Exhibit P

Fish and Wildlife Habitats and Species

Wheatridge Renewable Energy Facility East
May 2023

Prepared for
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Acronyms and Abbreviations

ASC	Application for Site Certificate
Certificate Holder	Wheatridge East Wind, LLC
Facility	Wheatridge Renewable Energy Facility East
OAR	Oregon Administrative Rules
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
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.

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 will be 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 2022, as indicated in Table P-1; Figure P-3 shows 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 2011–2022

Year	Survey	Reference	Extent
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-3
2022	Golden eagle nest watch survey	Attachment P-1	Observation points near four known and three potential golden eagle nests
2022	Wetlands and waters surveys	Attachment J-1	Amended wind micrositing corridors, as accessible
2022	Avian and eagle use surveys	WEST 2022	Amended Site Boundary; Avian Use Points; Figure P-4
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

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

Year	Survey	Reference	Extent
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-3
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-3
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
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

Year	Survey	Reference	Extent
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	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, 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 following 2022 field surveys that 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, are 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).

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 2022 are summarized in Table P-1 and shown in Figure P-2. Results of combined desktop analyses and field surveys from 2011 to 2022 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 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 17 and April 29, 2022; May 4 and May 15, 2022; and May 20 and May 29, 2022, in two phases, 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 2022 are summarized in Table P-1 and Figure P-2. 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 2022 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).

The extent of surveys conducted from 2011 to 2022 are summarized in Table P-1. 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 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 ongoing avian use surveys at the Facility began in April 2022 and are anticipated to run for one year for small birds (small-bird surveys) and for two years for large birds (large-bird surveys), particularly eagles. The large- and small-bird surveys are being conducted at the same 35 points within the Amended Site Boundary (Figure P-4). Each point is 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 is conducted for 60 minutes, and each small-bird survey is conducted for 10 minutes. Preliminary results from these ongoing 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, and 2022 (Table P-1). Surveys conducted between 2011 and 2014 are addressed in detail in the ASC (Wheatridge 2015). Surveys performed in 2019, 2020, and 2022, 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-3).

In 2019, raptor-nest surveys were performed within 2 miles of the adjacent WREF I and WREF II facilities (Figure P-3; 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-3). 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-3; 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-3). 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-3). 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 2016), the April 2020 Eagle Survey Memo (USFWS 2020), 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. A second year of raptor-nest surveys in this area is planned for 2023.

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.

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; and November 7 to 17, 2022 (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, 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-Native Perennial	299.0	299.0
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	25.5	25.5
Category 1 Total		**324.5**	**324.5**
2	Grassland-Exotic Annual	2,602.9	2,353.8
	Grassland-Native Perennial	60,135.0	48,238.0
	Shrub-steppe-Basin Big Sagebrush Shrub-steppe	154.2	138.0
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	3,132.3	2,815.1
	Cliffs, Caves, and Talus	1.2	1.2
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	489.6	328.8
	Developed-Revegetated or Other Planted Grassland	6,729.2	4,879.8
	Open Water – Lakes, Rivers, Streams-Permanent Ponds/Lakes	7.6	7.6
	Open Water – Lakes, Rivers, Streams-Seasonal Ponds	4.9	4.0
	Open Water – Lakes, Rivers, Streams-Perennial Streams	43.6	32.2
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	348.1	287.3
	Wetlands-Riverine Wetlands	30.0	30.0
	Wetlands-Emergent Wetlands	133.0	105.1
	Wetlands-Scrub-shrub Wetlands	23.6	7.9
Category 2 Total		**73,835.4**	**59,228.9**
3	Grassland-Native Perennial	5,971.1	3,319.0
	Shrub-steppe-Basin Big Sagebrush Shrub-steppe	84.8	84.3
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	549.7	458.9
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	50.4	8.5
	Developed-Revegetated or Other Planted Grassland	1,185.2	401.4
	Open Water – Lakes, Rivers, Streams-Perennial Streams	0.5	0.5
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	1.8	1.3
	Wetlands-Riverine Wetlands	1.1	1.1
	Wetlands-Emergent Wetlands	8.0	3.1
Category 3 Total		**7,853.2**	**4,278.2**
4	Grassland-Exotic Annual	6,201.6	2,327.1

Habitat Category	Habitat Type-Subtype	Acres within Analysis Area	Acres within Amended Site Boundary [1]
	Grassland-Native Perennial	41.9	41.9
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	18.7	17.6
	Open Water – Lakes, Rivers, Streams-Permanent Ponds/Lakes	0.6	0.6
	Open Water – Lakes, Rivers, Streams-Perennial Streams	0.6	0.3
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	79.7	28.1
	Open Water – Lakes, Rivers, Streams-Seasonal Ponds	0.8	0.2
Category 4 Total		**6,343.9**	**2,415.8**
6	Developed-Dryland Wheat	21,161.2	12,157.8
	Developed-Irrigated Agriculture	3,062.3	634.7
	Developed-Other	894.0	383.7
Category 6 Total		**25,117.5**	**13,176.3**
Grand Total		**113,474.5**	**79,423.6**
Note: 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 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 as feasible during final

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

design, including any WAGS Category 1 habitat identified following additional WAGS surveys that are anticipated prior to construction.

Five WAGS colonies were delineated within the Amended Site Boundary during surveys conducted in 2022. These colonies were primarily in Grassland: Native Perennial (299.0 acres of Category 1 habitat; Table P-3) and Shrub-steppe: Rabbitbrush/Snakeweed (25.5 acres of Category 1 habitat; Table P-3). The process of survey, detection, and delineation was used to ensure that all Facility components were subsequently 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.

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 6,424 acres of Category 2 habitat due to the presence of WAGS (based on 2022 surveys), and 73,715 acres of Category 2 habitat overall, considering overlap with ODFW mapped Mule Deer Winter Range and WAGS presence within the Analysis Area (Table P-3). All areas of WAGS Category 2 habitat are within Big Game Winter Range. Outside of Big Game Winter Range, three habitat types were identified as Category 2 habitat: Shrub-steppe–Basin Big Sagebrush Shrub-steppe, Open Water–Lakes, Rivers, Streams-Perennial Streams, and Open Water–Lakes, Rivers, Streams-Intermittent and Ephemeral Streams.

Shrub-steppe

- Category 2 Basin Big Sagebrush Shrub-steppe 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 Washington ground squirrel. 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 Shrub-steppe, 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 in 2022, 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 in 2022, 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 Shrub-steppe 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 in 2022, 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.

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 in 2022, 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-2). 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.

<u>Grassland</u>

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.

- <u>Category 3 Native Perennial Grasslands</u> 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 in 2022, 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 Washington ground squirrel. 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 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. State Sensitive species typically associated with this habitat include burrowing owls, grasshopper sparrows, and long-billed curlews. During special status species surveys in 2022, 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.

- 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 in 2022 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 in 2022, 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: ASC Avian Point Counts, 2022 Avian Point Counts	Documented: ASC Avian Point Counts, 2022 Avian Point Counts
Brewer's sparrow	*Spizella breweri*	S	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts
Burrowing owl (Western)	*Athene cunicularia hypugaea*	SC	Documented: 2022 Special Status Wildlife Surveys, ASC Special Status Wildlife Surveys	Documented: 2022 Special Status Wildlife Surveys, ASC Avian Point Counts, ASC Special Status Wildlife Surveys
Common nighthawk	*Chordeiles minor*	S	Documented: 2022 Avian Point Counts	Documented: 2022 Avian Point Counts, ASC Avian Point Counts (presumed; location unknown)
Ferruginous hawk	*Buteo regalis*	SC	Documented: 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, ASC Avian Point Counts, 2022 Avian Point Counts, 2018 Special Status Wildlife Surveys	Documented: 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, 2018 Special Status Wildlife Surveys, ASC Raptor Nest Surveys, ASC Avian Point Counts

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: 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, ASC Avian Point Counts	Documented: 2022 Raptor Nest Survey, 2022 Golden Eagle Nest Monitoring, 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, ASC Avian Point Counts, ASC Eagle Nest Survey, ASC Golden Eagle Nest Monitoring
Grasshopper sparrow	*Ammodramus savannarum*	S	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, 2020 Wagon Trail Special Status Wildlife Surveys, ASC Avian Point Counts, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, 2020 Wagon Trail Special Status Wildlife Surveys, ASC Avian Point Counts, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys
Lewis' woodpecker	*Melanerpes lewis*	SC	None	None
Loggerhead shrike	*Lanius ludovicianus*	S	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, ASC Avian Point Counts, ASC Special Status Wildlife Surveys
Long-billed curlew	*Numenius americanus*	SC	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, ASC Avian Point Counts, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys	Documented: 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, ASC Avian Point Counts, ASC Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys
Sagebrush sparrow	*Artemisiospiza nevadensis*	SC	None	None

Common name	Scientific name	Columbia Plateau Ecoregion ODFW Status[1]	Occurrence within Amended Site Boundary[2]	Occurrence within Analysis Area
Swainson's hawk	*Buteo swainsoni*	S	Documented: 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, ASC Avian Point Counts, 2018 Special Status Wildlife Surveys	Documented: 2022 Raptor Nest Survey, 2022 Special Status Wildlife Surveys, 2022 Avian Point Counts, 2020 Wagon Trail Special Status Wildlife Surveys, 2018 Special Status Wildlife Surveys, ASC Avian Point Counts, 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
Reptiles				
Sagebrush lizard (Northern)	*Sceloporus graciosus graciosus*	S	None	None
Western painted turtle	*Chrysemys picta*	SC	None	None

Common name	Scientific name	Columbia Plateau Ecoregion ODFW Status[1]	Occurrence within Amended Site Boundary[2]	Occurrence within Analysis Area

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 Point Counts— 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, Attachment P-1
   - 2022 Bat Activity Survey – Attachment P-1
   - 2022 Special Status Wildlife Surveys – Attachment P-1
   - 2022 Avian Point Counts—Preliminary results from ongoing surveys
   - 2022 Raptor Nest Survey Memo, Attachment P-1
   - 2022 Golden Eagle Nest Watch Memo, Attachment P-1
   - 2020 Wagon Trail Special Status Wildlife Surveys—Wheatridge East 2022, 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 surveys within the Amended Site Boundary, biologists observed nine state threatened, endangered, or sensitive wildlife species and eagles: WAGS (endangered; addressed in Exhibit Q), Brewer's sparrow (*Spizella breweri*; sensitive), burrowing owl (sensitive-critical), ferruginous hawk (sensitive-critical), golden eagle (BGEPA), grasshopper sparrow (sensitive), loggerhead shrike (sensitive), long-billed curlew (sensitive-critical), and Swainson's hawk (sensitive) (Attachment P-1). 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 2022. Documented occurrences of species reported from 2011 to 2022 are summarized below in Table P-5, with a focus on observations during the 2022 special status wildlife species surveys.

