, given their large population and stable populations in the Great Basin BCR, in addition to protective seasonal buffers of nests during construction, construction and operation of the Facility are not expected to result in population-level impacts to Swainson's hawks. The WMMP includes short-term and long-term nest monitoring to determine whether there are noticeable changes in nesting activity or nesting success in the local population of Swainson's hawk. Monitoring for Swainson's hawk and other sensitive raptor fatalities will also be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

8.2.2 Mammals

Five state sensitive bat species have the potential to occur within the Analysis Area (Table P-4). This section describes potential impacts to bats in general from construction and operation of the Facility, then summarizes anticipated impacts to each species based on the results of field surveys, review of known risk factors including estimated national and regional fatality patterns, and population estimates and trends, where available.

Wind turbines represent one of the largest sources of human-caused mortality for bats (Cryan 2011, O'Shea et al. 2016). Most bat species have low reproductive rates, increasing their potential for population-level impacts. Population-level effects, particularly for migratory tree-roosting bats may occur based upon cumulative effects of collisions with turbines in the United States and Canada as wind energy development increases (Hayes 2013, Zimmerling 2016). In the United States and Canada, approximately 75 percent of all wind energy-related fatalities consist of three species of migratory tree-dwelling bats, two of which (hoary bat, silver-haired bat) were detected during acoustic monitoring at the Facility (Squires et al. 2021). Hoary bat is the most widespread species among carcasses found during post-construction fatality monitoring conducted at wind farms in the United States and Canada, and is the most numerous among carcasses found (Arnett and Baerwald 2013, AWWI 2020b, Thompson et al. 2017). Efforts are underway to understand the scale of existing impacts to the hoary bat population due to wind energy development, and to assess whether projections of future impacts may be confidently made. However, gaps in baseline

population size data for this species remain a confounding factor in cumulative impact analyses (Friedenberg and Frick 2021). In Oregon, silver-haired bats and hoary bats rely on late-successional conifer forests for roosts but can be found in other habitats during migration (OCS 2016).

8.2.2.1 National and Regional Turbine Collision Trends

REWI has compiled publicly available bat collision fatality data from wind energy facilities in the United States (AWWI 2020b). Twenty-two species of bats were recorded as fatalities nationwide. The nationwide median fatality rate was 3.01 bat fatalities per megawatt per year. The USFWS Pacific Region (including Eastern Oregon) had the lowest range median fatality rate (0.69 bat fatalities per megawatt per year) compared to other USFWS Regions (based on 37 Pacific Region studies). Nationwide, hoary bat had the highest percentage of fatality incidents (31 percent) and the highest frequency of occurrences in post-construction fatality monitoring studies (95 percent; 259 of 273 studies). As noted above, the three migratory tree bats (hoary bat, eastern red bat [*Lasiurus borealis]*, and silver-haired bat) collectively accounted for 72 percent of all fatality incidents. In the USFWS Pacific Region, hoary bat and silver-haired bat were the most common bat species found as fatalities; hoary bats represented 47 percent of total bat fatalities found, while silver-haired bats accounted for 45 percent of bat fatalities regionally (AWWI 2020b). The eastern red bat does not occur within the Analysis Area. All other bats species accounted for less than 3 percent of bat fatalities in the USFWS Pacific Region.

Another source of summary information on direct impacts to bats resulting from collision of wind turbines in the CPE came from Jansen (2023). A total of 1,124 bat fatalities were documented at 37 wind energy facilities during 48 studies conducted from 1999–2020. The median fatality rate for the CPE was 0.77 bat fatalities per megawatt per year, which was similar to the fatality rate REWI reported for the Pacific Region. Four species of bats (hoary bat, silver-haired bat, little brown bat, and big brown bat) were recorded as fatalities in the CPE. Similar to other studies, a disproportionate number of migratory tree and leaf roosting bats were found; hoary bat and silver-haired bat comprised nearly 96 percent of all bat fatalities in the CPE. Johnson and Erickson (2011) had previously provided a regional summary and characterization of the effects of wind energy development on birds and bats in the CPE. Compared to 2011, the total number of hoary bat and silver-haired bat fatalities in the CPE nearly doubled, with hoary bat replacing silver-haired bat as the species most often found during fatality monitoring (Jansen 2023). There were marginal increases in the total number of fatalities found for other bat species (Jansen 2023).

Because hoary bat and silver-haired bat comprised most of the bat fatalities at fatality monitoring in the region, the Facility and new wind energy development in the surrounding area may affect these two species comparatively more than other bat species. The hoary bat and silver-haired bat have been documented as fatalities at wind projects across North America, most frequently in late summer and early fall during migratory periods (Arnett et al. 2008, Kunz et al. 2007, Strickland et al. 2011). Bat fatalities also occur during spring migration for some species at some facilities. Therefore, the greatest risk for migratory bats within the Amended Site Boundary is likely to occur during migration periods when bats are moving between summer and winter areas.

8.2.2.2 Challenges with Predicting Population Level Effects

Currently, there are no reliable population estimates for most bats. Estimating bat population abundance and trends is challenging due to bats' cryptic nature, wide ranging habits, and variable detectability (Frick et al. 2020, USFWS 2022c). Additionally, there is lack of information about where bat hibernacula occur, including the western United States (Weller et al. 2018). Over a third of bat species assessed by the International Union for Conservation of Nature are considered threatened or data deficient, and well over half of the species have unknown or decreasing population trends (Frick et al. 2020). A variety of methods have been developed and continue to be improved to fulfill this important information need, including winter and summer colony counts, mist-netting, acoustic monitoring, and mark-recapture studies (USFWS 2022c). However, these efforts are often limited in scope or have been inconsistently applied across species' ranges. There is concern that bat populations may not be able to sustain the existing rate of wind turbine fatalities and increased fatalities as the wind industry continues to grow (Kunz et al. 2007, Arnett et al. 2008). Although cumulative impacts raise concern, because population sizes and other sources of mortality are poorly understood it is difficult to determine whether bat fatalities at wind facilities represent a significant threat to bat populations, and more studies are needed to assess population impacts (Kunz et al. 2007, Arnett et al. 2008).

8.2.2.3 Other Factors Impacting Bats

In addition to mortality from wind turbines, another threat to bats in North America is the devastating bat disease called white-nose syndrome (WNS; *Pseudogymnoascus destructans*). WNS causes bats to wake up more frequently during hibernation, wasting precious fat reserves, which often leads to starvation. The disease is estimated to have killed millions of bats in the Midwestern and Eastern United States and can kill up to 100 percent of bats in a colony during hibernation. Bats that congregate in groups and hibernate in caves during winter have been the most affected by WNS. None of the five state sensitive species with potential to occur at the Facility have shown symptomatic, lethal responses to the fungus (WNS Team 2023). Silver-haired bats and Townsend's big-eared bats have been found carrying the fungus but had asymptomatic responses. To date, hoary bats, pallid bats, and spotted bats have not known to be affected by WNS (WNS Team 2023).

WNS was first detected in New York in 2006 and has been steadily spreading westward across the United States. The first case of WNS in Washington state was confirmed in 2016. Since then, the Washington Department of Fish and Wildlife (WDFW) has confirmed over 150 cases of the disease in at least four bat species in the state (WDFW 2023a). It has been found in several Washington counties, including Lewis, Mason, and Yakima, which are not far from Oregon's northern border. With the disease already in Washington state, it's probably just a matter of time before it arrives in Oregon (Oregon Capital Chronicle 2022). The spread of WNS could cause severe bat population declines, but we do not yet know how WNS will impact western bats. Bats in the west tend to hibernate in small groups dispersed across large expanses, as opposed to bats in the east that are often hibernate in large colonies clustered into a small number of caves. Fatality rates from wind turbines are typically lower for many of the species susceptible to WNS (Arnett and Baerwald,

2013; Langwig et al., 2012). However, the combined effects of mortality from WNS and wind turbine collisions may threaten some species (Erickson et al. 2016).

8.2.2.4 Facility Impacts

Of the five state sensitive bat species with the potential to occur within the Analysis Area, three species (i.e., hoary bats, pallid bats, and silver-haired bats) were detected during acoustic bat surveys, including at stations within the Analysis Area (Wheatridge 2015; Attachment P-1; Figure P-4). Spotted bats and Townsend's big-eared bats were not detected during surveys. The Analysis Area provides potentially suitable roosting habitat for bats, including Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian habitat and Caves, Cliffs, and Talus habitat (Table P-4, Figure P-5). Additional, potentially suitable rocky habitat within the Analysis Area includes rock outcrops recorded during habitat and wildlife surveys in 2022 and areas of cliff-nesting substrate identified during raptor-nest surveys in 2022 and 2023, primarily along Big Butter Creek. These rock outcrops and areas of cliff substrate were not delineated as separate habitat polygons but are depicted on Figure P-8 along with the Cliff, Caves, and Talus habitat to illustrate the full extent of cliff and rocky habitat potentially suitable for bats within the Analysis area.

During bat monitoring surveys in 2011, the greatest number of bat species (seven species) were observed at Station 7B, located in riparian habitat along Big Butter Creek (Figure P-4). The riparian habitat and perennial stream at this location provide higher moisture than the surrounding landscape, which likely supports a higher concentration of insect prey in the area. In addition, rock outcrops and cliffs were present on the hillsides surrounding Big Butter Creek, Little Butter Creek, and several tributaries to these creeks, which are preferred roosting and foraging locations for some bat species (e.g., western small-footed myotis, which was observed at all four of the monitoring locations in the vicinity of Big Butter Creek) (Figure P-4). During bat monitoring surveys in 2022, the greatest number of bat species (eight species) were observed at Station WR2, located south of Big Butter Creek and east of Little Butter Creek. These results suggest that species richness is highest in areas with features suitable for roosting and foraging Myotis species (i.e., trees, water sources, rocky outcroppings). As noted above, turbines have generally been sited up on ridges and above these cliff and stream habitats. However, given the prevalence of suitable roosting and foraging habitat within the Amended Site Boundary and regional fatality trends, impacts to bats from operation of the Facility are anticipated, especially to the state sensitive hoary bat and silver-haired bat, which are migratory tree bats.

8.2.2.5 Species-specific Impacts

Potential impacts on state sensitive bat species as a result of the construction and operation of the Facility are summarized below. The following information was used to assess potential impacts from the Facility, including the likelihood of population-level effects:

- occurrence within the Analysis Area;
- geographic range, associated habitat, threats, and life history traits;

- fatality estimates from wind energy studies nationally and in the region; and
- estimated population size and trend.

Measures described in Section 9.0 will be used to minimize or avoid these potential impacts.

Hoary bat

The detection of hoary bat at two of the seven acoustic monitoring sites within the Analysis Area in 2011 and all three acoustic monitoring sites in 2022 suggests that this species flies through much of the Facility during the late summer and fall months, concurrent with its migration period (Wheatridge 2015). The Facility does not provide suitable breeding habitat for hoary bat. As described in the ASC, the potential adverse impact to this species is collision with turbines, and individuals of this species are likely at moderate to high risk from the Facility (Wheatridge 2015). Hoary bats comprised 47 percent of total recorded bat fatalities in the USFWS Pacific Region (AWWI 2020b).

The hoary bat is seasonally locally common in western and central North America, and generally uncommon in the east. It is basically solitary and does not form substantial aggregations, though groupings may occur during migration (Valdez and Cryan 2009). The species can disperse widely but requires a minimum density of large trees for roosting. Across the United States, hoary bats have been the most common species among reported bat fatalities at wind farms (AWWI 2020b, Jansen 2023). Based on historical deforestation and fatalities at wind energy facilities, area of occupancy and population size probably have declined significantly over the long term, but the degree of decline is uncertain (NatureServe 2023). An expert elicitation process arrived at an estimate of 2.5 million individuals in 2014 (Frick et al. 2017). Based on estimates of population size and population growth rate, the effect of wind energy facilities installed as of 2014 (75,570 MW) was estimated to cause a 90 percent decline in the population of this species in 50 years (Frick et al. 2017). Using a simple population model, the Electric Power Research Institute (EPRI 2020) projected the risk of hoary bat population decline or extinction in the presence of wind turbine mortality from 2012 through 2050. In the absence of fatality reduction, declines of at least 50 percent occurred at all initial population sizes tested and in some scenarios were likely to occur prior to 2020. Assuming that fatality rates remain stable, Jansen (2023) estimated that 5,900-7,000 hoary bats would be killed annually in the CPE, depending on the future wind energy development scenario.

There are large gaps in our knowledge about hoary bat population size and dynamics, making the impact of wind turbine fatality difficult to assess, but expert opinion places the population parameters in a range in which the risk of decline may be high (Friedenberg and Frick 2021). There is concern that some frequently killed species such as the hoary bat and silver-haired bat may not be able to sustain the existing rate of wind turbine fatalities as the wind industry continues to grow. Hoary bat collisions with wind turbines at the Facility may contribute to cumulative anthropogenic impacts on populations. Monitoring for hoary bat and other bat fatalities will be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

Pallid bat

Pallid bats were not detected during acoustic surveys at the Facility in 2011, but they were detected at one station (WR1) during surveys at the Facility in 2022. Pallid bats are non-migratory and use caves/rock crevices, desert scrub, grassland, and shrubland habitat. Although suitable habitat for pallid bats is present within the Amended Site Boundary, the lack of detections of this species during acoustic surveys in 2011 and the limited detections in 2022 (e.g., 2.2 percent of all identifiable low frequency calls) at the Facility indicates the species is not common within the Amended Site Boundary.

The pallid bat ranges from western Canada through the west and central United States and down into Baja California, Central Mexico, and Cuba. Pallid bats are found in dry, open habitat. The pallid bat is uncommon and is found mostly in arid regions in canyons in southwestern and eastern Oregon (OCS 2016). Pallid bats are gregarious, and often roost in colonies of between 20 and several hundred individuals.

The species is rare within range, and published data to assess threats and population trends does not exist. The population size is unknown but exceeds 10,000 and likely is much larger (NatureServe 2023). Over the long term, the population likely has declined somewhat, but the degree of decline is uncertain (NatureServe 2023). Some populations are likely detrimentally affected by timber harvest, agricultural expansion, cheatgrass invasion, fire, urban development, excessive livestock grazing, and pesticide use, but on a range-wide basis, no major threats are known. To date, this species has not known to be affected by WNS (WNS Team 2023). Wind energy does not appear to be a concern for the species as mortalities have not yet been documented (AWWI 2020b, Jansen 2023). Potential adverse impacts such as habitat loss and collision with turbines are expected to be minimal for pallid bats given their likely infrequent use of the Facility and lack of detected fatalities at wind facilities within the CPE and nationwide. Therefore, construction and operation of the Facility are not expected to cause population-level impacts to pallid bats.

Silver-haired bat

The detection of silver-haired bat at all of the seven acoustic monitoring sites within the Analysis Area in 2011 and all three acoustic monitoring sites in 2022 suggests that this species is relatively common and flies through much of the Facility during the late summer and fall months, concurrent with its migration period (Wheatridge 2015). The Facility does not provide suitable breeding habitat for the silver-haired bat.

The silver-haired bat occurs from the tree line in Canada southward through most of the continental United States to the Mexican border in the West and nearly to the Gulf Coast in the East. It spends the majority of its life in forested habitats and is found in arid habitats at low elevations during seasonal migrations. Summer roosts and nursery sites are in coniferous or deciduous tree foliage, cavities, or under loose bark, sometimes in buildings. In winter, individuals have been found in mines, caves, houses, rock crevices, under loose bark, and in hollow trees. Silver-haired bats hibernate alone or in small groups.

The population size and trend of silver-haired bats is unknown, but declines are suspected due to loss of roosting habitat and fatalities at wind energy facilities (NatureServe 2023). Silver-haired bats are vulnerable to habitat loss and fragmentation are a result of deforestation (OSC 2016). Wind energy development may pose a substantial threat to silver haired bats. The silver-haired bat is one of the primary bat species killed by wind turbines at wind energy facilities (AWWI 2022b, Jansen 2023) and this is the primary threat to the species. Arnett and Baerwald (2013) estimated that about 149,000-308,000 silver-haired bats were killed at wind energy facilities in the United States and Canada during the period from 2000 to 2011 (18 percent of total bat fatalities). Wind energy is expected to expand from 61,000 MW in 2014 to 350,000 MW by 2030, so the cumulative impact from wind turbines on this species could be devastating (NatureServe 2023). Assuming that fatality rates remain stable, Jansen (2023) estimated that 5,200-6,200 silver-haired bats would be killed annually in the CPE, depending on the future wind energy development scenario. WNS has been detected on silver-haired bats in the eastern states and in Washington state, but there are no known mortalities (WDFW 2023a).

As described in the ASC, the potential adverse impact to this species is collision with turbines, and individuals of this species are likely at moderate to high risk from the Facility (Wheatridge 2015). Although there is limited information about silver-haired bat population abundance and trends, this species is highly susceptible to mortality from wind energy facilities, suggesting that the risk of decline may be high. There is concern that some frequently killed species such as the hoary bat and silver-haired bat may not be able to sustain the existing rate of wind turbine fatalities as the wind industry continues to grow. Silver-haired bat collisions with wind turbines at the Facility may contribute to cumulative anthropogenic impacts on populations. Monitoring for hoary bat and other bat fatalities will be conducted as described in the WMMP, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

Spotted bat

Spotted bats were not detected during acoustic surveys for the Facility in 2011 or 2022. Spotted bats use rock crevices in cliff faces for roosting, and riparian areas, meadows, old agricultural fields, and forest openings for foraging (Gerhardt and Anderson 2014). Although suitable habitat for spotted bats is present within the Amended Site Boundary, the lack of detections during acoustic surveys at the Facility indicates the species is not common within the Amended Site Boundary. Spotted bats are not reported as fatalities either by AWWI (2020b; summary of 336 studies) or WEST (2021; 530 studies).

The spotted bat inhabits arid environments in western North America from south-central British Columbia to central Mexico; the core area of its distribution appears to be the southwestern United States (WDFW 2023b). This species is solitary and is never found in colonies. Spotted bats forage over a variety of habitats including ponderosa pine forests, hay fields, rock cliffs, talus slopes, sagebrush bunch grass, sparse ponderosa pine bunchgrass, rivers, open water, and hardwood slopes, but the presence of cliffs with suitable roosting crevices determines species presence (WDFW 2023b). The species is rare within range (OCS 2016) and there is a lack of adequate information on population trends and threats. The population size is unknown but probably

exceeds 10,000 individuals (NatureServe 2023). Population trends are uncertain, but distribution and abundance likely have not changed much compared to the historical situation (NatureServe 2023).

Several factors such as large-scale pesticide programs for control of insects may negatively affect local populations, but no major threats are known. Roosting habitat and foraging areas are extensive and mostly not vulnerable to extensive loss. To date, WNS had not been detected in this species (WNS Team 2023). Spotted bats were not detected during acoustic surveys at the Facility, and wind energy does not appear to be a concern for the species as mortalities have not yet been documented (AWWI 2020b, Jansen 2023). Potential adverse impacts such as habitat loss and collision with turbines are expected to be minimal for spotted bats given their lack of use of the Facility and lack of detected fatalities at wind facilities within the CPE and nationwide. Therefore, construction and operation of the Facility are not expected to cause population-level impacts to spotted bats.

Townsend's big-eared bat

Townsend's big-eared bats were not detected during acoustic surveys for the Facility in 2011 or 2022. The Townsend's big-eared bat occurs throughout the western United States and is distributed from the southern portion of British Columbia south along the Pacific Coast to central Mexico and east into the Great Plains, with isolated populations occurring in the central and eastern United States (NPS 2023). Townsend's big-eared bats use a wide variety of habitat types including forests, deserts, native prairies, riparian communities, agricultural areas, and coastal habitat types. Their distribution is strongly correlated with the availability of caves and cave-like roosting habitat, with population centers occurring in areas dominated by exposed, cavity forming rock and/or historic mining districts. In the summer, the females form nesting roosts consisting of one or more small clusters, which rarely exceed 100 bats. Males are solitary during the maternity periods. In winter, hibernation colonies are comprised of males and females and range in size from a few individuals to several hundred bats. Townsend's big-eared bat is a relatively sedentary species and appears not to engage in long distance migrations, with movement by females during the nursing season rarely exceeding 9 miles (15 km) and movement at other times usually being less than 31 miles (50 km; Pierson and Rainey 1998, Gruver and Keinath 2006). Townsend's big-eared bat colonies are rare and poorly known; therefore, there is a need to conduct a more thorough inventory of roost sites, particularly maternity colonies and hibernacula, to ensure they are properly protected (WDFW 2023c).

The population size is uncertain but probably exceeds 100,000 individuals (NatureServe 2023). Perkins (1990) estimated that known Townsend's big-eared bat sites in Oregon and Washington contained approximately 2,700 and 800 adult females respectively. There is a lack of adequate information on population trends, but there is general concurrence among bat biologists that there has been a downward trend in abundance of Townsend's big-eared bat in the western portion of its range over the past half-century (Gruver and Keinath 2006). The primary threat appears to be disturbance and/or destruction of roost sites resulting from recreational caving, mining activities, destruction/decay of buildings used as roosts, or deliberate exclusion of bats from such buildings

(NatureServe 2023). Townsend's big-eared bats are very vulnerable to human disturbance. If disturbance occurs, the entire roost may be abandoned. Surveys conducted in Oregon, Washington, and California indicate that current and historic roost sites have been negatively impacted by human visitation and renewed mining activities, with most reported colonies exhibiting moderate to sizable reduction in numbers (Perkins 1990, Pierson and Rainey 1998). Additionally, pesticide spraying to control insects on forest and agricultural lands near roosts may reduce food resources for this species. WNS has been detected on Townsend's big-eared bat, but to date, individuals have not been found exhibiting symptoms of WNS (WNS Team 2023).

Although suitable habitat for Townsend's big-eared bats is present within the Amended Site Boundary, the lack of detections of this species during acoustic surveys at the Facility indicates the species is not common within the Amended Site Boundary. Wind energy does not appear to be a concern for the species as mortalities have not yet been documented (AWWI 2020b, Jansen 2023). Potential adverse impacts such as disturbance, habitat loss, and collision with turbines are expected to be minimal for Townsend's big-eared bats, given their low potential to occur at the Facility and lack of detected fatalities within the CPE and nationwide. Therefore, construction and operation of the Facility are not expected to cause population-level impacts to Townsend's big-eared bats.

8.2.3 Reptiles

No state sensitive reptiles have been documented within the Amended Site Boundary. No suitable habitat exists for the state sensitive western painted turtle or for the northern sagebrush lizard within the Amended Site Boundary. As such, no adverse impacts to state sensitive reptiles or their habitats are expected from construction and operation of the Facility as proposed in this RFA.

8.2.4 Fish

No adverse impacts to state sensitive fish are expected from construction and operation of the Facility as none are known to occur within the analysis area.

9.0 Measures to Avoid, Reduce, or Mitigate Impacts – OAR 345-021-0010(1)(p)(G)

OAR 345-021-0010(1)(p) (G) A description of any measures proposed by the applicant to avoid, reduce, or mitigate the potential adverse impacts described in (F) in accordance with the general fish and wildlife habitat mitigation goals and standards described in OAR 635-415-0025 and a description of any measures proposed by the applicant to avoid, minimize, and provide compensatory mitigation for the potential adverse impacts described in (F) in accordance with the sage-grouse specific habitat mitigation requirements described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through 635-

140-0025, and a discussion of how the proposed measures would achieve those goals and requirements.

This section describes measures to avoid, minimize, and mitigate for impacts to state sensitive and other wildlife species and their habitats, and describes how those measures are expected to achieve the habitat mitigation goals of OAR 635-415-0025. The planning, construction, and operation of the Facility as proposed will comply with the Site Certificate conditions[8].

9.1 Avoidance and Minimization

9.1.1 During Facility Design and Micrositing

Facility design and micrositing measures implemented to minimize impacts to sensitive and other wildlife species and their habitats include:

- Category 1 habitat has been avoided;
- Turbines have been sited at least 1,350 meters from Little and Big Butter creeks;
- Collector lines will be buried to the extent feasible; and
- The Certificate Holder designed overhead collector lines and transmission intraconnection lines in compliance with APLIC standards, as required by condition GEN-FW-02 (APLIC 2012)[9]. This is expected to minimize the risk of electrocution to eagles and other raptors generally, and to Swainson's hawk and ferruginous hawks in particular.
- As required by Condition GEN-SR-01, outdoor night lighting at the collector substations, existing operations and maintenance building, and battery storage system will be the minimum number and intensity required for safety and security, directed downward and inward within the Facility, and have motion sensors and switches to keep lights turned off when not needed. This is expected to minimize the risk of avian collision with Facility buildings for all birds and bats in general, but to nocturnal migrant species (including Brewer's sparrows, sagebrush sparrows, grasshopper sparrows) and to the crepuscular, insectivorous common nighthawk in particular.

9.1.2 Prior to Construction

In compliance with Condition PRE-FW-01, the Certificate Holder conducted a final habitat categorization survey to confirm the habitat categories of all areas that will be affected by Facility components, as well as the locations of sensitive resources such as active raptor nests. This mapping will inform final site design and facility layout and ensure habitat impacts and disturbance to nesting raptors and other sensitive resources are avoided, minimized, and mitigated as appropriate[9]. These surveys included areas not previously surveyed for WAGS, habitat, and special status species because they were added after surveys were completed, for example. In the event

[8] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

that WAGS are encountered, the Certificate Holder will make any final adjustments necessary to continue to avoid Category 1 habitat during final design. Therefore, development within the amended wind micrositing corridors would meet the Fish and Wildlife Habitat standard.

9.1.3 During Construction

Measures for avoiding and minimizing impacts to wildlife, including state sensitive species, will be implemented during construction in compliance with the Final Order[9].

9.1.3.1 Environmental Training

In compliance with condition CON-FW-03, the Certificate Holder will employ a qualified environmental professional to provide environmental-sensitivity training to all personnel prior to working onsite[9]. Training will include information on sensitive species potentially present onsite, precautions to avoid injuring or destroying wildlife or sensitive wildlife habitat, exclusion areas, permit requirements, and other environmental issues.

9.1.3.2 Construction Monitoring

An environmental inspector will be on site daily to perform the required monitoring and reporting, in compliance with condition CON-FW-04[10].

9.1.3.3 Seasonal Avoidance

During construction, within the time periods listed in condition CON-FW-02, the Certificate Holder will implement buffer zones around nest sites of Swainson's hawks, ferruginous hawks, burrowing owls, and any other sensitive raptor species nests identified during surveys required by condition PRE-FW-01[10]. No construction will occur in Mule Deer Winter Range during winter, defined as December 1 to March 31, as required by condition CON-FW-01[10].

9.1.3.4 Speed Limits

Construction impacts to sensitive species such as common nighthawk, and to all wildlife in general, will be further avoided by the implementation of a 20-mph speed limit as stipulated in condition GEN-FW-01[10].

9.1.3.5 Flagging Sensitive Resources

Sensitive or protected plant and wildlife species will be flagged as restricted work zones prior to construction in compliance with condition PRE-FW-03[10].

[9] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

9.1.3.6 Noxious Weed Control

The Certificate Holder will take steps to prevent and control the establishment and spread of noxious weed species during construction as described in the Draft Noxious Weed Control Plan (Attachment P-3).

9.1.4 During Operation

Following construction, measures for avoiding and reducing impacts to wildlife and habitat, including state sensitive species, will be implemented in compliance with the Final Order, as follows:

- After Facility construction, areas where habitat was temporarily disturbed by construction activities will be restored and monitored as necessary according to the Revegetation Plan (Attachment P-4). The final Revegetation Plan will be approved by ODOE in consultation with Umatilla and Morrow counties, and by ODFW, in compliance with condition PRE-FW-05.
- The Certificate Holder will take steps to prevent and control the establishment and spread of noxious weed species during Facility operation as described in the Draft Noxious Weed Control Plan (Attachment P-3).
- The Certificate Holder shall maintain a 20-mile-per-hour speed limit on new and improved private access roads as stipulated in condition GEN-FW-01[10].
- In compliance with condition PRE-FW-03, an updated WMMP will be submitted to and approved by ODOE and ODFW before site construction[11], based on the approved October 2020 Wildlife Monitoring and Mitigation Plan included as Attachment P-5 to this RFA. This Plan will include fatality monitoring, raptor-nest monitoring, WAGS monitoring, and ongoing environmental training for Facility personnel regarding reporting requirements for incidental wildlife injuries and deaths at the Facility. Monitoring for bird and bat fatalities, including of state sensitive birds and bats, will be conducted as part of WMMP implementation, which includes the potential for additional mitigation if previously established fatality thresholds are exceeded (Attachment P-5).

9.2 Mitigation

After avoidance and mitigation measures have been implemented, some impacts to wildlife habitat and potential impacts to wildlife will remain. Temporary and permanent habitat loss will be mitigated according to ODFW standards, as described in a Draft Habitat Mitigation Plan (Attachment P-4) which will be approved by ODOE in consultation with ODFW before construction per Condition PRE-FW-04. This plan will include measures for conserving and enhancing sufficient acreages of wildlife habitat to compensate for those temporarily or permanently impacted by the Facility, as proposed. It will entail protection and enhancement of one or more mitigation sites. This

[10] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

protection will last, at a minimum, for the duration of the Facility's lifespan. This plan will include success criteria and provisions for monitoring whether mitigation goals are achieved. Both temporary habitat disturbance associated with construction activities and permanent habitat loss will be mitigated for according to provisions of the Draft Habitat Mitigation Plan.

10.0 Monitoring Program – OAR 345-021-0010(1)(p)(H)

> *OAR 345-021-0010(1)(p)(H) A description of the applicant's proposed monitoring plans to evaluate the success of the measures described in (G).*

Monitoring the success of proposed measures to avoid, minimize, and mitigate impacts to sensitive wildlife and their habitat will be accomplished as part of the Revegetation Plan, the Habitat Mitigation Plan, and the WMMP[11]. As part of the Revegetation Plan, a qualified biologist will monitor the success of efforts to restore portions of the Facility where temporary impacts occur during construction. As part of the Habitat Mitigation Plan, there will be regular monitoring of the habitat mitigation area to assess whether criteria for conservation and enhancement have been achieved. The WMMP will identify methods—designed in cooperation with ODFW—for assessing the impacts of the construction and operation of the Facility to sensitive species. Monitoring associated with this plan will include periodic raptor-nest monitoring and a post-construction fatality monitoring study designed to assess bird and bat fatalities at the Facility. Amendments to the plan will be made in coordination with ODFW before construction of the Facility. Observations of listed and sensitive wildlife and protected plant species will be documented during monitoring activities and will be submitted with monitoring reports. Facility personnel will also be trained in procedures for discovering, tracking, and reporting injured and dead wildlife found at the Facility.

11.0 Conclusion

As part of the siting process, the Certificate Holder identified and categorized the fish and wildlife habitats within the Analysis Area pursuant to OAR 635-415-0025. Based on survey results, Facility infrastructure was adjusted to avoid all impacts to Category 1 habitat, and where feasible, to Category 2 habitats. For other habitat categories, the Certificate Holder will mitigate for habitat impacts consistent with OAR 635-415-0025. Therefore, based on the information provided in this exhibit, there is sufficient evidence upon which the Council may find that the design, construction, and operation of the Facility as modified by this RFA, considering the proposed mitigation measures, is consistent with the fish and wildlife mitigation goals and standards of OAR 635-415-0025. Accordingly, the Certificate Holder demonstrates compliance with OAR 345-022-0060.

[11] Final Order on Application for the Wheatridge Wind Energy Facility (April 2017)

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Figures

(Note that Figures P-3a. and P-3b. are confidential and are provided under separate cover)

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Wheatridge Renewable Energy Facility East

Figure P-1
Analysis Area for Fish and Wildlife Habitat

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- Amended Wind Micrositing Corridors
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway

TETRA TECH

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Reference Map



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Earthstar Geographics

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Wheatridge Renewable Energy Facility East

Figure P-2
Habitat and Wildlife Survey Areas

MORROW AND UMATILLA COUNTIES, OR

- Botanical Survey Area (2023)
- Botanical Survey Area (2022)
- Botanical Survey Area (2019)
- Biological Reconnaissance Survey Area (2018)
- Washington Ground Squirrel Survey Area (2023)
- Washington Ground Squirrel Survey Area (2022)
- Washington Ground Squirrel Survey Area (2021)
- Washington Ground Squirrel Survey Area (2020)
- Washington Ground Squirrel Survey Area (2019)
- Habitat Categorization Survey Area (2023)
- Habitat Categorization Survey Area (2022)
- Wagon Trail Solar Project Habitat and Special Status Wildlife Survey Area (2021)
- Wagon Trail Solar Project Habitat and Special Status Wildlife Survey Area (2020)
- WREFIII Habitat and Special Status Wildlife Survey Area (2020)
- 2011-2013 Surveys

- Amended Site Boundary
- Amended Wind Micrositing Corridors
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway

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Wheatridge Renewable Energy Facility East

Figure P-4
Avian Use and Bat Detector Survey Locations (2011-2023)

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- Amended Wind Micrositing Corridors
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway
- Bat Detector Locations (2011)
- Bat Detector Locations (2022)
- Avian Use Points (2022-2023)
- Wheatridge East Avian Use Survey Plots (2011-2012)
- Wheatridge West Avian Use Survey Plots (2011-2012)

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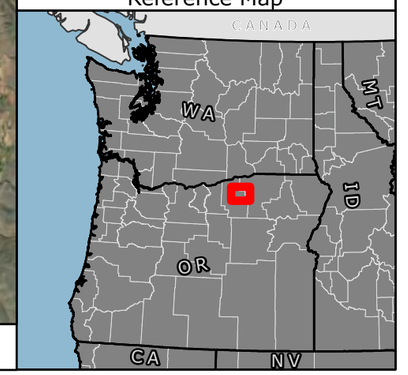

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Wheatridge Renewable Energy Facility East

Figure P-5
Habitat Types in the Analysis Area

MORROW AND UMATILLA COUNTIES, OR

Habitat Type-Habitat Subtype

- Cliffs, Caves and Talus
- Developed - Dryland Wheat
- Developed - Irrigated Agriculture
- Developed - Other
- Developed - Revegetated/Other Planted Grassland
- Grassland - Exotic Annual
- Grassland - Native Perennial
- Open Water – Lakes, Rivers, Streams - Intermittent or Ephemeral Streams
- Open Water – Lakes, Rivers, Streams - Perennial Streams
- Open Water – Lakes, Rivers, Streams - Permanent Ponds/Lakes
- Open Water – Lakes, Rivers, Streams - Seasonal Ponds
- Riparian Forest and Natural Shrubland Complexes - Eastside (interior) Riparian
- Shrub-steppe - Basin Big Sagebrush
- Shrub-steppe - Rabbitbrush/Snakeweed Shrub-steppe
- Wetlands - Emergent Wetlands
- Wetlands - Riverine Wetlands
- Wetlands - Scrub-shrub Wetlands

- Amended Site Boundary
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway
- ODFW Deer Winter Range

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Wheatridge Renewable Energy Facility East

Figure P-6
Habitat Categories in the Analysis Area

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway
- ODFW Deer Winter Range

Habitat Category

- 1
- 2
- 3
- 4
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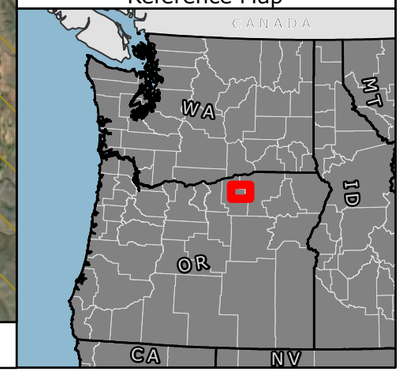

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Wheatridge Renewable Energy Facility East

Figure P-7 Detections of Special Status Wildlife Species (2011-2023)

MORROW AND UMATILLA COUNTIES, OR

2011-2023 Incidental Observations

- Bald eagle
- Brewer's sparrow
- Burrowing owl (Western)
- Common nighthawk
- Northern harrier
- Ferruginous hawk
- Golden eagle
- Grasshopper sparrow
- Loggerhead shrike
- Long-billed curlew
- Prairie falcon
- Sagebrush sparrow
- Swainson's hawk

- Amended Site Boundary
- Amended Wind Micrositing Corridors
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway

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Wheatridge Renewable Energy Facility East

Figure P-8 Special Habitat Features

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- Analysis Area (0.5-mile Buffer)
- City/Town
- County Boundary
- State Highway
- County Highway
- Rock Outcrops
- Cliffs, Caves and Talus
- Cliff Nests

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Attachment P-1. Biological Survey Reports

ATTACHMENT P-1 CONTENTS

- 2019 Raptor Nest Survey (Gerhardt and Kronner)
  - Figure 1. Wheatridge West Wind Energy Facility 2019 Raptor Nest Survey
  - Figure 2. Wheatridge West Area Current and Historical Ferruginous Hawk Nests
- 2022 Raptor Nest Survey (Tetra Tech)
  - Figure 1. 2022 Raptor Nest Survey Results – Non-eagle Nests
  - Figure 2. 2022 Raptor Nest Survey Results – Golden Eagle Nests
- 2022 Golden Eagle Nest Watch Survey (Tetra Tech)
  - Figure 1. Eagle Nest Watches
- 2022 Washington Ground Squirrel Survey Report (Tetra Tech)
  - Figure 3. Washington Ground Squirrel Active Colonies Overview
  - Appendix A. Photographs of Typical Washington Ground Squirrel Habitat and Sign
- 2022 Habitat Categorization and Special Status Wildlife Survey Report (Tetra Tech)
- 2022 Botanical Surveys (Tetra Tech)
  - Figure 2. Rare Plant Survey Results
- 2022 Bat Activity Survey (WEST)
- 2022-2023 Avian Use Study Final Report (WEST)
- 2023 Botanical Survey Report (WEST)
  - Attachment 1. Rare Plant Survey Results for Wheatridge East Wind Project, Morrow and Umatilla Counties, Oregon
- 2023 Habitat Categorization Survey Report (Tetra Tech)
- 2023 Raptor Nest Check Memo (WEST)
- 2023 Raptor Nest Survey Memo (Tetra Tech)
  - Figure 1. 2023 Raptor Nest Survey Results: Non-eagle Nests
  - Figure 2. 2023 Raptor Nest Survey Results: Eagle Nests
- 2023 WAGS and Other Special Status Wildlife Species Survey Report (Tetra Tech)
  - Figure 1. Washington Ground Squirrel Predicted Habitat within Occupied Watersheds in Oregon
  - Figure 3. Washington Ground Squirrel Active Colonies
- 2023 WAGS Survey Report (WEST)

**Red indicates Confidential Reports Submitted Under Separate Cover*

Northwest
Wildlife
Consultants, Inc.

MEMORANDUM

Date: June 27, 2019

To: Mike Pappalardo
Wheatridge Wind Energy, LLC

From: Rick Gerhardt and Karen Kronner, Wildlife Biologists
Northwest Wildlife Consultants, Inc.

Subject: Wheatridge West Wind Energy Facility 2019 Raptor Nest Survey

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Introduction

Wheatridge Wind Energy, LLC (Wheatridge), an indirect subsidiary of NextEra Energy Resources, LLC (NEER), received a site certificate authorizing the certificate holder to construct and operate the Wheatridge Wind Energy Facility within Morrow and Umatilla Counties, Oregon. Construction is proposed to begin as early as fall 2019 on Wheatridge West (WR West), which is entirely within Morrow County within ten miles of the towns of Ione, Lexington and Heppner.

A condition of the site certificate (December 2018 Third Amended Site Certificate, Condition PRE-FW-01) specifies that locations of sensitive resources such as raptor nests be confirmed prior to the beginning of construction. To comply with this condition and Condition CON-FW-02 for assessing the need for construction period seasonal restrictions, NEER contracted Northwest Wildlife Consultants, Inc. (NWC) to conduct a raptor nest survey in the spring of 2019. Information gained from this survey will be used to assist in final WR West facility layout and in preliminary scheduling of construction activities. Construction condition CON-FW-02 specifies spatial and temporal restrictions around nest sites that would be applied to certain construction activities. The 2019 nest database will also aid in post-construction nest monitoring design and implementation and, along with prior nest use information, will provide a baseline for analyzing raptor nesting trends. Condition PRE-FW-02 requires that a final Wildlife Monitoring and Mitigation Plan (WMMP) be prepared before the start of construction. The draft final WMMP specifies short- and long-term monitoring of raptor nesting.

The survey area consisted of land within the WR West site boundary—as provided to NWC on April 1, 2019 by Wheatridge and Tetra Tech, Inc.—and a 2-mile buffer of the site boundary (Figures 1 and 2, submitted separately). This area encompassed 160.7 square miles (416.3 square kilometers).

Methods

Prior to conducting the survey, NWC personnel reviewed information on raptor and corvid nests obtained through nest and other surveys conducted by NWC in 2011 (Gerhardt and Anderson, 2014) and results of ferruginous hawk nest monitoring conducted in 2015 (Gerhardt, 2015), 2016 (Gerhardt, 2016), and 2017 (Gerhardt, 2017). Prior years' ferruginous hawk nest monitoring results are included in this report.

In addition, NWC personnel recorded active raptor and corvid nests observed during surveys for Washington ground squirrels (WGS) that were conducted within the 2019 raptor nest survey area beginning in early April 2019.

An aerial survey was conducted on May 15, 2019 by NWC's raptor specialist (with nine years of experience conducting raptor nest and other wildlife surveys at Wheatridge) and a helicopter pilot experienced at this type of survey. Within the entire survey area, all potential nesting substrate was examined; this included trees, rock formations, transmission towers, and old water-pumper windmills. All raptor and common raven nests were recorded using a hand-held Global Positioning System (GPS) unit. All active nests were identified as to the species using them in 2019. Inactive nests were recorded both because they had presumably been used in the past and because they might be refurbished and used in the future. Active nests of common ravens were recorded because the nest itself could be used in future years by great horned owls or other raptors and because the same nest site (same tree, for example) might be used in future by raptors. Nest status (active or inactive) was determined using a combination of visual clues such as adult behavior, presence or absence of eggs or young or of whitewash, and also utilized information from the ground-based (WGS) surveys being conducted. Consistent with monitoring methods for ferruginous hawk nests in prior years, the 2019 active ferruginous hawk nests were monitored for outcome on June 25.

Results

Surveys resulted in the detection of 34 active raptor nests (Figure 1, submitted separately). Active nests of Swainson's and ferruginous hawk (two species with seasonal construction buffers) are described below. Ferruginous hawk nests are discussed in greater detail in regards to 2019 status as of June 25 (for nests active on May 15) and prior years' monitoring information previously submitted. The 34 were:

19 Swainson's Hawk
5 Ferruginous Hawk
4 Red-tailed Hawk
5 Great Horned Owl
1 Barn Owl

Also found were 20 active common raven nests and 21 inactive stick nests.

In Figures 1 and 2, a one-half mile buffer of the site boundary (known as of April 1, 2019) is included as a visual aid to assessing the potential need for construction constraints associated with the proximity (to proposed facilities) of active raptor nests in the 2020 or later nesting seasons.

Swainson's Hawk

There were 19 active Swainson's hawks nests found. Two of the active Swainson's hawk nests (**#4661** and **#4662** in Figure 1, northeast portion of survey area) were of a single pair and territory. Nest **#4661** was a newly built (or rebuilt) nest containing a single egg the size and the characteristic blue color of a Swainson's hawk's, and nest **#4662** was occupied by an incubating adult of this species. The proximity of these nests precludes their being occupied by two pairs; it is likely that the same female that laid the egg at **#4661** subsequently chose to nest in **#4662** instead.

Ferruginous Hawk

There were five active ferruginous hawk nests detected (Figure 1 and Figure 2). Three of these were previously documented as active nests of this species and two were previously unknown (details described below). The five 2019 active nests were monitored June 25, 2019 to determine their status at that time.

Ferruginous hawk nest **#3825**, on the wall of a quarry, had two young reach fledging age in 2019. This site was active (but not monitored for outcome) in 2011 (Gerhardt and Anderson, 2014), was active but failed in 2015 (Gerhardt, 2015), fledged three young in 2016 (Gerhardt, 2016), and was active but failed in 2017 (Gerhardt, 2017).

Nest **#3791**, on an artificial platform designed for this species, fledged three young in 2019. This site was active (but not monitored for outcome) in 2011 (Gerhardt and Anderson, 2014), fledged three young in 2015 (Gerhardt, 2015), fledged three young in 2016 (Gerhardt, 2016), and fledged three young in 2017 (Gerhardt, 2017).

At nest **#3770**, in a locust snag, the 2019 breeding attempt failed before June 25. This site was active (but not monitored for outcome) in 2011 (Gerhardt and Anderson, 2014), and was not monitored in 2015-2017.

As described above, two active ferruginous hawk nests documented in 2019 were previously unknown. The 2019 nest **#4674** was in a small locust; this breeding attempt failed before June 25. This appears to represent a new territory, although historical nests **#1727** and **#1728** (discussed below and shown in Figure 2, in which historical nests are represented by large yellow dots and green dots are 2019 active nests) were less than 6 kilometers (3.7 miles) from this nest.

Nest **#4696** was in a small Russian olive; on June 25, it held a single young just less than three weeks old (and still two weeks from fledging). Although 2019 was the first documented use of this nest, during the 2011 survey an old ferruginous hawk nest, **#3971** (on an escarpment) was detected in this general area (Figure 2).

Historical nest site **#1728** was a locust snag that by 2019 was no longer standing. It was the site of an active nest that fledged two young in 2015 (Gerhardt, 2015), an active nest that fledged three young in 2016 (Gerhardt, 2016), and an active nest that fledged two young in 2017 (Gerhardt, 2017). The nest tree fell during the 2018 breeding season (R. Gerhardt, personal field notes). In 2011, ferruginous

hawks had an active breeding attempt in nearby nest **#1727** (Gerhardt and Anderson, 2014), another locust snag; that breeding attempt was not monitored for outcome. In 2019, nest **#1727** contained an active Swainson's hawk nest.

Nest **#3022**, an historical ferruginous hawk nest in a juniper tree, contained an active common raven nest in 2019. Previously, ferruginous hawks fledged three young at this site in 2015 (Gerhardt, 2015), had a failed breeding attempt in 2016

(Gerhardt, 2016), and fledged three young in 2017 (Gerhardt, 2016); the nest was inactive in 2018 (R. Gerhardt, personal field notes). This juniper is the only remaining tree in this area, but in 2011 there was an active ferruginous hawk nest (from which four young fledged) in a nearby snag, nest **#4114** (Gerhardt and Anderson, 2014) that is no longer standing.

References

Gerhardt, R. and B. Anderson. 2014. Ecological investigations report for the Wheatridge Wind Energy Project. Prepared for Wheatridge Wind Energy, LLC, Ione, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Gerhardt, R. 2015. 2015 Wheatridge area ferruginous hawk nest monitoring. Prepared for Wheatridge Wind Energy, LLC, Ione, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Gerhardt, R. 2016. 2016 Wheatridge area ferruginous hawk nest monitoring. Prepared for Wheatridge Wind Energy, LLC, Ione, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Gerhardt, R. 2017. 2017 Wheatridge area ferruginous hawk nest monitoring. Prepared for Wheatridge Wind Energy, LLC, Heppner, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

To:	NextEra Energy Resources, LLC
From:	Tetra Tech, Inc.
Date:	October 12, 2022
Subject:	2022 Raptor Nest Survey Memo for the Wheatridge Renewable Energy East Facility

1.0 Introduction

This memo presents the methods and results for the 2022 raptor nest surveys conducted by Tetra Tech, Inc. (Tetra Tech) on behalf of Wheatridge East Wind, LLC (Certificate Holder) at the Wheatridge Renewable Energy Facility East (Facility). The Facility is an approved, but not yet constructed, wind energy generation facility located in Morrow and Umatilla counties, Oregon (Figure 1). The surveys were conducted to support the anticipated Request for Amendment 1 (RFA 1) to the Facility Site Certificate through the Oregon Energy Facility Siting Council (EFSC). The purpose of the surveys was to inventory raptor nests within the Project Lease Area and a 2-mile buffer to support Project permitting and inform potential avoidance and minimization measures. The surveys were designed in accordance with the voluntary U.S. Fish and Wildlife Service (USFWS) Land-based Wind Energy Guidelines (WEG; USFWS 2012), Stage 2 of the Eagle Conservation Plan Guidance (ECPG; USFWS 2013), the 2016 Eagle Rule (USFWS 2016), the April 2020 Eagle Survey Memo (USFWS 2020a), Site Certificate Condition PRE- FW-01, and in coordination with Oregon Department of Fish and Wildlife (ODFW), as described below (Section 2.0).

2.0 Methods

2.1 Description of the Survey Area

The surveys were initially scoped to cover the Project Lease Area plus a 2-mile buffer; however, this was modified in anticipation of the potential expansion of the Project Lease Area. Prior to the initial survey, the survey area was expanded an additional 2 miles to the south of the Project Lease Area (4-mile buffer). In addition, prior to the second survey, the survey area was expanded 1 mile to the northwest (3-mile buffer). The Project Lease Area had not been expanded at the time this report was prepared; therefore, the survey area covered the Project Lease Area plus a buffer of 2 to 4 miles (Figure 1).

2.2 Agency Coordination and Review of Existing Data

NextEra and Tetra Tech met with ODFW via video meeting on April 12, 2022, to introduce the Project and discuss planned biological studies, including raptor nest surveys. At the meeting, ODFW concurred with the raptor nest survey approach.

Prior to the surveys, Tetra Tech reviewed eagle nest data from several sources including the Oregon Biodiversity Information Center (ORBIC) database (ORBIC 2021), the Oregon Eagle Foundation (Leal 2020), and survey data collected in support of the siting and construction of the adjacent Wheatridge Renewable Energy Facility I and Wheatridge Renewable Energy Facility II (Gerhardt and Anderson 2014, Gerhardt and Kronner 2019). The data review identified 13 previously known golden eagle nests within the survey area, one of which was located within the Project Lease Area (Figure 2). No previously known bald eagle nests were identified. Bald eagle nesting sites are generally associated with aquatic foraging areas (Buehler 2020). Although bald eagles may use the Project Lease Area during migration or winter, they are not expected to nest in or near the Project based on a lack of suitable habitat conditions.

2.3 Field Surveys

Two rounds of aerial surveys were performed to facilitate a complete inventory of nest locations and accurate nest occupancy determinations. The initial survey was conducted on April 9-10, 2022, during the early nesting period, when most breeding pairs in the region exhibit nest-building or incubation behaviors. The second survey was conducted on June 4-6, 2022, when most raptors in the region are engaged in mid- to late-breeding season reproductive activities (e.g., brooding, feeding nestlings). The surveys were conducted from a Bell 206B3 Jet Ranger helicopter (JL Aviation based in Boring, Oregon). The crew consisted of a pilot and two Tetra Tech biologists for safety reasons, and to minimize the chance of missing nests. While searching for nests, the helicopter flew at a speed of 30 to 40 knots and an approximate altitude of 200 feet above ground. The speed and the altitude of the helicopter were reduced as needed for the inspection of nests and other areas of interest. Private residences and livestock were avoided or flown over at a higher altitude to keep disturbance to a minimum.

The helicopter flew north-to-south-oriented transects spaced 1 mile apart over the survey area. The helicopter deviated from the transects for closer inspection of quality nesting habitat as needed. The transects were shifted by 0.5 miles to the west during the second round to provide more complete coverage of the survey area. During both survey rounds the biologists checked the status of known raptor nests and searched for new raptor nests not previously identified. The surveyors documented all raptor nests, raven nests, concentrations of eagle prey resources (e.g., herds of big game, carrion, etc.) and incidental observations of eagles. Although not raptors, common raven nests were also documented because they could be used by nesting raptors during subsequent breeding seasons.

Data Collection

A tablet computer with ArcGIS mapping software and electronic data forms was used during the surveys to aid in navigation and record data. For each nest, the following data were collected:

- **Nest Identification Number:** Unique numeric identifier assigned to each nest site that also represents a geographical location that is determined by latitude and longitude coordinates.
- **Species:** If identified, the species was recorded. If the species using the nest could not be determined, it was recorded as unknown.
- **Adult Present:** Proximity of the adult to the nest (e.g., on nest, nearby, or unknown).
- **Eggs or Young:** Number of eggs or young observed.
- **Nest Size:** Classified as large or small; small nests were those estimated by the biologist as having a diameter of less than 24 inches, comprised of smaller sticks, and with other characteristics typical of nests used by smaller raptors and not by eagles. Large nests were those estimated by the biologist as having a diameter of 24 inches or greater, comprised of larger sticks, and with other characteristics typical of nests used by eagles and other large raptors.
- **Nest Substrate:** Structure in which nest was located (e.g., broadleaf tree, cliff, artificial nest structure, etc.).
- **Nest Height:** Height relative to the structure it was on (e.g., on top of transmission pole, 3/4 of height of tree).
- **Nest Status:** To assess nest status, the following terms were adapted from the 2016 Eagle Rule (USFWS 2016) and Postupalsky (1974):
    - Inactive: Defined by the absence of any adult, egg, or dependent young at the nest, or signs of building or adding to the nest in preparation for egg-laying. This term is specific to non-eagle nests.
    - In-use nest: The presence of eggs, dependent young, or adult on the nest, or signs of building or adding to the nest in preparation for egg-laying. This term applies to eagle and non-eagle nests.
    - Alternate nest: One of potentially several nests within an eagle territory that is not an in-use nest at the time of surveys. When there is no in-use nest, all nests in the territory are alternate nests. This term is specific to eagle nests.
    - Unknown: A nest not detected during the first round of surveys which may have gone undetected or been built subsequent to the survey, or a nest that is present but for which surveyors are unable to determine status (e.g., vegetation around the nest site obscured the view of nest, etc.). This term applies to eagle and non-eagle nests.

- No Longer Present: A nest that was located during a previous survey but has subsequently been positively ascertained to be destroyed and no evidence of the nest remains. This term applies to eagle and non-eagle nests.
- Not Found: A previously known nest that could not be located (e.g., road or access limitations), but that may still exist (not the same as "No Longer Present" above). This term applies to eagle and non-eagle nests.
- Not Surveyed: A known nest that occurred outside of the given survey area, or that could not be surveyed due to other reasons (e.g., no landowner permission, the presence of nearby cattle, etc.). This term applies to eagle and non-eagle nests.
- Failed: A nest for which evidence indicates nest initiation (egg-laying), but the nest failed to produce any chicks to fledging age. This term applies to eagle and non-eagle nests.

- **Nest Condition:** To assess nest condition, the following criteria were used (Postupalsky 1974):
  - Excellent: Defined cup or nest bowl with a well-maintained rim; adult or young present.
  - Good: Nest bowl intact and rim defined; minor repair needed for nest to be used; margins of nest in loose configuration, minor slumping occurring.
  - Fair: Nest bowl intact and nest not dilapidated but needs significant repair in order to be used; material is slumping or sliding.
  - Poor: Loose structure of nest bowl still present; nest walls and side falling out; nest is in need of major repair to be used.
  - Remnant: Nest bowl not defined; scant material remaining and not usable unless fully rebuilt.
  - Unknown: The nest cannot be found, was not surveyed, or the nest is present, but because of its location, a determination cannot be made.
  - Not Applicable: Nest no longer present.

3.0 Results and Discussion

At the completion of the second survey, 161 nests were present within the survey area, including five golden eagle nests (one in-use nest and four alternate nests), 37 ferruginous hawk nests (three in-use nests and 34 inactive nests), 11 in-use Swainson's hawk nests, 24 in-use red-tailed hawk nests, four in-use great horned owl nests, one in-use prairie falcon nest, 24 in-use common raven nests (two in large nests and 22 in small nests), three in-use Canada goose nests, one large in-use nest with unknown species determination (there were eggs present in the nest but no adults observed), two large inactive nests with unknown species determinations, and 49 small inactive

nests with unknown species determinations (Table 1, Figure 1). A large inactive nest (Nest 361) was located just outside the survey area (approximately 0.25 miles to the east; Figure 1.3).

An additional seven nests (one in-use red-tailed hawk nest, three common raven nests, and three small inactive nests) were present during the initial aerial survey but no longer present during the second aerial survey (Nests 104, 114, 107,108, 140, 145, and 159; Table 1). These nests are not included in the above totals nor depicted in the report figures. Another nest present during the initial survey but not found during the second survey (red-tailed hawk Nest 142; Table 1), was included in the totals and shown on Figure 1.2. The surveyors could not determine whether Nest 142 was not visible due to leaf out or was no longer present.

No new golden eagle nests were found during the surveys. Of the 13 previously known golden eagle nests within the survey area (Figure 2), one was in-use, four were alternate and eight were no longer present (Table 1). Three of the golden eagle nests that were no longer present were tree nests that had fallen to the ground (Nests 4, 6, and 12; Table 1). Each location where golden eagle nests were no longer present will be rechecked in 2023 because golden eagles often have long-enduring nesting territories (Palmer 1988).

Large nests observed during the surveys included one in-use golden eagle nest, four alternate golden eagle nests, three in-use ferruginous hawk nests, 34 inactive ferruginous hawk nests, two in-use common raven nests, three in-use Canada goose nests, one large in-use nest of an undetermined species, and three inactive nests (Table 1). Identifying raptor nests can be difficult without the birds' presence. Complicating matters further, raptors will use each other's old nests and other species such as Canada geese and common ravens sometimes utilize nests constructed by raptors (Call 1979, Peebles and Spencer 2020). When possible, we distinguished between nests that appeared to have been originally constructed by ferruginous hawks and those that may have been constructed by golden eagles. The determination that a nest had originally been built by ferruginous hawks was based on the size, arrangement of sticks (primarily sagebrush stems), and characteristic placement on the ground in rolling terrain, above or below rock outcrops or rimrock, or in lone or isolated clusters of trees and shrubs (WDFW 1996, Shaffer et al. 2019). Both species nest on cliffs; thus, determining which species had originally constructed nests on cliffs was not possible.

In addition to the the five known golden eagle nests (one in-use and four alternate nests), seven large nests were determined to have been likely built by eagles, based on their size and placement. These included the three nests occupied by Canada geese (Nests 154, 163, and 164), three large inactive nests (Nests 152, 206, and 361), and one large, in-use nest with unknown species determination (Nest 184; Table 1). During the first survey round, Nest 184 had eggs, but no adults were present. Based on the size and color of the eggs, the nest may have been occupied by Canada geese. During the second round, the nest was empty. Canada geese typically nest on the ground but will occupy nests left vacant by eagles and have a strong tendency to return to their nest sites in subsequent years (USDA 2009). All of the potential golden eagle nests were located on cliffs or rock outcrops. Because they may have originally been constructed by golden eagles, they could potentially be used by golden eagles in the future. All of the other large nests, including Nests 109

and 122, which were occupied by common ravens, appeared to have been originally built by ferruginous hawks. The condition of the inactive ferruginous hawk nests varied from remnant to excellent, but many appeared to have not been used in many years. Ferruginous hawk nests may persist for long periods without maintenance if they are built in protected places (WDFW 1996).

Ground-based nest watches were performed at alternate and potential golden eagle nests that were located within the survey area and visible from accessible locations to confirm the status of their occupancy. The nest watches are covered in a separate report.

Suitable nesting habitat within the survey area was primarily limited to riparian areas at the bottom of the canyons, cliffs, rock outcrops and bands of rock on the hillsides. There were 83 nests in trees (66 in broadleaf trees, eight in conifer trees, and nine in snags), 52 on cliffs, 13 on rock outcrops, 13 on the ground, and eight on man-made structures (four on telephone poles, three on windmills, and one on a fuel tank; Table 1). Most of the nests were in the central and southern portion of the survey area. The northern portion of the survey area lacks suitable substrate for nesting raptors.

No state or federally listed threatened or endangered species were documented during the raptor nest surveys. Four golden eagles were incidentally observed during the surveys (Figure 2): two during the initial survey and two during the second survey. Only one of the golden eagles was observed within the Project Lease Area but two of the eagles were located about 0.5 miles from known nests (alternate Nests 1 and 9; Figure 2). Golden eagles usually raise only one brood per season but occasionally re-nest when eggs fail to hatch (Katzner et al. 2020). The initial survey occurred right after the egg laying and incubation period for golden eagles, which occurs from the last week of January through the first week of April in Oregon (Isaacs 2021). The nests in proximity to the two golden eagles may have been occupied in February or March and failed prior to the initial survey.

Golden eagle prey concentrations observed incidentally during the surveys included herds of big game and cattle carcasses. Big game observations included 20 mule deer herds with 3 to 50 individuals and eight elk herds with 2 to 50 individuals (Figures 1.1-1.5). One cow carcass was observed during the surveys. It was in the northern portion of the survey area, east of the leased area.

Raptor Nest Buffers

The purpose of this survey was to inform NextEra of potential restrictions that might be applied to construction activities due to active raptor nests in or adjacent to the Project Lease Area. The USFWS recommends that wind turbines be sited at least 2 miles away from golden eagle nests (M. Stuber pers. comm). At the completion of this report, zero known eagle nests, and four potential golden eagle nests were within 2 miles of the proposed wind turbines (based on the draft turbine layout dated August 26, 2022). These numbers may change as the turbine layout is finalized.

Seasonal activity restrictions and spatial buffers for active raptor species based on Condition PRE-FW-01 of the Site Certificate are provided in Table 2. Note, the Site Certificate spatial buffer for

ferruginous hawks differs slightly from those for projects more recently permitted through the EFSC. Seasonal activity restrictions and buffer zones for other raptor species should be determined through consultation with ODFW and USFWS.

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Table 1. 2022 Raptor Nest Survey Results

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
154[2]	Canada goose	In-use	Inactive	Large	Cliff	
163[2]	Canada goose	In-use	Inactive	Large	Cliff	
164[2]	Canada goose	In-use	Inactive	Large	Cliff	Some of the nest had fallen apart during the second survey.
109	Common raven	In-use	Inactive	Large	Broadleaf Tree	Nest was likely built by ferruginous hawks.
122	Common raven	In-use	Inactive	Large	Broadleaf Tree	Nest was likely built by ferruginous hawks.
200	Common raven	Inactive	In-use	Small	Cliff	
101	Common raven	In-use	Inactive	Small	Broadleaf Tree	
111	Common raven	In-use	In-use	Small	Broadleaf Tree	
113	Common raven	In-use	Inactive	Small	Manmade Structure	Nest on windmill.
114	Common raven	In-use	No Longer Present	Small	Manmade Structure	Nest on telephone pole.
130	Common raven	Inactive	In-use	Small	Cliff	
139	Common raven	In-use	Inactive	Small	Rock Outcrop	
145	Common raven	In-use	No Longer Present	Small	Conifer Tree	
159	Common raven	In-use	No Longer Present	Small	Rock Outcrop	Nest material observed on ground below previous nest location during the second round.

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
162	Common raven	In-use	Inactive	Small	Cliff	
165	Common raven	In-use	Inactive	Small	Broadleaf Tree	
172	Common raven	In-use	Inactive	Small	Snag	
196	Common raven	In-use	In-use	Small	Broadleaf Tree	
205	Common raven	In-use	Inactive	Small	Cliff	
208	Common raven	In-use	In-use	Small	Broadleaf Tree	
212	Common raven	In-use	Inactive	Small	Cliff	
160	Common raven	In-use	In-use	Small	Snag	
302	Common raven	Unknown	In-use	Small	Manmade Structure	Nest on telephone pole.
322	Common raven	Unknown	In-use	Small	Conifer Tree	
323	Common raven	Unknown	In-use	Small	Broadleaf Tree	
326	Common raven	Unknown	In-use	Small	Manmade Structure	Nest on dilapidated windmill.
327	Common raven	Unknown	In-use	Small	Broadleaf Tree	
329	Common raven	Unknown	In-use	Small	Manmade Structure	Nest on windmill.
351	Common raven	Unknown	In-use	Small	Manmade Structure	Nest on fuel tank next to solar panel.
355	Common raven	Unknown	In-use	Small	Broadleaf Tree	
100	Ferruginous hawk	In-use	In-use	Large	Broadleaf Tree	
118	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
119	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
121	Ferruginous hawk	Inactive	Inactive	Large	Rock Outcrop	
125	Ferruginous hawk	Inactive	Inactive	Large	Ground	
126	Ferruginous hawk	Inactive	Inactive	Large	Cliff	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
128	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
131	Ferruginous hawk	Inactive	Inactive	Large	Ground	
133	Ferruginous hawk	Inactive	Inactive	Large	Ground	
134	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
135	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
141	Ferruginous hawk	Inactive	Inactive	Large	Rock Outcrop	
149	Ferruginous hawk	Inactive	Inactive	Large	Rock Outcrop	
151	Ferruginous hawk	In-use	In-use	Large	Cliff	
213	Ferruginous hawk	Inactive	Inactive	Large	Snag	
161	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
168	Ferruginous hawk	Inactive	Inactive	Large	Rock Outcrop	
177	Ferruginous hawk	Inactive	Inactive	Large	Ground	
178	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
179	Ferruginous hawk	Inactive	Inactive	Large	Ground	
186	Ferruginous hawk	Inactive	Inactive	Large	Ground	Nest on ground at base of cliff.
187	Ferruginous hawk	Inactive	Inactive	Large	Ground	Nest on ground at base of rock outcrop.
194	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
195	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
197	Ferruginous hawk	Inactive	Inactive	Large	Ground	
201	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
202	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
207	Ferruginous hawk	Inactive	Inactive	Large	Rock Outcrop	
210	Ferruginous hawk	Inactive	Inactive	Large	Ground	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
211	Ferruginous hawk	Inactive	Inactive	Large	Cliff	
311	Ferruginous hawk	Unknown	Inactive	Large	Ground	
312	Ferruginous hawk	Unknown	Inactive	Large	Cliff	
313	Ferruginous hawk	Unknown	In-use	Large	Cliff	
328	Ferruginous hawk	Unknown	Inactive	Large	Rock Outcrop	Ferruginous hawk observed in the area during the second survey.
337	Ferruginous hawk	Unknown	Inactive	Large	Rock Outcrop	
352	Ferruginous hawk	Unknown	Inactive	Large	Ground	
357	Ferruginous hawk	Unknown	Inactive	Large	Ground	
8[1]	Golden eagle	In-use	In-use	Large	Broadleaf Tree	One chick about 5-6 weeks old observed in the nest during the second survey.
1[1]	Golden eagle	Alternate Nest	Alternate Nest	Large	Cliff	
7[1]	Golden eagle	Alternate Nest	Alternate Nest	Large	Cliff	
9[1]	Golden eagle	Alternate Nest	Alternate Nest	Large	Cliff	
11[1]	Golden eagle	Alternate Nest	Alternate Nest	Large	Ground	Nest appears to have been constructed by ferruginous hawks rather than golden eagles.
2[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	
3[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
4[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	It appears that the nest tree has fallen down.
5[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	
6[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Large fallen tree with nesting material present at location.
10[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	
12[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Nest fell out of tree or nest tree fell down. There is a common raven nest very close to the historical golden eagle nest location; assuming they are not the same nest.
13[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Substrate near the historical nest location does not seem suitable for golden eagles.
129	Great horned owl	In-use	Inactive	Small	Cliff	Nest located in cavity on cliff.
158	Great horned owl	In-use	Inactive	Small	Broadleaf Tree	
185	Great horned owl	In-use	In-use	Small	Cliff	Nest in small cave on cliff.

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
204	Great horned owl	In-use	Inactive	Small	Cliff	
175	Prairie falcon	In-use	In-use	Small	Cliff	Nest in cavity on cliff.
137	Red-tailed hawk	Inactive	In-use	Small	Cliff	
102	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
104	Red-tailed hawk	In-use	No Longer Present	Small	Broadleaf Tree	
105	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
110	Red-tailed hawk	In-use	In-use	Small	Broadleaf Tree	
112	Red-tailed hawk	In-use	In-use	Small	Broadleaf Tree	
116	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
117	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
123	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
124	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
142	Red-tailed hawk	In-use	Not Found	Small	Broadleaf Tree	
146	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
147	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
148	Red-tailed hawk	In-use	In-use	Small	Snag	
153	Red-tailed hawk	In-use	In-use	Small	Cliff	
155	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
157	Red-tailed hawk	In-use	In-use	Small	Broadleaf Tree	
167	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
183	Red-tailed hawk	In-use	Inactive	Small	Cliff	
188	Red-tailed hawk	In-use	Inactive	Small	Broadleaf Tree	
193	Red-tailed hawk	In-use	Inactive	Small	Cliff	
203	Red-tailed hawk	In-use	In-use	Small	Cliff	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
300	Red-tailed hawk	Unknown	In-use	Small	Snag	
315	Red-tailed hawk	Unknown	In-use	Small	Broadleaf Tree	
350	Red-tailed hawk	Unknown	In-use	Small	Broadleaf Tree	
314	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
320	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
321	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
324	Swainson's hawk	Unknown	In-use	Small	Conifer Tree	
335	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
336	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
339	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
353	Swainson's hawk	Unknown	In-use	Small	Conifer Tree	
354	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
358	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
363	Swainson's hawk	Unknown	In-use	Small	Broadleaf Tree	
184[2]	Unknown	In-use	Inactive	Large	Cliff	Eggs in nest but no adults present.
152[2]	Unknown	Inactive	Inactive	Large	Rock Outcrop	
206[2]	Unknown	Inactive	Inactive	Large	Rock Outcrop	
361[2]	Unknown	Unknown	Inactive	Large	Cliff	Nest is located outside the aerial survey area.
136	Unknown	Inactive	Inactive	Small	Cliff	
103	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
106	Unknown	Inactive	Inactive	Small	Manmade Structure	Nest located on telephone pole.

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
115	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
120	Unknown	Inactive	Inactive	Small	Rock Outcrop	
132	Unknown	Inactive	Inactive	Small	Cliff	
138	Unknown	Inactive	Inactive	Small	Snag	
143	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
144	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
156	Unknown	Inactive	Inactive	Small	Snag	
166	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
169	Unknown	Inactive	Inactive	Small	Rock Outcrop	
170	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
171	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
173	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
176	Unknown	Inactive	Inactive	Small	Cliff	
180	Unknown	Inactive	Inactive	Small	Cliff	
181	Unknown	Inactive	Inactive	Small	Cliff	
182	Unknown	Inactive	Inactive	Small	Cliff	
189	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
190	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
191	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
192	Unknown	Inactive	Inactive	Small	Broadleaf Tree	
199	Unknown	Inactive	Inactive	Small	Cliff	
214	Unknown	Inactive	Inactive	Small	Cliff	
301	Unknown	Unknown	Inactive	Small	Manmade Structure	Nest on telephone pole. Probable raven nest.

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
303	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
304	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
305	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
306	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
307	Unknown	Unknown	Inactive	Small	Conifer Tree	
308	Unknown	Unknown	Inactive	Small	Conifer Tree	
309	Unknown	Unknown	Inactive	Small	Cliff	
310	Unknown	Unknown	Inactive	Small	Cliff	
316	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
317	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
318	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
319	Unknown	Unknown	Inactive	Small	Snag	
325	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
330	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
331	Unknown	Unknown	Inactive	Small	Conifer Tree	
332	Unknown	Unknown	Inactive	Small	Cliff	
333	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
334	Unknown	Unknown	Inactive	Small	Broadleaf Tree	
338	Unknown	Unknown	Inactive	Small	Cliff	
356	Unknown	Unknown	Inactive	Small	Cliff	Very tall nest, probably used over many years.
359	Unknown	Unknown	Inactive	Small	Cliff	
360	Unknown	Unknown	Inactive	Small	Broadleaf Tree	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Substrate	Pertinent Survey Notes
362	Unknown	Unknown	Inactive	Small	Conifer Tree	Nest likely constructed by Swainson's hawks.
107	Unknown	Inactive	No Longer Present	Small	Broadleaf Tree	
108	Unknown	Inactive	No Longer Present	Small	Broadleaf Tree	
140	Unknown	Inactive	No Longer Present	Small	Snag	It appears that the nest fell out of the tree as many of the snag's branches have broken.

1. Previously known nests record reported by Gerhardt and Anderson 2014, Gerhardt and Kronner 2019, Leal 2020, and ORBIC 2021.
2. Potential golden eagle nests detected during the 2022 surveys.

Table 1. Seasonal Activity Restrictions and Spatial Buffers for Active Nests per Site Certificate Condition PRE- FW-01

Species	Nesting Period	Restricted Activity Buffer (miles)[1]
Ferruginous hawk	March 15–August 15	0.25
Swainson's hawk	April 1–August 15	0.25
Western burrowing owl	April 1–August 15	0.25

1. If avoidance within the buffer restrictions cannot be maintained, the certificate holder may request approval from the Oregon Department of Energy in consultation with ODFW on a mitigation and conservation strategy for condition compliance.

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Figures

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To:	NextEra Energy Resources, LLC
From:	Tetra Tech, Inc.
Date:	October 12, 2022
Subject:	2022 Golden Eagle Nest Watch Memo for the Wheatridge Renewable Energy Facility East

1.0 Introduction

This memo presents the methods and results of golden eagle nest watches conducted by Tetra Tech, Inc. (Tetra Tech) on behalf of Wheatridge East Wind, LLC (Certificate Holder) at the Wheatridge Renewable Energy Facility East (Facility). The Facility is an approved, but not yet constructed, wind energy generation facility located in Morrow and Umatilla counties, Oregon (Figure 1). The nest watches were conducted to support the anticipated Request for Amendment 1 (RFA 1) to the Facility Site Certificate through the Oregon Energy Facility Siting Council (EFSC). Aerial raptor nest surveys performed during the 2022 breeding season identified several known and potential golden eagle nests within two miles of the Project area (Tetra Tech 2022). The objective of the nest watches was to assess occupancy at these known and potential golden eagle nests and associated territories, as recommended in the Eagle Conservation Plan Guidance (ECPG; USFWS 2013).

2.0 Methods

Nest watches were conducted from the ground at four known and three potential golden eagle nests identified in the 2022 aerial raptor nest surveys. The four known golden eagle nests were all unoccupied (alternate) during both aerial survey rounds. The three potential golden eagle nests were all large nests that may have originally been constructed by golden eagles but had an inactive or undetermined status during the aerial surveys. The potential golden eagle nests included two large, inactive nests, and one large nest with unknown species determination (during the first aerial survey there were eggs present but no adults, and during the second aerial survey the nest was empty). All other large nests detected during the aerial surveys were occupied or located outside the Project Lease Area (Tetra Tech 2022).

Prior to the nest watches, a desktop study was performed to determine the best accessible observation points from which to monitor each nest. The biologists were then provided with a digital map that included the nest locations, potential observation points, public roads, and approved access routes within the Project Lease Area. Photos of the nests taken during the aerial surveys were also included.

The nest watches were conducted by two Tetra Tech biologists equipped with binoculars and spotting scopes. Each nest watch consisted of a 4-hour observation period within sight of a known

nest or territory. When a nest was not visible from an accessible area, the biologists selected an observation point that provided a good view of the territory. The locations of all eagles observed during the nest watches were mapped (Figure1).

Data Collection

A tablet computer with ArcGIS mapping software and electronic data forms was used during the surveys to aid navigation and record data. For each nest/territory, the following data were collected:

- **Date:** Date the nest watch was performed.
- **Observer:** Name of the observer.
- **Observation Point Location:** Latitude and longitude coordinates of the observation point.
- **Start and End Time:** Time the nest watch began and ended.
- **Weather:** Percent cloud cover, temperature, wind speed and prevailing direction, and the type of any precipitation
- **Nest Identification Number:** Unique numeric identifier assigned to each nest site that also represents a geographical location that is determined by latitude and longitude coordinates.
- **Nest located?** Yes or no.
- **Territory Status:** Occupied or unoccupied.
- **Adults or Subadults Observed?** Yes or no.
- **Location of Adults or subadults:** Proximity to the nest (e.g., on nest, nearby, not observed or other).
- **Eggs or Young:** Number of eggs or young observed.
- **Nest Substrate:** Structure in which nest was located (e.g., broadleaf tree, cliff, artificial nest structure, etc.).
- **Nest Condition:** The following criteria were used to assess nest condition (Postupalsky 1974):
    - Excellent: Defined cup or nest bowl with a well-maintained rim; adult or young present.
    - Good: Nest bowl intact and rim defined; minor repair needed for nest to be used; margins of nest in loose configuration, minor slumping occurring.
    - Fair: Nest bowl intact and nest not dilapidated but needs significant repair in order to be used; material is slumping or sliding.
    - Poor: Loose structure of nest bowl still present; nest walls and side falling out; nest is in need of major repair to be used.

  - Remnant: Nest bowl not defined; scant material remaining and not usable unless fully rebuilt.
  - Unknown: The nest cannot be found, was not surveyed, or the nest is present, but because of its location, a determination cannot be made.
  - Not Applicable: Nest no longer present.
- **Nest Status:** The following terms were adapted from the 2016 Eagle Rule (USFWS 2016) and Postupalsky (1974) to assess nest status:
  - Inactive: Defined by the absence of any adult, egg, or dependent young at the nest, or signs of building or adding to the nest in preparation for egg-laying. This term is specific to non-eagle nests.
  - In-use nest: The presence of eggs, dependent young, or adult on the nest, or signs of building or adding to the nest in preparation for egg-laying. This term applies to eagle and non-eagle nests.
  - Alternate nest: One of potentially several nests within an eagle territory that is not an in-use nest at the time of surveys. When there is no in-use nest, all nests in the territory are alternate nests. This term is specific to eagle nests.
  - Unknown: A nest that is present but for which surveyors are unable to determine status (e.g., vegetation around the nest site obscured the view of nest, etc.). This term applies to eagle and non-eagle nests.
  - No Longer Present: A nest that was located during a previous survey but has subsequently been positively ascertained to be destroyed and no evidence of the nest remains. This term applies to eagle and non-eagle nests.
  - Not Visible: A known nest that could not be located (e.g., road or access limitations), but that may still exist (not the same as "No Longer Present" above). This term applies to eagle and non-eagle nests.
- **Estimated Age of Young:** Any observed young were estimated using the Protocol for Golden Eagle Occupancy, Reproduction, and Prey Population Assessment (Driscoll 2010).
- **Notes:** any pertinent notes.

3.0 Results and Discussion

The nest watches were performed June 15-17, 2022, following two rounds of aerial raptor nest surveys performed earlier in the breeding season. No nesting golden eagles were observed during the nest watches, and all the territories were determined to be unoccupied. The biologists were unable to view two of the nests from accessible areas (Nests 11 and 184; Table 1). Although the

nests were not visible, the observation points provided a view of the territory such that any eagle activity in the vicinity of the nests would have been observed. Additionally, all the nests were present but unoccupied during the second aerial survey which occurred about 10 days prior to the nest watches, providing further evidence that the nests were not active.

One individual golden eagle was observed during the nest watches. The bird was a second year subadult observed along a ridge to the west of Nest 206 (Figure 1). Because most golden eagles do not acquire a nesting territory until they are at least four years old (Katzner et al. 2020), we assumed that this eagle was not associated with any of the nests in the area.

The golden eagle breeding period lasts about four months; from when the first egg is laid until the last chick leaves the nest (Katzner et al. 2020). In Oregon, eggs are generally laid from late January to mid-February and peak abundance of 8- to 10-week-old eaglets occurs in mid-June (Katzner et al. 2020; Isaacs 2021). Prior to the nest watches, each nest was visited twice during the aerial surveys (first in April and again in June). Of the seven nests monitored, only Nest 184 showed signs of use during the breeding season (unattended eggs during the initial aerial survey). Based on the size and color of the eggs, the nest may have been occupied by Canada geese (Tetra Tech 2022).

Although no golden eagles were observed at these nests during the aerial surveys or nest watches, that does not preclude golden eagles from nesting in them in the future. Adult golden eagles were observed about 0.5 miles from alternate golden eagle Nests 1 and 9 during the initial aerial survey (Tetra Tech 2022). It is possible that these nests failed earlier in the breeding season or the eagles associated with these nests chose not to lay eggs. The initial aerial survey was conducted right after the incubation period which occurs through the first week of April for most golden eagles in Oregon (Isaacs 2021). Nests 1 and 9 may have been occupied and failed in February or March, prior to the initial survey. Alternatively, in years when food resources are scarce, it is not uncommon for a pair of eagles to occupy a territory yet never lay eggs.

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Table 1. 2022 Nest Watch Results

Nest ID	Nest Status During the Initial Aerial Survey (April 9–10, 2022)	Nest Status During the Second Aerial Survey (June 4–6, 2022)	Nest Status During the Nest Watch (June 15–17, 2022)	Territory Status During the Nest Watch	Eagles Observed During the Nest Watch?	Notes
1	Alternate	Alternate	Alternate	Unoccupied	No	
7	Alternate	Alternate	Alternate	Unoccupied	No	Local landowner reported that the golden eagles relocated to a locust tree in a nearby canyon which is where Nest 8, which was in-use nest in 2022, is located (Figure 1).
9	Alternate	Alternate	Alternate	Unoccupied	No	
11	Alternate	Alternate	Not Visible	Unoccupied	No	
184	In-use	Inactive	Not Visible	Unoccupied	No	Eggs in nest but no adults present during the initial aerial survey, so species was not confirmed, but based on the size and color of the eggs, surveyors speculated that the nest may have been occupied by Canada geese. Nest was empty during the second aerial survey.
152	Inactive	Inactive	Inactive	Unoccupied	No	
206	Inactive	Inactive	Inactive	Unoccupied	Yes	Subadult golden eagle (2nd year bird) observed soaring along ridge to the west during the nest watch.

Figure

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2022 Washington Ground Squirrel Survey Report

Wheatridge Renewable Energy Facility East
December 2022

Prepared for
Wheatridge East Wind, LLC

Prepared by



Tetra Tech, Inc.

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Table of Contents

1.0 Introduction 1
2.0 Survey Area 1
2.1 Habitat Assessment and Delineation 1
2.2 Historical Data Review 2
3.0 Methods 2
3.1 Identification of Protocol 2
3.2 Survey Schedule 3
3.3 Field Survey Methods 3
3.4 Recording Data 4
4.0 Results 4
5.0 Conclusions 8
6.0 References 8

List of Tables

Table 1. 2022 Surveyed Areas 5
Table 2. 2022 Washington Ground Squirrel Colony Results 5

List of Figures

Figure 1. Washington Ground Squirrel Predicted Habitat within Occupied Watersheds in Oregon
Figure 2. Washington Ground Squirrel Survey Area
Figure 3. Washington Ground Squirrel Active Colonies Overview (Confidential)

List of Appendices

Appendix A. Photographs of Typical Washington Ground Squirrel Habitat and Sign (Confidential)

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1.0 Introduction

This survey report presents the methods and results of the 2022 Washington ground squirrel (WAGS; *Urocitellus washingtoni*) survey conducted by Tetra Tech, Inc. (Tetra Tech) for the Wheatridge Renewable Energy Facility East (Project), performed for Wheatridge East Wind, LLC, a subsidiary of NextEra Energy Resources, Inc. This survey supports the anticipated Request for Amendment 1 to the Facility Site Certificate through the Oregon Energy Facility Siting Council. The survey aimed to identify WAGS colonies at the Project so impacts to WAGS may be avoided or minimized.

WAGS are small ground squirrels that inhabit the Columbia Basin, shrub-steppe ecoregion (Verts and Carraway 1998) of eastern Washington and north-central Oregon. In Oregon, the WAGS range extends from Umatilla County west through Gilliam and Morrow counties to the John Day River. Figure 1 shows the predicted WAGS habitat within Oregon watersheds where this species is known to occur, and in relation to the Project (INR 2011). In January of 2000, the Oregon Department of Fish and Wildlife (ODFW) listed WAGS as endangered in Oregon due to concerns over long-term population viability. On September 21, 2016, the U.S. Fish and Wildlife Service announced that listing WAGS as endangered under the federal Endangered Species Act of 1973 was not warranted (USFWS 2016).

2.0 Survey Area

The ODFW Habitat Mitigation Policy (OAR 635-415-0025) typically defines WAGS colonies with a 785-foot buffer in suitable habitat as Category 1 habitat, which has a mitigation strategy of avoidance. To define the 2022 WAGS Survey Corridor, or area initially considered for surveys in 2022, Tetra Tech buffered the amended wind micrositing corridors (as defined before surveys) by 1,000 feet to allow for Project siting changes and avoidance of Category 1 habitat based on the results of surveys. Tetra Tech then removed from consideration for detailed field surveys habitat that was unsuitable for WAGS, consisting of active agricultural fields and developed land. The resulting area (i.e., 2022 WAGS Survey Corridor with active agricultural and developed areas removed) was identified as appropriate for WAGS surveys in 2022. As further described in Section 3.2, this entire area (i.e., 2022 WAGS Survey Corridor with active agricultural areas removed) was not able to be surveyed in 2022. As a result, the WAGS Survey Area (Survey Area) described in this report consists of the approximately 9,188 acres of uncultivated and undeveloped habitat within the 2022 WAGS Survey Corridor that was surveyed once or twice in 2022, within and outside the Amended Site Boundary (Figure 2).

2.1 Habitat Assessment and Delineation

WAGS are most common in shrub-steppe habitats with deep sandy, or silt-loam soils that support the creation of burrows (Betts 1990, Yensen and Sherman 2003). Sagebrush habitats and

bunchgrass grasslands have the highest densities of WAGS. Lower densities are found in more degraded habitats, such as low shrub habitats with annual grasses, rabbitbrush (*Ericameria* sp. and *Chrysothamnus* sp.), and invasive species (Betts 1990). WAGS eat a broad range of seeds, forbs, leaves, flowers, and roots (Greene 1999) that provide adequate fat stores to survive their long aestivation, hibernation, and reproduction periods. Native plants, such as Sandberg bluegrass (*Poa secunda*), are likely key to their diet and survival (Tarifa and Yensen 2004).

Prior to commencing surveys, Tetra Tech used aerial photography to identity suitable WAGS habitat within the 2022 WAGS Survey Corridor. WAGS are found most often in sagebrush habitats and bunchgrass grasslands with few invasive species (Betts 1990); however, ODFW has advised that WAGS colonies can be found in all habitats except active agricultural fields and developed land. As a result, all non-agricultural and undeveloped land in the 2022 WAGS Survey Corridor was considered suitable habitat.

2.2 Historical Data Review

Tetra Tech formally requested and received element occurrence records for WAGS within 10 miles of the Project (the area under consideration as of April 2022) from the Oregon Biodiversity Information Center (ORBIC 2022). Two WAGS occurrences, associated with surveys performed in 1979 and 2013, were recorded within the Survey Area (Carlson et al. 1980, Gerhardt and Anderson 2014). One polygon overlaps the western portion of the Survey Area along Big Butter Creek Road. The second polygon overlaps the western part of the Survey Area along Highway 735. Both element occurrence records were initially reported in 1979 and last observed in 2013. Tetra Tech also reviewed previous WAGS surveys (Gerhardt and Anderson 2014), which indicated that WAGS were present in the vicinity of the Amended Site Boundary.

3.0 Methods

3.1 Identification of Protocol

The 2022 WAGS surveys generally followed the methodology in *Status and Habitat Use of the WAGS on State of Oregon Lands, South Boeing, Oregon* (Morgan and Nugent 1999). The survey dates (April to May 2022) were within the standard survey window (March 15 to June 1). Prior to beginning the surveys, Tetra Tech consulted the Oregon Department of Energy and ODFW regarding the planned survey methods and dates. ODFW verbally approved the protocol and date range (S. Cherry, personal communication, April 12, 2022). Tetra Tech's approved protocol included transects approximately 165 to 230 feet apart (consistent with Morgan and Nugent 1999) and allowed for approaching potential WAGS burrows identified during the first survey round at 90 degrees to the original transects (an approved deviation from Morgan and Nugent 1999) rather than walking the entire second round of transects at this bearing as in Morgan and Nugent (1999).

3.2 Survey Schedule

WAGS are diurnally active and spend much of the year underground. Adults emerge from burrows between January and March, depending on elevation and weather patterns, and return underground between late May and early June. Juveniles emerge from burrows between March and April and return underground a few weeks after the adults (Carlson et al. 1980). They aestivate throughout the summer and are thought to transition directly into hibernation (ODFW 1999, Sherman and Shellman 2005).

The survey protocol requires two rounds of surveys to increase the likelihood of detecting WAGS; the first round beginning around April 1 and the second round at least two weeks later. All surveys must be completed before WAGS go into aestivation in late May or early June. This survey period corresponds to juvenile squirrel emergence from the burrows and the associated increase in activity, and alarm calls are most frequent (Morgan and Nugent 1999). Due to access restrictions and late additions to the 2022 WAGS Survey Corridor, some parts were not surveyed, some were surveyed only once, and others were surveyed twice following the full protocol (Figure 2).

3.3 Field Survey Methods

Before beginning fieldwork, personnel visited an active WAGS colony where they were trained to identify burrows, scat, alarm calls, and squirrels. They were given guidance on WAGS natural history, habitat, and survey protocol. All field personnel also passed a hearing test to verify that they could hear the 8-kilohertz frequency typical of ground-dwelling squirrel alarm call vocalizations. WAGS are often presumed to be the only species of ground squirrel in its range; however, Carlson et al. (1980) documented one Belding's ground squirrel (*Urocitellus beldingi*) colony within the WAGS range, 15 miles northeast of Heppner. Heppner is about 7 miles southwest of the Survey Corridor at its closest point.

WAGS can be distinguished from Belding's ground squirrels by their smaller size, smaller ears, and distinct dorsal spotting (USFWS 2022). WAGS scat can be differentiated from other burrowing animal scat by its characteristic size and shape (Morgan and Nugent 1999). Belding's ground squirrels also have lower frequency calls with different tonal patterns (Robinson 1981).

Each day, surveyors recorded field personnel names, precipitation, average and maximum wind speed and direction, cloud cover, temperature, and Global Positioning System locations at the start, middle, and end of surveys. Surveys typically began in the morning, at least one hour after sunrise when temperatures supported ground squirrel activity, and ended in the early afternoon. Anemometers were used to measure the wind speeds throughout the day. When average wind speed exceeded 15 miles per hour, surveys were halted unless field personnel could find another area sheltered from the wind. Surveys were also halted if there was more than a light rain, as it would hinder hearing WAGS and likely limit WAGS activity.

Surveyors walked transects approximately 165 to 230 feet apart and at a similar pace to ensure there were no gaps in coverage. Field crew members communicated findings to the group via hand-held radios to avoid double-recording data. When surveyors observed potential WAGS burrows or

heard a WAGS alarm call, they alerted the group and searched the area for any squirrels or additional sign. A potential WAGS burrow was defined as a freshly dug (no vegetation or cobwebs), appropriately-sized, and structurally-sound hole with no additional WAGS sign (scat, visual, audio). Surveyors recorded the location of potential WAGS burrows during the first survey round, and revisited them during the second round to determine if an active colony was present. A colony was confirmed active if at least two of the following were identified: positive auditory or visual observation, fresh WAGS burrows, or fresh WAGS scat.

The second survey round followed the same method as the first, except potential WAGS burrows were approached from roughly a perpendicular direction compared to the first round. The approach direction was changed to account for topography and prevailing winds, which may affect WAGS detectability from a given direction. The second survey round also included transects offset from the first-round transects, to increase coverage by traveling between the initial transect paths. Second-round surveyors revisited existing colonies to determine if the activity level or colony boundaries had changed between surveys.

3.4 Recording Data

A Global Positioning System waypoint was recorded for each potential burrow observed in the first survey round, to reinvestigate during the second round. A burrow or burrow set was identified as potential if it was freshly dug (no vegetation or cobwebs), structurally sound, and the appropriate size and angle for this species, but showed no other WAGS sign (scat, visual, audio). When an active colony was observed, tabular data were collected on digital datasheets using the Survey123 software program. Spatial data were collected using the FieldMaps software and a Garmin Geode to record the activity center and colony boundary to submeter accuracy. Tabular data collected at each colony included habitat characteristics, number of burrows, number of scat, the time and weather conditions under which the colony was discovered, how the colony was first discovered, the plant-species composition within and directly surrounding the colony, and any potential disturbances within 1,000 feet of the colony. Colonies were considered active when WAGS activity was confirmed through squirrel sightings, audio confirmations (hearing alarms or social calls), and/or fresh WAGS scat near burrows. Weather, survey personnel, time of day, and surveyed areas were recorded daily. Precipitation, average wind speed and direction, cloud cover, and temperature were recorded at each survey day's start, middle, and end.

4.0 Results

Tetra Tech conducted protocol-level WAGS surveys on approximately 8,502 acres in 2022 (Table 1; Figure 2). Five active WAGS colonies were recorded, primarily south of Big Butter Creek Road and east of Little Butter Creek Road (Table 2; Figure 3). Table 2 shows the collected colony data, including the observation date, colony acreage, activity confirmation methods, and dominant plant species. Appendix A includes representative photos of the WAGS colony habitat and sign observed during the surveys.

Table 1. 2022 Surveyed Areas

Survey Year	Surveyed to protocol (two rounds)	Not surveyed to protocol (one round)	Total Survey Area	Not surveyed[1] (zero rounds)	Not surveyed (not suitable habitat)	Total Survey Corridor
2022	8,502 acres	686 acres	9,188 acres	4, 118 acres	1,323 acres	14,629 acres

Note: Numbers may not sum due to rounding.

1. Acres include suitable habitat without access at the time (2,770 acres), and suitable habitat added to the Survey Corridor late in the season (1,349 acres).

Table 2. 2022 Washington Ground Squirrel Colony Results

Colony	Date First Observed	Revisit Date	Colony Acreage within Survey Area	Activity Confirmation	Soil Type	Shrub Cover	Shrub Distribution	General Habitat Type	Dominated by Native or Exotic Plants?	Dominant Plant Species	Disturbance	Phase 1 Survey Notes	Phase 2 Survey Notes
WREE01	4/23/2022	5/10/2022	2.29	Alarm call, visual sighting, and scat	Silty loam	21-40%	Patchy	Bunchgrass	Neither native nor exotic dominant	Bulbous bluegrass, rubber rabbitbrush, gray rabbitbrush, storksbill	Light grazing	At least 3 calling WAGS, 60 burrows, some burrows with scat	Additional burrows detected on second visit and colony enlarged. Colony was very active with multiple individual sightings
WREE02	5/4/2022	5/20/2022	0.45	Alarm call and burrows	Silty	11-20%	Patchy	Bunchgrass	Neither native nor exotic dominant	Bulbous bluegrass, rubber rabbitbrush, stork's bill, common yarrow	Light grazing	25 disperse burrows with at least three different calling WAGS.	No active sign during revisit
WREE03	5/5/2022	5/20/2022	0.12	Alarm call and burrows	Silty loam	<1%	N/A	Bunchgrass	Neither native nor exotic dominant	Bulbous bluegrass, stork's bill, common yarrow	Light grazing	Heard 1 call, 12 burrows located	No active sign during revisit
WREE04	5/11/2022	N/A	0.26	Alarm call, visual sighting, and burrows	Silty	11-20%	Homogenous	Bunchgrass	Exotic	Cheatgrass, bulbous bluegrass, storksbill	Moderate grazing	N/A - Colony was identified during second visit	20 active burrows identified. Colony on south slope of draw, facing north. Numerous individuals seen and photographed
WREE05	5/13/2022	5/20/2022	1.06	Alarm call, visual sighting, and scat	Silty loam	1-10%	Patchy	Bunchgrass	Neither native nor exotic dominant	Bulbous bluegrass, small fescue, Sandberg bluegrass, rubber rabbitbrush, gray rabbitbrush, cheatgrass	Light grazing	N/A - Colony was identified during second visit	40 burrows initially documented on the slope. Multiple calls and visual confirmation. Additional activity center outside of Survey Area was mapped during revisit for training. Mapped additional colony area (3.44 acres) with ~70 additional burrows and high activity levels

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Four recorded colonies were in native bunchgrass habitats; one was in annual grassland habitat. Common grass species recorded at active colonies included Sandberg bluegrass and bulbous bluegrass (*Poa bulbosa*). For colonies with shrubs, the dominant species recorded were rubber rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus viscidiflorus*). The two dominant forbs recorded in the colonies were western yarrow (*Achillea millefolium*) and redstem stork's bill (*Erodium cicutarium*).

Surveys occurred between April 17 and April 29, 2022; May 4 and May 15, 2022; and May 20 and May 29, 2022, in two phases, spaced 2 weeks apart. Three colonies (WREE01, WREE02, and WREE03) were found by audio detection during the first round of surveys in April and early May. Audio detection found two additional colonies (WREE04 and WREE05) during the second survey round in May. Two first-round colonies, WREE02 and WREE03, had no audio detections during the second-round visits. WREE03, the most active in round one, had multiple audio detections, visual observations, and expanded colony area during the second-round surveys. A total of 121 potential WAGS burrows were recorded across the Survey Area during the first round of surveys. All potential burrows were revisited during the second round of surveys, resulting in the detection of the additional two colonies. WREE05 was revisited during the second round to train new field staff at an active colony. During this training visit, it was noted that the colony extended past the previously delineated boundary outside the Survey Area; the biologists delineated the full extent of the colony.

Two of the five recorded WAGS colonies (WREE01 and WREE04) were not located within the habitat predicted by the Institute for Natural Resources model (Figure 3; INR 2011). However, all but one (WREE04) of the five colonies occurred within WAGS Habitat Concentration Areas with very high connectivity modeled[1] by the Washington Wildlife Habitat Connectivity Working Group (Figure 3; WHCWG 2012, WHCWG 2013).

Three Belding's ground squirrel colonies were encountered incidentally during the surveys. The Survey Corridor is along the southern edge of the WAGS range and within the northwestern part of the Belding's ground squirrel range (USGS 2018). Belding's ground squirrels have been known to outcompete WAGS for available resources in disturbed habitats (Carlson et al. 1980). The Belding's ground squirrel colonies were detected in the southernmost section of the Survey Area, near the southern edge of the WAGS range, north of Highway 74 (Figure 3). Two of the Belding's colonies were in areas with low potential for WAGS occurrence according to both available models for WAGS habitat (WHCWG 2012 and 2013 for habitat connectivity, INR 2011 for predicted habitat quality, Figure 1, Figure 3). One of these colonies was south of the Survey Corridor, adjacent to Route 735, a large, frequently-used gravel road adjacent to residences and grazed fields. Biologists observed hundreds of burrows on both sides of the road and high activity, with Belding's squirrels running across the road. A second colony was northeast of the colony on Route 735, near the edge of the Survey Corridor, along a stream in a heavily grazed area. The third colony was south of the

[1] Habitat Concentration Areas are defined as "significant habitat areas that are expected or known to be important for focal species based on survey data or habitat association modeling" (WHCWG 2012).

documented WAGS colonies, in an area where models indicate good quality WAGS habitat in a high-connectivity area (WHCWG 2012, WHCWG 2013, INR 2011, Figure 1, Figure 3). This colony is the most remote of the three Belding's colonies observed. Biologists noted that the habitat at this colony is similar to that described at the WAGS colonies.

5.0 Conclusions

Five WAGS colonies were observed within the Survey Area during the 2022 surveys. All were east of Little Butter Creek Road, South of Big Butter Creek Lane, and north of Highway 74. No colonies were observed in the western portion of the Survey Area. Much of the eastern habitat is modified grassland with evidence of land manipulation like conversion of vegetation to pasture grasses, removal of rocks from the fields, and installation of extensive erosion-control earthworks. Belding's ground squirrel colonies were identified within the Survey Area both east and west of Little Butter Creek Lane.

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Figures

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Wheatridge Renewable Energy Facility East

Figure 1
Washington Ground Squirrel Predicted Habitat within Occupied Watersheds in Oregon

MORROW AND UMATILLA COUNTIES, OR

- Proposed Amended Site Boundary (12/05/2022)
- 2022 WAGS Survey Corridor
- County Boundary
- State Highway
- County Highway
- Local Roads
- WAGS Habitat Concentration Areas with very high connectivity[2]

Predicted Habitat Quality[1]

- None
- Poor
- Fair
- Good

[1]Source: Institute for Natural Resources, 2011
[2]Source: Washington Wildlife Habitat Connectivity Working Group, 2012

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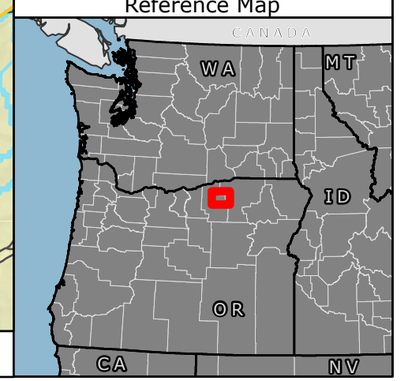
Reference Map



Morrow County

Umatilla County

Big Butter Creek Ln

Little Butter Creek Rd

578

207

735

602

813

74

1:130,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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Wheatridge Renewable Energy Facility East

Figure 2
Washington Ground Squirrel Survey Area

MORROW AND UMATILLA COUNTIES, OR

Umatilla County
Morrow County
Big Butter Creek Ln
Little Butter Creek Rd
207
578
735
813

- Proposed Amended Site Boundary (12/05/2022)
- 2022 WAGS Survey Corridor
- County Boundary
- State Highway
- County Highway
- Local Roads
- Not Suitable Habitat
- Not Surveyed

Survey Area

- Protocol Surveys
- Only One Survey

Survey Corridor = 1,000-ft buffer around amended wind micrositing corridor at the time survey were conducted.

Survey Area = suitable WAGS habitat within the Survey Corridor surveyed once or twice in 2022.

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Reference Map



1:85,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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Appendix A. Photographs of Typical Washington Ground Squirrel Habitat and Sign

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2022 Habitat Categorization and Special Status Wildlife Survey Report

Wheatridge Renewable Energy Facility East
December 2022

Prepared for
Wheatridge East Wind, LLC

Prepared by



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Table of Contents

1.0 Introduction 1
2.0 Methods 1
2.1 Survey Area 1
2.2 Habitat Categorization 1
2.3 Special Status Wildlife 3
3.0 Results 3
3.1 Habitat Categorization 3
3.2 Special Status Wildlife 4
4.0 Summary and Discussion 5
5.0 References 7

List of Tables

Table 1. Habitat Categories, Types, and Subtypes within the Survey Area 4
Table 2. Special Status Wildlife Species Observed During Surveys 5

List of Figures

Figure 1. Habitat Category

Figure 2. Habitat Type

Figure 3. Special Status Species and Special Features

List of Attachments

Attachment 1. Habitat Categorization Datasheet

Attachment 2. Habitat Types and Subtypes Potentially Occurring within the 2022 Habitat Categorization Survey Area

Attachment 3. Special Status Wildlife Species Potentially Occurring within the 2022 Habitat Categorization Survey Area

Attachment 4. Select Photographs of Habitat and Wildlife Taken during 2022 Surveys

Attachment 5. Wildlife Species Observed During 2022 Surveys

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1.0 Introduction

This survey report presents the methods and results of the 2022 habitat categorization and special status wildlife surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Wheatridge Renewable Energy Facility East (Project), performed for Wheatridge East Wind, LLC, a subsidiary of NextEra Energy Resources, Inc. This survey was conducted in support of the anticipated Request for Amendment 1 to the Facility Site Certificate through the Oregon Energy Facility Siting Council. The objective of this survey was to map and classify habitat according to Oregon Department of Fish and Wildlife (ODFW) guidelines set forth in Oregon Administrative Rule (OAR) 635-415-0025, and identify the presence of special status wildlife species and their habitats.

2.0 Methods

2.1 Survey Area

Figures 1, 2, and 3 show an Amended Site Boundary of approximately 79,424 acres in Morrow and Umatilla counties. The approximately 2,568-acre 2022 Habitat Categorization Survey Area (Survey Area) encompasses an amended wind micrositing corridor that was under consideration at the time of surveys (i.e., during the spring of 2022), limited to the areas accessible at the time of the survey.

2.2 Habitat Categorization

Prior to conducting field surveys, Tetra Tech conducted a desktop assessment of habitat in the Survey Area using aerial photography, topographic maps, surveys previously performed for the Project (Gerhardt and Anderson 2014), and ODFW Big Game Winter Range data (ODFW 2013a). Preliminary habitat polygons were identified using these desktop sources within the Survey Area and were either confirmed or re-delineated in the field.

The majority of the Survey Area overlaps with ODFW Mule Deer Winter Range. Based on consultation with ODFW prior to surveys, Tetra Tech mapped areas within ODFW-designated Mule Deer Winter Range as Category 2 habitat, except for cultivated cropland and developed land, which is Category 6 habitat (ODFW 2013b). ODFW indicated that determining the condition of habitat within these areas was not necessary (pers. comm., Steve Cherry, ODFW, April 12, 2022). Tetra Tech determined type and subtype in these areas using a combination of habitat categorization data collected during surveys for the state endangered Washington ground squirrel (WAGS; *Urocitellus washingtoni*; Tetra Tech 2022a), targeted field-based habitat categorization surveys, and post-field desktop delineation via aerial imagery. Tetra Tech performed targeted field-based surveys to document the vascular plant communities present in these areas, and to identify potentially appropriate habitat for the state-threatened Laurence's milkvetch (*Astragalus collinus* var. *laurentii*), for which targeted surveys were conducted and reported separately (Tetra Tech 2022a).

Within previously surveyed areas in the field, biologists used Esri FieldMaps software to confirm or recategorize areas of relatively homogenous vegetation and characterized the composition and structure on the field datasheets (Attachment 1). In areas not previously surveyed, biologists confirmed or updated the extents of desktop-delineated polygons, categorized areas of relatively homogenous vegetation, and characterized the composition and structure on the field datasheets. Each delineated vegetation polygon was assigned a habitat type, subtype, and habitat quality category guided by the draft habitat categorization table (Attachment 2). The habitat categorization table is consistent with previously employed category, type, and subtype definitions as described in Gerhardt and Anderson (2014), with overlays for Big Game habitat and WAGS colonies, as applicable. For habitats not defined in Gerhardt and Anderson (2014), such as Cliffs, Caves, and Talus, habitat definitions were adapted from *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001).

Habitat types and categories were not assigned to wetlands and waters in the field, as they will be derived from data being collected during ongoing wetlands and waters surveys, where available, following the habitat categorization field effort and reported separately. Outside of ODFW Mule Deer Winter Range, habitat was classified into one of six quality categories, with Category 1 habitat being the most important to fish and wildlife species (i.e., essential, limited, and irreplaceable habitat) and Category 6 being the least important (i.e., habitat that has low potential to become essential or important habitat), per the ODFW Habitat Mitigation Policy (OAR 635-415-0025). Data characterizing a particular habitat type and quality represented the average condition of all such polygons. A minimum mapping unit of 1 acre was implemented.

Habitat categorization surveys were conducted concurrently with special status wildlife species surveys. Surveyors walked meandering transects within non-cultivated land inside the Survey Area. While walking these transects, surveyors digitized habitats within these focused corridors, scanned the landscape and digitized habitats within the viewshed to map and categorize 100 percent of the Survey Area. Areas of cultivated land delineated in desktop analysis areas were verified for extent, cultivation status, and as applicable, crop in cultivation. This was done by driving paved roads, gravel roads, and two-tracks. These low-quality habitat areas were occasionally traversed on foot to verify their extent if they were not fully visible from the vehicle, if areas of potential habitat or nesting opportunities for special status species were identified, or if areas of adjacent habitat required delineation.

Following field surveys, the digitized habitat boundaries were downloaded and processed in GIS, and information from the field data were incorporated into the spatial data (Figures 1 and 2). Data were reviewed for quality control and processed to incorporate WAGS colonies and associated buffers as well as ODFW big game winter range data where not incorporated during field surveys. No data for wetlands and waters are included in this report. WAGS colonies and associated buffers were processed based on 2022 WAGS surveys (Tetra Tech 2022b).

2.3 Special Status Wildlife

Prior to conducting field surveys, Tetra Tech conducted a desktop review to identify special status wildlife species with the potential to occur at the Project. Special status wildlife include federal and state endangered, threatened, proposed, and candidate species; U.S. Fish and Wildlife Service (USFWS) species of concern; USFWS birds of conservation concern; ODFW sensitive and sensitive-critical species; and Oregon Conservation Strategy species (Attachment 3; OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, USFWS 2021, USFWS 2022). Tetra Tech reviewed habitat and range information for special status wildlife species known to occur in Morrow and Umatilla counties and the Columbia Plateau/Columbia Basin to develop the list of species that had the potential to occur at the Project. Species were eliminated from consideration if their habitat was absent from, or their range did not overlap with, the Project. In addition to reviewing publicly available sources, Tetra Tech submitted a formal request to the Oregon Biodiversity Information Center (ORBIC) to obtain site-specific records of special status species occurrences and sensitive habitats in the Project's vicinity (ORBIC 2022). The desktop review identified 28 special status wildlife species with the potential to occur at the Project, including 18 birds, seven mammals, two reptiles, and one invertebrate (Attachment 3).

Special status wildlife surveys occurred concurrently with the habitat categorization survey, as well as during targeted surveys for WAGS (Tetra Tech 2022b). In the field, surveyors scanned the landscape, the sky, and the ground looking for special status wildlife species and recognizable sign, focusing on non-cultivated areas likely to support special status wildlife species. Areas unlikely to support special status species—cultivated land, developed areas—were surveyed primarily from field vehicles by driving paved roads, gravel roads, and two-tracks. These areas were surveyed on foot if the full extent was not visible from the vehicle, or if areas of potential habitat or nesting opportunities for special status species were identified. Surveyors recorded the location of special status wildlife species (or recognizable sign) using Esri FieldMaps software, and recorded information on the number of individuals and their behavior. Surveyors also kept a running list of all wildlife species observed during 2022 surveys at the Project and documented special habitats and unique features if encountered, such as raptor nests, cliffs, rimrock, rock outcrops, and talus slopes. Targeted raptor nest surveys were performed in 2022 and are reported separately (Tetra Tech 2022c). Following field surveys, the digitized data were downloaded and processed using GIS software, and were reviewed for quality control and assurance.

3.0 Results

3.1 Habitat Categorization

Habitat categorization data were collected during WAGS surveys between April 19 and May 30, 2022. Targeted field-based habitat categorization surveys were performed from May 18 to 27, 2022, and desktop delineation via aerial imagery was performed following these field survey efforts. These field survey and desktop review efforts determined habitat type and category in 100

percent of the Survey Area as shown in Table 1 and Figures 1 and 2. Photos of select habitat types and categories are provided in Attachment 4.

Table 1. Habitat Categories, Types, and Subtypes within the Survey Area

Habitat Category, Type, and Subtype	Survey Area (acres)
Category 1	
Grassland: Native Perennial	56.9
Shrub-Steppe: Rabbitbrush/Snakeweed Shrub-steppe	2.6
Subtotal Category 1	**59.5**
Category 2[1]	
Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian	1.7
Grassland: Exotic Annual	20.9
Grassland: Native Perennial	1,424.7
Shrub-steppe: Rabbitbrush/ Snakeweed Shrub-steppe	34.0
Cliffs, Caves, and Talus	1.2
Developed: Revegetated/Other Planted Grassland	305.3
Subtotal Category 2	**1,787.8**
Category 3	
Grassland: Native Perennial	58.5
Subtotal Category 3	**58.5**
Category 4	
Grassland: Exotic Annual	293.2
Subtotal Category 4	**293.2**
Category 6	
Developed: Dryland Wheat	333.3
Developed: Irrigated Agriculture	6.0
Developed: Other	29.4
Subtotal Category 6	**368.8**
Grand Total	**2,567.8**

Note: Totals in this table may not be precise due to rounding.

1. All areas of Category 2 habitat within the Survey Area are defined as such based on post-field application of ODFW Big Game Winter Range and WAGS habitat overlays per Attachment 2. Within ODFW Big Game Winter Range, habitats were not assigned categories in the field.

3.2 Special Status Wildlife

The data received from ORBIC showed 31 occurrence records for five special status wildlife species in the Project's vicinity, including five occurrences of WAGS and two occurrences of golden eagles that overlap with the Amended Site Boundary. Tetra Tech conducted special status wildlife species

surveys concurrent with habitat categorization surveys (between May 18 to 27, 2022) and WAGS surveys (between April 19 and May 30, 2022). Tetra Tech observed a total of ten special status wildlife species during surveys, including nine special status bird species and one special status mammal species, the Washington ground squirrel for which targeted surveys were conducted and reported separately (Table 2, Figure 3; Tetra Tech 2022b). A complete list of species observed during all surveys is included as Attachment 5.

Table 2. Special Status Wildlife Species Observed During Surveys

Taxa	Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau/Columbia Basin[2]
Bird	Brewer's sparrow	*Spizella breweri*	-	S
Bird	Burrowing owl (Western)	*Athene cunicularia hypugaea*	SOC	SC
Bird	Ferruginous hawk	*Buteo regalis*	SOC	SC
Bird	Golden eagle	*Aquila chrysaetos*	BGEPA	-
Bird	Grasshopper sparrow	*Ammodramus savannarum*	-	S
Bird	Loggerhead shrike	*Lanius ludovicianus*	SOC	S
Bird	Long-billed curlew	*Numenius americanus*	-	SC
Bird	Northern harrier	*Circus hudsonius*	BCC	-
Bird	Swainson's hawk	*Buteo swainsoni*	-	S
Mammal	Washington ground squirrel	*Urocitellus washingtoni*	-	E

Species and status: OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2022, USFWS 2021, USFWS 2022.

1. Federal Status: SOC = Species of Concern, BCC = Bird of Conservation Concern, BGEPA = Bald and Golden Eagle Protection Act.
2. Oregon Department of Fish and Wildlife Status in the Columbia Plateau/Columbia Basin: E = Endangered, SC = Critical Sensitive Species, S = Sensitive Species.

4.0 Summary and Discussion

A total of 59 acres of Category 1 habitat were incorporated into the habitat categorization data based on the location of active WAGS colonies delineated during the spring 2022 plus a 785-foot buffer in suitable habitat (Tetra Tech 2022a). These Category 1 areas are composed of primarily Native Perennial Grassland with limited areas of Rabbitbrush/Snakeweed Shrub-steppe. A total of 81 percent of the Survey Area is located within ODFW Deer Winter Range. Within Winter Range, Developed: Dryland Wheat, Irrigated Agriculture, and Other are designated as Category 6; the remainder of all habitat types are designated as Category 2. No Category 2 habitat was identified within the Survey Area outside of Winter Range, although some areas of Native Perennial Grassland, particularly along ridge-tops, were of relatively high-quality. Outside of Winter Range, habitat not considered Category 6 is composed of Category 4 Exotic Annual Grassland (293 acres), Category 3 Native Perennial Grassland (59 acres).

Sixty percent of the Survey Area is Native Perennial Grassland. Dryland Wheat, Exotic Annual Grassland, and Revegetated/Other Planted Grassland were delineated in similar percentages within the Survey Area (13 percent, 12 percent, and 12 percent, respectively). Areas of Developed: Dryland Wheat, Irrigated Agriculture, and Other habitats comprise 14 percent of the Survey Area. The majority of these areas (333 acres) are Dryland Wheat, followed by 29 acres of paved and gravel roads, homes, quarries, ranching and other built infrastructure (Developed: Other), and finally, 6 acres of Irrigated Agriculture. Within areas of Irrigated Agriculture, surveyors noted crops including alfalfa, cultivated hay meadows composed of species such as alfalfa and orchard grass (*Dactylis glomerata*), and irrigated wheat. Limited areas of Shrub-steppe: Rabbitbrush/Snakeweed Shrub-steppe habitat were delineated in the Survey Area (3 acres of Category 1 habitat, 34 acres of Category 2 habitat).

The Survey Area includes three general areas with distinct habitat characteristics: north, east, and west. Habitat in the northern section of the Survey Area (i.e., north of Big Butter Creek Lane) is primarily composed of a mix of formerly cultivated fields dominated by Exotic Annual Grassland and one large, fenced area of Dryland Wheat (Attachment 4). Limited areas of Native Perennial Grassland inside the Survey Area extend beyond the mapped area on both hilltops and hillsides. Limited areas of Rabbitbrush/Snakeweed Shrub-steppe are also present outside the Survey Area along more steeply sloped hillsides, and along the north-south-running gravel road within the Survey Area. Special status species observed in this area included two active Western burrowing owl (*Athene cunicularia hypugaea)* burrows, burrowing owl individuals, Brewer's sparrow (*Spizella breweri*), ferruginous hawk (*Buteo regalis)*, northern harrier (*Circus hudsonius)*, Swainson's hawk (*Buteo swainsoni)*, grasshopper sparrow (*Ammodramus savannarum)*, and long-billed curlew (*Numenius americanus)*. Burrowing owl burrows were observed during habitat surveys on May 23, 2022 (Figure 3); pellets, feathers, and whitewash were observed at the burrows, but no owls were observed. Surveyors returned on May 27, 2022 to investigate further and observed two adult owls standing at the northern burrow and one adult owl standing at the southern burrow.

Habitat in the western section of the Survey Area (i.e., south of Big Butter Creek Lane, east of Little Butter Creek Road) is composed of a mix of Native Perennial Grassland, terraced Revegetated/Other Planted Grassland, and Dryland Wheat (Attachment 4). Disturbances in all Category 2 Native Perennial Grasslands include grazing, invasive plants, dirt roads, and gravel roads. Limited areas of Rabbitbrush/Snakeweed Shrub-steppe are also present within and outside the Survey Area along more steeply sloped hillsides, and in small, uncultivated islands within Dryland Wheat fields. Developed areas associated with residences and ranching infrastructure are also present. Special status species observed in this area included burrowing owl, golden eagle (*Aquila chrysaetos*), ferruginous hawk, northern harrier, Swainson's hawk, grasshopper sparrow, long-billed curlew, and loggerhead shrike (*Lanius ludovicianus;* Figure 3).

Habitat in the eastern section of the Survey Area (i.e., west of Little Butter Creek Road) is almost entirely Native Perennial Grassland habitat, with limited areas of Rabbitbrush/Snakeweed Shrub-steppe within and outside the Survey Area along more steeply sloped hillsides (Attachment 4). Native Perennial Grasslands are a mosaic of two plant communities – one associated with thin, rocky soils, usually on hilltops that sometimes include rock outcrops. These areas are composed of

a high percentage of native plant species, ranging from 55 to 100 percent native composition, meeting the definition of high-quality Category 3 habitat without consideration for Winter Range. In areas of deeper soils where bedrock is not visible, the forb layer is less diverse and includes more non-native species. These areas can include rock outcrops and talus. These areas meet the definition for a range of habitat qualities (Category 3 and 4) without consideration for Winter Range. Along Big Butter Creek, Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian, Irrigated Agriculture (wheat, alfalfa, and cultivated hay meadows), and Developed areas associated with residences and ranching infrastructure comingle along the Big Butter Creek Lane. Surveyors also noted rock outcrops if observed during surveys, and mapped one area of Cliff, Cave, and Talus along the Big Butter Creek. Cliff, Cave, and Talus habitat can provide roosting habitat for bats and nesting sites for raptors. During raptor nest surveys, 52 out of 161 nests were located on Cliff substrate, primarily along Big Butter Creek and within this western portion of the Project (Tetra Tech 2022c). Special status species observed in the western area included ferruginous hawk, northern harrier, Swainson's hawk, grasshopper sparrow, long-billed curlew, loggerhead shrike, and Washington ground squirrel (Figure 3, Tetra Tech 2022a).

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Figures

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.

Wheatridge Renewable Energy Facility East

Figure 1
Habitat Category

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- County Boundary
- State Highway
- County Highway
- Local Roads
- ODFW Deer Winter Range

Habitat Category

- 1
- 2
- 3
- 4
- 6

TETRA TECH

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Reference Map



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WGS 1984 UTM Zone 11N

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Wheatridge Renewable Energy Facility East

Figure 2
Habitat Subtype

MORROW AND UMATILLA COUNTIES, OR

Habitat Type: Subtype

- Cliffs, Caves and Talus
- Developed: Dryland Wheat
- Developed: Irrigated Agriculture
- Developed: Other
- Developed: Revegetated/Other Planted Grassland
- Grassland: Exotic Annual
- Grassland: Native Perennial
- Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian
- Shrub-steppe: Rabbitbrush/ Snakeweed Shrub-steppe

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- ODFW Deer Winter Range
- State Highway
- County Highway
- Local Roads
- County Boundary

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Reference Map



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Wheatridge Renewable Energy Facility East

Figure 3
Special Status Species and Special Features

MORROW AND UMATILLA COUNTIES, OR

Figure 3.1
Figure 3.2
Figure 3.3
Figure 3.4
Figure 3.5
Figure 3.6
Figure 3.7
Figure 3.8
Figure 3.9

Umatilla County
Morrow County

207
578
735
813

Map Grid
2022 Habitat Categorization Survey Area
Amended Site Boundary
State Highway
County Highway
County Boundary

Special Status Species

- Brewer's sparrow
- burrowing owl
- ferruginous hawk
- golden eagle
- grasshopper sparrow
- loggerhead shrike
- long-billed curlew
- Northern harrier
- Swainson's hawk

Special Features

- Rock Outcrops
- burrowing owl burrow

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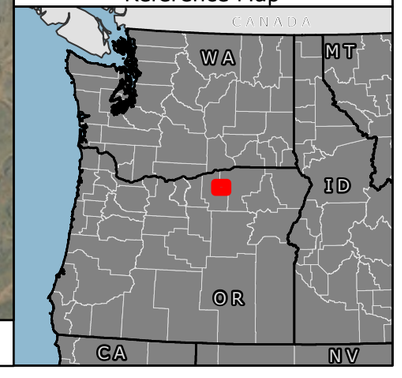
Reference Map



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Wheatridge Renewable Energy Facility East

Figure 3.1
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Amended Site Boundary
2022 Habitat Categorization Survey Area
Local Roads
County Boundary

Special Status Species

Brewer's sparrow
burrowing owl
grasshopper sparrow
long-billed curlew
Swainson's hawk

Special Features

burrowing owl burrow

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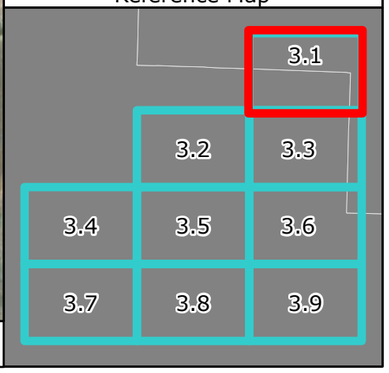
NEXTera ENERGY RESOURCES

Reference Map



Service Butte Rd
Co 1349 Rd
Vey Rd
Umatilla County
Whitehouse Rd
Tony Vey Rd
827
Morrow County
Natl Forest Develop Road 768 Rd
Natl Forest Develop Road 825 Rd

1:22,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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Wheatridge Renewable Energy Facility East

Figure 3.2
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Morrow County

Big Butter Creek Ln

Little Buttercreek Rd

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- Local Roads
- County Boundary

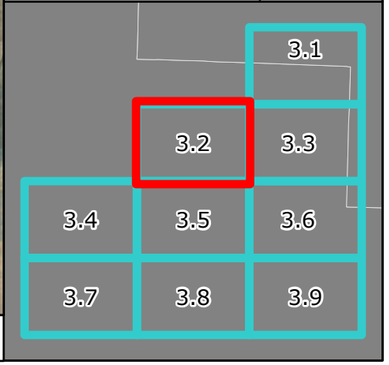
Special Status Species

- ferruginous hawk
- grasshopper sparrow

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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WGS 1984 UTM Zone 11N

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Wheatridge Renewable Energy Facility East

Figure 3.3
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Amended Site Boundary
2022 Habitat Categorization Survey Area
Local Roads
County Boundary

Special Status Species

- ferruginous hawk
- grasshopper sparrow
- long-billed curlew
- Northern harrier
- Swainson's hawk

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



Morrow County

Umatilla County

Tony Vey Rd

827

Big Butter Creek Ln

Butter Creek Rd

Co 1400 Rd

1:22,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

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Wheatridge Renewable Energy Facility East

Figure 3.4
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Myers Ln
578
735
Sand Hollow Rd
Spur Loop
Morrow County

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- County Highway
- Local Roads
- County Boundary

Special Status Species

- burrowing owl
- grasshopper sparrow
- loggerhead shrike
- Northern harrier
- Swainson's hawk

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



1:22,000

WGS 1984 UTM Zone 11N

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Wheatridge Renewable Energy Facility East

Figure 3.5
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Morrow County

Little Buttercreek Rd

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- Local Roads
- County Boundary

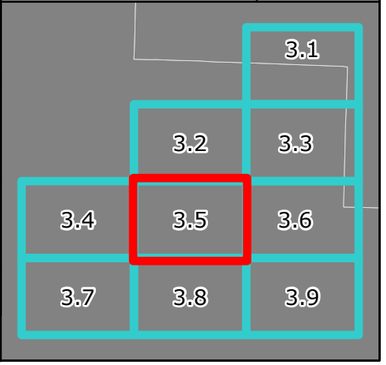
Special Status Species

- grasshopper sparrow
- long-billed curlew
- Northern harrier

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

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Wheatridge Renewable Energy Facility East

Figure 3.6
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Umatilla County

Morrow County

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- Local Roads
- County Boundary

Special Status Species

- grasshopper sparrow
- loggerhead shrike
- long-billed curlew

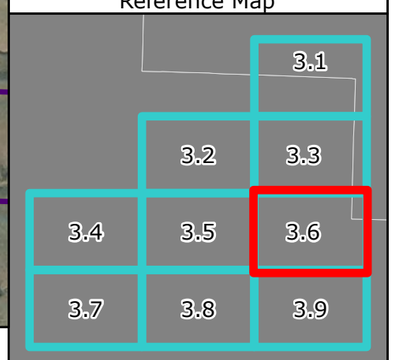
Special Features

- Rock Outcrops

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

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Wheatridge Renewable Energy Facility East

Figure 3.7
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- County Highway
- Local Roads
- County Boundary

Special Status Species

- golden eagle
- grasshopper sparrow
- long-billed curlew
- Northern harrier
- Swainson's hawk

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



Sand Hollow Rd

Spurlock Rd

735

Morrow County

1:22,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

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Wheatridge Renewable Energy Facility East

Figure 3.8
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Little Buttercreek Rd

Little Butter Creek Rd

Morrow County

Healy Rd

813

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- County Highway
- Local Roads
- County Boundary

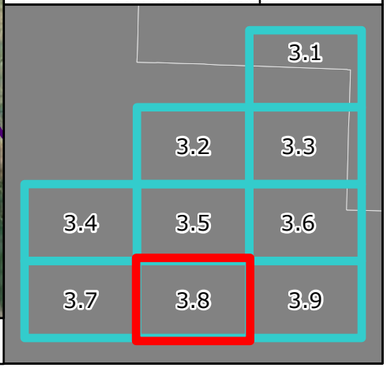
Special Status Species

- grasshopper sparrow
- long-billed curlew

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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WGS 1984 UTM Zone 11N

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Wheatridge Renewable Energy Facility East

Figure 3.9
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

Morrow County

Little Butter Creek Rd

- Amended Site Boundary
- 2022 Habitat Categorization Survey Area
- Local Roads
- County Boundary

Special Status Species

- grasshopper sparrow

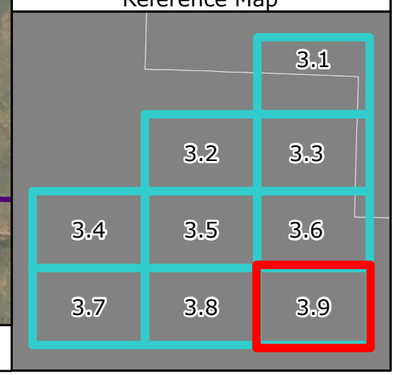
Special Features

- Rock Outcrops

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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WGS 1984 UTM Zone 11N

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Attachment 1. Habitat Categorization Datasheet

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Data Sheet Id: _____

Wheatridge Renewable Energy Facility East - HABITAT CATEGORIZATION

HABITAT CATEGORY ☐

Date _____ Surveyor _____

Site description:

EFSC habitat type/subtype: (circle one habitat type and one subtype):

Grassland: Exotic Annual (GA), Native Perennial (GB),
Shrub-steppe: Basin Big Sagebrush Shrub-steppe (SSA), Rabbitbrush/Snakeweed Shrub-steppe (SSB)
Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian (ER)
Developed: Dryland Wheat (DW), Irrigated Agriculture (IG), Developed Other (DX), Revegetated or Other Planted Grassland (RVG)
Cliffs, Caves, and Talus (CT)

Notes if confusion _____

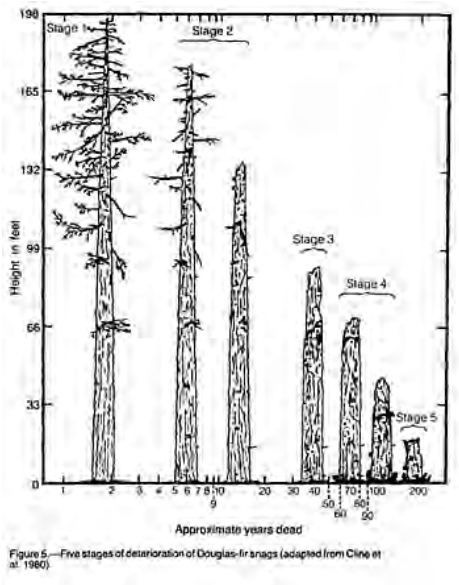


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

Detailed vegetation measurements:

**Dominant ≥20%, Subdominant 10-20%

Trees

Dominant species _____

Subdominant species _____

Avg. dbh (in.) __ Canopy closure (%) ___ No. subcanopy layers ____

Percent native cover _____ Percent bare ground or duff _____

Stumps present? Yes No

Snags present? Yes No Snag stage (circle one) 1 2 3 4 5 Abundance ____/ac

Forest phase per Brown: GF SHR OSP CSPS LGSAW OGDD

Shrubs

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover _____ Percent bare ground _____

Percent crytobiotic crust (if applicable)_____

Herbs & Grasses

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover:_____ Percent bare ground or duff ____

Percent crytobiotic crust (if applicable)_____

Other descriptions:

Disturbance type(s), check all that apply within the polygon, and for disturbances outside but in view of the polygon, insert the estimated distance in meters between the polygon edge and the disturbance:

__Grazing	__Thinning	__Wind Farm
__Invasive plants	__Quarry	__Fire
__Clearcut Logging	__Residence or Farm	__Other Building
__Railroad	__Communications Tower	__Campground
__Dirt Road	__Gravel Road	__Asphalt road
__Row Crop	__Urban Area	__Erosion

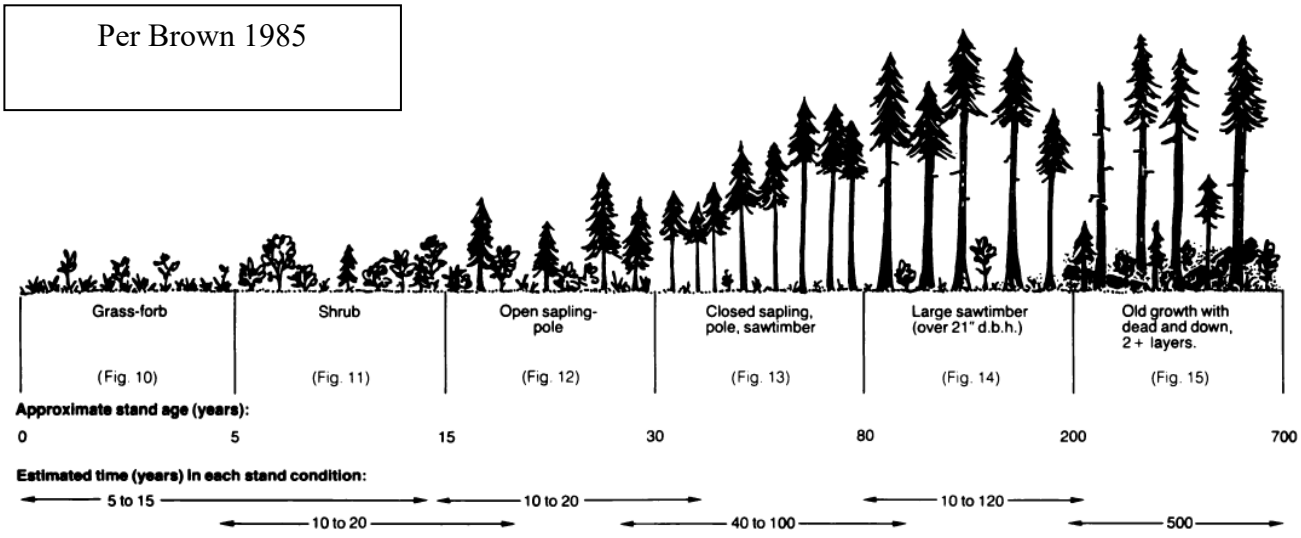
__Recreation, if so what kind? _____ Other (please specify) _____

Any sensitive species seen or habitat specifically noted (if yes, please explain)? Yes No

Any special features (for example: caves, mine openings, cliffs, rimrock, rock outcrops, talus slopes, abandoned buildings, large snags, abandoned wood bridges, balds and bluffs, wetland habitats (if yes, please explain)? Yes No

Any additional notes:

Per Brown 1985



Attachment 2. Habitat Types and Subtypes Potentially Occurring within the 2022 Habitat Categorization Survey Area

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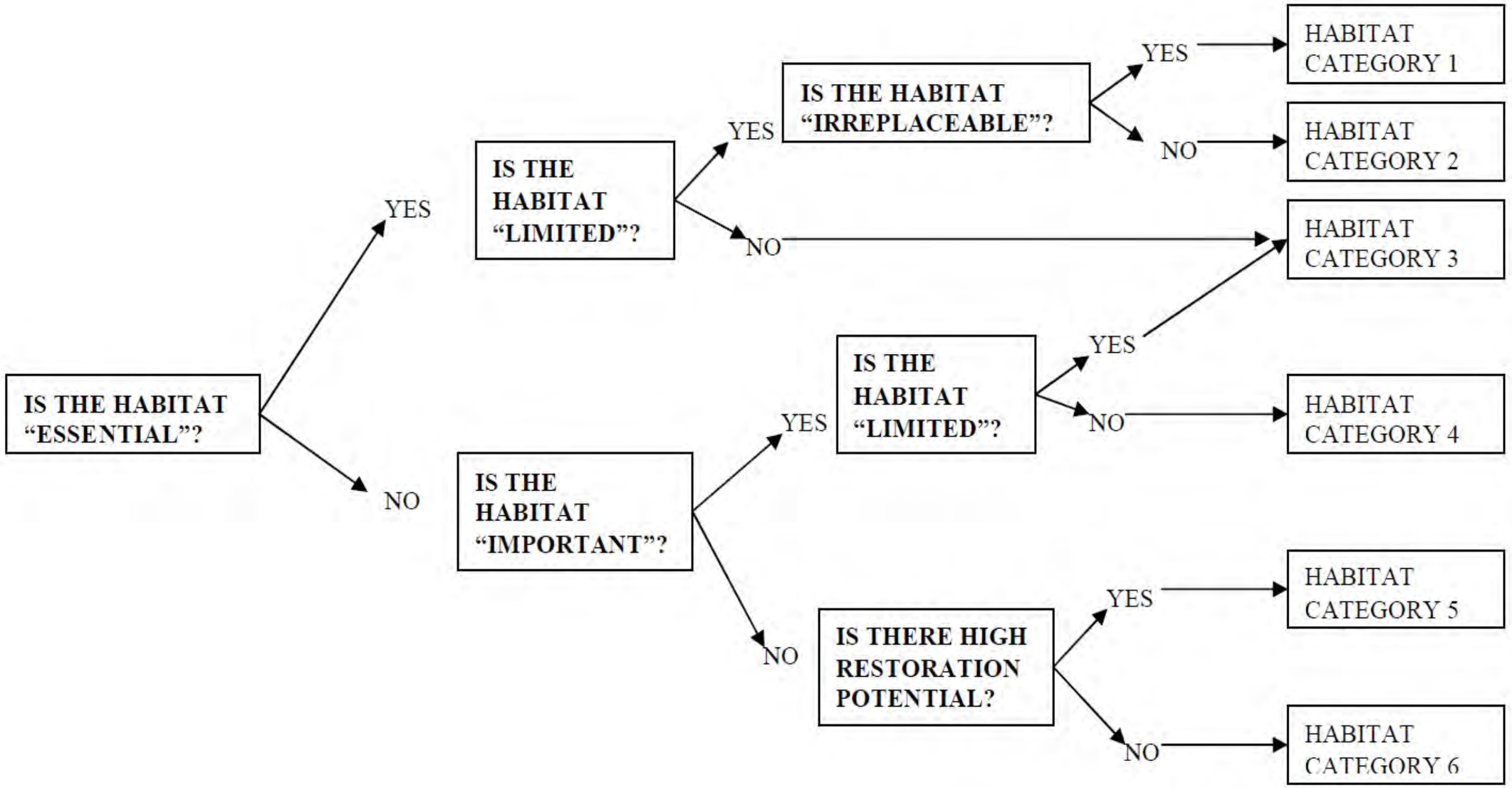
Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
The First Two Rows are Overlays That Automatically Assigns Categories, Based on Species Presence, to One or More of the Habitat Types Described Below							
Active WAGS Colony Overlay applies to habitat types Grassland and Shrub-steppe, and select Developed habitat subtypes (i.e., Revegetated or Other Planted Grasslands)		Active Washington ground squirrel colony with a 785-foot buffer in suitable habitat.	Additional 4,136 foot (total of 1.5km) buffer on WAGS Category 1 habitat except where there are habitat barriers to dispersal.	–	–	–	–
Big Game Winter Range Habitat Overlay applies to all habitat subtypes except Developed - Dryland Wheat, Developed – Irrigated Agriculture, and Developed – Other (i.e., except for cropland and developed areas).			Mule Deer Winter Range as designated by ODFW (2013).	–	–	–	–
Grassland	Exotic Annual	–	–	–	Non-native grasslands with a very high weed component and disturbed or less nutrient-rich soils. The forb component is composed primarily of non-native weeds, such as cheatgrass, bulbous bluegrass, cereal rye, tumble-mustard, and Russian thistle, with occasional patches of native bunchgrass, primarily Sandberg bluegrass. The high weed content is primarily due to past fires, which burned native shrubs and bunchgrasses and were followed by heavy grazing and/or wind erosion.	–	–
	Native Perennial	–	–	Dominated by native perennial grasses such as Sandberg bluegrass, bluebunch wheatgrass, Idaho fescue, western needlegrass, and needle-and-thread grass. Various native forbs and low shrubs such as gray rabbitbrush and, to a lesser extent, green rabbitbrush are present but are an inconspicuous component. Native vascular plants are diverse, and a variety of invertebrates can be found utilizing the plants throughout the growing season. These habitats have been altered through land use or wildfires, and generally contain a significant component of non-native vegetation (broad-leaf weeds and annual grasses). Category 3 Native Perennial Grasslands generally occur on sites with shallow soils and harsh exposures, or in areas that have experienced livestock grazing or frequent fires. Provide essential foraging habitat to a variety of common resident and migratory birds and common mammals.	Category 4 Native Perennial Grassland is ecologically similar to Category 3 Native Perennial Grassland but is classified as Category 4 because its small size and isolated nature limit its value to wildlife.	–	–

Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Shrub-steppe	Basin Big Sagebrush Shrub-steppe	–	Shrub-steppe habitat with an overstory of mature (large structure) patches of basin big sagebrush. Understory plants consist of a mix of native bunchgrasses and exotic annual grasses depending largely on level of impact from disturbance. Common grasses are Sandberg bluegrass, bluebunch wheatgrass, cheatgrass, and bulbous bluegrass. Category 2 Basin Big Sagebrush Shrub-steppe has a higher shrub density and greater plant health than similar but lesser quality Category 3 Basin Big Sagebrush Shrub-steppe habitat. Category 2 Basin Big Sagebrush Shrub-steppe offers high quality breeding habitat for shrub obligate species including loggerhead shrike and may support Washington ground squirrel. Sagebrush lizard may be found in areas where more sandy soils are present.	Patches of Category 3 Basin Big Sagebrush Shrub-steppe lack the density and plant health of Category 2 Basin Big Sagebrush Shrub-steppe or are in patches of limited size. The overstory sagebrush in this type is often decadent or lacks full foliage. Understory vegetation in Category 3 Basin Big Sagebrush Shrub-steppe often tends toward annual grasses and low weeds. These areas were historically higher quality habitats but are experiencing degradation due to land use practices or frequent fires. However, the mature shrub cover provides escape and resting cover for common wildlife and is limited in the immediate area and the region.	–	–	–
	Rabbitbrush/ Snakeweed Shrub-steppe	–	–	Have been affected by recent fires and are in a relatively early seral stage. Native rabbitbrush and other low-stature plants such as broom snakeweed and various buckwheat species are common. The understory is native Sandberg bluegrass, non-native cheatgrass, bulbous bluegrass, and tumblemustard. Patches of native perennial grasses, such as bluebunch wheatgrass and needle-and-thread grass, are present. Many of these sites contain small patches of sagebrush that are less than one acre (0.4 ha) in size.	Has the same plant species but differs in composition from Category 3 Rabbitbrush/Snakeweed Shrub-steppe in that it has a greater weed and annual grass component than Category 3 Rabbitbrush/Snakeweed Shrub-steppe. While aspect and soils may contribute somewhat to this, disturbances such as livestock grazing and fires likely have a far greater effect.	–	–
Cliffs, Caves, and Talus	Cliffs, Caves, and Talus	Sites with bat hibernacula.	Sites with known bat colonies.	Sites without bat colonies.	–	–	–
Riparian Forest and Natural Shrubland Complexes	Eastside (Interior) Riparian		High quality, diverse riparian areas that are not degraded	Typical mid-seral riparian, provides wildlife habitat	Provides marginal habitat; somewhat degraded.	Highly degraded; dominated by non-native plant species.	–

Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Developed	Revegetated or Other Planted Grassland	–	–	Planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. This habitat subtype is comprised mainly of native or native-like grasses. Native vegetation in Category 3 Revegetated or Other Planted Grasslands may be sparse and not well-developed and may have a significant component of annual grasses and weeds.	–	–	–
	Dryland Wheat	–	–	–	–	–	Agricultural fields that are currently in small grain production or fallow.
	Irrigated Agriculture	–	–	–	–	–	Agricultural fields that are irrigated.
	Other	–	–	–	–	–	Includes farming/ranching home and shop sites, corrals, structures, feedlots, active and inactive gravel quarries, non-irrigated pastures, graveled and paved roads, rights-of-way, and waste areas associated with on-going human activities.


IS THE HABITAT "ESSENTIAL"?
YES
NO
IS THE HABITAT "LIMITED"?
YES
NO
IS THE HABITAT "IRREPLACEABLE"?
YES
NO
HABITAT CATEGORY 1
HABITAT CATEGORY 2
HABITAT CATEGORY 3
IS THE HABITAT "IMPORTANT"?
YES
NO
IS THE HABITAT "LIMITED"?
YES
NO
HABITAT CATEGORY 4
IS THERE HIGH RESTORATION POTENTIAL?
YES
NO
HABITAT CATEGORY 5
HABITAT CATEGORY 6

Attachment 3. Special Status Wildlife Species Potentially Occurring within the 2022 Habitat Categorization Survey Area

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Common name	Scientific name	Federal Status[1]	ODFW Status[2] in Columbia Plateau	Occurs in Morrow County per ORBIC 2019	Occurs in Umatilla County per ORBIC 2019
Birds					
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	–	yes	yes
Brewer's sparrow	*Spizella breweri*	–	S, CSS	yes	yes
Burrowing owl (Western)	*Athene cunicularia hypugaea*	SOC	SC, CSS	yes	yes
Common nighthawk	*Chordeiles minor*	–	S, CSS	yes	yes
Ferruginous hawk	*Buteo regalis*	SOC	SC, CSS	yes	yes
Flammulated owl	*Otus flammeolus*	BCC	–	yes	yes
Golden eagle	*Aquila chrysaetos*	BGEPA	–	yes	yes
Grasshopper sparrow	*Ammodramus savannarum*	–	S, CSS	yes	yes
Lewis's woodpecker	*Melanerpes lewis*	BCC	SC, CSS	yes	yes
Loggerhead shrike	*Lanius ludovicianus*	–	S, CSS	yes	yes
Long-billed curlew	*Numenius americanus*	–	SC, CSS	yes	yes
Northern harrier	*Circus hudsonius*	BCC	–	N/A	N/A
Olive-sided flycatcher	*Contopus cooperi*	BCC	–	yes	yes
Sage thrasher	*Oreoscoptes montanus*	BCC	–	yes	yes
Sagebrush sparrow	*Artemisiospiza nevadensis*	–	SC, CSS	yes	yes
Short-eared owl	*Asio flammeus*	BCC	–	yes	yes
Swainson's hawk	*Buteo swainsoni*	–	S, CSS	yes	yes
Tricolored blackbird	*Agelaius tricolor*	SOC	–	no	yes
Mammals					
Gray wolf	*Canis lupus*	E	–	yes	yes
Hoary bat	*Lasiurus cinereus*	–	S, CSS	no	yes
Pallid bat	*Antrozous pallidus*	–	S, CSS	no	yes
Silver-haired bat	*Lasionycteris noctivagans*	–	S, CSS	no	yes
Spotted bat	*Euderma maculatum*	–	S, CSS	yes	no

Common name	Scientific name	Federal Status[1]	ODFW Status[2] in Columbia Plateau	Occurs in Morrow County per ORBIC 2019	Occurs in Umatilla County per ORBIC 2019
Townsend's big-eared bat	*Corynorhinus townsendii*	–	SC, CSS	no	yes
Washington ground squirrel	*Urocitellus washingtoni*	–	E, CSS	yes	yes
Reptiles					
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	SOC	S, CSS	yes	yes
Western painted turtle	*Chrysemys picta*	–	SC, CSS	yes	yes
Invertebrates					
Monarch butterfly	*Danaus plexippus*	C	CSS	yes	yes

Species and status: OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2022, USFWS 2021, USFWS 2022

1. Federal Status: BGEPA=Protected by the Bald and Golden Eagle Protection Act, USFWS Federally Listed Species: E = Endangered, C = Candidate, BCC = Bird of Conservation Concern in Bird Conservation Region 9
2. ODFW Status: E = Endangered, S=Sensitive, SC = Sensitive Critical, CSS = Conservation Strategy Species

Attachment 4. Select Photographs of Habitat and Wildlife Taken during 2022 Surveys

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Photo 1. East Side - Category 1 - Grassland: Native Perennial. WAGS colony WREE03. 5/5/2022.



Photo 2. East Side - Category 1 - Shrub-Steppe: Rabbitbrush/Snakeweed. WAGS colony WREE01. 5/10/2022.



Photo 3. East Side - Category 2 - Grassland: Native Perennial. Ridgetop with high bluebunch component. 4/22/2022.

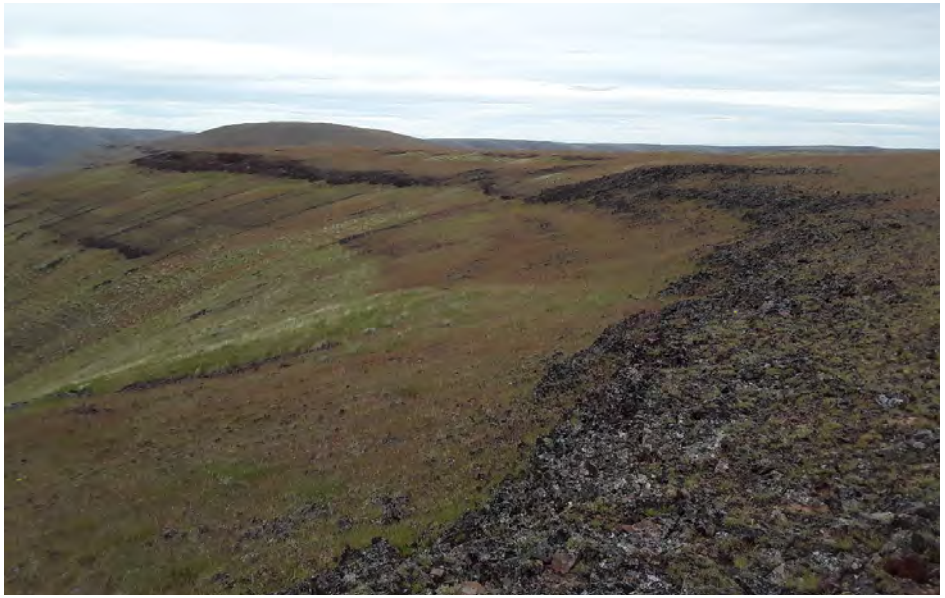

Photo 4. East Side - Category 2 - Grassland: Native Perennial. Rock outcrops along edge of ridgetop. 5/18/2022.



Photo 5. East Side - Category 2 - Grassland: Native Perennial. Ridgetop with rocky soil, high native composition. 5/18/2022.



Photo 6. East Side - Category 2 - Grassland: Native Perennial. Ridgetop habitat. 4/29/2022.



Photo 7. West Side - Category 2 - Grassland: Native Perennial. Grassland with high native composition including astragalus sp, balsamroot sp, just downslope from a ridgetop. 5/25/2022.



Photo 8. West Side - Category 2 - Grassland: Native Perennial. High elevation grassland with high native composition including bluebunch and Sandberg's bluegrass. 5/25/2022.



Photo 9. West Side - Category 2 - Grassland: Exotic Annual. Hill slope with high non-native compostion, including areas of cereal rye (bright green). 5/26/2022.



Photo 10. East Side - Category 2 - Grassland: Exotic Annual. Non-native annual grasses in heavily grazed area. 5/19/2022.

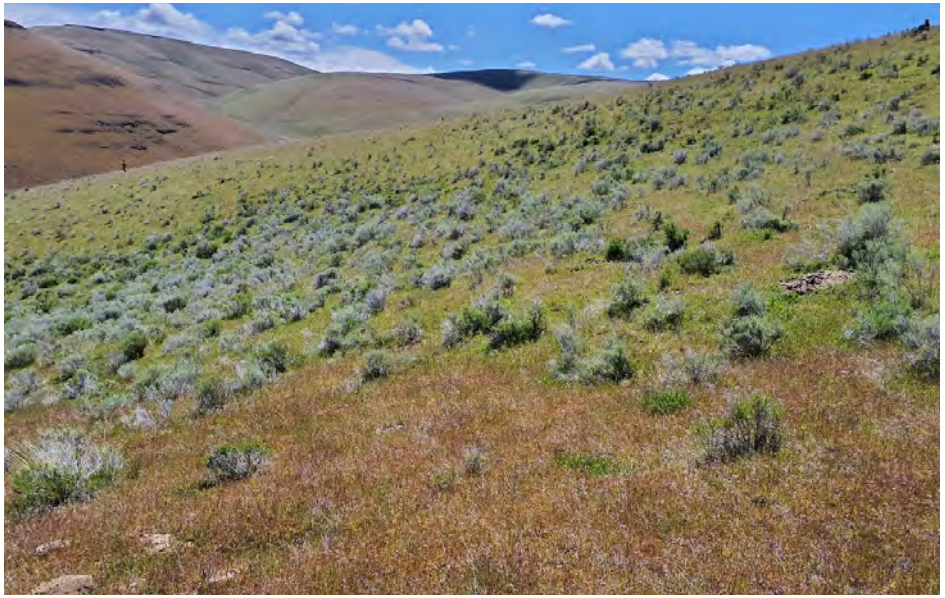

Photo 11. East Side - Category 1 - Shrub-Steppe: Rabbitbrush/Snakeweed. WAGS colony WREE01. 5/10/2022.



Photo 12. West Side - Category 2 - Shrub-Steppe: Rabbitbrush/Snakeweed. Small-stature rabbitbrush shrubs on ridgetop. 5/25/2022.



Photo 13. East Side - Category 2 - Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian. Along Big Butter Creek Lane. Barn owl roosted in cavity with whitewash. 5/27/2022.



Photo 14. West Side - Category 2 - Cliffs, Caves, Talus. Steep, rocky cliff along Big Butter Creek Lane. 5/19/2022.



Photo 15. West Side - Category 2 - Developed - Revegetated/Other Planted Grassland. Terraced planted grassland. 5/26/2022.

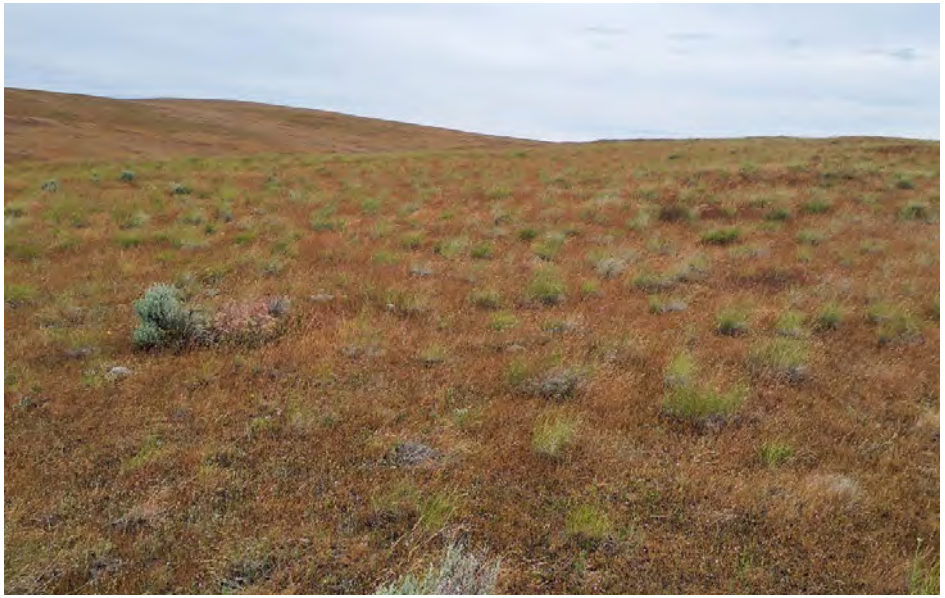

Photo 16. North End - Category 3 - Grassland: Native Perennial. Hilltop with high native composition. 5/23/2022.



Photo 17. North End - Category 4 - Grassland: Exotic Annual. High cheatgrass component. 5/27/2022.



Photo 18. North End - Category 4 - Grassland: Exotic Annual. Former agricultural field primarily composed of non-native annual grasses. 5/23/2022.

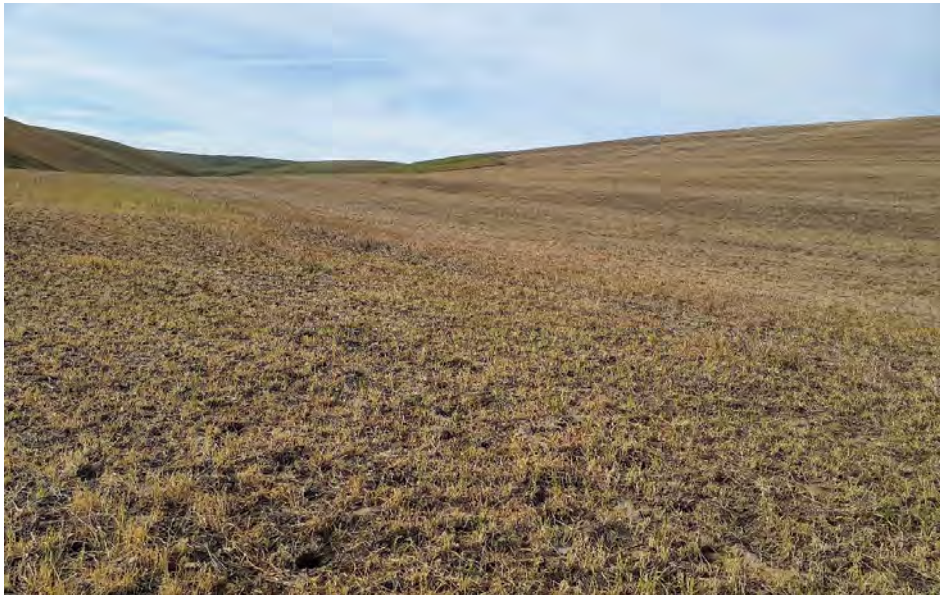

Photo 19. North End - Category 6 - Developed: Dryland Wheat. Stubble field. 5/26/2022.



Photo 20. East Side - Category 6 - Developed: Dryland Wheat. Active wheat field. 5/25/2022.



Photo 21. East Side - Category 6 - Developed: Irrigated Agriculture. Winter wheat. 5/19/2022.



Photo 22. East Side - Category 6 - Developed: Irrigated Agriculture. Alfalfa. 5/19/2022.



Photo 23. East Side - Category 6 - Developed: Other. Gravel lot with grain bins. 5/24/2022.



Photo 24. Loggerhead shrike. 5/8/2022.



Photo 25. Mule deer. 5/8/2022.



Photo 26. Elk. 5/12/2022.



Photo 27. Swainson's hawk. 5/12/2022.



Photo 28. Active burrowing owl burrow. 5/23/2022.

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Attachment 5. Wildlife Species Observed During 2022 Surveys

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Common Name	Scientific Name
Amphibians	
Pacific tree frog	*Pseudacris regilla*
Birds	
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Bank swallow	*Riparia riparia*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Black-billed magpie	*Pica hudsonia*
Black-headed grosbeak	*Pheucticus melanocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Brown-headed cowbird	*Molothrus ater*
Bullock's oriole	*Icterus bullockii*
Burrowing owl (Western)	*Athene cunicularia hypugaea*
California quail	*Callipepla californica*
Canada Goose	*Branta canadensis*
Cassin's vireo	*Vireo cassinii*
Chipping sparrow	*Spizella passerina*
Chukar	*Alectoris chukar*
Cliff swallow	*Petrochelidon pyrrhonota*
Common raven	*Corvus corax*
Cooper's hawk	*Accipiter cooperii*
Eastern kingbird	*Tyrannus tyrannus*
Eurasian collared dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Grasshopper sparrow	*Ammodramus savannarum*
Gray flycatcher	*Empidonax wrightii*
Greater sandhill crane	*Grus canadensis*
Horned lark	*Eremophila alpestris*
House finch	*Haemorhous mexicanus*
House sparrow	*Passer domesticus*

Common Name	Scientific Name
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Lazuli bunting	*Passerina amoena*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
MacGillivray's warbler	*Geothlypis tolmiei*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Northern harrier	*Circus hudsonius*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Red-eyed vireo	*Vireo olivaceus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Rock pigeon	*Columba livia*
Rock wren	*Salpinctes obsoletus*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Song sparrow	*Melospiza melodia*
Swainson's hawk	*Buteo swainsoni*
Turkey vulture	*Cathartes auraoni*
Vesper sparrow	*Pooecetes gramineus*
Warbling vireo	*Vireo gilvus*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western tanager	*Piranga ludoviciana*
Western wood-peewee	*Contopus sordidulus*
White-crowned sparrow	*Zonotrichia leucophrys*
Wilson's snipe	*Gallinago delicata*
Wilson’s warbler	*Cardellina pusilla*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow warbler	*Setophaga petechia*
Mammals	
Belding’s ground squirrel	*Urocitellus beldingi*
Coyote	*Canis latrans*
Elk	*Cervus canadensis*

Common Name	Scientific Name
Mule deer	*Odocoileus hemionus*
Porcupine	*Erethizon dorsatum*
Red fox	*Vulpes vulpes*
Washington ground squirrel	*Urocitellus washingtoni*
White-tailed jackrabbit	*Lepus townsendii*
Yellow-bellied marmot	*Marmota flaviventris*
Reptiles	
Gopher snake	*Pituophis catenifer*
Pygmy short-horned lizard	*Phrynosoma douglasii*

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2022 Botanical Survey Report

Wheatridge Renewable Energy Facility East
January 2023

Prepared for
Wheatridge East Wind, LLC

Prepared by



Tetra Tech, Inc.

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Table of Contents

1.0 Introduction 1
2.0 Methods 1
2.1 Target Species 1
2.2 Survey Area 1
2.3 Background Review 2
2.4 Survey Schedule 2
2.5 Field Survey Methods 3
3.0 Results 4
3.1 Target Species 4
3.2 Noxious Weeds 9
4.0 Conclusions 12
5.0 References 13

List of Tables

Table 1. Laurence's Milkvetch Occurrences Within the Survey Area 5
Table 2. Noxious Weeds Located Within the Survey Area 10

List of Figures

Figure 1. Botanical Survey Area
Figure 2. Rare Plant Survey Results **(Confidential)**

List of Attachments

Attachment 1. Vascular Plants Observed During the 2022 Field Surveys
Attachment 2. Site Photographs

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1.0 Introduction

This summary report presents the methods and results for the 2022 botanical surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Wheatridge Renewable Energy Facility East (Project), performed for Wheatridge East Wind, LLC. The Project is located within Morrow and Umatilla counties, approximately 6 miles northeast of Lexington, Oregon at its closest location (Figure 1). The purpose of the botanical surveys was to document the presence of federal or state-listed endangered and threatened vascular plant species and state and county-designated noxious weeds. This survey supports the anticipated Request for Amendment 1 to the Facility Site Certificate through the Oregon Energy Facility Siting Council.

2.0 Methods

2.1 Target Species

The initial list of potential primary target species included all vascular plant species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (ESA), or by the Oregon Department of Agriculture (ODA) under the Oregon ESA, that occur within Morrow or Umatilla counties. Only two species are for these two counties: Laurence's milkvetch (*Astragalus collinus* var*. laurentii) is located* in both counties and is listed as threatened under the Oregon ESA and a species of concern under the Federal ESA; and northern wormwood (*Artemisia campestris* var. *wormskioldii)* is located in Umatilla County and is listed as endangered under the Oregon ESA and a species of concern under the federal ESA (ODA 2022a, ODA 2022b, ORBIC 2019, ORBIC 2022, OregonFlora 2022a, OregonFlora 2022b, USFWS 2022).

Northern wormwood is restricted to the compacted basalt and sand along the banks of the Columbia River and was therefore removed from consideration as a target species for Project surveys. Laurence's milkvetch; however, has previously been located in the Project vicinity and was identified as having potential to occur at the Project due to the proximity to previously identified occurrences and presence of suitable habitat (i.e., sandy or rocky soils overlying basalt, on dry slopes of the Columbia Plateau in northern Oregon). Because Laurence's milkvetch looks similar to other *Astragalus* species when not in fruit, surveys need to occur during the plant's fruiting period, typically between late May to August (ODA 2022b).

2.2 Survey Area

The Project Amended Site Boundary consists of approximately 79,424 acres in Morrow and Umatilla counties. Prior to conducting surveys, Tetra Tech identified a Botanical Survey Corridor within the Amended Site Boundary as an area initially considered for botanical surveys in 2022. This Botanical Survey Corridor was based on the Project's amended wind micrositing corridors as

proposed at the time of surveys and contained all areas of anticipated disturbance (e.g., from turbine strings, transmission lines, access roads, collector lines, substations, and operations and maintenance facilities). Tetra Tech then reviewed aerial imagery of the Botanical Survey Corridor and removed active agricultural fields from consideration for surveys, as they do not support the target species. The resulting area (i.e., Botanical Survey Corridor with active agricultural areas removed) was identified as appropriate for botanical surveys in 2022. As described in Section 3.0, this entire area (i.e., Botanical Survey Corridor with active agricultural areas removed) was not able to be surveyed in 2022. As a result, the Botanical Survey Area (Survey Area) described in this report consists of 2,028 acres of uncultivated habitat surveyed in 2022 within the Botanical Survey Corridor(Figure 1).

2.3 Background Review

Tetra Tech completed a review of existing literature, herbarium records, and other sources prior to field surveys to generate a fact sheet for the one target species, Laurence's milkvetch (ODA 2022a, ORBIC 2019, OregonFlora 2022a, OregonFlora 2022b, USFWS 2022). This fact sheet was used by surveyors in the field and included:

- Photos of the Laurence's milkvetch and its habitat;
- Information detailing habitat associations;
- Range and flowering period;
- Identifying features; and
- Characteristics distinguishing Laurence's milkvetch from similar species within its range.

Tetra Tech also reviewed the Critical Issues Analysis that was completed for the Project in March 2022 (Tetra Tech 2022), the results of a query to the Oregon Biodiversity Information Center (ORBIC) that was received in April 2022 (ORBIC 2022), and the results of previous surveys conducted within the Amended Site Boundary (Wheatridge 2015). Review of the results of the ORBIC query identified 10 Laurence's milkvetch occurrences in the Project vicinity, none of which overlap with the Amended Site Boundary. Review of the results of previous surveys identified a Laurence's milkvetch occurrence within the Amended Site Boundary. Surveyors visited the location of this known Laurence's milkvetch occurrence within the Amended Site Boundary prior to commencing surveys in order to determine the current phenology of the species, and to provide an identification reference (i.e., search image) for individuals encountered within the Survey Area.

Tetra Tech also reviewed the list of noxious weed species designated as A, B, and T by ODA (ODA 2020) as well as noxious weed lists for Morrow County (Morrow County 2022) and Umatilla County (Umatilla County 2022).

2.4 Survey Schedule

The survey schedule was designed to cover the identification period for Laurence's milkvetch. Because Laurence's milkvetch can be confused with the closely related hillside milkvetch

(*Astragalus collinus* var. *collinus*), surveys need to be conducted during the fruiting season, considered to be late May to August (ODA 2022b). Crews began surveys in mid-July and continued surveying through the end of July, checking on plants to ensure fruits continued to be identifiable throughout the survey period.

2.5 Field Survey Methods

Tetra Tech conducted botanical field surveys using the Intuitive Controlled survey method, a standard and commonly accepted survey protocol (USFS and BLM 1998). This method incorporates meandering transects that traverse the survey area, and that target the full array of major vegetation types, aspects, topographical features, habitats, and substrate types. While en route, the surveyors search for target species, and when the surveyors arrive at an area of high potential habitat (that was defined in the pre-field review or encountered during the field visit), they conduct a complete survey for the target species. Complete surveys include an examination of 100 percent of the habitat.

When surveyors encountered a target species, they recorded the Global Positioning System (GPS) location with a tablet and submeter accuracy GPS unit. For individual plants, surveyors took a single GPS point. For numerous plants over a larger area, they mapped a polygon that encompassed all individuals. Tetra Tech mapped the portion of the occurrence within the Survey Area, but extensions of the occurrence beyond the Survey Area were only noted and mapped, to the extent possible, if visible from within the Survey Area. Surveyors collected data sufficient for completing ORBIC siting forms for each occurrence and took photos to serve as digital specimen vouchers to illustrate identifying characteristics, plant habit, and habitat.

Data for each occurrence included the following:

- Species phenology;
- Number of plants observed;
- Habitat information and associated species; and
- Visible threats.

During surveys, Tetra Tech maintained a running list of vascular plant species encountered, and made informal collections of unknown species for later identification. Identification was verified by the use of appropriate plant keys; in particular, Flora of the Pacific Northwest (Hitchcock and Cronquist 2018). Nomenclature follows the Oregon Vascular Plant Checklist, as used by OregonFlora (OregonFlora 2022c). The final vascular plant species list for the Survey Area is included as Attachment 1 in this report.

Surveyors also recorded observations of ODA-listed noxious weeds, which included A, B, and T listed species (ODA 2020), as well as listed weeds for Morrow (Morrow County 2022) and Umatilla counties (Umatilla County 2022). Observations were recorded as GPS points with estimates of extent and density of plants also recorded. Where noxious weeds were common across a landscape, points were periodically recorded to indicate continuation of observed conditions or changes in

density or presence. Where noxious weed distribution was more localized, an approximate size and number of plants within the grouping were recorded.

3.0 Results

Botanical surveys were conducted within the 2,028-acre Survey Area July 11 – 16, July 18 – 21, and July 23 – 30, 2022. Surveys continued through the end of July as individuals of Laurence's milkvetch continued to be in fruit and recognizable. Due to fire and safety concerns, access to much of the Botanical Survey Corridor was limited. Therefore, surveys in 2022 focused on the most easily accessed areas and large continuous blocks of potential habitat (Figure 1). Excessively hot weather resulted in surveys being discontinued at the beginning of August. Approximately 30 percent of the uncultivated habitat within the Botanical Survey Corridor was covered during the 2022 surveys. The northeast portion of the Botanical Survey Corridor received the greatest coverage, while the southeast portion was largely unsurveyed due to access restrictions. The majority of the western portion of the Botanical Survey Corridor was not surveyed, except for some areas near the roads.

Habitat within the Survey Area consists of rolling hills and draws. Annual grasses and native bunchgrasses dominated hillslopes with the shrubs green rabbitbrush (*Chrysothamnus viscidiflorus*) and gray rabbitbrush (*Ericameria nauseosa*) commonly occurring. Much of the hillslopes were moderately to sparsely vegetated with broken talus common. Ephemeral draws were common and a few perennial streams cut through the Survey Area, parallel to existing roads. The lowland areas are generally dominated by invasive species and show signs of disturbance due to historic and current farming and grazing activity. Higher elevation grassland hillslopes, where not converted to agriculture or intensive grazing, are generally dominated by native species. Basalt outcrops and talus slopes are present throughout the Survey Area.

3.1 Target Species

Laurence's milkvetch is a taprooted perennial in the pea (*Fabaceae*) family, which occupies sandy or rocky soils overlying basalt, on dry slopes of the Columbia Plateau in northern Oregon (ODA 2022b). Tetra Tech documented 11 occurrences of Laurence's milkvetch within the Survey Area (Figure 2). Following NatureServe (2020), observations within one kilometer of each other were assigned to the same occurrence. Plants were counted within each observation when the number of plants was less than or equal to 200 plants. The number of plants was estimated for observations with greater than 200 individuals. Table 1 provides additional details on each occurrence observed and photos of Laurence's milkvetch plants and associated habitat are included in Attachment 2.

Sixty-five observations (i.e., isolated individuals or groupings of individuals) were recorded within the Survey Area and six were recorded outside the Survey Area (Table 1). These observation records ranged from 1 to approximately 10,000 plants and occupied from 0.01 to approximately 13.65 acres. Observations were generally located within perennial grassland (native and non-native) and were present throughout much of the Survey Area, typically occupying upper slopes, on open, dry sites (Table 1; Figure 2).

Table 1. Laurence's Milkvetch Occurrences Within the Survey Area

Occurrence #	Observation Record	Date Observed	# of Plants within Survey Area[1]	Area Occupied within Survey Area (Acres)[2]	Habitat and Associated Species	Landscape Position	Phenology	Aspect	Gradient	Notes
1	AR001 and MG014	July 11 and 20, 2022	76	0.51	Perennial grassland with scattered shrubs. *Achillea millefolium, Allium* sp., *Astragalus purshii, Balsamorhiza serrata, Bromus tectorum, Bromus* sp., *Chrysothamnus viscidiflorus, Ericameria nauseosa., Festuca idahoensis, Plantago patagonica, Poa secunda, Salvia dorrii, Tragopogon dubius*	Upper slope, mid-slope	68% in fruit, 28% vegetative, 1% senescent, 3% in flower	Southwest, West	Moderate (20°-45°), slight (0°-20°)	Two observations. One observation is a previously identified population (Wheatridge 2015). Resurveyed occupied area is smaller than documented in 2015. Scattered individuals, most individuals in downslope half of the 2022 polygon; mostly fruiting, some stalks still in flower. Compacted soils with evidence of past heavy cattle use. Both observations extended outside the Survey Area. This observation was adjacent to previously cultivated fields that had been used for grazing in recent years and comprised a vegetation community distinct from the perennial grassland community associated with MG014.
2	AR015, AR015a, AR016, AR017, AR018, AR019, EB001, EB001a, EB001b, EB001c	July 25, 2022	1,846	1.22	Perennial grassland with scattered shrubs. *Achillea millefolium, Astragalus collinus* var. *collinus, Astragalus filipes, Astragalus purshii, Bromus tectorum, Bromus* sp., *Chrysothamnus viscidiflorus, Epilobium brachycarpum, Ericameria nauseosa., Erigeron divergens, Festuca* sp., *Lactuca serriola, Lupinus* sp., *Madia gracilis, Plantago patagonica, Poa secunda, Poa bulbosa, Pseudoroegneria spicata, Tragopogon dubius, Vicia* sp.	Mid-slope to crest, upper slope, crest	78% in fruit, 15% vegetative, 6% senescent, 1% in flower	North, Northeast	Slight (0°-20°)	Occurrence consists of eight observations within Survey Area. and two additional observations, (EB001b and EB001c) comprising two additional individuals outside the Survey Area. One observation record (AR015) includes most of the individuals (estimated at 1,810) and extends outside of the Survey Area (approximately 3.6 acres of this plant grouping were mapped outside the Survey Area). Plant distribution was patchy with the highest densities near the upper slope (within the Survey Area, therefore it is estimated that greater than 500 plants, potentially up to approximately half the observed plants) occurred within the Survey Area. The other groupings were smaller and generally along the crest and upper slope; and one of which, was delineated mostly outside the Survey Area.

Occurrence #	Observation Record	Date Observed	# of Plants within Survey Area[1]	Area Occupied within Survey Area (Acres)[2]	Habitat and Associated Species	Landscape Position	Phenology	Aspect	Gradient	Notes
3	AR005, AR005a, EG005, MG012, MG013	July 19, 2022	205	2.17	Perennial grassland and shrubland. *Achillea millefolium, Astragalus lentiginosus, Astragalus purshii, Bromus tectorum, Bromus* sp., *Centaurea stoebe* ssp. *micranthos, Chrysothamnus viscidiflorus, Ericameria nauseosa., Erodium cicutarium, Festuca idahoensis., Lupinus* sp., *Madia gracilis, Plantago patagonica, Poa secunda, Tragopogon dubius*	Mid-upper slope, crest	65% in fruit, 19% vegetative, 12% senescent, 4% in flower	Southwest, Northwest, Northeast	Moderate (20°-45°), slight (0°-20°)	Five observations. The majority (187) of the plants were identified within one observation. This observation, and all but one vegetative plant observed in a cattle track, were located on the south side of a fence that had less cattle grazing than the north side of the fence. Grazing impacts were still evident but less than on the north side of the fence. Grazing intensity was relatively low high on the slopes and increased with decreasing elevation. Two observations consisted of single individuals not in fruit but assumed to be Laurence's milkvetch due to proximity and similar morphology to plants nearby. An additional approximately 0.65 acre was delineated outside the Survey Area and included a small portion of the recorded individuals for this occurrence due to the irregular Survey Area boundaries and plant distribution in the area.
4	MG007, MG008, EG001	July 15, 2022	569	3.20	Perennial grassland with scattered shrubs. *Achillea millefolium, Astragalus filipes Astragalus purshii, Bromus tectorum, Centromadia pungens, Epilobium brachycarpum, Ericameria nauseosa., Erodium cicutarium, Lactuca serriola, Lepidium perfoliatum, Lupinus leucophyllus, Plantago patagonica, Poa bulbosa, Poa secunda, Pseudoroegneria spicata, Tragopogon dubius*	Upper slope, mid-upper slope, crest	37% in fruit, 41% vegetative, 13% senescent, 9% in flower	West, East	Moderate (20°-45°), slight (0°-20°)	Three observations; including two larger observations on east facing slopes and a single plant identified at the crest on a slight east facing slope. Largest observation record was estimated to include approximately 500 individuals and included approximately 0.2 acre delineated outside of the Survey Area. Approximately half an acre in total was delineated outside the Survey Area and included a portion of the reported individuals for this occurrence. Minor grazing impacts noted.
5	AR003, EG002, EG003, EG003a, EG003b, EG003c, EG004, MG010, MG011	July 18, 2022	283	2.62	Perennial grassland. *Achillea millefolium, Balsamorhiza serrata, Bromus tectorum, Calochortus macrocarpus, Centaurea diffusa, Chrysothamnus viscidiflorus, Clarckia purpurea, Croton setigerus, Ericameria nauseosa., Eriogonum vimineum, Erodium cicutarium, Festuca idahoensis, Lactuca serriola, Lupinus leucophyllus, Plantago patagonica, Poa secunda, Pseudoroegneria spicata, Tragopogon dubius*	Mid-upper slope, upper slope, crest	54% in fruit, 29% senescent, 14% vegetative, 3% in flower	Northeast, Northwest, Southwest	Moderate (20°-45°), slight (0°-20°)	Nine observations. One large observation and several smaller observations. The large observation (257 plants) was located on a southwest-facing slope and included almost 30% senescent plants, most of which were higher up on the slope. Plants continued outside the Survey Area.