Table P-5. State Sensitive and Eagle Species Observed During Special Status Species Surveys within the Analysis Area 2011-2022

Common name	Scientific name	Observation Notes
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*	Burrowing owls were observed in the north and western portions of the Amended Site Boundary during 2022 special status species surveys. Burrowing owls in the north portion of the Amended Site Boundary were in the vicinity of burrowing owl burrows; the burrowing owl observed in the western portion of the Amended Site Boundary was not associated with a burrow.
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.
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.

Common name	Scientific name	Observation Notes
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.
Loggerhead shrike	*Lanius ludovicianus*	Two loggerhead shrikes were observed during 2022 special status species 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.
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.

7.1.2 Special status Plant Species Surveys

The Certificate Holder documented eleven occurrences of Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) within the Amended Site Boundary in 2022; multiple plant groupings recorded within one kilometer of each other were assigned to the same occurrence (Attachment P-1). The eleven Laurence's milkvetch occurrences covered between 0.5 and 13.5 acres within the 2022 Botanical Survey Area and were located throughout 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).

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 sensitive bird species were detected within fifteen 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 Columbia Plateau ecoregion 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.

The 2022 avian use surveys are ongoing; therefore, the data reported herein are preliminary and subject to change following final quality assurance/quality control, though few if any significant changes are expected. As a result, the 2022 avian use findings discussed here are not depicted in the Exhibit P figures. At the time this document was prepared, a total of 188, 60-minute, large-bird point count surveys and 190, 10-minute, small-bird point count surveys had been conducted (between April 19 and October 26, 2022; WEST 2022). Seven sensitive bird species have been detected during the 2022 avian use surveys to date including Brewer's sparrow, common nighthawk, ferruginous hawk, grasshopper sparrow, loggerhead shrike, long-billed curlew, and Swainson's hawk. The sensitive species detected during the 2022 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 and burrowing owl was not detected during the 2022 surveys.

Like the 2011 and 2012 surveys, the most abundant sensitive bird species observed during the 2022 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 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 avian point count surveys. Four golden eagles have been detected during the surveys (one individual at Point

13, one at Point 27, and two at Point 26). The one bald eagle detected during the surveys was detected at Point 8 (Figure P-4).

7.1.4 Raptor-Nest Surveys

The results from raptor-nest surveys performed in 2019, 2020, and 2022 and depicted in Figure P-3 only include active (in-use) nests of sensitive species. The entire Analysis Area was surveyed during the 2019, 2020 and/or 2022 surveys (Figure P-3). Most of the Analysis Area was covered during the 2022 surveys, the remainder was covered during the 2019 and 2020 surveys (Figure P-3). Only 2019 and 2020 nest that were inside the Analysis Area but outside the 2022 Raptor-Nest Survey Area are displayed in Figure P-3. 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-3). In 2020, both nests were monitored to prevent 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-3). 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. Four golden eagles were observed incidentally during the aerial surveys: two during the initial survey and two during the second survey. Two of the golden eagles were observed incidentally during the aerial surveys: two during the initial survey and two during the second survey. Two of the golden eagles were observed within the Amended Site Boundary (Figure P-7). Two of the eagles were located about 0.5 miles from known, unoccupied (alternate) 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).

7.1.5 Golden Eagle Nest Monitoring

A data review performed prior to the 2022 raptor-nest surveys identified 13 previously known golden eagle nests 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 nests within the survey area, one was active, four were unoccupied (alternate) and eight were no longer present in 2022 (Attachment P-1). The active golden eagle nest and two of the alternate golden eagle nests are located within the Amended Site Boundary.

No nesting golden eagles were observed during the 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 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 for Option A and Option B, respectively, as defined in the Division 27 document (Table P-6).

Table P-6. Impacts by Habitat Category and Subtype

Habitat Category	Habitat Type-Subtype	Option A (acres)		Option B (acres)	
		Permanent	Temporary	Permanent	Temporary
2	Grassland-Exotic Annual	12.0	54.0	12.0	53.6
	Grassland-Native Perennial	74.3	475.2	74.3	471.6
	Shrub-steppe-Basin Big Sagebrush Shrub-steppe	-	0.2	-	-

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

Habitat Category	Habitat Type-Subtype	Option A (acres)		Option B (acres)	
		Permanent	Temporary	Permanent	Temporary
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	1.2	38.2	1.2	40.7
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	<0.1	4.0	<0.1	4.0
	Developed-Revegetated/Other Planted Grassland	10.7	72.1	10.7	72.1
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	0.3	<0.1	0.3
	Wetlands-Riverine Wetlands	<0.1	1.3	<0.1	2.4
	Wetlands-Emergent Wetlands	<0.1	0.2	<0.1	0.2
Total		98.3	645.5	98.3	645.0
3	Grassland-Native Perennial	2.5	31.6	2.5	29.2
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	0.7	4.5	0.7	7.2
	Developed-Revegetated/Other Planted Grassland	<0.1	13.5	0.1	16.2
	Wetlands-Riverine Wetlands	-	-	-	0.4
Total		**3.3**	**49.6**	**3.3**	**53.0**
4	Grassland-Exotic Annual	5.3	56.3	5.3	57.5
	Grassland-Native Perennial	-	<0.1	-	<0.1
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	0.1	<0.1	<0.1
Total		**5.3**	**56.3**	**5.3**	**57.6**
6	Developed-Dryland Wheat	41.5	285.2	41.6	273.9
	Developed-Irrigated Agriculture	<0.1	3.2	<0.1	3.2
	Developed-Other	0.4	4.8	0.4	5.9
Total		**42.0**	**293.2**	**42.0**	**283.0**
Grand Total		**148.8**	**1,044.6**	**148.9**	**1,038.5**

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 of impact.

Total impacts within the Amended Site Boundary are up to 1,193.4 acres for Option A, including 1,044.6 acres of temporary and 148.8 acres of permanent impact, and up to 1,187.4 acres for Option B, including 1,038.5 acres of temporary and 148.9 acres of permanent impact. The majority of the Amended Site Boundary overlaps with Mule Deer Winter Range; therefore, the majority of impacts under either option (62 percent for Option A, 63 percent for Option B) are within Category 2 habitat (ODFW 2013a).

8.2 Potential Impacts to State Sensitive Species

As described in the ASC, potential construction-related impacts 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).

8.2.1 Birds

Direct fatality impacts to state-sensitive avian species susceptible to collisions with turbines (Swainson's hawk, ferruginous hawk, and golden eagle) are addressed in the ASC (Wheatridge 2015).

Eight State Sensitive bird species and two eagle species have been detected within the Analysis Area (Table P-4). 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 not conduct ground-disturbing activities within species-specific buffer distances of active raptor nests during the nesting season, as described in Section 9.

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).

Avian mortality at the Facility due to collision with turbines is anticipated. 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, also considering the Facility's regional location, habitat, and the results of pre-construction surveys. 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).

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

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). Nationwide, the mean fatality rate for all birds was 1.83 birds per megawatt per 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).

Similar trends in species and species group fatalities 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 (*Sturnus vulgaris*), and common raven, all of which have been observed as fatalities at wind projects (AWWI

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

2020a). Based on their known use at the Facility and documented fatalities at other wind projects, it is expected that passerines, in particular horned larks, will make up the largest proportion of fatalities.

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).

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 (2.726 birds/20 minutes) when raptor use consisted mainly of rough-legged hawk (1.341 birds/20 minutes) and northern harrier (0.890 birds/20 minutes). At Wheatridge East, raptor mean use values were highest during spring season (0.907 birds/20 minutes) when raptor use was comprised mainly of rough-legged hawk and northern harrier (0.233 birds/20 minutes each) and red-tailed hawk (0.221 birds/20 minutes).

Aerial surveys conducted in 2022 identified active nests belonging to six raptor species (buteos and other species visible from the air), 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 aerial surveys (22 and 11 active nests within the survey area, 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. Each of these species have been observed as fatalities at wind farms (AWWI 2020a). Therefore, 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 (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].

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

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. During migration and daily hunting flights, 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 practicable.