Occurrence #	Observation Record	Date Observed	# of Plants within Survey Area[1]	Area Occupied within Survey Area (Acres)[2]	Habitat and Associated Species	Landscape Position	Phenology	Aspect	Gradient	Notes
6	GR001, MG004, MG001, MG002, MG003, AR002, AR300	July 14, 2022	66	0.82	Perennial grassland. *Achillea millefolium, Allium* sp., *Astragalus purshii, Balsamorhiza* sp., *Bromus tectorum, Bromus* sp., *Calochortus macrocarpus, Centaurea diffusa, Ericameria nauseosa., Erodium cicutarium, Lactuca serriola, Lupinus* sp., *Nothocalais troximoides, Plantago patagonica, Poa bulbosa, Pseudoroegneria spicata, Thinopyrum ponticum, Tragopogon dubius*	Mid-slope, upper - slope, crest	94% in fruit, 5% vegetative, 1% in flower	Southwest, West	Moderate (20°-45°)	Two observations (MG004 and AR002) comprised the majority of the individuals and were identified mid-slope. Five additional observations consisting of single plants were observed scattered along the hillslope. Plants higher up on the hillslope were closer to senescence than ones lower down on the slope. Vegetation was sparse over loose talus.
7	AR020, AR021, AR021a, AR021b, AR022, AR022a, AR022b, AR023a, AR023b, AR023c, EB002	July 26, 2022	866	2.67	Perennial grassland. *Achillea millefolium. Balsamorhiza sp., Bromus tectorum, Ericameria nauseosa, Festuca idahoensis, Lactuca serriola, Lomatium* sp., *Lupinus* sp., *Poa secunda, Pseudoroegneria spicata, Tragopogon dubius*	Mid-slope, upper slope, crest	86% in fruit, 7% vegetative 6%, senescent, <1% in flower	North, Northeast, East, South, Southwest	Moderate (20°-45°), slight (0°-20°), flat	Ten observations identified within the Survey Area and an additional observation (AR022b) consisting of one plant identified adjacent to, but outside of, the Survey Area. Two large observations comprised the majority of the plants identified. One observation had an ATV trail running through the middle of it, with plants within the tracks and immediately adjacent. The second large observation ranged from the upper slope to mid-slope and included plants scattered across the slope in varying densities. Diversity of associated vegetation was more limited than seen in some other occurrences. Plants continued outside the Survey Area
8	AR007, AR008, AR009, AR009a, AR010, AR011, AR012, AR013, AR013a, AR013b, AR014	July 24, 2022	295	2.01	Perennial grassland. *Achillea millefolium, Agoseris grandiflora, Astragalus collinus* var. *collinus, Astragalus purshii, Balsamorhiza serrata, Bromus tectorum, Bromus* sp., *Castilleja hispida, Centaurea diffusa, Chrysothamnus viscidiflorus, Cirsium cymosum, Epilobium brachycarpum, Eriogonum compositum Eriogonum* sp., *Erodium cicutarium, Festuca idahoensis, Grindelia hirsutula, Lactuca serriola, Lupinus* sp., *Madia gracilis, Poa bulbosa, Poa secunda, Pseudoroegneria spicata, Tragopogon dubius, Vicia villosa*	Mid-slope, upper slope, crest	55% vegetative, 39% % in fruit 5%, senescent, 1% in flower	East, Northeast, Southeast, North, South	Moderate (20°-45°), slight (0°-20°)	Eleven observations. Some extend beyond Survey Area. The largest observation was identified at the upper elevation extent of a large patch of *Vicia* sp. Other observations were identified along the upper slope and crest of the hill as the saddle increased in elevation. Plants continued outside the Survey Area.
9	MG009, MG009a, MG009b	July 16, 2022	25	0.20	Perennial grassland. *Achillea millefolium, Calochortus macrocarpus, Centaurea diffusa, Chaenactis douglasii, Ericameria nauseosa, Erigeron divergens, Festuca idahoensis, Lithophragma parviforum, Mentzelia dispersa, Poa secunda, Pseudoroegneria spicata*	Upper slope	80% in fruit, 17% vegetative, 3%, senescent	Southeast	Moderate (20°-45°)	One observation within Survey Area and two observations (MG009a and MG009b) identified continuing upslope and outside of the Survey Area. The observation within the Survey Area was lower on the slope than the observations outside the Survey Area. Plants continued outside the Survey Area.

Occurrence #	Observation Record	Date Observed	# of Plants within Survey Area[1]	Area Occupied within Survey Area (Acres)[2]	Habitat and Associated Species	Landscape Position	Phenology	Aspect	Gradient	Notes
10	AR024, AR025, AR026, AR027, AR028, AR029	July 28, 2022	10,007	13.51	Perennial grassland. *Achillea millefolium, Astragalus collinus* var. *collinus, Astragalus filipes, Balsamorhiza careyana, Blepharipappus scaber, Bromus tectorum, Cirsium cymosum, Festuca idahoensis, Lactuca serriola, Lupinus* sp., *Lupinus sulphureus, Madia gracilis Mentzelia dispersa, Poa bulbosa, Poa bulbosa, Poa secunda, Pseudoroegneria spicata, Sisymbrium altissimum, Toxicoscordion paniculatum, Tragopogon dubius*	Mid-slope, upper slope	90% in fruit, 6% vegetative, 4% senescent	South, Southwest	Moderate (20°-45°)	One very large observation covering almost 12 acres and approximately 10,000 plants. Plants continued downslope, outside of the Survey Area. Five additional observations (including seven plants) were identified to the west of the large observation. Plants continued outside the Survey Area.
11	AR030, AR031, AR031a, AR031b	July 30, 2022	227	0.75	Annual grassland. *Achillea millefolium, Astragalus collinus* var. *collinus, Astragalus filipes, Astragalus purshii, Balsamorhiza careyana, Balsamorhiza sp., Bromus sp., Bromus tectorum, Lactuca serriola, Lupinus sulphueus, Poa bulbosa, Poa secunda, Pseudoroegneria spicata, Tragopogon dubius*	Mid-slope	100% in fruit	Southwest, West, Northwest	Slight (0°-20°)	Three observations delineated within the Survey Area, adjacent to active and former agricultural fields. Plants continue outside of Survey Area, with an additional observation (AR031b) including five individuals was delineated adjacent to, but outside of, the Survey Area. Area was dominated by non-native grasses.

1. Number of plants includes all plants for observations located entirely within Survey Area as well as all plants for a recorded observation if the observation was at least partially within the Survey Area.
2. Acres for each occurrence was calculated based on the combined area of all portions of the associated observation records located within the Survey Area. Additional areas delineated outside of, but adjacent to, the Survey Area are discussed in the Notes column but are not included in the acreages listed in this column.

Almost all observations included individuals with fruits present, which are required to differentiate this variety from similar species and varieties that occur in the area. A few solitary vegetative plants were tentatively identified as Laurence's milkvetch, as the species was present in the general area. Plants were found to occur on slopes facing all compass directions (i.e., aspects) and on slight to moderate slopes (0 – 45 degrees; Table 1). Frequently associated species included the perennial grasses bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), bulbous bluegrass (*Poa bulbosa*), and Sandberg's bluegrass (*Poa secunda* ssp. *secunda*); the annual grasses cheatgrass (*Bromus tectorum*) and an unidentified brome (*Bromus* sp.); the forbs common yarrow (*Achillea millefolium*) and yellow salsify (*Tragopogon dubius*); and the shrubs gray rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus viscidiflorus)*.

Plants were found in loamy soils, ranging from rocky and gravelly loam to sandy loam. Basalt outcrops were common as well as sparsely vegetated talus slopes although they did not dominate the landscape. Many observations were found in perennial grassland habitat with a high proportion of native species; however, many of these areas were also impacted by grazing and non-native plants. Occurrences were also located in highly disturbed habitat, where non-native annual and perennial grasses, such as cheatgrass and bulbous bluegrass, were common. These areas included locations near farm roads between cultivated fields (Occurrence #11, which was located in non-native grassland), as well as a few locations where plants were observed growing directly in cattle trails. Grazing was present throughout the Survey Area and off-road vehicle use was evident within multiple occurrences. Plants were not observed in former agricultural land. In the northern portion of the Survey Area, Occurrence #1 was identified just west of previously cultivated areas used for grazing in recent years.

3.2 Noxious Weeds

Tetra Tech recorded 21 listed noxious weed species within the Survey Area; including 20 ODA-listed noxious weed species, 17 Morrow County listed weeds, and 16 Umatilla County listed weeds. Locations and abundance or the extent of the populations observed were also recorded. Noxious weeds were most abundant along roadsides, within drainages, and in or near current and former agricultural fields and structures such as field sheds, water troughs and fence lines. Table 2 lists the noxious weed species observed, their noxious weed designation, and the frequency of observations.

Table 2. Noxious Weeds Located Within the Survey Area

Scientific Name	Common Name	Status (State[1]/Morrow County[2]/Umatilla County[3]	Frequency
Aegilops cylindrica	jointed goatgrass	B/B/B**	Infrequent with occasional large patches
Bassia (*Kochia*) *scoparia*	kochia	B/B/B**	Abundant along roadsides and former fields
Centaurea x *gerstlaueri (C.* x *pratensis)*	meadow knapweed	B/-/A	Rare, with few documented observations
Centaurea diffusa	diffuse knapweed	B*/B/B**	Abundant
Centaurea solstitialis	yellow starthistle	B*/A/B**	Infrequent with occasional dense patches along roadsides
Centaurea stoebe ssp. *micranthos* (*C. maculosa*)	spotted knapweed	B,T/B/A**	Rarely documented with dispersed distribution occurring across hillslopes and low density
Centromadia (*Hemizonia*) *pungens*	common spikeweed	B/A/A	Multiple small to large patches
Chondrilla juncea	rush skeletonweed	B*,T/A/A	Infrequent, occurring in multiple small to medium patches
Cirsium arvense	Canada thistle	B*/B/B**	Infrequent small patches observed
Cirsium vulgare	bull thistle	B*/-/-	Rare, occurring in a few small patches
Conium maculatum	poison hemlock	B/B/B	Infrequent but occurring in medium to large-sized patches along drainages.
Convolvulus arvensis	field bindweed	B*/B/-	Common, occurring in many small to medium patches
Crupina vulgaris	common crupina	B/A/A	Rare, only a few occurrences noted
Cuscuta indecora	bigseed dodder, collared dodder	B/-/-	Rare, only a few occurrences noted
Hypericum perforatum	common St. John's wort	B*/B/B	Rare, occurrences consisted of small to medium patches
Onopordum acanthium	Scotch thistle	B/A/B**	Abundant, especially near fields and drainages; small to large patches observed
Rhaponticum (Acroptilon, Centaurea) repens	Russian knapweed	B/B/B	Infrequent and occurring near heavy cattle use and roads
Secale cereale	cereal rye	-/B/B	Rare, found in lowland areas and base of slopes, generally near existing agriculture
Solanum rostratum	buffalo bur, spiny nightshade	B/-/-	Rare, only a few occurrences noted
Taeniatherum caput-medusae	medusahead	B/B/-	Common with multiple medium to large patches, especially near cultivated or developed areas

Scientific Name	Common Name	Status (State[1]/Morrow County[2]/Umatilla County[3]	Frequency
Tribulus terrestris	puncture vine	B*/B/B	Few small to large patches, especially within roadways

1. "A" designated weeds: Weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent. "B" designated weeds: Weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties. "T" designated weeds: A priority noxious weed designated by the Oregon State Weed Board as a target for which the ODA will develop and implement a statewide management plan. "T" designated noxious weeds are species selected from either the "A" or "B" list (ODA 2020). Species marked with a (*) are targeted for biocontrol.
2. "A" designated weeds: Noxious weeds – plants determined to be injurious to public health, crops, lifestock, land or property under provisions of Oregon State Statute and thus mandated for control. "B" designated weeds: Weeds of economic importance. Weeds of limited distribution in the county and subject to intensive control or eradication where feasible (Morrow County 2022).
3. "A" designated weeds are those that have been found as single plants or in very limited populations. Prevention, early detection and eradication are high priority. Infestations are subject to intensive control when found. "B" designated weeds are subject to limited to intensive control at state or county level. Species designated with a (**) are targeted for additional enforcement throughout the county according to the land types and corresponding agricultural uses associated (Umatilla County 2022).

Scotch thistle (*Onopordum acanthium*), kochia (*Bassia scoparia*) and diffuse knapweed (*Centaurea diffusa*) were abundant throughout the Survey Area. Kochia was especially abundant near roads, areas of intensive grazing activity (such as feeding and watering areas), and active and former agricultural areas. Scotch thistle was scattered throughout the Survey Area in small to large patches along roadsides, drainages, and within grassland habitat. Some large populations of well over 1,000 individuals were observed in fallow fields and drainages. Diffuse knapweed was present throughout the Survey Area in low to high densities. Populations tended to be densest near roads or fallow fields; however, some hillslopes were also dominated by the species where well over 1,000 individuals could be observed creating a fairly dense layer across a hillside.

Medusahead (*Taeniatherum caput-medusae*) was abundant to dominant in valley areas and near active and fallow agricultural fields or outbuildings. Tetra Tech primarily documented yellow starthistle (*Centaurea solstitialis*) and puncture vine (*Tribulus terrestris*) along roads and in fallow fields. Rush skeletonweed (*Chondrilla juncea*) was observed in small to medium low-density patches of 1 to 50 individuals generally in or near former agricultural fields or heavily grazed portions of the Survey Area, and generally near roads. Common spikeweed was observed with moderate frequency and density. Some large patches were observed along stream and wetland areas as well as hillslopes where other invasives were common. Common spikeweed was also present scattered across hillsides but generally not in more sparsely vegetated talus habitats. Russian knapweed (*Rhaponticum repens*) was observed near heavy cattle use areas and roadways.

Poison hemlock (*Conium maculatum*) was observed in several patches of 10 to 500 individuals, exclusively in moist drainages. Canada thistle (*Cirsium arvense*) was observed in a few small patches within drainages. Bull thistle (*Cirsium vulgare*) was observed in a few small patches in drainages and along roads as well as associated with active and former agricultural fields.

Common St. John's wort (*Hypericum perforatum*) was observed sporadically, with occasional small to medium patches observed on grassland slopes, along roads, and in agricultural fields. Spotted knapweed (*Centaurea stoebe* ssp. *micranthos* [*C. maculosa*]) was also observed periodically along hillslopes and roadways. Cereal rye (*Secale cereale*) was identified near the base of hillslopes and near active or former agricultural lands. Surveyors observed field bindweed (*Convolvulus arvensis*) in small to medium patches along roads and drainages, as well as along grassland ridges. Jointed goatgrass (*Aegilops cylindrica*) was observed in a few locations; generally near roadsides and adjacent to agricultural fields. Some weeds —bigseed dodder (*Cuscuta indecora*), buffalo bur (*Solanum rostratum*), common crupina (*Crupina vulgaris*), and meadow knapweed (*Centaurea* x *gerstlaueri)*—were observed infrequently and associated with disturbance. Abundance of these and other weeds may be higher but could have been missed due to inconspicuous morphology at the time of survey.

Almost all noxious weed species observed are state "B" designated weeds, meaning that they are weeds of economic importance that are regionally abundant, but which may have limited distribution in some counties (ODA 2020). Two species, rush skeletonweed and spotted knapweed, are also "T" designated weeds, meaning that ODA has targeted this species for prevention and control (ODA 2020). No state "A" list species were observed; however, four species on the Morrow County "A" list (yellow starthistle, rush skeletonweed, common spikeweed, and Scotch thistle) and three species on the Umatilla County "A" list (common spikeweed, skeletonweed, spotted knapweed) were observed. In Morrow County, "A" designated species include "[a]ny plant that is determined by the weed advisory board, and so declared by the County Board of Commissioners to be injurious to public health, crops, livestock, land or property under provisions of Oregon State Statute and thus mandated for control" (Morrow County 2022). For Umatilla County, "A" designated weeds are those that "have been found as single plants or in very limited populations in the county. Prevention, early detection, and eradication is high priority" (Umatilla County 2022).

4.0 Conclusions

Botanical surveys in 2022 documented one state threatened species (Laurence's milkvetch) within the Survey Area. These plants could be impacted by the Project if avoidance measures that limit ground disturbance at these sites are not employed.

Tetra Tech documented 21 noxious weed species within the Survey Area. Some noxious weeds were observed primarily in disturbed areas, such as along roadsides, within drainages, and around both active and abandoned farming/ranching structures and corrals. Other noxious weeds, such as diffuse knapweed and Scotch thistle, were present throughout the Survey Area, especially along the lower hillslopes and drainages.

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Figures

Figure 2. Rare Plant Survey Results is **Confidential** and provided under a separate cover.

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Wheatridge Renewable Energy Facility East

Figure 1
Botanical Survey Area

MORROW AND UMATILLA COUNTIES, OR

Morrow County

Umatilla County

Lexington

578

207

735

602

813

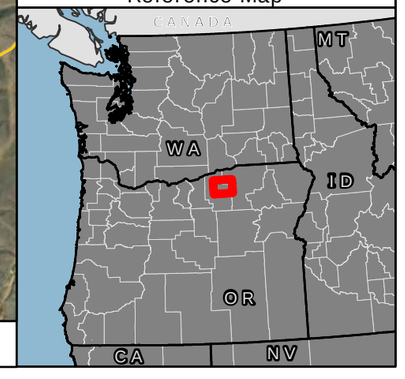
74

- Amended Site Boundary
- Botanical Survey Area
- Botanical Survey Corridor
- City/Town
- County Boundary
- State Highway
- County Highway

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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WGS 1984 UTM Zone 10N

0 2.5 5 10 Miles

NOT FOR CONSTRUCTION

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Attachment 1. Vascular Plants Observed During the 2022 Field Surveys

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Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
Achillea millefolium	common yarrow	N	
Aegilops cylindrica	jointed goatgrass	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Agoseris grandiflora	large-flowered agoseris	N	
Agoseris heterophylla	annual agoseris	N	
Allium sp.	onion	N	
Amsinckia lycopsoides	bugloss fiddleneck	N	
Amsinckia menziesii	Menzies' fiddleneck	N	
Antennaria dimorpha	low pussytoes	N	
Artemisia tridentata	big sagebrush	N	
Astragalus collinus var. *collinus*	hillside milkvetch	N	
Astragalus collinus* var. *laurentii[3]	**Laurence's milkvetch (Lawrence's milkvetch; Laurent's milkvetch)**	N	Threatened under the Oregon ESA.
Astragalus filipes	basalt milkvetch, threadstalk milkvetch	N	
Astragalus lentiginosus	freckled milkvetch	N	
Astragalus purshii	woollypod milkvetch; Pursh's milkvetch	N	
Avena sativa	oats	I	
Balsamorhiza careyana	Carey's balsamroot	N	
Balsamorhiza serrata	serrate balsamroot	N	
Bassia (*Kochia*) *scoparia*	kochia, burning bush	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Berula erecta	cutleaf water parsnip	N	
Bidens frondosa	leafy beggars-ticks	N	
Blepharipappus scaber	rough eyelashweed	N	
Brassica sp.	mustard	I	
Bromus briziformis	rattlesnake brome	I	
Bromus diandrus	ripgut brome	I	
Bromus hordeaceus (*B. mollis*)	soft chess; soft brome	I	
Bromus sp.	brome	I	

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
Bromus tectorum	cheatgrass	I	
Calochortus macrocarpus var. *macrocarpus*	sagebrush mariposa lily	N	
Castilleja applegatei	waxyleaf Indian paintbrush	N	
Castilleja hispida	harsh Indian paintbrush	N	
Centaurea cyanus	cornflower; bachelor's button	I	
Centaurea diffusa	diffuse knapweed	I	ODA Noxious Weed, B List; ; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Centaurea solstitialis	yellow starthistle, St. Barnaby's thistle	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, A list; Umatilla County Noxious Weed, B list
Centaurea stoebe ssp. *micranthos* (*C. maculosa*)	spotted knapweed	I	ODA Noxious Weed, B and T designate; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, A list
Centaurea x gerstlaueri	meadow knapweed	I	ODA Noxious Weed, B List; Umatilla County Noxious Weed, A list
Centromadia (Hemizonia) pungens	common spikeweed	I	ODA Noxious Weed, B and T designate; Morrow County Noxious Weed, A list; Umatilla County Noxious Weed, A list
Chaenactis douglasii	Douglas' dusty maidens	N	
Chamaesyce (*Euphorbia*) *glyptosperma*	2orrugate-seeded spurge, ripseed sandmat	N	
Chenopodium album	lamb's quarters, pigweed	I	
Chenopodium simplex	maple leaf goosefoot	N	
Chondrilla juncea	rush skeletonweed	I	ODA Noxious Weed, B and T Designate; Morrow County Noxious Weed, A list; Umatilla County Noxious Weed, A list
Chrysothamnus viscidiflorus	green rabbitbrush, sticky-flowered rabbitbrush	N	
Cichorium intybus	chicory	I	

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
Cirsium arvense	Canada thistle	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Cirsium cymosum	peregrine thistle	N	
Cirsium undulatum	wavyleaf thistle	N	
Cirsium vulgare	bull thistle	I	ODA Noxious Weed, B List
Clarkia purpurea	winecup clarkia	N	
Clematis ligusticifolia	western clematis	N	
Collomia grandiflora	large flowered collomia	N	
Conium maculatum	poison hemlock	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Convolvulus arvensis	field bindweed	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, A list
Crepis atribarba	slender hawksbeard	N	
Croton setigerus)	dove weed, turkey mullein	N	
Crupina vulgaris	common crupina	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, A list; Umatilla County Noxious Weed, A list
Cuscuta indecora	bigseed dodder, collared dodder	N	ODA Noxious Weed, B List
Dalea ornata	western prairie clover, ornate dalea	N	
Dieteria canescens (*Machaeranthera canescens*)	hoary-aster, hoary tansyaster	N	
Dipsacus fullonum (*D. sylvestris*)	Fuller's teasel, wild teasel	I	
Dodecatheon sp.	Shooting star	N	
Echinochloa sp.	Barnyard grass	I	
Elymus elymoides	squirreltail	N	
Elymus multisetus	big squirreltail	N	
Elymus trachycaulus	slender wheatgrass	N	
Epilobium brachycarpum	autumn willowherb, tall annual willowherb	N	
Equisetum arvense	common horsetail	N	

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
Equisetum sp.	Horsetail, scouring rush	N	
Ericameria nauseosa	rubber rabbitbrush, gray rabbitbrush	N	
Erigeron divergens	diffuse daisy, spreading fleabane	N	
Erigeron filifolius	threadleaf fleabane	N	
Erigeron poliospermus	hairy-seeded daisy, purple-cushion fleabane	N	
Erigeron pumilus	shaggy fleabane	N	
Eriogonum compositum	arrowleaf buckwheat, common buckwheat	N	
Eriogonum heracleoides	parsnipflower buckwheat	N	
Eriogonum strictum var. *proliferum*	Blue Mountain buckwheat	N	
Eriogonum strictum var. *strictum*	Blue Mountain buckwheat, strict wild buckwheat	N	
Eriogonum umbellatum	Sulphur-flower buckwheat	N	
Eriogonum vimineum	broom buckwheat, wickerstem buckwheat	N	
Erodium cicutarium	African filaree, red-stemmed filaree	I	
Erythranthe guttata (*Mimulus guttatus*)	common monkeyflower, seep monkeyflower	N	
Festuca idahoensis	Idaho fescue	N	
Gaillardia aristata	blanket flower, great-flowered gaillardia	N	
Grindelia squarrosa	curlycup gumweed, resinweed	N	
Helianthus annuus	common sunflower	N	
Heterotheca villosa	hairy goldenaster	N	
Hieracium scouleri	Scouler's hawkweed	N	
Holosteum umbellatum	jagged chickweed	I	
Hordeum jubatum	squirreltail barley	N	
Hypericum perforatum	common St. John's wort	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Juncus balticus	Baltic rush	N	
Juncus occidentalis	prairie rush, western rush	N	
Juncus sp.	Rush	N	

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
Lactuca serriola	prickly lettuce	I	
Lagophylla ramosissima	slender hareleaf, common rabbitleaf	N	
Lappula redowskii	western stickseed, western tickweed	I/N	
Lemna minor	common duckweed	N	
Lepidium perfoliatum	clasping pepperweed	I	
Leymus (*Elymus*) *cinereus*	Great Basin wildrye	N	
Linum lewisii var. *lewisii*	western blue flax, wild blue flax	N	
Lithophragma parviforum	pink woodland star, prairie star, small flowered woodland star	N	
Lithospermum ruderale	western gromwell, Columbia puccoon	N	
Lomatium sp.	Desert-parsley, biscuit-root	N	
Lomatium triternatum	broad-fruit lomatium, nineleaf lomatium	N	
Lupinus leucophyllus	velvet lupine, wooly-leaved lupine	N	
Lupinus sp.	Lupine	N	
Lupinus sulphureus	sulphur lupine	N	
Madia exigua	little tarweed, threadstem madia	N	
Madia gracilis	slender tarweed, common tarweed	N	
Marrubium vulgare	common horehound, white horehound	I	
Matricaria discoidea	pineapple weed	N	
Medicago lupulina	black medic, hop clover	I	
Medicago sativa	alfalfa	I	
Melilotus officinalis	yellow sweetclover	I	
Mentzelia dispersa	bushy blazing star	N	
Mentzelia laevicaulis	giant blazingstar, smoothstem blazingstar	N	
Nasturtium officinale	Watercress	I	
Nepeta cataria	catmint, catnip	I	
Nothocalais troximoides	sagebrush false dandelion	N	
Onopordum acanthium	Scotch thistle	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, A list; Umatilla

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
			County Noxious Weed, B list
Phacelia linearis	Carson's phacelia, threadleaf phacelia	N	
Phlox hoodii	Hood's phlox	N	
Phlox longifolia	long leaved phlox	N	
Phlox sp.	Phlox	N	
Plantago patagonica	woolly plantain, Indian wheat	N	
Poa bulbosa	bulbous bluegrass	I	
Poa secunda ssp. *Secunda*	Canby's bluegrass, Sandberg's bluegrass	N	
Polypogon monspeliensis	annual beardgrass, rabbitsfoot grass	I	
Populus trichocarpa (P. balsamifera ssp. *Trichocarpa*)	black cottonwood	N	
Populus tremuloides	quaking aspen	N	
Poterium sanguisorba var. polygamum (*Sanguisorba minor*)	garden burnet, small burnet	I	
Prunus virginiana	chokecherry	N	
Pseudoroegneria spicata	bluebunch wheatgrass	N	
Rhaponticum (Acroptilon/Centaurea) repens	Russian knapweed	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Rhus glabra	smooth sumac	N	
Rhus aromatica (*R. trilobata*)	aromatic sumac, fragrant sumac	N	
Ribes aureum	golden currant	N	
Rosa woodsii	Woods' rose	N	
Rumex crispus	curly dock, yellow dock	I	
Salix sp.	Willow	N	
Salsola tragus (S. kali)	prickly Russian thistle	I	
Salvia dorrii	mint sage, purple sage, gray ball sage	N	
Sarcobatus vermiculatus	black greasewood, greasewood	N	
Secale cereale	cereal rye, rye	I	Morrow County Noxious Weed, B List; Umatilla County Noxious Weed, B List

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes
Sisymbrium altissimum	Jim Hill mustard, tumble mustard	I	
Sisyrinchium idahoense	Idaho blue-eyed grass	N	
Solanum rostratum	Buffalo bur, spiny nightshade	I	ODA Noxious Weed, B List
Sphaeralcea munroana	Munro's globemallow, white-stemmed globemallow	N	
Stachys byzantina	lamb's ear, wooly hedgenettle	I	
Taeniatherum caput-medusae	medusahead	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list
Tetradymia canescens	gray horsebrush, spineless horsebrush	N	
Thinopyrum intermedium	intermediate wheatgrass	I	
Thinopyrum obtusiflorum (T. ponticum)	tall wheatgrass	I	
Toxicoscordion paniculatum	foothill death camas	N	
Tragopogon dubius	yellow salsify	I	
Tribulus terrestris	land caltrop, puncture vine, goat's head	I	ODA Noxious Weed, B List; Morrow County Noxious Weed, B list; Umatilla County Noxious Weed, B list
Trifolium sp.	clover	I/N	
Triteleia grandiflora	Howell's triteleia	N	
Triticum aestivum	wheat	I	
Typha latifolia	broad-leaf cattail, common cattail	N	
Urtica dioica	stinging nettle	I/N	
Verbascum Thapsus	common mullein, cowboy toilet paper, flannel plant	I	
Verbena bracteata	big bracted verbena, bracted vervain	N	
Veronica americana	American brooklime	N	
Veronica anagallis-aquatica	water pimpernel, water speedwell	I	
Vicia villosa	fodder vetch, hairy vetch	I	
Vulpia microstachys	desert fescue, small fescue	N	
Vulpia myuros	rat-tail six-weeks grass, rattail fescue	I	
Woodsia oregana	Oregon cliff fern	N	
Xanthium strumarium	common cockleburr	N	

Scientific Name (Synonym)[1]	Common Name	Native or Introduced[2]	Notes

1. Nomenclature follows the Oregon Vascular Plant Checklist, as used by OregonFlora (https://oregonflora.org/).

2. N=Native, I=Introduced.

3. Red type indicates a special status species.

Attachment 2. Site Photographs

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Photo 1. Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) in flower.



Photo 2. Laurence's milkvetch perennial grassland habitat.



Photo 3. Laurence's milkvetch pods.



Photo 4. Laurence's milkvetch in fruit.



Photo 5. Small vegetative Laurence's milkvetch (presumed) in two-track in grassland.



Photo 6. Small grouping of Laurence's milkvetch in mixed annual/perennial grassland near cultivated fields.

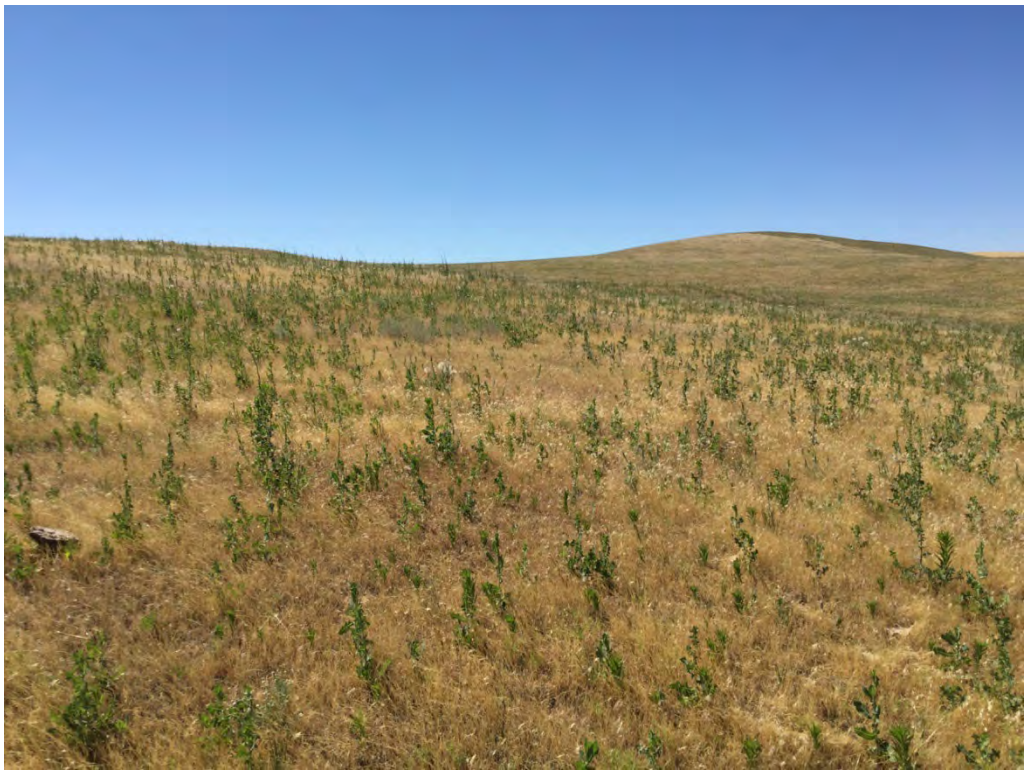

Photo 7. Former cultivated field habitat in northern end of Survey Area; contained no Laurence's milkvetch.



Photo 8. Example of off-road vehicle impacts to habitat.

Bat Activity Survey
for the Wheatridge Wind Energy Expansion Project
Morrow and Umatilla Counties, Oregon

June 7 – November 8, 2022



Prepared for:

NextEra Energy Resources

700 Universe Boulevard
Juno Beach, Florida 33408

Prepared by:

Joel Thompson, Meredith Hoggatt, and Richard Novy

Western EcoSystems Technology, Inc.
408 West Sixth Street
Bloomington, Indiana 47404

April 18, 2023

WEST

Confidential Business Information

EXECUTIVE SUMMARY

Western EcoSystems Technology, Inc. conducted a bat activity survey during the summer and fall of 2022 for the proposed Wheatridge Wind Energy Expansion Project area (Project Area) in Morrow and Umatilla counties, Oregon. The objective of the bat activity survey was to assess seasonal and temporal variation in bat activity within the Project Area. The survey followed recommendations from the US Fish and Wildlife Service *Land-Based Wind Energy Guidelines*.

Bat activity surveys were conducted from June 7 – November 8, 2022 at three fixed survey stations using Wildlife Acoustics Song Meter SM4BAT ultrasonic detectors, each having one ultrasonic microphone positioned about 10 feet (3 meters) above ground level. The combined mean (± standard error) activity rate at all stations was 0.56 ± 0.06 bat passes per detector-night.

Approximately 44% of bat passes were classified as high frequency (e.g., *Myotis*) species, and 56% of bat passes were classified as low frequency (e.g., hoary bat and silver-haired bat). Overall bat activity did not vary greatly between seasons, but was slightly higher in the summer (0.64 bat passes/detector-night) than fall (0.57). Low frequency bat activity was lower in summer and higher in the fall, peaking near the end of September at 1.00 bat pass/ detector night. High frequency bat activity was lower in the fall and higher in the summer, peaking in mid-June at 1.2 bat passes/detector night. No state- or federally listed species were documented or have the potential to occur in the Project Area.

Bat mortality in the Project Area is likely to exhibit patterns similar to those observed at other facilities within the region, which have typically ranged from less than 1.0 fatality/megawatt (MW)/year to 4.3 fatalities/MW/year, with higher mortality rates in the fall. Based on the bat activity patterns observed at the Project, post-construction bat fatality rates would be expected to fall within the range of fatality rates reported at these other regional facilities, with the majority of fatalities consisting of migratory species such as hoary bat and silver-haired bat.

STUDY PARTICIPANTS

Joel Thompson	Project Manager
Meredith Hoggatt	Data Analyst, Data Labeler, report Writer
Richard Novy	Bat Liaison
Kristina Hammond	Senior Reviewer
Erik Ost	GIS Technician
Sarah Martinson	Acoustic Report Coordinator
Zach Parsons	Statistician
Jeanette Haddock	Technical Editor
Lauren Niebel	Field Technician

REPORT REFERENCE

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TABLE OF CONTENTS

INTRODUCTION 1
PROJECT AREA 1
Overview of Bat Diversity 4
METHODS 4
Bat Activity Survey 4
Survey Stations 5
Survey Schedule 5
Data Collection 5
Call Analysis 7
Statistical Analysis 8
RESULTS 8
Bat Activity Surveys 8
Spatial Variation 9
Species Composition 9
Temporal Variation 13
DISCUSSION 17
REFERENCES 20

LIST OF TABLES

Table 1. Land cover types, coverage, and percent (%) composition within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon. 1
Table 2. Bat species with potential to occur within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, categorized by echolocation call frequency. 4
Table 3. Operational status of bat detectors and microphones (n=3) operating at the Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, separated by seasons from June 7 – November 8, 2022. 8
Table 4. Results of the bat activity survey conducted at detector stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. Passes are separated by call frequency: high frequency (HF), low frequency (LF), and very low frequency (VLF). 11

Table 5. Percentage of all confirmed bat calls (verified by manual review) that were identified to species by Kaleidoscope from acoustic surveys conducted at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. Passes are separated by detector station (WR1, WR2, WR3). 11

Table 6. Seasonal bat activity (bat passes per detector-night) recorded at stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, during each season, separated by call frequency: High Frequency (HF), Low Frequency (LF), and All Bats (AB). 13

Table 7. Seven-day period of peak activity for High Frequency (HF), Low Frequency (LF), and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. 13

Table 8. Fatality rates for bats (number of bats/megawatt [MW]/year) from publicly available studies at wind energy facilities in the US Pacific Northwest region of North America....18

LIST OF FIGURES

Figure 1. Location of the proposed Wheatridge Wind Energy Expansion Project Area. 2

Figure 2. Land cover types and coverage within the proposed Wheatridge Wind Energy Expansion Project Area. 3

Figure 3. Location of the bat activity stations at the proposed Wheatridge Wind Energy Expansion Project Area. 6

Figure 4. Operational status of Wildlife Acoustics Song Meter SM4BAT ultrasonic detectors (n = 3) at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. 10

Figure 5. Number of high frequency and low frequency bat passes per detector-night recorded at stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. 12

Figure 6. Seasonal bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. 14

Figure 7. Weekly patterns of bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. 15

Figure 8. Daily patterns of bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. 16

Figure 9. Fatality rates for bats (number of bats/megawatt [MW]/year) from publicly available studies at wind energy facilities in the US Pacific Northwest region of North America.....19

LIST OF APPENDICES

Appendix A. Site Photos for Bat Activity Surveys for the proposed Wheatridge Wind Energy Expansion Project Area, June 7 – November 8, 2022

Appendix B. Nightly Operational Status of Detectors During the Wheatridge Wind Energy Expansion Project, June 7 – November 8, 2022

Appendix C. Studies with Publicly Available Bat Activity Data (Bat Passes per Detector-Night) from North American Wind Energy Facilities

INTRODUCTION

NextEra Energy Resources (NextEra) is developing the Wheatridge Wind Energy Expansion Project area (Project Area) in Morrow and Umatilla counties, Oregon (Figure 1). NextEra contracted Western EcoSystems Technology, Inc. (WEST) to complete a bat activity survey following the recommendations of the US Fish and Wildlife Service (USFWS) *Land-based Wind Energy Guidelines* (USFWS 2012) to evaluate potential impacts to bats from the Project Area (Kunz et al. 2007a). Objectives of the bat activity survey were to assess seasonal and temporal variation in bat activity within the Project Area. This report describes the methods and results of bat activity surveys conducted in the Project Area from June 7 – November 8, 2022.

PROJECT AREA

The Project Area is composed of approximately 45,174 acres (18,281 hectares) in Morrow and Umatilla counties, Oregon. According to the National Land Cover Database (NLCD; 2019), the predominant land cover type within the Project Area is herbaceous (71%). Cultivated crops is the next predominant land cover type (19%), followed by shrub/scrub (7%), and developed, open space (2%; NLCD 2019) The remaining land cover types each comprise less than 1% of the Project Area (NLCD 2019; Table 1, Figure 2). The Project area contains one acre (<1%) of deciduous forest and 176 acres (<1%) of woody wetlands habitat that may provide foraging and roosting habitat for bats (Table 1).

Table 1. Land cover types, coverage, and percent (%) composition within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon.

Land Cover Type	Coverage (Acres)	% Composition
Herbaceous	32,178	71
Cultivated Crops	8,653	19
Shrub/Scrub	3,312	7
Developed	831	2
Emergent Herbaceous Wetlands	176	<1
Hay/Pasture	19	<1
Open Water	2	<1
Deciduous Forest	1	<1
Total	**45,174**	**100**

Source: National Land Cover Database 2019.

Note: Sums may not equal totals shown due to rounding.

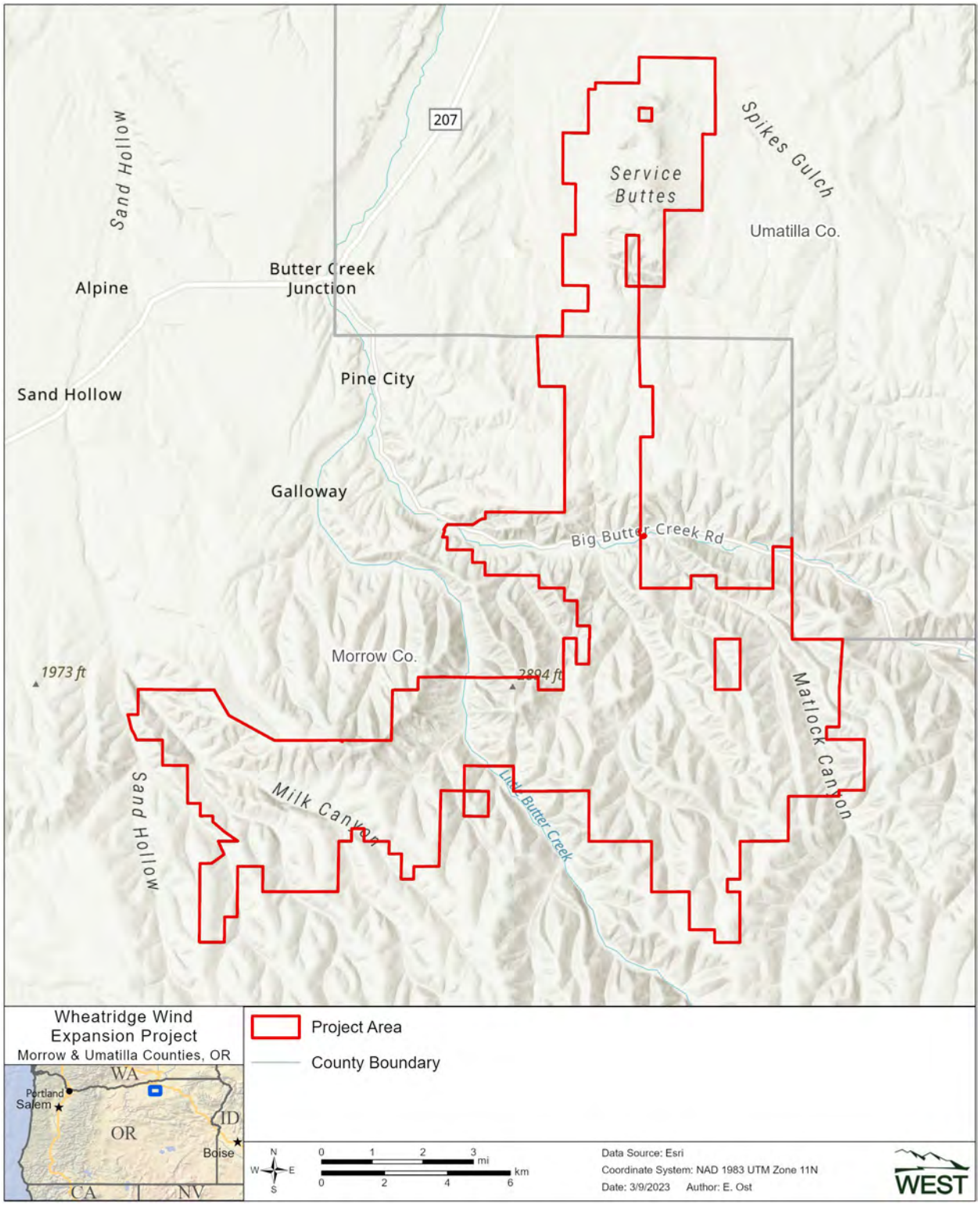

Figure 1. Location of the proposed Wheatridge Wind Energy Expansion Project Area.

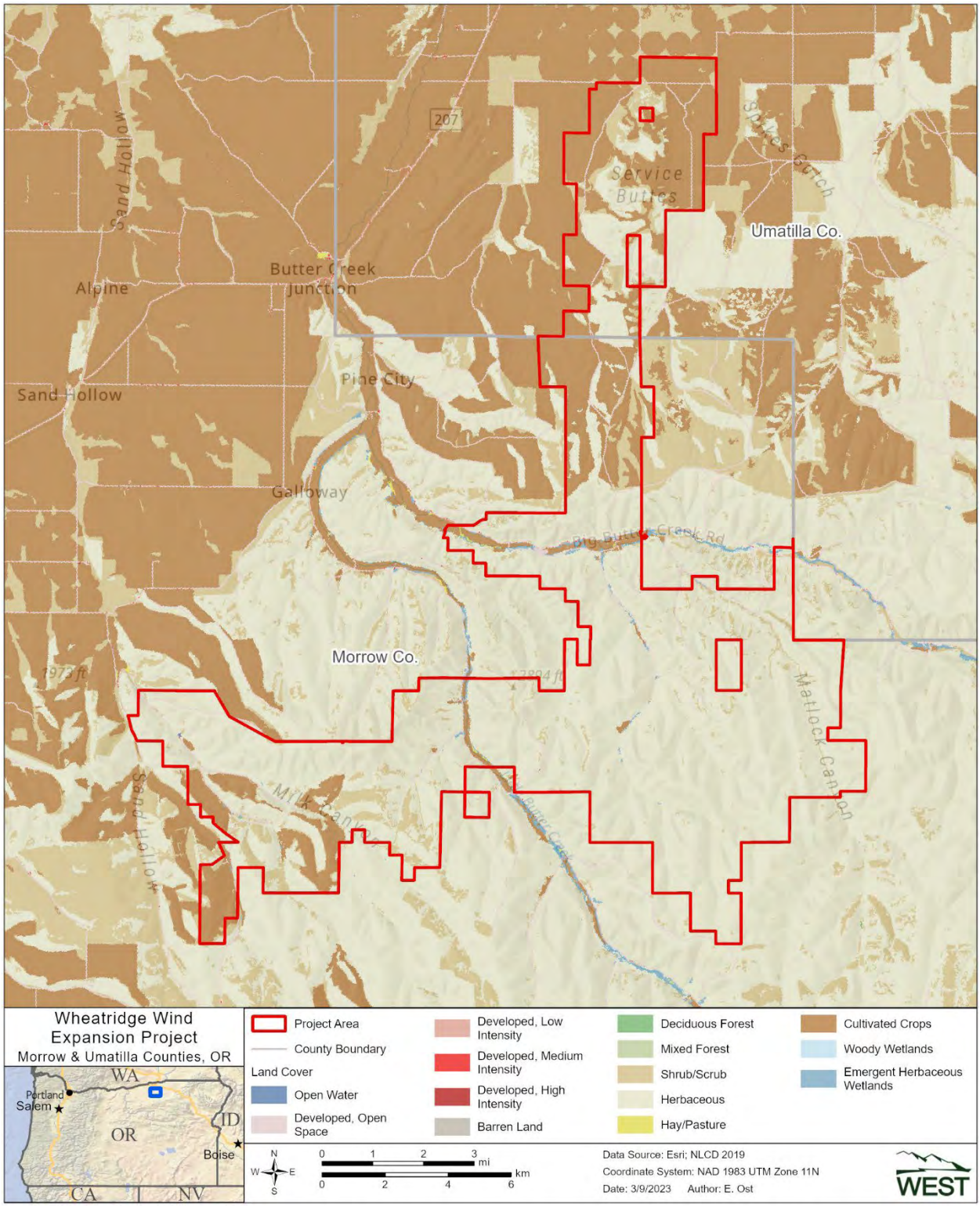

Figure 2. Land cover types and coverage within the proposed Wheatridge Wind Energy Expansion Project Area.

Overview of Bat Diversity

Of the 15 bat species that have been documented in Oregon (ODFW 2023, BCI 2023), 13 species have the potential to occur within the Project Area (Table 2). None of the potentially occurring species are federally listed as threatened or endangered, although the USFWS is currently conducting a Species Status Assessment for the little brown bat (*Myotis lucifugus*), which is being considered for listing under the federal Endangered Species Act (USFWS 2022, 2023).

Table 2. Bat species with potential to occur within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, categorized by echolocation call frequency.

Common Name	Scientific Name	USFWS Status[1]
High Frequency (>30 kHz)		
California bat[2]	*Myotis californicus*	
canyon bat[2]	*Parastrellus hesperus*	
little brown bat[2]	*Myotis lucifugus*	Under Review
long-legged bat[2]	*Myotis volans*	
western long-eared bat[2]	*Myotis evotis*	
Yuma bat[2]	*Myotis yumanensis*	
Low Frequency (15–30 kHz)		
big brown bat[2]	*Eptesicus fuscus*	
hoary bat[2,3]	*Lasiurus cinereus*	
fringed bat	*Myotis thysanodes*	
pallid bat	*Antrozous pallidus*	
silver-haired bat[2,3]	*Lasionycteris noctivagans*	
Townsend's big-eared bat	*Corynorhinus townsendii*	
Very Low Frequency (<15 kHz)		
spotted bat	*Euderma maculatum*	

1. US Fish and Wildlife Service (USFWS) status under the Endangered Species Act (USFWS 2022).
2. Species known to have been killed at wind energy facilities (American Wind Wildlife Institute 2018).
3. Long-distance migrant.

Source: USFWS 2022.

kHz = kilohertz.

METHODS

Bat Activity Survey

WEST conducted a bat activity survey using ultrasonic acoustic detectors at three stations to estimate levels of spatial and temporal variation in bat activity within the Project Area. Detectors were initially deployed in late May; however, due to data card errors in all three detectors, data collection did not commence until June 7. As such, all data collected and reported on herein are for the study period spanning June 7 – November 8, 2022. Ultrasonic bat detectors collect information on spatial distribution, timing, and species composition of bats and may provide insight into the possible impacts of wind development (Kunz et al. 2007a; Britzke et al. 2013; Loeb et al. 2015) and inform potential mitigation strategies (Weller and Baldwin 2012).

Survey Stations

Three full-spectrum Song Meter SM4BAT ultrasonic detectors (SM4; Wildlife Acoustics, Maynard, Massachusetts) were used during the study at three survey stations (station photos in Appendix A). All three detectors were deployed in open grassland habitats representative of future turbine locations (Figure 3; Appendix A). Each SM4 was deployed with one weatherproof SMM-U1 microphone raised to approximately 10 feet [ft; 3 meters (m)] above ground level. SMM-U1 microphones have a variable detection distance (approximate maximum detection distance of 98 ft [30 m]), influenced by atmospheric attenuation (affected by humidity, temperature, and air pressure), surrounding vegetation, and wind, as well as bat call frequency, amplitude, and direction.

Survey Schedule

Detectors were programmed to turn on at 18:00 and off at 8:00 in order to capture bat activity from shortly before sunset until after sunrise each night. To highlight seasonal activity patterns, the survey was divided into two survey periods: summer (June 7 – August 15) and fall (August 16 – November 8). Mean bat activity was also calculated for a standardized Fall Migration Period (FMP), defined as July 30 – October 14. WEST defined the FMP as a standard for comparison with activity from other wind projects.

Data Collection

The SM4 is a full-spectrum bat detector that records complete acoustic waveforms by sampling sound waves at a rate of 256 kilohertz (kHz). This high sampling rate enables the detector to make high-resolution recordings of sound amplitude data at all frequencies up to 128 kHz. Detectors were periodically checked throughout the survey period to swap data cards and conduct maintenance to ensure detectors were functioning properly. Intervals between checks varied throughout the study period, with some longer intervals resulting from access limitations due to fire season. Summary files associated with each recording session were reviewed in detail to ensure each detector (and station) was operational and the microphone was triggering throughout the recording period. The SM4s were set using a trigger window of five seconds and a maximum file length of 15 seconds. All microphones were fitted with windscreens and were tested using an ultrasonic calibrator from Wildlife Acoustics and determined to meet factory threshold prior to deployment.

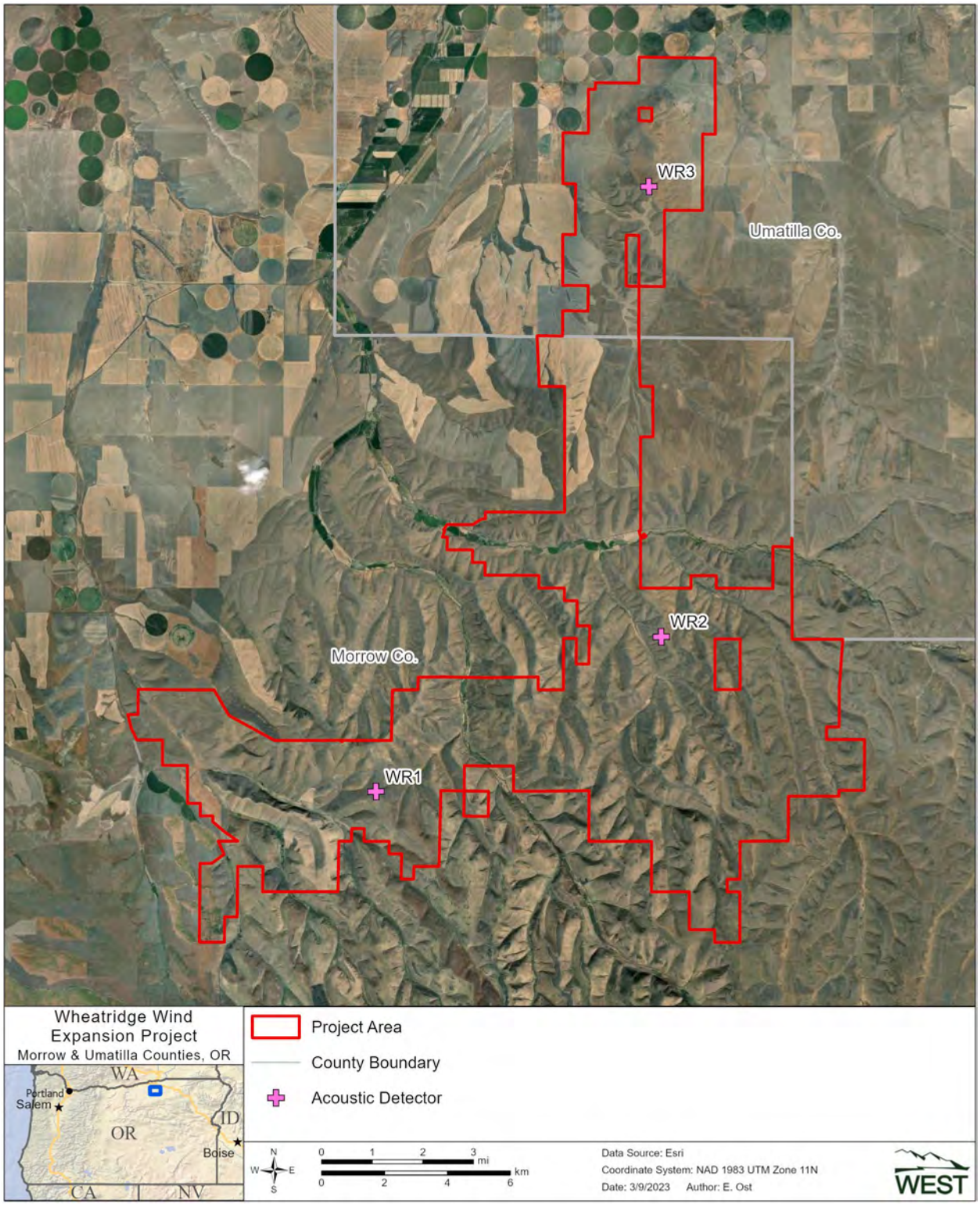

Figure 3. Location of the bat activity stations at the proposed Wheatridge Wind Energy Expansion Project Area.

Call Analysis

The collected full-spectrum acoustic recordings were input into Kaleidoscope Pro 5.4.7 (Kaleidoscope) for automated identification using the Bats of North America classifier 5.4.0 at neutral -1 sensitivity setting (Wildlife Acoustics, Inc. 2022). These settings and version are the most currently approved by the USFWS for acoustic analysis of sensitive species (USFWS 2019). Kaleidoscope uses Hidden Markov Models and other statistical methods known for applications in temporal pattern recognition such as speech analysis, handwriting analysis, and DNA sequencing (Agranat 2012). Only potentially occurring bat species listed in Table 2 were included in the Kaleidoscope identification model. Despite the capabilities of Kaleidoscope, many bat passes cannot be identified with absolute certainty, either because only call fragments were recorded due to the distance between the bat and microphone or because many bat species produce similar calls with overlapping call characteristics that cannot be distinguished. Therefore, automated call identification is imperfect, and each identification has an associated error rate (Agranat 2012, Clement et al. 2014, Lemen et al. 2015, Russo and Voigt 2016, Rydell et al. 2017). The Kaleidoscope output was limited to files confirmed to contain a bat call and was used to generate a preliminary list of species that may have been present in the Project area after all noise files were removed. These species-specific results were intended to provide insight into the species mix potentially present. However, for the above reasons, the results of the Kaleidoscope analysis, and automated call identification, in general, can be misleading.

Full-spectrum data were transformed into zero-crossing data using the program Kaleidoscope Pro 5.4.7 (Kaleidoscope; Wildlife Acoustics, Inc. 2022). The zero-crossing data were then viewed in Analook© software as digital spectrograms that show changes in echolocation call frequency over time (Analook 2004). Frequency versus time displays were used to separate bat calls from other types of ultrasonic noise (e.g., wind, rain, insects) and to determine the call frequency category. A bat pass was defined as a sequence of at least two echolocation calls (pulses) produced by an individual bat with no pause between calls of more than one second, unless determined by a qualified bat biologist to be a single individual (Fenton 1980, Gannon et al. 2003). All bat passes were manually labelled as the appropriate bat species or species group using Analook©. These labels were inserted into the desired output file (in this case, the zero-crossing file) for review and analysis.

For each station, bat passes were sorted into three groups based on their minimum call frequency. High frequency (HF) bats, such as the little brown bat and canyon bat (*Parastrellus hesperus*), have minimum frequencies (Fmin) greater than 30 kHz. Low frequency (LF) bats, such as big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*), typically emit echolocation calls with Fmin from 15–30 kHz. Very low frequency (VLF) bats, such as the spotted bat (*Euderma maculatum*), typically emit echolocation calls with Fmin lower than 15 kHz. Table 2 lists HF, LF, and VLF species that could occur within the Project Area.

Statistical Analysis

The number of bat passes per detector-night was used as an index of bat activity. An experienced bat acoustic analyst (M. Hoggatt) determined the number of bat passes using AnalookW© software to view recorded call files. A detector-night was defined as one detector operating for one entire night (at least within one hour of sunrise). Bat passes per detector-night were calculated for all bats by species group (HF, LF, and VLF bats). Bat pass rates represent indices of bat activity and do not represent numbers of individuals. Mean bat activity was calculated by station, by season, and overall (overall averages were calculated as an unweighted average of total activity at each individual detector). Using detector-nights as a metric for calculating bat activity controlled for differences in sampling effort among individual detectors and provided unbiased estimates for the deployed nights. Comparisons of mean bat activity among seasons were made to evaluate seasonal variation in bat activity.

The period of peak sustained bat activity was defined as the 7-day period with the highest average bat activity. This and all multi-station averages in this report were calculated as an unweighted average of total activity at each station.

RESULTS

Bat Activity Surveys

Bat activity was surveyed at three stations from June 7 – November 8, 2022 (Appendix B). Detectors and microphones were operating for 79% of the sampling period (n = 351 nights; Table 3; Figure 4). The primary cause of lost data was memory card errors and access issues concerning fire safety, with memory card errors resulting in the loss of data at all detectors at different dates throughout the study period.

Table 3. Operational status of bat detectors and microphones (n=3) operating at the Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, separated by seasons from June 7 – November 8, 2022.

Season	WR1g	WR2g	WR3g
Microphone Height (meters)	**3**	**3**	**3**
Summer			
First night	June 7	June 7	June 7
Last night	August 15	August 15	August 15
# of potential data collection nights	70	70	70
# of successful data collection nights	62	46	51
# of failed data collection nights	8	24	19
% of failed nights	11	34	27
Fall			
First night	August 16	August 16	August 16
Last night	November 8	November 2	October 25
# of potential data collection nights	85	79	71
# of successful data collection nights	85	71	36
# of failed data collection nights	0	8	35
% of failed nights	0	10	49

Note: percentage totals may not add up exactly due to rounding.

Spatial Variation

Bat activity was highest at station WR2 (0.97 ± 0.17 bat passes per detector-night) compared to the other two stations (WR1 and WR3; 0.41 ± 0.06 and 0.30 ± 0.07, respectively; Table 4).

Species Composition

Kaleidoscope identified 1,753 bat passes as HF, 1,319 passes as LF, and one pass as VLF; however, after review by a bat biologist, only 88 of those passes (44%) were classified as HF, 112 (56%) as LF, and none as VLF (Table 4). Bat passes identified by Kaleidoscope were reclassified from their original identification to either a non-bat noise label or to another frequency group (e.g., HF or LF) if diagnostic call characteristics were not present in the call sequence to determine the species (or species group) that produced the calls. Of all the bat passes confirmed to come from a bat during manual review, Kaleidoscope had classified approximately 67% to species. Of the LF passes identified by Kaleidoscope to the species level (n = 93), silver-haired bat and hoary bat accounted for approximately 90% (Table 5). Of the HF passes identified to species (n = 38), little brown bat and long-legged bat accounted for approximately 87% (Table 5).

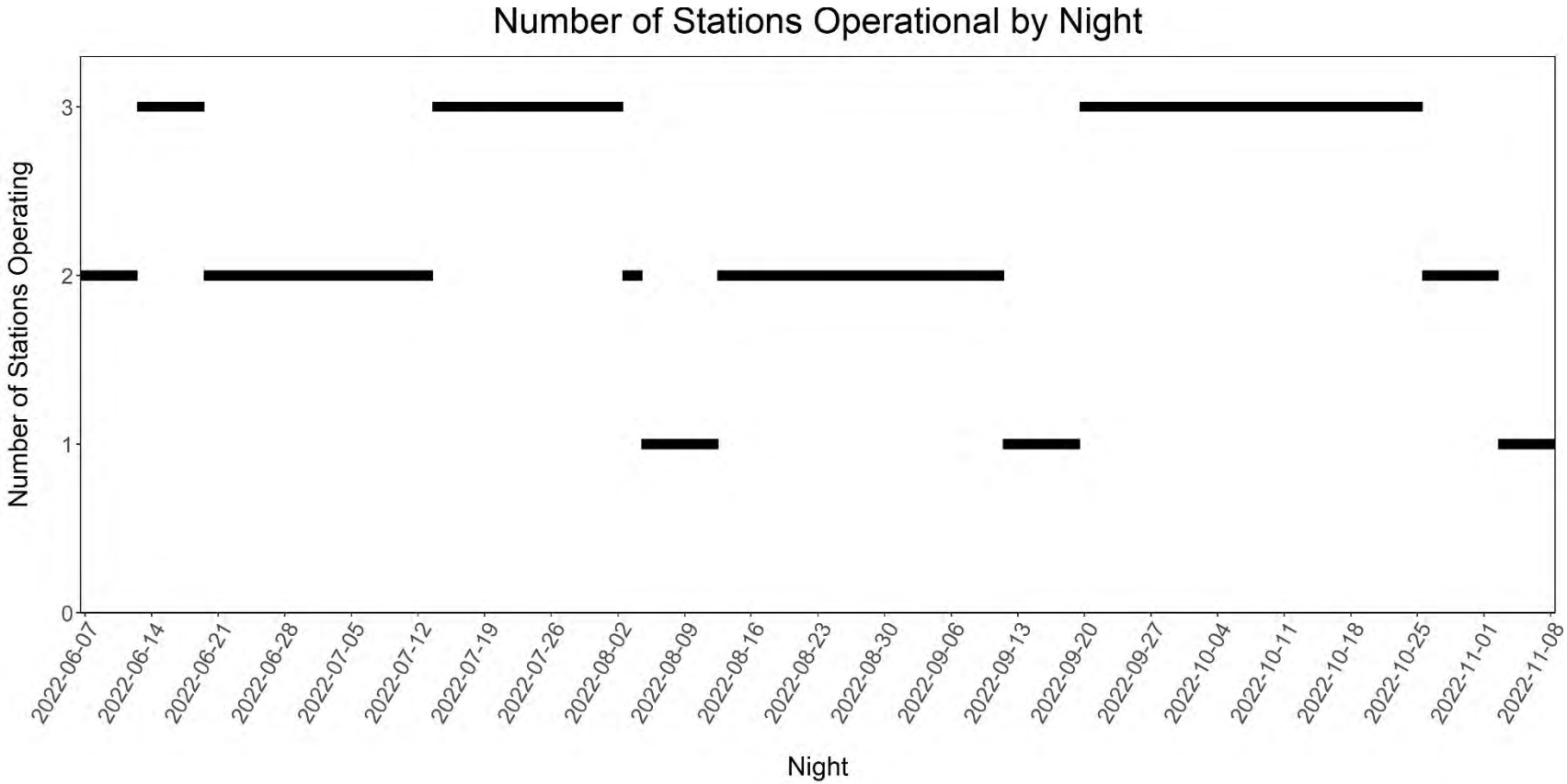

Figure 4. Operational status of Wildlife Acoustics Song Meter SM4BAT ultrasonic detectors (n = 3) at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

Table 4. Results of the bat activity survey conducted at detector stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. Passes are separated by call frequency: high frequency (HF), low frequency (LF), and very low frequency (VLF).

Station	# of HF Bat Passes (%)[1]	# of LF Bat Passes (%)[1]	# of VLF Bat Passes (%)[1]	Total Bat Passes	Detector -Nights	# of Noise Labels[1]	Total # of Labels[1]	% of Labels Marked as a bat[1]	Bat Passes/ Detector-Night[2]
WR1	15	46	0	61	147	9,805	9,866	<1	0.41 ± 0.06
WR2	73	40	0	113	117	5,354	5,467	2	0.97 ± 0.17
WR3	0	26	0	26	87	29,193	29,219	<1	0.30 ± 0.07
Total	**88 (44%)**	**112 (56%)**	**0 (0%)**	**200**	**351**	**44,352**	**44,552**	**<1**	**0.56 ± 0.06**

1. All bat passes were manually labelled as the appropriate bat species group using Analook.

2. ± bootstrapped standard error.

Table 5. Percentage of all confirmed bat calls (verified by manual review) that were identified to species by Kaleidoscope from acoustic surveys conducted at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022. Passes are separated by detector station (WR1, WR2, WR3).

Species	WR1 (%)	WR2 (%)	WR3 (%)	Total (%)
silver-haired bat	19.4	15.1	19.4	53.8
hoary bat	14.0	20.4	2.2	36.6
big brown bat	4.3	3.2	0.0	7.5
pallid bat	2.2	0.0	0.0	2.2
Identified LF Species Total	**39.8**	**38.7**	**21.5**	**100**
California bat	0.0	7.9	0.0	7.9
western long-eared bat	0.0	2.6	0.0	2.6
little brown bat	10.5	57.9	0.0	68.4
long-legged bat	5.3	13.2	0.0	18.4
canyon bat	0.0	2.6	0.0	2.6
Identified HF Species Total	**15.8**	**84.2**	**0.0**	**100**

Note: totals may not be exact, due to rounding.

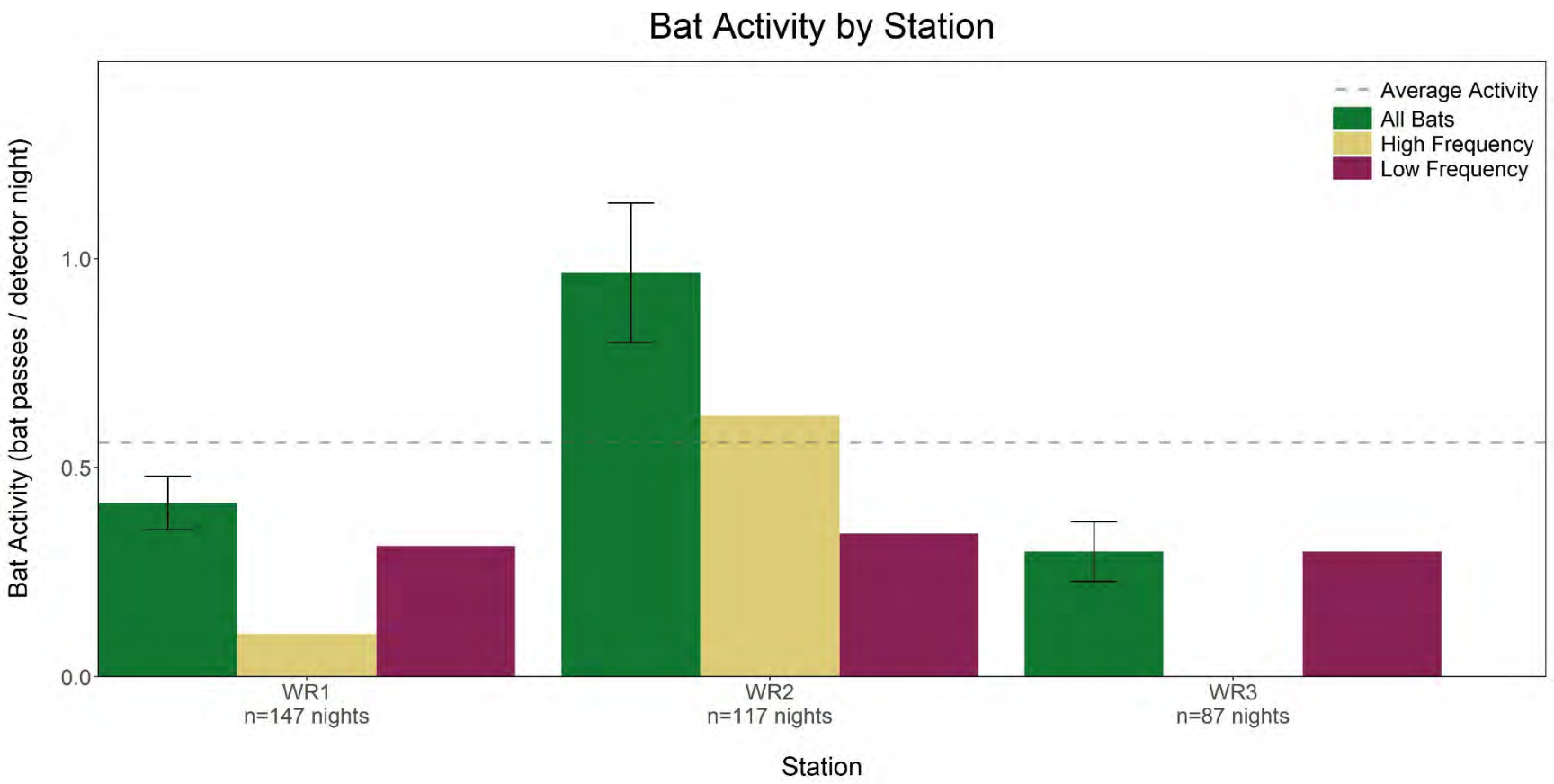

Figure 5. Number of high frequency and low frequency bat passes per detector-night recorded at stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

Note: The bootstrapped standard errors are represented by black error bars on 'All Bats' columns. No Very Low Frequency passes were recorded. Dashed line represents mean activity across all stations in the "All bats" category. n = number of detector nights.

Temporal Variation

Overall bat activity at the survey stations was similar across the fall (0.57 ± 0.08 bat passes per detector-night) and summer (0.64 ± 0.12) seasons (Table 6, Figure 6). Bat activity was slightly higher (0.69 ± 0.09) at stations during the FMP (Table 6). Weekly acoustic activity, driven by HF bat activity, was highest in early to mid-June, followed by a decrease in activity that stayed relatively low through the remainder of the survey period (Figure 7). LF bat activity was lower in the summer and higher in the fall, peaking near the end of September at 1.0 bat pass/ detector night (Tables 6 and 7; Figures 7 and 8). HF bat activity was lower in the fall and higher in the summer, with a peak in activity in mid-June (1.2 bat passes/detector night; Tables 6 and 7; Figures 7 and 8).

Table 6. Seasonal bat activity (bat passes per detector-night) recorded at stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, during each season, separated by call frequency: High Frequency (HF), Low Frequency (LF), and All Bats (AB).

		Summer	Fall	FMP
Station	**Call Frequency**	**June 7 – Aug 15**	**Aug 16 – Nov 8**	**July 30 – Oct 14**
WR1 Total	HF	0.11	0.09	0.12
	LF	0.15	0.43	0.51
	AB	0.26	0.52	0.62
WR2 Total	HF	1.50	0.06	0.29
	LF	0.09	0.51	0.46
	AB	1.59	0.56	0.75
WR3 Total	HF	0	0	0
	LF	0.08	0.61	0.69
	AB	0.08	0.61	0.69
Overall[1]	**HF**	**0.54 ± 0.12**	**0.05 ± 0.01**	**0.14 ± 0.04**
	LF	**0.10 ± 0.02**	**0.52 ± 0.07**	**0.55 ± 0.08**
	AB	**0.64 ± 0.12**	**0.57 ± 0.08**	**0.69 ± 0.09**

1. ± bootstrapped standard error.

FMP = Fall Migration Period.

Table 7. Seven-day period of peak activity for High Frequency (HF), Low Frequency (LF), and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

Species Group	Start Date of Peak Activity	End Date of Peak Activity	Bat Passes/Detector-Night
HF	June 15	June 21	1.2
LF	September 26	October 2	1.0
All Bats	June 15	June 21	1.2

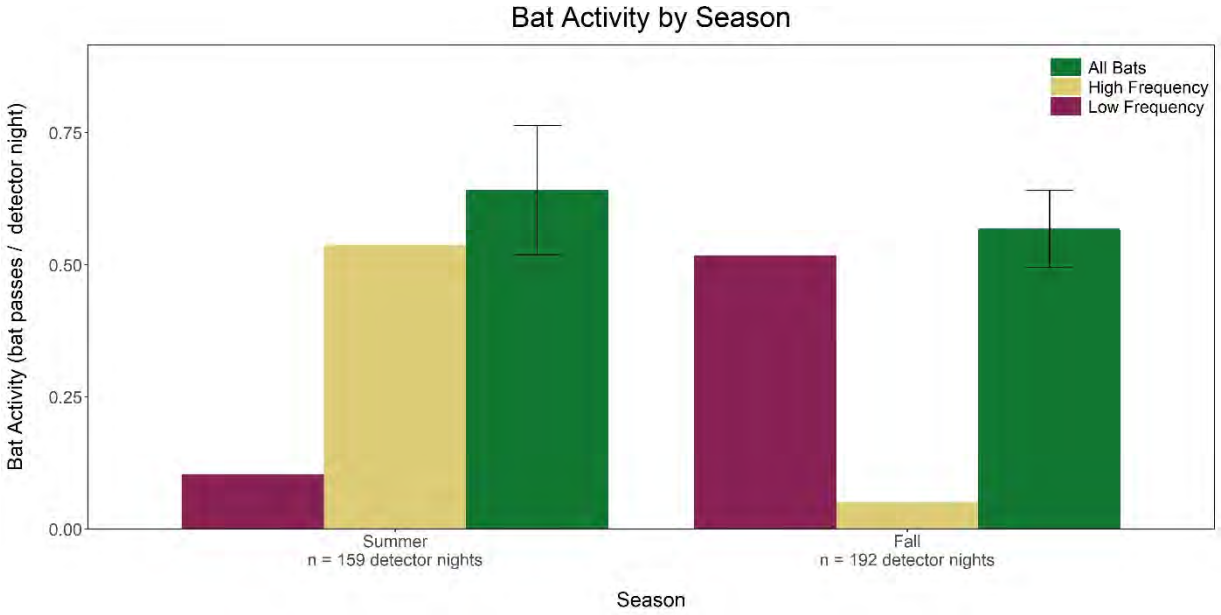

Figure 6. Seasonal bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

Note: The bootstrapped standard errors are represented by black error bars on 'All Bats' columns. No Very Low Frequency passes were recorded.

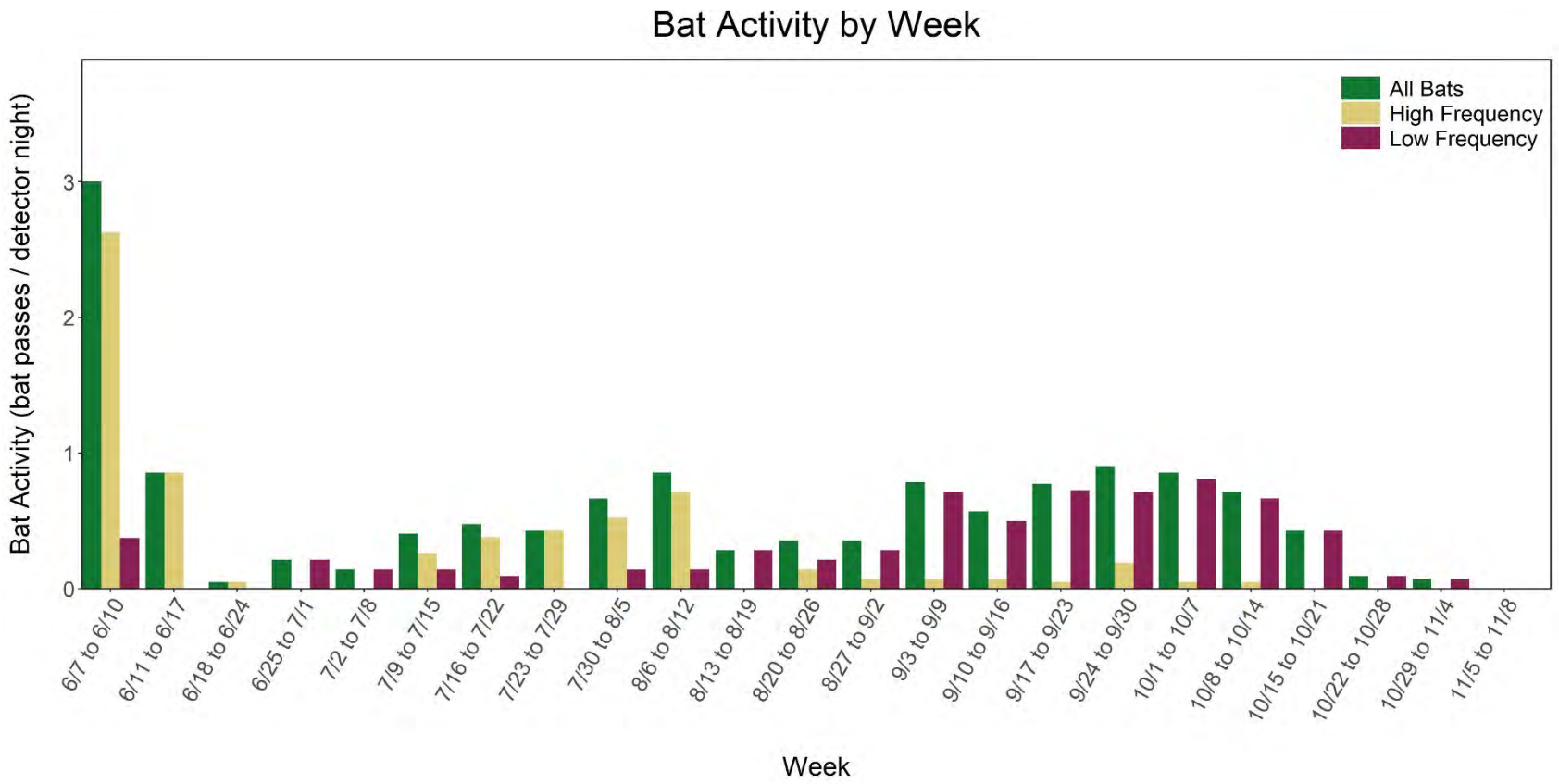

Figure 7. Weekly patterns of bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

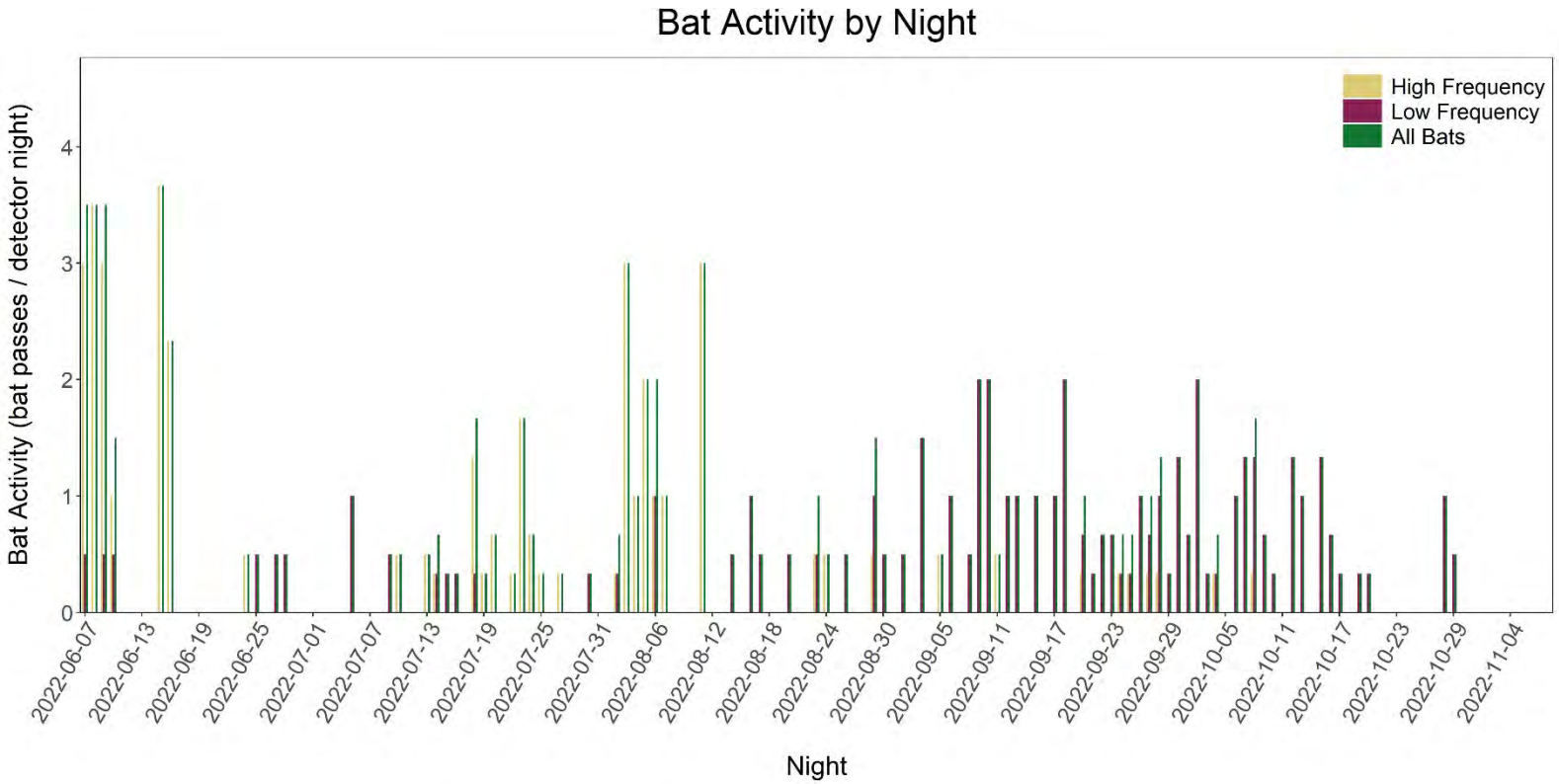

Figure 8. Daily patterns of bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

DISCUSSION

Bat activity surveys were recommended as a risk assessment tool soon after large-scale bat fatality events at wind facilities were first documented (Arnett et al. 2005). Bat fatalities have been discovered at most wind energy facilities monitored in North America, with fatality estimates ranging from zero to 60.6 bat fatalities/megawatt/year (American Wind Wildlife Institute [AWWI] 2018, MidAmerican Energy Company 2019). The timing of peaks in bat activity has been found to correlate with peak fatality periods at wind energy facilities (Johnson et al. 2004, Arnett et al. 2008). Although it was assumed the magnitude of pre-construction bat activity would similarly predict the magnitude of post-construction bat fatalities (Kunz et al. 2007b), pre-construction bat activity is not strongly correlated with post-construction bat fatality (Hein et al. 2013; Solick et al 2020). However, pre-construction activity surveys can still provide useful information about spatial use in the development area, seasonal activity patterns, and species composition for a project area.

Bat activity at the Project (0.56 passes/detector night) was substantially lower than the median publicly available pre-construction bat acoustic activity for North America (7.68 bat passes per detector-night; Appendix C). However, the ability to compare acoustic data in the Project Area with data from other sites to define "high" or "low" is limited due to varying sampling effort, detector types, detector heights, and survey periods (i.e., all year vs. fall only) among studies. For example, SM4 detectors like the ones used during this bat acoustic activity survey record an average of 2.5 times more bat passes per detector-night than Anabat SD1/SD2 detectors, which were previously the most common detector used in pre-construction bat activity surveys (Bishop-Boros et al. 2020). Further, research has found bat acoustic data provides limited inference into predicting bat fatality rates (Hein et al. 2013; Solick et al. 2020).

Overall bat activity in the Project Area was relatively low throughout the survey period. Because it was based solely on automated identification by Kaleidoscope, the species composition presented herein must be viewed with caution; however, seven of the nine species identified during this study were all also identified during the original acoustic surveys conducted in 2011 to support initial permitting of the Project (Gerhardt and Anderson 2014). Only pallid bat and big brown bat, which together represented less than 10% of the LF passes, were not identified during the 2011 surveys.

Driven by higher activity rates within the HF group, overall bat activity was highest in mid-June, whereas activity rates within the LF group was higher in the fall, peaking the last week of September. The recorded peaks in activity are consistent with periods of increased landscape-scale movements (during summer and fall) and fall reproductive behavior that are often associated with increased levels of bat fatalities at operational wind energy facilities (Arnett et al. 2008, Cryan 2008, Arnett and Baerwald 2013, Barclay et al. 2017). In the Pacific Northwest specifically, bat fatalities primarily comprise LF bat species such as hoary bat and silver haired bat (WEST 2021) and occur during the fall migration period (AWWI 2018), whereas HF species are rarely

documented during fatality studies at other Pacific Northwest facilities (2% of bat fatalities; WEST 2021).

Bat fatality rates observed at other facilities within the region have typically ranged from less than 1.0 fatality/megawatt (MW)/year to 4.3 fatalities/MW/year (Figure 8; Table 8). The most recent publicly available data from the region is from the Montague Wind Facility, located approximately 37.7 miles (60.6 kilometers) away (Table 8). This facility had a bat mortality rate of 0.73 fatalities per megawatt per year (Table 8). While the pre-construction bat activity rates at the Project cannot be used to predict post-construction bat fatality rates accurately, the patterns in bat activity can still be informative. The patterns observed were consistent with patterns observed at other projects, with peak activity for the most commonly impacted LF species occurring during the FMP. Bat activity at stations in the Project Area exhibited similar patterns to data from other pre-construction studies, but was lower during the FMP than other published pre-construction bat acoustic activity surveys during the FMP (Appendix C). Based on the activity rates and patterns observed in the Project Area, post-construction bat fatality rates would be expected to fall within the range of fatality rates reported at these other regional facilities, with the majority of fatalities consisting of migratory species such as hoary bat and silver-haired bat.

Table 8. Fatality rates for bats (number of bats/megawatt [MW]/year) from publicly available studies at wind energy facilities in the US Pacific Northwest region of North America.

Wind Energy Facility	Bat fatalities/ MW/year	Plot Size (meters)	Estimator	Project Areas Land Cover[1]	Reference
Palouse Wind, WA (2012–2013)	4.23	120 x 120	unmodified Huso	AG, GR	Stantec (2013)
Nine Canyon, WA (2002–2003)	2.47	180 x 180	Shoenfeld	AG, GR	Erickson et al. (2003)
Tucannon River, WA (2018)	2.32	134 (radius)	Huso	CR, DE, GR, SS, WW	Hallingstad et al. (2019)
Vansycle, OR (1999)	1.12	126 x 126	naïve	AG, GR	Erickson et al. (2000)
Montague, OR (2019–2020)	0.73	150 (radius)	GenEst	AG, CR, PA, WH	Chatfield and Martin (2021)
Biglow Canyon III, OR (2011–2012)	0.66	250 x 250	Shoenfeld	AG, GR, SS, WH	Enz et al. (2013)

[1.] AG = agriculture; GR = grassland; CR = cropland; DE = developed; SS = shrub/steppe; WW = winter wheat; PA = pasture; WH = wheat.

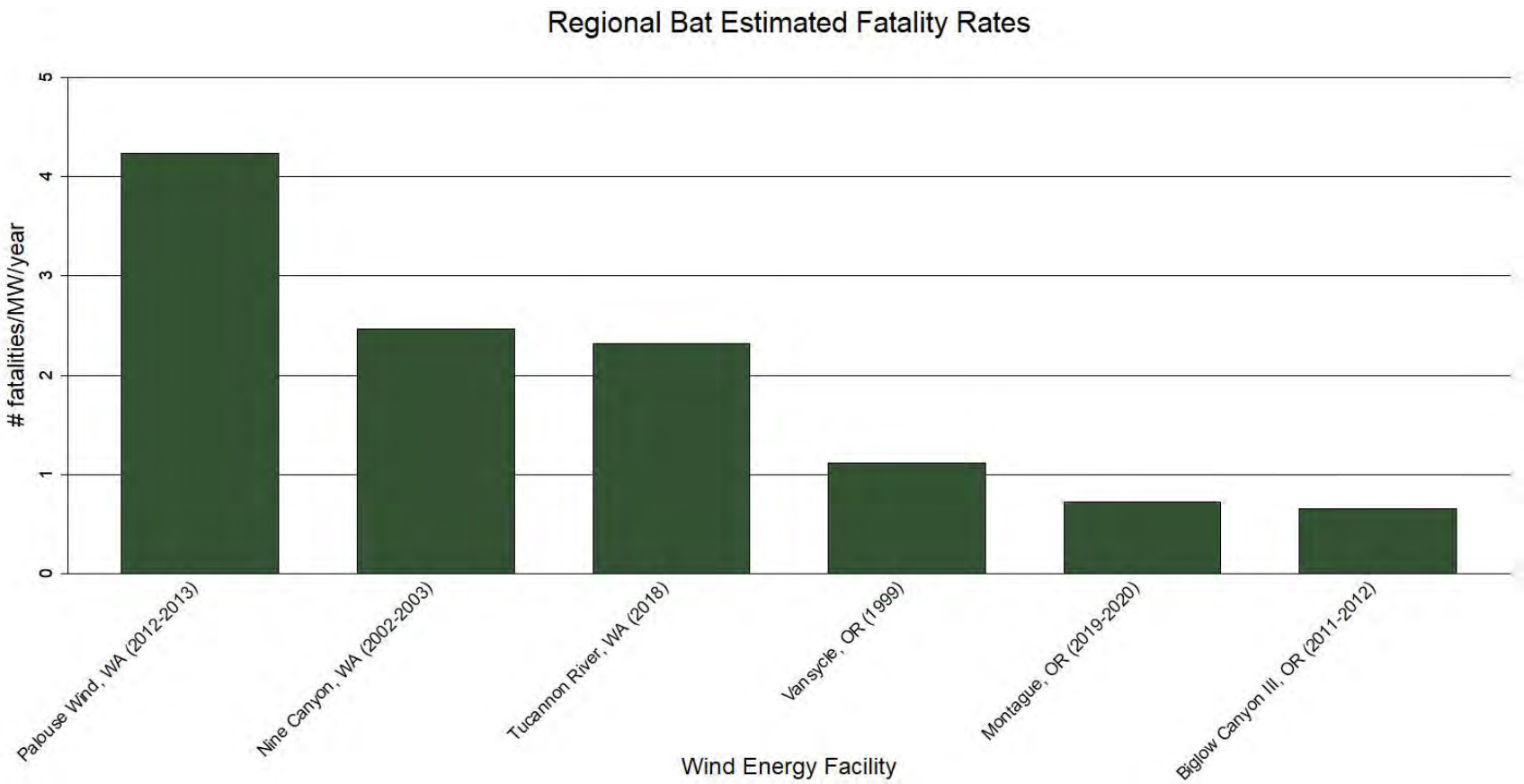

Figure 9. Fatality rates for bats (number of bats/megawatt [MW]/year) from publicly available studies at wind energy facilities in the US Pacific Northwest region of North America.

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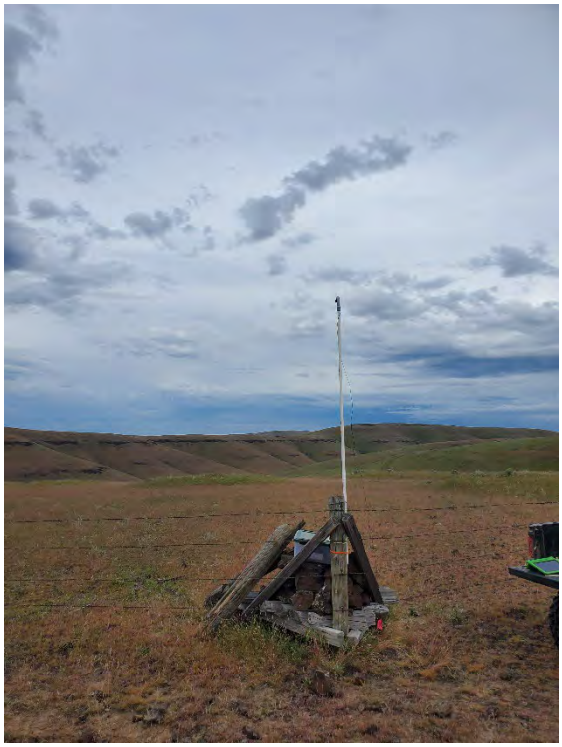
Appendix A. Site Photos for Bat Activity Surveys for the proposed Wheatridge Wind Energy Expansion Project Area, June 7 – November 8, 2022





Appendix A1. Acoustic station WR1.





Appendix A2. Acoustic station WR2.





Appendix A3. Acoustic station WR2.

Appendix B. Nightly Operational Status of Detectors During the Wheatridge Wind Energy Expansion Project, June 7 – November 8, 2022

Appendix B. Nightly operational status of detectors during the Wheatridge Wind Energy Expansion Project, June 7 – November 8, 2022. Status equates to Operational (O), Failed (F), Not Deployed (i.e., not in the field).

Date	WR1g	WR2g	WR3g
6/7/2022	O	O	F
6/8/2022	O	O	F
6/9/2022	O	O	F
6/10/2022	O	O	F
6/11/2022	O	O	F
6/12/2022	O	O	F
6/13/2022	O	O	O
6/14/2022	O	O	O
6/15/2022	O	O	O
6/16/2022	O	O	O
6/17/2022	O	O	O
6/18/2022	O	O	O
6/19/2022	O	O	O
6/20/2022	O	F	O
6/21/2022	O	F	O
6/22/2022	O	F	O
6/23/2022	O	F	O
6/24/2022	O	F	O
6/25/2022	O	F	O
6/26/2022	O	F	O
6/27/2022	O	F	O
6/28/2022	O	F	O
6/29/2022	O	F	O
6/30/2022	O	F	O
7/1/2022	O	F	O
7/2/2022	O	F	O
7/3/2022	O	F	O
7/4/2022	O	F	O
7/5/2022	O	F	O
7/6/2022	O	F	O
7/7/2022	O	F	O
7/8/2022	O	F	O
7/9/2022	O	F	O
7/10/2022	O	F	O
7/11/2022	O	F	O
7/12/2022	O	F	O
7/13/2022	O	F	O
7/14/2022	O	O	O
7/15/2022	O	O	O
7/16/2022	O	O	O
7/17/2022	O	O	O
7/18/2022	O	O	O
7/19/2022	O	O	O
7/20/2022	O	O	O
7/21/2022	O	O	O
7/22/2022	O	O	O
7/23/2022	O	O	O
7/24/2022	O	O	O
7/25/2022	O	O	O
7/26/2022	O	O	O
7/27/2022	O	O	O

Appendix B. Nightly operational status of detectors during the Wheatridge Wind Energy Expansion Project, June 7 – November 8, 2022. Status equates to Operational (O), Failed (F), Not Deployed (i.e., not in the field).

Date	WR1g	WR2g	WR3g
7/28/2022	O	O	O
7/29/2022	O	O	O
7/30/2022	O	O	O
7/31/2022	O	O	O
8/1/2022	O	O	O
8/2/2022	O	O	O
8/3/2022	O	O	F
8/4/2022	O	O	F
8/5/2022	F	O	F
8/6/2022	F	O	F
8/7/2022	F	O	F
8/8/2022	F	O	F
8/9/2022	F	O	F
8/10/2022	F	O	F
8/11/2022	F	O	F
8/12/2022	F	O	F
8/13/2022	O	O	F
8/14/2022	O	O	F
8/15/2022	O	O	F
8/16/2022	O	O	F
8/17/2022	O	O	F
8/18/2022	O	O	F
8/19/2022	O	O	F
8/20/2022	O	O	F
8/21/2022	O	O	F
8/22/2022	O	O	F
8/23/2022	O	O	F
8/24/2022	O	O	F
8/25/2022	O	O	F
8/26/2022	O	O	F
8/27/2022	O	O	F
8/28/2022	O	O	F
8/29/2022	O	O	F
8/30/2022	O	O	F
8/31/2022	O	O	F
9/1/2022	O	O	F
9/2/2022	O	O	F
9/3/2022	O	O	F
9/4/2022	O	O	F
9/5/2022	O	O	F
9/6/2022	O	O	F
9/7/2022	O	O	F
9/8/2022	O	O	F
9/9/2022	O	O	F
9/10/2022	O	O	F
9/11/2022	O	O	F
9/12/2022	O	F	F
9/13/2022	O	F	F
9/14/2022	O	F	F
9/15/2022	O	F	F
9/16/2022	O	F	F

Appendix B. Nightly operational status of detectors during the Wheatridge Wind Energy Expansion Project, June 7 – November 8, 2022. Status equates to Operational (O), Failed (F), Not Deployed (i.e., not in the field).

Date	WR1g	WR2g	WR3g
9/17/2022	O	F	F
9/18/2022	O	F	F
9/19/2022	O	F	F
9/20/2022	O	O	O
9/21/2022	O	O	O
9/22/2022	O	O	O
9/23/2022	O	O	O
9/24/2022	O	O	O
9/25/2022	O	O	O
9/26/2022	O	O	O
9/27/2022	O	O	O
9/28/2022	O	O	O
9/29/2022	O	O	O
9/30/2022	O	O	O
10/1/2022	O	O	O
10/2/2022	O	O	O
10/3/2022	O	O	O
10/4/2022	O	O	O
10/5/2022	O	O	O
10/6/2022	O	O	O
10/7/2022	O	O	O
10/8/2022	O	O	O
10/9/2022	O	O	O
10/10/2022	O	O	O
10/11/2022	O	O	O
10/12/2022	O	O	O
10/13/2022	O	O	O
10/14/2022	O	O	O
10/15/2022	O	O	O
10/16/2022	O	O	O
10/17/2022	O	O	O
10/18/2022	O	O	O
10/19/2022	O	O	O
10/20/2022	O	O	O
10/21/2022	O	O	O
10/22/2022	O	O	O
10/23/2022	O	O	O
10/24/2022	O	O	O
10/25/2022	O	O	O
10/26/2022	O	O	ND
10/27/2022	O	O	ND
10/28/2022	O	O	ND
10/29/2022	O	O	ND
10/30/2022	O	O	ND
10/31/2022	O	O	ND

Appendix B. Nightly operational status of detectors during the Wheatridge Wind Energy Expansion Project, June 7 – November 8, 2022. Status equates to Operational (O), Failed (F), Not Deployed (i.e., not in the field).

Date	WR1g	WR2g	WR3g
11/1/2022	O	O	ND
11/2/2022	O	O	ND
11/3/2022	O	O	ND
11/4/2022	O	ND	ND
11/5/2022	O	ND	ND
11/6/2022	O	ND	ND
11/7/2022	O	ND	ND
11/8/2022	O	ND	ND

Appendix C. Studies with Publicly Available Bat Activity Data (Bat Passes per Detector-Night) from North American Wind Energy Facilities

Appendix C. Studies with publicly available bat activity data (bat passes per detector-night) from North American wind energy facilities.[1]

Study and Location	Study Citation
Alta Wind I, CA	Solick et al. 2010
Alta Wind II-V, CA	Solick et al. 2010
Blue Sky Green Field, WI	Gruver 2009
Buffalo Mountain, TN	Fiedler 2004
Buffalo Ridge, MN (Phase II/Lake Benton I, Phase III/Lake Benton II)	Johnson et al. 2004
Cedar Ridge, WI	BHE Environmental 2008
Dry Lake I, AZ	Thompson et al. 2011
Dry Lake II, AZ	Thompson and Bay 2012
Foote Creek Rim I, WY	Gruver 2002
Forward Energy Center, WI	Watt and Drake 2011
Mount Storm, WV	Young et al. 2009a, 2009b, 2010a, 2010b, 2011
Noble Clinton, NY	Reynolds 2010a
Noble Ellenburg, NY	Reynolds 2010b
Record Hill, ME	Stantec Consulting, Inc. (Stantec) 2008
Stetson Mountain I, ME	Stantec 2009
Summerview, AB	Baerwald 2008
Top of Iowa, IA	Jain 2005

[1] Note that most of this historic data was collected with AnaBat detectors (Titely, Scientific, Columbia, Missouri, and Queensland, Australia), which may not be directly comparable to data collected with SongMeter detectors (Wildlife Acoustics, Inc., Maynard, Massachusetts). Unlike AnaBat detectors, SongMeter SM3 detectors record full-spectrum data, which is likely to record more calls than a zero-cross AnaBat detector sampling the same airspace (see Solick et al. 2011, Adams et al. 2012).

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Avian Use Study

Wheatridge Wind Energy Project

Morrow and Umatilla Counties, Oregon

Final Report

April 19, 2022 – March 13, 2023



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WEST

EXECUTIVE SUMMARY

NextEra Energy Resources Development LLC contracted Western EcoSystems Technology, Inc. (WEST) to conduct a pre-construction avian use study at the Wheatridge Wind Energy Project (Project) in Morrow and Umatilla counties, Oregon. The principal objective of the study was to provide spatial and temporal information regarding use of the Project area, with a particular focus on eagles, other diurnal raptors, and species of concern (SOC). WEST conducted avian use surveys at the Project in all months between April 19, 2022, and March 13, 2023; however, survey effort was lower during the summer season compared to the other seasons because of land access issues resulting from landowner concerns over fire danger. In total, 363 large bird use surveys and 364 small bird use surveys were conducted across 37 survey points.

Overall, 25 unique large bird species and 27 unique small bird species were recorded during surveys. Large bird species richness was highest during spring (20 species) and lowest during fall and winter (12 species each), while small bird species richness was highest during fall (16 species) and lowest during winter (12 species).

Bald and golden eagles were documented during the 2022 – 2023 avian use surveys for the Project. Three bald eagle observations were recorded in spring and winter; however, all three observations were recorded at flight heights above the turbine risk cylinder resulting in zero recorded bald eagle minutes. Eight golden eagle observations were recorded during spring, fall, and winter; no golden eagles were observed in summer. Of the eight golden eagle observations, five were observed within the turbine risk cylinder for a total of 11 golden eagle minutes. Bald and golden eagle activity was only recorded in the southern half of the Project, south of Butter Creek.

Diurnal raptors were detected at nearly all survey locations and were observed year-round but showed seasonal shifts in species composition. Of 11 diurnal raptor species observed during surveys, red-tailed hawk, Swainson's hawk, and northern harrier accounted for 65% of observations, with northern harrier the most abundant raptor species observed in fall and winter, Swainson's hawk in spring, and red-tailed hawk in summer. Among the diurnal raptors observed during surveys, two (Swainson's hawk and ferruginous hawk) are considered Sensitive/Species of Greatest Conservation Need (SGCN) by the Oregon Department of Fish and Wildlife. In addition to the two diurnal raptors, six other large bird SGCN were observed during surveys or incidentally.

Three species (horned lark, European starling, and western meadowlark) accounted for 83% of all recorded small bird observations. Western meadowlark was the most abundant (199 groups/261 observations) of five small bird SGCN observed during surveys or incidentally; all four others were observed on fewer than five occasions.

The 2022 – 2023 avian use surveys provide initial insights into the spatial and temporal use of the Project by eagles and 13 state SGCN. A second year of large bird use surveys, initiated in April 2023 will provide additional data on eagles, other diurnal raptors, and other large bird SGCN.

STUDY PARTICIPANTS

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REPORT REFERENCE

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TABLE OF CONTENTS

INTRODUCTION 1
PROJECT AREA 1
METHODS 5
Study Design 5
Survey Methods 6
All Birds 6
Eagles 7
Incidental Observations 7
Data Management 9
Quality Assurance and Quality Control 9
Data Compilation and Storage 9
Statistical Analysis 9
Mean Use, Percent of Use, and Frequency of Occurrence 9
Flight Height 10
Spatial Variation 10
Eagles 10
RESULTS 10
Species of Concern 11
Eagles 11
Mean Use 11
Eagle Minutes 11
Eagle Flight Height 15
Spatial Variation 15
Federal- and State-protected Species 18
Other Species of Concern 18
Large Birds 20
Mean Use, Percent of Use, and Frequency of Occurrence 20
Large Bird Mean Flight Height 23
Spatial Variation 23
Mean Use by Point 23
Flight Paths 24
Small Birds 26
Mean Use, Percent of Use, and Frequency of Occurrence 26
Small Bird Mean Flight Height 26

Spatial Variation 27
Mean Use by Point 27
Incidental Observations 28
DISCUSSION 29
REFERENCES 30

LIST OF TABLES

Table 1. Land cover, coverage, and percent (%) composition within the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon. 3

Table 2. Summary of survey effort and species richness (species/plot[a]/survey[b]) by season and overall during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 11

Table 3. Bald eagle minutes and observations by month recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 12

Table 4. Bald eagle minutes and observations by season recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 12

Table 5. Golden eagle minutes and observations by month recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 13

Table 6. Golden eagle minutes and observations by season recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 13

Table 7. Flight height characteristics by large bird type[a] and raptor subtype during 60-minute use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 16

Table 8. Species of concern observed during and outside scheduled avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 19

Table 9. Mean use (number of birds/plot[a]/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each bird type and subtype by season during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 21

Table 10. Group and individual observation flight height characteristics by bird type[a] during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 27

Table 11. Species incidentally observed outside of the standardized avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 28

LIST OF FIGURES

Figure 1. Location of the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon. 2

Figure 2. Land cover at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon. 4

Figure 3. Avian use survey points and plots at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023....8

Figure 4. Golden eagle minutes per survey point within the risk cylinder (within 800 meters [m; 2,625 feet] of survey point and below 200 m [656 feet] above ground level) at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 14

Figure 5. Eagle flight paths recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 17

Figure 6a. Large bird mean use (# observations/800-m plot/60 minute survey) by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 22

Figure 6b. Large bird percent of use by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 22

Figure 6c. Large bird frequency of occurrence by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 23

Figure 7. Large bird mean use (# observations/plot/60-minute survey) by point by bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 24

Figure 8. Large bird flight paths at the paths recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 25

Figure 9. Small bird mean use (# observations/plot/10 minute survey) by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 26

Figure 10. Small bird mean use (observations/plot/10-minute survey) by survey point at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023. 28

LIST OF APPENDICES

Appendix A. All Birds Observed by Season at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, during Avian Use Surveys, April 19, 2022 – March 13, 2023.

Appendix B. Mean Use, Percent of Use, and Frequency of Occurrence for All Birds during Avian Use Surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Appendix C. Mean Use by Point for All Birds during Avian Use Surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

INTRODUCTION

NextEra Energy Resources Development LLC (NextEra) is proposing the development of the Wheatridge Wind Energy Project (Project) in Morrow and Umatilla counties, Oregon. To support development of the Project, NextEra contracted Western EcoSystems Technology, Inc. (WEST) to conduct a pre-construction avian use study for the Project. Study methodology was based upon the recommendations in the US Fish and Wildlife Service's (USFWS) 2012 *Land-Based Wind Energy Guidelines* (WEG), Appendix C(1)(a) of the 2013 USFWS *Eagle Conservation Plan Guidance* (ECPG), and the USFWS *Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests* (2016 Final Eagle Rule [81 Federal Register 91494 (December 16, 2016)]).

The objective of the avian use surveys was to document the species composition and spatial and temporal use patterns of large and small birds, with a particular focus on bald and golden eagles, other raptors, and species of concern (SOC). This report summarizes results of the 2022 – 2023 avian use surveys at the Project.

PROJECT AREA

The Project Area (Figure 1) used in this study (provided by NextEra in March 2022) encompasses approximately 18,263 hectares (45,128 acres) in Morrow and Umatilla counties, Oregon, approximately 16–32 kilometers (km; 10–20 miles [mi]) south of Hermiston, Oregon (Figure 1). The Project Area is located within the Level III Columbia Plateau Ecoregion, encompassing much of central and eastern Washington and north-central Oregon (US Environmental Protection Agency [USEPA] 2012). Within the larger Columbia Plateau ecoregion, the Project Area is located predominately within the central portion of the Level IV Umatilla Plateau Ecoregion, with the northern portion of the Project Area extending into the Level IV Pleistocene Lake Basins Ecoregion (USEPA 2012). The Umatilla Plateau Ecoregion is characterized by rolling, treeless hills with a basalt bedrock and loess soil deposits. Areas with thicker deposits of loess soils have been converted to dry land farming for winter wheat (*Triticum aestivum*), and irrigated areas support alfalfa (*Medicago sativa*) and/or barley (*Hordeum* spp.) crops. In uncultivated areas of higher elevation, moisture levels are generally high enough to support grasslands of bluebunch wheatgrass (*Pseudoroegneria spicata*) and Idaho fescue (*Festuca idahoensis*) without the associated sagebrush (*Artemisia* spp.) more common in the Pleistocene Lake Basins Ecoregion to the north.

Topography in the Project Area consists of rolling hills in the north with steeper canyons and defined ridgelines located in the southern half of the Project Area. Based on review of the 2019 National Land Cover Database, dominant land cover types within the Project Area are herbaceous vegetation, cultivated crops, and shrub/scrub, composing 71%, 19% and 7% of the Project Area's total acreage, respectively (Table 1, Figure 2). Land use in the Project Area includes cattle (*Bos taurus*) grazing and wheat production. The Project Area generally lacks exposed cliffs or large trees.

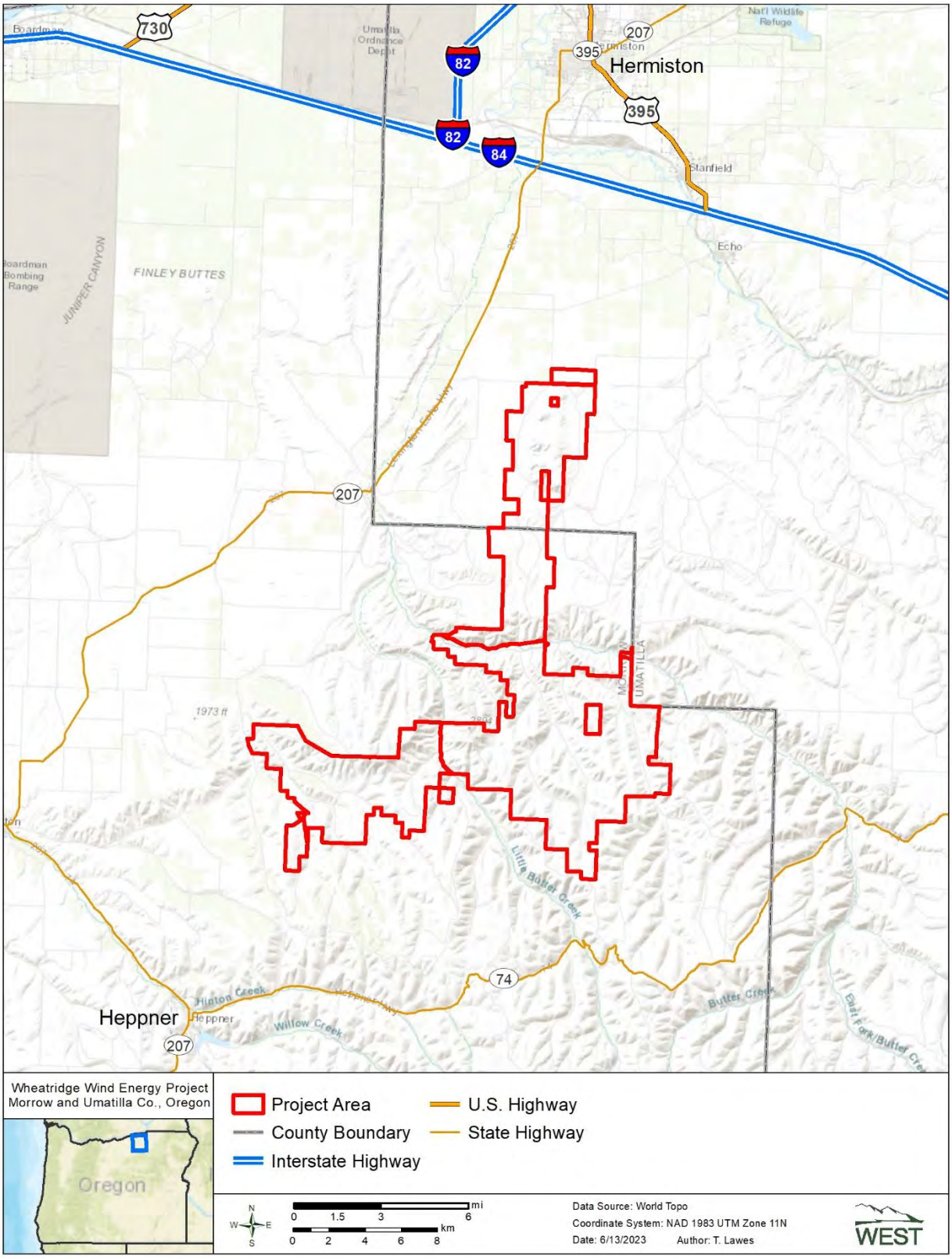

Figure 1. Location of the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon.

Table 1. Land cover, coverage, and percent (%) composition within the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon.

Land Cover Type	Area (acres)	Composition (%)
Herbaceous	32,159	71
Cultivated Crops	8,641	19
Shrub/Scrub	3,307	7
Developed	821	2
Emergent Herbaceous Wetlands	176	<1
Hay/Pasture	19	<1
Open Water	2	<1
Deciduous Forest	1	<1
Total	**45,128**	**100**

Source: National Land Cover Database 2019.

Sums can differ from values shown due to rounding.

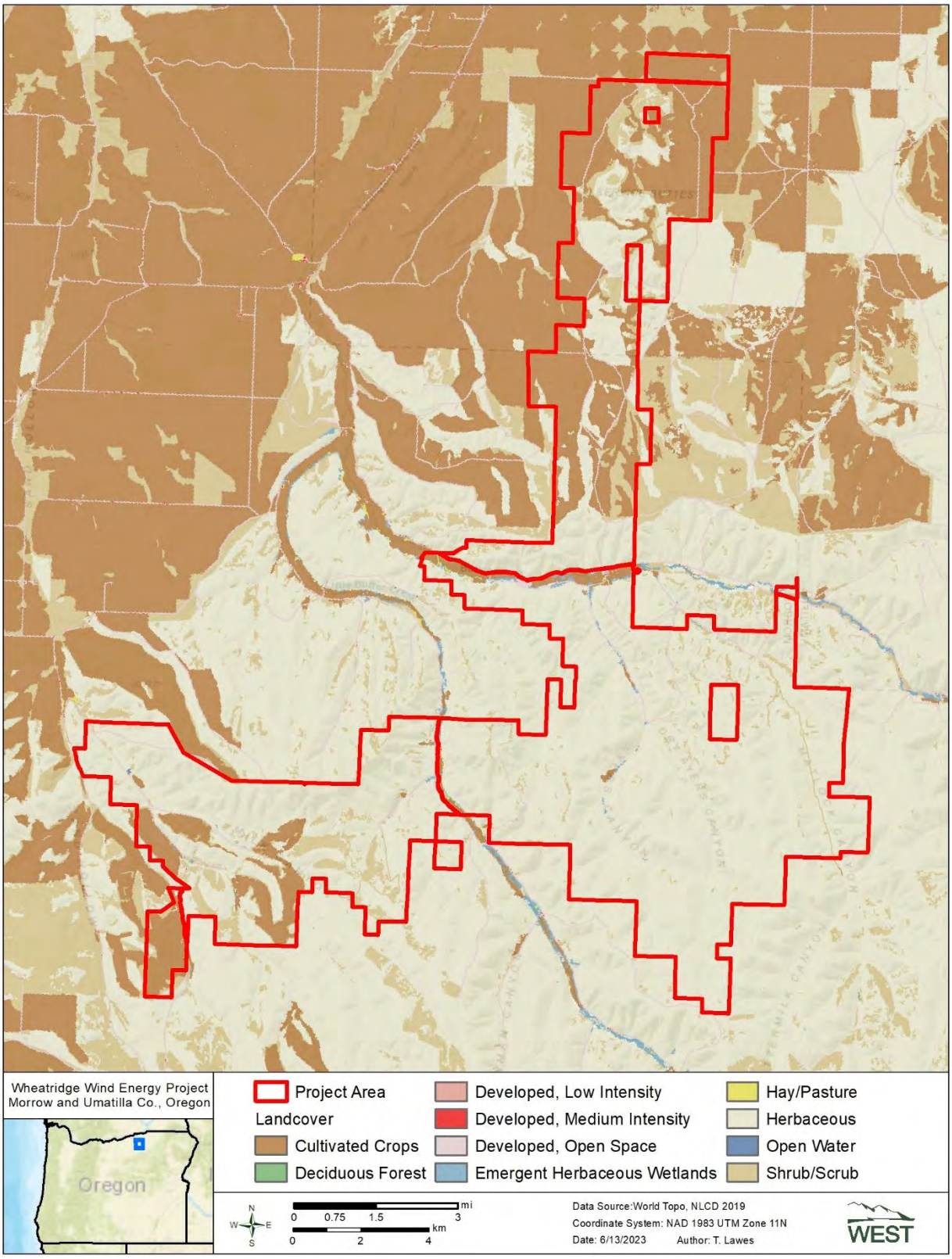

Figure 2. Land cover at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon.

METHODS

The study design and survey methodology primarily followed guidance in the WEG (USFWS 2012), ECPG (USFWS 2013) and 2016 Final Eagle Rule (USFWS 2016). The methods described below are common for all bird surveys, except as noted. Surveys consisted of counts of bird use and behavior following methods similar to Reynolds et al. 1980 and were designed to collect eagle data consistent with the 2016 Final Eagle Rule. Because of their regulatory status[1] and the proximity of the Project Area to eagle nesting habitat, eagles were a focal species for the study and are presented first in the results section.

In addition to bald and golden eagles, other SOC were documented. SOC were defined as: 1a) species listed as an endangered, threatened, or candidate species under the federal or state Endangered Species Act of 1973, 1b) species designated by law, regulation, or other formal process for protection and/or management by the relevant agency or other authority; or 1c) species that have been shown to be significantly adversely affected by wind energy development; and 2) determined to be possibly affected by the Project (USFWS 2012).

The Oregon Conservation Strategy (Oregon Department of Fish and Wildlife [ODFW] 2016) identifies a suite of Strategy Species which are considered Oregon's Species of Greatest Conservation Need (SGCN). These Strategy Species/SGCN are defined as having small or declining populations, are at risk, and/or are of management concern (ODFWS 2016). Most of these species are also listed as Sensitive under Oregon's Sensitive Species Rule (OAR 635-100-0040) by ODFW (ODFW 2021). Throughout this report, these species are generally referred to as SGCN for consistency. SGNC with the potential to occur within the Project Area included the American white pelican, Brewer's sparrow, chipping sparrow, common nighthawk, ferruginous hawk, flammulated owl (*Psiloscops flammeolus*), grasshopper sparrow, Lewis's woodpecker (*Melanerpes lewis*), loggerhead shrike, long-billed curlew, olive-sided flycatcher (*Contopus cooperi*), sage thrasher (*Oreoscoptes montanus*), sagebrush sparrow (*Artemisiospiza nevadensis*), sandhill crane, short-eared owl (*Asio flammeus*), Swainson's hawk, tricolored blackbird (*Agelaius tricolor*), western burrowing owl (*Athene cunicularia hypugaea*), and western meadowlark (Oregon Department of Fish and Wildlife [ODFW] 2021).

Large birds were defined as waterbirds, waterfowl, shorebirds, gulls/terns, diurnal raptors (i.e., kites, accipiters, buteos, eagles, falcons, northern harrier, and osprey [*Pandion haliaetus*]), owls, vultures, upland game birds, doves/pigeons, nightjar, and large corvids. Small birds were defined as cuckoos, swifts/hummingbirds, woodpeckers, kingfishers, small corvids, and passerines.

Study Design

NextEra initially provided thirty-six survey locations to WEST to consider for implementation of surveys. WEST assessed each of the 36 points provided and adjusted them as necessary to accommodate access and maximize viewsheds. Ultimately, 35 survey points were established to

[1] Bald and Golden Eagle Protection Act of 1940.

be spatially representative of the Project Area. Each survey point was centered in a circular plot with an 800-meter (m; 2,625-foot [ft]) radius for large birds and 100-m (328-ft) radius for small birds (Reynolds et al. 1980, USFWS 2013, USFWS 2016).

Given the shape the Project Area (a reversed L; Figure 3) a minimum convex polygon (MCP) established around the hazardous areas (i.e., rotor radius) of proposed turbine locations would have included an extensive area outside of the Project Area that was not under NextEra control (i.e., not leased). In addition, NextEra has avoided siting turbines along Little Butter Creek, resulting in a roughly 2-mi (3-km) separation of turbines in this area. Due to the shape of the Project Area and the gap along Little Butter Creek, WEST delineated two MCPs within the larger Project Area, one encompassing the southwestern turbine array and one encompassing the eastern turbine array as of May 2022. Survey coverage of these two MCPs was approximately 41% and 47%, exceeding the minimum 30% coverage identified in the ECPG and 2016 Final Eagle Rule.

Surveys at each plot were conducted (as possible) once per month during all seasons, from April 19, 2022 – March 13, 2023. Seasons were defined as spring (March 1 – May 31), summer (June 1 – August 31), fall (September 1 – November 30), and winter (December 1 – February 28), Surveys were conducted during daylight hours, and the order in which plots were surveyed was intentionally varied to cover all daylight hours during a season. Surveys were conducted under all weather conditions except when visibility was less than 800 m horizontally or 200 m (656 ft) vertically (USFWS 2016) or when access to survey locations was limited due to road conditions or fire hazard/landowner restrictions.

Survey Methods

All Birds

Surveys at each point were conducted for a period of 70 minutes (min), with only small birds recorded during the first 10 min of the survey period out to a 100-m radius, and only large birds (including eagles) recorded for the remaining 60 min of the survey period out to a 800-m radius. Observations of groups of birds (one or more birds) were recorded for each survey along with the date, start and end time, and weather (i.e., temperature, wind speed, wind direction, precipitation, and percent cloud cover). If during surveys, the biologist lost sight of a group for more than a minute, or if the same bird species returned to the survey plot during the survey period, but the biologist was unsure if it was the same group, a new observation was recorded. In addition to the above information, the following data also were recorded for each group of birds observed:

- Observation number
- Species (or best possible identification)
- Number of individuals
- Sex and age class (if possible)
- Distance from survey point to the nearest 5-m (16-ft) interval (first & closest)
- Flight height above ground level (AGL) to the nearest 5-m interval (first, lowest, and highest)

- Flight direction (first observed)
- Habitat
- Activity (e.g., flying, perched)
- Observation type (visual or aural)
- Flight paths and perch locations of eagles and other SOC

Eagles

Data were collected based on the recommendations in the ECPG and the 2016 Final Eagle Rule if a golden, bald, or unidentified eagle was observed during the survey period. Biologists recorded eagle behavior (i.e., flight height, distance from observer, activity) each minute, at the top of the minute, to provide an instantaneous count for every eagle observed. Whether the eagle was flying at or below 200 m AGL within 800 m of the survey location at any time during each observation minute was also recorded. Age class (juvenile [1st year], immature or sub-adult [2nd to 4th year], or adult [5th year and older]) also was recorded.

Incidental Observations

Incidental observations were wildlife seen outside the standardized avian use surveys but within the Project Area, and were focused on federal- or state-protected species, state SGCN, unusually large congregations of individuals, species not yet recorded during surveys, or eagle attractants (e.g., areas with a concentration of carrion or prey). Data recorded for incidentally observed species were similar to data recorded during scheduled surveys.

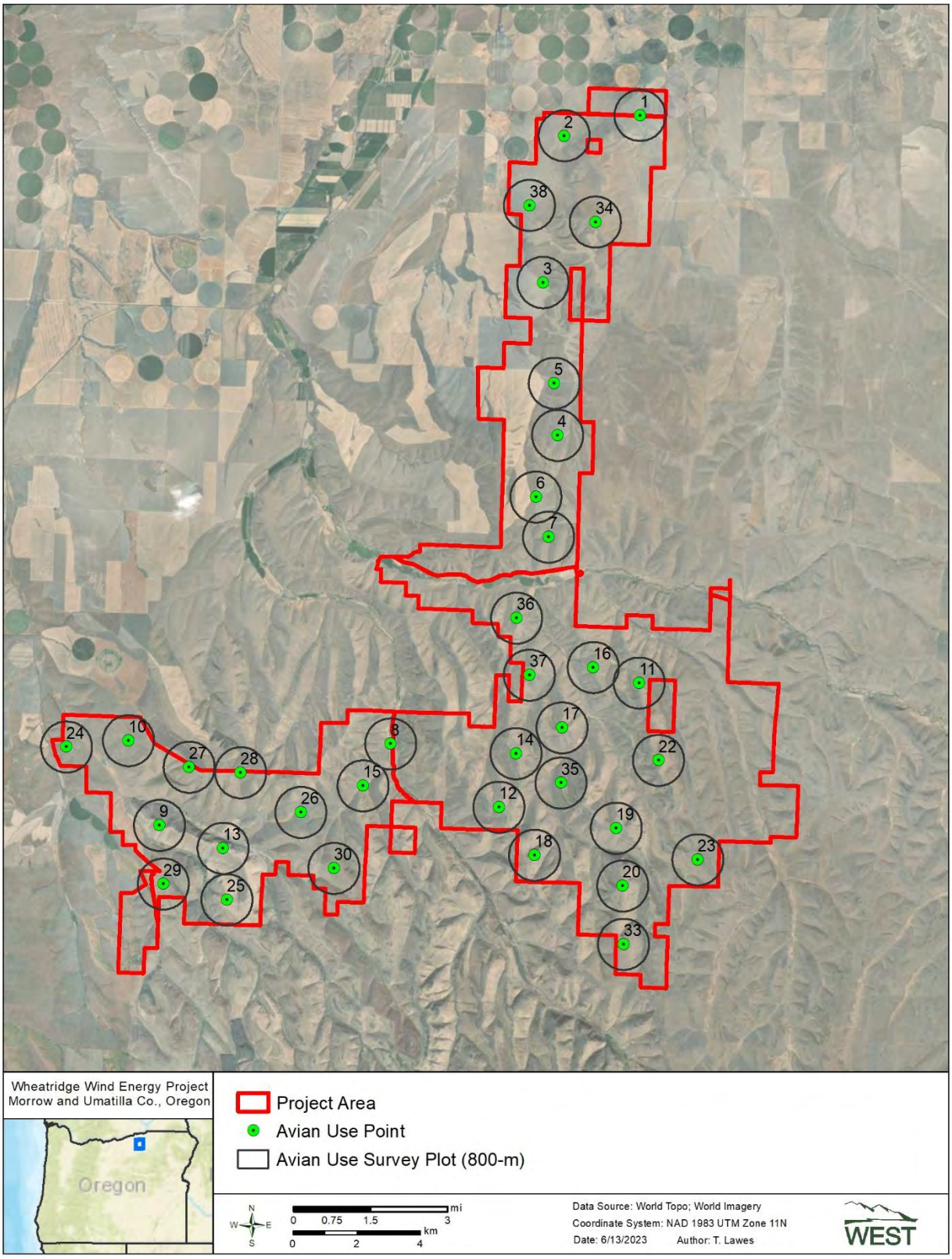

Figure 3. Avian use survey points and plots at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Data Management

Quality Assurance and Quality Control

WEST implemented quality assurance and quality control (QA/QC) measures at all stages of the study, including in the field, during data entry and analysis, and report writing. Following surveys, biologists were responsible for inspecting data forms for completeness, accuracy, and legibility. If errors or anomalies were found within the data, follow-up measures were implemented including discussions and review of field data with field technicians and/or Project Managers. If any errors, omissions, or problems were identified in later stages of analysis, they were traced back to the raw data forms where appropriate changes and measures were implemented, no matter what stage of analysis. Multiple reviews were conducted as QA/QC measures.

Data Compilation and Storage

A Microsoft® SQL Server database was specifically developed to store, organize, and retrieve survey data. Project data were keyed into the electronic database using a pre-defined format to facilitate subsequent QA/QC and data analysis. WEST retained all data forms and electronic data files for reference.

Statistical Analysis

A *visit* was defined as one sequential survey of the survey plots within the Project Area and could occur across multiple dates but could not overlap with another visit, and had to be completed in a single season (e.g., spring). If unforeseen conditions prevented all plots from being surveyed during a visit, then a visit might not have constituted a complete survey of all plots.

A *survey* was defined as a single 10-min or 60-min count of birds. In some cases, a count of bird observations may represent repeated observations of the same individual. Only observations within the defined (100-m or 800-m) survey plot were included for statistical analysis.

Species richness was defined as a count of species observed within a survey plot during avian use surveys. Groups of unidentified species were included in species richness if a species from that group was not otherwise recorded.

Mean Use, Percent of Use, and Frequency of Occurrence

Mean use is the average number of birds observed per plot per survey for small or large birds. Small bird use (per 100-m radius plot per 10-min survey) and large bird use (per 800-m radius plot per 60-min survey) was calculated by: 1) summing birds per plot per visit, 2) averaging number of birds over plots within a visit, and 3) averaging number of birds across visits within a season. Overall mean use was calculated as a weighted average of seasonal values based on the number of days in each season. *Percent of use* was calculated as the percentage of use attributable to a particular bird type or species. *Frequency of occurrence* was calculated as the percent of surveys in which a particular bird type or species was observed.

Mean use and frequency of occurrence describe different aspects of relative abundance, in that mean use is based on the number of birds (i.e., large groups can produce high estimates), whereas

frequency of occurrence is based on the number of groups (i.e., it is not influenced by group size). Qualitative comparisons were made with these metrics among bird types, seasons, and survey points to help illustrate temporal and spatial avian use of the Project Area. For large birds, the top five bird groups were depicted graphically to show the dominant patterns in mean use, percent of use, and frequency of occurrence. For small birds, the top three bird groups were depicted graphically to show the dominant patterns in mean use, percent of use, and frequency of occurrence.

Flight Height

Flight heights are important metrics to assess relative potential exposure to turbine blades and were used to calculate the percentage of large birds and small birds observed flying within the rotor-swept height (RSH) of proposed turbines. A RSH of 25–153 m (82–502 ft) AGL was assumed for the purpose of the analysis. Flight height recorded during the initial observation was used to calculate the percentage of birds flying within the RSH and mean flight height.

Spatial Variation

Mean use was calculated by survey point for large birds and small birds to make spatial comparisons among the survey points. Additionally, flight paths and perched locations of eagles and other SOC were mapped during large bird use surveys to qualitatively show potential areas of concentration of flight paths and consistent flight patterns within the Project Area compared to Project Area characteristics (e.g., topographic features).

Eagles

Eagle minutes were defined as the number of minutes an eagle was observed in flight within the risk cylinder during a large bird survey. *The risk cylinder* was defined as the area within 800 m of the survey point up to 200 m AGL. *Total minutes* were defined as the amount of time eagles were observed inside and outside the risk cylinder, including perched birds.

Eagle observations during surveys were summarized to provide flight heights (see *Flight Height*) and flight path maps (see *Spatial Use*). Data were collected during each minute eagles were observed within the risk cylinder to count eagle minutes and the time eagles were observed inside and outside the risk cylinder to count total minutes.

The eagle minutes per observation hour were reported by survey plot and month to enable spatial and temporal assessments of eagle minutes recorded in the Project Area. The perch locations and flight paths of all eagles were mapped to qualitatively assess areas of eagle use within the Project Area.

RESULTS

Three visits were made during each season of the April 2022 – March 2023 study resulting in 363 avian use surveys for large birds and 364 for small birds. All large bird surveys were conducted for 60 minutes and all small bird surveys were conducted for 10 minutes, with the exception of one small bird survey that lasted only four minutes for an unknown reason. Schedules were originally planned to provide near equal number of surveys during each season; however, landowner access restrictions during peak fire season resulted in about a 50% reduction in the number of summer surveys (Table 2).

Seasonally, large bird species richness was highest during spring (20 species) and lower during the summer (14 species) and fall and winter (12 species each, Table 2; Appendix A1). For small birds, species richness was higher during the fall (16 species), spring and summer (15 species each), and lowest in the winter (12 species; Table 2; Appendix A2). However, given the reduced number of surveys in the summer, species richness during this season could be underrepresented. Overall, 25 unique large bird species and 27 unique small bird species were recorded (Table 2; Appendix A).

Supplemental appendices, which present species-level detail on the following: scientific names and numbers of groups and observations seen during surveys but not limited to viewshed (Appendices A1 and A2), avian use, percent of use, and frequency of occurrence within the survey plot by season (Appendices B1 and B2), and mean use by survey point (Appendix C).

Table 2. Summary of survey effort and species richness (species/plot[a]/survey[b]) by season and overall during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

		# Surveys Conducted	Species Richness	
Season	**# Visits**	**Large Birds/Small Birds**	**Large Birds**	**Small Birds**
Spring	3	103/104	20	15
Summer	3	50/50	14	15
Fall	3	105/105	12	16
Winter	3	105/105	12	12
Overall	**12**	**363/364**	**25**	**27**

Species richness was defined as a count of species observed within a survey plot during avian use surveys. Groups of unidentified species were included in species richness if a species from that group was not otherwise recorded.

a. 800-meter (m; 2,625-foot [ft]) radius plot for large birds, 100-m (328-ft) radius plot for small birds.

b. 60-minute survey time for large birds, 10-minute survey time for small birds.

Species of Concern

Eagles

Mean Use

Bald eagle use (observations/800-m plot/60-min survey) was recorded only during summer and fall (0.01 in each season; Appendix B1). Annual bald eagle mean use was less than 0.01. Golden eagle use was recorded in spring (0.05), fall (0.02), and winter (0.01); no golden eagle use was recorded in summer (Appendix B1). Annual golden eagle mean use was 0.2.

Eagle Minutes

From April 19, 2022 – March 13, 2023, 363 observation hours were recorded during large bird use surveys. No bald eagles were observed within the risk cylinder during these surveys, but surveyors did record three bald eagle observations flying outside of the risk cylinder for a total of eight minutes (Tables 3 and 4). Seasonally, two of the bald eagle observations were recorded in the spring (March and May) and one in the winter (February; Table 4).

During the 363 hours of large bird use surveys, eight golden eagle observations were recorded for a total of 46 minutes (Tables 5 and 6). Five of the eight golden eagles were observed within the risk

cylinder, totaling 11 eagle minutes (Tables 5 and 6). Golden eagle minutes per survey hour ranged from zero to four minutes across all months (Table 5). Golden eagle minutes at the Project Area were greatest in the months of April and December (four eagle minutes each), followed by March (two eagle minutes), and May (one eagle minute); no golden eagle minutes were recorded in the remaining months (Table 5). Seasonally, golden eagle minutes per survey hour ranged from 0.04 min/survey hour (winter) to 0.07 min/survey hour (spring), with no golden eagle minutes recorded during summer and fall (Table 6). Spatially, all eagle minutes were recorded at five points in the southern part of the Project Area: Point 37 (four eagle minutes), points 16, 26, and 27 (two eagle minutes each), and Point 13 (one eagle minute; Figure 4).

Table 3. Bald eagle minutes and observations by month recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Minutes[a]		Observations[b]		Survey	Eagle Minutes
Month	Within Risk Cylinder[c]	Total	Within Risk Cylinder	Total	Hours	per Survey Hour
April 2022	0	0	0	0	34	0
May 2022	0	1	0	1	34	0
June 2022	0	0	0	0	24	0
July 2022	0	0	0	0	13	0
August 2022	0	0	0	0	13	0
September 2022	0	0	0	0	35	0
October 2022	0	0	0	0	35	0
November 2022	0	0	0	0	35	0
December 2022	0	0	0	0	35	0
January 2023	0	0	0	0	35	0
February 2023	0	2	0	1	35	0
March 2023	0	5	0	1	35	0
Total	**0**	**8**	**0**	**3**	**363**	**0**

a. Eagle minutes= minutes of eagles within the risk cylinder; total=minutes inside and outside the risk cylinder.

b. Eagle observations within the risk cylinder; total = observations inside and outside the risk cylinder.

c. Risk cylinder is the area within 800 meters (m; 2,625 feet [ft]) of the survey point and below 200 m (656 ft) AGL during the 60-min survey period.

Table 4. Bald eagle minutes and observations by season recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Minutes[a]		Observations[b]		Survey	Eagle Minutes
Season	Within Risk Cylinder[c]	Total	Within Risk Cylinder	Total	Hours	per Survey Hour
Spring	0	6	0	2	103	0
Summer	0	0	0	0	50	0
Fall	0	0	0	0	105	0
Winter	0	2	0	1	105	0
Total	**0**	**8**	**0**	**3**	**363**	0

a. Eagle minutes= minutes of eagles within the risk cylinder; total=minutes inside and outside the risk cylinder.

b. Eagle observations within the risk cylinder; total = observations inside and outside the risk cylinder.

c. Risk cylinder is the area within 800 meters (m; 2,625 feet [ft]) of the survey point and below 200 m (656 ft) AGL during the 60-min survey period.

Table 5. Golden eagle minutes and observations by month recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Minutes[a]		Observations[b]		Survey	Eagle Minutes
Month	Within Risk Cylinder[c]	Total	Within Risk Cylinder	Total	Hours	per Survey Hour
April 2022	4	27	2	3	34	0.1176
May 2022	1	3	1	1	34	0.0294
June 2022	0	0	0	0	24	0
July 2022	0	0	0	0	13	0
August 2022	0	0	0	0	13	0
September 2022	0	0	0	0	35	0
October 2022	0	0	0	0	35	0
November 2022	0	7	0	2	35	0
December 2022	4	4	1	1	35	0.1143
January 2023	0	0	0	0	35	0
February 2023	0	0	0	0	35	0
March 2023	2	5	1	1	35	0.0571
Total	**11**	**46**	**5**	**8**	**363**	**0.0303**

a. Eagle minutes= minutes of eagles within the risk cylinder; total=minutes inside and outside the risk cylinder.

b. Eagle observations within the risk cylinder; total = observations inside and outside the risk cylinder.

c. Risk cylinder is the area within 800 meters (m; 2,625 feet [ft]) of the survey point and below 200 m (656 ft) AGL during the 60-min survey period.

Table 6. Golden eagle minutes and observations by season recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Minutes[a]		Observations[b]		Survey	Eagle minutes
Season	Within Risk Cylinder[c]	Total	Within Risk Cylinder	Total	Hours	per survey hour
Spring	7	35	4	5	103	0.0680
Summer	0	0	0	0	50	0
Fall	0	7	0	2	105	0
Winter	4	4	1	1	105	0.0381
Total	**11**	**46**	**5**	**8**	**363**	**0.0303**

a. Eagle minutes= minutes of eagles within the risk cylinder; total=minutes inside and outside the risk cylinder.

b. Eagle observations within the risk cylinder; total = observations inside and outside the risk cylinder.

c. Risk cylinder is the area within 800 meters (m; 2,625 feet [ft]) of the survey point and below 200 m (656 ft) AGL during the 60-min survey period.

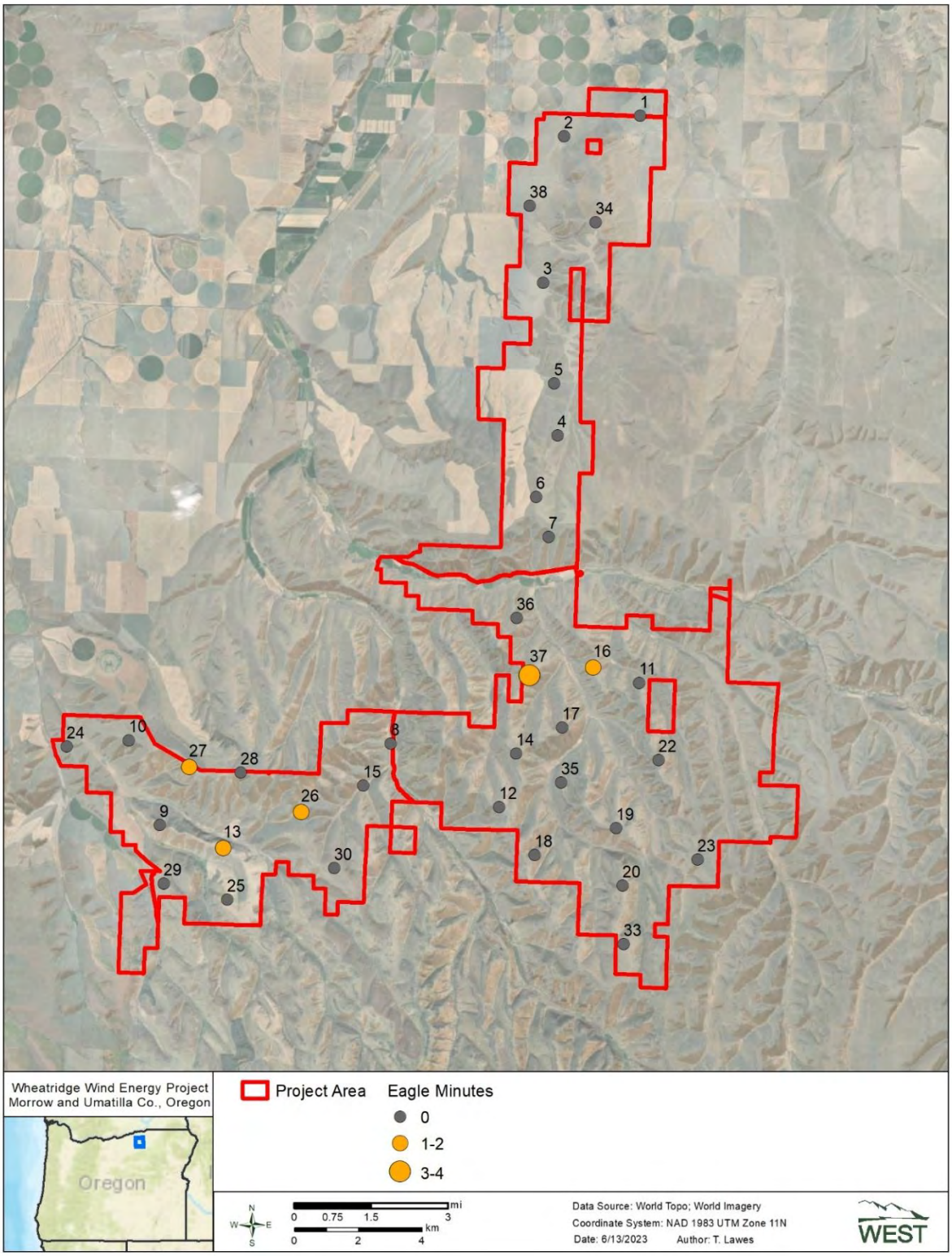

Figure 4. Golden eagle minutes per survey point within the risk cylinder (within 800 meters [m; 2,625 feet] of survey point and below 200 m [656 feet] above ground level) at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Eagle Flight Height

Eagle flights were recorded most frequently (70%) above the RSH, with fewer flights within the RSH (25–153 m AGL) and below the RSH zone (Table 7). The mean flight height of bald eagles was 500 m (1,640 ft) AGL; the mean flight height of golden eagles was 265 m (869 ft) AGL; and the mean flight height of all eagles was 312 m (1,024 ft) AGL.

Spatial Variation

Mean Use by Point

Mean eagle use (birds/60-min survey) ranged from zero to 0.20 among points and was greatest in the southern portion of the Project Area (Appendix C1). The highest mean eagle use occurred at survey Point 22 (0.20) and Point 26 (0.17). Point 22 was located on a ridgeline above Dry Ayers Canyon and Point 26 was located on a ridgeline above Milk Canyon (Figure 5). These two canyons and ridge complexes appeared to be the areas with the highest concentration of eagle use within the Project Area during the first year of avian use surveys.

Flight Paths

The flight paths of eagles observed at the Project Area were mapped, and similar to the mean use by survey point, eagle flight paths were all located within the southern portion of the Project Area (Figure 5). Eagle flight paths were also more concentrated at survey points located along ridges proximal to Dry Ayers Canyon and Milk Canyon (Figure 5).

Table 7. Flight height characteristics by large bird type[a] and raptor subtype during 60-minute use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

					% within Flight height Categories		
Bird Type	**# Groups Flying**	**# Obs Flying**	**% Obs Flying**	**Mean Flight Height (m)**	**<25 m**	**25–153 m[b]**	**>153 m**
Waterbirds	**12**	**564**	**97.6**	**817**	**0**	**0**	**100**
Waterfowl	**7**	**54**	**96.4**	**364**	**5.6**	**59.3**	**35.2**
Shorebirds	**19**	**38**	**74.5**	**36**	**34.2**	**65.8**	**0**
Diurnal Raptors	**167**	**178**	**92.2**	**121**	**27.5**	**49.4**	**23.0**
Accipiters	*5*	*5*	*71.4*	*105*	*0*	*60.0*	*40.0*
Buteos	*93*	*102*	*93.6*	*99*	*20.6*	*64.7*	*14.7*
Northern Harrier	*43*	*43*	*95.6*	*152*	*39.5*	*23.3*	*37.2*
Eagles	*10*	*10*	*100*	*312*	*10.0*	*20.0*	*70.0*
Falcons	*15*	*16*	*84.2*	*43*	*62.5*	*31.3*	*6.3*
Other Raptors	*1*	*2*	*66.7*	*150*	*0*	*100*	*0*
Upland Game Birds	**3**	**18**	**34.0**	**1**	**100**	**0**	**0**
Doves/Pigeons	**2**	**4**	**57.1**	**19**	**25.0**	**75.0**	**0**
Large Corvids	**163**	**395**	**72.9**	**201**	**35.4**	**37.7**	**26.8**
Nightjars	**9**	**21**	**95.5**	**38**	**52.4**	**47.6**	**0**
Unidentified Birds	**1**	**1**	**50.0**	**5**	**100**	**0**	**0**
Large Birds Overall	**383**	**1,273**	**84.6**	**173**	**18.5**	**24.1**	**57.3**

[a] 800-meter (m; 2,625-foot [ft]) radius plot for large birds.

[b] The assumed rotor-swept height for potential collision with a turbine blade, or 25–153 m (82–502 ft) above ground level.

Zeroes and NA values indicate that the species was observed but was not flying.

obs = observations; m = meter.

All metrics are developed based on First Activity and First Flight Height.

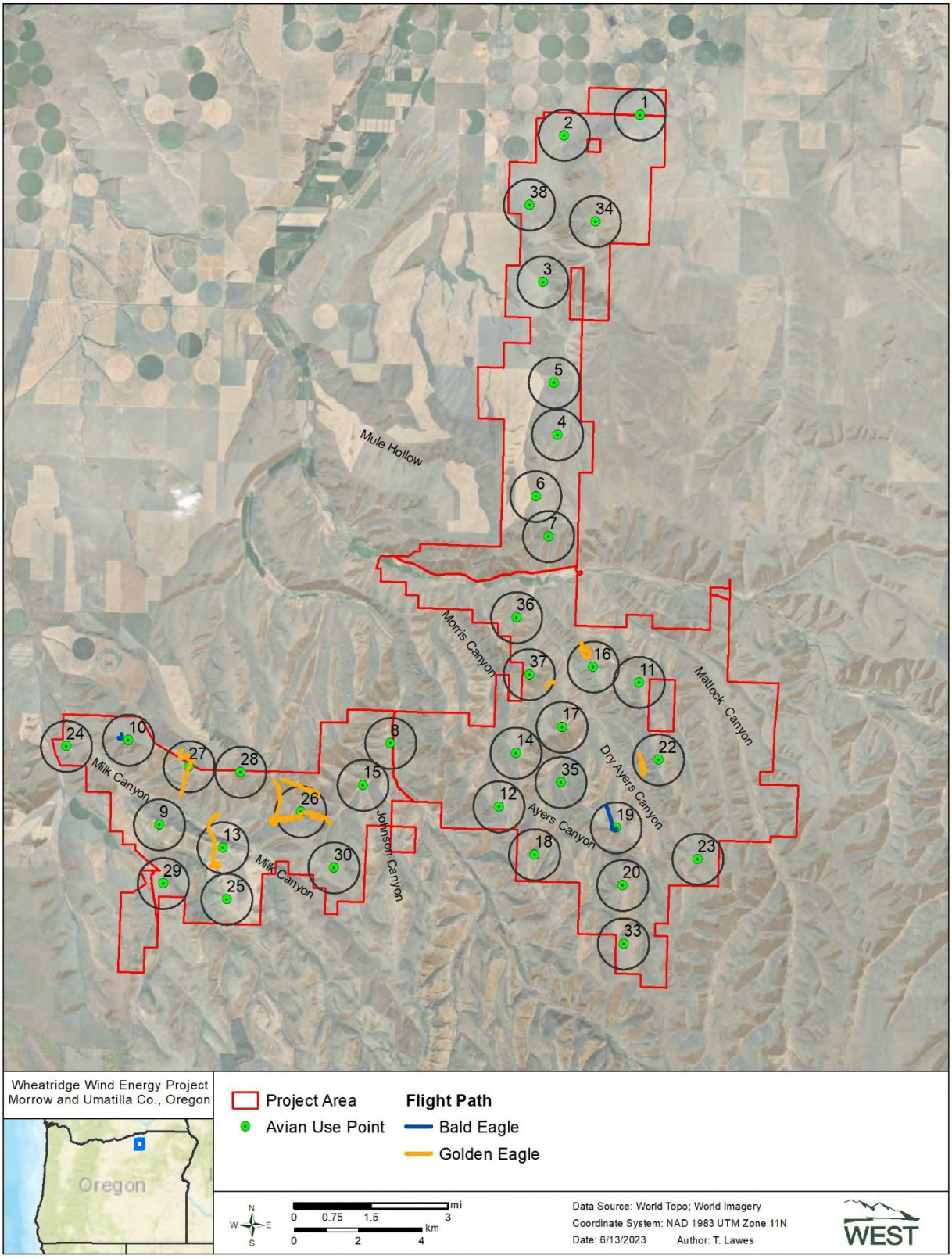

Figure 5. Eagle flight paths recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Federal- and State-protected Species

No federally threatened or endangered species were observed during the study period. Bald and golden eagles were observed during the study period, both of which are protected under the Bald and Golden Eagle Protection Act (1940; Table 8). From April 19, 2022 – March 13, 2023, there were five bald eagle observations (three observations during surveys and two incidental observations) and 10 golden eagle observations (eight observations during surveys and two incidental observations; Table 8)

Other Species of Concern

In addition to the bald and golden eagles, 13 SGCN were recorded within the Project Area during the 2022 – 2023 avian use study (Table 8; ODFW 2021). Two SGCN, Sandhill crane (578 observations) and western meadowlark (261 observations), accounted for 82% of the 1,029 observations of SGCN, with long-billed curlew (6% of observations) and Swainson's hawk (5%) accounting for another 11% of SGCN observation (Table 8).

Table 8. Species of concern observed during and outside scheduled avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

			Surveys		Incidental		Total	
Species	**Scientific Name**	**Status**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
American white pelican	*Pelecanus erythrorhynchos*	SGCN	1	2	0	0	1	2
bald eagle	*Haliaeetus leucocephalus*	BGEPA	3	3	2	2	5	5
Brewer's sparrow	*Spizella breweri*	SGCN	2	19	0	0	2	19
burrowing owl	*Athene cunicularia*	SGCN	0	0	3	3	3	3
chipping sparrow	*Spizella passerina*	SGCN	1	1	0	0	1	1
common nighthawk	*Chordeiles minor*	SGCN	10	22	0	0	10	22
ferruginous hawk	*Buteo regalis*	SGCN	8	8	0	0	8	8
golden eagle	*Aquila chrysaetos*	BGEPA	8	8	2	2	10	10
grasshopper sparrow	*Ammodramus savannarum*	SGCN	3	3	1	1	4	4
loggerhead shrike	*Lanius ludovicianus*	SGCN	1	1	0	0	1	1
long-billed curlew	*Numenius americanus*	SGCN	27	51	8	11	35	62
sandhill crane	*Antigone canadensis*	SGCN	15	578	0	0	15	578
short-eared owl	*Asio flammeus*	SGCN	0	0	1	2	1	2
Swainson's hawk	*Buteo swainsoni*	SGCN	31	44	5	7	36	51
western meadowlark	*Sturnella neglecta*	SGCN	195	257	4	4	199	261
Total	**15 species**		**305**	**997**	**26**	**32**	**331**	**1,029**

SGCN = Species of Greatest Conservation Need (Oregon Department of Fish and Wildlife 2021); BGEPA = Bald and Golden Eagle Protection Act of 1940; grps = groups; obs = observations.

Large Birds

Twenty-five species of large birds were documented within the Project Area during 363 hours of surveys from April 19, 2022 – March 13, 2023 (Table 2). Of the 25 species, 11 were diurnal raptors (including bald and golden eagles), four were upland gamebirds, three were waterfowl, two were waterbirds, two were doves/pigeons, two were large corvids, one was a shorebird, and one was a nightjar (Appendix A1).

Mean Use, Percent of Use, and Frequency of Occurrence

Mean use, percent of use, and frequency of occurrence were calculated by season for large bird types (Table 9, Figures 6a, 6b, and 6c) and species (Appendix B1). Large bird mean use (observations/800-m plot/60-min survey) ranged from 1.62 to 7.19 among seasons and was highest during fall (7.19), followed by spring (3.83), summer (3.38), and winter (1.62). Large bird mean use was 4.01 (Appendix B1).

Waterbirds composed the majority of large bird use during fall (5.50). Large corvids composed the majority of use during spring (1.81), summer (1.88), and winter (1.06). Mean use by diurnal raptors was greatest in summer (0.97) and lowest in the fall (0.22). Mean use by waterbirds was greatest in the fall (5.50) and absent during all other seasons. Mean use by waterfowl was greatest in the spring (0.45) and lowest in the summer (0.01; Table 9).

Waterbirds, represented by 15 groups of sandhill crane, accounted for the majority of large bird observations during fall (76.6% of total use), but were not observed during the other seasons (Table 9). Large corvids accounted for the majority of observations during spring (47.3%), summer (55.8%), and winter (65.3%).

Large corvids were the most frequently observed group during the summer (51.4%), fall (59.0%), and winter (51.4%), while diurnal raptors were the most frequently observed group in the spring (54.3%) and second most frequently observed group in summer (48.8%), fall (15.2%), and winter (21.0%; Table 9).

Table 9. Mean use (number of birds/plot[a]/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each bird type and subtype by season during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Mean Use				% of Use				% Frequency			
Type/Subtype	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Waterbirds	**0**	**0**	**5.50**	**0**	**0**	**0**	**76.6**	**0**	**0**	**0**	**9.5**	**0**
Waterfowl	**0.45**	**0.01**	**0.06**	**0.03**	**11.8**	**0.4**	**0.8**	**1.8**	**3.9**	**1.4**	**1.9**	**1.9**
Shorebirds	**0.45**	**0.07**	**0**	**0**	**11.8**	**2.1**	**0**	**0**	**15.7**	**4.2**	**0**	**0**
Diurnal Raptors	**0.86**	**0.97**	**0.22**	**0.27**	**22.5**	**28.8**	**3.0**	**16.5**	**43.9**	**48.8**	**15.2**	**21.0**
Accipiters	*0.02*	*0.05*	*0.02*	*0.01*	*0.5*	*1.5*	*0.3*	*0.6*	*2.0*	*2.6*	*1.9*	*1.0*
Buteos	*0.58*	*0.56*	*0.05*	*0.12*	*15.1*	*16.7*	*0.7*	*7.6*	*33.3*	*34.2*	*3.8*	*9.5*
Northern Harrier	*0.08*	*0.23*	*0.12*	*0.11*	*2.0*	*6.7*	*1.7*	*7.1*	*6.8*	*16.0*	*8.6*	*9.5*
Eagles	*0.06*	*0*	*0.02*	*0.02*	*1.5*	*0*	*0.3*	*1.2*	*4.8*	*0*	*1.0*	*1.9*
Falcons	*0.13*	*0.08*	*0.01*	*0*	*3.3*	*2.4*	*0.1*	*0*	*9.8*	*6.7*	*1.0*	*0*
Other Raptors	*0*	*0.05*	*0*	*0*	*0*	*1.6*	*0*	*0*	*0*	*4.0*	*0*	*0*
Upland Game Birds	**0.23**	**0.03**	**0.02**	**0.25**	**5.9**	**0.8**	**0.3**	**15.3**	**4.9**	**2.8**	**1.9**	**3.8**
Doves/Pigeons	**0.03**	**0.10**	**0**	**0**	**0.8**	**3.0**	**0**	**0**	**1.0**	**5.1**	**0**	**0**
Large Corvids	**1.81**	**1.88**	**1.39**	**1.06**	**47.3**	**55.8**	**19.3**	**65.3**	**40.9**	**51.4**	**59.0**	**51.4**
Nightjars	**0**	**0.31**	**0**	**0**	**0**	**9.1**	**0**	**0**	**0**	**8.3**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0.02**	**0**	**0**	**0**	**1.2**	**0**	**0**	**0**	**1.0**
Large Birds Overall	**3.83**	**3.38**	**7.19**	**1.62**	**100**	**100**	**100**	**100**	**NA**	**NA**	**NA**	**NA**

[a] 800-meter (2,625-foot) radius plot for large birds.

Sums of values may not equal totals shown due to rounding.

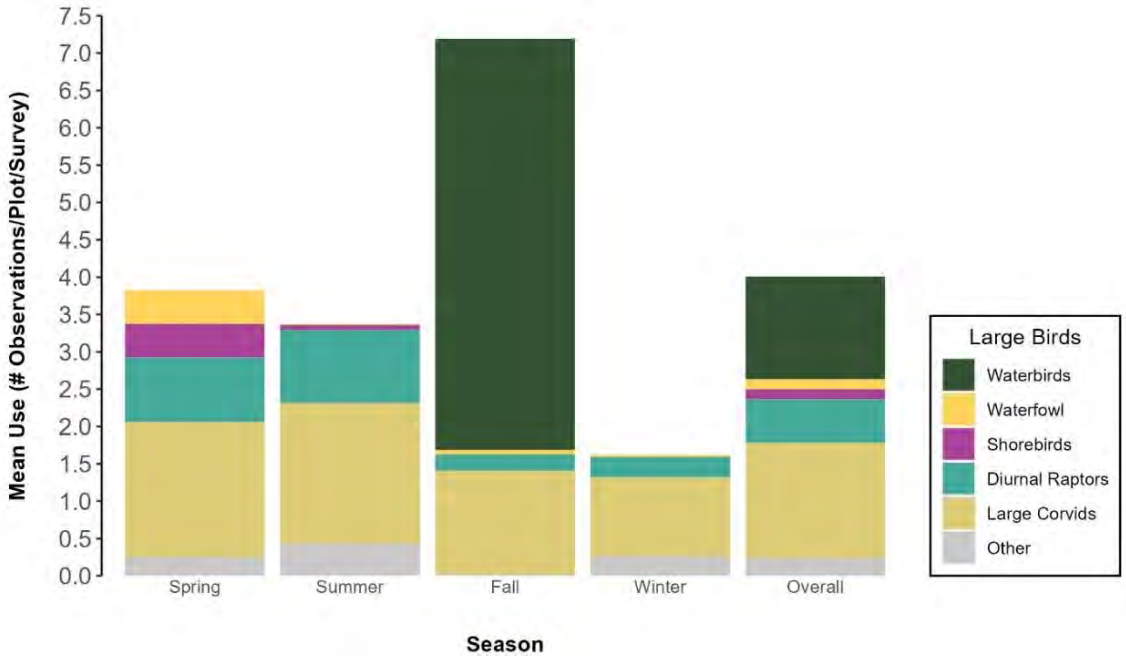

Figure 6a. Large bird mean use (# observations/800-m plot/60 minute survey) by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

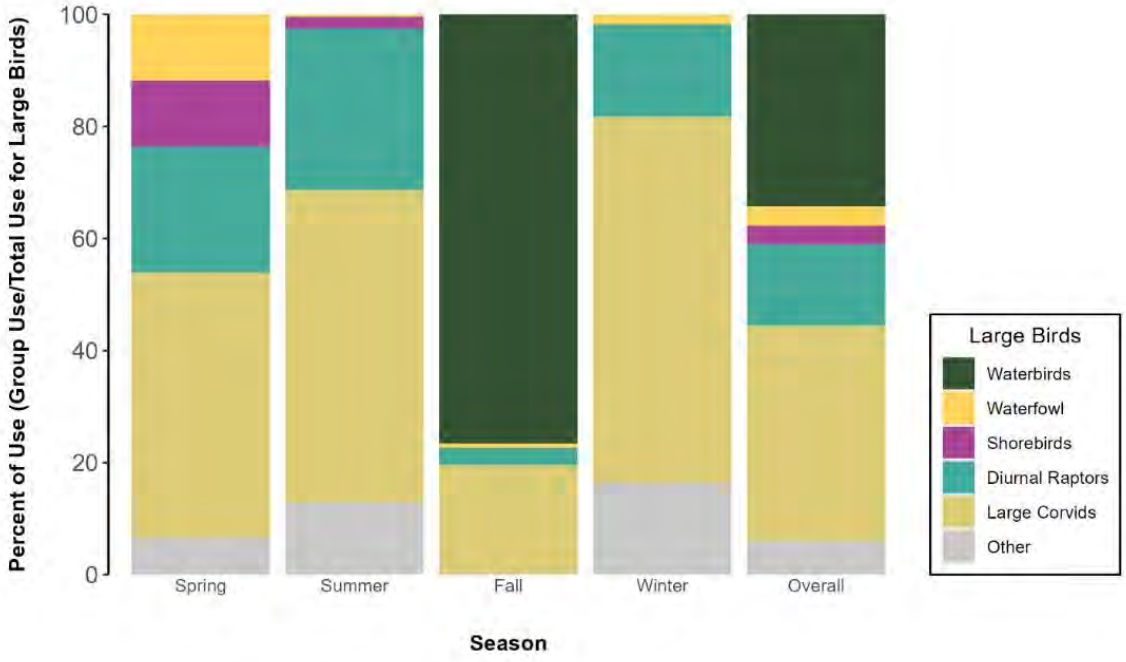

Figure 6b. Large bird percent of use by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

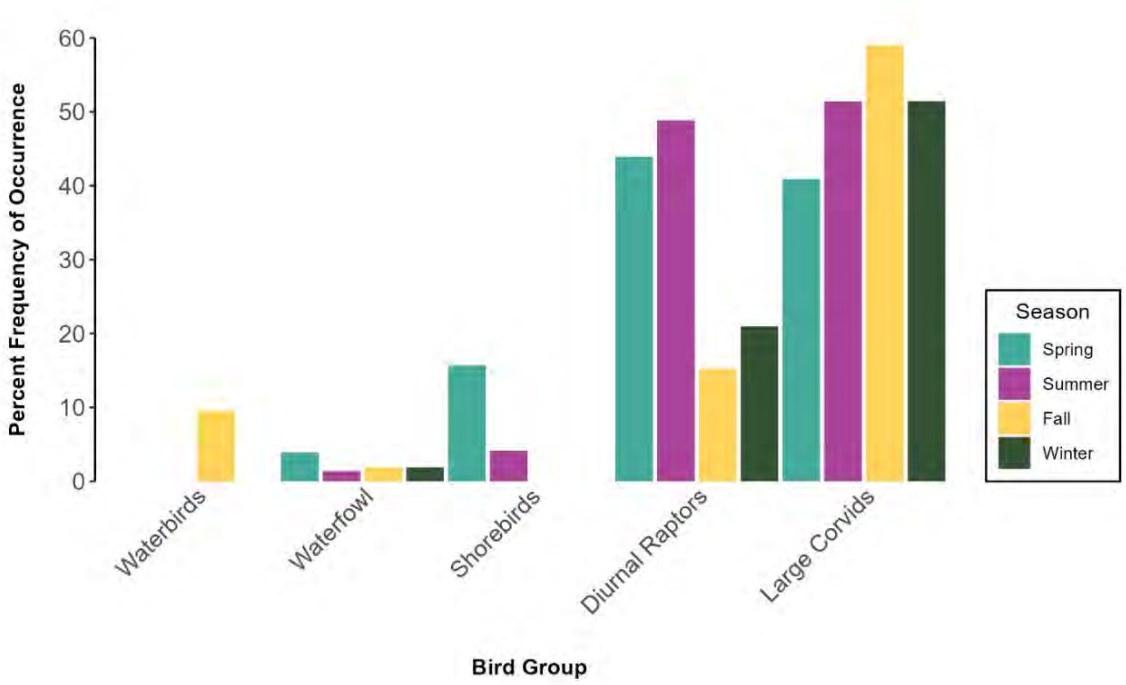

Figure 6c. Large bird frequency of occurrence by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Large Bird Mean Flight Height

Mean large bird flight heights ranged from 1.0 m (3.3 ft) for upland game birds to 817 m (2,680 ft) for waterbirds. Of the large bird species groups with more than five observations within the Project Area, shorebirds (65.8%) and waterfowl (59.3%) were recorded most frequently within the RSH (Table 7). For diurnal raptors, 49.4% of flights were within the RSH. For large birds overall, 24.1% of flights were within the RSH (Table 7).

Spatial Variation

Mean Use by Point

Large bird use (observations/ 800-m plot/60-min survey) ranged from 0.56 to 18.56 across points, with an overall mean use of 4.31 (±0.77 Standard Error [SE]) for all survey locations. The highest use values were from waterbirds at survey points 3, 5, and 20 and large corvids at Point 38 (Figure 7; Appendix C1). Diurnal raptors were observed at 32 of the 35 survey points and use ranged from zero to 1.67 across points. The greatest diurnal raptor use was recorded at points 7 and 8 (Figure 7; appendix C1). Large corvids were the only species group observed at all survey points (Figure 7; Appendix C1).

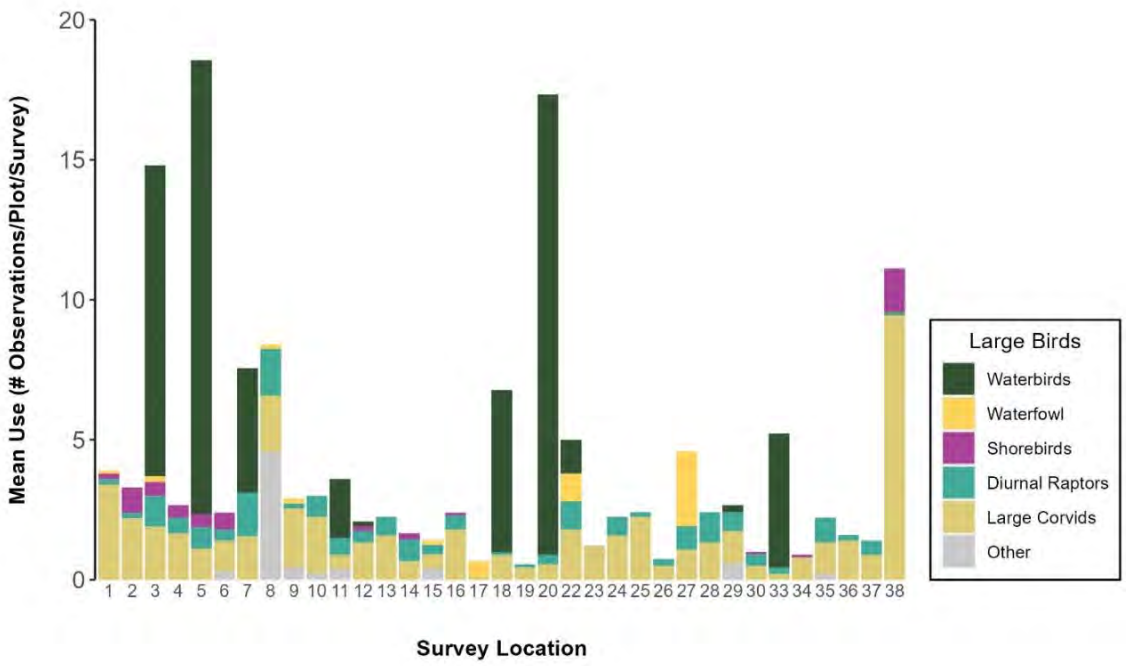

Figure 7. Large bird mean use (# observations/plot/60-minute survey) by point by bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Flight Paths

Flight paths and perch locations of diurnal raptors (excluding eagles) and the flight paths of waterbirds, waterfowl, shorebirds, and nightjars were mapped (Figure 8). Flight paths of diurnal raptors were documented from 32 of 35 survey points, and perches from two of 35 points. Of these two locations, seven perching diurnal raptors were reported at Point 8. Point 8 is located near a farmstead along Little Butter Creek, where perching substrates in the form of trees and power poles were abundant relative to other survey points (Figure 8). Diurnal raptors were observed in flight throughout the Project Area, with no distinct patterns of spatial use readily apparent. The flight paths of waterbirds (i.e., long-billed curlew) were recorded mainly from survey points within the northern half of the Project Area.

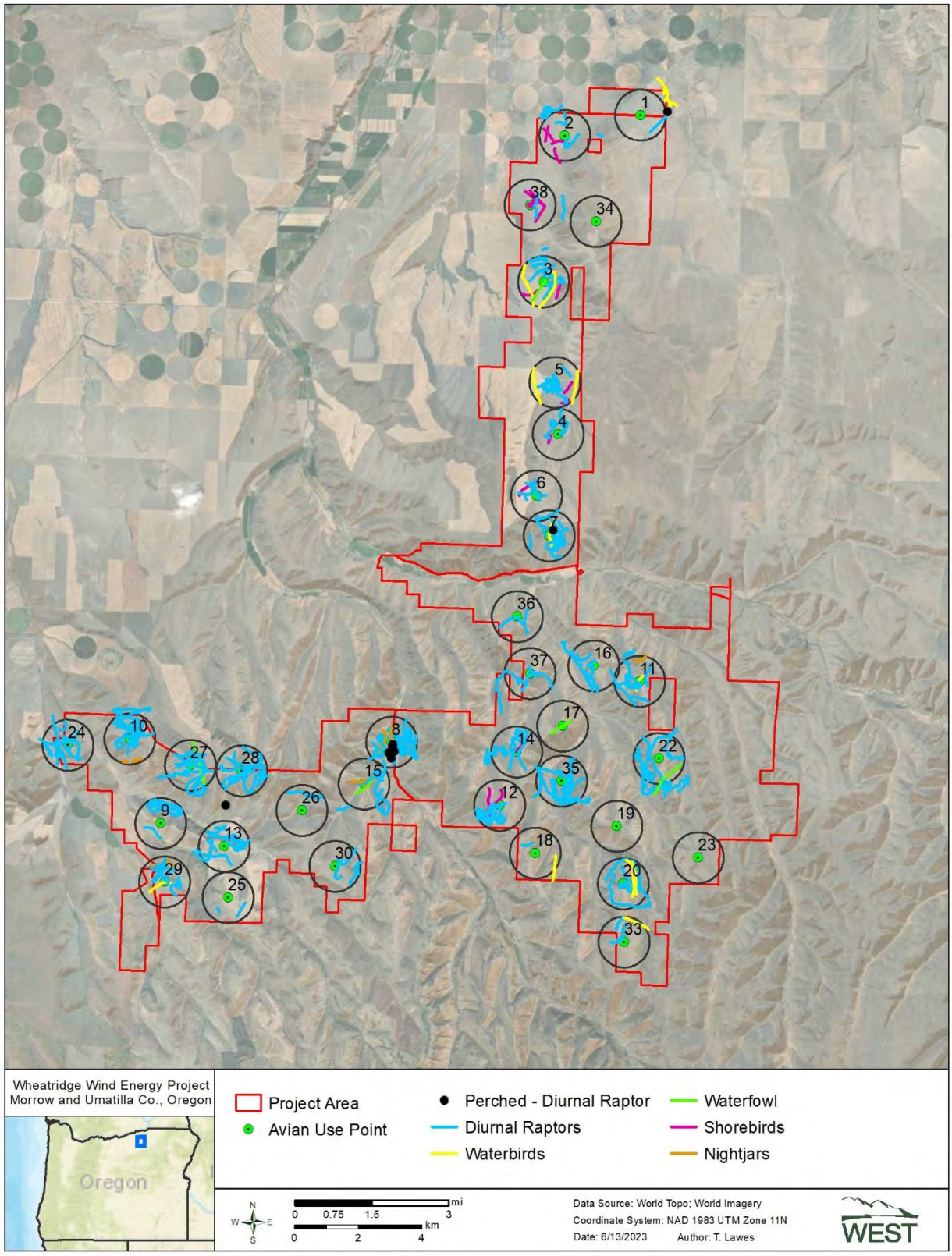

Figure 8. Large bird flight paths at the paths recorded during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Small Birds

Twenty-seven species of small birds were documented within the Project Area during the 364 surveys (Table 2). Of these 27 species, 26 were passerines and one was a woodpecker.

Mean Use, Percent of Use, and Frequency of Occurrence

Mean use, percent of use, and frequency of occurrence were calculated by season for small bird types and species (Appendix B2). Seasonal small bird mean use (observations/100-m radius plot/10-min survey) was highest during fall (9.06), followed by winter (5.20), summer (4.77), and spring (4.15; Figure 9). Annual small bird mean use was 5.8 (Figure 9).

Passerines accounted for more than 99% of small bird use during all seasons (Appendix B2) and were observed during 71.4% of winter surveys up to 92.4% of spring surveys (Appendix B2).