As described above, eight State Sensitive bird species and two eagle species may occur within the Analysis Area. Impacts specific to sensitive bird species with the potential to occur within the Amended Site Boundary are addressed below. 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 point count surveys (Table P-4). Bald eagle was observed once during both the 2011 to 2012 and 2022 avian point count surveys. The observation during the 2011 to 2012 surveys occurred in winter, while the bald eagle observation during the 2022 surveys occurred in spring. 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). As noted in the ASC, use of the area is expected to be limited to migration and winter, when the species sometimes feeds on carrion (Wheatridge 2015, Buehler 2022). Bald eagles have been documented in only two fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies; AWWI 2020a). Construction and operation of the Facility are not expected to adversely impact bald eagles.
- **Brewer's Sparrow (sensitive species):** Low numbers of Brewer's sparrows were observed in the Analysis Area during pedestrian wildlife surveys and avian point counts (Table P-4). Brewer's sparrow was detected once during the 2022 avian point count surveys and once during the 2022 special-status wildlife surveys. Both detections occurred in the northern portion of the Amended Site Boundary. There are no records of this species during the ASC surveys (from 2011 to 2012). Brewer's sparrows are sagebrush obligates, generally occurring in sagebrush shrublands with a canopy height greater than 5 feet (OCS 2016, Rottenburry 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. Brewer's sparrows have been documented in 16 fatality incidents at wind projects nationwide (i.e., 0.2 percent of fatality incidents based on 337

studies) (AWWI 2020a). Based on the low incidence of collision with turbines and low use of the Amended Site Boundary, construction and operation of the Facility are not expected to adversely impact Brewer's sparrows.

- **Burrowing Owl (sensitive-critical species):** Low numbers of burrowing owls have been observed within the Analysis Area during pedestrian wildlife surveys and avian point counts (Table P-4.). A single burrowing owl was observed during the ASC avian point count surveys, 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-3). 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. Burrowing owls have been documented in 6 fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies at 227 wind projects) (AWWI 2020a). To prevent nesting disturbance, the Certificate Holder will implement buffer zones around burrowing owl nest sites as required by condition PRE-FW-01[7]. Based on the low incidence of collision with turbines and low use of the Amended Site Boundary, construction and operation of the Facility are not expected to adversely impact burrowing owls.
- **Common nighthawk (sensitive species):** The common nighthawk was observed once during avian point count surveys 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. During the 2022 surveys, 22 common nighthawk individuals were observed at six survey points. 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).

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

- **Ferruginous hawk (sensitive-critical species):** This species was detected during avian use and pedestrian 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 avian use surveys (Wheatridge 2015, WEST 2022). Ferruginous hawks were detected during avian use surveys 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 (*Spermophilus* sp., *Urocitellus* sp.), and prairie dogs (*Cynomys* sp.) where they occur. 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-3).

  During construction and operation, nesting and foraging disturbance and collisions with turbine blades may adversely impact this species. 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). To reduce raptor collision mortality, the Certificate Holder will avoid constructing turbines near areas of high prey density (e.g., WAGS colonies). 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.

- **Golden eagle (no state status, BGEPA-protected):** Golden eagles were observed within the Analysis Area during avian use surveys, pedestrian 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.

  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. Of the 13 previously known golden eagle nests within the raptor-nest survey area, one was active, four were unoccupied (alternate) and eight were no longer present in 2022 (Attachment P-1). The active golden eagle nest and two of the alternate golden eagle nests are located within the Amended Site Boundary. Aerial surveyors observed golden eagles flying in the vicinity of two of the inactive nests. The inactive 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. Regardless of whether the observed eagles were associated with the alternate nests, the nests could be used in the future. In a 41-year study in Idaho, Kochert and Steenhof (2012) found that 86 percent of alternative nests were used during at least one breeding season, and time until reuse ranged from 1 to 39 years.

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 (Attachment P-1). Other sources of golden eagle prey noted during the 2022 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*]). During the 2022 aerial raptor-nest surveys, surveyors observed 20 mule deer herds with 3 to 50 individuals, eight elk herds with 2 to 50 individuals, and one cow carcass (Attachment P-1). Such eagle-prey concentrations could attract golden eagles.

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). 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. Of the five golden eagle nests documented in 2022 (Attachment P-1), the active nest was 1.61 miles from the amended wind micrositing corridors and the four inactive golden eagle nests ranged between 0.62 and 2.51 miles from the amended wind micrositing corridors.

- **Grasshopper sparrow (sensitive species):** Grasshopper sparrows were observed throughout the Amended Site Boundary during pedestrian 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. 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 Columbia Plateau Ecoregion 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). As a result, impacts to grasshopper sparrows from collisions with turbine blades are anticipated to be minimal. Additionally, 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.

- **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.
- **Loggerhead shrike (sensitive species):** Loggerhead shrikes were detected both during avian use surveys and pedestrian 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 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 only 13 fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies) (AWWI 2020a). As a result, impacts to loggerhead shrike from collisions with turbine blades are anticipated to be minimal.

- **Long-billed curlew (sensitive-critical species)**: Long-billed curlews were observed within the Amended Site Boundary during avian use surveys and pedestrian 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 avian use surveys (166 individuals observed at 11 survey points and 51 individuals observed at 12 survey points, respectively). 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). 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. Long-billed curlews have been documented in only 10 fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 337 studies) (AWWI 2020a). As a result, impacts to long-billed curlew from collisions with turbine blades are anticipated to be minimal.
- **Sagebrush sparrow (sensitive-critical species):** This species was not detected during surveys for the Facility. 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 sparrow 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). As a result, impacts to sagebrush sparrow from collisions with turbine blades are anticipated to be minimal.
- **Swainson's hawk (sensitive species):** This species was detected during avian use and pedestrian wildlife surveys for the Facility (Table P-4). Swainson's hawk activity was distributed throughout the Amended Site Boundary, in the spring, summer and fall during the ASC avian use surveys (Wheatridge 2015). Swainson's hawks are open-country specialists that hunt and forage in grassland, shrubsteppe, 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-3). Four of the nests were in the Amended Site Boundary.

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). 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. The Certificate Holder will monitor for bird fatalities, including Swainson's hawk, during Facility operation as described in the Wildlife Monitoring and Mitigation Plan (Attachment P-5).

8.2.2 Mammals

Five State Sensitive bat species have the potential to occur within the Analysis Area: hoary bats, pallid bats, silver-haired bats, spotted bats, and Townsend's big-eared bats. Of these species, 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, primarily along Big Butter Creek. These rock outcrops and areas of cliff-nesting 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.

Direct fatality impacts on State Sensitive bat species are addressed in the ASC (Wheatridge 2015). Mitigation for turbine-specific impacts on these species is addressed in Condition PRE-FW-02, and in the Wheatridge Wildlife Monitoring and Mitigation Plan[8]. Potential impacts on State Sensitive bat species from the Facility as proposed in this RFA are summarized here.

During operation, impacts to bats are likely to occur primarily in the late summer and fall, during the migratory period for tree-roosting bats, because of turbine collision. The hoary bat and silver-

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

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). 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.

Wind turbines represent one of the largest sources of human-caused mortality for bats (Cryan 2011, O'Shea et al. 2016). 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 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).

In a cumulative fatality study specific to the Columbia Plateau Ecoregion, Johnson and Erickson (2013) estimated that the bat fatality rate was 1.14 bats per megawatt per year. Silver-haired bats and hoary bats accounted for 98 percent while Myotis species accounted for only 2 percent of the observed fatalities at 23 wind facilities. The Renewable Energy Wildlife Institute (Formerly American Wind Wildlife Institute, or AWWI; 2020b) found a similar trend based on a review of publicly available and available confidential bat collision fatality records in the American Wind Wildlife Information Center (AWWIC). The USFWS Pacific Region (including Eastern Oregon) had the lowest range median fatality rate (0.7 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 monitoring studies (95 percent; 259 of 273 studies). 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 contained in the AWWIC. In the USFWS Pacific Region, hoary bat and silver-haired bat are the most common bat species found as fatalities; hoary bats represent 51 percent of total bat fatalities found, while silver-haired bats account for 45 percent of bat fatalities regionally (WEST 2021). The eastern red bat does not occur 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. Potential impacts on State Sensitive bat species as a result of the construction and operation of the Facility are summarized below.

- **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 comprise 51 percent of total recorded bat fatalities in the USFWS Pacific Region (WEST 2021). The potential risk to populations and to the species as a whole is unknown; however, that risk is expected to be less for the Facility than at facilities sited nearer the species' preferred forest habitats and far less than at facilities in the eastern United States (Wheatridge 2015).
- **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. Pallid bats are not reported as fatalities either by AWWI (2020b; summary of 336 studies) or WEST (2021; 530 studies). Therefore, 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 nationwide.
- **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. 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). Silver-haired bats comprise 45 percent of total bat fatalities in the USFWS Pacific Region (WEST 2021). The potential risk to populations and to the species as a whole is unknown; however, that risk is expected to be less for the Facility than at facilities sited nearer the species' preferred forest habitats and far less than at facilities in the eastern United States (Wheatridge 2015).

- **Spotted bat:** Spotted bats were not detected during acoustic surveys for the Facility in 2011. 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). Therefore, potential adverse impacts such as habitat loss and collision with turbines are expected to be minimal for spotted bats given their low potential to occur at the Facility and lack of detected fatalities nationwide.
- **Townsend's big-eared bat:** Townsend's big-eared bats were not detected during acoustic surveys for the Facility in 2011. Townsend's big-eared bats use mines, caves, and buildings for roosting and stream edges, forest edges, desert scrub, and agricultural areas for foraging (Gerhardt and Anderson 2014). 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. Townsend's big-eared bats are not reported as fatalities either by AWWI (2020b; summary of 336 studies) or WEST (2021; 530 studies). Therefore, potential adverse impacts such as 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 nationwide.

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[9].

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.

9.1.2 Prior to Construction

In compliance with condition PRE-FW-01, the Certificate Holder will conduct 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

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

to nesting raptors and other sensitive resources are avoided, minimized, and mitigated as appropriate[9]. These surveys will include areas not previously surveyed for WAGS, habitat, and special status species because they were added after surveys were completed, for example. In the event that WAGS are encountered, the Certificate Holder will make any final adjustments necessary to continue to avoid Category 1 habitat during final design as feasible. 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[10]. 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].