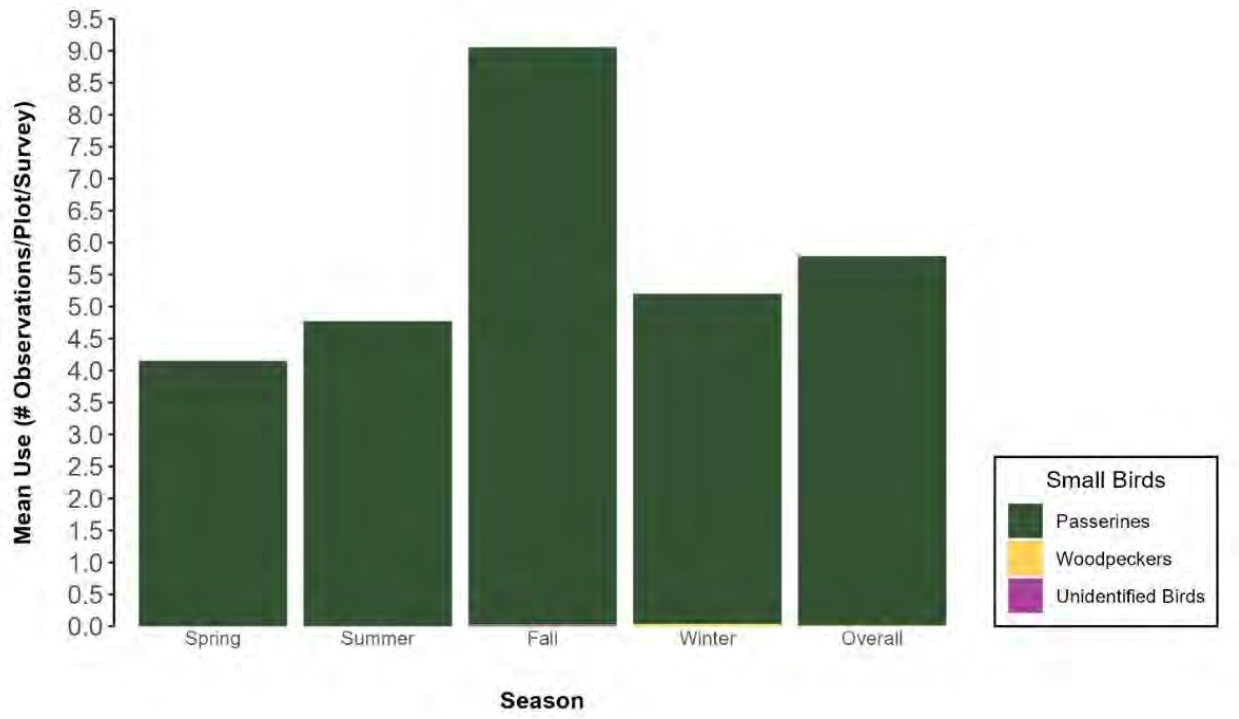

Figure 9. Small bird mean use (# observations/plot/10 minute survey) by season and bird type at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Small Bird Mean Flight Height

Of the identified small bird species, mean flight heights averaged less than 10 m (33 ft) for all small bird types, with only 1.8% of flights recorded within the rotor swept heights of 25–153 m AGL (Table 10). Small birds were mainly (98.2% of observations) recorded flying below the RSH of 25–153 m AGL.

Table 10. Group and individual observation flight height characteristics by bird type[a] during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Bird Type	# Groups Flying	# Obs Flying	% Obs Flying	Mean Flight Height (m)	% within Flight height Categories		
					<25 m	25–153 m[b]	>153 m
Passerines	**257**	**1,358**	**62.8**	**5**	**98.2**	**1.8**	**0**
Blackbirds/Orioles	*33*	*641*	*70.3*	*9*	*97.2*	*2.8*	*0*
Finches/Crossbills	*1*	*8*	*57.1*	*1*	*100*	*0*	*0*
Flycatchers	*1*	*2*	*22.2*	*0*	*100*	*0*	*0*
Grassland/Sparrows	*208*	*676*	*57.2*	*5*	*99.0*	*1.0*	*0*
Swallows	*12*	*29*	*82.9*	*5*	*100*	*0*	*0*
Shrikes	*1*	*1*	*16.7*	*5*	*100*	*0*	*0*
Thrushes	*1*	*1*	*25.0*	*1*	*100*	*0*	*0*
Titmice/Chickadees	*0*	*0*	*0*	*NA*	*NA*	*NA*	*NA*
Waxwings	*0*	*0*	*0*	*NA*	*NA*	*NA*	*NA*
Wrens	*0*	*0*	*0*	*NA*	*NA*	*NA*	*NA*
Woodpeckers	**0**	**0**	**0**	**NA**	**NA**	**NA**	**NA**
Unidentified Birds	**0**	**0**	**0**	**NA**	**NA**	**NA**	**NA**
Small Birds Overall	**257**	**1,358**	**62.6**	**5**	**98.2**	**1.8**	**0**

a. 100-meter (m; 328-foot [ft]) radius plot for small birds.

b. The assumed rotor-swept height for potential collision with a turbine blade, or 25–153 m (82–502 ft) above ground level.

Zeroes and NA values indicate that the species was observed but was not flying.

obs = observations; m = meter.

All metrics based on First Activity and First Flight Height.

Spatial Variation

Mean Use by Point

Small bird mean use (observations/100-m radius plot/10-min survey) ranged from 1.70 to 55.10 across all survey points (Figure 10), with an overall mean use of 5.95 (±1.54 SE). The highest use was recorded at Point 16 (55.10), followed by points 6, 8, and 10 (Figure 10). Small bird use at Point 16 was far greater than at any of the other survey points; however, European starlings accounted for approximately 95% of the small bird use at this location with one large group (500 individuals) accounting for 91% of those observations.

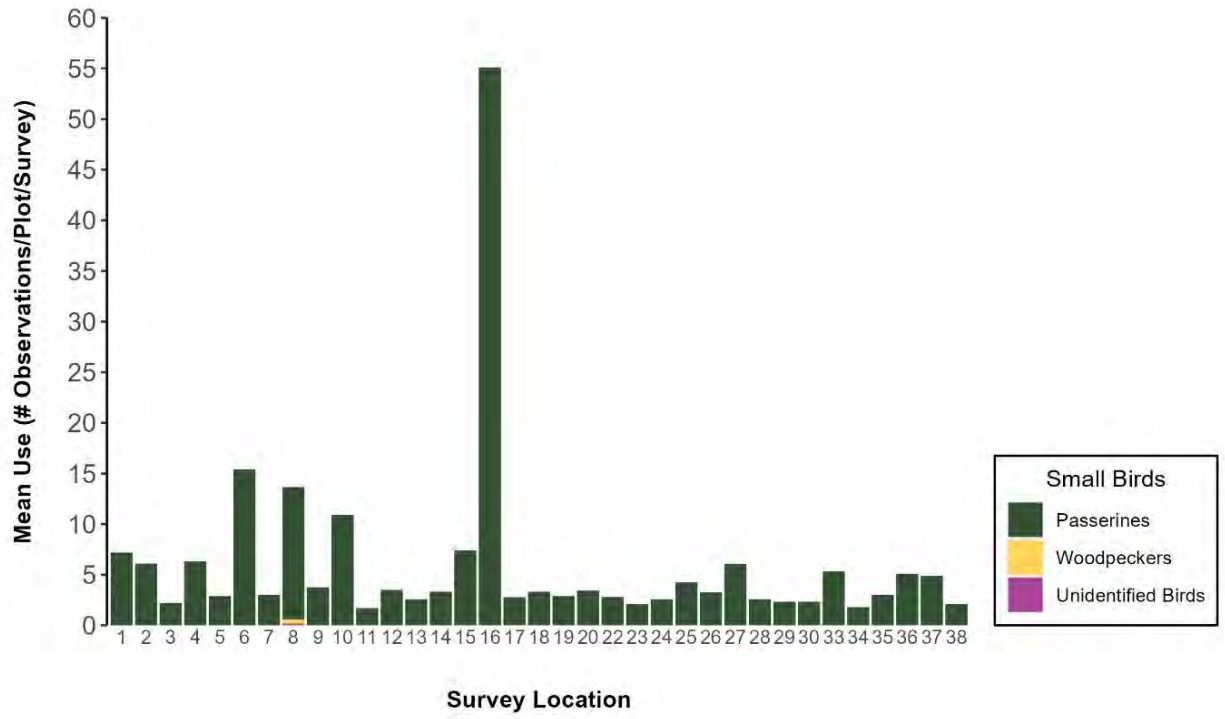

Figure 10. Small bird mean use (observations/plot/10-minute survey) by survey point at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Incidental Observations

Within the Project Area, nine avian species were recorded only as incidental observations, and not during standardized surveys (Table 11), two of which are SGCN (burrowing owl and short-eared owl; Table 8). In addition, three mammal species were observed and recorded as incidental observations: Rocky Mountain elk (*Cervus elaphus canadensis*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*).

Table 11. Species incidentally observed outside of the standardized avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Species	Scientific Name	# grps	# obs
brown-headed cowbird	*Molothrus ater*	1	1
burrowing owl	*Athene cunicularia*	3	3
eastern kingbird	*Tyrannus tyrannus*	1	1
Eurasian collared-dove	*Streptopelia decaocto*	1	1
house sparrow	*Passer domesticus*	1	1
killdeer	*Charadrius vociferus*	1	1
merlin	*Falco columbarius*	2	2
short-eared owl	*Asio flammeus*	1	2
yellow-headed blackbird	*Xanthocephalus xanthocephalus*	1	1
Total	**9 species**	**12**	**13**

grps = groups; obs = observations.

DISCUSSION

The objective of the avian use surveys was to document species composition and spatial and temporal patterns of avian use within the Project Area, with a particular focus on eagles, diurnal raptors, and other SOC. During the 2022 – 2023 avian use study, both bald and golden eagles were documented using the Project Area, although eagle activity was only recorded in the southern half of the Project Area (south of Butter Creek). Bald eagle use of the Project Area was recorded in spring and winter, whereas golden eagle use was recorded in spring, fall, and winter. No eagles were observed during the summer. All three of the bald eagle observations were recorded at flight heights above of the turbine risk cylinder (greater than 200 m AGL) and resulted in zero bald eagle minutes. Eight golden eagle observations were recorded during surveys, of which five were within the turbine risk cylinder and resulted in 11 golden eagle minutes. Nesting substrate for eagles is generally lacking within the Project Area, with the closest known golden eagle territories located approximately two to three mi (five km) south and east of the Project Area. Based on raptor nest surveys conducted by Tetra Tech for the Project, only one of the two eagle territories was active in 2022, with the one active nest located almost three mi south of the nearest avian survey point. The lack of local eagle nesting during the survey period may have contributed to the absence of golden eagle observations in the Project Area during the summer months. While observed eagle use was relatively low, especially in the northern portion of the Project Area (north of Butter Creek) and during the summer months, some risk of impacts to eagles does exist given their documented presence. Both eagle species are federally protected under the Bald and Golden Eagle Protection Act of 1940.

During the 2022 – 2023 avian use surveys, diurnal raptors were observed in all seasons and throughout the Project Area. Of the 11 diurnal raptor species observed during surveys, red-tailed hawk, Swainson's hawk, and northern harrier were the most abundant species, with northern harrier most abundant in fall and winter, Swainson's hawk in spring, and red-tailed hawk in summer. Combined, these three species accounted for 65% of all diurnal raptor observations. Among the diurnal raptors observed, two species (Swainson's hawk and ferruginous hawk) are listed as SGCN. Four other large bird species observed during surveys (American white pelican, common nighthawk, long-billed curlew, and sandhill crane) and two large bird species recorded incidentally (burrowing owl and short-eared owl) are also listed as SGCN. Among these eight SGCN, sandhill cranes were the most abundant, followed by long-billed curlews and Swainson's hawks. Sandhill crane observations were temporally limited to the fall season, while long-billed curlew and Swainson's hawk were temporally limited to the spring and summer seasons.

Small bird use was dominated by three species, horned lark, European starling, and western meadowlark, which together accounted for 83% of all small bird observations recorded during surveys. Western meadowlark was the most abundant (199 groups/261 observations) of five small bird SGCN observed during surveys; all four others were observed on fewer than five occasions.

In conclusion, no state or federally threatened or endangered species were observed during the 2022 – 2023 avian use surveys; however, both eagle species and 13 SGCN were documented within the Project Area. The 2022 – 2023 avian use surveys provide initial insights into the spatial and temporal use of the Project Area by SGCN. A second year of large bird use surveys, initiated in April 2023, will provide additional data on eagles and other large bird SGCN, and will provide insight into potential annual variability in their use of the Project Area.

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Appendix A. All Birds Observed by Season at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, during Avian Use Surveys, April 19, 2022 – March 13, 2023.

Appendix A1. Summary of all large bird groups and individual observations, regardless of distance from observer, by bird type and species during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon. from April 19, 2022 – March 13, 2023.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Waterbirds		**0**	**0**	**1**	**2**	**15**	**578**	**0**	**0**	**16**	**580**
American white pelican	*Pelecanus erythrorhynchos*	0	0	1	2	0	0	0	0	1	2
sandhill crane	*Antigone canadensis*	0	0	0	0	15	578	0	0	15	578
Waterfowl		**4**	**46**	**1**	**1**	**2**	**6**	**2**	**3**	**9**	**56**
Canada goose	*Branta canadensis*	3	44	0	0	1	5	1	2	5	51
mallard	*Anas platyrhynchos*	1	2	1	1	0	0	0	0	2	3
snow goose	*Anser caerulescens*	0	0	0	0	1	1	1	1	2	2
Shorebirds		**23**	**46**	**4**	**5**	**0**	**0**	**0**	**0**	**27**	**51**
long-billed curlew	*Numenius americanus*	23	46	4	5	0	0	0	0	27	51
Diurnal Raptors		**95**	**99**	**52**	**71**	**23**	**23**	**28**	**28**	**198**	**221**
Accipiters		*2*	*2*	*1*	*2*	*2*	*2*	*1*	*1*	*6*	*7*
Cooper's hawk	*Accipiter cooperii*	2	2	0	0	2	2	1	1	5	5
sharp-shinned hawk	*Accipiter striatus*	0	0	1	2	0	0	0	0	1	2
Buteos		*65*	*69*	*30*	*44*	*5*	*5*	*13*	*13*	*113*	*131*
ferruginous hawk	*Buteo regalis*	4	4	4	4	0	0	0	0	8	8
red-tailed hawk	*Buteo jamaicensis*	21	24	19	21	3	3	7	7	50	55
rough-legged hawk	*Buteo lagopus*	7	7	0	0	0	0	0	0	7	7
Swainson's hawk	*Buteo swainsoni*	24	25	7	19	0	0	0	0	31	44
unidentified buteo		9	9	0	0	2	2	6	6	17	17
Northern Harrier		*8*	*8*	*12*	*12*	*13*	*13*	*12*	*12*	*45*	*45*
northern harrier	*Circus hudsonius*	8	8	12	12	13	13	12	12	45	45
Eagles		*7*	*7*	*0*	*0*	*2*	*2*	*2*	*2*	*11*	*11*
bald eagle	*Haliaeetus leucocephalus*	2	2	0	0	0	0	1	1	3	3
golden eagle	*Aquila chrysaetos*	5	5	0	0	2	2	1	1	8	8
Falcons		*13*	*13*	*4*	*5*	*1*	*1*	*0*	*0*	*18*	*19*
American kestrel	*Falco sparverius*	8	8	3	4	1	1	0	0	12	13
prairie falcon	*Falco mexicanus*	4	4	1	1	0	0	0	0	5	5
unidentified falcon		1	1	0	0	0	0	0	0	1	1
Other Raptors		*0*	*0*	*5*	*8*	*0*	*0*	*0*	*0*	*5*	*8*
unidentified raptor		0	0	5	8	0	0	0	0	5	8
Upland Game Birds		**7**	**23**	**2**	**2**	**2**	**2**	**10**	**26**	**21**	**53**
California quail	*Callipepla californica*	1	5	0	0	0	0	0	0	1	5
chukar	*Alectoris chukar*	2	12	0	0	0	0	1	15	3	27
gray partridge	*Perdix perdix*	1	2	0	0	0	0	0	0	1	2
ring-necked pheasant	*Phasianus colchicus*	3	4	2	2	2	2	9	11	16	19

Appendix A1. Summary of all large bird groups and individual observations, regardless of distance from observer, by bird type and species during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon. from April 19, 2022 – March 13, 2023.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Doves/Pigeons		**1**	**3**	**4**	**4**	**0**	**0**	**0**	**0**	**5**	**7**
mourning dove	*Zenaida macroura*	0	0	4	4	0	0	0	0	4	4
rock pigeon	*Columba livia*	1	3	0	0	0	0	0	0	1	3
Large Corvids		**66**	**194**	**45**	**132**	**104**	**146**	**81**	**111**	**296**	**583**
black-billed magpie	*Pica hudsonia*	1	1	1	1	4	6	7	8	13	16
common raven	*Corvus corax*	65	193	44	131	100	140	74	103	283	567
Nightjars		**0**	**0**	**10**	**22**	**0**	**0**	**0**	**0**	**10**	**22**
common nighthawk	*Chordeiles minor*	0	0	10	22	0	0	0	0	10	22
Unidentified Birds		**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**2**
unidentified large bird		0	0	0	0	0	0	2	2	2	2
Overall		**196**	**411**	**119**	**239**	**146**	**755**	**123**	**170**	**584**	**1,575**

grps = groups; obs = observations.

Appendix A2. Summary of all small bird groups and individual observations, regardless of distance from observer, by bird type and species during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Passerines		**271**	**437**	**144**	**242**	**242**	**950**	**180**	**542**	**837**	**2,171**
Blackbirds/Orioles		*98*	*166*	*56*	*98*	*51*	*583*	*22*	*71*	*227*	*918*
Brewer's blackbird	*Euphagus cyanocephalus*	3	23	3	20	1	15	2	29	9	87
Bullock's oriole	*Icterus bullockii*	0	0	1	1	0	0	0	0	1	1
European starling	*Sturnus vulgaris*	5	15	2	3	1	500	2	21	10	539
red-winged blackbird	*Agelaius phoeniceus*	6	17	3	10	2	6	0	0	11	33
unidentified blackbird		1	1	0	0	0	0	0	0	1	1
western meadowlark	*Sturnella neglecta*	83	110	47	64	47	62	18	21	195	257
Finches/Crossbills		*1*	*1*	*0*	*0*	*1*	*1*	*3*	*12*	*5*	*14*
American goldfinch	*Spinus tristis*	0	0	0	0	1	1	3	12	4	13
house finch	*Haemorhous mexicanus*	1	1	0	0	0	0	0	0	1	1
Flycatchers		*1*	*2*	*4*	*7*	*0*	*0*	*0*	*0*	*5*	*9*
western kingbird	*Tyrannus verticalis*	1	2	3	5	0	0	0	0	4	7
western wood-pewee	*Contopus sordidulus*	0	0	1	2	0	0	0	0	1	2
Grassland/Sparrows		*161*	*244*	*77*	*123*	*184*	*360*	*151*	*455*	*573*	*1,182*
American pipit	*Anthus rubescens*	0	0	0	0	4	54	4	79	8	133
Brewer's sparrow	*Spizella breweri*	0	0	1	1	1	18	0	0	2	19
chipping sparrow	*Spizella passerina*	0	0	1	1	0	0	0	0	1	1
grasshopper sparrow	*Ammodramus savannarum*	0	0	3	3	0	0	0	0	3	3
horned lark	*Eremophila alpestris*	158	241	70	116	171	279	144	371	543	1,007
Savannah sparrow	*Passerculus sandwichensis*	1	1	2	2	6	7	0	0	9	10
song sparrow	*Melospiza melodia*	1	1	0	0	1	1	2	4	4	6
white-crowned sparrow	*Zonotrichia leucophrys*	1	1	0	0	1	1	1	1	3	3
Swallows		*7*	*21*	*5*	*12*	*2*	*2*	*0*	*0*	*14*	*35*
barn swallow	*Hirundo rustica*	1	3	4	9	2	2	0	0	7	14
cliff swallow	*Petrochelidon pyrrhonota*	2	2	0	0	0	0	0	0	2	2
northern rough-winged swallow	*Stelgidopteryx serripennis*	4	16	0	0	0	0	0	0	4	16
unidentified swallow		0	0	1	3	0	0	0	0	1	3
Shrikes		*1*	*1*	*0*	*0*	*3*	*3*	*2*	*2*	*6*	*6*
loggerhead shrike	*Lanius ludovicianus*	0	0	0	0	1	1	0	0	1	1
northern shrike	*Lanius borealis*	1	1	0	0	2	2	2	2	5	5
Thrushes		*2*	*2*	*1*	*1*	*1*	*1*	*0*	*0*	*4*	*4*
American robin	*Turdus migratorius*	2	2	1	1	1	1	0	0	4	4
Titmice/Chickadees		*0*	*0*	*0*	*0*	*0*	*0*	*1*	*1*	*1*	*1*
black-capped chickadee	*Poecile atricapillus*	0	0	0	0	0	0	1	1	1	1

Appendix A2. Summary of all small bird groups and individual observations, regardless of distance from observer, by bird type and species during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Waxwings		*0*	*0*	*0*	*0*	*0*	*0*	*1*	*1*	*1*	*1*
cedar waxwing	*Bombycilla cedrorum*	0	0	0	0	0	0	1	1	1	1
Wrens		*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*
house wren	*Troglodytes aedon*	0	0	1	1	0	0	0	0	1	1
Woodpeckers		**0**	**0**	**0**	**0**	**1**	**1**	**4**	**4**	**5**	**5**
northern flicker	*Colaptes auratus*	0	0	0	0	1	1	4	4	5	5
Unidentified Birds		**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**2**	**2**
unidentified small bird		0	0	0	0	2	2	0	0	2	2
Overall		**271**	**437**	**144**	**242**	**245**	**953**	**184**	**546**	**844**	**2,178**

grps = groups; obs = observations.

Appendix B. Mean Use, Percent of Use, and Frequency of Occurrence for All Birds during Avian Use Surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Appendix B1. Mean large birds use (number of large birds/plot[a]/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each large bird type, subtype, and species by season during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Mean Use				% of Use				% Frequency			
Type/Subtype/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Waterbirds	**0**	**0**	**5.50**	**0**	**0**	**0**	**76.6**	**0**	**0**	**0**	**9.5**	**0**
sandhill crane	0	0	5.50	0	0	0	76.6	0	0	0	9.5	0
Waterfowl	**0.45**	**0.01**	**0.06**	**0.03**	**11.8**	**0.4**	**0.8**	**1.8**	**3.9**	**1.4**	**1.9**	**1.9**
Canada goose	0.43	0	0.05	0.02	11.3	0	0.7	1.2	2.9	0	1.0	1.0
mallard	0.02	0.01	0	0	0.5	0.4	0	0	1.0	1.4	0	0
snow goose	0	0	0.01	0.01	0	0	0.1	0.6	0	0	1.0	1.0
Shorebirds	**0.45**	**0.07**	**0**	**0**	**11.8**	**2.1**	**0**	**0**	**15.7**	**4.2**	**0**	**0**
long-billed curlew	0.45	0.07	0	0	11.8	2.1	0	0	15.7	4.2	0	0
Diurnal Raptors	**0.86**	**0.97**	**0.22**	**0.27**	**22.5**	**28.8**	**3.0**	**16.5**	**43.9**	**48.8**	**15.2**	**21.0**
Accipiters	*0.02*	*0.05*	*0.02*	*0.01*	*0.5*	*1.5*	*0.3*	*0.6*	*2.0*	*2.6*	*1.9*	*1.0*
Cooper's hawk	0.02	0	0.02	0.01	0.5	0	0.3	0.6	2.0	0	1.9	1.0
sharp-shinned hawk	0	0.05	0	0	0	1.5	0	0	0	2.6	0	0
Buteos	*0.58*	*0.56*	*0.05*	*0.12*	*15.1*	*16.7*	*0.7*	*7.6*	*33.3*	*34.2*	*3.8*	*9.5*
ferruginous hawk	0.02	0.04	0	0	0.5	1.2	0	0	2.0	1.4	0	0
red-tailed hawk	0.23	0.37	0.03	0.07	6.1	10.9	0.4	4.1	16.6	32.8	2.9	5.7
rough-legged hawk	0.07	0	0	0	1.8	0	0	0	4.9	0	0	0
Swainson's hawk	0.24	0.15	0	0	6.2	4.5	0	0	14.7	1.4	0	0
unidentified buteo	0.02	0	0.02	0.06	0.5	0	0.3	3.5	2.0	0	1.0	4.8
Northern Harrier	*0.08*	*0.23*	*0.12*	*0.11*	*2.0*	*6.7*	*1.7*	*7.1*	*6.8*	*16.0*	*8.6*	*9.5*
northern harrier	0.08	0.23	0.12	0.11	2.0	6.7	1.7	7.1	6.8	16.0	8.6	9.5
Eagles	*0.06*	*0*	*0.02*	*0.02*	*1.5*	*0*	*0.3*	*1.2*	*4.8*	*0*	*1.0*	*1.9*
bald eagle	0.01	0	0	0.01	0.2	0	0	0.6	1.0	0	0	1.0
golden eagle	0.05	0	0.02	0.01	1.3	0	0.3	0.6	3.9	0	1.0	1.0
Falcons	*0.13*	*0.08*	*0.01*	*0*	*3.3*	*2.4*	*0.1*	*0*	*9.8*	*6.7*	*1.0*	*0*
American kestrel	0.08	0.07	0.01	0	2.1	2.0	0.1	0	6.9	5.3	1.0	0
prairie falcon	0.04	0.01	0	0	1.0	0.4	0	0	2.0	1.4	0	0
unidentified falcon	0.01	0	0	0	0.3	0	0	0	1.0	0	0	0
Other Raptors	*0*	*0.05*	*0*	*0*	*0*	*1.6*	*0*	*0*	*0*	*4.0*	*0*	*0*
unidentified raptor	0	0.05	0	0	0	1.6	0	0	0	4.0	0	0
Upland Game Birds	**0.23**	**0.03**	**0.02**	**0.25**	**5.9**	**0.8**	**0.3**	**15.3**	**4.9**	**2.8**	**1.9**	**3.8**
California quail	0.05	0	0	0	1.3	0	0	0	1.0	0	0	0
chukar	0.12	0	0	0.14	3.1	0	0	8.8	2.0	0	0	1.0
gray partridge	0.02	0	0	0	0.5	0	0	0	1.0	0	0	0
ring-necked pheasant	0.04	0.03	0.02	0.10	1.0	0.8	0.3	6.5	2.9	2.8	1.9	3.8

Appendix B1. Mean large birds use (number of large birds/plot[a]/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each large bird type, subtype, and species by season during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Mean Use				% of Use				% Frequency			
Type/Subtype/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Doves/Pigeons	**0.03**	**0.10**	**0**	**0**	**0.8**	**3.0**	**0**	**0**	**1.0**	**5.1**	**0**	**0**
mourning dove	0	0.10	0	0	0	3.0	0	0	0	5.1	0	0
rock pigeon	0.03	0	0	0	0.8	0	0	0	1.0	0	0	0
Large Corvids	**1.81**	**1.88**	**1.39**	**1.06**	**47.3**	**55.8**	**19.3**	**65.3**	**40.9**	**51.4**	**59.0**	**51.4**
black-billed magpie	0.01	0.01	0.06	0.08	0.2	0.4	0.8	4.7	1.0	1.4	1.9	5.7
common raven	1.80	1.87	1.33	0.98	47.0	55.4	18.5	60.6	40.9	51.4	58.1	48.6
Nightjars	**0**	**0.31**	**0**	**0**	**0**	**9.1**	**0**	**0**	**0**	**8.3**	**0**	**0**
common nighthawk	0	0.31	0	0	0	9.1	0	0	0	8.3	0	0
Unidentified Birds	**0**	**0**	**0**	**0.02**	**0**	**0**	**0**	**1.2**	**0**	**0**	**0**	**1.0**
unidentified large bird	0	0	0	0.02	0	0	0	1.2	0	0	0	1.0
Overall	**3.83**	**3.38**	**7.19**	**1.62**	**100**	**100**	**100**	**100**	**NA**	**NA**	**NA**	**NA**

[a] 800-meter (2,625-foot) radius plot for large birds.

Sums of values may not equal totals shown due to rounding.

Appendix B2. Mean small birds use (number of small birds/plot[a]/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type, subtype, and species by season during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Mean Use				% of Use				% Frequency			
Type/Subtype/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Passerines	**4.15**	**4.77**	**9.03**	**5.16**	**100**	**100**	**99.7**	**99.3**	**92.4**	**75.5**	**77.1**	**71.4**
Blackbirds/Orioles	*1.56*	*1.93*	*5.54*	*0.68*	*37.5*	*40.3*	*61.2*	*13.0*	*54.0*	*49.5*	*27.6*	*10.5*
Brewer's blackbird	0.22	0.45	0.14	0.28	5.4	9.5	1.6	5.3	2.9	4.0	1.0	1.0
Bullock's oriole	0	0.01	0	0	0	0.3	0	0	0	1.4	0	0
European starling	0.14	0.05	4.76	0.20	3.5	1.1	52.6	3.8	3.9	4.0	1.0	1.9
red-winged blackbird	0.16	0.20	0.06	0	3.9	4.1	0.6	0	3.8	5.3	1.0	0
unidentified blackbird	0.01	0	0	0	0.2	0	0	0	1.0	0	0	0
western meadowlark	1.01	1.21	0.58	0.20	24.4	25.3	6.4	3.8	53.1	49.5	25.7	9.5
Finches/Crossbills	*0.01*	*0*	*0.01*	*0.11*	*0.2*	*0*	*0.1*	*2.2*	*1.0*	*0*	*1.0*	*2.9*
American goldfinch	0	0	0.01	0.11	0	0	0.1	2.2	0	0	1.0	2.9
house finch	0.01	0	0	0	0.2	0	0	0	1.0	0	0	0
Flycatchers	*0.02*	*0.16*	*0*	*0*	*0.5*	*3.3*	*0*	*0*	*1.0*	*6.5*	*0*	*0*
western kingbird	0.02	0.13	0	0	0.5	2.7	0	0	1.0	5.1	0	0
western wood-pewee	0	0.03	0	0	0	0.6	0	0	0	1.4	0	0
Grassland/Sparrows	*2.34*	*2.39*	*3.42*	*4.33*	*56.3*	*50.1*	*37.7*	*83.3*	*84.6*	*64.9*	*71.4*	*67.6*
American pipit	0	0	0.51	0.75	0	0	5.7	14.5	0	0	1.9	3.8
Brewer's sparrow	0	0.01	0.17	0	0	0.3	1.9	0	0	1.4	1.0	0
chipping sparrow	0	0.03	0	0	0	0.5	0	0	0	2.6	0	0
grasshopper sparrow	0	0.04	0	0	0	0.9	0	0	0	4.2	0	0
horned lark	2.31	2.26	2.66	3.53	55.6	47.3	29.3	67.9	83.6	62.3	69.5	65.7
Savannah sparrow	0.01	0.05	0.06	0	0.2	1.1	0.6	0	1.0	5.1	4.8	0
song sparrow	0.01	0	0.01	0.04	0.2	0	0.1	0.7	1.0	0	1.0	1.9
white-crowned sparrow	0.01	0	0.01	0.01	0.2	0	0.1	0.2	1.0	0	1.0	1.0
Swallows	*0.20*	*0.27*	*0.02*	*0*	*4.8*	*5.7*	*0.2*	*0*	*4.8*	*9.1*	*1.9*	*0*
barn swallow	0.03	0.20	0.02	0	0.7	4.1	0.2	0	1.0	6.5	1.9	0
cliff swallow	0.02	0	0	0	0.5	0	0	0	1.9	0	0	0
northern rough-winged swallow	0.15	0	0	0	3.7	0	0	0	3.8	0	0	0
unidentified swallow	0	0.08	0	0	0	1.6	0	0	0	2.6	0	0
Shrikes	*0.01*	*0*	*0.03*	*0.02*	*0.2*	*0*	*0.3*	*0.4*	*1.0*	*0*	*2.9*	*1.9*
loggerhead shrike	0	0	0.01	0	0	0	0.1	0	0	0	1.0	0
northern shrike	0.01	0	0.02	0.02	0.2	0	0.2	0.4	1.0	0	1.9	1.9
Thrushes	*0.02*	*0.01*	*0.01*	*0*	*0.5*	*0.3*	*0.1*	*0*	*1.9*	*1.4*	*1.0*	*0*
American robin	0.02	0.01	0.01	0	0.5	0.3	0.1	0	1.9	1.4	1.0	0

Appendix B2. Mean small birds use (number of small birds/plot[a]/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type, subtype, and species by season during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Mean Use				% of Use				% Frequency			
Type/Subtype/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Titmice/Chickadees	*0*	*0*	*0*	*0.01*	*0*	*0*	*0*	*0.2*	*0*	*0*	*0*	*1.0*
black-capped chickadee	0	0	0	0.01	0	0	0	0.2	0	0	0	1.0
Waxwings	*0*	*0*	*0*	*0.01*	*0*	*0*	*0*	*0.2*	*0*	*0*	*0*	*1.0*
cedar waxwing	0	0	0	0.01	0	0	0	0.2	0	0	0	1.0
Wrens	*0*	*0.01*	*0*	*0*	*0*	*0.3*	*0*	*0*	*0*	*1.4*	*0*	*0*
house wren	0	0.01	0	0	0	0.3	0	0	0	1.4	0	0
Woodpeckers	**0**	**0**	**0.01**	**0.04**	**0**	**0**	**0.1**	**0.7**	**0**	**0**	**1.0**	**1.9**
northern flicker	0	0	0.01	0.04	0	0	0.1	0.7	0	0	1.0	1.9
Unidentified Birds	**0**	**0**	**0.02**	**0**	**0**	**0**	**0.2**	**0**	**0**	**0**	**1.0**	**0**
unidentified small bird	0	0	0.02	0	0	0	0.2	0	0	0	1.0	0
Overall	**4.15**	**4.77**	**9.06**	**5.20**	**100**	**100**	**100**	**100**	**NA**	**NA**	**NA**	**NA**

[a] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C. Mean Use by Point for All Birds during Avian Use Surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Appendix C1. Mean use (number of birds/60-minute survey) by point for large birds[a] and bird types observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point								
Bird Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Waterbirds	**0**	**0**	**11.10**	**0**	**16.22**	**0**	**4.44**	**0**	**0**
Waterfowl	**0.10**	**0**	**0.20**	**0**	**0**	**0**	**0**	**0.17**	**0.18**
Shorebirds	**0.20**	**0.90**	**0.50**	**0.44**	**0.44**	**0.60**	**0**	**0**	**0**
Diurnal Raptors	**0.20**	**0.20**	**1.10**	**0.56**	**0.78**	**0.40**	**1.56**	**1.67**	**0.18**
Accipiters	*0*	*0*	*0*	*0*	*0*	*0.10*	*0.11*	*0.17*	*0*
Buteos	*0.20*	*0.10*	*1.10*	*0.22*	*0.44*	*0.10*	*0.67*	*0.83*	*0.09*
Northern Harrier	*0*	*0.10*	*0*	*0.33*	*0.33*	*0.20*	*0.56*	*0.17*	*0.09*
Eagles	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Falcons	*0*	*0*	*0*	*0*	*0*	*0*	*0.22*	*0.50*	*0*
Other Raptors	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Upland Game Birds	**0**	**0**	**0**	**0**	**0**	**0.10**	**0**	**3.42**	**0.36**
Doves/Pigeons	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.33**	**0**
Large Corvids	**3.40**	**2.20**	**1.90**	**1.67**	**1.11**	**1.10**	**1.56**	**2.00**	**2.09**
Nightjars	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.83**	**0.09**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**	**0.20**	**0**	**0**	**0**
All Large Birds	**3.90**	**3.30**	**14.80**	**2.67**	**18.56**	**2.40**	**7.56**	**8.42**	**2.91**

[a.] 800-meter (2,625-foot) radius plot for large birds.

Sums of values may not equal totals shown due to rounding.

Appendix C1. (*continued*) Mean use (number of birds/60-minute survey) by point for large birds[a] and bird types observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point								
Bird Type	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Waterbirds	**0**	**2.10**	**0.17**	**0**	**0**	**0**	**0**	**0**	**5.78**
Waterfowl	**0**	**0**	**0**	**0**	**0**	**0.17**	**0**	**0.56**	**0**
Shorebirds	**0**	**0**	**0.17**	**0**	**0.22**	**0**	**0.10**	**0**	**0**
Diurnal Raptors	**0.75**	**0.60**	**0.42**	**0.67**	**0.78**	**0.33**	**0.50**	**0**	**0.11**
Accipiters	*0*	*0*	*0*	*0*	*0*	*0*	*0.10*	*0*	*0*
Buteos	*0.50*	*0.60*	*0.17*	*0.42*	*0.22*	*0.17*	*0.10*	*0*	*0*
Northern Harrier	*0*	*0*	*0*	*0.17*	*0.56*	*0.08*	*0.20*	*0*	*0.11*
Eagles	*0.08*	*0*	*0*	*0.08*	*0*	*0*	*0.10*	*0*	*0*
Falcons	*0.17*	*0*	*0.17*	*0*	*0*	*0.08*	*0*	*0*	*0*
Other Raptors	*0*	*0*	*0.08*	*0*	*0*	*0*	*0*	*0*	*0*
Upland Game Birds	**0.08**	**0.20**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Doves/Pigeons	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Large Corvids	**2.00**	**0.50**	**1.33**	**1.58**	**0.67**	**0.50**	**1.80**	**0.11**	**0.89**
Nightjars	**0.17**	**0.20**	**0**	**0**	**0**	**0.42**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
All Large Birds	**3.00**	**3.60**	**2.08**	**2.25**	**1.67**	**1.42**	**2.40**	**0.67**	**6.78**

[a.] 800-meter (2,625-foot) radius plot for large birds.

Sums of values may not equal totals shown due to rounding.

Appendix C1. (*continued*) Mean use (number of birds/60-minute survey) by point for large birds[a] and bird types observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point							
Bird Type	**19**	**20**	**22**	**23**	**24**	**25**	**26**	**27**
Waterbirds	**0**	**16.44**	**1.20**	**0**	**0**	**0**	**0**	**0**
Waterfowl	**0**	**0**	**1.00**	**0**	**0**	**0**	**0**	**2.67**
Shorebirds	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Diurnal Raptors	**0.11**	**0.33**	**1.00**	**0**	**0.67**	**0.17**	**0.25**	**0.83**
Accipiters	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Buteos	*0*	*0.33*	*0.60*	*0*	*0.42*	*0.08*	*0.08*	*0.50*
Northern Harrier	*0*	*0*	*0*	*0*	*0.17*	*0.08*	*0*	*0.08*
Eagles	*0.11*	*0*	*0.20*	*0*	*0*	*0*	*0.17*	*0.08*
Falcons	*0*	*0*	*0*	*0*	*0.08*	*0*	*0*	*0.17*
Other Raptors	*0*	*0*	*0.20*	*0*	*0*	*0*	*0*	*0*
Upland Game Birds	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Doves/Pigeons	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Large Corvids	**0.44**	**0.56**	**1.80**	**1.22**	**1.58**	**2.25**	**0.50**	**1.08**
Nightjars	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
All Large Birds	**0.56**	**17.33**	**5.00**	**1.22**	**2.25**	**2.42**	**0.75**	**4.58**

[a.] 800-meter (2,625-foot) radius plot for large birds.

Sums of values may not equal totals shown due to rounding.

Appendix C1. (*continued*) Mean use (number of birds/60-minute survey) by point for large birds[a] and bird types observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point								
Bird Type	**28**	**29**	**30**	**33**	**34**	**35**	**36**	**37**	**38**
Waterbirds	**0**	**0.25**	**0**	**4.78**	**0**	**0**	**0**	**0**	**0**
Waterfowl	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Shorebirds	**0**	**0**	**0.08**	**0**	**0.10**	**0**	**0**	**0**	**1.56**
Diurnal Raptors	**1.08**	**0.67**	**0.42**	**0.22**	**0**	**0.89**	**0.20**	**0.50**	**0.11**
Accipiters	*0*	*0*	*0.08*	*0*	*0*	*0*	*0.10*	*0*	*0*
Buteos	*0.83*	*0.17*	*0.25*	*0.11*	*0*	*0.78*	*0*	*0.20*	*0*
Northern Harrier	*0.25*	*0.50*	*0.08*	*0*	*0*	*0*	*0.10*	*0.10*	*0.11*
Eagles	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.10*	*0*
Falcons	*0*	*0*	*0*	*0.11*	*0*	*0.11*	*0*	*0.10*	*0*
Other Raptors	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Upland Game Birds	**0**	**0.17**	**0**	**0**	**0**	**0.22**	**0**	**0**	**0**
Doves/Pigeons	**0**	**0.25**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Large Corvids	**1.33**	**1.17**	**0.50**	**0.22**	**0.80**	**1.11**	**1.40**	**0.90**	**9.44**
Nightjars	**0**	**0.17**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
All Large Birds	**2.42**	**2.67**	**1.00**	**5.22**	**0.90**	**2.22**	**1.60**	**1.40**	**11.11**

[a.] 800-meter (2,625-foot]) radius plot for large birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Bird Type	Survey Point				
	1	2	3	4	5
Passerines	7.20	6.10	2.20	6.33	2.89
Woodpeckers	0	0	0	0	0
Unidentified Birds	0	0	0	0	0
All Small Birds	7.20	6.10	2.20	6.33	2.89

[a.] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. (*continued*) Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Bird Type	Survey Point				
	6	7	8	9	10
Passerines	15.40	3.00	13.08	3.75	10.92
Woodpeckers	0	0	0.42	0	0
Unidentified Birds	0	0	0.17	0	0
All Small Birds	15.40	3.00	13.67	3.75	10.92

[a.] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. (*continued*) Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

Bird Type	Survey Point				
	11	12	13	14	15
Passerines	1.70	3.50	2.58	3.33	7.42
Woodpeckers	0	0	0	0	0
Unidentified Birds	0	0	0	0	0
All Small Birds	1.70	3.50	2.58	3.33	7.42

[a.] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. (*continued*) Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point				
Bird Type	**16**	**17**	**18**	**19**	**20**
Passerines	**55.10**	**2.78**	**3.33**	**2.89**	**3.44**
Woodpeckers	**0**	**0**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**
All Small Birds	**55.10**	**2.78**	**3.33**	**2.89**	**3.44**

[a.] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. (*continued*) Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point				
Bird Type	**22**	**23**	**24**	**25**	**26**
Passerines	**2.80**	**2.11**	**2.58**	**4.25**	**3.25**
Woodpeckers	**0**	**0**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**
All Small Birds	**2.80**	**2.11**	**2.58**	**4.25**	**3.25**

[a] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. (*continued*) Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point				
Bird Type	**27**	**28**	**29**	**30**	**33**
Passerines	**6.08**	**2.58**	**2.33**	**2.33**	**5.33**
Woodpeckers	**0**	**0**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**
All Small Birds	**6.08**	**2.58**	**2.33**	**2.33**	**5.33**

[a.] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

Appendix C2. (*continued*) Mean use (number of birds/10-minute survey) by point for bird types[a] observed during avian use surveys at the Wheatridge Wind Energy Project, Morrow and Umatilla counties, Oregon, from April 19, 2022 – March 13, 2023.

	Survey Point				
Bird Type	**34**	**35**	**36**	**37**	**38**
Passerines	**1.80**	**3.00**	**5.10**	**4.90**	**2.11**
Woodpeckers	**0**	**0**	**0**	**0**	**0**
Unidentified Birds	**0**	**0**	**0**	**0**	**0**
All Small Birds	**1.80**	**3.00**	**5.10**	**4.90**	**2.11**

[a.] 100-meter (328-foot) radius plot for small birds.

Sums of values may not equal totals shown due to rounding.

2023 Botanical Survey Report
Wheatridge East Wind Project
Morrow and Umatilla Counties, Oregon

Final Report



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TABLE OF CONTENTS

1 INTRODUCTION 1
2 METHODS 1
2.1 Target Species 1
2.2 Survey Area 2
2.3 Background Review 2
2.4 Survey Schedule 2
2.5 Field Survey Methods 2
3 RESULTS 4
3.1 Target Species 4
3.1.1 Laurence's Milkvetch 4
3.1.2 ODA Candidate Species 4
3.2 Noxious Weeds 6
4 CONCLUSIONS 6
5 REFERENCES 7

LIST OF TABLES

Table 1. Oregon Department of Agriculture candidate plant species with the potential to occur at the Wheatridge East Wind Project, Morrow and Umatilla counties, Oregon. 1
Table 2. Laurence's milkvetch occurrences surveyed in 2022[1] and 2023 in the Survey Area at Wheatridge East Wind Project, Morrow and Umatilla counites, Oregon. 5
Table 3. Noxious weeds observed in the Survey Area, Wheatridge East Wind Project, Morrow and Umatilla counties, Oregon. 6

LIST OF FIGURES

Figure 1. Botanical Survey Area and high moisture areas at Wheatridge East Wind Project, Morrow and Umatilla counties, Oregon. 3

LIST OF ATTACHMENTS

Attachment 1. Rare Plant Survey Results for Wheatridge East Wind Project, Morrow and Umatilla Counties, Oregon – Confidential and Provided Under Separate Cover
Attachment 2. Representative Photographs from the 2023 Botanical Surveys at the Wheatridge East Wind Project, Morrow and Umatilla Counties, Oregon.

1 INTRODUCTION

NextEra Energy Resources Development LLC (NextEra) is proposing development of the Wheatridge East Wind Project (Project) in Morrow and Umatilla counties, Oregon. To support development of the Project, NextEra contracted Western EcoSystems Technology, Inc. (WEST) to conduct pre-construction botanical surveys in support of the Request for Amendment 1 to the Facility Site Certificate through the Oregon Energy Facility Siting Council. Survey methodology was consistent with and based on similar surveys completed for the Project in 2022 (Tetra Tech 2023).

The objective of botanical surveys was to document the location of federal- or state-listed endangered and threatened vascular plant species and state and county-designated noxious weeds. This report summarizes the results of 2023 botanical surveys at the Project.

2 METHODS

2.1 Target Species

The targeted vascular plant during the 2023 survey was Laurence's milkvetch (*Astragalus collinus* var. *laurentii*), which is listed as threatened under the Oregon Endangered Species Act and a species of concern under the Federal Endangered Species Act and is known to occur in both Morrow and Umatilla counties (Oregon Department of Agriculture [ODA] 2022a, 2022b; US Fish and Wildlife Service 2022). The Project has suitable habitat (i.e., sandy or rocky soils overlying basalt, on dry slopes of the Columbia Plateau) and Laurence's milkvetch was recorded at the Project in 2022 (Tetra Tech 2023). Given the similarity to other *Astragalus* species, Laurence's milkvetch surveys must occur during the plant's fruiting period for accurate identification, typically between late May and August (ODA 2022b).

ODA candidate species with the potential to occur at the Project are listed in Table 1. Surveys did not occur at the appropriate time for disappearing monkeyflower or sessile mousetail; however, suitable habitat was recorded if encountered.

Table 1. Oregon Department of Agriculture candidate plant species with the potential to occur at the Wheatridge East Wind Project, Morrow and Umatilla counties, Oregon.

Species	Scientific Name	Habitat
dwarf evening-primrose	*Eremothera pygmaea*	Dry plains and slopes with unstable soils or on gravel in steep talus, dry washes, banks and roadcuts
disappearing monkeyflower	*Erythranthe inflatula*	Moist, heavy gravel that is inundated in early spring
hepatic monkeyflower	*Erythranthe jungermannioides*	Basalt crevices in seepage zones of vertical cliffs and canyon walls
sessile mousetail	*Myosurus sessilis*	Vernal pools and alkali flats

2.2 Survey Area

The Survey Area encompassed 9,169 acres (ac) in Morrow and Umatilla counties, Oregon, approximately 10 miles south of Hermiston, Oregon (Figure 1). The 2023 Survey Area consisted of the Project's micrositing corridors associated with potential disturbance areas resulting from construction of turbines, transmission lines, access roads, collector lines, substations, and operations and maintenance facilities, exclusive of active agricultural fields and areas surveyed in 2022 (Tetra Tech 2023). One string of potential turbines not currently contained within the Projects micrositing corridors was also surveyed in 2023.

2.3 Background Review

Surveyors visited known Laurence's milkvetch occurrences at the Project prior to starting surveys to confirm that seed pods were present, indicating the appropriate survey window. Surveyors also reviewed the list of noxious weed species designated as "A" by ODA (2020) as well as noxious weed lists for Morrow and Umatilla counties (Morrow County 2022, Umatilla County 2022).

2.4 Survey Schedule

Surveys were scheduled during the fruiting season (late May to August) to differentiate between Laurence's milkvetch and hillside milkvetch (*Astragalus collinus* var. *collinus*; ODA 2022b). Crews began surveys in early June and continued surveying through mid-August, checking plants to ensure fruits were identifiable throughout the survey period.

2.5 Field Survey Methods

Botanical surveys were conducted from June 7 to August 17, 2023, using methods described in the 2022 Botanical Survey Report (Tetra Tech 2023). Surveyors walked meandering transects with approximately 25-meter (m) spacing throughout the Survey Area to ensure 100% visual coverage. When surveyors encountered Laurence's milkvetch, the population was mapped using Esri FieldMaps. Individuals or small clusters of plants (less than one meter wide) were mapped using a single point. Points were later buffered in ArcGIS Pro by 0.5 m for analysis. Larger populations were mapped as a polygon, with individuals within 100 feet (ft) included in the same polygon. Population extensions outside the Survey Area were noted but not mapped. Surveyors collected data sufficient for completing Oregon Biodiversity Information Center siting forms for each population and took photos to illustrate identifying characteristics and habitat. Individuals were counted within each population when the number of plants was 200 or less. The number of plants was estimated for populations greater than 200 individuals. When identification was unclear due to lack of pods or grazing, milkvetch were mapped as Laurence's milkvetch with a note that the identification was uncertain.

Data recorded for each population included the following:

- Species phenology
- Number of plants observed
- Habitat information and associated species
- Visible threats

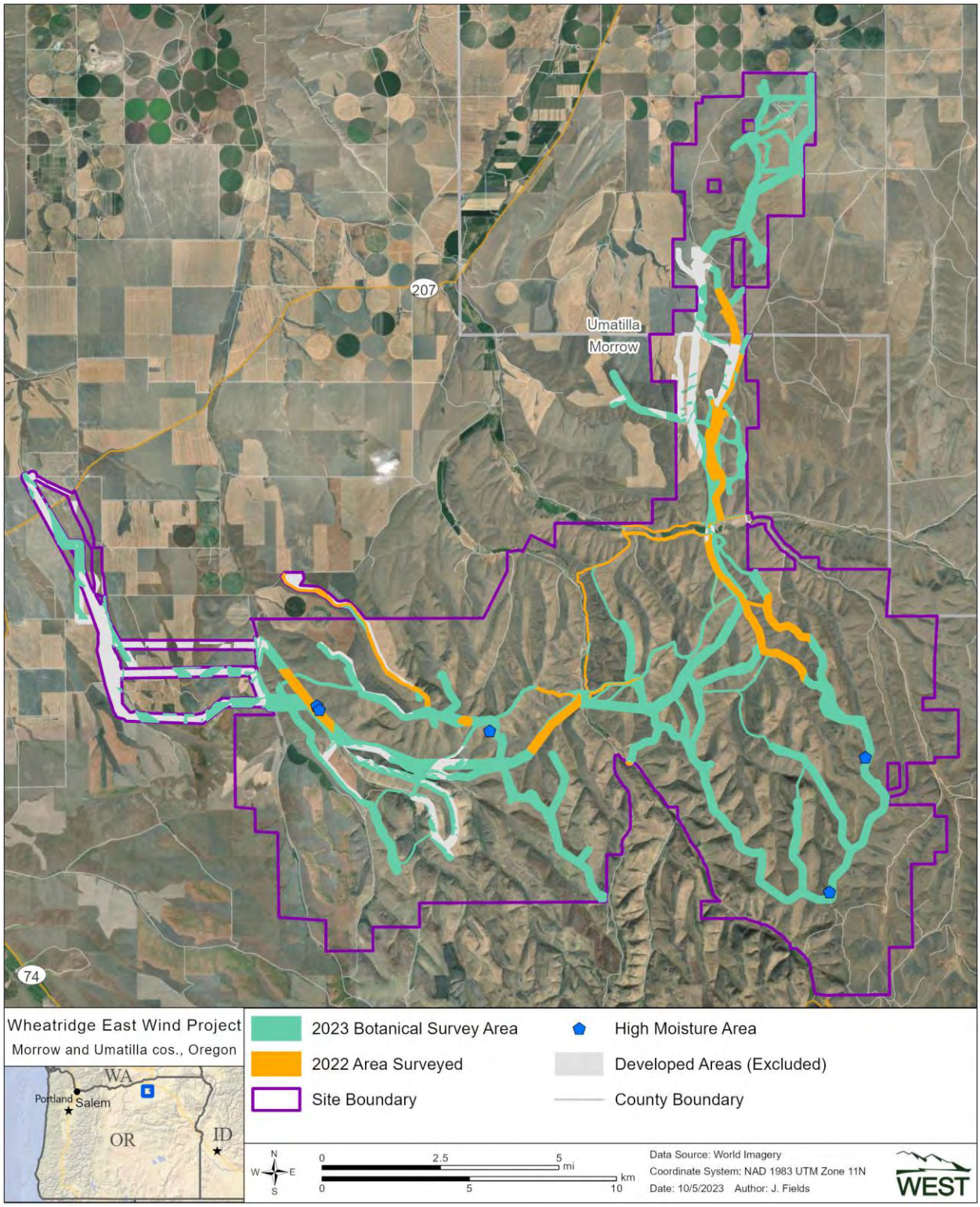

Figure 1. Botanical Survey Area and high moisture areas at Wheatridge East Wind Project, Morrow and Umatilla counties, Oregon.

ODA candidate species disappearing monkeyflower and sessile mousetail were not mapped in 2023 because it was not the appropriate time of year to identify the species; however, suitable habitat (high moisture areas such as seeps or vernal pools) was recorded.

Surveyors also recorded observations of "A" rated ODA-listed noxious weeds and "A" and "B" listed weeds for Morrow and Umatilla counties (ODA 2020, Morrow County 2022, Umatilla County 2022). Observations were recorded as Global Positioning System points with estimates of the extent and density of plants also recorded. Where noxious weeds were common across a landscape, points were periodically recorded to indicate continuation of observed conditions or changes in density or presence. Where noxious weed distribution was more localized, an approximate size and number of plants within the grouping were recorded. Noxious weed points were later converted to polygons in ArcGIS Pro based on field attributes.

3 RESULTS

Botanical surveys were conducted in the Survey Area from June 7 to August 17, 2023. Agricultural fields encountered within the Survey Area were not surveyed (Figure 1).

3.1 Target Species

3.1.1 Laurence's Milkvetch

Surveys occurred from early June to mid-August to target the fruiting period of Laurence's milkvetch. Laurence's milkvetch individuals observed in August were desiccated but could still be identified to species by seed pods attached to the plant or on the ground immediately under the plant (see Photo 4 in Attachment 2).

Surveys resulted in the mapping of 334 populations (i.e., isolated individuals or clusters of plants within 100 ft of each other) totaling 473.6 ac within the Survey Area in 2023. Populations ranged from one to approximately 5,000 plants and the largest population occupied 62.4 ac. Populations were present throughout the central and southeast portion of the Survey Area, but largely absent in the northern and western portions of the Project (Attachment 1).

Following NatureServe (2020), populations within one kilometer were assigned to the same occurrence. Fourteen occurrences of Laurence's milkvetch were recorded in the Survey Area in 2022 and 2023 combined (Tetra Tech 2023; Table 2, Attachment 1). Photos of Laurence's milkvetch and associated habitat are included in Attachment 2.

3.1.2 ODA Candidate Species

Suitable habitat was observed for dwarf evening primrose and disappearing monkeyflower. Dwarf evening primrose is not known to occur in Morrow or Umatilla counties, and none were observed during surveys. Surveys did not occur at the appropriate time to map disappearing monkeyflower. No suitable habitat was observed for hepatic monkeyflower or sessile mousetail.

Table 2. Laurence's milkvetch occurrences surveyed in 2022[1] and 2023 in the Survey Area at Wheatridge East Wind Project, Morrow and Umatilla counites, Oregon.

Occurrence #	# of Populations	# of Plants	Acres in Survey Area	Notes
1	5	114	0.7	Several low-density populations along upper and mid slope. Very steep.
2	7	1,846	1.2	Observed in 2022, no additional populations mapped in 2023.
3	1	1	<0.1	New occurrence in 2023. Single fruiting plant observed on a gentle slope.
4	4	569	3.2	Observed in 2022, no additional populations mapped in 2023.
5	68	2,814	71.7	Several large populations and scattered individuals. Populations extend outside Survey Area.
6	10	296	4.6	New occurrence in 2023. Several small populations mostly on upper slope and ridge crest.
7	156	12,134	209.1	Largest occurrence. Desiccation and grazing made some individuals difficult to identify. Populations extend outside Survey Area.
8	8	315	2.0	Observed in 2022, one additional population mapped in 2023.
9	57	11,952	110.1	Large occurrence. Desiccation and grazing made some individuals difficult to identify. Populations extend outside Survey Area.
10	4	90	1.5	New occurrence in 2023. Several small populations on gentle slope. One population extended outside Survey Area.
11	7	760	18.2	Several populations on gentle slope.
12	15	2,194	12.9	New occurrence in 2023. Three populations extended outside Survey Area.
13	46	4,340	68.0	New occurrence in 2023. Most populations on the upper slope and ridge crest. Extended outside Survey Area.
14	1	1	<0.1	New occurrence in 2023. Single fruiting plant observed.
Total[2]	**389**	**37,426**	**503.2**	

1. 2022 data from Tetra Tech 2023.
2. Sums may not equal total due to rounding.

3.2 Noxious Weeds

WEST recorded 15 listed noxious weed species within the Survey Area, including one ODA "A" listed noxious weed, 14 Morrow County listed weeds, and 12 Umatilla County listed weeds (Table 3). One state "A" list species was observed (hawkweed spp. [*Hieracium* spp.]) although the observation was not identified to species. Four species on the Morrow County "A" list (yellow starthistle [*Centaurea solstitialis*], rush skeletonweed [*Chondrilla juncea*], common spikeweed [*Hemizonia pungens*], and Scotch thistle [*Onopordum acanthium*]) and three species on the Umatilla County "A" list (common spikeweed, rush skeletonweed, spotted knapweed [*Centaurea maculosa*]) were observed. The most common noxious weeds observed were diffuse knapweed (*Centaurea diffusa*), Scotch thistle, and rush skeletonweed.

Table 3. Noxious weeds observed in the Survey Area, Wheatridge East Wind Project, Morrow and Umatilla counties, Oregon.

		Status		
Scientific Name	**Common Name**	**State[1]**	**Morrow County[2]**	**Umatilla County[3]**
Canada thistle	*Cirsium arvense*	–	B	B
cereal rye	*Secale cereale*	–	B	B
diffuse knapweed	*Centaurea diffusa*	–	B	B
field bindweed	*Convolvulus arvensis*	–	B	–
hawkweed spp.	*Hieracium* spp.	A	–	–
kochia	*Kochia scoparia*	–	B	B
Medusahead rye	*Taeniatherum caput-medusae*	–	B	–
poison hemlock	*Conium maculatum*	–	B	B
rush skeletonweed	*Chondrilla juncea*	–	A	A
Russian knapweed	*Acroptilon repens*	–	B	B
Scotch thistle	*Onopordum acanthium*	–	A	B
spike weed	*Hemizonia pungens*	–	A	A
spotted knapweed	*Centaurea maculosa*	–	B	A
St. Johnswort	*Hypericum perforatum*	–	B	B
yellow starthistle	*Centaurea solstitialis*	–	A	B

1. "A": Weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent (Oregon Department of Agriculture 2020).
2. "A": Noxious weeds – plants determined to be injurious to public health, crops, livestock, land or property under provisions of Oregon State Statute and thus mandated for control. "B": Weeds of economic importance. Weeds of limited distribution in the county, subject to intensive control or eradication where feasible (Morrow County 2022).
3. "A": Weeds that have been found as single plants or in very limited populations. Prevention, early detection and eradication are high priority. "B": designated weeds subject to limited to intensive control at state or county level (Umatilla County 2022).

4 CONCLUSIONS

WEST documented Laurence's milkvetch (state threatened) within the Survey Area during 2023 botanical surveys (Attachment 1). Laurence's milkvetch was primarily observed in the southeast third of the Survey Area. In total, an estimated 37,426 plants were identified during the 2022/2023 survey efforts, roughly four-fold more than the approximately 8,700 plants estimated as the range- wide population for this species based on known occurrence records as of 2020 (Tetra Tech 2020). The site-specific surveys conducted for Laurence's milkvetch at the Project

provide a substantial expansion of the known spatial extent and size of current populations of this rare plant within its range.

Several high moisture areas were recorded (Figure 1), which are potentially suitable habitat for disappearing monkeyflower. These areas should be checked for presences during the appropriate survey window (May – June) if impacts may occur at these locations.

WEST documented 15 noxious weed species within the Survey Area. Noxious weeds were observed primarily along roadsides, within drainages, and agricultural areas. Other noxious weeds, such as diffuse knapweed and Scotch thistle, were present throughout the Survey Area.

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Attachment 1.
Rare Plant Survey Results for Wheatridge East Wind Project, Morrow and Umatilla Counties, Oregon – Confidential and Provided Under Separate Cover

Attachment 2.
Representative Photographs from the 2023 Botanical Surveys at the Wheatridge East Wind Project, Morrow and Umatilla Counties, Oregon.



Photo 1. Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) in fruit.



Photo 2. Laurence's milkvetch seed pod.



Photo 3. Vegetative Laurence's milkvetch (presumed).



Photo 4. Laurence's milkvetch desiccated with seed pods.



Photo 5. Laurence's milkvetch grassland habitat.



Photo 6. Grassland habitat near agricultural fields.



Photo 7. Laurence's milkvetch shrub steppe habitat.



Photo 8. Heavily grazed grassland habitat.

2023 Habitat Categorization Survey Report

Wheatridge Renewable Energy Facility East
November 2023

Prepared for
Wheatridge East Wind, LLC

Prepared by

TETRA TECH

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Table of Contents

1.0 Introduction 1
2.0 Methods 1
2.1 Survey Area 1
2.2 Habitat Categorization 1
3.0 Results 3
4.0 Summary and Discussion 5
5.0 References 6

List of Tables

Table 1. Habitat Categories, Types, and Subtypes within the Survey Area 3

List of Figures

Figure 1. Habitat Category

Figure 2. Habitat Subtype

List of Appendices

Appendix A. Habitat Categorization Datasheet

Appendix B. Habitat Types and Subtypes Potentially Occurring Within the 2023 Habitat Categorization Survey Area

Appendix C. Select Photographs of Habitat Taken During 2023 Surveys

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1.0 Introduction

This survey report presents the methods and results of the 2023 habitat categorization surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Wheatridge Renewable Energy Facility East (Project) on behalf of Wheatridge East Wind, LLC, a subsidiary of NextEra Energy Resources, Inc. These surveys were conducted in support of Request for Amendment 1 to the Facility Site Certificate through the Oregon Energy Facility Siting Council. The objective was to map and classify habitat according to the Oregon Department of Fish and Wildlife (ODFW) guidelines set forth in Oregon Administrative Rules (OAR) 635-415-0025.

2.0 Methods

2.1 Survey Area

The Project is located in Morrow and Umatilla counties and includes amended wind micrositing corridors within which impacts will occur. According to Site Certificate Condition PRE-FW-01, field-based habitat surveys are required prior to construction to confirm habitat categories for areas that will be affected by construction. Therefore, the 2023 habitat categorization survey area (Survey Area) consisted of the amended wind micrositing corridors under consideration at the time of the surveys (during the spring of 2023) plus one string of potential turbines not within the amended wind micrositing corridors at the time of surveys (15,947 acres) (Figures 1 and 2). Based on consultation with ODFW, habitat categorization surveys are not required within Mule Deer Winter Range except to confirm areas of Category 6 habitat (e.g., cultivated cropland and developed areas), which was completed during surveys for the state endangered Washington ground squirrel (WAGS; *Urocitellus washingtoni*) (Reiley and Thompson 2023, Tetra Tech 2023a). Therefore, 2023 habitat categorization surveys focused on areas outside of Mule Deer Winter Range but also included spot checks within Mule Deer Winter Range to confirm the habitat type and extent of Category 6 habitat mapped during WAGS surveys and to confirm habitat types with broader implications for Project mitigation needs (e.g., riparian habitat)..

2.2 Habitat Categorization

Before the field surveys, Tetra Tech conducted a desktop assessment of the habitat using aerial photography, topographic maps, previous project surveys (Gerhardt and Anderson 2014, Tetra Tech 2022), and ODFW Big Game Winter Range data (ODFW 2013a). Preliminary habitat polygons, subtypes, and categories within the Survey Area were identified using these sources and confirmed or adjusted in the field.

Most of the Survey Area overlaps with ODFW Mule Deer Winter Range (9,649 acres). Based on consultation with ODFW prior to the surveys, Tetra Tech mapped areas within ODFW-designated Mule Deer Winter Range as Category 2 habitat (8,484 acres), except for cultivated cropland (Dryland Wheat and Irrigated Agriculture) and Other Developed areas including gravel and paved

roads, construction laydown areas, gravel quarries, dump sites, livestock corrals, and pastures, all of which are considered Category 6 habitat (ODFW 2013b). ODFW indicated that determining the condition of the habitat within these areas was not necessary (pers. comm., Steve Cherry, ODFW, February 16, 2023).

Within previously surveyed areas, biologists used Esri FieldMaps software in the field to confirm or recategorize areas of relatively homogenous vegetation and characterized the habitat composition and structure on the field datasheets (Attachment 1). In areas not previously surveyed, biologists confirmed or updated the extents of desktop-delineated polygons, categorized areas of relatively homogenous vegetation, and characterized the habitat composition and structure on the field datasheets. Each delineated vegetation polygon was assigned a habitat type, subtype, and habitat quality category guided by the draft habitat categorization table (Attachment 2). The habitat categorization table is consistent with previously employed category, type, and subtype definitions as described in Gerhardt and Anderson (2014) and Tetra Tech (2022), with overlays for Big Game habitat and WAGS colonies, as applicable. For habitats not defined in Gerhardt and Anderson (2014), such as Cliffs, Caves, and Talus, habitat definitions were adapted from *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001).

Habitat types and categories were not assigned to wetlands and waters in the field, as they were derived from data collected during wetlands and waters surveys for the Project. Within the Survey Area, habitat was classified into one of six quality categories, with Category 1 habitat being the most important to fish and wildlife species (i.e., essential, limited, and irreplaceable habitat) and Category 6 being the least important (i.e., habitat that has low potential to become essential or important habitat), per the ODFW Habitat Mitigation Policy (OAR 635-415-0025). Data characterizing a particular habitat type and quality represented the average condition of all such polygons. A minimum mapping unit of 1 acre was implemented.

During habitat categorization surveys, surveyors walked meandering transects within the non-cultivated land in the Survey Area. While walking, surveyors scanned the landscape and digitized the habitats within these focused corridors and the viewshed to map and categorize 100 percent of the Survey Area outside of Mule Deer Winter Range. Areas of cultivated land delineated in the desktop analysis were initially confirmed during WAGS surveys between March and May, but were also verified for extent, cultivation status, and crop in cultivation (as applicable) during habitat categorization surveys. These low-quality habitat areas were surveyed by driving paved roads, gravel roads, and two-tracks, and occasionally by traversing on foot if the extent was not fully visible from the vehicle or adjacent habitat required delineation. Areas previously mapped as Riparian habitat, including areas within Mule Deer Winter Range, were traversed on foot to verify and update, as needed, the mapped habitat subtype. Although these areas within Mule Deer Winter Range are considered Category 2 habitat regardless of condition, verification of habitat subtype was needed to inform habitat mitigation needs for the Project, including "in-kind" (i.e., similar habitat structure) habitat mitigation for impacts to Category 2 and 3 habitat per the ODFW Habitat Mitigation Policy. During habitat categorization surveys, surveyors also documented incidental observations of state sensitive species (ODFW 2021), eagles, and nesting raptors. Targeted special

status wildlife surveys and raptor nest surveys were performed in 2023 and are reported separately (Tetra Tech 2023a, Tetra Tech 2023b).

Following field surveys, the digitized habitat boundaries were downloaded and processed in a geographic information system (GIS), and information from the field data was incorporated into the spatial data. Data were reviewed for quality control and processed to incorporate any applicable wildlife overlays (e.g., WAGS colonies and associated buffers or ODFW Big Game Winter Range data where not incorporated during field surveys). WAGS colonies and associated buffers were processed based on 2023 WAGS surveys (Reiley and Thompson 2023, Tetra Tech 2023a).

3.0 Results

Targeted, field-based habitat categorization surveys were performed from June 18 to 23, 2023, within the Survey Area. These surveys determined habitat subtypes and categories within the Survey Area as shown in Table 1, Figure 1, and Figure 2. Photos of select habitat types and categories are provided in Attachment 3. Additionally, data regarding Category 6 habitat status were collected during WAGS surveys between March and May 2023 in areas surveyed for that species (Reiley and Thompson 2023, Tetra Tech 2023a).

Table 1. Habitat Categories, Types, and Subtypes within the Survey Area

Habitat Category, Type, and Subtype	Survey Area Within Winter Range (acres)	Survey Area Outside Winter Range (acres)	Total Acres
Category 1			
Grassland: Native Perennial	245.7	22.0	**267.7**
Grassland: Exotic Annual	-	92.9	**92.9**
Shrub-steppe: Rabbitbrush/Snakeweed Shrub-steppe	3.3	-	**3.3**
Subtotal Category 1	**249.0**	**114.8**	**363.9**
Category 2			
Grassland: Native Perennial	6,452.2	471.5	**6,923.8**
Grassland: Exotic Annual	508.9	668.4	**1,177.3**
Developed: Revegetated/Other Planted Grassland	771.0	-	**771.0**
Shrub-steppe: Rabbitbrush/Snakeweed Shrub-steppe	638.9	19.2	**657.4**
Shrub-steppe: Basin Big Sagebrush Shrub-steppe	40.1	0.2	**40.2**
Wetlands - Riverine Wetlands	30.0	-	**30.0**
Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian	19.3	-	**20.0**

Habitat Category, Type, and Subtype	Survey Area Within Winter Range (acres)	Survey Area Outside Winter Range (acres)	Total Acres
Open Water - Lakes, Rivers, Streams: Intermittent or Ephemeral Streams	12.3	-	**12.3**
Wetlands - Emergent Wetlands	7.0	-	**7.0**
Open Water - Lakes, Rivers, Streams: Perennial Streams	3.0	-	**3.0**
Cliffs, Caves, and Talus Slopes	1.3	-	**1.3**
Subtotal Category 2	**8,484.1**	**1,159.3**	**9,643.3**
Category 3			
Grassland: Native Perennial	-	691.1	**691.1**
Developed: Revegetated/Other Planted Grassland	-	0.6	**0.6**
Shrub-steppe: Rabbitbrush/Snakeweed Shrub-steppe	-	62.2	**62.2**
Shrub-steppe: Basin Big Sagebrush Shrub-steppe	-	54.0	**54.0**
Wetlands - Riverine Wetlands	-	1.1	**1.1**
Wetlands - Emergent Wetlands	-	0.0	**0.0**
Subtotal Category 3	**-**	**809.1**	**809.1**
Category 4			
Grassland: Exotic Annual	-	839.1	**839.1**
Shrub-steppe: Rabbitbrush/Snakeweed Shrub-steppe	-	549.3	**549.3**
Grassland: Native Perennial	-	5.4	**5.4**
Open Water - Lakes, Rivers, Streams: Intermittent or Ephemeral Streams	-	2.9	**2.9**
Subtotal Category 4	**-**	**1,396.7**	**1,396.7**
Category 6			
Developed: Dryland Wheat	824.7	2,701.7	**3,526.4**
Developed: Other	70.7	116.7	**187.5**
Developed: Irrigated Agriculture	20.6	-	**20.6**
Subtotal Category 6	**916.0**	**2,818.4**	**3,734.5**
Grand Total	**9,649.1**	**6,298.3**	**15,947.5**
Note: Totals in this table may not be precise due to rounding.			

4.0 Summary and Discussion

Approximately 49 percent of the Survey Area is Native Perennial Grassland, followed by Dryland Wheat at 22 percent, and Exotic Annual Grassland at 13 percent. Rabbitbrush/Snakeweed Shrub-steppe constitutes 8 percent of the Survey Area, Revegetated/Other Planted Grassland constitutes approximately 5 percent, and Other Developed habitats constitute 1 percent. Other Developed habitats consist of paved and gravel roads, homes, quarries, and ranching and other built infrastructure. All other habitats individually constitute less than 1 percent of the Survey Area. These include limited areas of Basin Big Sagebrush Shrub-steppe (40 acres of Category 2 habitat and 54 acres of Category 3 habitat), Irrigated Agriculture (20 acres of Category 6 habitat), Wetlands (37 acres of Category 2 habitat and 1 acre of Category 3 habitat), Riparian Forest and Natural Shrubland Complexes (19 acres of Category 2 habitat), and Open Water (15 acres of Category 2 habitat and 3 acres of Category 4 habitat) habitats.

The Survey Area includes three general areas with distinct habitat characteristics: north, southeast, and west. Habitat in the northern section of the Survey Area (i.e., north of Big Butter Creek Lane) is dominated by Exotic Annual Grassland and Dryland Wheat. Limited areas of Native Perennial Grassland occur on hilltops and hillsides inside the Survey Area, and minimal areas of Rabbitbrush/Snakeweed Shrub-steppe are present along more steeply sloped hillsides (Figure 2).

Habitat in the western section of the Survey Area (i.e., west of Little Butter Creek Road) is dominated by a mix of Native Perennial Grassland, Revegetated/Other Planted Grassland, and Dryland Wheat. Existing disturbances in this area include existing wind farms, grazing, invasive plants, paved roads, gravel roads, and dirt roads. Limited areas of Rabbitbrush/Snakeweed Shrub-steppe are also present within the Survey Area along more steeply sloped hillsides. Developed areas associated with residences and ranching infrastructure are also present.

Habitat in the southeastern section of the Survey Area (i.e., south of Big Butter Creek Lane, and east of Little Butter Creek Road) is almost entirely Native Perennial Grassland habitat with limited areas of Rabbitbrush/Snakeweed Shrub-steppe and Basin Big Sagebrush Shrub-steppe. Along Big Butter Creek and Big Butter Creek Lane, Riparian Forest and Natural Shrubland Complexes, Irrigated Agriculture (wheat, alfalfa, and cultivated hay meadows), and Developed areas associated with residences and ranching infrastructure comingle.

During habitat categorization surveys, surveyors documented several state sensitive and eagle species using habitat within and adjacent to the Survey Area. Flocks of long-billed curlew were observed in grasslands in the northern section of the Survey Area, and individuals and small groups of long-billed curlew were documented elsewhere within the Survey Area (approximately 108 individuals total). Four common nighthawks were observed flying near Big Butter Creek. In the northern section of the Project, just outside the Survey Area, one burrowing owl was observed near two active burrows that were documented during surveys for WAGS in the area (Reiley and Thompson 2023). An additional active burrowing owl burrow was observed roughly 213 meters from the two previously recorded burrows. All three burrows had recent burrowing owl sign (feathers, scat, and pellets); however, no individual burrowing owls were seen at the additional

burrow recorded during habitat categorization surveys. One golden eagle was seen flying overhead, and one potential ferruginous hawk was observed sitting on a nest with chicks present. These raptor observations were incorporated into the raptor nest survey report (Tetra Tech 2023b).

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Figures

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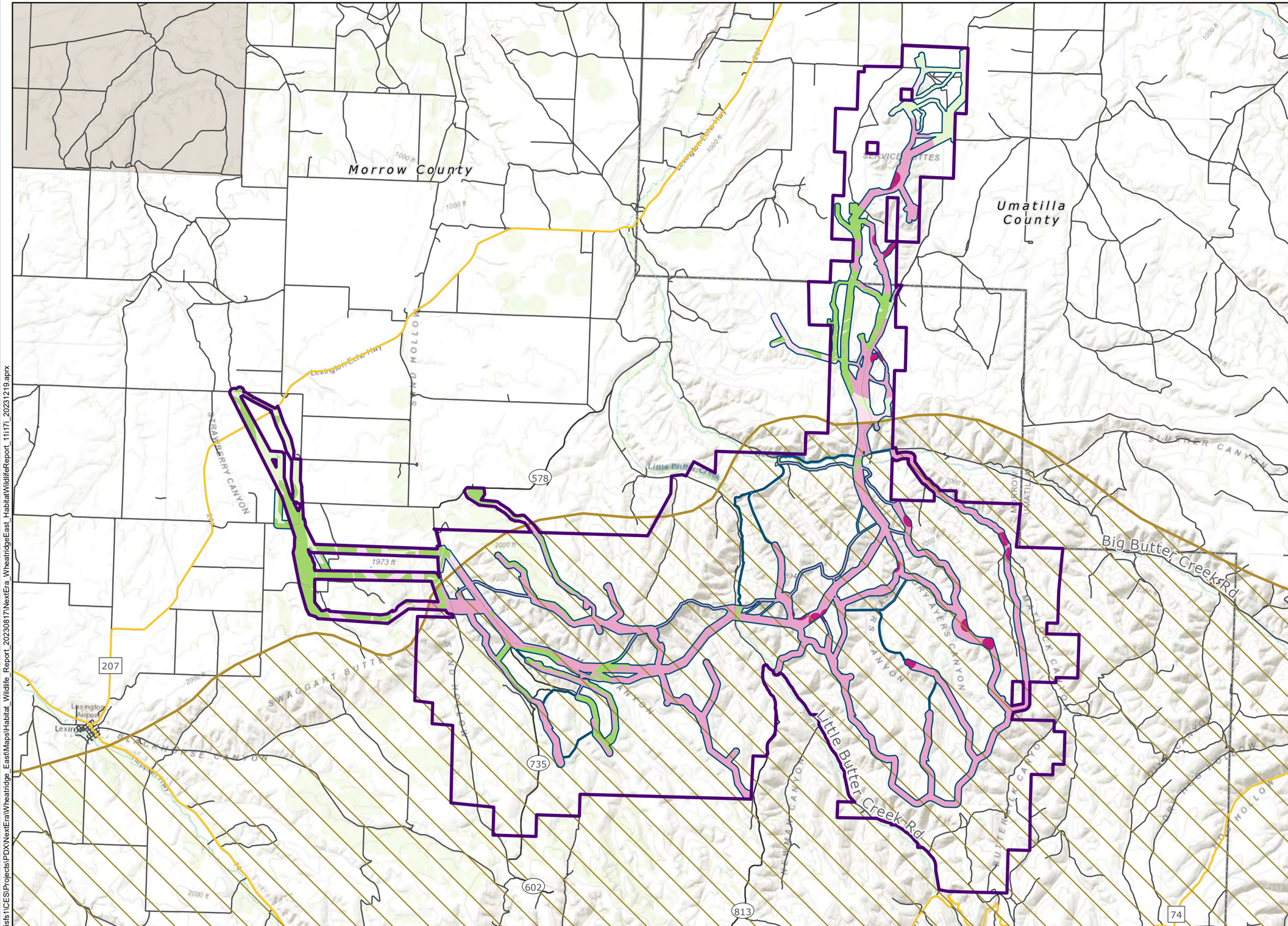


Wheatridge Renewable Energy Facility East

Figure 1
Habitat Category

MORROW AND UMATILLA COUNTIES, OR

- Amended Site Boundary
- 2023 Habitat Categorization Survey Area
- County Boundary
- State Highway
- County Highway
- Local Roads
- ODFW Deer Winter Range

Habitat Category*

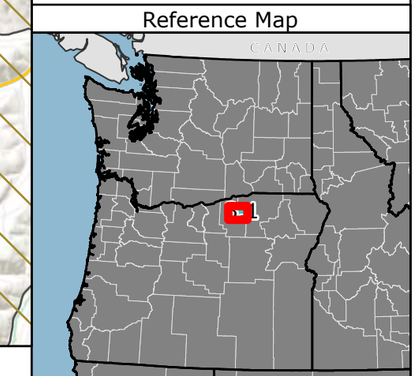
- 1
- 2
- 3
- 4
- 6

*Areas of ODFW-designated Mule Deer Winter Range are considered Category 2 habitat at a minimum except for cultivated cropland and developed land, which is Category 6 habitat.