[10] 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[11].
- In compliance with condition PRE-FW-03, an updated Wildlife Monitoring and Mitigation Plan 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, Washington ground squirrel monitoring, and ongoing environmental training for Facility personnel regarding reporting requirements for incidental wildlife injuries and deaths at the Facility.

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 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

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

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 Wildlife Monitoring and Mitigation Plan[12]. 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 Wildlife Monitoring and Mitigation Plan 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.

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

12.0 References

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Figures

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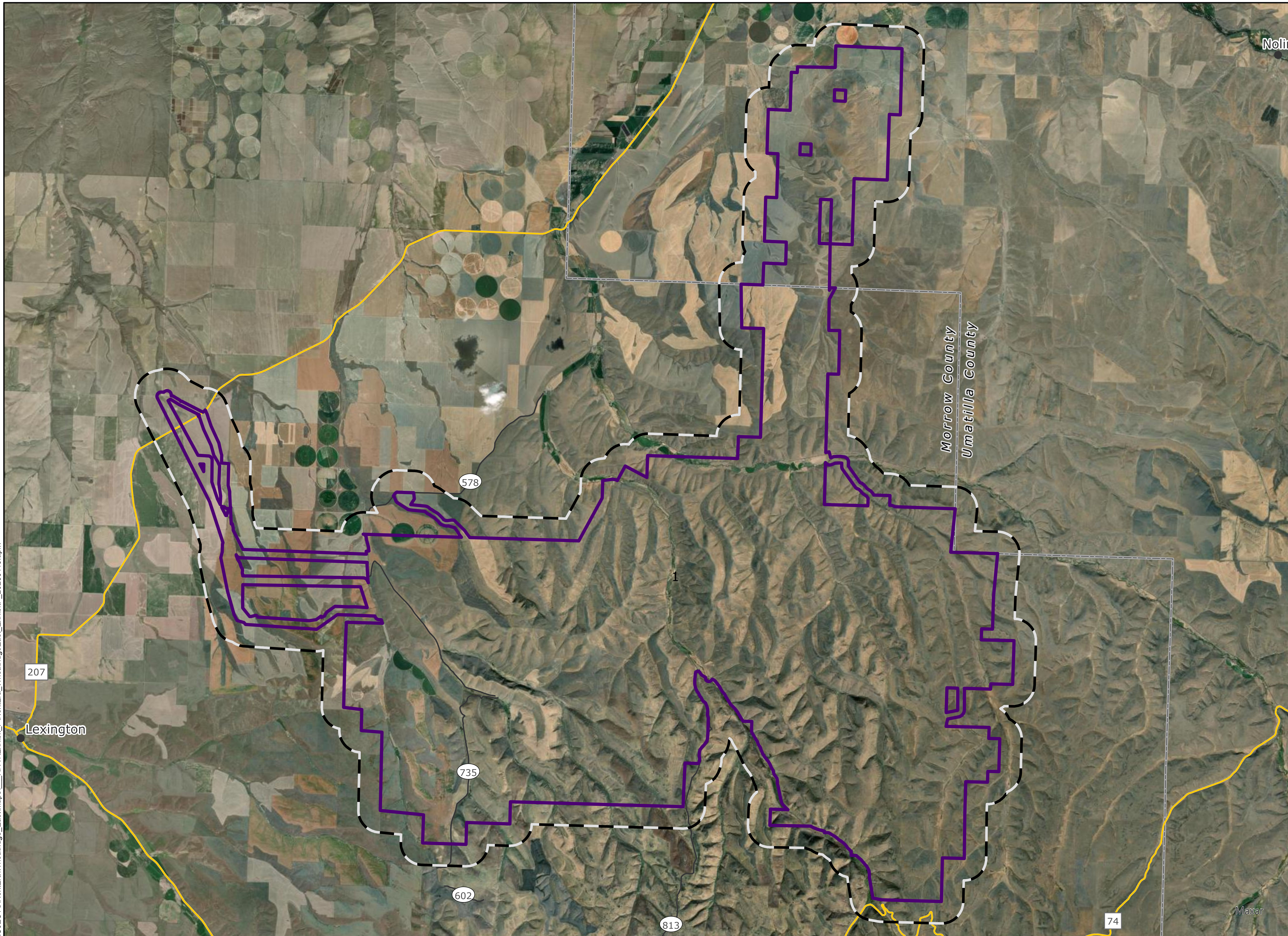


Wheatridge Renewable Energy Facility East

Figure P-1
Analysis Area for Fish and Wildlife Habitat

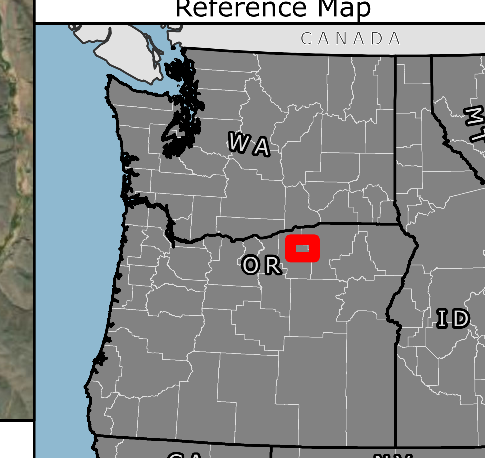
MORROW AND UMATILLA COUNTIES, OR

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

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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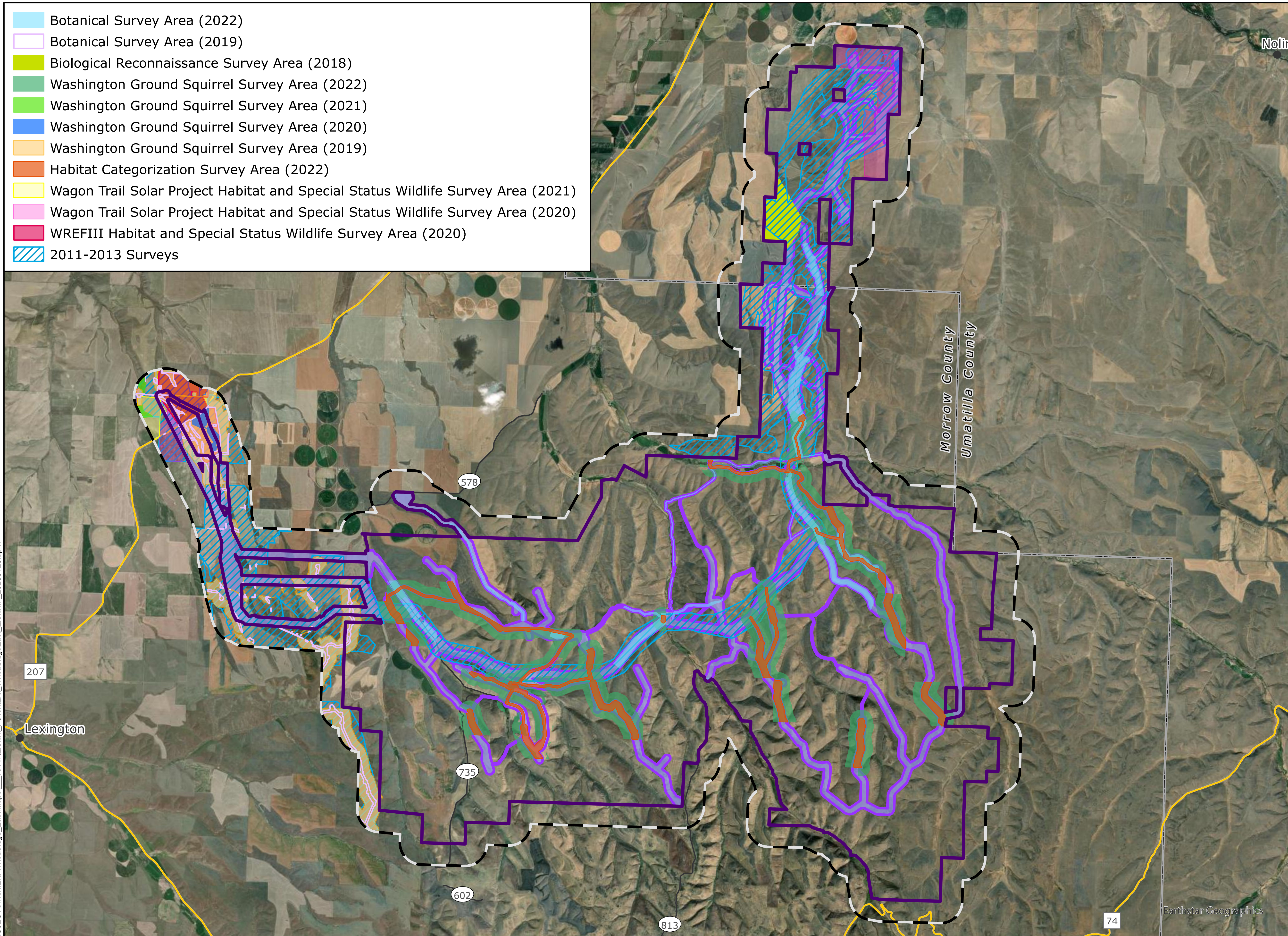

Wheatridge Renewable Energy Facility East

Figure P-2 Habitat and Wildlife Survey Areas

MORROW AND UMATILLA COUNTIES, OR

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

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map

CANADA
WA
MT
OR
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CA
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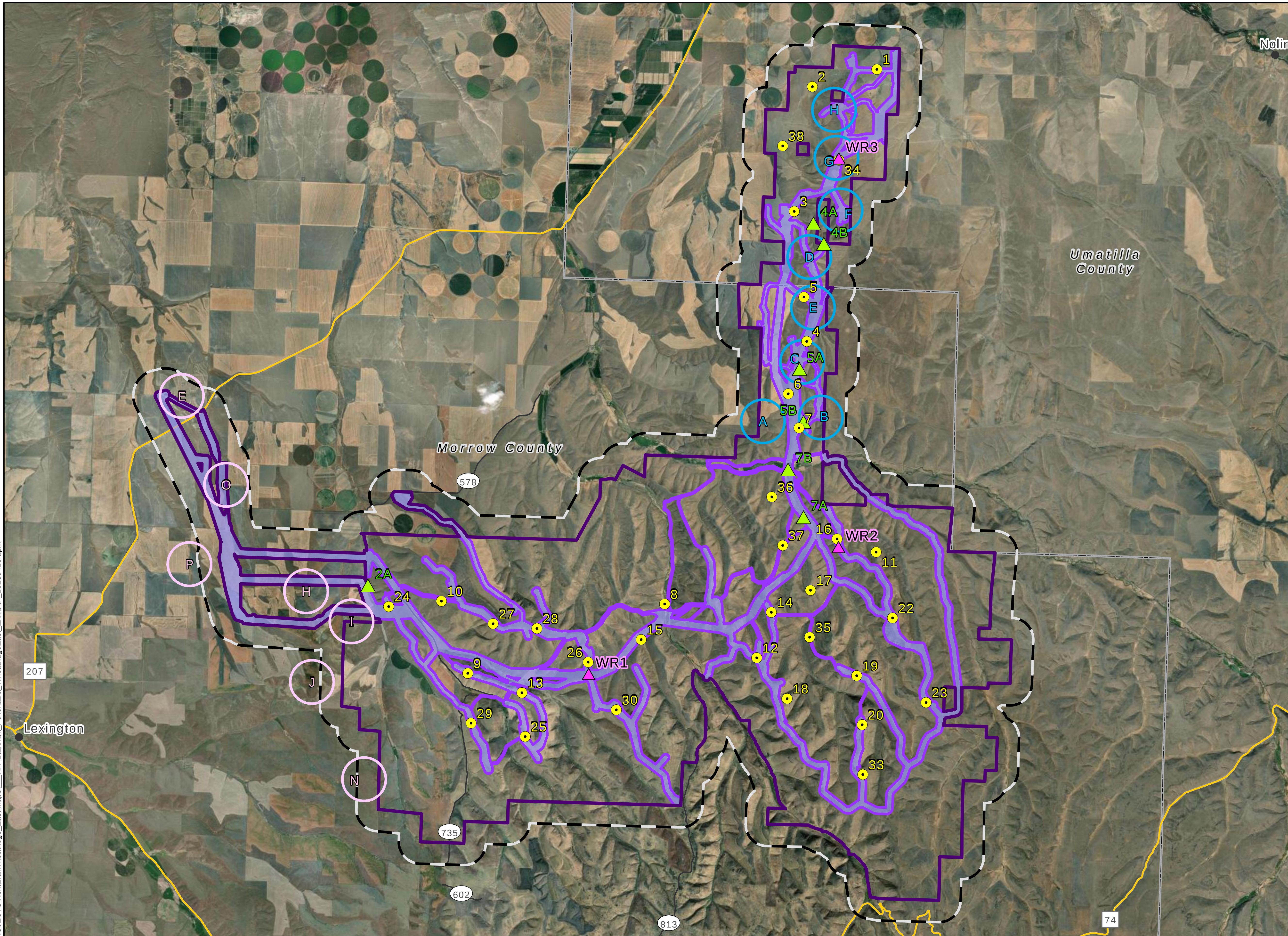
Figure P-3 is confidential and submitted under a separate cover



Wheatridge Renewable Energy Facility East

Figure P-4
Avian Use and Bat Detector Survey Locations (2011-2022)

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)
- Wheatridge East Avian Use Survey Plots (2011-2012)
- Wheatridge West Avian Use Survey Plots (2011-2012)

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map

CANADA WA MT OR ID CA NV

1:135,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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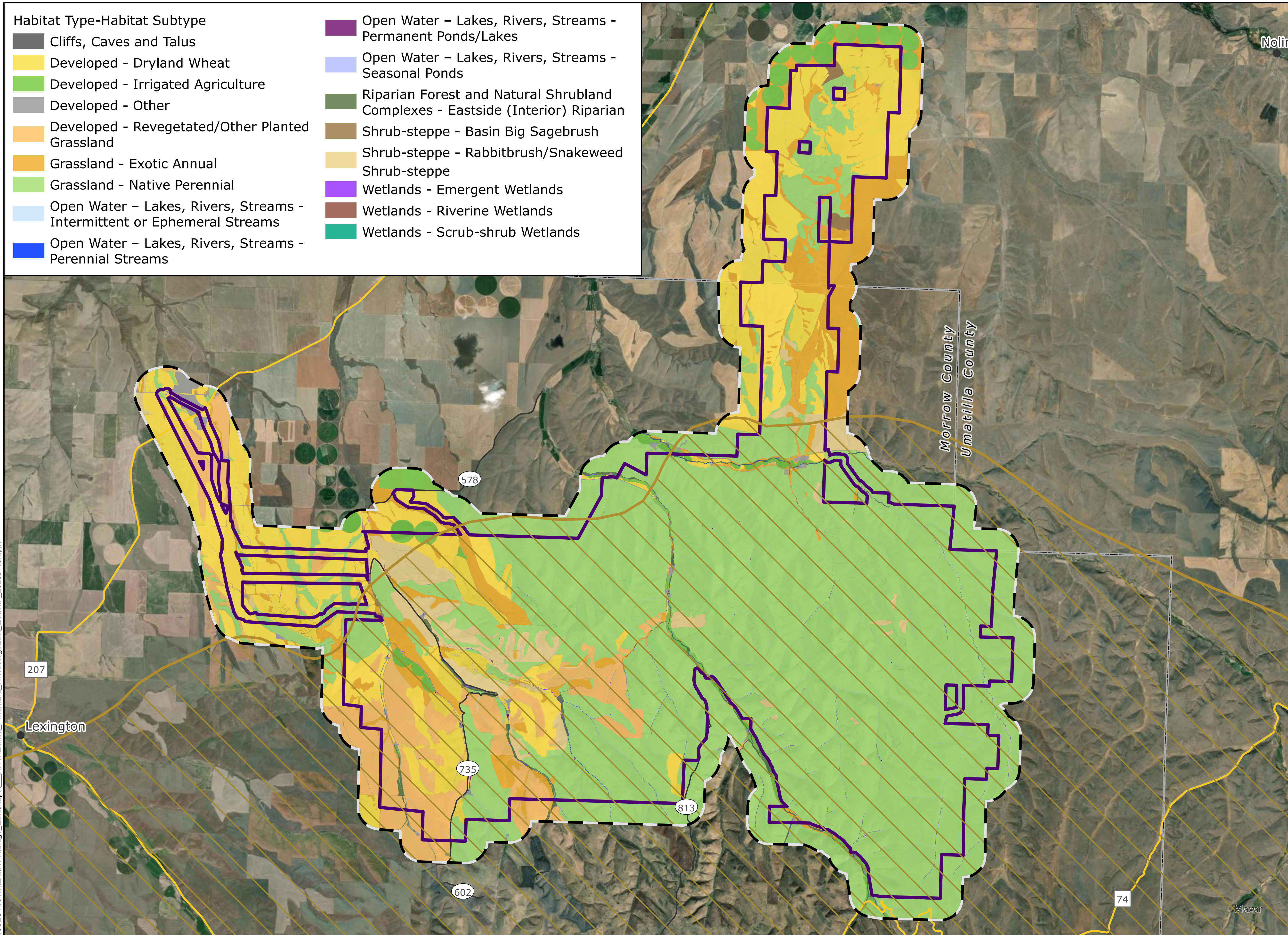