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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Wheatridge Renewable Energy Facility East

Figure 2
Habitat Subtype

MORROW AND UMATILLA COUNTIES, OR

EFSCType: EFSCSub

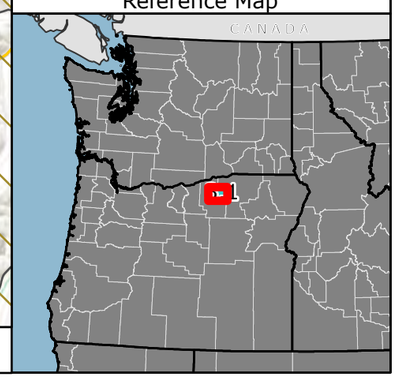
- Cliffs, Caves and Talus
- Developed: Dryland Wheat
- Developed: Irrigated Agriculture
- Developed: Other
- Developed: Revegetated/Other Planted Grassland
- Grassland: Exotic Annual
- Grassland: Native Perennial
- Open Water – Lakes, Rivers, Streams: Intermittent or Ephemeral Streams
- Open Water – Lakes, Rivers, Streams: Perennial Streams
- Riparian Forest and Natural Shrubland Complexes: Eastside (interior) Riparian
- Shrub-steppe: Basin Big Sagebrush
- Shrub-steppe: Rabbitbrush/Snakeweed Shrub-steppe
- Wetlands: Emergent Wetlands
- Wetlands: Riverine Wetlands

- Amended Site Boundary
- 2023 Habitat Categorization Survey Area
- ODFW Deer Winter Range
- State Highway
- County Highway
- Local Roads
- County Boundary

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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Attachment 1. Habitat Categorization Datasheet

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Data Sheet Id: _____

Wheatridge Renewable Energy Facility East - HABITAT CATEGORIZATION

HABITAT CATEGORY ☐

Date _____ Surveyor _____

Site description:

EFSC habitat type/subtype: (circle one habitat type and one subtype):

Grassland: Exotic Annual (GA), Native Perennial (GB),
Shrub-steppe: Basin Big Sagebrush Shrub-steppe (SSA), Rabbitbrush/Snakeweed Shrub-steppe (SSB)
Riparian Forest and Natural Shrubland Complexes: Eastside (Interior) Riparian (ER)
Developed: Dryland Wheat (DW), Irrigated Agriculture (IG), Developed Other (DX), Revegetated or Other Planted Grassland (RVG)
Cliffs, Caves, and Talus (CT)

Notes if confusion _____

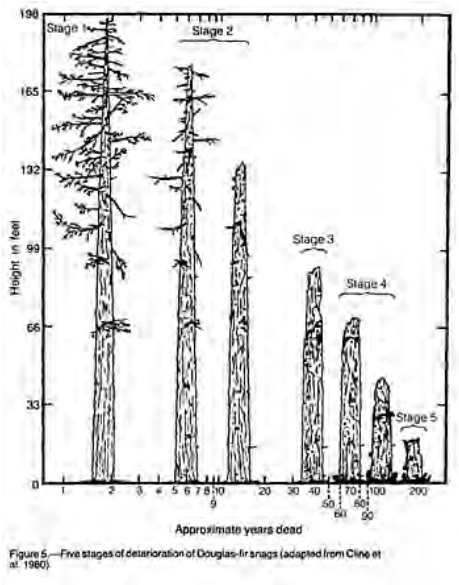


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

Detailed vegetation measurements:

**Dominant ≥20%, Subdominant 10-20%

Trees

Dominant species _____

Subdominant species _____

Avg. dbh (in.) __ Canopy closure (%) ___ No. subcanopy layers ____

Percent native cover _____ Percent bare ground or duff _____

Stumps present? Yes No

Snags present? Yes No Snag stage (circle one) 1 2 3 4 5 Abundance ____/ac

Forest phase per Brown: GF SHR OSP CSPS LGSAW OGDD

Shrubs

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover _____ Percent bare ground _____

Percent crytobiotic crust (if applicable)_____

Herbs & Grasses

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover:_____ Percent bare ground or duff ____

Percent crytobiotic crust (if applicable)_____

Other descriptions:

Disturbance type(s), check all that apply within the polygon, and for disturbances outside but in view of the polygon, insert the estimated distance in meters between the polygon edge and the disturbance:

__Grazing	__Thinning	__Wind Farm
__Invasive plants	__Quarry	__Fire
__Clearcut Logging	__Residence or Farm	__Other Building
__Railroad	__Communications Tower	__Campground
__Dirt Road	__Gravel Road	__Asphalt road
__Row Crop	__Urban Area	__Erosion

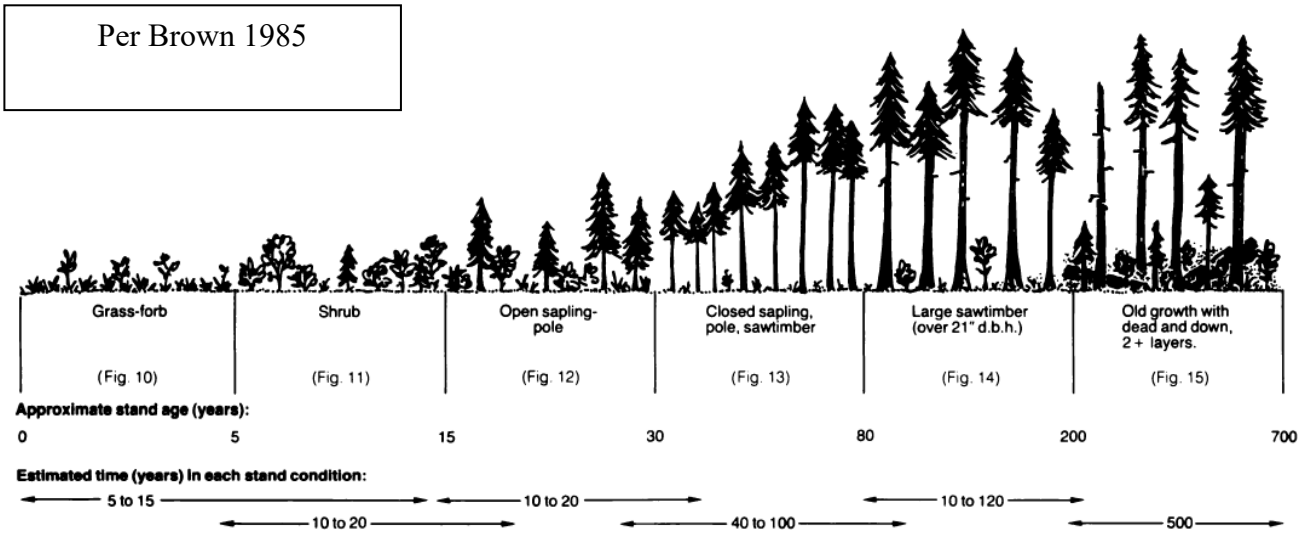
__Recreation, if so what kind? _____ Other (please specify) _____

Any sensitive species seen or habitat specifically noted (if yes, please explain)? Yes No

Any special features (for example: caves, mine openings, cliffs, rimrock, rock outcrops, talus slopes, abandoned buildings, large snags, abandoned wood bridges, balds and bluffs, wetland habitats (if yes, please explain)? Yes No

Any additional notes:

Per Brown 1985



Attachment 2. Habitat Types and Subtypes Potentially Occurring within the 2023 Habitat Categorization Survey Area

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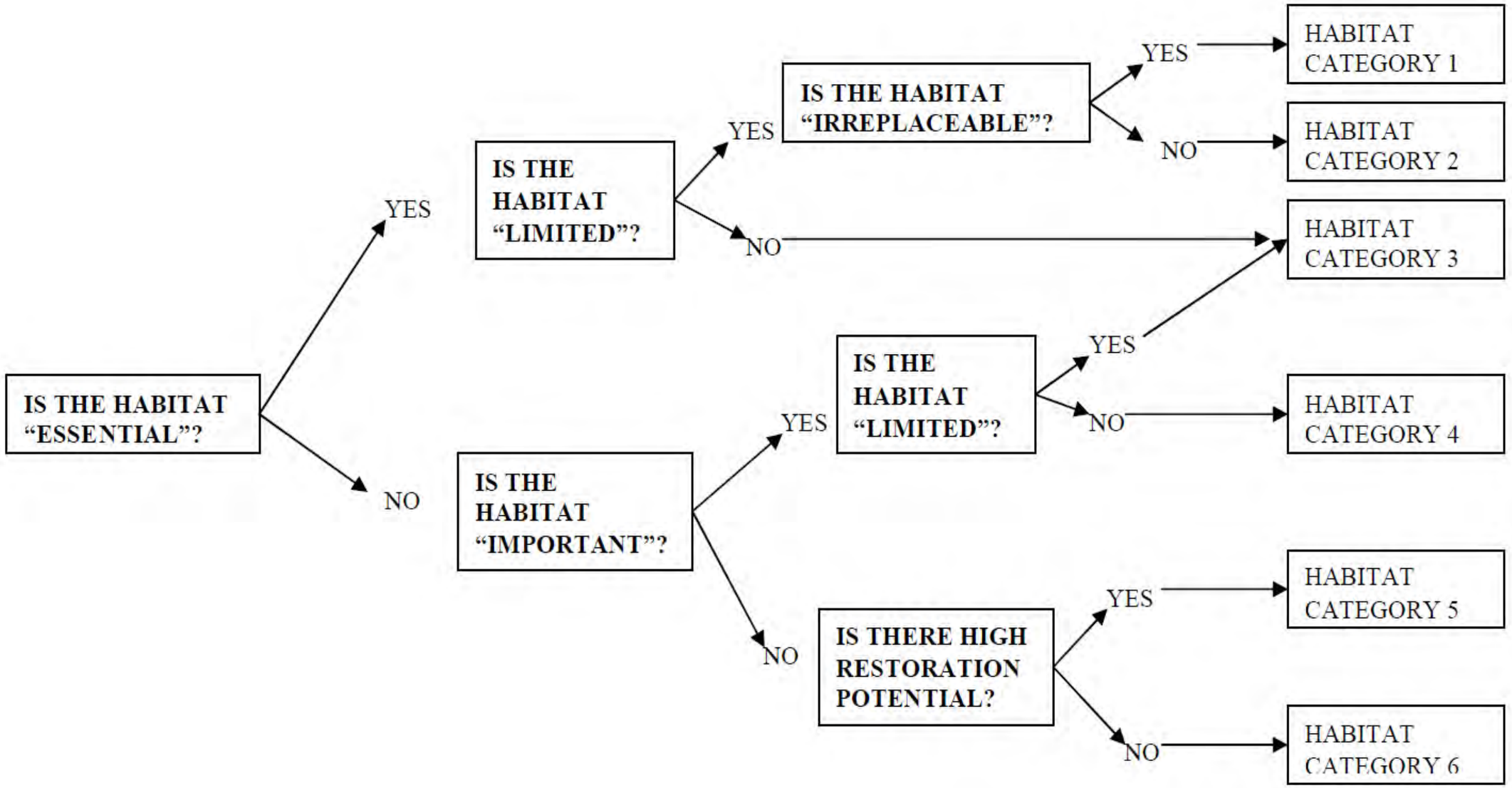
Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
The First Two Rows are Overlays That Automatically Assigns Categories, Based on Species Presence, to One or More of the Habitat Types Described Below							
Active WAGS Colony Overlay applies to habitat types Grassland and Shrub-steppe, and select Developed habitat subtypes (i.e., Revegetated or Other Planted Grasslands)		Active Washington ground squirrel colony with a 785-foot buffer in suitable habitat.	Additional 4,136 foot (total of 1.5km) buffer on WAGS Category 1 habitat except where there are habitat barriers to dispersal.	–	–	–	–
Big Game Winter Range Habitat Overlay applies to all habitat subtypes except Developed - Dryland Wheat, Developed – Irrigated Agriculture, and Developed – Other (i.e., except for cropland and developed areas).			Mule Deer Winter Range as designated by ODFW (2013).	–	–	–	–
Grassland	Exotic Annual	–	–	–	Non-native grasslands with a very high weed component and disturbed or less nutrient-rich soils. The forb component is composed primarily of non-native weeds, such as cheatgrass, bulbous bluegrass, cereal rye, tumble-mustard, and Russian thistle, with occasional patches of native bunchgrass, primarily Sandberg bluegrass. The high weed content is primarily due to past fires, which burned native shrubs and bunchgrasses and were followed by heavy grazing and/or wind erosion.	–	–
	Native Perennial	–	–	Dominated by native perennial grasses such as Sandberg bluegrass, bluebunch wheatgrass, Idaho fescue, western needlegrass, and needle-and-thread grass. Various native forbs and low shrubs such as gray rabbitbrush and, to a lesser extent, green rabbitbrush are present but are an inconspicuous component. Native vascular plants are diverse, and a variety of invertebrates can be found utilizing the plants throughout the growing season. These habitats have been altered through land use or wildfires, and generally contain a significant component of non-native vegetation (broad-leaf weeds and annual grasses). Category 3 Native Perennial Grasslands generally occur on sites with shallow soils and harsh exposures, or in areas that have experienced livestock grazing or frequent fires. Provide essential foraging habitat to a variety of common resident and migratory birds and common mammals.	Category 4 Native Perennial Grassland is ecologically similar to Category 3 Native Perennial Grassland but is classified as Category 4 because its small size and isolated nature limit its value to wildlife.	–	–

Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Shrub-steppe	Basin Big Sagebrush Shrub-steppe	–	Shrub-steppe habitat with an overstory of mature (large structure) patches of basin big sagebrush. Understory plants consist of a mix of native bunchgrasses and exotic annual grasses depending largely on level of impact from disturbance. Common grasses are Sandberg bluegrass, bluebunch wheatgrass, cheatgrass, and bulbous bluegrass. Category 2 Basin Big Sagebrush Shrub-steppe has a higher shrub density and greater plant health than similar but lesser quality Category 3 Basin Big Sagebrush Shrub-steppe habitat. Category 2 Basin Big Sagebrush Shrub-steppe offers high quality breeding habitat for shrub obligate species including loggerhead shrike and may support Washington ground squirrel. Sagebrush lizard may be found in areas where more sandy soils are present.	Patches of Category 3 Basin Big Sagebrush Shrub-steppe lack the density and plant health of Category 2 Basin Big Sagebrush Shrub-steppe or are in patches of limited size. The overstory sagebrush in this type is often decadent or lacks full foliage. Understory vegetation in Category 3 Basin Big Sagebrush Shrub-steppe often tends toward annual grasses and low weeds. These areas were historically higher quality habitats but are experiencing degradation due to land use practices or frequent fires. However, the mature shrub cover provides escape and resting cover for common wildlife and is limited in the immediate area and the region.	–	–	–
	Rabbitbrush/ Snakeweed Shrub-steppe	–	–	Have been affected by recent fires and are in a relatively early seral stage. Native rabbitbrush and other low-stature plants such as broom snakeweed and various buckwheat species are common. The understory is native Sandberg bluegrass, non-native cheatgrass, bulbous bluegrass, and tumblemustard. Patches of native perennial grasses, such as bluebunch wheatgrass and needle-and-thread grass, are present. Many of these sites contain small patches of sagebrush that are less than one acre (0.4 ha) in size.	Has the same plant species but differs in composition from Category 3 Rabbitbrush/Snakeweed Shrub-steppe in that it has a greater weed and annual grass component than Category 3 Rabbitbrush/Snakeweed Shrub-steppe. While aspect and soils may contribute somewhat to this, disturbances such as livestock grazing and fires likely have a far greater effect.	–	–
Cliffs, Caves, and Talus	Cliffs, Caves, and Talus	Sites with bat hibernacula.	Sites with known bat colonies.	Sites without bat colonies.	–	–	–
Riparian Forest and Natural Shrubland Complexes	Eastside (Interior) Riparian		High quality, diverse riparian areas that are not degraded	Typical mid-seral riparian, provides wildlife habitat	Provides marginal habitat; somewhat degraded.	Highly degraded; dominated by non-native plant species.	–

Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Developed	Revegetated or Other Planted Grassland	–	–	Planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. This habitat subtype is comprised mainly of native or native-like grasses. Native vegetation in Category 3 Revegetated or Other Planted Grasslands may be sparse and not well-developed and may have a significant component of annual grasses and weeds.	–	–	–
	Dryland Wheat	–	–	–	–	–	Agricultural fields that are currently in small grain production or fallow.
	Irrigated Agriculture	–	–	–	–	–	Agricultural fields that are irrigated.
	Other	–	–	–	–	–	Includes farming/ranching home and shop sites, corrals, structures, feedlots, active and inactive gravel quarries, non-irrigated pastures, graveled and paved roads, rights-of-way, and waste areas associated with on-going human activities.


IS THE HABITAT "ESSENTIAL"?
YES
NO
IS THE HABITAT "LIMITED"?
YES
NO
IS THE HABITAT "IRREPLACEABLE"?
YES
NO
HABITAT CATEGORY 1
HABITAT CATEGORY 2
HABITAT CATEGORY 3
IS THE HABITAT "IMPORTANT"?
YES
NO
IS THE HABITAT "LIMITED"?
YES
NO
HABITAT CATEGORY 4
IS THERE HIGH RESTORATION POTENTIAL?
YES
NO
HABITAT CATEGORY 5
HABITAT CATEGORY 6

Attachment 3. Select Photographs of Habitat Taken During 2023 Surveys

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Photo 1. Category: 2, Eastside Interior Riparian.



Photo 2. Category: 2, Revegtated or Other Planted Grassland.



Photo 3. Category: 3, Basin Big Sagebrush Shrub-steppe.



Photo 4. Category: 3, Rabbitbrush Snakeweek Shrub-steppe.



Photo 5. Category: 3, Native Perennial Grassland.

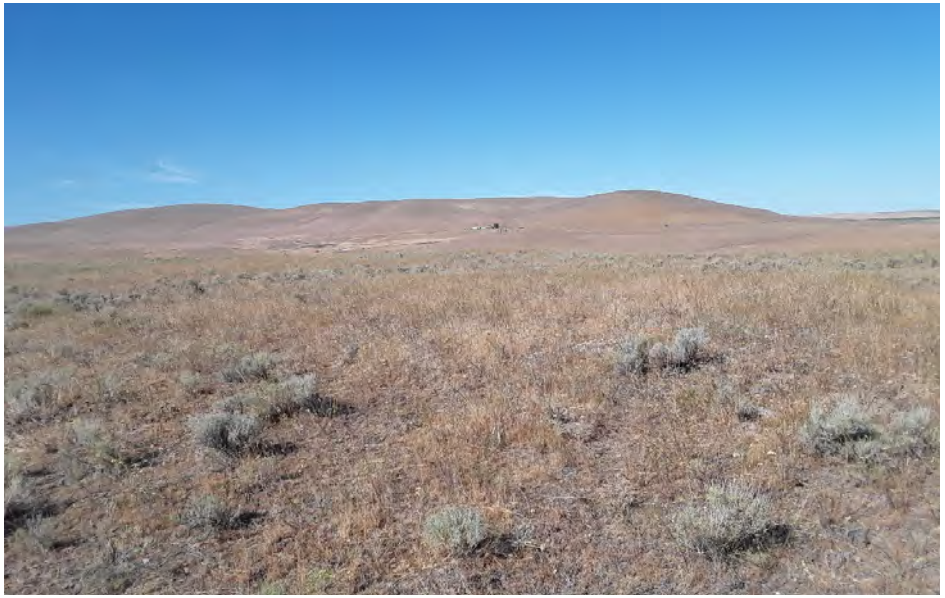

Photo 6. Category: 3, Native Perennial Grassland.



Photo 7. Category: 4, Native Perennial Grassland.



Photo 8. Category: 4, Exotic Annual Grassland.



Photo 9. Category: 4, Exotic Annual Grassland.



Photo 10. Category: 4, Rabbitbrush Snakeweek Shrub-steppe.



Photo 11. Category: 6, Dryland Wheat.



Photo 12. Category: 6, Irrigated Agriculture.



Photo 13. Category: 6, Other Developed Areas.



Photo 14. Active burrowing owl burrow.

2023 Raptor Nest Survey Report

Wheatridge Renewable Energy Facility East

Prepared for:



Prepared by:



1750 S Harbor Way, Suite 400
Portland, Oregon 97201

October 2023

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Table of Contents

1.0 Introduction 1
2.0 Regulatory Context 1
3.0 Review of Existing Data 1
4.0 Methods 2
4.1 Field Surveys 2
4.2 Data Collection 2
5.0 Results and Discussion 4
6.0 Raptor Nest Buffers 6
7.0 References 6

List of Tables

Table 1. Wheatridge Renewable Energy Facility East 2023 Raptor Nest Survey Results
Table 2. Seasonal Activity Restrictions and Spatial Buffers for Active Nests per Site Certificate Condition CON- FW-02

List of Figures

Figure 1. 2023 Raptor Nest Survey Results: Non-eagle Nests (Confidential)
Figure 2. 2023 Raptor Nest Survey Results: Eagle Nests (Confidential)
Figure 3. 2023 Raptor Nest Survey Results: Incidental Big Game

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1.0 Introduction

This report presents the methods and results for the 2023 raptor nest surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Wheatridge Renewable Energy Facility East (Facility), performed for Wheatridge East Wind, LLC, a subsidiary of NextEra Energy Resources, Inc. The Facility is an approved, but not yet constructed, wind energy generation facility located in Morrow and Umatilla counties, Oregon (Figure 1). The surveys were conducted to support Request for Amendment 1 to the Facility Site Certificate through the Oregon Energy Facility Siting Council. The survey area covered a 2-mile buffer around the Amended Site Boundary. The purpose of the surveys was to inventory above-ground raptor nests within the survey area to support Facility permitting and inform potential avoidance and minimization measures. Surveys for the state endangered Washington ground squirrel (WAGS) and other special status wildlife species were also conducted for the Facility in 2023 (Tetra Tech 2023). Above-ground raptor nests incidentally documented during the 2023 WAGS surveys or other Facility-related fieldwork are reported here.

2.0 Regulatory Context

The surveys were designed in accordance with the voluntary U.S. Fish and Wildlife Service (USFWS) Land-based Wind Energy Guidelines (WEG; USFWS 2012), Stage 2 of the Eagle Conservation Plan Guidance (ECPG; USFWS 2013), the 2016 Eagle Rule (USFWS 2016), the April 2020 Eagle Survey Memo (USFWS 2020), Site Certificate Condition PRE- FW-01, and in coordination with Oregon Department of Fish and Wildlife (ODFW).

Raptors and other migratory birds are protected under the Migratory Bird Treaty Act (MBTA). Bald and golden eagles are also protected under the Bald and Golden Eagle Protection Act (BGEPA). These acts prohibit anyone without a permit from the USFWS from "taking" any part of these birds, their eggs, or their nests. This includes removing an active nest or disturbing an adult bird so that it abandons the nest, causing the eggs or young to die. The ECPG and 2016 Eagle Rule recommend that at least 2 years of pre-construction raptor nest surveys be conducted at wind energy project sites. The first year of raptor nest surveys at the Facility was conducted in 2022 (Tetra Tech 2022) and encompassed the Project Lease Area plus a 2-mile radius and an additional 2 miles to the south and 1 mile to the northwest in anticipation of the potential expansion of the Facility.

Site Certificate Condition PRE- FW-01 requires that field-based surveys be conducted to identify active raptor nests to inform the implementation of buffer zones around active nest sites during construction as specified in CON-FW-02.

3.0 Review of Existing Data

Tetra Tech reviewed raptor nest data from several sources including the Oregon Biodiversity Information Center (ORBIC; ORBIC 2022), the Oregon Eagle Foundation (OEF; Leal 2020), and the

2022 surveys (Tetra Tech 2022). The data review identified 155 known raptor nest records within the survey area, including 12 historical golden eagle nest records (Nests 1 through 11 and 13, Table 1, Figure 2). These nests were checked during the 2023 surveys. No known bald eagle nests were identified during this review of existing data. Bald eagle nesting sites are generally associated with aquatic foraging areas (Buehler 2022). Although bald eagles may use the Facility Amended Site Boundary during migration or winter, they are not expected to nest in or near the Facility based on a lack of suitable habitat conditions.

4.0 Methods

4.1 Field Surveys

Two rounds of aerial surveys were performed to facilitate a complete inventory of nest locations and accurate nest occupancy determinations. The initial survey was conducted from March 4 to 6, 2023, during the early nesting period when most breeding pairs in the region exhibit nest-building or incubation behaviors. The second survey was conducted from May 10 to 12, 2023, when most raptors in the region are engaged in mid- to late-breeding season reproductive activities (e.g., brooding, feeding nestlings). The surveys were conducted from a Bell 206B3 Jet Ranger helicopter (JL Aviation based in Boring, Oregon). The crew consisted of a pilot and two Tetra Tech biologists for safety reasons and to minimize the chance of missing nests. Because of overlap between the Wheatridge Renewable Energy Facility East survey area and the Heppner Wind Project survey area, both projects were surveyed during the same mobilization for both survey rounds in 2023.

The helicopter flew north-to-south-oriented transects spaced 1 mile apart over the survey area. The helicopter deviated from the transects for closer inspection of high quality nesting habitat as needed. The transects were shifted by 0.5 miles during the second round to provide more complete coverage of the survey area by increasing the overall number of transects and reducing the spacing between the transects. While searching for nests, the helicopter flew at a speed of 30 to 40 knots and an approximate altitude of 200 feet above the ground. The speed and the altitude of the helicopter were reduced as needed for the inspection of nests and other areas of interest. Private residences and livestock were avoided or flown over at a higher altitude to keep disturbance to a minimum.

During both survey rounds, the biologists checked the status of known raptor nests and searched for new raptor nests not previously identified. The surveyors documented all raptor nests, raven nests, concentrations of eagle prey resources (e.g., herds of big game, carrion, etc.) and incidental observations of eagles. Although not raptors, common raven nests were documented because they could be used by nesting raptors during subsequent breeding seasons.

4.2 Data Collection

A tablet computer with ArcGIS mapping software and electronic data forms was used during the surveys to aid in navigation and record data. For each nest, the following data were collected:

- **Nest Identification Number:** Unique numeric identifier assigned to each nest site that also represents a geographical location that is determined by latitude and longitude coordinates.
- **Species:** If identified, the species was recorded. If the species using the nest could not be determined, it was recorded as unknown.
- **Adult Present:** Proximity of the adult to the nest (e.g., on nest, nearby, or unknown).
- **Eggs or Young:** Number of eggs or young observed.
- **Nest Size:** Classified as large or small. Small nests were those estimated by the biologist as having a diameter of less than 24 inches, comprised of smaller sticks, and with other characteristics typical of nests used by smaller raptors and not by eagles. Large nests were those estimated by the biologist as having a diameter of 24 inches or greater, comprised of larger sticks, and with other characteristics typical of nests used by eagles and other large raptors.
- **Nest Substrate:** Structure in which the nest was located (e.g., broadleaf tree, cliff, artificial nest structure, etc.).
- **Nest Height:** Height relative to the structure it was on (e.g., on top of a transmission pole, 3/4 of height of tree).
- **Nest Status:** To assess nest status, the following terms were adapted from the 2016 Eagle Rule (USFWS 2016) and Postupalsky (1974):
    - Inactive: Defined by the absence of any adult, egg, or dependent young at the nest, or signs of building or adding to the nest in preparation for egg-laying. This term is specific to non-eagle nests.
    - In-use: The presence of eggs, dependent young, or adult on the nest, or signs of building or adding to the nest in preparation for egg-laying. This term applies to eagle and non-eagle nests.
    - Alternate: One of potentially several nests within an eagle territory that is not an in-use nest at the time of surveys. When there is no in-use nest, all nests in the territory are alternate nests. This term is specific to eagle nests.
    - Unknown: A nest not detected during the first round of surveys which may have gone undetected or been built subsequent to the survey, or a nest that is present but for which surveyors are unable to determine status (e.g., vegetation around the nest site obscured the view of nest, etc.). This term applies to eagle and non-eagle nests.
    - No Longer Present: A nest that was located during a previous survey but has subsequently been positively ascertained to be destroyed and no evidence of the nest remains. This term applies to eagle and non-eagle nests.

  - Not Found: A previously known nest that could not be located (e.g., access limitations), but that may still exist (not the same as "No Longer Present" above). This term applies to eagle and non-eagle nests.
  - Not Surveyed: A known nest that occurred outside of the given survey area or that could not be surveyed due to other reasons (e.g., inaccessible to helicopter, the presence of a residence, nearby cattle, etc.). This term applies to eagle and non-eagle nests.
  - Failed: A nest for which evidence indicates nest initiation (egg-laying), but the nest failed to produce any chicks to fledging age. This term applies to eagle and non-eagle nests.

- **Nest Condition:** To assess nest condition, the following criteria were used (Postupalsky 1974):
  - Excellent: Defined cup or nest bowl with a well-maintained rim; adult or young present.
  - Good: Nest bowl intact and rim defined; minor repair needed for nest to be used; margins of nest in loose configuration, minor slumping occurring.
  - Fair: Nest bowl intact and nest not dilapidated but needs significant repair in order to be used; material is slumping or sliding.
  - Poor: Loose structure of nest bowl still present; nest walls and side falling out; nest is in need of major repair to be used.
  - Remnant: Nest bowl not defined; scant material remaining and not usable unless fully rebuilt.
  - Unknown: The nest cannot be found, was not surveyed, or the nest is present, but because of its location, a determination cannot be made.
  - Not Applicable: Nest no longer present.

5.0 Results and Discussion

At the completion of the surveys, 159 nests were known to be present within the survey area, including six golden eagle nests (three in-use nests and three alternate nests), 47 ferruginous hawk nests (10 in-use nests and 37 inactive nests), nine in-use Swainson's hawk nests, 21 in-use red-tailed hawk nests, nine in-use great horned owl nests, two in-use prairie falcon nests, one in-use northern harrier nest, one in-use barn owl nest, 23 in-use common raven nests, and 40 small inactive nests with unknown species determinations (Table 1, Figure 1 and 2).

Three additional small inactive nests were present during the initial aerial survey but no longer present during the second aerial survey (Nests 130, 182, and 317; Table 1). These nests are not included in the above totals nor depicted in the report figures. There were 16 nests present during the initial survey that were not checked during the second survey because of nearby cattle (Table

1); these nests were included in the totals and are shown on the report figures. Surveyors were unable to check one of the known nests (Nest 358) during either survey round because of nearby cattle (Table 1). In 2022, Nest 358 was a small nest occupied by Swainson's hawks (Tetra Tech 2022).

Large nests observed during the surveys included three in-use golden eagle nests, three alternate golden eagle nests, 10 in-use ferruginous hawk nests, and 37 inactive ferruginous hawk nests(Table 1). One of the golden eagle nests, in-use Nest 170, was a new nest (Figure 2). It was first recorded as a small inactive nest in 2022. It remained a small inactive nest throughout 2022 and up until the second survey in 2023. In between the 2023 survey rounds, golden eagles added more material to the nest and built it up to a fairly large nest. The nest is in a poplar tree, which is unusual as most tree-nesting golden eagles in the area select cottonwood or locust trees. Nest 170 is approximately 1.8 miles northwest of Nest 8, which was used by golden eagles in 2022. The pair of eagles using Nest 8 in 2022 may have moved to Nest 170 in 2023. Golden eagles often have long-enduring nesting territories, and usually build several nests within their territory which are used alternately (Palmer 1988). All other golden eagle nests, aside from Nest 170, are historical nests from the OEF/ORBIC datasets. Of the 12 golden eagle nest records from the OEF/ORBIC datasets, two were in-use, three were alternate, and seven were no longer present in 2023 (Table 1, Figure 2).

Identifying raptor nests can be difficult without the birds' presence. When possible, Tetra Tech distinguished between nests that appeared to have been originally constructed by ferruginous hawks and those that may have been constructed by golden eagles. The determination that a nest had originally been built by ferruginous hawks was based on the size, arrangement of sticks (primarily sagebrush stems), and characteristic placement on the ground, on top of rounded rock outcrops, or in lone or isolated clusters of trees and shrubs (WDFW 1996, Shaffer et al. 2019).

Suitable nesting habitat within the survey area primarily consists of riparian areas at the bottom of the canyons, cliffs, rock outcrops, and bands of rock on the hillsides. Of the 159 nests, 72 were in trees (54 in broadleaf trees, 7 in conifer trees, and 11 in snags), 1 in a shrub, 40 on cliffs, 29 on rimrock, 9 on rock outcrops, 4 on the ground, and 4 on man-made structures (1 on a telephone pole, 1 on a windmill, 1 on a communication tower, and 1 on a fuel tank; Table 1). Most of the nests were in the central and southeastern portions of the survey area. The northern portion of the survey area generally lacks suitable substrate for nesting raptors.

No state or federally listed threatened or endangered species were documented during the raptor nest surveys. Eighteen golden eagles and 10 bald eagles were incidentally observed during the surveys (Figure 2). Sixteen of the golden eagles were observed during the initial survey and two during the second survey. All 10 bald eagles were observed during the initial survey, indicating those eagles were probably migrants. Most of the eagles were observed within the southcentral and southeastern portions of the survey area (Figure 2). A cluster of four golden eagles were observed to the south of the east side of the Amended Site Boundary (Figure 2). These eagles may have been associated with Nests 170, 7, and 8 but they were closer to three historical golden eagle nest records that were confirmed to no longer be present during the surveys (Nests 4, 5 and 6; Figure 2). Golden eagle prey concentrations observed incidentally during the surveys consisted of herds of elk

and mule deer. A total of 78 elk and 492 mule deer were observed during the surveys (Figure 3). Elk and deer carrion can be an important food source for eagles, especially in the winter when prey is less available (O'Connell and Kochert 2013, Katzner et al. 2020, Buehler 2022).

6.0 Raptor Nest Buffers

As discussed in Section 1.0, the primary purpose of this survey was to inform potential restrictions for the Facility that might be applied to construction activities due to active raptor nests in or adjacent to the Amended Site Boundary. Two of the species observed nesting within the survey area, Swainson's hawk and ferruginous hawk, have been designated as state sensitive species by ODFW (ODFW 2021) and therefore are addressed in the Facility's permitting through the Oregon Energy Facility Siting Council, per OAR 345-021-0010(1)(p). In addition to the state sensitive designation for Swainson's hawks and ferruginous hawks, all raptor species nesting within the survey area are protected by the MBTA. Seasonal activity restrictions and spatial buffers for active raptor species based on Condition CON- FW-02 of the Site Certificate are provided in Table 2. Seasonal activity restrictions and buffer zones for other raptor species not listed in Table 2 should be determined through coordination with ODFW and USFWS.

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Table 1. Wheatridge Renewable Energy Facility East 2023 Raptor Nest Survey Results

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
175[1]	Barn owl	Inactive	In-use	Small	Excellent	Excellent	Cliff	Nest is in a small grotto on cliff. It was occupied by prairie falcons in 2022.
160[1]	Common raven	Inactive	In-use	Small	Poor	Excellent	Snag	
171[1]	Common raven	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
196[1]	Common raven	Inactive	In-use	Small	Fair	Excellent	Broadleaf tree	
214[1]	Common raven	In-use	In-use	Small	Good	Excellent	Cliff	
306[1]	Common raven	Inactive	In-use	Small	Fair	Excellent	Broadleaf tree	
323[1]	Common raven	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
353[1]	Common raven	Inactive	In-use	Small	Excellent	Excellent	Conifer tree	
355[1]	Common raven	Inactive	In-use	Small	Fair	Excellent	Broadleaf tree	
422	Common raven	Inactive	In-use	Small	Good	Excellent	Snag	
500	Common raven	Unknown	In-use	Small	Unknown	Excellent	Cliff	
501	Common raven	Unknown	In-use	Small	Unknown	Excellent	Snag	
502	Common raven	Unknown	In-use	Small	Unknown	Excellent	Snag	
508	Common raven	Unknown	In-use	Small	Unknown	Excellent	Cliff	
509	Common raven	Unknown	In-use	Small	Unknown	Excellent	Conifer tree	
510	Common raven	Unknown	In-use	Small	Unknown	Excellent	Windmill	
512	Common raven	Unknown	In-use	Small	Unknown	Excellent	Conifer tree	
513	Common raven	Unknown	In-use	Small	Unknown	Excellent	Conifer tree	
519	Common raven	Unknown	In-use	Small	Unknown	Excellent	Cliff	
523	Common raven	Unknown	In-use	Small	Unknown	Excellent	Cliff	
525	Common raven	Unknown	In-use	Small	Unknown	Excellent	Cliff	
535	Common raven	Unknown	In-use	Small	Unknown	Excellent	Rock outcrop	
702[2]	Common raven	Unknown	In-use	Small	Not Applicable	Excellent	Broadleaf tree	
703[2]	Common raven	Unknown	In-use	Small	Not Applicable	Excellent	Communication Tower	
100[1]	Ferruginous hawk	Inactive	In-use	Large	Excellent	Excellent	Snag	
134[1]	Ferruginous hawk	Inactive	In-use	Large	Excellent	Excellent	Rock outcrop	
151[1]	Ferruginous hawk	Inactive	In-use	Large	Good	Excellent	Cliff	
312[1]	Ferruginous hawk	Inactive	In-use	Large	Good	Excellent	Cliff	
337[1]	Ferruginous hawk	Inactive	In-use	Large	Poor	Excellent	Rimrock	
401	Ferruginous hawk	Inactive	In-use	Large	Fair	Excellent	Snag	
404	Ferruginous hawk	Inactive	In-use	Large	Fair	Excellent	Rimrock	Nest above quarry.
409	Ferruginous hawk	Inactive	In-use	Large	Good	Excellent	Snag	
413	Ferruginous hawk	Inactive	In-use	Large	Excellent	Excellent	Conifer tree	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
708[2]	Ferruginous hawk	Unknown	In-use	Large	Not Applicable	Excellent	Ground	
109[1]	Ferruginous hawk	Inactive	Inactive	Large	Excellent	Excellent	Snag	
118[1]	Ferruginous hawk	Inactive	Inactive	Large	Good	Good	Rimrock	
119[1]	Ferruginous hawk	Inactive	Inactive	Large	Good	Good	Rimrock	
121[1]	Ferruginous hawk	Inactive	Not Surveyed	Large	Excellent	Unknown	Rimrock	Not surveyed during second round because of nearby cattle.
125[1]	Ferruginous hawk	Inactive	Inactive	Large	Good	Fair	Cliff	
126[1]	Ferruginous hawk	Inactive	Inactive	Large	Good	Fair	Cliff	
128[1]	Ferruginous hawk	Inactive	Inactive	Large	Poor	Poor	Rimrock	
131[1]	Ferruginous hawk	Inactive	Inactive	Large	Poor	Poor	Rimrock	
133[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Poor	Rimrock	
135[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Poor	Rimrock	
149[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Fair	Rock outcrop	
152[1]	Ferruginous hawk	Inactive	Inactive	Large	Good	Fair	Cliff	
161[1]	Ferruginous hawk	Inactive	Inactive	Large	Poor	Poor	Rimrock	
168[1]	Ferruginous hawk	Inactive	Inactive	Large	Remnant	Remnant	Ground	
177[1]	Ferruginous hawk	Inactive	Inactive	Large	Remnant	Remnant	Rimrock	
178[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Fair	Rimrock	
179[1]	Ferruginous hawk	Inactive	Inactive	Large	Remnant	Remnant	Cliff	
187[1]	Ferruginous hawk	Inactive	Inactive	Large	Remnant	Remnant	Rimrock	
194[1]	Ferruginous hawk	Inactive	Not Surveyed	Large	Fair	Unknown	Rimrock	Not surveyed during second round because of nearby cattle.
195[1]	Ferruginous hawk	Inactive	Not Surveyed	Large	Fair	Unknown	Rimrock	Not surveyed during second round because of nearby cattle.
201[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Fair	Rimrock	
202[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Fair	Rimrock	
207[1]	Ferruginous hawk	Inactive	Inactive	Large	Remnant	Remnant	Rimrock	
211[1]	Ferruginous hawk	Inactive	Inactive	Large	Good	Good	Rimrock	
311[1]	Ferruginous hawk	Inactive	Inactive	Large	Poor	Poor	Rimrock	
313[1]	Ferruginous hawk	Inactive	Inactive	Large	Excellent	Fair	Cliff	
356[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Fair	Cliff	
359[1]	Ferruginous hawk	Inactive	Inactive	Large	Fair	Poor	Rimrock	
412	Ferruginous hawk	Inactive	Inactive	Large	Fair	Fair	Cliff	
425	Ferruginous hawk	Inactive	Inactive	Large	Poor	Poor	Rimrock	
426	Ferruginous hawk	Inactive	Inactive	Large	Excellent	Fair	Rimrock	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
511	Ferruginous hawk	Unknown	Inactive	Large	Unknown	Fair	Rock outcrop	
524	Ferruginous hawk	Unknown	Inactive	Large	Unknown	Fair	Rock outcrop	
532	Ferruginous hawk	Unknown	Inactive	Large	Unknown	Good	Rock outcrop	
533	Ferruginous hawk	Unknown	Inactive	Large	Unknown	Poor	Rimrock	
536	Ferruginous hawk	Unknown	Inactive	Large	Unknown	Remnant	Ground	
712[2]	Ferruginous hawk	Unknown	Inactive	Large	Not Applicable	Good	Rock outcrop	A few feathers visible in and near the nest, and whitewash present on larger perch rocks within 15 meters of the nest.
1[1]	Golden eagle	In-use	In-use	Large	Good	Excellent	Cliff	During the first round, an adult briefly observed perched on nest before it flew off and copulated with another golden eagle near the nest. An incubating/brooding adult on nest during the second round.
9[1]	Golden eagle	Alternate	In-use	Large	Excellent	Excellent	Cliff	One white, downy chick approximately 3 weeks old in nest during the second round.
170[1]	Golden eagle	Inactive	In-use	Large	Excellent	Excellent	Broadleaf tree	Nest was built up considerably between surveys; it was a small nest during the initial round and a large nest during the second round. Incubating/brooding adult on nest during the second round.
7[1]	Golden eagle	Alternate	Alternate	Large	Good	Good	Cliff	
8[1]	Golden eagle	Alternate	Alternate	Large	Good	Excellent	Broadleaf tree	
11[1]	Golden eagle	Alternate	Alternate	Large	Poor	Remnant	Rimrock	Nest may have been constructed by ferruginous hawks rather than golden eagles.
2[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	The nest has fallen off the cliff face and onto the ground below. The fallen nest is unlikely to be used by eagles or other raptors in the future; therefore, it was recorded as no longer present.
3[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
4[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
5[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
6[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
10[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
13[1]	Golden eagle	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
102[1]	Great horned owl	In-use	Not Surveyed	Small	Excellent	Unknown	Broadleaf tree	Not surveyed during second round because of nearby cattle.
105[1]	Great horned owl	In-use	Inactive	Small	Excellent	Fair	Broadleaf tree	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
137[1]	Great horned owl	In-use	In-use	Small	Excellent	Excellent	Cliff	
143[1]	Great horned owl	In-use	In-use	Small	Excellent	Excellent	Broadleaf tree	
155[1]	Great horned owl	In-use	Inactive	Small	Excellent	Fair	Broadleaf tree	
411	Great horned owl	In-use	Inactive	Small	Excellent	Excellent	Cliff	
423	Great horned owl	In-use	Inactive	Small	Excellent	Good	Broadleaf tree	
424	Great horned owl	In-use	Not Surveyed	Small	Excellent	Unknown	Broadleaf tree	Not surveyed during second round because of nearby cattle.
704[2]	Great horned owl	Unknown	In-use	Small	Not Applicable	Excellent	Broadleaf tree	
705[2]	Northern harrier	Unknown	In-use	Small	Not Applicable	Excellent	Ground	
176[1]	Prairie falcon	Inactive	In-use	Small	Excellent	Excellent	Cliff	
711[2]	Prairie falcon	Unknown	In-use	Small	Not Applicable	Excellent	Cliff	
101[1]	Red-tailed hawk	In-use	In-use	Small	Excellent	Excellent	Broadleaf tree	
110[1]	Red-tailed hawk	In-use	In-use	Small	Excellent	Excellent	Broadleaf tree	
117[1]	Red-tailed hawk	In-use	In-use	Small	Excellent	Excellent	Broadleaf tree	Quick, high flyover made during both survey rounds due to cattle in the vicinity.
123[1]	Red-tailed hawk	In-use	In-use	Small	Excellent	Excellent	Broadleaf tree	
132[1]	Red-tailed hawk	Inactive	In-use	Small	Poor	Excellent	Cliff	
138[1]	Red-tailed hawk	In-use	In-use	Small	Excellent	Excellent	Snag	
144[1]	Red-tailed hawk	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
147[1]	Red-tailed hawk	Inactive	In-use	Small	Excellent	Excellent	Broadleaf tree	
153[1]	Red-tailed hawk	Inactive	In-use	Small	Fair	Excellent	Cliff	
166[1]	Red-tailed hawk	Inactive	In-use	Small	Excellent	Excellent	Broadleaf tree	
180[1]	Red-tailed hawk	Inactive	In-use	Small	Excellent	Excellent	Cliff	
188[1]	Red-tailed hawk	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
189[1]	Red-tailed hawk	Inactive	In-use	Small	Fair	Excellent	Broadleaf tree	
204[1]	Red-tailed hawk	In-use	Not Surveyed	Small	Excellent	Unknown	Cliff	Not surveyed during second round because of nearby cattle.
300[1]	Red-tailed hawk	Inactive	In-use	Small	Excellent	Excellent	Broadleaf tree	
315[1]	Red-tailed hawk	In-use	In-use	Small	Good	Excellent	Broadleaf tree	
504	Red-tailed hawk	Unknown	In-use	Small	Unknown	Excellent	Broadleaf tree	
507	Red-tailed hawk	Unknown	In-use	Small	Unknown	Excellent	Cliff	
706[2]	Red-tailed Hawk	Unknown	In-use	Small	Not Applicable	Excellent	Telephone pole	
707[2]	Red-tailed Hawk	Unknown	In-use	Small	Not Applicable	Excellent	Broadleaf tree	
710[2]	Red-tailed Hawk	Unknown	In-use	Small	Not Applicable	Excellent	Broadleaf tree	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
316[1]	Swainson's hawk	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
321[1]	Swainson's hawk	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
324[1]	Swainson's hawk	Inactive	In-use	Small	Good	Excellent	Conifer tree	
402	Swainson's hawk	Inactive	In-use	Small	Good	Excellent	Broadleaf tree	
414	Swainson's hawk	Inactive	In-use	Small	Poor	Excellent	Broadleaf tree	
506	Swainson's hawk	Unknown	In-use	Small	Unknown	Excellent	Broadleaf tree	
520	Swainson's hawk	Unknown	In-use	Small	Unknown	Excellent	Conifer tree	
521	Swainson's hawk	Unknown	In-use	Small	Unknown	Excellent	Broadleaf tree	
522	Swainson's hawk	Unknown	In-use	Small	Unknown	Excellent	Broadleaf tree	
112[1]	Unknown	Inactive	Not Surveyed	Small	Excellent	Unknown	Broadleaf tree	Not surveyed during second round because of nearby cattle.
115[1]	Unknown	Inactive	Inactive	Small	Excellent	Good	Broadleaf tree	
120[1]	Unknown	Inactive	Inactive	Small	Fair	Fair	Cliff	
122[1]	Unknown	Inactive	Not Surveyed	Small	Excellent	Unknown	Broadleaf tree	Not surveyed during second round because of nearby cattle.
136[1]	Unknown	Inactive	Inactive	Small	Excellent	Good	Cliff	
139[1]	Unknown	Inactive	Inactive	Small	Good	Good	Rock outcrop	
141[1]	Unknown	Inactive	Inactive	Small	Fair	Poor	Rock outcrop	
148[1]	Unknown	Inactive	Inactive	Small	Good	Poor	Broadleaf tree	
154[1]	Unknown	Inactive	Inactive	Small	Good	Good	Cliff	
163[1]	Unknown	Inactive	Not Surveyed	Small	Excellent	Unknown	Rimrock	Not surveyed during second round because of nearby cattle.
164[1]	Unknown	Inactive	Not Surveyed	Small	Good	Unknown	Rimrock	Not surveyed during second round because of nearby cattle.
172[1]	Unknown	Inactive	Inactive	Small	Good	Good	Snag	
173[1]	Unknown	Inactive	Inactive	Small	Fair	Good	Broadleaf tree	
181[1]	Unknown	Inactive	Inactive	Small	Excellent	Good	Cliff	
183[1]	Unknown	Inactive	Not Surveyed	Small	Good	Unknown	Cliff	Not surveyed during second round because of nearby cattle.
184[1]	Unknown	Inactive	Inactive	Small	Excellent	Excellent	Cliff	
185[1]	Unknown	Inactive	Inactive	Small	Excellent		Cliff	Nest in a small cave on cliff.
193[1]	Unknown	Inactive	Inactive	Small	Good	Good	Rimrock	
203[1]	Unknown	Inactive	Not Surveyed	Small	Good	Unknown	Cliff	Not surveyed during second round because of nearby cattle.
205[1]	Unknown	Inactive	Not Surveyed	Small	Remnant	Unknown	Cliff	Not surveyed during second round because of nearby cattle.
206[1]	Unknown	Inactive	Inactive	Small	Good	Excellent	Rimrock	
213[1]	Unknown	Inactive	Inactive	Small	Good	Fair	Snag	
305[1]	Unknown	Inactive	Inactive	Small	Excellent	Good	Broadleaf tree	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
314[1]	Unknown	Inactive	Not Surveyed	Small	Good	Unknown	Broadleaf tree	Not surveyed during second round because of nearby cattle.
318[1]	Unknown	Inactive	Inactive	Small	Excellent	Good	Broadleaf tree	
319[1]	Unknown	Inactive	Not Surveyed	Small	Good	Unknown	Broadleaf tree	
327[1]	Unknown	Inactive	Inactive	Small	Excellent	Good	Broadleaf tree	
333[1]	Unknown	Inactive	Inactive	Small	Good	Good	Shrub	
338[1]	Unknown	Inactive	Inactive	Small	Fair	Good	Cliff	
339[1]	Unknown	Inactive	Inactive	Small	Good	Good	Broadleaf tree	
351[1]	Unknown	Inactive	Inactive	Small	Good	Excellent	Fuel tank	Quick, high flyover due to lose due to cattle in the vicinity.
403	Unknown	Inactive	Inactive	Small	Good	Good	Broadleaf tree	
442	Unknown	Inactive	Inactive	Small	Good	Fair	Broadleaf tree	
527	Unknown	Unknown	Inactive	Small	Unknown	Good	Broadleaf tree	
528	Unknown	Unknown	Inactive	Small	Unknown	Excellent	Broadleaf tree	
530	Unknown	Unknown	Inactive	Small	Unknown	Excellent	Cliff	
531	Unknown	Unknown	Inactive	Small	Unknown	Fair	Broadleaf tree	
534	Unknown	Unknown	Inactive	Small	Unknown	Excellent	Cliff	
701[2]	Unknown	Unknown	Inactive	Small	Not Applicable	Excellent	Broadleaf tree	
709[2]	Unknown	Unknown	Inactive	Small	Not Applicable	Excellent	Broadleaf tree	
358[1]	Unknown	Not Surveyed	Not Surveyed	Unknown	Unknown	Unknown	Broadleaf tree	Not surveyed because of nearby cattle present during both rounds.
103[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
106[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Telephone pole	
113[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Windmill	
124[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
142[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
156[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Snag	
162[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Cliff	
165[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
167[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
169[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Rock outcrop	
186[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Ground	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
190[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
191[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
192[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
197[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Ground	
200[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Cliff	
210[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Ground	
212[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Cliff	
301[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Telephone pole	
302[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Telephone pole	
303[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
304[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
320[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
322[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Conifer tree	
325[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
326[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Windmill	
328[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Rock outcrop	
329[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Windmill	
330[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Conifer tree	
331[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Conifer tree	
332[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Cliff	
334[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
336[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
350[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
352[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Ground	

Nest ID	Species	Nest Status During the First Survey	Nest Status During the Second Survey	Nest Size Class	Nest Condition During the First Survey	Nest Condition During the Second Survey	Nest Substrate	Pertinent Survey Notes
354[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
357[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Ground	
360[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
363[1]	Not Applicable	No Longer Present	No Longer Present	Not Applicable	Not Applicable	Not Applicable	Broadleaf tree	
129[1]	Not Applicable	Inactive	No Longer Present	Small	Excellent	Not Applicable	Cliff	
130[1]	Not Applicable	Inactive	No Longer Present	Small	Fair	Not Applicable	Cliff	
182[1]	Not Applicable	Inactive	No Longer Present	Small	Good	Not Applicable	Cliff	
317[1]	Not Applicable	Inactive	No Longer Present	Small	Good	Not Applicable	Broadleaf tree	

1. Previously known nest record reported by Leal 2020, ORBIC 2022, or Tetra Tech 2022.
2. Nest found incidentally during 2023 Washington ground squirrel surveys or other Facility-related fieldwork.

Table 2. Seasonal Activity Restrictions and Spatial Buffers for Active Nests per Site Certificate Condition CON-FW-02

Species	Nesting Period	Restricted Activity Buffer (miles)[1]
Ferruginous hawk	March 15–August 15	0.25
Swainson's hawk	April 1–August 15	0.25
Western burrowing owl	April 1–August 15	0.25

1. If avoidance within the buffer restrictions cannot be maintained, the certificate holder may request approval from the Oregon Department of Energy in consultation with ODFW on a mitigation and conservation strategy for condition compliance.

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Figures

(Figure 1 and Figure 2 are confidential and provided under a separate cover.)

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Wheatridge Renewable Energy Facility East

Figure 3
2023 Raptor Nest Survey Results
Incidental Big Game

MORROW AND UMATILLA COUNTY, OR

- Amended Site Boundary
- Survey Area (2-mile Buffer)
- County Boundary

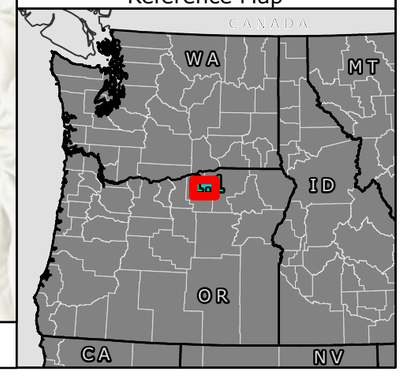
Incidental Sightings (Number of Individuals)

- Elk (78)
- Mule Deer (492)

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



1:160,000 WGS 1984 UTM Zone 11N

0 2.5 5 10 15 Miles

NOT FOR CONSTRUCTION

\\cess706gisfs1\CES\Projects\PDX\NextEra\Wheatridge_East\Maps\RNS_Results_20230613\NextEra_WheatridgeEast_RNS_Results_11i17i_20231219.aprx

2023 Washington Ground Squirrel and Other Special Status Wildlife Species Survey Report

Wheatridge Renewable Energy Facility East
September 2023

Prepared for
Wheatridge East Wind, LLC

Prepared by



Tetra Tech, Inc.

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Table of Contents

1.0 Introduction 1
2.0 Survey Area 1
2.1 Habitat Assessment and Delineation 2
2.2 Historical Data Review 3
3.0 Methods 3
3.1 Washington Ground Squirrel 3
3.1.1 Identification of Protocol 3
3.1.2 Survey Schedule 4
3.1.3 Field Survey Methods 4
3.1.4 Recording Data 5
3.2 Other Special Status Wildlife 5
4.0 Results 6
4.1 Washington Ground Squirrel 6
4.2 Other Special Status Wildlife 12
5.0 Summary and Conclusions 14
6.0 References 14

List of Tables

Table 1. Survey Area Definitions and Figure Labels 2
Table 2. 2023 Surveyed Areas 9
Table 3. 2023 Washington Ground Squirrel Colony Results 9
Table 4. Special Status Wildlife Species Observed During Surveys 13

List of Figures

Figure 1. Washington Ground Squirrel Predicted Habitat within Occupied Watersheds in Oregon (Confidential; provided under separate cover)

Figure 2. Washington Ground Squirrel Survey Area

Figure 3. Washington Ground Squirrel Active Colonies (Confidential; provided under separate cover)

Figure 4. Special Status Species

List of Appendices

Appendix A. Special Status Wildlife Species Potentially Occurring within the 2023 WAGS Survey Area

Appendix B. Select Photographs of WAGS and Other Wildlife and Habitat Taken during 2023 Surveys

Appendix C. Wildlife Species Observed During 2023 Surveys

1.0 Introduction

This survey report presents the methods and results of the 2023 Washington ground squirrel (WAGS; *Urocitellus washingtoni*) and other special status wildlife species surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Wheatridge Renewable Energy Facility East Project (Project), performed for Wheatridge East Wind, LLC, a subsidiary of NextEra Energy Resources, Inc. This survey supports the Request for Amendment 1 to the Project Site Certificate through the Oregon Energy Facility Siting Council. The survey aimed to identify the presence of WAGS colonies and other special status wildlife species and their habitats at the Project so impacts may be avoided or minimized.

WAGS are small ground squirrels that inhabit the Columbia Basin, shrub-steppe ecoregion (Verts and Carraway 1998) of eastern Washington and north-central Oregon. In Oregon, the WAGS range extends from Umatilla County west through Gilliam and Morrow counties to the John Day River. Figure 1 shows the predicted WAGS habitat within Oregon watersheds where this species is known to occur and in relation to the Project (INR 2011). In January 2000, the Oregon Department of Fish and Wildlife (ODFW) listed WAGS as endangered in Oregon due to concerns over long-term population viability. On September 21, 2016, the U.S. Fish and Wildlife Service (USFWS) announced that listing WAGS as endangered under the federal Endangered Species Act of 1973 was not warranted (USFWS 2016).

2.0 Survey Area

The ODFW Habitat Mitigation Policy (OAR 635-415-0025) typically defines WAGS colonies with a 785-foot buffer in suitable habitat as Category 1 habitat, which has a mitigation strategy of avoidance. Site Certificate Condition PRE-TE-01 for the Project requires pre-construction surveys for WAGS be conducted in all areas of suitable habitat within 1,000 feet of any ground disturbing activity between 1 and 3 years prior to construction, and a (non-protocol) survey of known WAGS colonies the year prior to construction to verify colony activity and to determine the updated extent of the WAGS colony boundaries and associated Category 1 habitat for areas surveyed to protocol 2 to 3 years prior to construction. Therefore, to define the 2023 WAGS Survey Corridor, or area initially considered for surveys in 2023, Tetra Tech buffered suitable WAGS habitat within the amended micrositing corridors (containing all areas of proposed ground disturbing activity in suitable habitat) by 1,000 feet. Wheatridge East Wind, LLC contracted with a separate environmental consulting company (Western Ecosystems Technology, Inc. [WEST]) to conduct WAGS surveys for the majority of the Project north of Big Butter Creek Lane, with the exception of a small area north of Big Butter Creek Lane that Tetra Tech surveyed following a property boundary of a parcel that spanned both sides of Big Butter Creek Lane. The area WEST surveyed was excluded from the 2023 WAGS Survey Corridor discussed in this report (Figure 2).

Following the identification of the 2023 WAGS Survey Corridor, Tetra Tech removed habitat that was unsuitable for WAGS (i.e., active agricultural fields and developed land) and areas previously surveyed to protocol in 2022 from consideration for field surveys, although 2022 WAGS colonies in these areas were revisited and delineated as noted below and in compliance with Site Certificate Condition PRE-TE-01. In addition, small portions of the 2023 WAGS Survey Corridor were removed from survey consideration because infrastructure was no longer under consideration in these areas at the start of surveys (i.e., they were not within 1,000 feet of proposed ground disturbance) or access was not granted at the time of surveys (Figure 2). As a result, the 2023 WAGS Survey Area (Survey Area) described in this report consists of the approximately 20,772 acres of uncultivated and undeveloped habitat within the 2023 WAGS Survey Corridor that was not surveyed to protocol in 2022, had landowner access granted at the time of surveys, and where infrastructure remained under consideration at the time of surveys (Table 1; Figure 2). The 20,772-acre Survey Area is depicted in Figure 2 as "2023 Surveyed to Protocol" and "Contingency Area (Not Surveyed to Protocol)". As described later in Section 4.1, the Contingency Area was only surveyed once because it was removed from consideration following the first round of surveys, due to the presence of WAGS that made the proposed infrastructure at that location no longer feasible.

Table 1. Survey Area Definitions and Figure Labels

Survey Term	Survey Term Figure Label[1]	Definition		Exclusion Figure Label[1]
		Area Initially Considered	Exclusions	
2023 WAGS Survey Corridor	2023 WAGS Survey Corridor	Suitable habitat within the 1,000-foot buffer on suitable WAGS habitat within the amended micrositing corridors	Area surveyed by WEST	Not depicted
2023 WAGS Survey Area (Survey Area)	2023 Surveyed to Protocol plus Contingency Area (Not Surveyed to Protocol)	2023 WAGS Survey Corridor	Areas surveyed to protocol in 2022	2022 Surveyed to Protocol
			Areas where infrastructure was no longer under consideration	Infrastructure No Longer Under Consideration (Not Surveyed to Protocol)
			Areas with no access	No Access
			Active agricultural and developed areas	Not WAGS Habitat

[1] Area label on Figure 2.

2.1 Habitat Assessment and Delineation

WAGS are most common in shrub-steppe habitats with deep sandy, or silt-loam soils that support the creation of burrows (Betts 1990, Yensen and Sherman 2003). Sagebrush habitats and bunchgrass grasslands have the highest densities of WAGS. Lower densities are found in more

degraded habitats, such as low shrub habitats with annual grasses, rabbitbrush (*Ericameria* sp. and *Chrysothamnus* sp.), and invasive species (Betts 1990). WAGS eat a broad range of seeds, forbs, leaves, flowers, and roots (Greene 1999) that provide adequate fat stores to survive their long aestivation, hibernation, and reproduction periods. Native plants, such as Sandberg bluegrass (*Poa secunda*), are likely key to their diet and survival (Tarifa and Yensen 2004).

Prior to commencing surveys, Tetra Tech used aerial imagery to identity suitable WAGS habitat within the 2023 WAGS Survey Corridor. WAGS are found most often in sagebrush habitats and bunchgrass grasslands with few invasive species; however, ODFW has advised that WAGS colonies can be found in all habitats except active agricultural fields and developed land. As a result, all non-agricultural and undeveloped land in the 2023 WAGS Survey Corridor was considered suitable habitat.

2.2 Historical Data Review

In 2022, Tetra Tech received element occurrence records for WAGS within 10 miles of the Project (the area under consideration as of April 2022) from the Oregon Biodiversity Information Center (ORBIC; 2022). Tetra Tech reviewed the results of this ORBIC query as well as the results of previous WAGS surveys for the Project (Gerhardt and Anderson 2014, Tetra Tech 2022), all of which indicated that WAGS had been documented in the Project vicinity (Tetra Tech 2022).

3.0 Methods

3.1 Washington Ground Squirrel

3.1.1 Identification of Protocol

The 2023 WAGS surveys generally followed the methodology used in *Status and Habitat Use of the WAGS on State of Oregon Lands, South Boeing, Oregon* (Morgan and Nugent 1999). The survey dates (mid-March through May 2023) were within the active squirrel season identified in Site Certificate Condition PRE-TE-01 (March 1 to May 31). Prior to beginning the surveys, Tetra Tech consulted the Oregon Department of Energy and ODFW regarding the planned survey methods and dates. ODFW confirmed the protocol and date range, and recommended surveys in March begin at lower elevations (S. Cherry, personal communication via Teams meeting, February 16, 2023). Tetra Tech's approved protocol included transects approximately 165 to 230 feet apart (consistent with Morgan and Nugent 1999) and allowed for approaching potential WAGS burrows identified during the first survey round at 90 degrees to the original transects (an approved deviation from Morgan and Nugent 1999), rather than walking the entire second round of transects at this bearing as in Morgan and Nugent (1999). In addition, ODFW confirmed 2023 surveys should consist of revisiting the colonies previously mapped in 2022 to identify any changes in colony boundaries and confirm WAGS presence.

3.1.2 Survey Schedule

WAGS are diurnally active and spend much of the year underground. Adults emerge from burrows between January and March, depending on elevation and weather patterns, and return underground between late May and early June. Juveniles emerge from burrows between March and April and return underground a few weeks after the adults (Carlson et al. 1980). They aestivate throughout the summer and are thought to transition directly into hibernation (ODFW 1999, Sherman and Shellman Sherman 2005).

The survey protocol requires two rounds of surveys to increase the likelihood of detecting WAGS. The first round of surveys began on March 15 and the second round started the last week of April, with surveys ending before June 1. This survey period corresponds to juvenile squirrel emergence from the burrows, and the associated increase in activity and alarm calls in the early spring through the start of the aestivation period in late May to early June (Morgan and Nugent 1999).

3.1.3 Field Survey Methods

Before beginning fieldwork, personnel visited an active WAGS colony where they were trained to identify burrows, scat, alarm calls, and squirrels. They were given guidance on WAGS natural history, habitat, and survey protocol. All field personnel also passed a hearing test to verify that they could hear the 8-kilohertz frequency typical of ground-dwelling squirrel alarm call vocalizations. WAGS are often presumed to be the only species of ground squirrel in its range; however, Carlson et al. (1980) documented one Belding's ground squirrel (*Urocitellus beldingi*) colony within the WAGS range, 15 miles northeast of Heppner. Heppner is about 7 miles southwest of the Survey Corridor at its closest point. Belding's ground squirrels were documented during surveys for the Project in 2022, and therefore surveyors were also trained on methods to distinguish WAGS from Belding's ground squirrels.

WAGS can be distinguished from Belding's ground squirrels by their smaller size, smaller ears, and distinct dorsal spotting (USFWS 2022). Both species have the uniquely shaped characteristic ground squirrel scat with a pinched end, but WAGS scat is much smaller, with adult WAGS scat approximately the same size as juvenile Belding's scat. Belding's ground squirrels also have lower frequency calls with different tonal patterns (Robinson 1981).

Each day, surveyors recorded weather points at the start, middle, and end of surveys. Surveys typically began in the morning, at least one hour after sunrise when temperatures supported ground squirrel activity, and ended in the early afternoon. Anemometers were used to measure the wind speeds throughout the day. When average wind speed exceeded 15 miles per hour, surveys were halted unless field personnel could find another area sheltered from the wind. Surveys were also halted if there was more than a light rain, as it would hinder hearing WAGS and likely limit WAGS activity.

Surveyors walked transects approximately 165 to 230 feet apart and at a similar pace to ensure there were no gaps in coverage. Field crew members communicated findings to the group via hand-

held radios to avoid double-recording data. When surveyors observed potential WAGS burrows or heard a WAGS alarm call, they alerted the group and searched the area for any squirrels or additional sign. A potential WAGS burrow was defined as a freshly dug (no vegetation or cobwebs), appropriately sized, and structurally sound hole with no additional WAGS sign (scat, visual, audio). Surveyors recorded the location of potential WAGS burrows during the first survey round and revisited them during the second round to determine if an active colony was present. A colony was confirmed active if at least two of the following were identified: positive auditory or visual WAGS observation, fresh WAGS burrows, or fresh WAGS scat.

The second survey round followed the same method as the first, except potential WAGS burrows were approached from roughly a perpendicular direction compared to the first round. The approach direction was changed to account for topography and prevailing winds, which may affect WAGS detectability from a given direction. The second survey round also included transects offset from the first-round transects to increase coverage by traveling between the initial transect paths. Second-round surveyors revisited existing colonies to determine if the activity level or colony boundaries had changed between surveys.

3.1.4 Recording Data

A Global Positioning System waypoint was recorded for each potential burrow observed in the first survey round to reinvestigate during the second round. When an active colony was observed, tabular data were collected on digital datasheets using the Survey123 software program. Spatial data were collected using the FieldMaps software and a Garmin Geode to record the activity center and colony boundary to submeter accuracy. Tabular data collected at each colony included habitat characteristics, number of burrows, number of scat, the time and weather conditions under which the colony was discovered, how the colony was first discovered, the plant-species composition within and directly surrounding the colony, and any potential disturbances within 1,000 feet of the colony. Weather points were collected at the start, middle, and end of each survey day; recorded data included the date, field personnel, precipitation, average wind speed and direction, cloud cover, and temperature.

3.2 Other Special Status Wildlife

Prior to conducting field surveys, Tetra Tech conducted a desktop review to identify special status wildlife species with the potential to occur at the Project. Special status wildlife included federal and state endangered, threatened, proposed, and candidate species; USFWS species of concern; USFWS birds of conservation concern; eagles; ODFW sensitive and sensitive-critical species; and Oregon Conservation Strategy species (Appendix A; OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, USFWS 2021, USFWS 2023). Tetra Tech reviewed habitat and range information for special status wildlife species known to occur in Morrow County (as Umatilla County is outside of the 2023 WAGS Survey Corridor) and the Columbia Plateau/Columbia Basin to develop the list of species that had the potential to occur at the Project. Species were eliminated from consideration if their habitat was not present or their range did not overlap the Project. In addition to reviewing publicly

available sources, Tetra Tech submitted a formal request to ORBIC to obtain site-specific records of special status species occurrences and sensitive habitats in the Project's vicinity (ORBIC 2022).

Special status wildlife surveys occurred concurrently with WAGS surveys. In the field, surveyors scanned the landscape, the sky, and the ground looking for special status wildlife species and recognizable sign (e.g., burrowing owl burrows with scat and pellets), focusing on non-cultivated areas likely to support special status wildlife species. Areas unlikely to support special status species—cultivated land, developed areas—were surveyed primarily from field vehicles by driving paved roads, gravel roads, and two-tracks while confirming these areas were unsuitable for WAGS. Surveyors recorded the location of special status wildlife species (or recognizable sign) using Esri FieldMaps software and recorded information on the number of individuals and their behavior. Surveyors also kept a running list of all wildlife species observed during 2023 surveys at the Project and documented raptor nests if observed. Targeted raptor nest surveys were performed in 2023 and are reported separately (Tetra Tech 2023). Following field surveys, the digitized data were downloaded and processed using geographic information system (GIS) software and were reviewed for quality control and assurance.

4.0 Results

4.1 Washington Ground Squirrel

Tetra Tech conducted protocol-level WAGS surveys on approximately 18,246 acres in 2023 (Table 2; Figure 2). Tetra Tech surveyed an additional 2,526 acres during round one only, within the Contingency Area, because this area was removed from consideration following the first round of surveys due to the presence of WAGS that made the proposed infrastructure at that location no longer feasible. Seven new active WAGS colonies were recorded, all south of Big Butter Creek Lane and east of Little Butter Creek Road (Table 3; Figure 3). Two of these colonies identified during the first round of surveys (WRE_2023_B04 and WRE_2023_B05) were located in the Contingency Area that was subsequently removed from consideration for development. Table 3 shows the collected colony data, including the observation date, colony acreage within the Survey Area, WAGS activity confirmation methods, and dominant plant species. Appendix B includes representative photos of the WAGS colony habitat and sign observed during the surveys.

During the 2023 surveys, all WAGS colonies recorded in 2022 were also revisited to determine activity status and any updates to the colony extent by walking concentric circles around each colony boundary to approximately 656 feet from the boundary and looking for evidence of present or past burrow activity. Two of the five colonies identified in 2022 (WREE01 and WREE05) were observed to be active during the 2023 surveys, while the remaining three (WREE02, WREE03, and WREE04) had no evidence of colony activity. WREE01 was minimally active when it was revisited in March but fully active when revisited in April with multiple active burrows and alarm calls observed; the colony boundaries had also slightly shifted from those recorded in 2022 and included a total of approximately 2.2 acres, entirely outside of the 2023 Survey Area, but still completely

within the Survey Corridor. WREE05 was very active when it was revisited in late March and again in late April. Multiple activity centers were documented, with visible WAGS calling and adults with pups observed during the second visit. The colony boundary had expanded to at least twice the area recorded in 2022, totaling approximately 11.7 acres, of which 2.4 acres were within the 2023 Survey Area and 9.3 acres outside, although 4.9 of those acres were still within the Survey Corridor. WREE05 was used to train new field staff at an active colony due to its size and consistent activity level. The three 2022 colonies that showed no activity were revisited at least twice during the 2023 surveys, including at least once during each round. At WREE03, the grasses were tall and there was no WAGS activity detected. One burrow was observed at the top of the hill and later revisited during the second round with no activity detected. At WREE02, potential burrows were observed in and around the colony boundaries during the first visit, although there was no evidence of use within the past season (i.e., no browsed vegetation or scat near the entrances) or during the second visit. At WREE04, no activity was detected during the first or second visit.

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Table 2. 2023 Surveyed Areas

Survey Year	Surveyed to protocol (two rounds)	Not surveyed to protocol (one round)	Total Survey Area	Not surveyed[1] (zero rounds)	Not surveyed (not suitable habitat)	Total Survey Corridor
2023	18,246 acres	2,526 acres	20,772 acres	1,213 acres	5,771 acres	27,757 acres

Note: Numbers may not sum due to rounding.

1. Acres include suitable habitat without access at the time (407 acres), and suitable habitat for areas where proposed infrastructure is no longer under consideration (807 acres).

Table 3. 2023 Washington Ground Squirrel Colony Results

Colony	Date First Observed	Revisit Date	Colony Acreage within the Survey Area	Activity Confirmation	Soil Type	Shrub Cover	Shrub Distribution	General Habitat Type[1]	Dominated by Native or Exotic Plants?	Dominant Plant Species	Disturbance	Round 1 Survey Notes	Round 2 Survey Notes
WRE_2023_A01	4/5/2023	5/13/2023	0.003	Call, burrows, scat	Silty loam	1-10%	Patchy	Grassland	Native species dominant	*Pseudoroegneria spicata, Poa secunda, Lupinus* sp.	Light grazing	One active burrow with scat identified and one confirmed call. Multiple additional potential burrows identified outside of the three-burrow colony polygon.	No activity observed. All potential burrows had cobwebs or non-trimmed vegetation growing in and over them.
WRE_2023_A02	4/14/2023	5/16/2023	2.72	Calls, burrows, scat, and visual siting	Silty loam	1-10%	Sparse	Grassland	Exotic species dominant	*Bromus tectorum*	None documented	172 burrows were counted, including at least 26 burrows with scat. Calls were frequent and multiple animals were observed.	No activity detected.
WRE_2023_B01	3/29/2023 and 4/25/2023	4/30/2023 and 5/25/2023	4.41*	Calls, burrows, scat, and visual for upslope area. Calls, burrows, and scat for downslope area.	Silty sand upslope area. Silty loam downslope area.	1-10%	Homogenous	Grassland	Native species dominant	*Pseudoroegneria spicata, Bromus tectorum, Lupinus leucophyllus, Achillea millefolium*	Moderate grazing	Initially identified as two separate colonies; the earlier one with 20 burrows downslope, and the later one with 81 burrows upslope.	Revisit showed activity between colonies and at previously identified potential burrows, resulting in merging and expanding initial colony boundaries.
WRE_2023_B02	4/5/2023	5/17/2023	1.95	Calls and burrows	Silty loam	41-60%	Homogenous	Grassland /shrub-steppe mosaic	Neither native nor exotic dominant	*Bromus tectorum, Ericameria nauseosa, Lupinus sulphureus*	Light grazing and bermed two-track present	Small colony with 25 burrows identified in mid- to lower drainage. Calls heard and burrows found though well hidden in vegetation.	Multiple calls heard outside of mapped colony; burrows and scat also identified. Colony was expanded to top of drainage to encompass calls and additional 52 burrows.
WRE_2023_B03	4/13/2023	5/24/2023	0.37	Calls and burrows	Silty	11-20%	Patchy	Grassland	Neither native nor exotic dominant	*Bromus tectorum, Bromus* sp., *Poa secunda, Pseudoroegneria spicata, Sisymbrium altissimum*	Light grazing and All Terrain Vehicle activity	Colony with 46 burrows near top of hill in grazed bunchgrasses. Multiple calls heard and evidence of small animal herbivory near burrows.	No activity detected.

Colony	Date First Observed	Revisit Date	Colony Acreage within the Survey Area	Activity Confirmation	Soil Type	Shrub Cover	Shrub Distribution	General Habitat Type[1]	Dominated by Native or Exotic Plants?	Dominant Plant Species	Disturbance	Round 1 Survey Notes	Round 2 Survey Notes
WRE_2023_B04	4/18/2023	N/A	0.48	Calls, burrows, scat	Silty loam	21-40%	Homogenous	Shrub-steppe	Native species dominant	*Artemesia tridentata, Chrysothamnus viscidiflorus, Ericameria nauseosa, Poa secunda*	Moderate grazing, adjacent to dirt road	Multiple calls heard and 50 burrows found within sagebrush and grasses. Scat from WAGS and at least two other rodent species observed.	Area removed from Project consideration after first round; no second round surveys conducted.
WRE_2023_B05	4/18/2023	N/A	0.15	Calls, burrows, scat	Silty loam	61-80%	Homogenous	Shrub-steppe	Native species dominant	*Artemesia tridentata, Erodium cicutarium, Poa secunda*	Grazing, bisected by dirt road	Multiple calls heard and 22 burrows found within sagebrush and grasses.	Area removed from Project consideration after first round; no second round surveys conducted.

1. General Habitat Types identified within colonies may differ from habitat mapped during the habitat categorization survey due to the scale of mapping at the colony-level versus the 1-acre minimum mapping unit used during habitat categorization surveys.

* WRE_2023_B01 colony included an additional 3.28 acres that extended outside of the 2023 Survey Area.

Two new recorded active colonies were in native perennial grassland habitats; two were in exotic annual or exotic annual/native perennial mixed grassland habitat; one was in exotic annual/native perennial mixed grassland and shrub habitat; and two colonies (in the Contingency Area) were in shrub-steppe habitat. Common grass species recorded at active colonies included Sandberg bluegrass, bulbous bluegrass (*Poa bulbosa*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and cheatgrass (*Bromus tectorum*). For colonies where shrubs were not the dominant cover, the most common shrub species recorded were rubber rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus viscidiflorus*). Two colonies were dominated by big sagebrush (*Artemesia tridentata*). The two most dominant forbs recorded in the active colonies were western yarrow (*Achillea millefolium*) and redstem stork's bill (*Erodium cicutarium*).

Surveys occurred during six mobilizations in 2023: between March 15 and 23, March 28 and April 5, April 11 and 19, April 25 and May 3, May 9 and 17, and May 23 and 30, 2023. Surveys took place during two rounds, spaced at least 2 weeks apart. All new 2023 colonies were detected during the first round of surveys (i.e., during the first of two surveys over the area). Two colonies (WRE_2023_A01 and WRE_2023_B03) were found when surveyors stopped to investigate potential burrows and subsequently heard alarm calls. The remaining five colonies were initially located by audio detection.

Two colonies, WRE_2023_B04 and WRE_2023_B05, were detected in the Contingency Area, which was dropped from further Project consideration and therefore a second round of surveys was not conducted in this area. Three colonies, WRE_2023_A01, WRE_2023_B03, and WRE_2023_A02, had no audio detections during the second-round visits. Two colonies found in the first round of surveys, WRE_2023_B01 and WRE_2023_B02, were active during the second round of surveys. One of these colonies, WRE_2023_B01, was initially recorded as two colonies in the first round of surveys; however, during the second round, additional burrows and calls were detected between and around the initial colonies, leading to the remapping of this activity into a single colony. Colony WRE_2023_B02 was revisited during the second round of surveys and calls were heard well outside the delineated colony area. The boundary was remapped, based on calls and burrows, almost doubling the colony area.

A total of 564 potential WAGS burrows were recorded across the Survey Area during the first round of surveys. Potential burrows were revisited during the second round of surveys. Although no new colonies were identified during the second round of surveys (including at the locations of potential burrows recorded during the first round of surveys), the boundaries for both WRE_2023_B01 and WRE_2023_B02 were expanded to include active burrows (i.e., with scat) recorded during the first round as potential burrows, as well as the locations of alarm calls outside the original colony boundary mapped during the first round of surveys.

Four of the nine total WAGS colonies recorded as active in 2023 (WRE_2023_B04, WRE_2023_B05, WRE_2023_A01, and WREE01 [originally detected in 2022]) were not located within the suitable habitat predicted by the Institute for Natural Resources (Figure 1; INR 2011). However, all but one

(WRE_2023_A01) of the nine colonies occurred within WAGS Habitat Concentration Areas[1] with very high connectivity modeled by the Washington Wildlife Habitat Connectivity Working Group (Figure 1; WHCWG 2012). The locations of the two colonies identified in the Contingency Area (WRE_2023_B04 and WRE_2023_B05) were not modeled in predicted WAGS habitat (INR 2011) but were within WAGS Habitat Concentration Areas with very high connectivity. Only one colony, WRE_2023_A01, was in a location not modeled as predicted suitable habitat or a WAGS Habitat Concentration Area with very high connectivity.

A Belding's ground squirrel colony was encountered incidentally during the surveys. The 2023 WAGS Survey Corridor is on the southern edge of the WAGS range and within the northwestern part of the Belding's ground squirrel range (USGS 2018). Belding's ground squirrels have been known to outcompete WAGS for available resources in disturbed habitats (Carlson et al. 1980). The one Belding's ground squirrel colony identified in 2023 was in an area with low potential for WAGS occurrence according to both available models for WAGS habitat (WHCWG 2012 for habitat connectivity, INR 2011 for predicted habitat quality). The newly identified colony was located approximately one mile east of County Road 735 near the southern extent of the central Survey Area (Figure 3). The colony extended along both sides of streambank and dirt road and up a hillside. Cattle grazing was heavy to moderate, with a cattle feeding area within 328 feet of the colony. Ground squirrels were seen running about near the creek, and surveyors took time to observe them to determine the ear size and lack of dorsal spotting. Scat was observed at varying sizes, including within the range of the WAGS. However, the habitat, visual cues, and the slightly different call frequency confirmed these were not WAGS.

4.2 Other Special Status Wildlife

The data received from ORBIC in 2022 showed 31 occurrence records for five special status wildlife species in the Project's vicinity. A summary of the ORBIC findings can be found in the 2022 Habitat Categorization and Special Status Wildlife Survey Report (Tetra Tech 2022). The desktop review identified 26 special status wildlife species with the potential to occur at the Project, including 17 birds, six mammals, two reptiles, and one invertebrate (Appendix A). Tetra Tech conducted special status wildlife species surveys concurrent with WAGS surveys (between March 15 and May 30, 2023). Tetra Tech observed a total of 10 special status wildlife species during surveys, including nine special status bird species and one special status mammal species, the Washington ground squirrel (Table 4, Figure 4). A complete list of species observed during all surveys is included as Appendix C.

[1] Habitat Concentration Areas are defined as "significant habitat areas that are expected or known to be important for focal species based on survey data or habitat association modeling" (WHCWG 2012).

Table 4. Special Status Wildlife Species Observed During Surveys

Taxa	Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau/Columbia Basin[2]
Bird	Bald eagle	*Haliaeetus leucocephalus*	BGEPA	-
Bird	Burrowing owl (Western)	*Athene cunicularia hypugaea*	SOC	SC
Bird	Ferruginous hawk	*Buteo regalis*	SOC	SC
Bird	Golden eagle	*Aquila chrysaetos*	BGEPA	-
Bird	Grasshopper sparrow	*Ammodramus savannarum*	-	S
Bird	Loggerhead shrike	*Lanius ludovicianus*	SOC	S
Bird	Long-billed curlew	*Numenius americanus*	-	SC
Bird	Northern harrier[3]	*Circus hudsonius*	BCC	-
Bird	Sagebrush sparrow	*Artemisiospiza nevadensis*	-	SC
Bird	Swainson's hawk	*Buteo swainsoni*	-	S
Mammal	Washington ground squirrel	*Urocitellus washingtoni*	-	E

Species and status: OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2022, USFWS 2021, USFWS 2023.

1. Federal Status: SOC = Species of Concern, BCC = Bird of Conservation Concern, BGEPA = Bald and Golden Eagle Protection Act.
2. Oregon Department of Fish and Wildlife Status in the Columbia Plateau/Columbia Basin: E = Endangered, SC = Critical Sensitive Species, S = Sensitive Species.
3. Northern harriers were observed during surveys, but the locations were not recorded as the surveyors prioritized recording state sensitive and listed species and eagles. Therefore, northern harriers are not depicted on Figure 4.

A total of 3 burrowing owls, 3 ferruginous hawks, 1 juvenile golden eagle, 77 grasshopper sparrows, 4 loggerhead shrikes, 28 long-billed curlews, 3 sagebrush sparrows, and 5 Swainson's hawks were recorded during the two rounds of WAGS surveys (Figure 4). Northern harriers were observed during surveys, but the locations were not recorded as the surveyors prioritized recording state sensitive and listed species and eagles. One of the observed burrowing owls was documented in association with an active burrowing owl burrow and thus is depicted on Figure 4 as a confirmed active burrowing owl burrow.

Four active burrowing owl burrows in total were confirmed within the Survey Area during surveys (Figure 4). Fresh pellets, feathers, and/or whitewash were observed at burrows on April 13, May 9, and May 12, 2023, but no owls were initially detected at any burrow. Two of these active burrowing owl burrows were determined to be active based on observations during the surveyors' initial encounter with the burrows, and two were determined to be active based on observations during subsequent follow-up surveys, further detailed here. Surveyors returned on May 28, 2023, to further investigate three previously recorded potentially active burrows in close proximity to each other and observed an owl flying from one of the burrows as well as fresh pellets and feathers at that burrow and one other burrow. These two burrows were then designated as active; they are close together (approximately 480 feet) and assumed to be part of the same territory. The third

burrow, approximately 1,370 feet to the northeast, no longer showed signs of burrowing owl activity, as cobwebs and vegetation were now present inside and there were no fresh pellets or whitewash present; this burrow was removed from consideration as an active burrow in 2023 and is not depicted in Figure 4. Another potentially active burrowing owl burrow recorded in the northern section of the Contingency Area was not revisited later in the season to determine if owls were actively using it because that area was dropped from further Project consideration (Figure 4).

5.0 Summary and Conclusions

Nine active WAGS colonies were observed during the 2023 surveys, including seven new, active colonies within the Survey Area. All were east of Little Butter Creek Road, south of Big Butter Creek Lane, and north of Oregon Route 74 (OR-74). No colonies were observed in the western portion of the Survey Area. Much of the western habitat is modified grassland with evidence of land manipulation like conversion of vegetation to pasture grasses, removal of rocks from fields, and installation of extensive erosion-control earthwork.

A large Belding's ground squirrel colony was observed near the southern extent of the southcentral portion of the Survey Area. This colony was mostly located in an irrigated, heavily grazed pasture next to ranch structures and not within WAGS habitat.

During the surveys, deer were generally commonly recorded throughout the Survey Area. Elk, however, were most often recorded in the southeast portion of the Survey Area. Coyotes were recorded periodically and appeared to be more common in the eastern half of the Survey Area. During the second round of surveys, grasshopper sparrows were observed or heard throughout the Survey Area. Raptor nests, including owls and hawks, were observed in drainages where sufficient tree/snag cover was present, and a northern harrier nest was encountered within the reeds of a wetland in the west/central portion of the Survey Area. Red-tailed hawks were frequently observed flying over the Survey Area. Small mammals such as mice and voles were frequently detected throughout the Survey Area, with evidence of surface burrowing and runs between their burrows in denser clumps of grass or small shrubs. Snakes were frequently observed during the second round of surveys, most often in rocky areas but also in mixed-grassland areas where they were observed retreating into burrows.

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Figures

(Figures 1 and 3 are Confidential and provided under separate cover)

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Wheatridge Renewable Energy Facility East

Figure 2
Washington Ground Squirrel Survey Area

MORROW AND UMATILLA COUNTIES, OR

Morrow County

Umatilla County

578

207

735

602

813

74

- Proposed Amended Site Boundary (12/05/2022)
- 2023 WAGS Survey Corridor
- County Boundary
- State Highway
- County Highway

Survey Area Category

- 2022 Surveyed to Protocol
- 2023 Surveyed to Protocol
- Contingency Area (Not Surveyed to Protocol)
- Infrastructure No Longer Under Consideration (Not Surveyed to Protocol)
- No Access
- Not WAGS Habitat

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



1:135,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Wheatridge Renewable Energy Facility East

Figure 4
Special Status Species

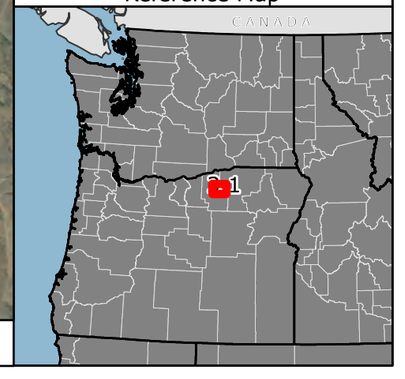
MORROW AND UMATILLA COUNTIES, OR

- Proposed Amended Site Boundary (12/05/2022)
- 2023 WAGS Survey Corridor
- Bald eagle
- Burrowing owl
- Burrowing owl burrow (confirmed active)
- Burrowing owl burrow (potentially active)
- Ferruginous hawk
- Golden eagle
- Grasshopper sparrow
- Loggerhead shrike
- Long-billed curlew
- Sagebrush sparrow
- Swainson's hawk

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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Appendix A. Special Status Wildlife Species Potentially Occurring within the 2023 WAGS Survey Area

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Common name	Scientific name	Federal Status[1]	ODFW Status[2] in Columbia Plateau	Occurs in Morrow County per ORBIC 2019
Birds				
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	–	yes
Brewer's sparrow	*Spizella breweri*	–	S, CSS	yes
Burrowing owl (Western)	*Athene cunicularia hypugaea*	SOC	SC, CSS	yes
Common nighthawk	*Chordeiles minor*	–	S, CSS	yes
Ferruginous hawk	*Buteo regalis*	SOC	SC, CSS	yes
Flammulated owl	*Otus flammeolus*	BCC	–	yes
Golden eagle	*Aquila chrysaetos*	BGEPA	–	yes
Grasshopper sparrow	*Ammodramus savannarum*	–	S, CSS	yes
Lewis's woodpecker	*Melanerpes lewis*	BCC	SC, CSS	yes
Loggerhead shrike	*Lanius ludovicianus*	–	S, CSS	yes
Long-billed curlew	*Numenius americanus*	–	SC, CSS	yes
Northern harrier	*Circus hudsonius*	BCC	–	N/A
Olive-sided flycatcher	*Contopus cooperi*	BCC	–	yes
Sage thrasher	*Oreoscoptes montanus*	BCC	–	yes
Sagebrush sparrow	*Artemisiospiza nevadensis*	–	SC, CSS	yes
Short-eared owl	*Asio flammeus*	BCC	–	yes
Swainson's hawk	*Buteo swainsoni*	–	S, CSS	yes
Mammals				
Gray wolf	*Canis lupus*	E	–	yes
Hoary bat	*Lasiurus cinereus*	–	S, CSS	no
Pallid bat	*Antrozous pallidis*	–	S, CSS	no
Silver-haired bat	*Lasionycteris noctivagans*	–	S, CSS	no
Spotted bat	*Euderma maculatum*	–	S, CSS	yes
Washington ground squirrel	*Urocitellus washingtoni*	–	E, CSS	yes

Common name	Scientific name	Federal Status[1]	ODFW Status[2] in Columbia Plateau	Occurs in Morrow County per ORBIC 2019
Reptiles				
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	SOC	S, CSS	yes
Western painted turtle	*Chrysemys picta*	–	SC, CSS	yes
Invertebrates				
Monarch butterfly	*Danaus plexippus*	C	CSS	yes

Species and status references: OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2022, USFWS 2021, USFWS 2023

1. Federal Status: BGEPA=Protected by the Bald and Golden Eagle Protection Act, E = Endangered, C = Candidate, SOC = Species of Concern, BCC = Bird of Conservation Concern in Bird Conservation Region 9

2. ODFW Status: E = Endangered, S=Sensitive, SC = Sensitive Critical, CSS = Conservation Strategy Species

Appendix B. Select Photographs of Habitat and Wildlife Taken during 2023 Surveys

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Photo 1. WRE_2023_A01: Habitat near activity center photographed during second round of surveys. 5/15/2023.



Photo 2. WRE_2023_A01: Example burrow in activity center identified during first round of surveys. 4/5/2023.



Photo 3. WRE_2023_A02: Example burrow near colony activity center taken during second round of surveys; showing old grasses pulled into burrow. 5/15/2023.



Photo 4. WRE_2023_A02: Medium-large colony in mixed grassland with some rabbitbrush. Colony was very active during first visit, but no activity was observed during second round surveys. 4/14/2023.



Photo 5. WRE_2023_B01: Activity center burrows showing cattle activity present in much of this area of the colony. 4/25/2023.



Photo 6. WRE_2023_B01: Colony area near second activity center observed at upslope section of colony area documented at the end of the first round of surveys. 4/25/2023.



Photo 7. WRE_2023_B02: Example burrow from colony area delineated during first round of surveys. 4/5/2023.



Photo 8. WRE_2023_B02: Colony near activity center identified during first round of surveys. 4/5/2023.



Photo 9. WRE_2023_B02: Activity center in expanded colony area identified during second round of surveys; upslope of previously delineated boundary. 5/17/2023.



Photo 10. WRE_2023_B03: Example burrow showing entrance and herbivory on adjacent grasses. 4/13/2023.



Photo 11. WRE_2023_B03: Medium colony in grazed bunchgrass habitat at top of hillslope during first round of surveys. 4/13/2023.



Photo 12. WRE_2023_B04. Medium-sized colony in contingency area near drainage dominated by big sagebrush. Calls, burrows, and scat were identified. Area is grazed and has a dirt road adjacent. 4/18/2023.



Photo 13. WRE_2023_B04: Example of burrows near activity center. Burrows were found at base of sagebrush as well as out in the open. 4/18/2023.



Photo 14. WRE_2023_B05: Small to medium-sized colony in contingency area in valley bottom with dirt road passing through. Colony is dominated by big sagebrush with burrows scattered throughout; at base of sagebrush as well as in the open. Moderate cattle activity. 4/18/2023.



Photo 15. WREE01: Area near activity center observed during revisit at beginning of second round of surveys. 4/27/2023.



Photo 16. WREE01: Active WAGS burrow with scat present. 3/18/2023.



Photo 17. WREE05: Activity center near middle of colony observed during first 2023 visit; appears to be old coyote/badger burrow surrounded by 8 WAGS burrows, 2 scat at 1 burrow. 3/29/2023.



Photo 18. WREE05: Activity center near lower end of colony observed during first 2023 visit; appears to be re-excavated old coyote burrows. 3/29/2023.



Photo 19. Burrowing owl burrow: Burrow near base of east-facing slope near the center of Survey Area. Multiple fresh pellets, feathers, and scat present. 5/28/2023.



Photo 20. Burrowing owl burrow: Example of owl pellet found near mouth of burrow showing correct size and rodent bones. 5/28/2023.



Photo 21. Burrowing owl burrow: Multiple fresh pellets and scat observed near burrow entrance. 5/9/2023.



Photo 22. Burrowing owl burrow: Burrow near base of southwest facing slope near center of Survey Area. Multiple fresh pellets and scat observed near burrow entrance. 5/9/2023.



Photo 23. Burrowing owl burrow: Burrow near center of Survey Area. 5/9/2023.



Photo 24. Burrowing owl burrow: Burrow midslope in central Survey Area with pellets and scat observed. 5/9/2023.