Wheatridge Renewable Energy Facility East

Figure P-5 Habitat Types in the Analysis Area

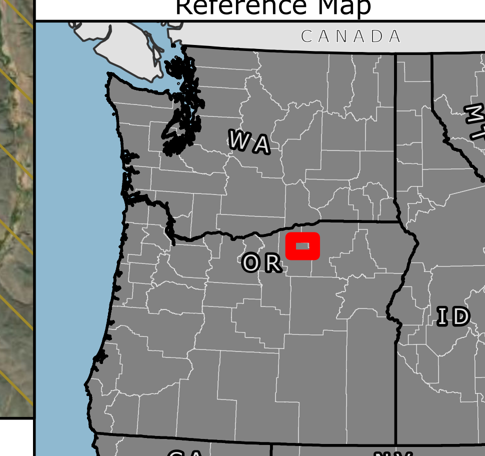
MORROW AND UMATILLA COUNTIES, OR

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

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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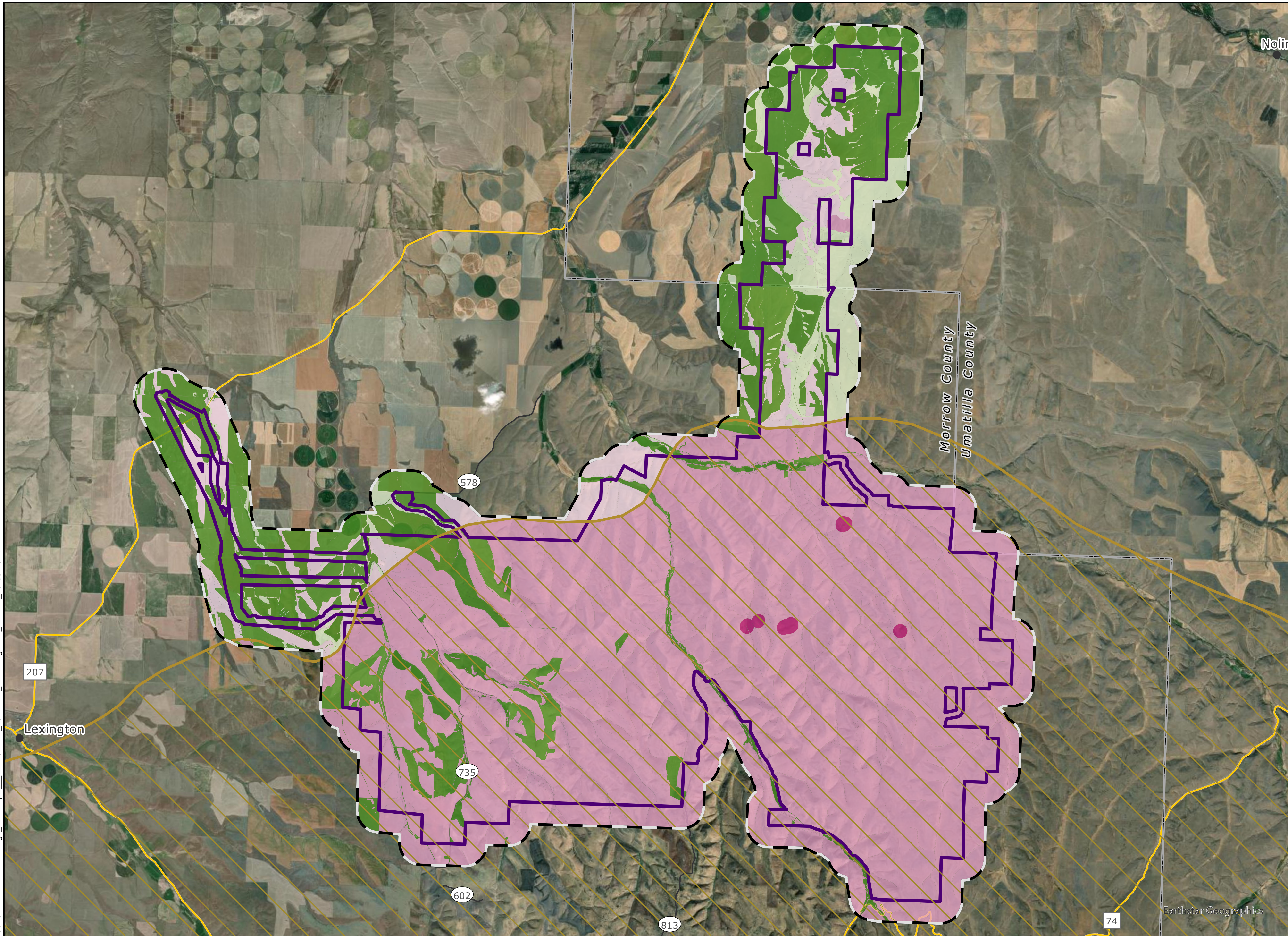

Wheatridge Renewable Energy Facility East

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
- 6

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map

1:135,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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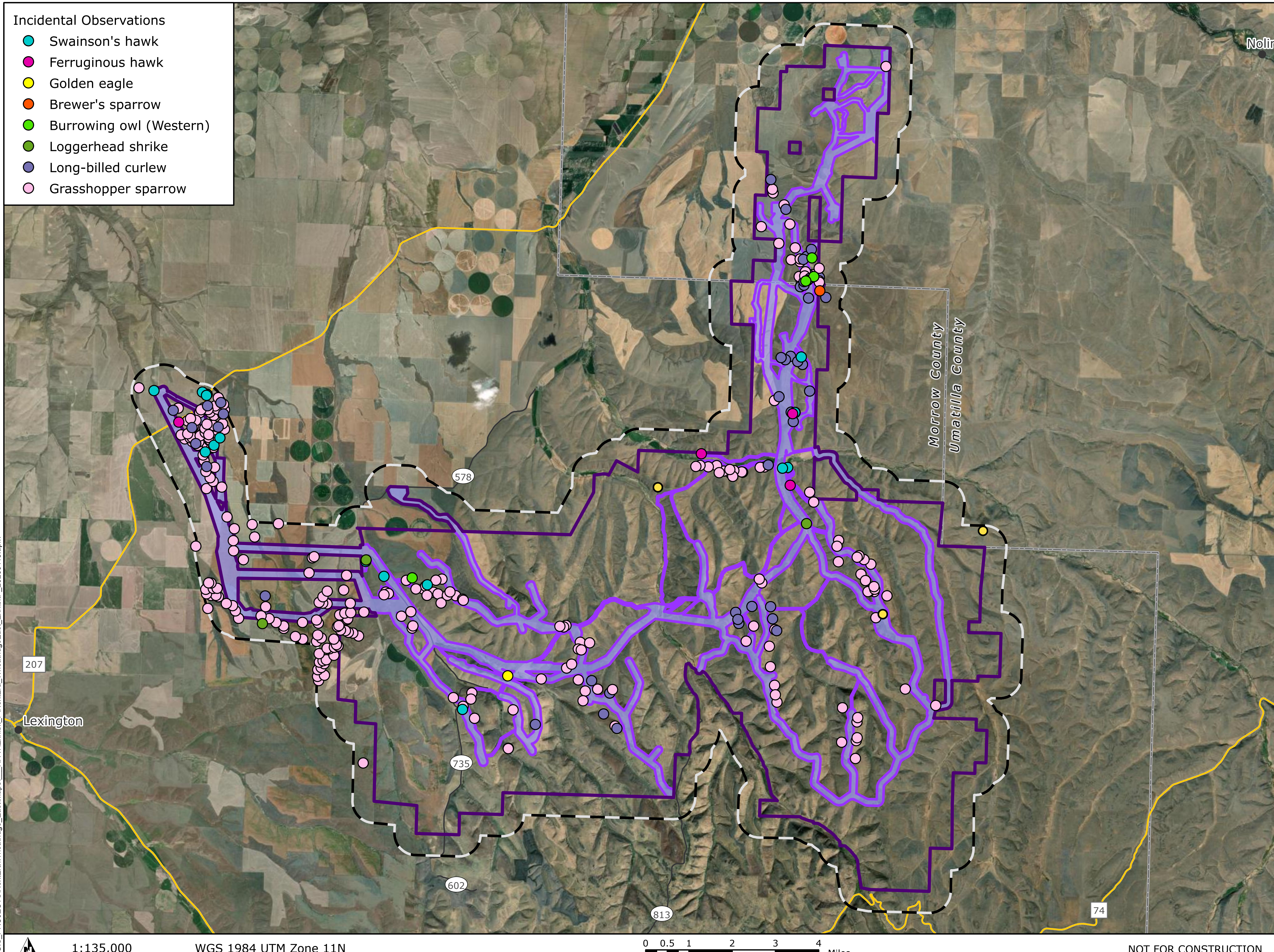
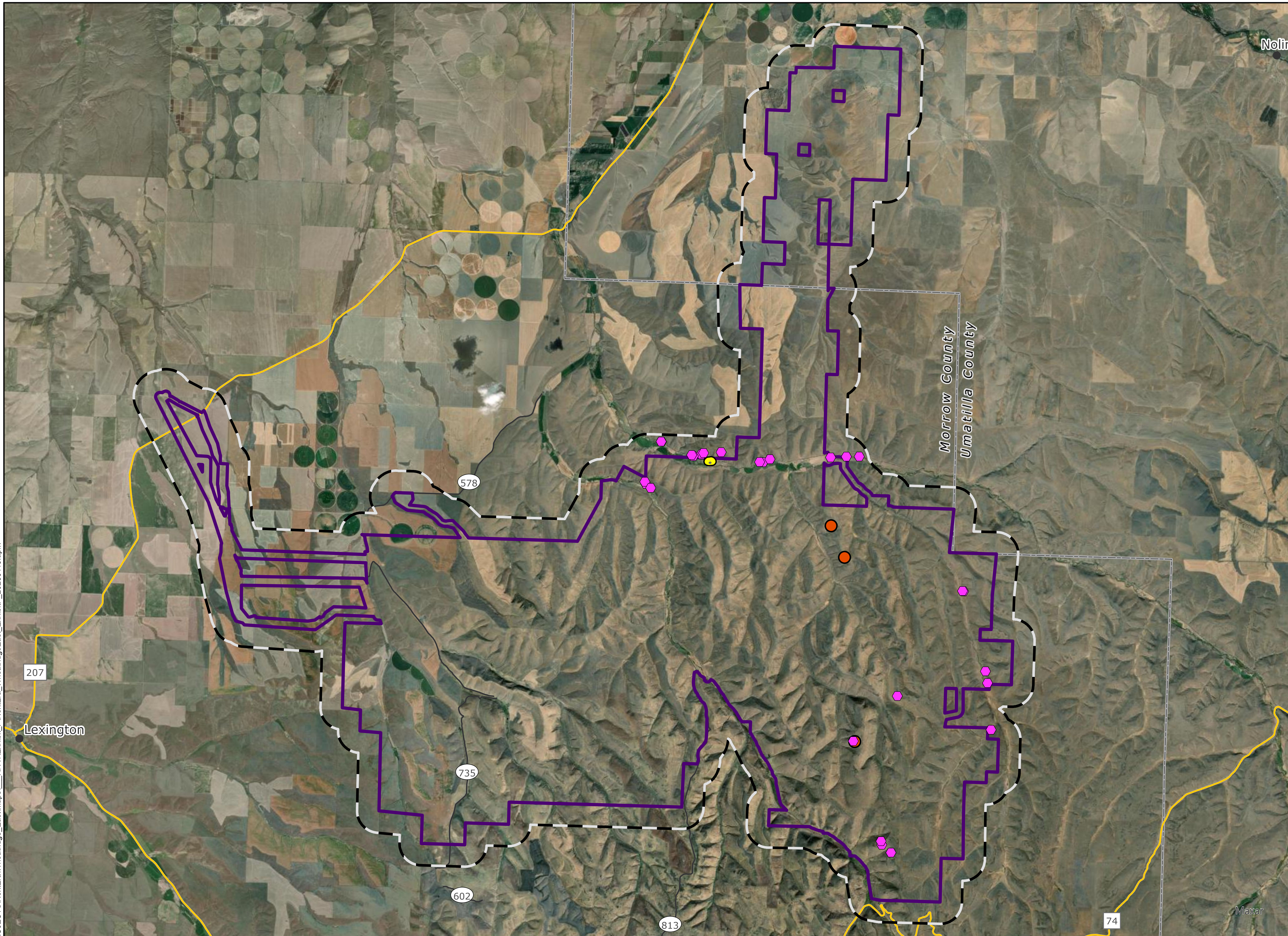
Wheatridge Renewable Energy Facility East