Appendix C. Wildlife Species Observed During 2023 Surveys

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Common Name	Scientific Name
Amphibians	
Pacific tree frog	*Pseudacris regilla*
Birds	
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Bald eagle	*Haliaeetus leucocephalus*
Bank swallow	*Riparia riparia*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Black-billed magpie	*Pica hudsonia*
Black crowned night heron	*Nycticorax nycticorax*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
Bullock’s oriole	*Icterus bullockii*
Burrowing owl (Western)	*Athene cunicularia hypugaea*
California quail	*Callipepla californica*
Canada goose	*Branta canadensis*
Chipping sparrow	*Spizella passerina*
Chukar	*Alectoris chukar*
Cliff swallow	*Petrochelidon pyrrhonota*
Common raven	*Corvus corax*
Cooper’s hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Eastern kingbird	*Tyrannus tyrannus*
Eurasian collared dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Grasshopper sparrow	*Ammodramus savannarum*
Gray partridge	*Perdix perdix*
Great horned owl	*Bubo virginianus*
Greater sandhill crane	*Antigone canadensis tabida*
Horned lark	*Eremophila alpestris*
House sparrow	*Passer domesticus*

Common Name	Scientific Name
Killdeer	*Charadrius vociferus*
Lark sparrow	*Chondestes grammacus*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Mallard	*Anas platyrhynchos*
Mountain bluebird	*Sialia currucoides*
Mourning dove	*Zenaida macroura*
Northern harrier	*Circus hudsonius*
Prairie falcon	*Falco mexicanus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Rock pigeon	*Columba livia*
Rock wren	*Salpinctes obsoletus*
Sagebrush sparrow	*Artemisiospiza nevadensis*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Song sparrow	*Melospiza melodia*
Swainson's hawk	*Buteo swainsoni*
Turkey vulture	*Cathartes auraoni*
Vesper sparrow	*Pooecetes gramineus*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
White-crowned sparrow	*Zonotrichia leucophrys*
Yellow warbler	*Setophaga petechia*
Mammals	
American badger	*Taxidea taxus*
Belding’s ground squirrel	*Urocitellus beldingi*
Black-tailed jackrabbit	*Lepus californicus*
Common porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Elk	*Cervus canadensis*
Kangaroo rat	*Dipodomys sp.*
Mountain cottontail	*Sylvilagus nuttallii*
Mule deer	*Odocoileus hemionus*

Common Name	Scientific Name
Pronghorn antelope	*Antilocapra americana*
Red fox	*Vulpes vulpes*
Vole species	*Microtus sp.*
Washington ground squirrel	*Urocitellus washingtoni*
White-tailed deer	*Odocoileus virginianus*
White-tailed jackrabbit	*Lepus townsendii*
Yellow-bellied marmot	*Marmota flaviventris*
Reptiles	
Gopher snake	*Pituophis catenifer*
Garter snake	*hamnophis sirtalis*
North American racer	*Coluber constrictor*
Striped whipsnake	*Masticophis taeniatus*
Rubber boa	*Charina bottae*
Western rattlesnake	*Crotalus viridis*
Pygmy short-horned lizard	*Phrynosoma douglasii*

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Attachment P-2. Draft Habitat Mitigation Plan

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Wheatridge Renewable Energy Facility East

Draft Habitat Mitigation Plan

Prepared for

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Ione, Oregon 97843

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January 2024

(Approved at March 13, 2020 EFSC Meeting as part of the WREFII Site Certificate. Updated April 2023 and January 2024 as part of Wheatridge Renewable Energy Facility East RFA 1)

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Table of Contents

1.0 Introduction 1
2.0 Habitat Categories and Habitat Types 1
3.0 Temporary and Permanent Impacts 2
4.0 Methods for Calculating Mitigation 4
5.0 Habitat Mitigation Area 7
5.1 Habitat Assessment and Mitigation Accounting 7
5.1.1 WAGS Habitat Suitability 8
5.1.2 WAGS In-Proximity Mitigation 9
5.2 Habitat Enhancement Actions 9
5.3 HMA Monitoring 10
5.4 HMA Success Criteria 11
6.0 Implementation Schedule 12
7.0 Amendment of the HMP 13
8.0 References 13

List of Tables

Table 1. Habitat Categorization Types 2
Table 2. Temporary and Permanent Impacts by Habitat Category and Habitat Subtype 3
Table 3. Calculating Mitigation for Permanent Impacts 4
Table 4. Calculating Mitigation for Temporary Impacts 5
Table 5. HMA Success Criteria 11
Table 6. Mitigation Implementation Schedule 12

List of Figures

Figure 1. Habitat Mitigation Plan – Easement and Habitat Mitigation Areas (HMA) **(Confidential–provided under separate cover)**

Figure 2. Habitat Mitigation Plan - Full 2100-Acre Parcel

Figure 3. WGS Modeled Habitat and Area Available for Habitat Mitigation Areas (HMA) **(Confidential–provided under separate cover)**

Figure 4. Soil Types and Area Available for Habitat Mitigation Areas (HMA) **(Confidential–provided under separate cover)**

Figure 5. Washington Ground Squirrel Habitat and Area Available for Habitat Mitigation Areas (HMA) **(Confidential–provided under separate cover)**

List of Appendices

Appendix A. Wildlife Observed at the Project

Appendix B. Annual Monitoring Report Outline

1.0 Introduction

The Wheatridge Renewable Energy Facility East (Facility) is an approved, but not yet constructed, wind energy generation facility consisting of up to 66 turbines and related or supporting facilities with a peak generating capacity of up to 200 megawatts (MW), to be located in an Approved Site Boundary of approximately 4,582 acres, on over 42,000 acres of leased land in Morrow and Umatilla counties, Oregon. As part of Request for Amendment (RFA) 1 to the Facility Site Certificate, Wheatridge East Wind, LLC (Certificate Holder) is proposing to expand wind power generation at the Facility to provide the opportunity for increased power capacity and availability. This includes expanding the Site Boundary and micrositing corridors, increasing the peak generating capacity by adding more and newer turbines, changing the intraconnection routes, and extending the construction date. The previously approved Intraconnection Corridor options specifically will be replaced by modified options for the western section of the route (either Transmission Line A or Transmission Line B, both 26 miles in length). See the RFA 1's Division 27 document (*Request for Amendment #1 for the Wheatridge Renewable Energy Facility East*) for a more detailed summary of the proposed changes. See Exhibit P for a description of the Amended Site Boundary and the amended wind micrositing corridors, within which the habitat impacts as proposed in RFA 1 would occur.

This Draft Habitat Mitigation Plan (HMP) provides concepts for meeting the habitat mitigation needs of the Facility. The Certificate Holder has conducted habitat categorization surveys and other biological studies that inform habitat categorization in accordance with the Oregon Department of Fish and Wildlife's (ODFW) Fish and Wildlife Habitat Mitigation Policy, Oregon Administrative Rules (OAR) 635-415-0000 through 0025. The Certificate Holder has also identified potential mitigation opportunities and potential habitat enhancement actions.

The Certificate Holder's goal is to reduce and eliminate the impact of the Facility over time by preserving and maintaining in-kind habitat in the Columbia Basin Ecoregion to achieve a net benefit to Category 2 habitat, and no net loss of Categories 3 and 4 through the concepts proposed in this Draft HMP. The proposed concepts were discussed with personnel from the ODFW on August 20, 2012 and on July 11, 2014. The February 2020 version of this document was approved at the March 13, 2020 Council meeting, through request by Certificate Holder to amend the previously finalized HMP for Wheatridge Wind Energy Facility. This January 2024 version was updated to accompany RFA 1, as described above. The actual acres of temporary and permanent impacts and the associated mitigation requirements will be determined based on the final design and included in a final HMP prior to construction.

2.0 Habitat Categories and Habitat Types

In compliance with Condition PRE-FW-01, a pre-construction habitat survey was conducted to verify habitat subtypes and habitat categories of all areas to be affected by the Facility. The ODFW

Fish and Wildlife Habitat Mitigation Policy provides a framework to categorize habitats based on type, quality, availability, and usefulness/importance to wildlife, and establishes mitigation goals and implementation standards for each. Table 1 defines each of the six habitat category types as presented in the ODFW Habitat Mitigation Policy.

Table 1. Habitat Categorization Types

Category Type	Definition[1]	Mitigation Goal
1	Irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population or unique assemblage.	The mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality.
2	Essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage.	The mitigation goal if impacts are unavoidable is no net loss of either habitat quantity or quality and to provide a net benefit of habitat quantity or quality.
3	Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.	The mitigation goal is no net loss of either habitat quantity or quality.
4	Important habitat for fish and wildlife species.	The mitigation goal is no net loss of either habitat quantity or quality.
5	Habitat for fish and wildlife having high potential to become either essential or important habitat.	The mitigation goal, if impacts are unavoidable, is to provide a net benefit in habitat quantity or quality.
6	Habitat that has low potential to become essential or important habitat for fish and wildlife.	The mitigation goal is to minimize impacts.
1. Source: OAR 635-415-0025.		

3.0 Temporary and Permanent Impacts

Impacts may be permanent or temporary. Permanent impacts are defined as those impacts that will exist for the life of the Facility. Temporary impacts are those impacts that will last for a time less than the life of the Facility. The duration of temporary impacts to habitat will vary by habitat subtype. For example, the recovery period for agricultural areas that were temporarily disturbed could be as short as 1 to 3 years, grasslands generally recover within 3 to 7 years, and shrublands may require 10 to 50 years to recover (with the longer recovery periods associated with disturbances in mature sagebrush habitats). The Certificate Holder will restore temporary impacts consistent with the Revegetation Plan.

As described in Exhibit P, Category 1 habitat includes habitat within 785 feet of documented Washington ground squirrel (*Urocitellus washingtoni*; WAGS) colonies. Category 1 habitat occurs within the Amended Site Boundary, but the Facility is designed and microsited to avoid Category 1 habitat. Therefore, there are no impacts to Category 1 habitat. Category 2 habitat occurs in the Amended Site Boundary and will be impacted by the Facility. Category 2 habitat is associated with ODFW Mule Deer Winter Range (ODFW 2013), areas of potential WAGS use, areas of high quality sagebrush shrub-steppe, and streams with resident and migratory native fish. Areas of potential ground squirrel use are adjacent to and within 4,921 feet (1.5 kilometers [km]) of ground squirrel colonies, excluding the 785-feet of Category 1 habitat, but not occupied by any squirrels either for burrowing or foraging, which is of similar habitat type and quality to the adjacent WAGS Category 1 habitat. Category 3, 4, and 6 habitat will also be impacted by the Facility, while Category 5 habitat is not identified in the Amended Site Boundary. Table 2 shows the acres of permanent and temporary impacts in each habitat category by habitat subtype for the Facility.

Table 2. Temporary and Permanent Impacts by Habitat Category and Habitat Subtype

Habitat Category	Habitat Type-Subtype	Impact (acres)	
		Perm.	Temp.
2	Grassland-Exotic Annual	12.9	120.1
	Grassland-Native Perennial	80.3	603.6
	Shrub-steppe-Basin Big Sagebrush	1.2	8.8
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	5.2	34.8
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	<0.1	0.6
	Developed-Revegetated/Other Planted Grassland	11.6	70.3
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	0.2
	Wetlands-Riverine Wetlands	<0.1	0.5
	Wetlands-Emergent Wetlands	–	0.1
Total		**111.3**	**838.8**
3	Grassland-Native Perennial	2.7	18.4
	Shrub-steppe-Basin Big Sagebrush	0.6	5.3
	Developed-Revegetated/Other Planted Grassland	–	<0.1
	Wetlands-Emergent Wetlands	<0.1	<0.1
Total		**3.4**	**23.8**
4	Grassland-Exotic Annual	6.9	51.4
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	3.0	11.3
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	<0.1
Total		**9.9**	**62.7**

Habitat Category	Habitat Type-Subtype	Impact (acres)	
		Perm.	Temp.
6	Developed-Dryland Wheat	39.0	178.2
	Developed-Irrigated Agriculture	<0.1	0.9
	Developed-Other	1.4	16.7
Total		**40.5**	**195.8**
Grand Total		**165.0**	**1121.1**
Note: Totals in this table may not sum correctly due to rounding; "-" means no impact while <0.1 means greater than zero but less than 0.05 acres impact.			

4.0 Methods for Calculating Mitigation

Table 3 shows the methods for calculating mitigation for permanent impacts. Table 4 shows the methods for calculating mitigation for temporary impacts, including the results of slight departures in methods from the February 2020 version of this document based on subsequent coordination with ODFW and the Oregon Department of Energy (ODOE) during pre-construction compliance for the adjacent Wheatridge Energy Facility I and Wheatridge Energy Facility II. The Certificate Holder is not proposing compensatory mitigation under the ODFW Fish and Wildlife Habitat Mitigation Policy for impacts to Category 6 habitat.

Table 3. Calculating Mitigation for Permanent Impacts

Habitat Category	Impact Acres	Mitigation Ratio[1]	Mitigation Need	Mitigation Description
Category 2	111.3	2:1	222.5	The mitigation goal for Category 2 habitat is "no net loss" and "net benefit." Accordingly, mitigation for permanent impacts on Category 2 habitat needs to demonstrate a net benefit in quality or quantity.
Category 3 and Category 4	13.2	1:1	13.2	The mitigation goal for Category 3 & 4 habitat is "no net loss" in quantity or quality.
Category 6	40.5	0:1	0	The mitigation goal for impacts on Category 6 habitat is minimization; no compensatory mitigation proposed.
Grand Total	165.0	--	235.8	--
1. Acres mitigation per acres impacted.				

Table 4. Calculating Mitigation for Temporary Impacts

Habitat Category	Habitat Subtype	Impact Acres	Mitigation Ratio[1]	Mitigation Needs	Mitigation Description
Category 2	Grassland-Exotic Annual, Grassland-Native Perennial, Developed-Revegetated or Other Planted Grassland, Open Water – Lakes, Rivers, Streams – Intermittent or Ephemeral Streams, Riparian Forest and Natural Shrubland Complexes – Eastside (Interior) Riparian, Wetlands – Riverine Wetlands, Wetlands – Emergent Wetlands	795.2	0:1	0.0	The mitigation goal for Category 2 habitat is "no net loss" and "net benefit." Accordingly, mitigation for temporary impacts on Category 2 habitat needs to demonstrate a net benefit in quality or quantity. Mitigation would be an equal or greater amount of acreage than what is impacted by the Facility for areas with longer recovery periods (i.e., shrub-steppe). All areas of temporary disturbance would be restored at the site of impact. The proposed mitigation ratio would meet the "net benefit" requirement and would account for the temporary loss of habitat function during restoration.
	Shrub-steppe Basin Big Sagebrush	8.8	2:1	17.6	
	Shrub-steppe Rabbitbrush/Snakeweed Shrub-steppe	34.8	1:1	34.8	
Category 3	Grassland – Native Perennial, Developed-Revegetated/Other Planted Grassland, Wetlands – Emergent Wetlands	18.5	0:1	0	The mitigation goal for Category 3 and 4 habitat is "no net loss" in quantity or quality. The proposed mitigation ratio would result in a lesser amount of acreage of mitigation than what is impacted by the Facility. Combined with restoration of temporary disturbances, the proposed mitigation ratio is intended to account for the temporary
	Shrub-Steppe Basin Big Sagebrush	5.3	1:1	5.3	
Category 4	Grassland – Exotic Annual, Open Water - Lakes, Rivers, Streams – Intermittent or Ephemeral Streams	51.4	0:1	0	

Habitat Category	Habitat Subtype	Impact Acres	Mitigation Ratio[1]	Mitigation Needs	Mitigation Description
	Shrub-steppe Rabbitbrush/Snakeweed Shrub-steppe	11.3	0.5:1	5.7	loss of habitat functionality and meet the "no net loss" goal. Temporary disturbances to Category 3 and Category 4 Grasslands are not mitigated beyond restoration.
Category 6	Developed-Dryland Wheat, Developed - Irrigated Agriculture, Developed-Other	195.8	0:1	0	The mitigation goal for Category 6 habitat is minimization; no compensatory mitigation is proposed.
Grand Total	**–**	**1,121.1**	**–**	**63.4**	

1. Mitigation ratios adapted from the February 2020 HMP Wheatridge Wind Energy Project Habitat Mitigation Plan, available here: https://www.oregon.gov/energy/facilities-safety/facilities/Facilities%20library/2021-03-13-WRW-Amended-HMP.pdf

As proposed in RFA 1, Facility impacts would result in a mitigation need of 299.2 acres, including 235.8 acres of mitigation for permanent impacts and 63.4 acres of mitigation for temporary impacts. As described above, the actual acres of temporary and permanent impacts and the associated mitigation requirements will be determined based on the final design and included in a final HMP prior to construction.

Prior to construction, the Certificate Holder shall provide an estimate, in tabular format, of the acres of temporary and permanent impacts shown in Table 2 with the mitigation ratios shown in Table 3 and Table 4 to provide an updated estimate of mitigation requirements.

As a commitment to ensuring no loss of habitat quality for temporary disturbances to wildlife habitat, the Certificate Holder may provide additional compensatory habitat mitigation for temporary disturbances to Grassland-Native Perennial habitat and other habitats with intact native plant communities that do not recover within five years of disturbance. Grassland habitats are typically assumed to be able to recover within five years of disturbance. Therefore, the Certificate Holder will work with ODFW to develop and implement an adaptive management plan to address mitigation shortfalls in areas where revegetation does not meet success criteria within five years. However, the Certificate Holder is hopeful that with appropriate oversight of revegetation contractors, the restoration of habitats will be successful within the five-year period and no adaptive management or additional mitigation would be required.

5.0 Habitat Mitigation Area

The Habitat Mitigation Area (HMA) is the area where the Certificate Holder is proposing to perform enhancement and preservation actions that are in addition to the revegetation of areas of temporary disturbance associated with the Facility. The HMA must be large enough and have the characteristics to meet the standards set in OAR 635-415-0025.

According to ODFW standards, areas appropriate for mitigation of Category 2 and Category 3 habitat impacts must provide "in-kind" mitigation which creates similar structure and function to that being disturbed and also be "in-proximity" to the Facility and have potential for habitat enhancement. The Certificate Holder identified privately-owned land that contains native and revegetated uplands of interest and importance for conservation. The Certificate Holder also looked for land that is within designated mule deer winter range. The Certificate Holder has identified up to 339.7 acres that are available as mitigation for this Facility, where the HMA will be located (Figure 1). The Certificate Holder has an executed conservation easement for 200 acres, of which 120.3 acres has been accounted for across three different HMAs (Figure 1). Therefore, the Certificate Holder has 79.7 acres remaining in the executed conservation easement to use as an HMA to fulfill other mitigation requirements in part or whole. In addition, the Certificate Holder has entered into an option agreement for an additional 260 acres at the same location (Figure 1). Once finalized, the executed conservation easement for this additional area will be provided to ODOE.

5.1 Habitat Assessment and Mitigation Accounting

The Certificate Holder has identified 339.7 acres of suitable in-kind and in-proximity habitat that is available for mitigation for Facility impacts on 2,100 acres of private land along Rock Creek in Gilliam County within which they will establish an HMA for this Facility, alongside HMAs established for the Wheatridge Energy Facility I, II, and III projects (Figure 1). The entire 2,100 acres are within Category 2 mule deer winter range. The primary habitat subtypes within the available 339.7 acres consist primarily of Category 2 Native Perennial Grassland and Shrub-steppe Mosaic habitat and Revegetated Grasslands. The total number of acres to be set aside in the HMA will be determined and updated prior to construction when the layout and mitigation needs are finalized.

Wildlife species usage of the approximately 2,100-acre property in which the HMA lies has been recorded for the past 11 years and is similar to what has been recorded during surveys of the Facility. There are 152 bird species recorded from the property containing the HMA. This includes special status nesting bird species such as grasshopper sparrow. Several species of raptors, including golden eagle and ferruginous hawk, have been documented hunting on the property containing the HMA and some species nest onsite or in the general area. Mule deer and occasionally elk are observed wintering in the HMA and nearby. Appendix A includes a list of wildlife species observed at the property. Wind-blown ridges and south-facing slopes provide for early green-up big game forage. Other long-term conserved habitat (approximately 324 acres) consisting of Native Perennial Grassland and Shrub-steppe Mosaic, cliffs and escarpments along canyons is nearby

(Figure 2). The property supports documented WAGS use areas and habitat. With the addition of this HMA, a larger more contiguous tract of preserved habitat will be available for wildlife that provides important functionality and connectivity along Rock Creek in the Columbia Plateau.

Based on the acreage of preliminary permanent impacts to WAGS habitat included in the preliminary RFA 1 submittal to ODOE, ODOE requested additional evidence to support mitigation of permanent impacts to Category 2 WGS habitat. This proposed acreage of permanent impacts to WAGS habitat has been reduced and the description here provides the requested evidence. The previously approved HMP provided mitigation for impacts to Category 2 WAGS habitat and was developed in coordination with ODFW (ODOE 2020). This updated HMP, submitted as part of RFA 1, continues to provide mitigation for impacts to Category 2 WAGS habitat, as the areas available for mitigation 1) contain suitable WAGS habitat (e.g., native perennial grassland and shrub-steppe mosaic within soil types suitable for WAGS and overlapping with WAGS modelled habitat), and 2) are located within the range of WAGS (and the same ecoregion as the Facility). Additionally, this HMP describes enhancement actions that would benefit WAGS through habitat improvements (e.g., noxious weed control, seeding and planting of native plants, fire response and control, and strategic removal of WAGS mammalian predators; see Section 5.2). Additional evidence to support how the proposed mitigation will satisfy requirements for in-kind, in-proximity mitigation of impacts to Category 2 WAGS habitat is provided in the description below and in Figures 3, 4, and 5.

5.1.1 WAGS Habitat Suitability

The areas available for mitigation contain WAGS habitat suitable for in-kind mitigation. The majority of the areas available for mitigation were modeled by the Washington Wildlife Habitat Connectivity Working Group (WHCWG 2012) as WAGS habitat concentration areas with very high connectivity, and by the Institute for Natural Resources (INR 2011) as good quality habitat for WAGS (Figure 3). WAGS are most common in shrub-steppe habitats with deep sandy, or silt-loam soils that support the creation of burrows (Betts 1990, Yensen and Sherman 2003).

The habitat types mapped within these areas include habitat types typically identified as suitable for WAGS (i.e., Native Perennial Grassland and Shrub-steppe Mosaic), as well as habitat types where WAGS can occur and where there is opportunity to improve habitat quality for WAGS (e.g., Revegetated or Other Planted Grassland; see Figure 1). These areas available for mitigation include silt loam soil types that support the deep burrowing required by WAGS, including Mikkalo silt loam and Ritzville silt loam (Figure 4). Mikkalo soils consist of moderately deep, well drained soils on canyons, hills, plateaus, and ridges from 300 to 2,800 feet. Ritzville soils consist of very deep and deep to duripan, well drained soils typically found on upland plateaus and benches from 700 to 3,000 feet.

Although comprehensive WAGS surveys within the Olex Property Boundary have not been conducted, WAGS have been documented incidentally within the Olex Property Boundary and the Category 2 habitat associated with the known colony extends into the area available for mitigation (Figure 5). The soils where the known WAGS colony is located within the Olex Property Boundary consist of Ritzville Silt Loam and Mikkalo Silt Loam, which also occur within the areas available for

mitigation, indicating the areas available for mitigation also contain suitable habitat for WAGS (Figure 4). Based on the known presence of WAGS within the Olex Property Boundary and the suitability of the areas available for mitigation for WAGS, conserving and uplifting habitat as proposed in the HMP could provide WAGS habitat connectivity at a large scale to support the species' dispersal, as well as WAGS breeding and foraging.

5.1.2 WAGS In-Proximity Mitigation

The areas available for mitigation are located within the Columbia Plateau Ecoregion and are suitable for in-proximity WAGS mitigation. Ecoregions are the basis for ODFW's Oregon Conservation Strategy (OCS) and are areas with similar climate and vegetation (OCS 2016). The OCS describes shared characteristics, conservation issues and priorities, limiting factors, and recommended approaches for each ecoregion, including the Columbia Plateau Ecoregion. Both the Facility and the areas available for mitigation are located within the Columbia Plateau Ecoregion as well as within the range of WAGS, and therefore the areas available for mitigation are suitable for in-proximity WAGS mitigation. Furthermore, the OCS (2016) identifies Conservation Opportunity Areas as places where broad fish and wildlife conservation goals would best be met and to guide conservation actions. The areas available for mitigation are located within the Rock Creek – Butter Creek Grasslands Conservation Opportunity Area, which stretches between the Olex Property Boundary and the Facility, indicating that the areas available for mitigation are both desirable for conservation and connected to the Facility by this Conservation Opportunity Area, which contains intact grassland habitat (OCS 2016).

5.2 Habitat Enhancement Actions

Habitat designated for mitigation will be conserved and uplifted for the life of the Facility. Final detailed enhancement actions and monitoring procedures will be designed in consultation with the ODFW and biologists familiar with the HMA. Besides such legal protection to ensure no development, potential enhancement actions for the HMA include the following.

- Modification of grazing practices—wildlife habitat values have priority and livestock grazing will be reduced or restricted from the HMA to ensure that habitat is maximally useful to wildlife, livestock grazing can be used as a wildlife habitat enhancement tool.
- The Certificate Holder will work with the landowner to monitor and control or eradicate County-designated noxious weeds impacting wildlife habitat quality. A Weed Plan will be prepared.
- Seeding and planting with native plants—sagebrush and bunch grasses—will occur in reasonable proportion to the acres of functional sagebrush and native grassland habitats lost through Facility construction. Sagebrush seeding and/or planting will provide future cover and browse for wintering mule deer. Specific details for amount and extent to be determined after final Facility impacts are known. Native grassland plugs and young shrubs can be planted in sensitive areas where seeding is not appropriate.

- A plan for fire response and control will be in place and applied to the HMA. It will include fire prevention measures, methods to detect fires, and a protocol for fire response and suppression.
- Wildlife Projects:
    - Where old barbed wire fence on the HMA presents potential problems for big game and other wildlife, the Certificate Holder will work with the landowner to remove such fencing.
    - Wildlife guzzler as a watering source for wildlife, if the wildlife guzzlers currently present are insufficient.
    - Install burrowing owl artificial burrows. Burrows would be paired, and pairs separated by 0.25 mile.
    - Install artificial raptor nest platforms (target species is Ferruginous hawk).
    - Strategic removal of WAGS mammalian predators. An example would be to live-trap and transplant badgers that are disturbing ground squirrel natal sites in the fall and winter.
- Habitat protection will involve restricting any uses of the mitigation area that would be inconsistent with the goals of no net loss of habitats in Categories 2, 3, and 4 and a net benefit to Category 2 habitat quantity or quality.

Enhancement activities will be performed on an appropriate portion of the HMA to meet the required mitigation goals.

5.3 HMA Monitoring

The Certificate Holder will hire a qualified, independent investigator (wildlife biologist, botanist, or revegetation specialist) to conduct monitoring at the HMA and the success of its protection and (within applicable acres) enhancements. Monitoring duration is for the life of the Facility, with annual monitoring occurring over the first five years. After Year 5, a long-term monitoring plan will be developed in consultation with ODOE and ODFW. At a minimum, annual monitoring for the first five years will include assessments of:

- Description of the amount and quality of vegetation at the HMA. Describe year-to-date climate data;
- Success of weed control measures;
- Degree of recovery of native grasses and forbs following disturbances such as habitat enhancement actions, fire, or erosion;
- Success of sagebrush plantings, if applicable;
- Wildlife observed and notes on special status species (wildlife and plants) present;

- Observations of wintering mule deer will be recorded as observed from a distance (so disturbance is kept at a minimum); and
- Maintenance needs of guzzler.

Methods and results of all monitoring will be reported to ODOE and ODFW, along with a report of the mitigation/enhancement measures undertaken since the last monitoring report. An annual monitoring report outline is included as Appendix B. This outline is subject to change based on actual executed easement.

5.4 HMA Success Criteria

The goal of the habitat mitigation described herein is to protect and enhance a sufficient quantity of habitat to meet ODFW standards of no net loss of habitat Category 3 and Category 4 and a net benefit of habitat quantity and quality of Category 2. Habitat protection alone—apart from enhancement—is not sufficient to meet the net-benefit criterion for Category 2 habitat. The entire HMA is within Category 2 mule deer winter range, so modifying the category through habitat enhancement actions is not possible. However, habitat enhancement actions will be implemented, and progress can be monitored against baseline conditions to determine success. Table 5 shows the success criteria for the habitat enhancement actions proposed in Section 5.2.

Table 5. HMA Success Criteria

Habitat Enhancement Action	Success Criteria
Grazing practices compatible with conservation	The Easement terms will state that grazing, nature study, and other land uses are permitted provided that conservation and wildlife habitat values and wildlife use shall take precedence and priority where such uses are or may be deemed incompatible. Under the current ownership, no grazing is expected. If grazing is used in the future, monitoring of shrub recruitment and recruitment of other desirable shrub-steppe species can occur through photo point monitoring and qualitative observations.
County-designated noxious weed control	Control of County-designated noxious weeds at the HMA. Photo point monitoring will show that known sites of noxious weeds are not expanding or have been reduced or eliminated. Chemical control is the most likely method to be used; however, mechanical control methods may also be used depending on site-specific conditions.
Planting of sagebrush.	Successful establishment of sagebrush on an appropriate acreage to be determined prior to construction. Photo point monitoring will show successful shrub establishment where planted. The average density or frequency of the shrub component should be at least 50 percent of the reference site established at the Facility for revegetation monitoring.
Fire response plan	Deliver a plan for the HMA to the North Gilliam County Rural Fire Protection District
Modification of winter human activities	Minimize human disturbance on the HMA from December 1 to March 31. Schedule routine ranch activities to be performed during other times of the year. There are no public roads or access points in or adjacent to the HMA.

Habitat Enhancement Action	Success Criteria
	Ensure that signage where public roads intersect with access points to the property within which the HMA is located are clearly marked as private property with no trespassing.
Removal of old barbed wire fences	Removal and disposal of old barbed wire fencing will be deemed successful through photographic documentation.
Installation of a wildlife guzzler	This action will be deemed successful after installation is complete. Monitoring reports will confirm continued operation and describe any maintenance activities performed to keep the guzzler in operation.

6.0 Implementation Schedule

As required by condition PRE-FW-04(e), Table 6 includes a schedule for implementation of all mitigation actions, including those covered in other pre-construction compliance plans.

Table 6. Mitigation Implementation Schedule

Mitigation Action	Schedule	Associated Plan
Restoration and revegetation of temporary construction-related impacts at the Facility.	As soon as possible following construction. Late fall seeding, just before the soil freezes, is typical when seeding grasses in the Columbia basin shrub-steppe ecoregion. Seeding can occur through early spring.	Revegetation Plan
Monitoring revegetation success at the Facility.	Annually for the first 5 years. Annual monitoring is anticipated to occur in the fall, with the annual monitoring report being provided the following spring. The Certificate Holder will consult with ODOE and ODFW to design a long-term monitoring schedule.	Revegetation Plan
Monitoring weed control in the Facility revegetation areas.	Annually for the first five years. Early detection is paramount for successful weed control. Therefore, monitoring may occur earlier in the growing season and again during revegetation monitoring. Reporting on noxious weeds will be included in the revegetation annual monitoring report.	Noxious Weed Control Plan

Mitigation Action	Schedule	Associated Plan
	The Certificate Holder will consult with ODOE and ODFW to design a long-term monitoring schedule.	
Securing the conservation easement establishing the HMA, where not already established.	Prior to commencing construction.	Habitat Mitigation Plan
Performing habitat enhancement actions at the HMA.	Concurrently with construction.	Habitat Mitigation Plan
Monitoring habitat enhancement actions at the HMA.	Annually for the first 5 years. Annual monitoring is anticipated to occur in the fall, with the annual monitoring report being provided the following spring. Then the Certificate Holder will consult with ODOE and ODFW to design a long-term monitoring schedule.	Habitat Mitigation Plan

7.0 Amendment of the HMP

The final HMP may be amended from time to time by agreement of the Certificate Holder and EFSC. Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this plan. ODOE shall notify EFSC of all amendments, and EFSC retains the authority to approve, reject, or modify any amendment of this plan agreed to by ODOE.

8.0 References

Betts, B.J. 1990. Geographical distribution and habitat preferences of Washington ground squirrels (*Spermophilus washingtoni*). Northwestern Naturalist 71:27-37.

INR (Institute for Natural Resources). 2011. Washington Ground Squirrel (*Spermophilus washingtoni*), Predicted habitat within occupied watersheds, 01/2008, updated 07/2011. Oregon Wildlife Explorer, Oregon Explorer, Institute to Natural Resources and Oregon State University. Accessed April 26, 2017. Available online at oe.oregonexplorer.info/Wildlife/ExternalContent/SpeciesDistributionMaps/AMAFB05020.pdf.

OCS (Oregon Conservation Strategy). 2016. Oregon Department of Fish and Wildlife, Salem, Oregon.

ODFW (Oregon Department of Fish and Wildlife). 2013. ODFW Winter Range for Eastern Oregon. Available online at: https://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=885.xml

ODOE (Oregon Department of Energy). 2020. Final Order on Request for Amendment 1 to the Site Certificate for Wheatridge Renewable Energy Facility II. November 19, 2020. Attachment C-2: Wheatridge Renewable Energy Facility East Draft Habitat Mitigation Plan. Approved at March 13, 2020 EFSC Meeting as part of the WREFII Site Certificate.

WHCWG (Washington Wildlife Habitat Connectivity Working Group). 2012. Washington Connected Landscapes Facility: Analysis of the Columbia Plateau Ecoregion. Washington Department of Fish and Wildlife, and Washington Department of Transportation, Olympia, WA.

Yensen, E., and P.W. Sherman. 2003. Ground-dwelling Squirrels of the Pacific Northwest. U.S Fish and Wildlife Service and BLM, Boise, ID. 28 pp. + maps.

Figures

(Figures 1, 3, 4 and 5 are confidential and are provided under separate cover)

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Wheatridge Renewable Energy Facility East

Figure 2
Habitat Mitigation Plan - Full 2100 Acre Parcel

MORROW, UMATILLA AND GILLIAM COUNTIES, OR

- Amended Site Boundary
- Analysis Area (0.5-mile Buffer)
- Amended Wind Micrositing Corridors
- Olex Property Boundary
- Interstate Highway
- US Highway
- State Highway
- County Highway
- City/Town
- ODFW Deer Winter Range (Category 2 Habitat)

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



Arlington
Cecil
Olex
Ione
Lexington
Heppner
Stanfield
Morrow County
Umatilla County
Gilliam County
Morrow County
14
74
30
84
395
578
207
19
813
602
206

1:225,000 WGS 1984 UTM Zone 11N

0 2 4 8 12 16 Miles

NOT FOR CONSTRUCTION

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Appendix A. Wildlife Observed at the Project

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Wheatridge Habitat Mitigation Area and Surrounding Area Comprehensive List of all Vertebrate Wildlife Observed 2008–2019

(listed alphabetically within wildlife groups and classes)

Common Name	*Scientific Name*
Birds - 152	
Waterfowl - 11	
American white pelican	*Pelecanus erythrorhynchos*
Blue-winged teal	*Anas discors*
Canada goose	*Branta canadensis*
Cinnamon teal	*Anas cyanoptera*
Common merganser	*Mergus merganser*
Greater white-fronted goose	*Anser albifrons*
Green-winged teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Snow goose	*Chen caerulescens*
Raptors - 21	
Cooper's hawk	*Accipiter cooperii*
Sharp-shinned hawk	*Accipiter striatus*
Ferruginous hawk[1]	*Buteo regalis*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
Swainson's hawk[1]	*Buteo swainsoni*
Bald eagle	*Haliaeetus leucocepahlus*
Golden eagle	*Aquila chrysaetos*
American kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Peregrine falcon	*Falco peregrinus*
Prairie falcon	*Falco mexicanus*
Northern harrier	*Circus cyaneus*
Osprey	*Pandion haliaetus*
Barn owl	*Tyto alba*
Barred Owl	*Strix varia*
Great horned owl	*Bubo virginianus*
Northern saw-whet owl	*Aegolius acadicus*
Short-eared owl	*Asio flammeus*
Western screech owl	*Megascops kennicottii*

Common Name	*Scientific Name*
Turkey vulture	*Cathartes aura*
Crane - 1	
Sandhill crane	*Antigone canadensis*
Dove - 3	
Eurasian collared-dove	*Streptopelia decaocta*
Mourning dove	*Zenaida macroura*
Rock pigeon	*Columba livia*
Gamebird - 5	
California quail	*Callipepla californica*
Chukar	*Alectoris chukar*
Gray partridge	*Perdix perdix*
Ring-necked pheasant	*Phasianus colchicus*
Wild turkey	*Meleagris gallopavo*
Goatsucker - 2	
Common nighthawk[1]	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
Gull - 2	
Franklin's gull	*Larus pipixcan*
Western gull	*Larus occidentalis*
Hummingbird - 4	
Anna's hummingbird	*Calypte anna*
Black-chinned hummingbird	*Archilochus alexandri*
Calliope hummingbird	*Stellula calliope*
Rufous hummingbird	*Selasphorus rufus*
Kingfisher - 1	
Belted kingfisher	*Megaceryle alcyon*
Shorebird - 5	
Greater yellowlegs	*Tringa melanoleuca*
Killdeer	*Charadrius vociferous*
Long-billed curlew[1]	*Numenius americanus*
Spotted sandpiper	*Actitis macularius*
Wilson's snipe	*Gallinago delicata*
Swift - 1	
Vaux's swift	*Chaetura vauxi*
Wading Bird - 5	
American bittern	*Botaurus lentiginosus*
American coot	*Fulica americana*

Common Name	*Scientific Name*
Black-crowned night-heron	*Nycticorax nycticorax*
Great blue heron	*Ardea herodias*
Virginia rail	*Rallus limicola*
Woodpecker - 5	
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Lewis' woodpecker[1]	*Melanerpes lewis*
Northern flicker	*Colaptes auratus*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Passerine - 81	
American goldfinch	*Spinus tristis*
American pipit	*Anthus rubescens*
American robin	*Turdus migratorius*
American tree sparrow	*Spizelloides arborea*
Ash-throated flycatcher	*Myiarchus cinerascens*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Bewick's wren	*Thryomanes bewickii*
Black-capped chickadee	*Poecile atricapillus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-throated gray warbler	*Dendroica nigrescens*
Brewer’s blackbird	*Euphagus cyanocephalus*
Brown creeper	*Certhia americana*
Brown-headed cowbird	*Molothrus ater*
Bullock’s oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
Canyon wren	*Catherpes mexicanus*
Cassin’s finch	*Carpodacus cassinii*
Cassin's vireo	*Vireo cassinii*
Cedar waxwing	*Bombycilla cedrorum*
Chipping sparrow	*Spizella passerina*
Cliff swallow	*Hirundo pyrrhonota*
Common redpoll	*Acanthis flammea*
Common yellowthroat	*Geothlypis trichas*
Dark-eyed junco	*Junco hyemalis*
Eastern kingbird	*Tyrannus tyrannus*
European starling	*Sturnus vulgaris*

Common Name	*Scientific Name*
Evening grosbeak	*Coccothraustes vespertinus*
Fox sparrow	*Passerella iliaca*
Golden-crowned kinglet	*Regulus satrapa*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Grasshopper sparrow[1]	*Ammodramus savannarum perpallidus*
Gray flycatcher	*Empidonax wrightii*
Hammond's flycatcher	*Empidonax hammondii*
Harris's sparrow	*Zonotrichia querula*
Hermit thrush	*Catharus guttatus*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Lark sparrow	*Chondestes grammacus*
Lazuli bunting	*Passerina amoena*
Lesser goldfinch	*Carduelis psaltria*
Loggerhead shrike[1]	*Lanius ludovicianus*
MacGillivray's warbler	*Oporornis tolmiei*
Mountain chickadee	*Poecile gambeli*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shrike	*Lanius excubitor*
Olive-sided flycatcher	*Contopus cooperi*
Orange-crowned warbler	*Oreothlypis celata*
Pacific wren	*Troglodytes pacificus*
Pine siskin	*Carduelis pinus*
Purple finch	*Carpodacus purpureus*
Red crossbill	*Loxia curvirostra*
Red-breasted nuthatch	*Sitta canadensis*
Red-winged blackbird	*Agelaius phoeniceus*
Rock wren	*Salpinctes obsoletus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ruby-crowned kinglet	*Regulus calendula*
Savannah sparrow	*Passerculus sandwichensis*
Say’s phoebe	*Sayornis saya*
Song sparrow	*Melospiza melodia*
Spotted towhee	*Pipilo maculatus*
Townsend's solitaire	*Myadestes townsendi*

Common Name	*Scientific Name*
Townsend's warbler	*Dendroica townsendi*
Tree swallow	*Tachycineta bicolor*
Varied thrush	*Ixoreus naevius*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*
Warbling vireo	*Vireo gilvus*
Western kingbird	*Tyrannus verticalis*
Western tanager	*Piranga ludoviciana*
Western wood-peewee	*Contopus sordidulus*
White-breasted nuthatch	*Sitta carolinensis*
White-crowned sparrow	*Zonotrichia leucophrys*
White-throated sparrow	*Zonotrichia albicollis*
Willow flycatcher	*Empidonax traillii*
Wilson's warbler	*Wilsonia pusilla*
Yellow warbler	*Setophaga petechia*
Yellow-breasted chat	*Icteria virens*
Yellow-rumped warbler	*Dendroica coronata*
Corvid - 5	
American crow	*Corvus brachyrhynchos*
Black-billed magpie	*Pica hudsonia*
Common raven	*Corvus corax*
Steller's jay	*Cyanocitta stelleri*
Western scrub-jay	*Aphelocoma californica*
Mammals – 40	
American badger	*Taxidea taxus*
American mink	*Neovison vison*
Beaver	*Castor canadensis*
Belding’s ground squirrel	*Urocitellus beldingi*
Big-brown bat	*Eptesicus fuscus*
Bobcat	*Lynx rufus*
Bushy-tailed woodrat	*Neotoma cinerea*
California myotis	*Myotis californicus*
Canyon bat	*Parastrellus hesperus*
Porcupine	*Erethizon dorsatum*
Raccoon	*Procyon lotor*
Cougar	*Puma concolor*
Coyote	*Canis latrans*

Common Name	*Scientific Name*
Deer mouse	*Peromyscus maniculatus*
Elk	*Cervus elaphus*
Fringed myotis	*Myotis thysanodes*
Hoary bat[1]	*Lasiurus cinereus*
House mouse	*Mus musculus*
Little brown myotis	*Myotis lucifugus*
Long-eared myotis	*Myotis evotis*
Long-legged myotis	*Myotis volans*
Long-tailed weasel	*Mustela frenata*
Montane vole	*Microtus montanus*
Mountain cottontail	*Sylvilagus nuttallii*
Mule deer	*Odocoileus hemionus*
Northern pocket gopher	*Thomomys talpoides*
Ord's kangaroo rat	*Dipodomys ordii*
Pallid bat[1]	*Antrozous pallidus pacificus*
Pronghorn	*Antilocarpa americana*
Red fox	*Vulpes vulpes*
River otter	*Lutra canadensis*
Silver-haired bat[1]	*Lasionycteris noctivagans*
Striped skunk	*Mephitis mephitis*
Townsend's big-eared bat[1]	*Corynorhinus townsendii*
Virginia opossum	*Didelphis virginiana*
Washington ground squirrel[2]	*Urocitellus washingtoni*
Western small-footed myotis	*Myotis ciliolabrum*
White-tailed deer	*Odocoileus virginianus*
White-tailed jackrabbit	*Lepus townsendii*
Yellow-bellied marmot	*Marmota flaviventris*
Amphibians and Reptiles - 14	
Common garter snake	*Thamnophis sirtalis*
Gopher snake	*Pituophis catenifer*
Great Basin spadefoot	*Elgaria coerulea*
Long-toed salamander	*Ambystoma macrodactylum*
Northern alligator lizard	*Spea intermontana*
Northern sagebrush lizard[1]	*Sceloporus graciosus graciosus*
Night snake	*Hypsiglena torquata*
Pacific chorus frog	*Pseudacris regilla*
Side-blotched lizard	Uta *stansburiana*

Common Name	*Scientific Name*
Racer	*Coluber constrictor*
Western fence lizard	*Sceloporus occidentalis*
Western rattlesnake	*Crotalus viridis*
Western skink	*Eumeces skiltonianus*
Western toad	*Bufo boreas*
1. Denotes ODFW Sensitive Species in the Columbia Plateau Ecoregion (ODFW 2021a).[1] 2. Denotes ODFW Endangered Species (ODFW 2021b).[2]	

[1] ODFW. 2021a. Oregon Department of Fish and Wildlife Sensitive Species List. Available online at: https://www.dfw.state.or.us//wildlife/diversity/species/docs/Sensitive_Species_List.pdf

[2] ODFW. 2021b. Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon. Available online at: https://www.dfw.state.or.us/wildlife/diversity/species/docs/Threatened_and_Endangered_Species.pdf

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Appendix B. Annual Monitoring Report Outline

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Wheatridge Wind Energy Facility's Habitat Mitigation Area Annual Reporting Outline

1.0 Background

- Project statement.
- Identify the monitoring report's timeframe and reference to previous monitoring reports.
- General description of the amount and quality of vegetation at the HMA and discuss if/how it has changed year/year.
- Discuss annual climate data and any disturbances that have occurred on the HMA such as fire, flooding, or erosion.

2.0 Enhancement Actions Implemented

- Discussion of enhancement actions performed during this report's monitoring timeframe.

3.0 Monitoring of Enhancement Actions

Discussion of monitoring efforts for previous years' enhancement actions

1. Sagebrush plantings
    a. Native shrub density estimates
    b. Native shrub diversity estimates
2. Weed control
    a. Discussion of previous years' treatments
    b. Photo point monitoring of treated areas
3. Guzzler
    a. Discussion of installation and operation
    b. Discussion of maintenance performed
    c. Discussion of weed control and native plant recruitment in areas disturbed during installation.
4. Barbed wire removal

a. Discuss this effort in year that this action is performed, otherwise no monitoring once performed.

4.0 Recommendations for Next Year

1. Make recommendations for any adaptive management at sagebrush plantings
2. Make recommendations for weed control efforts

Appendix A. Sagebrush Monitoring Plot Belt Transect Forms

Appendix B. Photo Point Monitoring

Attachment P-3. Draft Noxious Weed Control Plan

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Draft Noxious Weed Control Plan for the Wheatridge Renewable Energy Facility East

Prepared for
Wheatridge East Wind, LLC

Prepared by



January 2024
(Approved February 2020 as part of the WREFII Site Certificate. Updated May and January 2024 as part of Wheatridge Renewable Energy Facility East RFA 1)

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Table of Contents

1.0 Introduction 1
2.0 Regulatory Framework 1
2.1 State of Oregon 1
2.2 Morrow County 2
2.3 Umatilla County 2
3.0 State and County Weeds Lists 3
4.0 Noxious Weeds Identified at the Facility 4
5.0 Weed Management 7
5.1 Education and Personnel Requirements 8
5.2 Prevention 8
5.3 Control Methods 9
5.3.1 Mechanical Treatment 10
5.3.2 Chemical Treatments 10
6.0 Monitoring 13
7.0 Roles and Responsibilities 14
8.0 References 16

List of Tables

Table 1. Noxious Weeds Identified at the Facility 5
Table 2. Example Noxious Weed Monitoring Schedule 16

List of Figures

Figure 1. Noxious Weed Observations **(Confidential–provided under separate cover)**

Appendices

Appendix A. Oregon State Noxious Weed List

Appendix B. Noxious Weed Lists for Morrow and Umatilla Counties

Appendix C. Recommended Timing and Control Methods

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1.0 Introduction

The Wheatridge Renewable Energy Facility East (Facility) is an approved, but not yet constructed, wind energy generation facility consisting of up to 66 turbines and related or supporting facilities with a peak generating capacity of up to 200 megawatts (MW), to be located in an Approved Site Boundary of approximately 4,582 acres on over 42,000 acres of leased land in Morrow and Umatilla counties, Oregon. As part of Request for Amendment (RFA) 1 to the Facility Site Certificate, Wheatridge East Wind, LLC (Certificate Holder) is proposing to expand wind power generation at the Facility to provide the opportunity for increased power capacity and availability. This includes expanding the Site Boundary and micrositing corridors, increasing the peak generating capacity by adding more and newer turbines, changing the intraconnection routes, and extending the construction date. See the RFA 1's Division 27 document (*Request for Amendment #1 for the Wheatridge Renewable Energy Facility East*) for a more detailed summary of the proposed changes. See Exhibit P for a description of the Amended Site Boundary and amended wind micrositing corridors within which habitat impacts as proposed in RFA 1 would occur.

This Draft Noxious Weed Plan (Plan) has been prepared for the Facility. Noxious weed species can adversely affect the structure, composition, and success of revegetation efforts associated with construction-related temporary disturbances. The intent of this Plan is to provide clear methods to prevent the introduction and spread of designated noxious weeds from the construction and operation of the Facility, to control existing populations of noxious weeds within construction areas, and to monitor efforts to prevent and control noxious weeds. The Certificate Holder and its contractors will be responsible for implementing the methods detailed in this Plan.

2.0 Regulatory Framework

2.1 State of Oregon

In Oregon, noxious weeds are defined under Oregon Revised Statutes (ORS) 569.175 as "terrestrial, aquatic, or marine plants designated by the Oregon State Weed Board (OSWB) under ORS 569.615 as among those representing the greatest public menace and as a top priority for action by weed control programs." Noxious weeds have been declared by ORS 569.350 as a menace to public welfare, and control of these plants is the responsibility of private landowners and operators, as well as county, state, and federal governments.

The Oregon State Weed Board (OSWB) is created in the State Department of Agriculture under ORS 569.600. It provides direction to control noxious weeds at the state level and develops and maintains the State Noxious Weed List. The OSWB and the Oregon Department of Agriculture (ODA) classify noxious weeds in Oregon in accordance with the ODA Noxious Weed Classification System (ODA 2022). There are three designations under the State's system:

- **Class A State Listed Noxious Weed:** A weed of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is

not known to occur in Oregon, but its presence in neighboring states makes future occurrence in Oregon seem imminent.

    - **Recommended Action:** Infestations are subject to eradication or intensive control when and where found.

- **Class B State Listed Noxious Weed:** A weed of economic importance that is regionally abundant but may have limited distribution in some counties.

    - **Recommended Action:** Limited to intensive control at the state, county, or regional level as determined on a site-specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.

- **Class T Designated State Noxious Weeds:** Priority noxious weed species that are selected from the A or B list as a focus for prevention and control by the Noxious Weed Program. Action against these weeds will receive priority. T-designated noxious weeds are determined by the OSWB and directs ODA to develop and implement a statewide management plan.

2.2 Morrow County

The Morrow County Code Enforcement Ordinance establishes procedures for enforcing Morrow County Code through the authority granted to general law counties by ORS Chapter 203. Section 11 of the county Code Enforcement Ordinance, updated on July 5, 2021, establishes Morrow County as a weed control district, defines what is considered a noxious weed or weed of economic importance, identifies the responsibility of private landowners to control weeds, and outlines the authority of the weed control district and Morrow County Weed Coordinator/Inspector to administer and enforce weed control in the ordinance (Morrow County 2021).

Morrow County has its own weed classification system that differs from the state. Morrow County defines two classifications of weeds:

- **Morrow County A List:** Noxious Weeds. Any plant that is determined by the weed advisory board, and so declared by the County Board of Commissioners to be injurious to public health, crops, livestock, land, or property under provisions of Oregon State Statute and thus mandated for control.
- **Morrow County B List:** Weeds of economic importance. Weeds of limited distribution in the county and subject to intensive control or eradication where feasible.

2.3 Umatilla County

The Umatilla County Weed Control Board, as part of the Umatilla County Road Department, carries out the State Noxious Weed Laws in ORS Chapter 569 – Weed Control that assists landowners and managers in being responsible stewards of the land and resources by protecting and conserving

agricultural lands, recreational areas, and natural resources from the degrading impact of exotic, invasive noxious weeds.

The County Code Enforcement Ordinance establishes procedures for enforcing Umatilla County Code through the authority granted to general law counties by ORS Chapter 203. The Weed Control Ordinance, Chapter 97 of the county Code Enforcement, passed on May 17, 2000, establishes Umatilla County as a weed control district, defines what is considered a noxious weed, identifies the responsibility of landowners to control weeds, and outlines the authority of the weed inspector or any employee of the Umatilla County Weed Control office to enforce the ordinance (Umatilla County 2000).

Umatilla County has its own weed classification system that differs from the state noxious weed classification (Umatilla County 2022). Umatilla County defines two classifications of weeds:

- **Umatilla County "A" Designated Weed List:** These "A" designated weeds are of known economic importance which occur in the state/county in small enough infestations to make eradication/containment possible; or is not known to occur, but its presence in neighboring states/county make future occurrence in Oregon seem imminent. These weeds have been found as single plants or in limited populations in the county. Prevention, early detection, and eradication is high priority. Infestations are subject to intensive control when and where found.
- **Umatilla County "B" Designated Weed List:** These "B" designated weeds are of known economic importance and are regionally abundant, but which may have limited distribution in some counties. Where implementation of a fully integrated statewide management plan is feasible, biological control shall be the main control approach for species which biological agents are available; noted by asterisk. Limited to intensive control at state or county level as determined on a case-by case basis.

3.0 State and County Weeds Lists

The ODA lists 46 Class A species and 98 Class B species for the state of Oregon (ODA 2022; Appendix A). Of these, 144 Class A and Class B species, 47 species are also Class T-designated noxious weeds. Morrow County specifically recognizes 36 species of noxious weeds (Appendix B; Morrow County 2022). The Umatilla County Weed Board specifically recognizes 39 species of noxious weeds, which have also been approved by the Umatilla County Board of Commissioners (Appendix B; Umatilla County 2022). Although not all of the Morrow and Umatilla county-recognized noxious weeds noted in Appendix B occur in the vicinity of the Facility, the Certificate Holder and its contractors should be aware of the entire list, as well as the ODA list, while monitoring and controlling weeds. Noxious weeds known to occur in the vicinity of the Amended Site Boundary are discussed in Section 4.0.

4.0 Noxious Weeds Identified at the Facility

The Certificate Holder conducted botanical surveys within the Facility micrositing corridors in 2022 and 2023, omitting agricultural fields. Botanical surveys consisted of surveys for the state-listed threatened plant species Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) as well as documenting observations of state and county-listed noxious weeds. Field surveys were conducted within the micrositing corridors in July 2022 and from mid-June to mid-August 2023 (see RFA 1 Exhibits P and Q; Tetra Tech 2023a; Fields and Thompson 2023). Approximately 330 acres within the amended micrositing corridors were not surveyed in 2022 or 2023, primarily (i.e., 259 acres) in areas associated with transmission line routes no longer under consideration. The Certificate Holder will continue to conduct surveys as needed prior to ground disturbance in areas that have not been surveyed.

The Certificate Holder recorded 21 listed noxious weed species within the micrositing corridors, including 21 ODA-listed noxious weed species, 17 Morrow County-listed weeds, and 15 Umatilla County-listed weeds. Table 1 identifies the state- and county-listed noxious weed species observed during these surveys, their noxious weed designations, and their estimated frequency of occurrence. Locations of noxious weed observations are shown in Figure 1. Although the noxious weed infestation sizes were recorded during field survey observations, the sizes of noxious weed infestations are not displayed in Figure 1. Noxious weeds were most abundant along roadsides, within drainages, and in or near current and former agricultural fields and structures such as field sheds, water troughs, and fence lines.

Surveys in 2022 documented ODA, Morrow County, and Umatilla County A- and B-List noxious weeds if present, while surveys in 2023 documented ODA A-List noxious weeds and Morrow County and Umatilla County A- and B-List noxious weeds if present. Surveys in 2023 identified one potential ODA A-List noxious weed (hawkweed spp. [*Hieracium* spp.]) although the observation was not identified to species. Further review of photos and supplemental taxonomic keys identified the hawkweed observed was likely the native Scouler's hawkweed (*Hieracium scouleri*); however, this hawkweed species is retained in Table 1, below, and in Figure 1 for field verification prior to any noxious weed treatment.

Table 1. Noxious Weeds Identified at the Facility

Scientific Name	Common Name	State Status (ODA)[1]	Morrow County Status [1]	Umatilla County Status [1]	Frequency
Aegilops cylindrica	jointed goatgrass	**B**	**B**	**B****	Infrequent (<20 observations), but moderate to high abundance in 8 of 9 observations where found; Occasional large patches.
Bassia (Kochia) scoparia	kochia	**B**	**B**	**B****	Abundant along roadsides and former fields
Centaurea diffusa	diffuse knapweed	**B**	**B**	**B****	Abundant (>100 observations)
Centaurea solstitialis	yellow starthistle	**B***	**A**	**B****	Common (>20 observations); Occasional patches.
Centaurea stoebe ssp. *micranthos* (*C. maculosa*)	spotted knapweed	**B*/T**	**B**	**A****	Rare (<5 observations)
Centromadia (Hemizonia) pungens	common spikeweed	**B**	**A**	**A**	Abundant (>100 observations). Multiple small to large patches
Chondrilla juncea	rush skeletonweed	**B*/T**	**A**	**A**	Common (>20 observations); Several small to medium-sized patches
Cirsium arvense	Canada thistle	**B***	**B**	**B****	Infrequent (<20 observations); Few small patches.
Cirsium vulgare	bull thistle	**B**	**-**	**-**	Rare (<5 observations); Few small patches.
Conium maculatum	poison hemlock	**B**	**B**	**B**	Infrequent (<20 observations); Several medium to large-sized patches along drainages.
Convolvulus arvensis	field bindweed	**B***	**B**	**-**	Common (>20 observations). Several small to medium patches
Crupina vulgaris	common crupina	**B**	**A**	**A**	Rare (<5 observations)
Cuscuta indecora	bigseed dodder, collared dodder	**B**	**-**	**-**	Rare (<5 observations)
Hieracium spp.	Hawkweed spp.	**A**[2]	**-**	**-**	Rare (<5 observations)
Hypericum perforatum	common St. John's wort	**B***	**B**	**B**	Common (>20 observations); Small to medium patches.

Scientific Name	Common Name	State Status (ODA)[1]	Morrow County Status [1]	Umatilla County Status [1]	Frequency
Onopordum acanthium	Scotch thistle	**B**	**A**	**B****	Abundant with small to large patches especially near fields and drainages.
Rhaponticum (Acroptilon/ Centaurea) repens	Russian knapweed	**B**	**B**	**B**	Common (>20 observations); Moderate to high abundance in most observations.
Secale cereale	cereal rye, rye	**-**	**B**	**B**	Common (>20 observations)
Solanum rostratum	buffalo bur, spiny nightshade	**B**	**-**	**-**	Rare (<5 observations)
Taeniatherum caput-medusae	medusahead; medusahead rye	**B**	**B**	**-**	Common with multiple medium to large patches, especially near cultivated or developed areas.
Tribulus terrestris	puncture vine, land caltrop, goat's head	**B***	**B**	**B**	Few small to large-sized patches, especially within roadways.

Sources: ODA 2022. Morrow County 2022, Umatilla County 2022.

1. Definitions for state and county noxious weed status are provided in Section 2.0.

2. Observations of hawkweed plants were not identifiable to species and thus were conservatively assumed to potentially be the ODA A-List species king devil hawkweed (*Hieracium piloselloides*). Post-field review of photos and supplemental taxonomic keys identified the hawkweed observed was likely the native Scouler's hawkweed (*Hieracium scouleri*); however, this hawkweed species is retained here and in Figure 1 for field verification prior to any noxious weed treatment.

Scotch thistle (*Onopordum acanthium*), kochia (*Bassia scoparia*), diffuse knapweed (*Centaurea diffusa*) and rush skeletonweed (*Chondrilla juncea*) were abundant throughout the micrositing corridors. Kochia was especially abundant, near roads, areas of intensive grazing activity (such as feeding and watering areas), and active and former agricultural areas. Scotch thistle was scattered throughout the micrositing corridors in small to large patches along roadsides, drainages, and within grassland habitat. Some large populations of well over 1,000 individuals were observed in fallow fields and drainages. Diffuse knapweed was present throughout the micrositing corridors in low to high densities. Populations tended to be densest near roads or fallow agricultural fields; however, some hillslopes were also dominated by the species where well over 1,000 individuals were observed creating a fairly dense layer across a hillside. Rush skeletonweed was observed primarily in the northern portion of the micrositing corridors.

Medusahead (*Taeniatherum caput-medusae*) was abundant to dominant in valley areas and near active and fallow agricultural fields or outbuildings. The Certificate Holder primarily documented yellow starthistle (*Centaurea solstitialis*), and puncture vine (*Tribulus terrestris*) along roads, and in fallow fields. Common spikeweed (*Centromadia pungens)* was observed with moderate frequency and density. Some large patches were observed along stream and wetland areas as well as

hillslopes where other invasives were common. Russian knapweed (*Rhaponticum repens*) was observed near heavy cattle use areas and roadways.

Poison hemlock (*Conium maculatum*) was observed in several patches of 10 to 500 individuals, exclusively in moist drainages. Canada thistle (*Cirsium arvense*) was observed in a few small patches within drainages. Bull thistle (*Cirsium vulgare*) was observed in a few small patches in drainages and along roads as well as associated with active and former agricultural fields.

Common St. John's wort (*Hypericum perforatum*) was observed sporadically, with occasional small to medium patches observed on grassland slopes, along roads, and in agricultural fields. Spotted knapweed (*Centaurea stoebe* ssp. *micranthos* [*C. maculosa*]) was observed periodically along hillslopes and roadways. Cereal rye (*Secale cereale*) was identified near the base of hillslopes and near active or former agricultural lands. Surveyors observed field bindweed (*Convolvulus arvensis*) in small to medium patches along roads and drainages, as well as along grassland ridges. Jointed goatgrass (*Aegilops cylindrica*) was observed in a few locations; generally near roadsides and adjacent to agricultural fields. Some weeds, such as bigseed dodder (*Cuscuta indecora*), buffalo bur (*Solanum rostratum*), and common crupina (*Crupina vulgaris*), were observed infrequently and associated with disturbance. Abundance of these and other weeds may be higher but could have been missed due to inconspicuous morphology at the time of survey.

Almost all noxious weed species observed are included on the state "B" listed weeds, meaning that they are weeds of economic importance that are regionally abundant, but which may have limited distribution in some counties (ODA 2020). Two species, rush skeletonweed and spotted knapweed, are also "T" designated weeds, meaning that ODA has targeted this species for prevention and control (ODA 2020). One state "A" list species was potentially observed (hawkweed spp.), although the observation was not identified to species. ODA "A" listed populations are subject to eradication or intensive control when and where found (Section 2.1, ODA 2020). Additionally, four of the species observed are on the Morrow County "A" list (yellow starthistle, rush skeletonweed, common spikeweed, and Scotch thistle) and three species are on the Umatilla County "A" list (common spikeweed, skeletonweed, spotted knapweed). In Morrow County, "A" list species include "[a]ny plant that is determined by the weed advisory board, and so declared by the County Board of Commissioners to be injurious to public health, crops, livestock, land or property under provisions of Oregon State Statute and thus mandated for control" (Morrow County 2022). For Umatilla County, "A" designated weeds are those that "have been found as single plants or in very limited populations in the county. Prevention, early detection, and eradication is high priority" (Umatilla County 2022).

5.0 Weed Management

This section describes the steps the Certificate Holder will take to prevent and control the establishment and spread of noxious weed species during both construction and operation of the Facility.

The management of noxious weeds will be considered throughout all stages of construction and operation of the Facility and will include:

- **Education and Personnel Requirements:** Educating all construction personnel regarding known locations of noxious weed infestations, identification of noxious weed species, and the importance of preventive measures and treatment methods.
- **Prevention:** Implementing measures to prevent the spread of noxious weeds during construction, operation, and maintenance activities.
- **Control:** Treating noxious weed infestations with appropriate control methods within the most effective timeframe.

The Certificate Holder's objective is to prevent the introduction of new weed populations and the spread of existing noxious weed populations. The methods described below will be implemented to minimize the spread of noxious weeds during construction activities. New noxious weeds detected during post-construction revegetation will be considered a result of construction activities and will be controlled accordingly.

5.1 Education and Personnel Requirements

Prior to construction, all construction personnel will be instructed on the importance of controlling noxious weeds. As part of start-up activities, and to help facilitate the avoidance of existing infestations and identification of new infestations, the Certificate Holder or their construction contractor will provide information and training to all construction personnel regarding noxious weed identification and management. Operations and maintenance personnel will be similarly informed. The importance of preventing the spread of noxious weeds in areas not currently infested and controlling the proliferation of noxious weeds already present within or near the Facility, will be emphasized.

5.2 Prevention

Implementation of the following best management practices are intended to prevent the spread of noxious weeds during construction activities, revegetation efforts, and operation and maintenance activities.

- Flagging areas of noxious weed infestations prior to construction to alert construction personnel;
- Limiting vehicle access to designated routes, whether existing roads or newly constructed roads, and the outer limits of construction disturbances per the final design for the Facility;
- Limiting vehicle traffic in noxious weed-infested areas;
- Cleaning construction vehicles prior to entering the Facility for the first time and upon completion of work at the Facility at a wash station located within at an onsite location, or at a public car wash in the vicinity of the Facility;

- Cleaning vehicles and equipment associated with ground disturbance and movement of topsoil utilizing a mobile wash station after performing work in noxious weed-infested areas and prior to performing work in non-infested areas;
- Topsoil and other soils from noxious weed infested areas will not be moved outside of the infested areas and will be returned to its previous location during reclamation activities;
- Treating soils from infested areas with a pre-emergent herbicide prior to initiation of revegetation efforts, depending on site-specific conditions;
- Limiting movement of topsoil and other soils from non-infested areas to eliminate the transport of weed seeds, roots, or rhizomes;
- Providing information regarding target noxious weed species at the O&M buildings;
- Treating noxious weeds via mechanical or chemical control (see Section 5.3);
- Preventing conditions favorable for noxious weed germination and spread by revegetating temporarily disturbed areas as soon as possible;
- Monitoring areas of disturbance for noxious weeds after construction (see Section 6.0), during the normal course of revegetation maintenance of temporary workspaces, and implementing control measures as appropriate;
- Revegetating the site with appropriate, local native seed or native plants; when these are not available, non-invasive, and non-persistent non-native species may be used;
- Inspecting and certifying that the seed and straw mulch used for site rehabilitation and revegetation are free of noxious weed seed and propagules; and
- Utilizing a mobile wash station placed in proximity to the main access points to Laurence's milkvetch habitat to minimize the introduction of noxious weeds or other invasive plant species by construction vehicles to occupied Laurence's milkvetch habitat. Vehicles will be washed prior to entering these areas.

5.3 Control Methods

Control of noxious weeds will be implemented through mechanical or chemical control measures. The Certificate Holder will be responsible for hiring a qualified contractor to implement the treatment of noxious weeds. The Certificate Holder will ensure that noxious weed management actions will be conducted by specialists with the following qualifications:

- Experience in native plant, non-native and invasive plants, and noxious weed identification;
- Experience in noxious weed mapping;
- If chemical control is used, specialists must possess a Commercial or Public Pesticide Applicator License from the ODA or possess an Immediately Supervised Pesticide Trainee License and be supervised by a licensed applicator;

- Training in noxious weed management or Integrated Pest Management with an emphasis in noxious weeds; and
- Experience in coordination with agency and private landowners.

The weed control contractor will employ mechanical and/or chemical methods as described in Sections 5.3.1 and 5.3.2. The control method will be selected based on the noxious weed species, infestation extent, and site conditions (e.g., presence of sensitive habitats).

Existing noxious weed populations should be prevented from expanding in size and density and should not be spread to new sites. Within the Facility rights-of-way such as around Facility disturbances, facilities, and access roads, existing populations of noxious weeds should be eradicated. If it is determined that noxious weeds have invaded areas immediately adjacent to the Facility (e.g., areas visible just beyond the outer limits of construction disturbances associated with the Facility or along access roads) as a result of construction, the Certificate Holder will contact the landowner and seek approval to treat those noxious weed populations.

Long-term weed control methods will be described in a long-term monitoring plan as described in Section 6.0. The main factor in long-term weed control is successful revegetation with non-weedy species as described in the updates to the Revegetation Plan prepared for the Facility (Tetra Tech 2023b). As noted above, short-term noxious weed control will be done through mechanical or chemical treatment. However, it will be important to ensure that the short-term treatment does not affect the establishment of the native perennial cover that will help provide the long-term control. Additionally, early detection and control of small noxious weed populations before they can expand into larger populations is extremely important for successful weed control efforts.

5.3.1 Mechanical Treatment

Mechanical control methods rely on removal of plants, seed heads, and/or cutting roots with a shovel or other hand tools or equipment that can be used to remove, mow, or disc noxious weed populations. Hand removal of plants is also included under this treatment method. Mechanical methods are useful for smaller, isolated populations of noxious weeds in areas of sensitive habitats such as around known populations of Laurence's milkvetch (Figure 1). Some rhizomatous plants can spread by discing or tillage; therefore, implementation of discing will be species specific. If such a method is used in areas to be reclaimed, subsequent seeding will be conducted to re-establish desirable vegetative cover that will stabilize the soils and slow the potential re-invasion of noxious weeds. Discing or other mechanical treatments that disturb the soil surface within native habitats will be avoided in favor of herbicide application (see Section 5.3.2), which is an effective means of reducing the size of noxious weed populations as well as preventing the establishment of new infestations.

5.3.2 Chemical Treatments

Chemical control can effectively remove noxious weeds through use of selective herbicides. The recommended chemical treatment and timing of chemical application for noxious weeds that have

been identified at the Facility are provided in Appendix C. The herbicides used and the timing of application will differ depending on whether the species are (1) perennial, broad-leaved, or dicot weeds (e.g., thistles and knapweeds, field bindweed) or (2) annual grasses or monocots (e.g., medusahead), as appropriate herbicides differ substantially between dicots and monocots.

All herbicides included in Appendix C are currently approved for use by the U.S. Environmental Protection Agency (EPA) and ODA; however, the status of herbicide approval should be checked annually. Prior to construction and every fall season during facility operation, the Certificate Holder or its contractor shall consult with the Morrow and Umatilla County Weed Supervisors on timing, method, and application rates for each identified weed species of concern, to allow for adaptive weed management given changes in weed control effectiveness from noxious weed species tolerance to herbicide treatment over time. Results of the consultation shall be reported in the Certificate Holder's annual weed monitoring report. Any alternative control methods can be proposed by the Certificate Holder or its contractors after consulting with the Morrow and Umatilla County Weed Supervisors and included in the Certificate Holder's annual weed monitoring report.

The application of herbicides will be to identified, treatable, noxious weed infestations. The Certificate Holder or their contractors will coordinate with the Morrow County and Umatilla Weed Control Supervisors to determine which populations are treatable and will notify landowners of proposed herbicide use on their lands prior to application. If a noxious weed population is deemed to be untreatable (e.g., too widespread and established in an area to successfully control), the Certificate Holder will implement the prevention measures discussed in Section 5.2, except for treatment with herbicides.

5.3.2.1 Herbicide Application and Handling

Herbicide application will adhere to EPA and ODA standards. Only those herbicides that are approved by the EPA and ODA will be used. In general, application of herbicides will not occur when the following conditions exists:

- Wind velocity exceeds 15 miles per hour for granular application, or exceeds 10 miles per hour for liquid applications;
- Snow or ice covers the foliage of target species; or
- Adverse weather conditions are forecasted within the next few days.

Hand application methods (e.g., backpack spraying) may be used in roadless areas or in rough terrain. Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Calibration checks of equipment will be conducted prior to spraying activities, as well as periodically throughout use, to ensure that appropriate application rates are achieved.

Herbicides will be transported to the Facility daily with the following stipulations:

- Only the quantity needed for that day's work will be transported.

- Concentrate will be transported in approved containers only, and in a manner that will prevent spilling, stored separately from food, clothing, and safety equipment.
- Mixing will be done off site and at a distance greater than 200 feet from open or flowing water, wetlands, or other sensitive species' habitat. No herbicides will be applied at these areas unless authorized by the appropriate regulatory agencies.
- All herbicide equipment and containers will be inspected daily for leaks.
- Herbicides use will be in accordance with all manufacture's label recommendations and warnings.

5.3.2.2 Herbicide Spills and Cleanups

All appropriate precautions will be taken to avoid herbicide spills. In the event of a spill, cleanup will be immediate. Contractors will keep spill kits in their vehicles and in an appropriate storage shed to allow for quick and effective response to spills. Items included in the spill kit will be:

- Protective clothing and gloves;
- Adsorptive clay, "kitty litter," or other commercial adsorbent;
- Plastic bags and a bucket;
- A shovel;
- A fiber brush and screw-in handle;
- A dustpan;
- Caution tape;
- Highway flares (use on existing hard-top roads only); and
- Detergent.

Response to an herbicide spill will vary with the size and location of the spill, but general procedures include:

- Stopping the leak;
- Containing the spilled material;
- Traffic control;
- Dressing the clean-up team in protective clothing;
- Cleaning up and removing the spilled herbicide, as well as the contaminated adsorptive material and soil; and
- Transporting the spilled herbicide and contaminated material to an authorized disposal site.

5.3.2.3 Herbicide Spill Reporting

All herbicide contractors will have readily available copies of the appropriate material safety data sheets for the herbicides used at their disposal and will keep copies of the material safety data sheets in the application vehicle. All herbicide spills will be reported in accordance with applicable laws and requirements. If a spill occurs, the appropriate agency and spill coordinators will be notified promptly. In case of a spill into wetlands and waterbodies, the appropriate federal, state, and county agencies will be notified immediately.

5.3.2.4 Special Considerations

The Certificate Holder will provide special consideration to perennial, intermittent, and ephemeral streams/draws during treatment activities. No herbicide will be sprayed where the drift can enter standing water or saturated soil. It will be the herbicide applicators' responsibility to ensure that no herbicide or drift enters standing water, regardless of the season when the herbicide is applied. Similar considerations will be made when in proximity to agricultural fields and Laurence's milkvetch populations (Figure 1). The Facility's staff and qualified herbicide applicators will consult with ODA regarding weed treatment in areas in proximity to occurrences of Laurence's milkvetch prior to any treatment.

6.0 Monitoring

A qualified investigator will be employed to assess noxious weed growth during the first five years following construction and to make recommendations on noxious weed control measures. Monitoring for noxious weed infestations will enable the Certificate Holder to respond to new noxious weed infestations in a timely manner and ensure the success of the site's revegetation. Noxious weed inspections will occur across the entire Facility through visual inspection of the site while driving and/or walking. These inspections will be used to inform ongoing noxious weed control efforts.

Monitoring will assess the success of noxious weed treatments and will document any new noxious weed infestations observed. These results will be summarized in annual monitoring reports that describe the noxious weeds identified, treatments implemented, and treatment success, and will make recommendations to improve treatment success (if necessary) and note any new target noxious weed species or emergence. Reports will be submitted to the Oregon Department of Energy (ODOE), ODA, Oregon Department of Fish and Wildlife (ODFW), Morrow County, and Umatilla County annually. Based on the success of control efforts after the fifth year of monitoring, the Certificate Holder will consult with ODOE, ODFW, ODA, Morrow County, and Umatilla County to design a long-term weed control plan. The Certificate Holder will maintain ongoing communication with individual landowners, the Morrow County Weed Program Manager, the Umatilla County Weed Control Supervisor, and ODOE regarding noxious weeds within the Facility. Landowners may also contact the Certificate Holder directly to report the presence of noxious weeds related to Facility activity. The Certificate Holder will control the noxious weeds on a case-by-case basis and

prepare a summary of measures taken for that landowner. During the operational period of the Facility, the Certificate Holder will control noxious weeds as described in Section 5.3 in all revegetation areas.

The following contact information for the Morrow County Weed Program Manager will be used and updated as needed:

Corey Sweeney, Weed Program Manager

Morrow County Public Works

365 West Highway 74

Lexington, OR 97839

(541) 989.9502

mcweed@co.morrow.or.us

The following contact information for the Umatilla County Weed Control Supervisor will be used and updated as needed:

Theodore Orr, Umatilla County Noxious Weed Department Supervisor

Umatilla County Road Department

3920 Westgate Street

Pendleton, OR 97801

(541) 278.5462

7.0 Roles and Responsibilities

The Certificate Holder is the overall responsible party for construction and operation of the Facility and implementation of the noxious weed management activities described in this Plan. However, the Certificate Holder may use contractors to complete tasks associated with noxious weed management and monitoring. Example responsible parties and their roles may include:

Monitoring Contractor

- Perform site visits (4-8 times annually as needed) to document noxious weed occurrences.
- Provide summary memo after each visit to Certificate Holder's operations manager outlining findings and treatment recommendations.
- Communicate directly with Weed Management Contractor and provide maps, and photos of noxious weed species locations to Weed Management Contractor.
- Communicate with Morrow County Weed Program Manager, Umatilla County Weed Department Supervisor, and ODA about noxious weed survey findings and treatment plans.

- Prepare annual report for the Facility describing noxious weed monitoring findings and treatments.
- Organize and attend quarterly calls with the Certificate Holder and Weed Management Contractor.
- Attend calls with ODOE, ODA, Umatilla County, and Morrow County as needed.

Certificate Holder Site Manager

- Communicate findings and recommendations from Monitoring Contractor to the Weed Management Contractor.
- Document the work performed by the Weed Management Contractor and provide documentation to Monitoring Contractor. Documentation should include type and quantity of herbicides applied, dates applied, and any associated EPA/U.S. Department of Environmental Quality licensing/documentation of chemicals used.
- Reviews annual reports to ensure all treatments performed by the Weed Management Contractor are documented.
- Maintain landowner communications, providing guidance to the Monitoring Contractor and Weed Management Contractor regarding landowner restrictions/requests for performing noxious weed monitoring/treatment on their properties.
- Attend quarterly calls with Monitoring Contractor and the Weed Management Contractor.
- Attend calls with ODOE, ODA, Umatilla County, and Morrow County as needed.

Weed Management Contractor

- Review Monitoring Contractor memos describing noxious weed occurrences and recommendations and plan appropriate treatment to address those issues.
- Communicate treatment plan to the Certificate Holder.
- Maintain records of when, where, and what type of noxious weed treatments are being performed.
- Maintain all appropriate documentation of chemicals applied. Shares documentation during the quarterly calls with the Certificate Holder and Monitoring Contractor, and prior to Annual Report preparation.
- Attend quarterly calls with Monitoring Contractor and Certificate Holder.

Morrow County and Umatilla County

- Review Monitoring Contractor memos describing weed occurrences and recommendations.
- Attend quarterly calls and provide recommendations.

Table 2. Example Noxious Weed Monitoring Schedule

Schedule	Frequency	Task
March-April	Once	Conduct a full site-wide noxious weed survey to identify areas for treatment. Work with Certificate Holder Site Manager and Weed Management Contractor on a post-emergent chemical and mechanical treatment plan. Monitor and report on previous treatments effectiveness, as applicable.
April-September	Monthly or as needed	Monitor treated areas for effectiveness, identify and map new noxious weed populations, make recommendations for chemical retreatment or mechanical controls to manage new or small populations.
June-August	Once	Monitor and collect data on noxious weed populations in revegetated areas (see Revegetation Plan; Tetra Tech 2023b).
September-October	Once	Conduct a full site-wide noxious weed survey to monitor treated areas, identify new noxious weed populations, make recommendations for chemical retreatment or mechanical controls and plan for pre-emergent chemical applications in fall or winter when conditions are appropriate.