Figure P-7 Detections of Special Status Wildlife Species (2011-2022)

MORROW AND UMATILLA COUNTIES, OR





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

TETRA TECH

NEXTera ENERGY RESOURCES

1:135,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Attachment P-1. Biological Survey Reports

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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.

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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

Tetra Tech, Inc.

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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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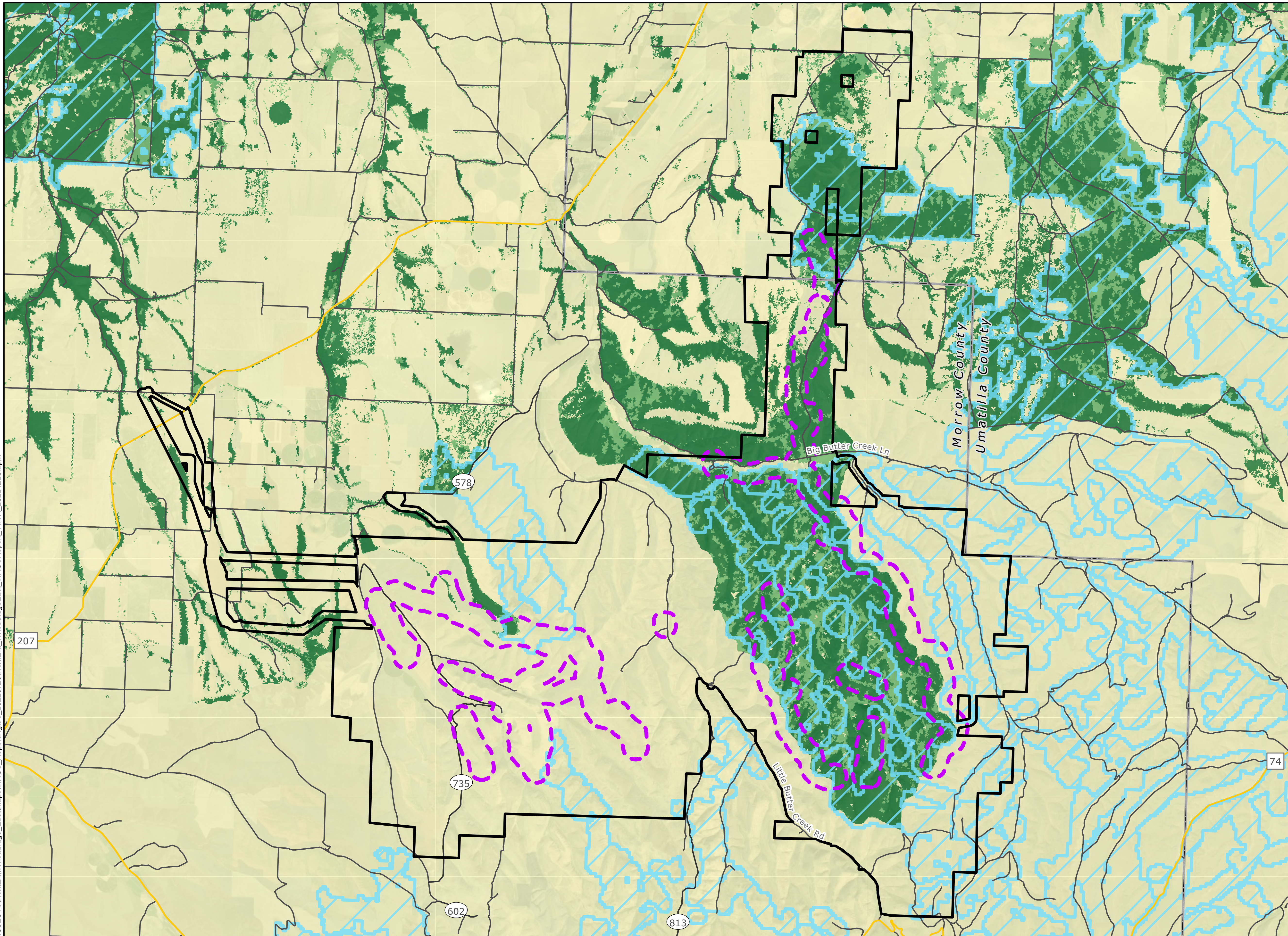
Wheatridge Renewable Energy Facility East

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]

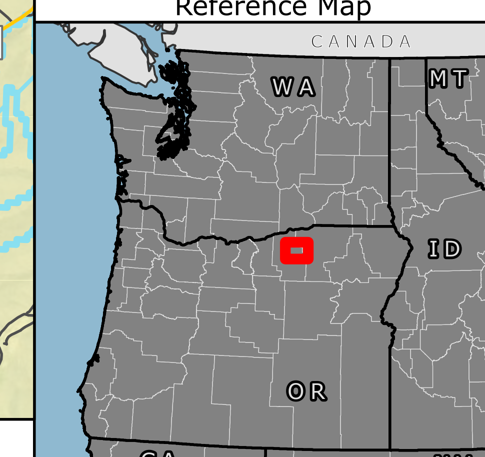
- None
- Poor
- Fair
- Good

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

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



1:130,000 WGS 1984 UTM Zone 11N

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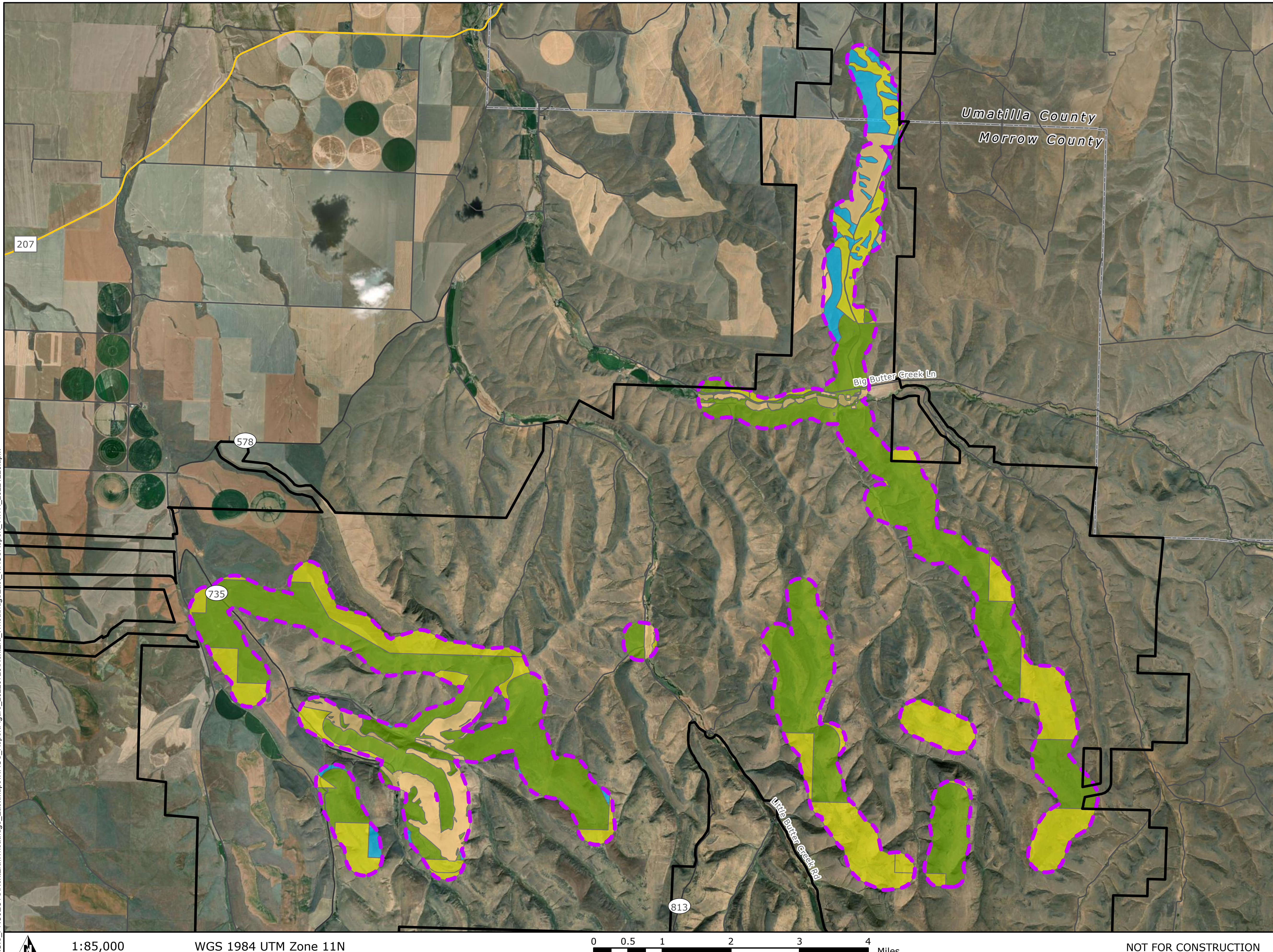