8.0 References

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Figures

(Confidential–provided under separate cover)

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Appendix A. Oregon State Noxious Weed List

Scientific Name	Common Name	Classification
Aegilops ovata	goatgrass, ovate	A
Aegilops triuncialis	goatgrass, barbed (T)	A
Alhagi pseudalhagi	camelthorn	A
Alyssum murale, A. corsicum	yellowtuft (T)	A
Berteroa incana	hoary alyssum (T)	A
Bryonia alba	white bryonia	A
Butomus umbellatus	flowering rush (T)	A
Carduus acanthoides	thistle, plumeless (T)	A
Carduus cinereus	thistle, Turkish (T)	A
Carduus crispus	thistle, welted (curly plumeless) (T)	A
Carthamus baeticus	thistle, smooth distaff	A
Carthamus lanatus	thistle, woolly distaff (T)	A
Centaurea calcitrapa	starthistle, purple (T)	A
Centaurea iberica	starthistle, Iberian (T)	A
Centaurea virgata	squarrose knapweed (T)	A
Cuscuta japonica	Japanese dodder	A
Cyperus rotundus	purple nutsedge	A
Delairea odorata	cape-ivy (T)*	A
Echium plantagineum	Paterson's curse (T)	A
Euphorbia oblongata	oblong spurge (T)	A
Galega officinalis	goatsrue (T)	A
Heracleum mantegazzianum	giant hogweed (T)	A
Hieracium aurantiacum	hawkweed, orange (T)*	A
Hieracium floribundum	hawkweed, yellow (T)	A
Hieracium pilosella	hawkweed, mouse-ear (T)*	A
Hieracium piloselloides	hawkweed, king-devil*	A
Hydrilla verticillat	hydrilla	A
Hydrocharis morsus-ranae	common frogbit	A

Scientific Name	Common Name	Classification
Limnobium laevigatum	west Indian spongeplant	A
Lysimachia vulgaris	garden yellow loosestrife (T)	A
Nardus stricta	matgrass (T)	A
Nymphoides peltata	yellow floating heart (T)	A
Onopordum tauricum	thistle, Taurian (T)	A
Peganum harmala	African rue (T)	A
Pueraria lobata	kudzu (T)	A
Saccharum ravennae	ravennagrass (T)	A
Sagittaria platyphyla	delta arrowhead (T)	A
Solanum elaeagnifolium	silverleaf nightshade	A
Spartina alterniflora	cordgrass, smooth (T)	A
Spartina anglica	cordgrass, common	A
Spartina densiflora	cordgrass, dense-flowered (T)	A
Spartina patens	cordgrass, saltmeadow (T)	A
Stratiotes aloides	water soldiers	A
Trapa natans	European water chestnut	A
Tussilago farfara	coltsfoot	A
Zygophyllum fabago	Syrian bean-caper	A
Abutilon theophrasti	velvetleaf	B
Acaena novae-zelandiae	biddy-biddy	B
Acroptilon repens	knapweed, Russian*	B
Adonis aestivalis	pheasant's eye	B
Aegilops cylindrica	jointed goatgrass	B
Ailanthus altissima	tree of heaven	B
Alliaria petiolata	garlic mustard (T)	B
Ambrosia artemisiifolia	ragweed	B
Amorpha fruticosa	indigo bush	B
Anchusa officinalis	common bugloss (T)	B

Scientific Name	Common Name	Classification
Arundo donax	giant reed (T)*	B
Brachypodium sylvaticum	false brome	B
Buddleja davidii (B. variabilis)	butterfly bush	B
Carduus nutans	thistle, Musk*	B
Carduus pycnocephalus	thistle, Italian*	B
Carduus tenuiflorus	slender-flowered*	B
Centaurea diffusa	knapweed, diffuse*	B
Centaurea pratensis	knapweed, meadow*	B
Centaurea solstitialis	yellow starthistle*	B
Centaurea stoebe (C. maculosa)	knapweed, spotted* (T)	B
Chondrilla juncea	rush skeletonweed* (T)	B
Cirsium arvense	thistle, Canada*	B
Cirsium vulgare	thistle, bull*	B
Clematis vitalba	old man's beard	B
Conium maculatum	poison hemlock*	B
Convolvulus arvensis	field bindweed*	B
Cortaderia jubata	jubata grass	B
Crataegus monogyna	English hawthorn	B
Crupina vulgaris	common crupina*	B
Cuscuta approximata	dodder, smoothseed alfalfa	B
Cuscuta indecora	dodder, bigseed	B
Cuscuta pentagona	dodder, bive-angled	B
Cynoglossum officinale	houndstongue	B
Cyperus esculentus	yellow nutsedge	B
Cytisus scoparius	broom, Scotch*	B
Cytisus striatus	broom, Portuguese (T)	B
Daphne laureola	spurge laurel	B
Dipsacus laciniatus	cutleaf teasel	B

Scientific Name	Common Name	Classification
Echium pininana	pine echium	B
Echium vulgare	common viper's bugloss	B
Egeria densa (Elodea)	South American waterweed	B
Erica lusitanica	Spanish heath	B
Euphorbia esula	spurge, leafy* (T)	B
Euphorbia myrsinites	spurge, myrtle	B
Fallopia japonica (Polygonum)	knotweed, Japanese*	B
Fallopia sachalinensis (Polygonum)	knotweed, giant*	B
Fallopia x bohemica	knotweed, Bohemian*	B
Genista monspessulana	broom, French*	B
Geranium lucidum	geranium, shiny leaf	B
Geranium robertianum	geranium, herb Robert	B
Halogeton glomeratus	halogeton	B
Hedera helix	ivy, English	B
Hedera hibernica	ivy, Atlantic	B
Hemizonia pungens	spikeweed	B
Hypericum perforatum	St. Johnswort*	B
Impatiens glandulifera	policeman's helmet	B
Iris pseudacorus	yellow flag iris	B
Isatis tinctoria	Dyer's woad	B
Kochia scoparia	kochia	B
Lamiastrum galeobdolon	yellow archangel	B
Lathyrus latifolius	perennial peavine	B
Lepidium chalepensis	whitetop, lens-podded	B
Lepidium draba	whitetop, whitetop (hoary cress)*	B
Lepidium latifolium	perennial pepperweed (T)	B
Lepidium pubescens	whitetop, hairy	B
Linaria dalmatica	toadflax, dalmatian* (T)	B

Scientific Name	Common Name	Classification
Linaria vulgaris	toadflax, yellow*	B
Ludwigia grandiflora	primrose-willow, large-flower (T)	B
Ludwigia hexapetala	primrose-willow, water (T)	B
Ludwigia peploides	primrose-willow, floating (T)	B
Lythrum salicaria	purple loosestrife*	B
Myriophyllum aquaticum	parrot feather	B
Myriophyllum spicatum	Eurasian watermilfoil*	B
Onopordum acanthium	thistle, Scotch	B
Orabanche minor	small broomrape	B
Phalaris arundinacea var. Picta	ribbongrass (T)	B
Phragmities australis ssp. australis	common reed	B
Pilosella caespitosum (Hieracium)	meadow hawkweed (T)	B
Polygonum polystachyum	knotweed, Himalayan	B
Potentilla recta	sulfur cinquefoil	B
Ranunculus ficaria	lesser celandine	B
Rorippa sylvestris	creeping yellow cress	B
Rosa canina	rose, dog	B
Rosa rubiginosa	rose, sweetbriar	B
Rubus armeniacus (R. procerus, R. discolor)	Armenian (Himalayan) blackberry	B
Salvia aethiopis	Mediterranean sage*	B
Senecio jacobaea (Jacobaea vulgaris)	tansy ragwort* (T)	B
Silybum marianum	thistle, milk*	B
Solanum rostratum	buffalobur	B
Sorghum halepense	johnsongrass	B
Spartium junceum	broom, Spanish	B
Sphaerophysa salsula	Swainsonpea	B
Taeniatherum caput-medusae	medusahead	B
Tamarix ramosissima	saltcedar* (T)	B

Scientific Name	Common Name	Classification
Tribulus terrestris	puncturevine*	B
Ulex europaeus	gorse* (T)	B
Ventenata dubia	ventenata grass	B
Xanthium spinosum	spiny cocklebur	B
*Biocontrol; (T) T-Designated Weed		

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Appendix B. Noxious Weed Lists for Morrow and Umatilla Counties

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Table 1. Morrow County Weed Department Weed Lists and Classifications

Scientific Name	Common Name	Morrow County Classification
Butomus umbellatus	flowering rush	A
Carduus acanthoides	plumeless thistle	A
Carduus nutans	musk thistle	A
Centaurea solstitialis	yellow starthistle	A
Centromadia (*Hemizonia*) *pungens*	common spikeweed	A
Chondrilla juncea	rush skeletonweed	A
Crupina vulgaris	common crupina	A
Cynoglossum officinale	houndstongue	A
Euphorbia esula	leafy spurge	A
Iris pseudacorus	yellow flag iris	A
Lepidium (*Cardaria*) *draba*	whitetop (hoary cress)	A
Linaria dalmatica	dalmatian toadflax	A
Linaria vulgaris	yellow toadflax	A
Lythrum salicaria	purple loosestrife	A
Onopordum acanthium	Scotch thistle	A
Salvia aethiopis	Mediterranean sage	A
Senecio jacobaea	tansy ragwort	A
Aegilops cylindrica	jointed goatgrass	B
Bassia (*Kochia*) *scoparia*	kochia	B
Centaurea diffusa	diffuse knapweed	B
Centaurea stoebe subsp. *micranthos* (*C. maculosa*)	spotted knapweed	B
Cicuta douglasii	water hemlock	B
Cirsium arvense	Canada thistle	B
Conium maculatum	poison hemlock	B
Convolvulus arvensis	field bindweed	B
Cuscuta spp.	field dodder	B
Euphorbia myrsinites	myrtle spurge	B
Hypericum perforatum	common St. John's wort	B
Lepidium latifolium	perennial pepperweed	B
Rhaponticum (*Acroptilon/Centaurea) repens*	Russian knapweed	B
Secale cereale	cereal rye, rye	B
Sonchus arvensis	perennial sowthistle	B
Sorghum halepense	johnsongrass	B
Taeniatherum caput-medusae	medusahead	B

Scientific Name	Common Name	Morrow County Classification
Tribulus terrestris	puncture vine, land caltrop, goat's head	B
Ventenata dubia	ventenata	B

Table 2. Umatilla County Noxious Weed Control List

Scientific Name	Common Name	Umatilla County Classification
Alhagi pseudalhagi	camelthorn	A
Alliaria petiolata	garlic mustard	A
Anchusa officinalis	common bugloss	A
Butomus umbellatus	flowering rush	A
Cannabis sativa	marijuana	A
Centaurea calcitrapa	purple starthistle	A
Centaurea x *gerstlaueri (C. jacea X C. Nigra)*	meadow knapweed	A
Centaurea stoebe ssp. *micranthos* (*C. maculosa*)	spotted knapweed	A
Centromadia (Hemizonia) pungens	common spikeweed	A
Chondrilla juncea	rush skeletonweed	A
Crupina vulgaris	common crupina	A
Echiuin vulgare	Viper's bugloss	A
Euphorbia esula	leafy spurge	A
Euphorbia myrsinites	myrtle spurge	A
Fallopia japonica (*Polygonum cuspidatum*)	Japanese knotweeds	A
Iris pseudacorus	yellow flag iris	A
Lythrum salicaria	purple loosestrife	A
Rorippa sylvestris	creeping yellow cress	A
Senecio jacobaea	tansy ragwort	A
Aegilops cylindrica	jointed goatgrass	B
Ambrosia artemisiifolia	ragweed	B
Bassia (Kochia) scoparia	kochia	B
Cardaria draba	hoary cress	B
Carduus nutans	musk thistle	B
Centaurea diffusa	diffuse knapweed	B
Centaurea solstitialis	yellow starthistle	B
Cirsium arvense	Canada thistle	B
Conium maculatum	poison hemlock	B

Scientific Name	Common Name	Umatilla County Classification
Cuscuta pentagona	dodder	B
Elymus (*Agropyron*) *repens*	Quackgrass	B
Hypericum perforatum	common St. John's wort	B
Linaria dalmatica	dalmatian toadflax	B
Onopordum acanthium	Scotch thistle	B
Rhaponticum (*Acroptilon /Centaurea) repens*	Russian knapweed	B
Salvia aethiopis	Mediterranean sage	B
Secale cereale	cereal rye, rye	B
Sorghum halepense	Johnson grass	B
Sphaerophysa salsula	Austrian peaweed	B
Tribulus terrestris	puncture vine, land caltrop, goat's head	B

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Appendix C. Recommended Timing and Control Methods

Noxious Weed Species	Method and Timing of Control
*Acroptilon (Centaurea) repens (*Russian knapweed*)*	**2,4-D –** Apply at the early stage of flower stem elongation (late April to early May). • Rate: 1 to 2 lb ae/a[1] **Aminocyclopyrachlor + chlorsulfuron** – Apply to actively growing plants in spring. • Rate: 1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product)[1] **Aminopyralid –** Spring or fall when rosettes are present. • Rate: 1.75 oz ae/a (7 fluid oz/a Milestone)[1] **Clopyralid –** apply before the bud stage of knapweeds. • Rate 0.25 to 0.5 lb ae/A (0.66 to 1.33 pints/A). Labeled rates vary with crops. **Clopyralid + 2,4-D amine –** Apply after most rosettes emerge but before flower stem elongates. • Rate: 2 to 4 quarts/A Curtail **Diflufenzopyr + dicamba –** Apply to rosettes • Rate: 0.26 to 0.35 lb ae/A (6 to 8 oz/A) **Glyphosate -** Apply to actively growing knapweed when most plants are at bud stage. • Rate: 3 lb ae/A **Imazapic -** Apply in fall or early winter after Russian knapweed has grown old. • Rate: 0.188 lb ai/A for Russian knapweed **Picloram -** Apply in late spring before or during flower stem elongation. • Rate: 0.25 to 0.5 lb ae/A (1 lb ae/A for Russian knapweed) **Triclopyr + clopyralid -** Apply from rosette to early bolt stage when weeds are actively growing. Russian knapweed should be in early bud to early flower growth stage. • Rate: 1.5 to 2 pints/A (2.5 to 4 pints/A for Russian knapweed)
Aegilops cylindrica (jointed goatgrass)	**Glyphosate** – Apply to actively growing plants emerged before bolt stage (i.e., stage of growth where growth is focused on seed development versus leaf development). • Rate: 0.38 to 0.75 lb ae/a[1] **Imazapic –** Apply pre-emergence in fall. Due to the residual effect of this herbicide, it will not be used in areas to be revegetated. • Rate: 0.063 to 0.188 lb/a[1] **Sulfometuron** – Apply in fall or in late winter before jointed goatgrass is 3 inches tall. • Rate: 1 to 1.5 oz ai/a (1.33 to 2 oz/a)[1]
Bassia (Kochia) *scoparia*	**Aminocyclopyrachlor + chlorsulfuron** – Apply either pre-emergence (late winter/early spring) or post-emergence. Postemergence is most effective on seedlings. • Rate: 4.75 to 8 oz/a[1] **Chlorsulfuron –** Apply pre-emergence (late winter/early spring), or post-emergence from seedling to bolting stage of growth. • Rate: 0.75 oz ai/a (1 oz/a)[1] **Dicamba –** Apply in spring when seedlings are actively growing. • Rate: 0.25 to 1 lb ae/a (0.5 to 2 pints/a)[1] **Fluroxypyr** – Apply in spring from seedling to bolting stage of growth. • Rate: 2.1 to 7.7 oz ae/a (6 to 22 o/a)[1]

Noxious Weed Species	Method and Timing of Control
	Glyphosate – Apply in spring from seedling to flowering stage of growth. • Rate: 1.1 to 1.7 lb ae/a[1] **Hexazinone –** Apply pre-emergence in the early spring. • Rate: 0.5 to 1.5 lb ai/a (2 to 6 pints/a)[1] **Imazapyr –** Apply pre-emergence (late winter/early spring) or post-emergence to actively growing kochia. • Rate: 0.5 to 1.5 lb ae/a (2 to 4 pints/a)[1] **Metsulfuron –** Apply in spring from seedling to flowering stage of growth. • Rate: 0.6 to 1.2 oz ai/a (1 to 2 oz/a)[1] **Rimsulfuron –** Apply pre-emergence (late winter/early spring) or post-emergence to kochia seedlings. • Rate: 1 oz ai/a (4 oz/a)[1]
Centaurea diffusa (diffuse knapweed)	**2,4-D –** Apply at the early stage of flower stem elongation (late April to early May). • Rate: 1 to 2 lb ae/a[1] **Aminocyclopyrachlor + chlorsulfuron** – Apply to actively growing plants in spring. • Rate: 1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product)[1] **Aminopyralid** – Consult label for optimum timing. Diffuse and spotted knapweed: apply to actively growing plants in fall or in spring from rosette to bolting growth stages. • Rate: 1 to 1.75 oz ae/a[1] **Clopyralid –** Up to the bud stage of knapweeds. • Rate: 0.25 to 0.5 lb ae/a (0.66 to 1.33 pints/a)[1] **Clopyralid + 2,4-D amine (Curtail) –** Apply after most rosettes emerge but before flower stem elongates. • Rate: 2 to 4 quarts/a Curtail[1] **Diflufenzopyr + dicamba –** Apply to rosettes. • Rate: 0.26 to 0.35 lb ae/a[1] **Glyphosate –** Apply to actively growing knapweed when most plants are at bud stage. • Rate: 3 lb ae/a[1] **Picloram –** Apply in late spring before or during flower stem elongation. • Rate: 0.25 to 0.5 lb ae/a[1] **Triclopyr + clopyralid –** Apply from rosette to early bolt stage when weeds are actively growing. • Rate: 1.5 to 2 pints/a[1]
Centaurea solstitialis (yellow starthistle)	**2,4-D LV ester or 2,4-D amine –** Apply before flowering. • Rate: 1 lb ae/a[1] in 50 gallons of water **Aminocyclopyrachlor + chlorsulfuron –** Apply to actively growing plants. • Rate: 1.2 to 1.8 oz/a[1] aminocyclopyrachlor + 0.5 to 0.7 oz/a chlorsulfuron (3 to 4.5 oz/a of product) **Aminopyralid (Milestone) –** Apply to plants at the rosette through bolting stages. • Rate: 0.75 to 1.25 oz ae/a (3 to 5 fluid oz/a Milestone)[1]

Noxious Weed Species	Method and Timing of Control
	Chlorsulfuron – For best results apply to young, actively growing plants. • Rate: 1.125 oz ai/a (1.5 oz/a)[1] **Clopyralid –** After most rosettes have emerged but before bud formation. • Rate: 0.09 to 0.375 lb ae/a (0.25 to 1 pint/a)[1] **Clopyralid + 2,4-D amine (Curtail) –** Apply after most rosettes have emerged but before bud formation. • Rate: 1 to 5 quarts/a Curtail[1] **Dicamba –** Apply when plants are still in rosettes but before flower stems elongate. • Rate: 1 to 2 lb ae/a[1] **Diflufenzopyr + dicamba –** Apply to seedlings or rosettes. • Rate: 0.26 to 0.35 lb ae/a (6 to 8 oz/a)[1] **Picloram –** In spring, to plants still in rosette through bud formation. • Rate: 0.25 to 0.375 lb ae/a[1] **Triclopyr + clopyralid –** Apply from rosette to early bolt stage when starthistle is actively growing. • Rate: 1.5 to 2.5 pints/a[1]
Centromadia (Hemizonia) pungens (common spikeweed)	**2,4-D –** Apply postemergence when plants are in rosette stage in winter or early spring. Application during cool weather allows for the use of ester formulations of 2,4-D, which may have better absorption into the glandular leaves. • Rate: 1.5 qt product/acre (1.4 lb a.e./acre) **Aminocyclopyrachlor + chlorsulfuron (Perspective) –** Apply preemergence or early postemergence before bolting. • Rate: 1.75 to 2.75 ounces product/acres **Dicamba** – Apply postemergence when target plants are small and rapidly growing. • Rate: 1 to 2 pt product/acre (0.5 to 1 lb a.e./acre) **Chlorsulfuron –** Apply preemergence or postemergence to plants in rosette stage. Rate: 0.5 to 1 oz product/acre (0.375 to 0.75 oz a.i./acre)
Chondrilla juncea (rush skeletonweed)	**2,4-D or MCPA –** Apply to rosettes in the spring immediately before or during bolting. • Rate: 2 lb ae/a[1] **Aminocyclopyrachlor + chlorsulfuron –** Apply to actively growing plants in spring. • Rate: 1.8 to 3.2 oz/a1 aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product) **Aminopyralid (Milestone) –** Spring or fall when rosettes are present. • Rate: 1.75 oz ae/a (7 fluid oz/a Milestone)[1] **Clopyralid –** Apply to rosettes in fall or up to early bolting in spring. • Rate: 0.25 to 0.375 lb ae/a (0.66 to 1 pint/a)[1] **Picloram –** Apply from late fall to early spring. For best results, apply just before or during bolting. • Rate: 1 lb ae/a[1]
Cirsium arvense (Canada thistle)	**Aminocyclopyrachlor + chlorsulfuron –** Apply to actively growing plants in spring.

Noxious Weed Species	Method and Timing of Control
	• Rate: 1.8 to 3.2 oz/a[1] aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product) **Aminopyralid (Milestone) –** Apply in the spring to plants in the pre-bud stage of growth or in the fall to plant regrowth. • Rate: 1.25 to 1.75 oz ae/a (5 to 7 fluid oz/a Milestone)[1] **Chlorsulfuron –** Apply post-emergence. For best results, apply to plants in the bud-bloom stage or to fall rosettes. • Rate: 1.125 oz ai/a (1.5 oz/a)[1] **Clopyralid + 2,4-D amine (Curtail) or clopyralid (Stinger or Transline) –** Apply to actively growing thistle after most basal leaves emerge but before bud stage. • Rate: Consult labels. Rate depends on use site. **Dicamba –** May be applied any time during the growing season. • Rate: 2 lb ae/a. Spot treatment: use mixtures of 2 to 4 lb ae dicamba per 100 gallons of water[1] **Diflufenzopyr + dicamba –** Apply in spring to the rosettes. • Rate: 0.26 to 0.35 lb ae/a (6 to 8 oz/a)[1] **Glyphosate –** Apply when plants are actively growing but past the bud growth stage. Fall applications must be before the first killing frost. • Rate: Broadcast: 1.5 to 2.25 lb ae/a[1]; Wiper: 10 to 33% solution; Hand-held and high-volume equipment: 2% solution. • Thistles that were mowed or tilled and have rosettes at least 6 inches wide in late summer or fall can be suppressed with 0.75 lbs. ae/a glyphosate plus 0.5 to 1% nonionic surfactant applied in 3 to 10 gal/a water. **Picloram –** Control is best if applied to actively growing thistle after most leaves emerge but before bud stage. • Rate: In broadcast or boom sprayers, apply 1 lb ae/a. Mixtures normally used for spot treatments include 1 lb ae per 100 gallons of water[1] **Triclopyr + clopyralid –** Apply from rosette to bud stage to actively growing thistle. • Rate: 2.5 to 4 pints/a[1]
Conium maculatum (poison hemlock)	**2,4-D or MCPA –** Apply in seedling to rosette stage of growth. • Rate: 1.5 lb ae/a[1] **Aminocyclopyrachlor + chlorsulfuron –** Apply to broadleaf weeds in spring. • Rate: 1.8 to 3.2 oz/A aminocyclopyrachlor + 0.7 to 1.3 oz/A chlorsulfuron (4.5 to 8 oz/A of product) **Glyphosate –** Apply to actively growing plants before they begin to bolt. • Rate: 0.75 lb ae/A[1] **Glyphosate (Roundup Pro Concentrate) –** Inject with a hand-held device into one leaf cane per plant,10 to 12 inches above root crown. • Rate: Inject 5 ml of a 5% v/v solution into each leaf cane. **Metsulfuron –** Apply to actively growing plants. • Rate: Escort: 0.6 oz ai/A (1 oz/A)[1]

Noxious Weed Species	Method and Timing of Control
Convolvulus arvensis (field bindweed)	**2,4-D (for suppression) amine –** Apply at bud growth stage or at summer fallow in early August. • Rate: 2 to 3 lb ae/a[1] **Aminocyclopyrachlor + chlorsulfuron –** Apply to broadleaf weeds in spring. • Rate: 1.8 to 3.2 oz/a[1] aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product)[1] **Dicamba or dicamba + 2,4-D (for suppression) –** Apply during fallow, before planting and when plants are actively growing. • Rate: 0.5 to 1 lb ae/a dicamba; or 0.5 to 1 lb ae/a dicamba + 1 to 2 lb ae/a 2,4-D[1] **Dicamba or dicamba + 2,4-D (for control) –** Apply in late summer or fall before killing frost. • Rate: 1 to 2 lb ae/a dicamba; or 1 to 2 lb ae/a dicamba + 1 to 2 lb ae/a 2,4-D[1] **Glyphosate –** Apply at full bloom to early seed stage of maturity. Application on fall regrowth may provide some control. • Rate: 3 to 3.75 lb ae/a[1] **Glyphosate + 2,4-D (Landmaster BW)–** Apply to bindweed runners that are at least 10 inches long. Use 1% solution to spot treat with high-volume, spray-to-wet applications. Tilling after treatment may improve control. • Rate: 0.378 to 0.67 lb ae/a (54 oz/a Landmaster)[1] **Glyphosate + dicamba –** Apply mid- to late-bloom but before seed matures. Applying to fall regrowth may give some control. • Rate: 1.5 lb ae/a glyphosate + 0.5 lb ae/a dicamba[1] **Imazapic –** Apply after 25% bloom through fall to actively growing bindweed. • Rate: 0.125 to 0.188 lb ai/a[1] **Metsulfuron –** Apply to actively growing bindweed in bloom stage. • Rate: 0.6 to 1.2 oz ai/a (1 to 2 oz/a)[1] **Picloram –** Apply in the growing season on non-cropland when bindweed is visible. Timing is not critical, but results are most consistent if bindweed is in early bud to full bloom. • Rate: 1 lb ae/a[1] **Quinclorac –** Apply in fall before frost to actively growing bindweed with stems at least 4 inches long. • Rate: 6 oz ai/a (8 oz/a)[1]
Crupina vulgaris (common crupina)	**Aminocyclopyrachlor + chlorsulfuron** – Apply to seedlings in spring when plants are actively growing. • Rate: 4.75 to 8 oz/a[1] **Aminopyralid + metsulfuron –** Apply to seedlings in spring when plants are actively growing. • Rate: 3 to 3.3 oz/A[1] **Chlorsulfuron –** Apply to seedlings in spring when plants are actively growing. • Rate: 0.75 to 0.195 oz ai/A (1 to 2.6 oz/A)[1] **Clopyralid -** Apply as a split application to common crupina foliage in fall and spring. • Rate 2 oz ae/A (0.33 pints/a)[1]

Noxious Weed Species	Method and Timing of Control
	Dicamba – Apply in spring when seedlings are actively growing. • Rate: 0.5 lb ae/a (1 pint/a)[1] **Metsulfuron** – Apply to seedlings in spring when plants are actively growing. • Rate: 0.3 to 0.6 oz ai/A (0.5 to 1 oz/A)[1] **Picloram**– Apply to seedlings in spring when plants are actively growing.. • Rate: 4 to 8 oz ae/A[1]
Onopordum acanthium (Scotch thistle)	**2,4-D –** spring or fall. • Rate: 1.5 to 2 lb ae/a[1] **Aminocyclopyrachlor + chlorsulfuron (Perspective) –** Apply to actively growing plants in spring. • Rate: 1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product)[1] **Aminopyralid (Milestone)** – Apply in spring or early summer to rosettes or bolting plants or in fall to seedlings and rosettes. • Rate: 0.75 to 1.25 oz ae/a (3 to 5 fl oz/a Milestone)[1] **Chlorsulfuron –** Apply to young, actively growing plants. • Rate: 0.75 oz ai/a (1 oz/a)[1] **Clopyralid + 2,4-D amine (Curtail) –** Apply to actively growing thistle after most basal leaves emerge but before bud stage. • Rate: 1 to 5 quarts/a Curtail[1] **Clopyralid –** Apply up to the bud stage. • Rate: 0.09 to 0.375 lb ae/a (0.25 to 1 pint/a)[1] **Dicamba –** Apply before flower stalk lengthens on established plants and for seedling control. Spray fall applications to control rosettes. • Rate: 0.5 to 1 lb ae/a[1] **Diflufenzopyr + dicamba –** Apply to the rosettes. • Rate: 0.175 to 0.35 lb ae/a (4 to 8 oz/a)[1] **Glyphosate + 2,4-D –** Apply to plants in rosette stage of growth in spring or before freeze-up in fall. • Rate: Broadcast: 16 to 32 fl oz/a[1]. Spot treatment: 1 to 2% solution. **Metsulfuron (Escort and others) –** Apply post-emergence to actively growing plants. • Rate: Escort: 0.6 oz ai/a (1 oz/a)[1] **Picloram –** Apply in the fall before thistle bolts. • Rate: 0.25 lb ae/a[1] **Triclopyr + clopyralid –** Apply to actively growing thistle from rosette to early bolt stage. • Rate: 1.5 to 2 pints/a[1]
Taeniatherum caput-medusae (medusahead)	Consult with Morrow County and Umatilla County Weed Supervisors. **Aminopyralid –** Apply preemergence in fall. • Rate: 7 to 14 oz product/acre (1.75 to 3.5 ox a.e./acre) **Glyphosate –** For selective control in shrubland, apply post-emergence in spring after all seedlings are up and before heading; the tillering stage is ideal. For late-season, non-selective control, apply to rapidly growing plants before seeds are produced.

Noxious Weed Species	Method and Timing of Control
	• Rate: 0.75 to 1 pint product /a (0.42 to 0.56 lb a.e./acre) for early-season selective control in shrubland or other perennial systems; 1 to 2 quarts product (Roundup ProMax)/acre (1.1 to 2.25 lb a.e./a)[1] for late-season, non-selective control. **Imazapic –** Fall or spring. In warm-winter areas, fall applications may be most effective. In colder climates, spring applications after snow melt is better. • Rate: 4 to 12 fluid oz product/a (1 to 3 oz ae/a)[1] **Rimsulfuron –** Apply pre-emergence (fall) to early post-emergence (early spring) • Rate: 4 oz product/a (1 oz active ingredient (ai)/a)[1] **Sulfometuron –** Pre-emergence to early post-emergence. Pre-emergence (fall) applications are generally more effective. • Rate: 0.75 to 1.5 oz product/a (0.56 to 1.13 oz ai/a)[1] **Sulfometuron + chlorsulfuron –** Pre-emergence in fall or after soil thaws in spring. • Rate: 1.5 to 2.25 oz product/a[1]
Tribulus terrestris (puncturevine)	**2,4-D amine or 2,4-D LV ester–** Apply every 3 weeks during growing season or when new seedlings appear. • Rate: 1 to 2 lb ae in 10 to 20 gal water for spot treatments **Aminocyclopyrachlor + chlorsulfuron–** Apply to actively growing plants in spring • Rate: 1.8 to 3.2 oz/A aminocyclopyrachlor + 0.7 to 1.3 oz/A chlorsulfuron (4.5 to 8 oz/A of product) **Bentazon (Basagran) + imazamox (Raptor)–** Apply to small, actively growing puncturevine • Rate: 0.75 to 1 lb ai/A bentazon + 0.031 lb ai/A imazamox (4 oz/A Raptor) **Bromacil + diuron–** Apply before weeds emerge. • Rate: 8 lb ai/A (10 lb/A)[1] **Chlorsulfuron–** Apply late fall or late winter preemergence to growth. Needs moisture to activate. • Rate: 1 oz ai/A (1.5 oz/A)[1] **Fomesafen –** Apply pre- and postemergence, depending on crop. • Rate: 1 to 2 pints/A (0.25 to 0.5 lb ai/A)[1] **Imazapic –** Apply early postemergence when plants are cracking. • Rate: 0.125 to 0.188 lb ai/a[1] **Indaziflam –** Apply at least several weeks prior to expected germination of puncture vine Apply to dry soils when rain is not expected for at least 48 hr. Can be successfully applied several months in advance of weed germination. • Rate: Grazed areas 0.046 to 0.065 lb ai/A (3.5 to 5 oz/A Rejuvra); areas not grazed or cut for hay 0.046 to 0.09 lb ai/A (3.5 to 7 oz/A Rejuvra). Use lower rates only where weed pressure is light and shorter period of residual activity is desired.f **Norflurazon –** Apply in fall to spring, before puncture vine emerges. • Rate: Refer to label. Adjust rates depending on soil texture and organic matter **Paraquat –** Apply as a postemergence spray to puncture vine foliage • Rate: 0.38 to 0.49 lb ai/A[1] •

Noxious Weed Species	Method and Timing of Control
Sources: DiTomaso e al. 2013; Kyser et al. 2014, Prather and Peachey 2022.	
[1] a = acre; ae = acid equivalent; ai = active ingredient; lb= pound; oz = ounces	

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Attachment P-4. Draft Revegetation Plan

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Wheatridge Renewable Energy Facility East
Draft Revegetation Plan

Prepared for
Wheatridge East Wind, LLC

Prepared by

TETRA TECH

January 2024

(Approved by ODOE on November 9, 2020 as part of WREFII Site Certificate; changes were presented at November 19-20, 2020 EFSC Meeting. Updated May and January 2024 as part of Wheatridge Renewable Energy Facility East RFA 1)

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Table of Contents

1.0 Introduction 1
2.0 Site Description 2
2.1 Soil Types 2
2.2 Existing Habitat 5
2.3 Existing Agricultural Practices 6
3.0 Temporary Impacts 7
3.1 Temporary Impacts to Cropland 7
3.2 Temporary Impacts to Wildlife Habitat 7
4.0 Revegetation Methods 8
4.1 Roles and Responsibilities 8
4.2 Site Preparation 9
4.3 Soil Reclamation 10
4.3.1 Soil Quantitative Reclamation Criteria 10
4.4 Restoration of Cropland 11
4.5 Restoration of Wildlife Habitat 12
4.5.1 Broadcast Seeding 12
4.5.2 Drill Seeding 13
4.5.3 Hydroseeding 13
4.5.4 Mulching and Soil Stabilization 13
4.6 Seed Mixes and Shrub Plantings 13
5.0 Monitoring 14
5.1 Revegetation Record 14
5.2 Habitat Reference and Monitoring Sites 15
5.2.1 Habitat Reference Sites 16
5.2.2 Habitat Monitoring Sites 17
5.3 Soil Monitoring Sites 17
5.3.1 Soil Monitoring Plots 17
5.4 Monitoring Procedures 18
5.4.1 Noxious Weed Control 18
5.4.2 Wildlife Habitat Recovery 19
5.4.3 Soil Reclamation 19

5.5 Success Criteria 19
5.6 Remedial Action 21
6.0 Plan Amendment 21
7.0 References 21

List of Tables

Table 1. Soil Units Making Up Five Percent or More of the Amended Site Boundary 3
Table 2. Habitat Types and Revegetation Classes in the Amended Site Boundary 5
Table 3. Summary of Temporary Impacts to Cropland 7
Table 4. Summary of Temporary Impacts to Wildlife Habitat 7
Table 5. Columbia Plateau Seed Mix 14
Table 6. Shrub Seeding Rates to Supplement High Desert Seed Mix 14
Table 7. Proposed Soil Quality Metrics and Timing 18

1.0 Introduction

The Wheatridge Renewable Energy Facility East (Facility) is an approved, but not yet constructed, wind energy generation facility consisting of up to 66 turbines and related or supporting facilities with a peak generating capacity of up to 200 megawatts (MW), to be located in an Approved Site Boundary of approximately 4,582 acres on over 42,000 acres of leased land in Morrow and Umatilla counties, Oregon. As part of Request for Amendment (RFA) 1 to the Facility Site Certificate, Wheatridge East Wind, LLC (Certificate Holder) is proposing to expand wind power generation at the Facility to provide the opportunity for increased power capacity and availability. This includes expanding the Site Boundary and micrositing corridors, increasing the peak generating capacity by adding more and newer turbines, change the intraconnection routes, and extending the construction date. See the RFA 1's Division 27 document (*Request for Amendment #1 for the Wheatridge Renewable Energy Facility East*) for a more detailed summary of the proposed changes. See Exhibit P for a description of the Amended Site Boundary and amended wind micrositing corridors within which habitat impacts as proposed in RFA 1 would occur. This Draft Revegetation Plan (Plan) has been prepared to support the Facility's RFA 1.

The details of this Plan were developed based on previous consultations for the approved site certificate and on other projects by the Certificate Holder's parent company in the region. The details of this Plan will be finalized in consultation with personnel from the Oregon Department of Fish and Wildlife (ODFW), ODOE, and the Morrow and Umatilla County Weed Control Departments. A stand-alone Draft Noxious Weed Control Plan has also been prepared (Tetra Tech 2023a). Information on Morrow and Umatilla County-listed noxious weeds, noxious weeds observed during surveys, and treatment and monitoring of noxious weeds are included in the Draft Noxious Weed Control Plan (Tetra Tech 2023a). Throughout construction and revegetation activities, the Certificate Holder will take appropriate actions to prevent the spread of noxious weeds (Tetra Tech 2023a). Where appropriate, and pursuant to consultation with the Morrow and Umatilla County Weed Control Supervisors, monitoring of noxious weeds and the effectiveness of weed control/eradication efforts will be performed concurrently with the revegetation monitoring described in this document.

The Certificate Holder will consult with Oregon Department of Agriculture (ODA) on revegetation, weed treatment, and restoration for areas in proximity to occurrences of Laurence's milkvetch (*Astragalus collinus* var. *laurentii*).

This Plan will also be used to evaluate soils in areas of temporary disturbance and inform the final assessment of temporarily impacted soils including erosion, compaction impact potential, and reclamation measures. The analysis of soils includes soil classification and description of soil properties, existing vegetation cover, historic and current land use, and seasonal precipitation conditions. Based on the soil analysis, the Certificate Holder shall develop quantitative reclamation criteria that will be used to measure successful reclamation of disturbed soils. This Plan, including the soil reclamation criteria, will be submitted to ODOE for review and approval in consultation

with the Umatilla Soil and Water Conservation District, the Morrow Soil & Water Conservation District, ODA, Natural Resource Conservation Service or a third-party consultant with expertise in soils.

2.0 Site Description

The Facility is located in Oregon's Umatilla and Morrow counties. It lies within the Columbia Plateau Ecoregion at elevations within the Amended Site Boundary ranging from 761 to 3,225 feet above mean sea level. The Facility is sited entirely on private land and includes agricultural land used for cultivation of primarily wheat and grazing of livestock. Native vegetation has been modified not only through agricultural conversion, but also through historical and current livestock grazing, by changes in fire regimes, and by the presence of exotic grasses and other vegetation, although large tracts of relatively intact native perennial grassland are present.

2.1 Soil Types

The Amended Site Boundary is zoned Exclusive Farm Use by Morrow County (see Exhibit K). It is private agricultural land generally used for dryland wheat production or as rangeland. There are 63 major soil types (soil units) in the Amended Site Boundary (see Exhibit I: Table I-1 and Figure I-1). The eight soil units that make up 5 percent or more of the Amended Site Boundary are described in Table 1.

Historic and current land uses within the Amended Site Boundary primarily consist of land use categories "non-irrigated agriculture" (approximately 18 percent) and "habitat lands" (approximately 81 percent). For further details, see descriptions of land use categories in Exhibit K. The Amended Site Boundary includes some areas with soils defined as High Value Farmland by the Natural Resources Conservation Service (2021). See Exhibit K for a definition and analysis of the High Value Farmland present within the Amended Site Boundary.

Table 1. Soil Units Making Up Five Percent or More of the Amended Site Boundary

Soil Type	Soil Description	Approximate Thickness (feet)	Formation Setting	Permeability	Runoff	Hazard for Erosion	Wind Erosion Rating[1]	K-factor[2]	Percent of Amended Site Boundary
Lickskillet Very Stony Loam (7–40% slopes)	These are shallow, well-drained soils formed in stony colluvium. They are composed of loess, rock fragments and residuum weathered from basalt and rhyolite. Lickskillet soils are on uplands, about 1.4 inches thick. The erosion hazard is moderate. Most slopes in the Amended Site Boundary are between 7 and 40 percent. The soil has low permeability and high runoff.	43	loess mixed with colluvium from basalt	Low	High	Moderate	7	(0.37-0.43)	20
Lickskillet-Rock Outcrop Complex (40–70% slopes)	These are shallow, well-drained soils composed of loess and colluvium from basalt. Lickskillet soils are on uplands, less than 1.4 inches thick. The erosion hazard is severe. Most slopes in the Amended Site Boundary are between 40 and 70 percent. The soil has low permeability and high runoff.	0	loess mixed with colluvium from basalt	Low	High	Severe	7	(0.37-0.43)	10
Morrow Silt Loam (20–35% north slopes)	These are shallow, well-drained soils of silt loam and silty clay loam. Morrow soils are about 26 inches thick. The erosion hazard is severe. Most slopes in the Amended Site Boundary are between 20 and 35 percent. The soil has moderate permeability and moderately high runoff.	66	loess	Moderate	Moderately High	Severe	6	(0.43-0.55)	5
Bakeoven-Morrow Complex (2–20% slopes)	These are shallow, well-drained soils formed in loess mixed with residuum weathered from basalt. The soil is very cobbly loam and extremely cobbly loam. Bakeoven-Morrow complex soils are on uplands, about 7 inches thick. The erosion hazard is moderate. Most slopes in the Amended Site Boundary are between 2 and 20 percent. The soil has low permeability and high runoff.	18	loess; loess mixed with residuum weathered from basalt	Low	High	Moderate	6	(0.37-0.55)	7
Rhea Silt Loam (20–35% slopes)	These are well-drained soils formed in loess mixed with small amounts of volcanic ash. The soil is silt loam. Rhea silt loam soils are on uplands, more than 76 inches thick. The erosion hazard is severe. Most slopes in the Amended Site Boundary are between 20 and 35 percent. The soil has high permeability and moderately low runoff.	> 7	loess mixed with small amounts of volcanic ash	High	Moderately Low	Severe	6	(0.43-0.49)	6
Rhea Silt Loam (35–50% slopes)	These are deep, well-drained soils formed in loess mixed with small amounts of volcanic ash. The soil is silt loam. Rhea silt loam soils are on uplands, more than 76 inches thick. The erosion hazard is severe. Most slopes in the Amended Site Boundary are between 35 and 50 percent. The soil has high permeability and moderately low runoff.	> 7	loess mixed with small amounts of volcanic ash	High	Moderately Low	Severe	6	(0.43-0.49)	7
Bakeoven-Valby Complex (2–20% slopes)	These are shallow, well-drained soils formed in loess over basalt and loess mixed with residuum weathered from basalt. The soil is silt loam, very cobbly loam, and extremely cobbly loam. Bakeoven-Valby complex soils are on uplands, between 7 and 30 inches thick. The erosion hazard is moderate. Most slopes in the Amended Site Boundary are between 2 and 20 percent. The soil has low permeability and high runoff.	18	loess mixed with residuum weathered from basalt; loess over basalt	Low	High	Moderate	6	(0.37-0.55)	5
Valby Silt Loam (12–20% north slopes)	These are shallow, well-drained soils formed in loess over basalt and consisting of silt loam. Valby silt loam soils are on hillslopes, about 30 inches thick. The erosion hazard is severe. Most slopes in the Amended Site Boundary are between 12 and 20 percent. The soil has moderate permeability and moderately high runoff.	76	loess over basalt	Moderate	Moderately High	Severe	5	(0.43-0.55)	6

1. A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

2. Erosion factor K (Kw for the whole soil) indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation and the Revised Universal Soil Loss Equation to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on silt, sand, and organic matter percentage and on soil structure and saturated hydraulic conductivity. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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2.2 Existing Habitat

Habitat subtypes within the Amended Site Boundary primarily consist of Native Perennial Grassland (66 percent; Grassland habitat type), Dryland Wheat (15 percent; Developed habitat type), Exotic Annual Grassland (9 percent; Grassland habitat type), Revegetated/Other Planted Grassland (6 percent; Developed habitat type) and Rabbitbrush/Snakeweed Shrub-steppe (4 percent; Shrub-steppe habitat type). Other habitat subtypes make up 1 percent or less of the Amended Site Boundary. Exhibit P of RFA 1 details each habitat subtype and category that will be temporarily and permanently disturbed during construction and operation of the Facility.

The majority of the Amended Site Boundary overlaps with ODFW-designated Mule Deer Winter Range and is therefore classified as Category 2, which is considered essential and limited habitat, where not cultivated or developed. The Amended Site Boundary also overlaps with the locations of Washington ground squirrel (*Urocitellus washingtoni*; state endangered) colonies which have associated Category 1 (essential, limited, and irreplaceable habitat) as well as Category 2 wildlife habitat, where not cultivated or developed. Outside Mule Deer Winter Range and Category 1 and 2 habitat, the Facility includes Category 3 (essential habitat, or important and limited habitat) and Category 4 (important habitat) wildlife habitat. Agricultural and developed land is classified as Category 6, which is considered habitat that has low potential to become essential or important habitat. Two of the three Category 6 habitat subtypes (Developed-Dryland Wheat and Developed-Irrigated Agriculture) are grouped together as cropland for the purposes of revegetation. The Developed-Other habitat subtype includes farm and ranch homes and related infrastructure, roads, quarries, livestock facilities, and other areas associated with human activity. All other habitat subtypes are collectively referred to as wildlife habitat for the purposes of revegetation (Table 2).

Table 2. Habitat Types and Revegetation Classes in the Amended Site Boundary

Revegetation Class	Habitat Type and Subtype
Cropland	Developed-Dryland Wheat
	Developed-Irrigated Agriculture
	Developed-Other
Wildlife Habitat	Grassland-Exotic Annual
	Grassland-Native Perennial
	Shrub-steppe-Basin Big Sagebrush
	Shrub-steppe-Rabbitbrush/Snakeweed
	Cliffs, Caves, and Talus
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian
	Developed-Revegetated or Other Planted Grassland
	Open Water – Lakes, Rivers, Streams-Permanent Ponds/Lakes
	Open Water – Lakes, Rivers, Streams-Seasonal Ponds
	Open Water – Lakes, Rivers, Streams-Perennial Streams
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams

Revegetation Class	Habitat Type and Subtype
	Wetlands-Riverine Wetlands
	Wetlands-Emergent Wetlands
	Wetlands-Scrub-shrub Wetlands

2.3 Existing Agricultural Practices

Agricultural land within the Amended Site Boundary includes two types of crops (dryland and irrigated) as well as grazed rangeland. Dryland crops are on the hillsides and on the plateau in primarily the western and northern portion of the Amended Site Boundary. The irrigated crops are in the valley bottoms under circle pivot or wheel line irrigation. The rangeland covers the hillsides and plateaus in the eastern part of the Amended Site Boundary.

Approximately 28 percent of the land in the amended micrositing corridor is in a 2-year dryland winter wheat/fallow crop rotation (land use category "Agriculture, non-irrigated" in Exhibit K, Table K-3). Dryland wheat is planted in the fall and harvested in early summer. After harvest the farmer will leave standing stubble over the next year until planting in the late fall of year two of the crop rotation. That fallow period allows for the collection of moisture in the soil; leaving the standing stubble reduces wind and water erosion on cropland. Herbicides are applied during the fallow year to kill off any vegetation that will use moisture present in the soil profile. Some farmers will seed directly into the standing stubble (no-till farming) while others will till the stubble and then seed (conservation tillage). The conventional method of tilling after harvest is no longer commonly used in the inland Northwest because of the loss of topsoil to wind and water erosion during the fallow year.

In addition to using a 2-year wheat/fallow rotation, farmers have built terraces on their steeper hillsides to capture stormwater during precipitation events and prevent rill erosion. Those terraces slow the flow of water and allow it to infiltrate into the soil profile. These are maintained on an as-needed basis.

Approximately 1 percent of the Amended Site Boundary contains irrigated cropland (Table K-3 and on Figure K-3 of Exhibit K). Irrigated crops within the Amended Site Boundary include alfalfa (five- to six-year rotation), seed corn (annual crop), and sorghum (annual crop). These crops are planted in the spring with herbicides applied on an as-needed basis.

Approximately 81 percent of the Amended Site Boundary contains rangeland (Table K-3 of Exhibit K, labeled as Habitat Lands). Rangeland within the Amended Site Boundary is a mix of grassland (Exotic Annual and Native Perennial); Riparian; Shrub-steppe; Cliffs/Caves/Talus; and occasional streams and wetlands (Table 2). Management is minimal in the rangeland and mostly consists of maintenance of the two-track roads and livestock watering facilities.

Landowners within the Amended Site Boundary have a mix of agricultural land uses on their farms. Of the 44 landowners/collections of landowners within the Amended Site Boundary, 22 are farming dryland winter wheat and 5 contain irrigated annual cropland. Many landowners are utilizing a hybrid of more than one land use type (rangeland, dryland cropland, and/or irrigated annual

cropland). Additionally, many of the landowner parcels contain berms or terraces (9 landowners) or pre-existing solar panels (3 landowners) which will influence the type of revegetation methods selected for each parcel. Additional information regarding farming practices in the Amended Site Boundary is provided in Exhibit K.

3.0 Temporary Impacts

3.1 Temporary Impacts to Cropland

Temporary disturbance to areas identified as Cropland (Developed-Dryland Wheat, Developed-Irrigated Agriculture, and Developed-Other habitat subtypes) are shown in Table 3. Restoration of Developed-Other habitat subtypes will be determined on a case-by-case basis and is not covered further in this Plan. Temporary disturbances to Developed-Dryland Wheat and Developed-Irrigated Agriculture will be restored as described in Section 4.4.

Table 3. Summary of Temporary Impacts to Cropland

Habitat Category and Habitat Type-Subtype	Temporary Impact (acres)[1]
Category 6	
Developed-Dryland Wheat	178.2
Developed-Irrigated Agriculture	0.9
Developed-Other	16.7
Subtotal Category 6	**195.8**
1. Totals in this table may not be precise due to rounding.	

3.2 Temporary Impacts to Wildlife Habitat

Temporary disturbance to areas identified as wildlife habitat are shown in Table 4. These temporary disturbances will be restored as described in Section 4.5.

Table 4. Summary of Temporary Impacts to Wildlife Habitat

Habitat Category and Habitat Subtype	Temporary Impact (acres)[1]
Category 2	
Grassland-Exotic Annual	120.1
Grassland-Native Perennial	603.6
Shrub-steppe-Basin Big Sagebrush	8.8
Shrub-steppe-Rabbitbrush/Snakeweed	34.8
Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	0.6
Developed-Revegetated or Other Planted Grassland	70.3
Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	0.2

Habitat Category and Habitat Subtype	Temporary Impact (acres)[1]
Wetlands-Riverine Wetlands	0.5
Wetlands-Emergent Wetlands	0.1
Subtotal Category 2	**838.8**
Category 3	
Grassland-Native Perennial	18.4
Shrub-steppe-Basin Big Sagebrush	5.3
Developed-Revegetated or Other Planted Grassland	<0.1
Wetlands-Emergent Wetlands	<0.1
Subtotal Category 3	**23.8**
Category 4	
Grassland-Exotic Annual	51.4
Shrub-steppe - Rabbitbrush/Snakeweed	11.3
Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1
Subtotal Category 4	**62.7**
Grand Total	**925.4**
Note: Totals in this table may not sum correctly due to rounding; <0.1 means greater than zero but less than 0.05 acres of impact.	

4.0 Revegetation Methods

This Plan addresses revegetation methods for cropland (Dryland Wheat, Irrigated Agriculture) and wildlife habitat. Revegetation will begin as soon as feasible after construction completes. Seeding and planting will be done in a timely manner and in the appropriate season. Restoration of Dryland Wheat and Irrigated Agriculture will be designed in consultation with the landowner.

4.1 Roles and Responsibilities

The construction contractor will be responsible for implementing the measures in the National Pollutant Discharge Elimination System (NPDES) 1200-C permit, as well as the revegetation activities discussed herein during and immediately after construction. A qualified botanist or revegetation specialist will be responsible for monitoring and reporting on revegetation success. Remedial revegetation actions, if needed during the operation phase, will be performed by a qualified contractor. The Certificate Holder will be responsible for ensuring that all contractors perform work in accordance with permit requirements and all agreed upon methods for revegetation. Additionally, for areas in proximity to occurrences of Laurence's milkvetch, the Certificate Holder will consult with ODA on revegetation, weed treatment, and restoration.

Revegetation is challenging in the arid conditions in the vicinity of the Facility. Other energy facilities in the region have struggled to meet revegetation success criteria. This Revegetation Plan

incorporates the Certificate Holder's "lessons learned" from previous projects, with the goal of implementing effective revegetation actions. Key lessons learned have included the need for seeding and planting within narrow, site-specific windows based on weather and soil moisture levels, and the importance of closely managing revegetation contractor methods and procedures.

To increase the probability of revegetation success and ensure no loss of habitat quality for temporary disturbances to wildlife habitat, the Certificate Holder will ensure that the contractor selected for the revegetation of temporary impact areas will be a qualified restoration and seeding contractor with demonstrated experience in the Columbia Plateau. Options the Certificate Holder is considering for contracting and managing this work include:

- Having their construction contractor subcontract the revegetation of temporary impact areas out to a qualified restoration and seeding contractor. The contract will stipulate the Certificate Holder's right to dictate the timing, methods, and management of seeding.
- Contracting directly with the qualified restoration and seeding contractor, with the power to contractually enforce seed timing and methods.
- Having their environmental contractor (e.g., Tetra Tech) contract with the qualified restoration and seeding contractor, with the power to contractually enforce seed timing and methods.

The restoration and seeding contractor's qualifications will be provided as a submittal to ODOE prior to construction. Additionally, staff from either the Certificate Holder or their environmental contractor (e.g., Tetra Tech) will field-verify seeding method and timing requirements are followed appropriately, and will document any variances and the justifications for those variances. Monitoring and follow-up will be provided as described in Section 5.0 to ensure oversight and increase the probability of revegetation success.

4.2 Site Preparation

In areas where soil is removed during construction, the following measures will be taken where appropriate:

- The topsoil will be stockpiled separately from the subsurface soils.
- Mineral soils will be decompacted where needed, i.e., reclaimed crane paths, laydown yards, and temporary roads.
- The conserved soil will be put back in place as topsoil prior to revegetation activities.
- Prior to seeding and/or planting of revegetation areas, soils will be prepared to facilitate revegetation success.
- Soil preparation will involve standard, commonly used methods, and will take into account all relevant site-specific factors, including slope, size of area, and erosion potential.
- Topsoil and other soils from noxious weed infested areas will not be moved outside of the infested areas and will be returned to its previous location during reclamation activities;

- Soils from weed infested areas may be treated with a pre-emergent herbicide prior to initiation of revegetation efforts, depending on site-specific conditions;
- Movement of topsoil and other soils from non-infested areas will be limited to eliminate the transport of weed seeds, roots, or rhizomes.
- In general, the soil will be prepared into a firm, fine-textured seedbed that is relatively free of debris before seeding or planting. Shallow tilling with a disc, followed by a harrow or drag if necessary, can typically achieve this. If replaced soil is too soft, then seeds may be buried too deep to properly germinate; a roller or culti-packer should be used to pack down the soil.
- In non-cropland areas, site complexity will be considered during soil preparation. For instance, it may be desirable to purposely create an uneven, patchy site that allows for depressions and other microsites that result in small variations in aspect and moisture holding to promote complexity.
- The construction contractor will use mulching and other appropriate practices, as required by the NPDES 1200-C permit, to control erosion and sediment during construction and revegetation work.

4.3 Soil Reclamation

Successful vegetative reclamation of disturbed areas depends on productive soils. Therefore, soil reclamation is included and addressed as part of this Plan.

4.3.1 Soil Quantitative Reclamation Criteria

For the purposes of this Facility, adverse impacts will be considered as a change from the current conditions of the soils within the construction areas. A quantitative assessment of the physical and chemical soil characteristics including the following will be used to determine if the impacted soils are measurably different (more than 10 percent different) from the surrounding undisturbed soils:

- **Soil physical observations and estimations**. These tests involve describing the soils physical characteristics and include describing the soil profile and determining aggregate size. Soil pits up to 36 inches will be dug in the sampling area. Soils will then be described by their topsoil depths, Munsell Color, and aggregate size. Topsoil depth is important for water storage and nutrient supply for plant growth. Generally, removal of the topsoil will result in loss of soil fertility, water-holding capacity, soil organic carbon content, and productivity. Soil structure is the arrangement and organization of particles in the soil. Soil structure affects the retention and transmission of water and air in the soil as well as the mechanical proper ties of the soil. This test only needs to be done once at the start of the site monitoring efforts as these characteristics will not change unless there are additional disturbances to the soil.
- **Infiltration rate test**. Infiltration is the process of water entering the soil. The rate at which water enters the soil is the infiltration rate, which is dependent on the soil type; soil structure, or amount of aggregation; and the soil water content (Lowery et al. 1996). This test will show

the effects of compaction from construction in each site. Compacted soils will have less pore space, resulting in lower infiltration rates. Lower infiltration rates will result in more runoff (creating erosion issues) and less available water for plants.

- **Nutrient test that includes organic matter content and pH.** A nutrient test will show the plant available nutrients in the soil which is an indicator for plant productivity. The organic matter content measurement gives the amount of stored nutrients, including organic carbon, in the soils that can be made available to plants based on the health of the soil microorganisms. Soil pH is a measure of the acidity or alkalinity of a soil, which affects the availability of plant nutrients, activity of microorganisms, and the solubility of soil minerals. This test will show the available nutrients in the soils.

If any of the above criteria have changed more than 10 percent from the surrounding undisturbed soils or baseline conditions, mitigation measures such as further decompaction of the impacted soils, additional nutrients or minerals to adjust pH, or the addition of composted organic matter will be taken. The areas having negative impacts to soil conditions will be monitored and mitigated for using adaptive management techniques.

4.4 Restoration of Cropland

Croplands will be reseeded with the appropriate crop or maintained as fallow in consultation with the landowner or farm operator. The construction contractor will also consult with the landowner or farm operator to determine seed mix, application methods, and rates for seed and fertilizer. Each cropland type (i.e., dryland vs. irrigated) will require a different restoration management regime. This section discusses the restoration of dryland crops and irrigated agriculture; rangeland restoration is discussed in Section 4.5.

Dryland croplands will be reseeded to match the timing of the crop rotation on adjacent cropland in order to facilitate easy harvest and re-establish the appropriate crop rotation on that land. Dryland cropland that will be seeded in the year that construction is complete can be temporarily hydromulched or otherwise stabilized until seeding can occur in the fall; dryland cropland that will be fallow for a year (i.e., fallow rather than reseeded the year construction is complete) will be planted with spring wheat (dependent on timing of construction closeout) or have continued stabilization with hydromulch or other best management practices (BMPs) through the fallow year.

If terraces within the dryland croplands are disturbed during construction, they will be rebuilt to the Natural Resource Conservation Service's specification upon which they were installed by the farmers. These features, while beneficial for conservation, can impede the movement of construction crews through the area due to their uneven surfaces and potential obstruction of equipment.

Irrigated crops will be planted with a short-term cover crop until the timing is right to seed the desired crop or temporarily stabilized with hydromulch or other BMPs. Fast-growing cover crops can protect the soil from erosion, enhance organic matter content, and improve nutrient cycling during fallow periods. This BMP will be dependent on the water rights and soil conditions of the

farmer, and the Certificate Holder will work with farmers to establish which technique will work best on their land.

Soil compaction as a result of construction activity is another concern for restoring agricultural soils to their pre-construction productivity. During construction of temporary facilities, the Certificate Holder will excavate and store soils by soil horizon, so that soils are replaced and restored appropriately, including replacing topsoil. During post-construction restoration of temporary impacts to agricultural areas, the Certificate Holder will loosen agricultural soil by mechanical scarification (tilling or ripping the soil) to an appropriate depth to reduce the potential effects of compaction. Soil amendment, by addition of organic matter (compost), may also be necessary to alleviate compaction. The measures outlined in Section 4.2 will be performed in cropland where applicable.

4.5 Restoration of Wildlife Habitat

All wildlife habitats will be reseeded with either 1) a mix of native or non-invasive, non-persistent non-native grasses; or 2) a mix of native or non-invasive, non-persistent non-native grasses, forbs, and shrubs. The seed mixes and application rates described in Section 4.6 were determined in consultation with ODFW for the adjacent Wheatridge Renewable Energy Facility II (WREFII), and included consideration of the soil types, erosion potential, and growing conditions found near the Facility. The seed mixes will be approved by ODFW prior to application and seeds will be obtained from a reputable supplier in compliance with the Oregon Seed Law (Oregon Administrative Rule 603-056).

The methods used and timing of planting will be appropriate to the seed mixes, weather conditions, and site conditions (including area size, slope, and erosion potential) based upon consultation with ODFW and the Morrow and Umatilla County Weed Control Supervisors. Preparation of disturbed ground may include replacing lost topsoil, or chemical or mechanical weed control per the Draft Noxious Weed Control Plan (Tetra Tech 2023a). Following soil preparation (Section 4.2), seed mixes in non-cropland areas will be applied through broadcast, drill, or hydroseeding.

During construction, the construction contractor will implement site stabilization measures, including seeding of temporarily disturbed areas according to the Certificate Holder's NPDES 1200-C permit. Approximately 6 months prior to commercial operation, the Certificate Holder and construction contractor will meet with ODFW, ODOE, and the Morrow and Umatilla County Weed Control Authority personnel to review the actual extent and conditions of temporarily impacted areas, confirm the revegetation methods to be implemented, and to revisit reference areas, as necessary.

4.5.1 Broadcast Seeding

Broadcast seeding will be chosen based on the type of seed, disturbance level, soil type, terrain, and precipitation levels for the area to be revegetated. For example, the best time to seed big sagebrush is late fall, and one of the best methods of successful revegetation of big sagebrush is broadcast seeding followed by raking or harrowing (Lambert 2005). In this method, the seed mix will be

broadcast at a rate of 20-24 pounds per acre; however, the rate may be adjusted depending on the recommendations of the actual seed supplier. Broadcasting should not be utilized when winds exceed 5 miles per hour. If feasible, half of the seed mix will be broadcast in one direction, with the other half broadcast perpendicular to the first half. A tracking dye may be added to facilitate uniform application. Unsuccessful broadcast seeding is often due to lack of seed-to-soil contact. Therefore, broadcast seeding will be applied to the surface of the soil and then covered by 0.5 to 1 inch of soil by raking or harrowing to ensure soil-to-seed contact and improve success (Pyke et al. 2018).

4.5.2 Drill Seeding

Drill seeding will be chosen based on the type of seed, disturbance level, soil type, and precipitation levels for the area to be revegetated. For example, drill seeding is often used on slopes less than 30 percent or flat areas that allow mechanical equipment and where soils are not stony (Pyke et al. 2018). Drill seeding is often a preferred method of seeding on erodible soils and as it plants seeds at a uniform depth favorable for successful germination, not too shallow, or too deep. Drill seeding plants seeds at a rate of 12-14 pounds per acre using an agricultural or range seed drill; however, the rate may be adjusted depending on the recommendations of the actual seed supplier.

4.5.3 Hydroseeding

Hydroseeding is most applicable for areas where drill or broadcast seeding machinery cannot access, including steeper sloped or narrow terrain, or where the simultaneous application of mulch is desired for soil stabilization. Seeding rates typically increase by 30 to 50 percent above broadcast seeding rates for single applications per consultation with the seed supplier.

4.5.4 Mulching and Soil Stabilization

Mulching, erosion control fabric and/or other appropriate practices will be implemented to control erosion and sediment during revegetation work. Temporary stabilization of seeded areas shall be accomplished by application of seedless, certified weed-free hydromulch containing a tackifier. Alternate methods for application of mulch may be proposed by the revegetation contractor but will require prior written approval and must provide demonstrated success in sites with similar wind and soil conditions. In addition, this Plan assumes that imported topsoil, if required, will be demonstrated to be suitable for vegetative success. If soils are not suitable, soil amendments may be required.

4.6 Seed Mixes and Shrub Plantings

Based on the 2022 botanical survey report for the Facility (Tetra Tech 2023b), the primary perennial grass species observed in the grasslands include bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), bulbous bluegrass (*Poa bulbosa*), and Sandberg bluegrass (*Poa secunda*). A commercially available grassland mix from a regional restoration company will be used for the seed mixes for revegetation of grasslands, such as the Columbia

Plateau Seed Mix from BFI Native Seeds (BFI Native Seeds 2023), which contains three native species observed in grasslands (Table 5). The Columbia Plateau Mix, or a similar commercially available seed mix from a regional restoration company, is proposed for revegetation efforts at the Facility and contains only native grasses. Bulbous bluegrass is not native and is not in any of the seed mixes provided by BFI Native Seeds. The Certificate Holder assumes that reasonable substitutions can be made to the seed mix included in Table 5, with approval from ODOE, based on seed availability at the time of procurement. As this Columbia Plateau Seed Mix is commercially and regionally available, the process for seed mix ordering is not included in this Plan, as orders for the Columbia Plateau Seed Mix can be made directly with BFI Native Seeds.

Additionally, planting of shrubs is being proposed for revegetation of temporarily disturbed shrub-steppe habitats. Similarly, the Certificate Holder assumes that seeding of shrub species can occur if plant stock is unavailable or too costly.

Table 5. Columbia Plateau Seed Mix

Common Name	Scientific Name	Percent of Mix
Bluebunch wheatgrass	*Pseudoroegneria spicata*	50
Bottlebrush squirreltail	*Elymus elymoides*	15
Sandberg's bluegrass	*Poa secunda*	15
Thickspike wheatgrass	*Elymus lanceolatus*	20

ODFW discussed a preference for shrub plantings instead of including them in seed mixes at the adjacent WREFII. It is likely ODFW will have a preference for shrub plantings in areas of shrub-steppe habitat for the Facility as well. In the approximately 60.3 acres of temporarily disturbed shrub-steppe habitat (Table 4), the Certificate Holder will prioritize plantings of basin big sagebrush and rabbitbrush. If plantings are not feasible due to availability of plant stock or cost, the Certificate Holder will notify ODOE, and shrub seeds would be added to High Desert Seed Mix at the seeding rates noted in Table 6.

Table 6. Shrub Seeding Rates to Supplement High Desert Seed Mix

Common Name	Scientific Name	Minimum Pounds/Acre Pure Live Seeds
Big sagebrush	*Artemisia tridentata*	0.1 to 0.2
Gray rabbitbrush	*Ericameria nauseosa*	0.1
Green rabbitbrush	*Chrysothamnus viscidiflorus*	0.1

5.0 Monitoring

5.1 Revegetation Record

Records will be kept of revegetation efforts, both for cropland and for wildlife habitat. Records will include:

- Date construction was completed;
- Description of the affected area;
- Date revegetation was initiated; and
- Description of the revegetation effort.

The Certificate Holder will update these records periodically as revegetation work occurs, and will provide ODOE with copies of these records along with submission of the monitoring report that is required by the site certificate.

5.2 Habitat Reference and Monitoring Sites

In order to determine if the revegetation efforts are meeting success criteria, paired monitoring and reference sites will be established. Monitoring and reference sites will be located in each of the following wildlife habitat subtypes that will be temporarily disturbed by construction of the Facility:

- Wildlife Habitat (Habitat Category 2):
    - Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams,
    - Shrub-steppe-Basin Big Sagebrush,
    - Wetlands-Riverine Wetlands (Big Game Winter Range overlay),
    - Wetlands-Emergent Wetlands (Big Game Winter Range overlay),
    - Grassland-Exotic Annual (Big Game Winter Range overlay; WAGS habitat),
    - Grassland-Native Perennial (Big Game Winter Range overlay; WAGS habitat),
    - Shrub-steppe-Rabbitbrush/Snakeweed (Big Game Winter Range overlay; WAGS habitat),
    - Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian (Big Game Winter Range overlay), and
    - Developed-Revegetated or Other Planted Grassland (Big Game Winter Range overlay);
- Wildlife Habitat (Habitat Category 3):
    - Wetlands-Emergent Wetlands,
    - Grassland-Native Perennial,
    - Shrub-steppe-Basin Big Sagebrush, and
    - Developed-Revegetated or Other Planted Grassland;
- Wildlife Habitat (Habitat Category 4):
    - Grassland-Exotic Annual,

- Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams, and
- Shrub-steppe-Rabbitbrush/Snakeweed.

Reference sites are intended to represent target conditions for the revegetation effort. Paired reference sites will be used for any habitat subtype with greater than 0.5 acres of temporary impacts. Vegetation within monitoring plots in revegetation areas will be compared with those in the associated reference sites to measure success of the required revegetation activities.

5.2.1 Habitat Reference Sites

Prior to operation, reference sites—areas of habitat quality similar to those found prior to disturbance at the areas to be revegetated—will be identified in consultation with ODOE and ODFW. Reference sites will be chosen with consideration to land use patterns, soil types, terrain, and presence of noxious weeds. Alternate reference sites may be chosen in consultation with ODOE and ODFW if land use changes, wildfire, or other disturbance makes a chosen reference site no longer representative of target conditions.

Proposed reference sites will be chosen based on review of:

- Aerial imagery (Google Earth 2022);
- Information from previous vegetation surveys conducted for Approved Site Boundary between 2011 and 2023 (see Table P-1 in Exhibit P; Fields and Thompson 2023, Tetra Tech 2022, Tetra Tech 2023b, Tetra Tech 2023c);
- Local knowledge of the site by biologists who have conducted surveys within the Facility's boundaries; and
- Soil survey data (NRCS 2021).

Final selection of proposed reference sites will include a site visit that will be conducted at the appropriate time to evaluate baseline conditions within these reference sites. These site visits will document the following:

- Vascular plant species present;
- Native/non-native status of species present;
- Approximate percent cover of dominant species;
- Approximate percent cover of state and county-listed noxious weeds; and
- Evidence of ongoing, recent, or past disturbance.

In each of the reference sites, a permanent 50 by 100-foot sample plot will be established. Three 50-foot transects will be established within each of these permanent sample plots, perpendicular to the long side of the plot. For the grassland plots, the line-point intersect method will be used to document vegetation at 1-foot intervals along the transect line. For the shrub-steppe plots, 6-foot-wide belt transects will be established, 3 feet on each side of the transect line. All shrubs and

herbaceous species occurring within these transects will be recorded and percent cover of the dominant species will be estimated.

5.2.2 Habitat Monitoring Sites

Per ODFW recommendations at the adjacent WREFII, a minimum of one monitoring plot will be located within habitats where temporary disturbances will be less than 5 acres in size. For habitats where the impacts will be greater than 5 acres, the number of monitoring plots will be chosen to represent five percent of the total temporary disturbance area by habitat subtype and category, or a maximum of 10 monitoring plots.

The number of monitoring plots for habitat subtypes where impacts will be greater than 5 acres will be determined first by multiplying the impact acreage by five percent and then converting the acreages into square feet. This square footage will then be divided by 5,000, which represents the number of square feet within a proposed sample plot (50 feet by 100 feet). The final Revegetation Plan will present, in tabular format, the number of monitoring plots that will be established within each habitat subtype and category of temporary disturbance.

Monitoring sites within each habitat subtype will be selected randomly utilizing existing habitat mapping. The monitoring plot dimensions and transect spacing may need to be adjusted to account for the numerous linear features associated with the Facility whose disturbance footprint may be less than 50 feet wide. These detailed considerations for monitoring methods will be determined in consultation with ODOE and ODFW prior to implementation of monitoring.

5.3 Soil Monitoring Sites

Paired monitoring will also occur in each distinct soil type making up more than 5 percent of the impacted soil units. Sample sites will be paired within each soil unit impacted with one sample site in the impacted area and one sample site in the adjacent non-impacted soil. Paired plots will be compared per the quantitative reclamation criteria described in Section 4.3.1 above, and recommendations will be developed to address any differences in the impacted soils versus the adjacent soils via the addition of nutrients, decompaction, or other methods.

5.3.1 Soil Monitoring Plots

The soil assessments listed in Section 4.3.1 above will be performed on paired plots throughout the Amended Site Boundary following construction until successful soil reclamation. The soils will be considered reclaimed when the soil conditions in the disturbed and undisturbed areas are less than 10 percent different. A summary of the proposed soil quality metrics and timing is shown in Table 7. There are 63 major soil types in the Amended Site Boundary, and eight soil types that make up 5 percent or more of the Amended Site Boundary. Construction would temporarily disturb up to 1,121.1 acres. Sample sites will be paired within each of the eight impacted soil types that makes up more than 5 percent of the total Amended Site Boundary with one sample site in the impacted area and one sample site in the adjacent non-impacted soil.

Table 7. Proposed Soil Quality Metrics and Timing

Soil Measurement	Timing of Collection	Number of Data Points
Soil profile description and aggregate sizing	Soil profiles will be described one time in the first year of the study.	One soil pit per each sample.
Soil infiltration rates	Infiltration measurements will be taken annually at each site for 5 years unless there is less than 10 percent difference in disturbed versus undisturbed, preferably during mid-growing season.	One infiltration test per sample site per year.
Compaction	Compaction measurements will be taken annually at each site for 5 years unless there is less than 10 percent difference in disturbed versus undisturbed.	One compaction measurement per sample site per year.
Soil chemistry testing	Lab tests for total organic matter content and pH levels will be taken at the same time as the infiltration and compaction measurements at each site for 5 years unless there is less than 10 percent difference in disturbed versus undisturbed.	Three tests per sample site.

5.4 Monitoring Procedures

Monitoring of the revegetation effort will be conducted by a qualified botanist or revegetation specialist; this monitoring will be done annually for 5 years, starting on the first growing season after seeding/planting.

During each assessment, revegetated areas will be compared to reference sites with regard to:

- Presence and density of noxious weeds;
- Degree of erosion;
- Vegetative density;
- Proportion of perennial native and desirable introduced plant species; and
- Species diversity and structural stage of perennial native and desirable introduced plant species.

Monitoring will not be required for areas that have been converted by the landowner to land uses that preclude meeting revegetation success criteria.

5.4.1 Noxious Weed Control

A qualified investigator will be employed to assess noxious weed presence during the first 5 years of revegetation work and to make recommendations on noxious weed control measures. Checks for

noxious weed infestations will enable the Certificate Holder to respond to new noxious weeds infestations in a timely manner and ensure the success of the Revegetation Plan. Reports will be submitted to ODOE and to ODFW annually. Details regarding known noxious weed occurrence at the Facility, proposed noxious weed monitoring, and control of noxious weeds are available in a separate Draft Noxious Weed Control Plan (Tetra Tech 2023a).

5.4.2 Wildlife Habitat Recovery

In the first growing season after planting in revegetation areas, a qualified botanist or revegetation specialist will inspect each wildlife habitat revegetation area to assess the success of revegetation measures. These assessments will be annually for the first 5 years. Monitoring reports will be submitted to the Certificate Holder, ODOE, and ODFW. Assessments will address whether, based on evaluation of monitoring and reference sites, each wildlife habitat revegetation area is trending toward meeting the success criteria described below.

Based on the fifth annual assessment, the Certificate Holder will consult with ODOE and ODFW to design an action plan for subsequent years. The Certificate Holder is obligated to revegetate and implement weed control measures in disturbed areas regardless of its ability to meet success criteria; nonetheless, the Certificate Holder may propose remedial actions and/or additional monitoring for areas that have been determined by ODOE, in consultation with ODFW, not to have met the success criteria. Revegetation efforts may in some cases be deemed to have failed, and additional mitigation may be proposed in such cases to compensate for loss of wildlife habitat; revegetation and weed control would continue to apply with success criteria described in Section 5.5.

5.4.3 Soil Reclamation

A qualified investigator will be employed to annually collect samples (Table 7) in paired soil unit plots to assess soil quality during the first 5 years of reclamation work to make recommendations on soil reclamation. Reports will be submitted to ODOE and to ODFW following each annual soil sampling and analysis.

5.5 Success Criteria

Each monitoring report will involve assessing the progress of each area of wildlife habitat disturbed during construction toward meeting revegetation objectives. Habitat quality shall be evaluated based on the success criteria listed below. Final determination of whether the Certificate Holder has met the revegetation obligations will be made by ODOE, in consultation with ODFW.

- **Native Forbs:** Based on ODFW input on other projects by the Certificate Holder's parent company in the region, no success criteria are applied to this Facility because forbs were not

included in the ODFW-approved revegetation seed mix due to concerns regarding noxious weed control. [1]

- **Native Shrubs:** The average density or frequency of the shrub component should be at least 50 percent of the reference site within 5 years. At least 15 percent of the shrub density or frequency should be the dominant species found on the reference site. The diversity of shrub species within the revegetated areas should at least equal the shrub species diversity measured on the reference site.
- **Native Grasses:** Revegetated sites should maintain grass species diversity and density that is at least 85 percent similar to reference sites. Native bunchgrasses should be given preference. Native grasses are to be planted at rates sufficient to achieve abundance and diversity characteristics of the grass component at the reference site.
- **Non-Native Weeds:** Every attempt should be made to prevent and control all species listed on county, state, and federal noxious weed lists. Revegetation sites should not contain a higher percentage of non-native weed cover than the reference site, or within 10 percent similar non-native weed cover of the reference site. All state and federal laws pertaining to noxious weeds must be followed. Highly competitive invasive species such as cheatgrass and other weedy brome grasses are prohibited in seed mixtures and should be actively controlled if any are found in the reclaimed areas.
- **Soil Testing:** The soil assessments listed in Section 5.3.1 above will be performed on paired plots throughout the Approved Site Boundary. The soil reclamation and monitoring will continue until the impacted soil is within 10 percent of non-impacted paired sample point's soil quality criteria described in Section 5.3.1. If soil testing shows that soils were either not impacted or were reclaimed to within 10 percent of pre-disturbance conditions, then monitoring could be discontinued.

Success of cropland revegetation will have been achieved when production of the revegetated area is comparable to that of adjacent, non-disturbed croplands of the same type. Success determination will involve consultation with the landowner or farm operator, and the Certificate Holder will report to ODOE on the success of cropland restoration efforts. Noxious weed control is necessary for successful revegetation of croplands and will be implemented per the methods described in the Draft Noxious Weed Control Plan (Attachment P-3 of Exhibit P) which was updated as part of RFA 1 to the Facility Site Certificate (Tetra Tech 2023a).

[1] ODFW's recommended success criterion for native forbs is that the average density or frequency of desirable forbs (typically native, with some site-specific exceptions) should be a minimum of 75 percent of the reference site within 5 years. Diversity of forbs on a reclaimed site should at least equal the diversity measured on the reference site within 5 years.

5.6 Remedial Action

Remedial action options will be identified in cases where success criteria are not met, whether due to wildfire subsequent to construction or because of lower than expected rates of germination or survival. Remedial actions may include reseeding or other measures. The investigator will make recommendations for remedial actions after each monitoring visit, and the Certificate Holder will take appropriate measures to meet the restoration objectives. The Certificate Holder will include the investigator's recommendations for remedial actions and the measures taken in that year's monitoring report. ODOE may require reseeding or other remedial actions in cases where revegetation objectives have not been met.

As a commitment to ensuring no loss of habitat quality for temporary disturbances to wildlife habitat, the Certificate Holder may provide additional compensatory habitat mitigation for temporary disturbances to Grassland-Native Perennial habitat and other habitats with intact native plant communities that do not recover within five years of disturbance. Grassland habitats are typically assumed to be able to recover within five years of disturbance. Therefore, the Certificate Holder will work with ODFW to develop and implement an adaptive management plan to address mitigation shortfalls in areas where revegetation does not meet success criteria within five years. However, the Certificate Holder is hopeful that with appropriate oversight of revegetation contractors, the restoration of habitats will be successful within the five-year period and no adaptive management or additional mitigation would be required.

6.0 Plan Amendment

This Plan may be amended by agreement of the Certificate Holder and the Oregon Energy Facility Siting Council (EFSC). Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this Plan. ODOE shall notify EFSC of all amendments, and EFSC retains the authority to approve, reject, or modify any amendment of this Plan agreed to by ODOE.

7.0 References

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Attachment P-5. Wildlife Monitoring and Mitigation Plan

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Wildlife Monitoring and Mitigation Plan

(Approved at August 19-20, 2020 EFSC Meeting as part of the WREFII Site Certificate)

Prepared for
Wheatridge East Wind, LLC

Prepared by

TETRA TECH

October 2020

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Table of Contents

1.0 Introduction 1
2.0 EFSC Compliance 2
3.0 Fatality Monitoring – Wind Facility 2
3.1 Standardized Carcass Searches 3
3.1.1 Search Plot Size and Configuration 3
3.1.2 Search Schedule and Interval 4
3.1.3 Search Strategy and Fatality Documentation 5
3.1.4 Duration 6
3.2 Carcass Persistence Trials 6
3.3 Searcher Efficiency Trials 7
3.4 Incidental Finds and Injured Birds 8
3.5 Fatality Estimation 9
3.6 Mitigation 10
4.0 Wildlife Response and Reporting System 12
5.0 Raptor Nest Surveys 12
5.1 Short-Term Monitoring 13
5.2 Long-Term Monitoring 13
6.0 Washington Ground Squirrel Monitoring 14
7.0 Data Reporting 14
8.0 Amendment of the Plan 14
9.0 References 15

List of Tables

Table 1. Post-Construction Fatality Monitoring Standardized Carcass Search Parameters 4
Table 2. Fatality Thresholds of Concern by Species Group 11

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1.0 Introduction

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

WREFE was originally permitted as part of a larger facility, the Wheatridge Wind Energy Facility (WRW). The WRW site certificate was issued by the Oregon Department of Energy's (ODOE) Energy Facility Siting Council (EFSC) on April 28, 2017 (EFSC 2017a). Following the 2017 site certificate issuance, the certificate holder received approval of five site certificate amendments from 2017 through 2020, where the fifth amendment split previously approved facility components into two original site certificates for facilities named Wheatridge Renewable Energy Facility I (WREFI) and WREFII. In November 2020, EFSC approved Amendment 1 of the WREFII site certificate, further splitting WREFII into three site certificates including an amended WREFII (200 MW wind), Wheatridge Renewable Energy Facility III (WREFIII, 150 MW solar) and WREFE (200 MW wind). This WMMP applies to the WREFE site certificate.

This WMMP has the following components:

1. Fatality monitoring program, including:
    a. Standardized carcass searches;
    b. Carcass persistence trials;
    c. Searcher efficiency trials; and
    d. Data analysis and fatality estimation.
2. Wildlife Response and Reporting System (WRRS);
3. Raptor nesting surveys;
4. Washington ground squirrel monitoring; and
5. Data reporting.

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

2.0 EFSC Compliance

The WMMP addresses the following site certificate conditions for WREFII (EFSC 2020):

> ***PRE-FW-02*** *Prior to construction, the certificate holder shall finalize and implement the Wildlife Monitoring and Mitigation Plan (WMMP) provided in Attachment F of the Final Order on Request for Amendment 5, based on the final facility design, as approved by the department in consultation with ODFW.*
>
> > *a. The final WMMP must be submitted and ODOE's concurrence received prior to the beginning of construction. ODOE shall consult with ODFW on the final WMMP. The certificate holder shall implement the requirements of the approved WMMP during all phases of construction and operation of the facility.*
> >
> > *b. The WMMP may be amended from time to time by agreement of the certificate holder and the Oregon Energy Facility Siting Council ("Council"). Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of the WMMP agreed to by the Department.*
>
> ***PRE-TE-02*** *In accordance with Fish and Wildlife Habitat Condition 4, prior to construction, the certificate holder shall finalize and implement the Wildlife Monitoring and Mitigation Plan (WMMP) provided in Attachment F of the Final Order on Amendment 5, based on the final facility design, as approved by the department in consultation with ODFW. The final WMMP shall include a program to monitor potential impacts from facility operation on Washington ground squirrel. Monitoring shall be of any known colonies and shall be completed on the same schedule as the raptor nest monitoring for the facility. The monitoring surveys shall include returning to the known colonies to determine occupancy and the extent of the colony as well as a general explanation of the amount of use at the colony. If the colony is not found within the known boundary of the historic location a survey 500 feet out from the known colony will be conducted to determine if the colony has shifted over time. Any new colonies that are located during other monitoring activities, such as raptor nest monitoring surveys, shall be documented and the extent of those colonies should be delineated as well. These newly discovered colonies shall also be included in any future WGS monitoring activities.*

3.0 Fatality Monitoring – Wind Facility

The objective of fatality monitoring is to estimate the number of bird and bat fatalities that are attributable to Facility operation. The Certificate Holder will employ qualified and properly trained personnel (investigators) to perform fatality monitoring. The program will include standardized carcass searches to detect fatalities, methods to adjust for sources of bias inherent in fatality detection, and the estimation of annual fatality rates attributable to 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) estimation of the portion of the carcass fall distribution searched. Methods and results of all components of the fatality monitoring program will be reported to ODOE on an annual basis (Section 7.0).

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

3.1 Standardized Carcass Searches

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

3.1.1 Search Plot Size and Configuration

This mortality monitoring effort focuses on three size classes of fatalities: bats, small birds, and large birds. Turbine-related fatalities are distributed non-uniformly around a turbine (fall distribution). As a result, carcass density is not the same at all distances from a turbine, but typically rises over a short distance and eventually decreases to zero (Huso et al. 2016; Dalthorp 2020). The fall distribution depends on a number of factors including species' size and body mass (e.g., larger, heavier carcasses tend to land farther from turbines than lighter carcasses; Hull and Muir 2010; Huso et al. 2016; Choi et al. 2020), 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 100 meters of the turbine, and edges of the vegetation along the roadside. Ninety-nine percent of fatalities of small birds and bats are predicted to occur within 100 meters from the base of Facility turbines (based on modeling for large turbines by Hull and Muir [2010]).

The second search plot, "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.

3.1.2 Search Schedule and Interval

Fatality monitoring will begin just prior to the start of the first full season following commencement of commercial operation of the Facility. Fatality monitoring will commence with a "clearance search." The clearance search serves to identify fatalities that occurred prior to the initiation of the fatality monitoring program and for which 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 both search plot types during the spring, summer and fall seasons to capture migration and breeding seasons of birds and bats. The frequency of standardized carcass searches will be reduced to monthly (once every 28 days) in both plot types during winter. Over the course of one monitoring year, the investigators will conduct 22 standardized carcass searches (excluding the clearance search) in road and pad plots and 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.

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

Season	Dates[1]	Search Interval[2]	Search Plot Parameters	Target Size Class	Search Strategy	Number of Survey Periods per Season
Spring	March 16 to May 31	14 Days	Road and pad plot out to 100 meters	Bats/small birds and large birds	Walk	6
		14 Days	120-meter radius centered on turbine	Large birds	Binocular Scans from turbine base	6
Summer	June 1 to August 15	14 Days	Road and pads plot out to 100 meters	Bats/small birds and large birds	Walk	5
		14 Days	120-meter radius centered on turbine	Large birds	Binocular Scans from turbine base	5
Fall	August 16 to November 15	14 Days	Road and pad plot out to 100 meters	Bats/small birds and large birds	Walk	7
		14 Days	120-meter radius centered on turbine	Large birds	Binocular Scans from turbine base	7

Season	Dates[1]	Search Interval[2]	Search Plot Parameters	Target Size Class	Search Strategy	Number of Survey Periods per Season
Winter	November 16 to March 15	28 Days	Road and pad plot out to 100 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

1. Seasonal demarcation dates may be shifted slightly to accommodate a full search interval in any given season.
2. Search interval for 28 days based on carcass persistence data for the Northern Rockies avifauna biome (in which the project is located) (AWWI 2019).

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

3.1.3 Search Strategy and Fatality Documentation

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

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 3.3).

Investigators will flag all bird and bat carcasses discovered. Carcasses are defined as a complete carcass or body part, three or more primary flight feathers, five or more tail feathers, or 10 or more feathers of any type concentrated together in an area 3 meters square or smaller. When parts of

carcasses and feathers from the same species are found within a search plot, investigators will make note of the relative positions and assess whether these are from the same fatality.

All carcasses (bird and bat) found during the standardized carcass searches will be photographed, recorded, and labeled with a unique number. Investigators will record the location of the carcass using a global positioning system (GPS)-enabled device. Data collected per carcass found will include the date; the turbine number; the distance from and bearing from the nearest turbine; the species, age, and sex of the carcass when possible; the extent to which the carcass is intact; the estimated time since death; the habitat in which the carcass was found; whether the carcass was collected or left in place; and whether the carcass was found during a standardized carcass search or incidentally. Additional measurements may be required to identify the species of bat carcasses. Investigators will describe all evidence that might assist in determination of cause of death, such as evidence of electrocution, vehicular strike, wire strike, predation, or disease. If the necessary collection permits are not acquired by the Certificate Holder, all carcasses will be discreetly marked so as to avoid double counting and will be left in place.

3.1.4 Duration

The investigators will perform one full year of fatality monitoring starting in the first year of facility operation (Year 1). When Year 1 of monitoring at the Facility has been completed, the raw data will be compiled by the investigators and the Certificate Holder in a comprehensive report, which will include fatality estimates (see Section 7.0). The results will be compared with other wind energy facilities in the region. If fatality rates for the first year of monitoring at the Facility exceed any of the thresholds of concern (see Section 3.6) or the range of fatality rates found at other wind power facilities in the region (as available), the Certificate Holder will consult with ODOE and ODFW regarding potential mitigation. If mitigation is deemed appropriate, the Certificate Holder will propose appropriate mitigation for ODOE and ODFW review within 6 months after reporting the fatality rates to the ODOE. Alternatively, the Certificate Holder may opt to conduct a second year of fatality monitoring consecutive to the first year if the Certificate Holder believes that the results of Year 1 monitoring were anomalous. The investigators will perform an additional year of monitoring in the fifth year of operations (Year 5) regardless of the results of the Year 1 study.

3.2 Carcass Persistence Trials

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

The investigators will conduct a carcass persistence trial within each season defined in Table 1 during a fatality monitoring year. A minimum of 10 each of large bird, small bird, and bat surrogate trial carcasses will be placed each season. 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 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, and coordination with the other survey work. The condition of scavenged carcasses will be documented during each assessment, and at the end of the trial all traces of the carcasses will be removed from the site. Scavenger or other activity could result in complete removal of all traces of a carcass in a location or distribution of feathers and carcass parts to several locations. This feather distribution will not constitute complete carcass removal if evidence of the carcass remains within an area similar in size to a search plot and if the evidence would be detectable to a searcher during a normal survey.

3.3 Searcher Efficiency Trials

Searcher efficiency is defined as the probability that investigators will find a carcass that is available to be found within the search plot. Several factors influence searcher efficiency, including investigator experience, vegetation conditions within a search plot, and characteristics of individual carcasses (e.g., size, color). The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that investigators are able to 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 an additional 12 large birds will be placed just in the large bird plots in the spring, summer, and fall seasons. In winter, when bat fatalities are not anticipated, a minimum of 12 each of large bird and small bird carcasses will be placed in road and pad plots, 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.

3.4 Incidental Finds and Injured Birds

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

The Certificate Holder will contact a qualified rehabilitation specialist approved by ODOE[1] to respond to injured wildlife. The Certificate Holder will pay costs, if any, charged for time and

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

expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to the Facility operations.

3.5 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. Calculations will utilize ballistic modeling results presented in Hull and Muir (2010) for small birds and bats, and Hallingstad (2018) for large birds. Other peer-reviewed models that update the state of the science may be utilized if they become available within the duration of the monitoring period.

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

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

In 2018, the U.S. Geological Survey released a fatality estimator program, GenEst (Dalthorp et al. 2018). GenEst provides the most current state-of-the-science software for fatality estimation by minimizing biases associated with fatality estimation and allowing users to select the most appropriate methods and assumptions for project-specific circumstances. Rigorous testing of the performance of GenEst compared to other estimators using simulated data has shown GenEst to be the least biased, enabling more precise fatality estimation and reliable comparison of fatality

estimates among projects (Simonis et al. 2018). Additionally, GenEst allows for fatality estimates to be split into subcategories which allows for estimates to be parsed by parameters such as season, year, or turbine type.

The estimation of annual fatality rates will account for:

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

3.6 Mitigation

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

Mitigation may be appropriate if fatality rates exceed a "threshold of concern" (Table 2). For the purpose of determining whether a threshold has been exceeded, the Certificate Holder will determine the mean estimated annual fatality rate for species groups after each year of monitoring (provided three or more detections within any of the species groups listed in Table 2 are available to accurately determine estimates for these groups). Based on current knowledge of the species that are likely to use the habitat in the area of the Facility, the thresholds of concern established by EFSC (Table 2) will be used in conjunction with most current regional fatality rates published by the American Wind and Wildlife Institute to evaluate the fatality rates associated with the Facility and guide discussions on appropriate mitigation.

Table 2. Fatality Thresholds of Concern by Species Group

Species Group	Threshold of Concern[1] (Fatalities per MW)
Raptors[2] (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl.)	0.06
Grassland species (All native bird species that rely on grassland habitat and are either resident species occurring year-round or species that nest in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.20
Bats[3]	2.50

1. EFSC adopted the concept of "thresholds of concern" for raptors, grassland species, and state sensitive avian species in the Final Order on the Application for the Klondike III Wind Project (June 30, 2006) and for bats in the Final Order on the Application for the Biglow Canyon Wind Farm (June 30, 2006). The exceeding of a threshold, by itself, would not be a scientific indicator that operation of the Facility would result in range-wide population-level declines of any of the species affected.
2. Regionally, the median fatality rate for all raptors in the Northern Rockies avifaunal biome (includes eastern Oregon; 22 studies) was 0.10 birds/MW/year (AWWI 2019). 75 percent of studies in the Northern Rockies reporting raptor estimates reported approximately 0.12 birds/MW/year.
3. Regionally, the USFWS Pacific Region (includes Oregon; 35 studies) had a range of 0.0 to 4.2 bat/MW/year, with a median of 0.7 bats/MW/year (AWWI 2018).

If the data from a given 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. ODFW, ODOE, and the Certificate Holder may review fatality data on a per turbine basis to aid in discussions. If mitigation is determined to be necessary, the Certificate Holder will propose mitigation measures designed to benefit the affected species or species group. ODOE may recommend additional, targeted data collection if the need for mitigation is unclear based on the information available at the time. If, following consultation and any such additional data collection, ODOE determines that mitigation is required, the Certificate Holder will propose mitigation measures designed to benefit the affected species or species group, commensurate with the level of impact.

Acceptable mitigation may include, but is not limited to, contributions to wildlife rehabilitators, conducting or making a 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.

4.0 Wildlife Response and Reporting System

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

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

5.0 Raptor Nest Surveys

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

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

5.1 Short-Term Monitoring

Short-term monitoring will be done in two monitoring seasons. The first monitoring season will be in the first raptor nesting season after completion of construction of the Facility. The second monitoring season will be in the fourth year after construction is completed. The Certificate Holder will provide a summary of the first-year results in the monitoring report described in Section 7.0. After the second monitoring season, the investigators will analyze two years of data compared to the baseline data.

During each monitoring season, the investigators will conduct a minimum of one aerial and one ground survey for raptor nests in late May or early June and additional surveys as described in this section. The survey area is the area within the Facility site and a 2-mile buffer zone around the site. For the ground surveys while checking for nesting success (conducted within the Facility site and up to a maximum of 0.5 miles from the Facility site), nests outside of parcels that are under a lease agreement with the Certificate Holder will be checked from public roads, if feasible.

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

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

5.2 Long-Term Monitoring

In addition to the two years of post-construction short-term raptor nest surveys described in Section 5.1, the investigators will conduct long-term raptor nest surveys at 5-year intervals for the life of the facility.[2] Investigators will conduct the first long-term raptor nest survey in the raptor nesting season of the ninth year after construction is completed and will repeat the survey at 5-year intervals thereafter. In conducting long-term surveys, the investigators will follow the same survey protocols as described in Section 5.1 unless the investigators propose alternative protocols that are approved by ODOE. In developing an alternative protocol, the investigators will consult with ODFW and will take into consideration other raptor nest monitoring conducted in adjacent areas. The

[2] As used in this plan, “life of the facility” means continuously until the facility site is restored and the site certificate is terminated in accordance with OAR 345-027-0110.

investigators will analyze the data—as a way of determining trends in the number of raptor breeding attempts the facility supports and the success of those attempts—and will submit a report after each year of long-term raptor nest surveys.

6.0 Washington Ground Squirrel Monitoring

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

7.0 Data Reporting

The Certificate Holder will report wildlife monitoring data and analysis to ODOE for each calendar year in which wildlife monitoring occurs. Monitoring data include fatality monitoring program data, WRRS data, and raptor nest survey data. The Certificate Holder may include the reporting of wildlife monitoring data and analysis in the annual report required under OAR 345-026-0080 or submit this information as a separate document at the same time the annual report is submitted. In addition, the Certificate Holder will provide to ODOE any data or record generated in carrying out this monitoring plan upon request by ODOE.

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

8.0 Amendment of the Plan

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

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