Wheatridge Renewable Energy Facility East

Figure 2
Washington Ground Squirrel Survey Area

MORROW AND UMATILLA COUNTIES, OR

- 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

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

TETRA TECH

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Table of Contents

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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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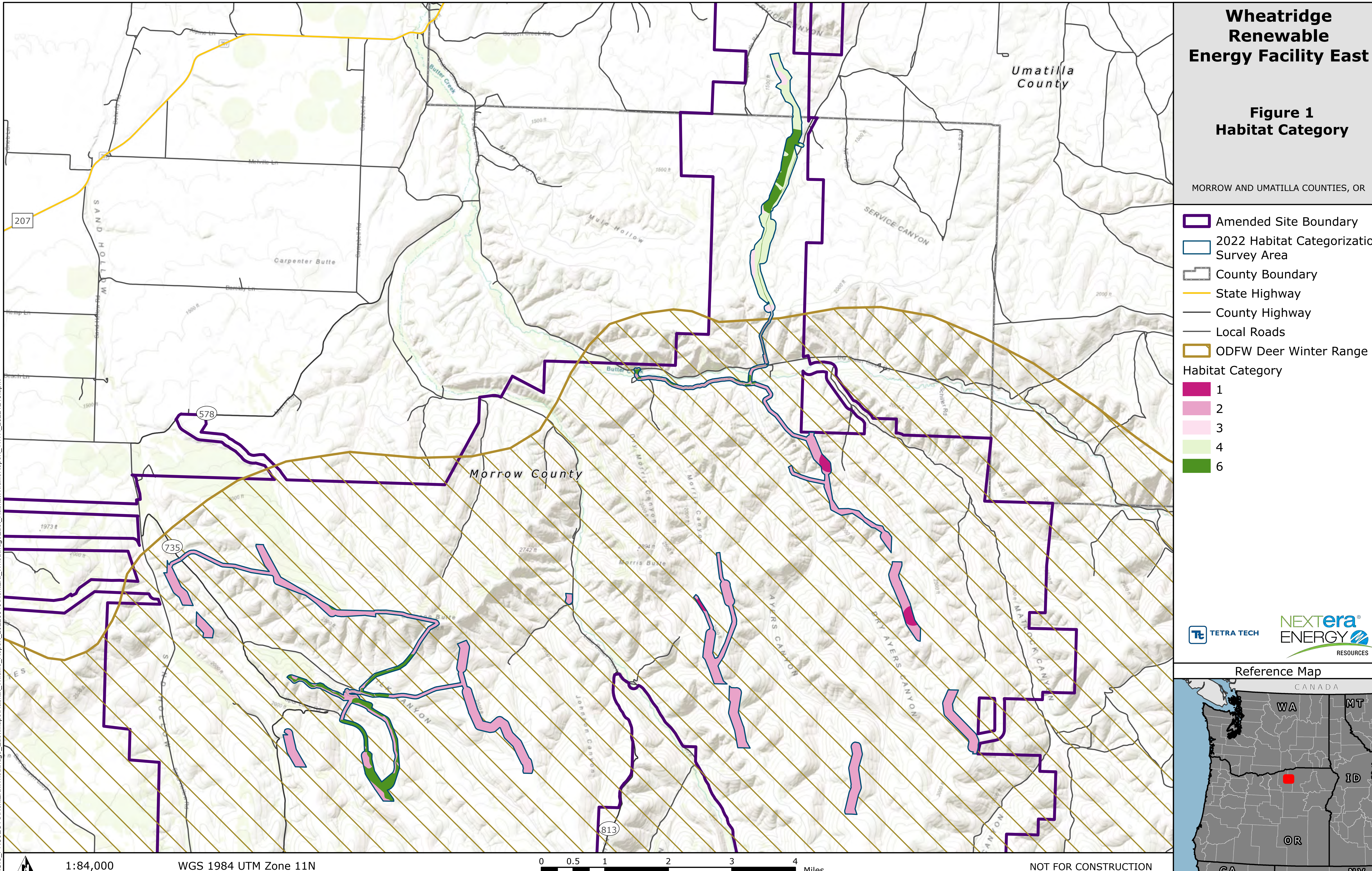
Wheatridge Renewable Energy Facility East

Figure 1
Habitat Category

MORROW AND UMATILLA COUNTIES, OR



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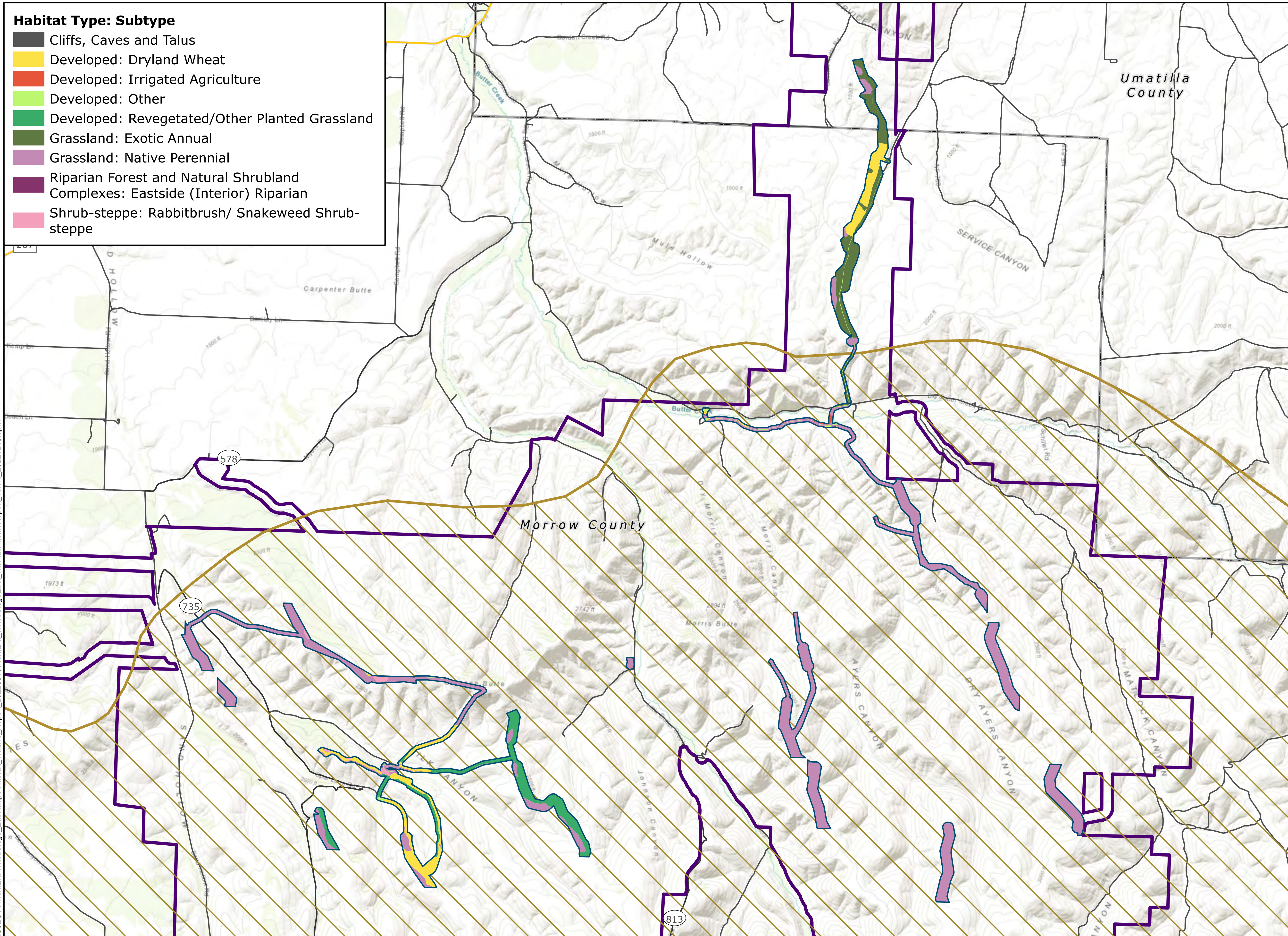

Wheatridge Renewable Energy Facility East

Figure 2
Habitat Subtype

MORROW AND UMATILLA COUNTIES, OR

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

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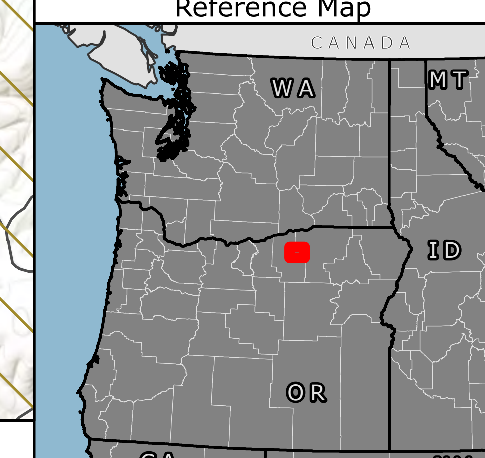
Reference Map



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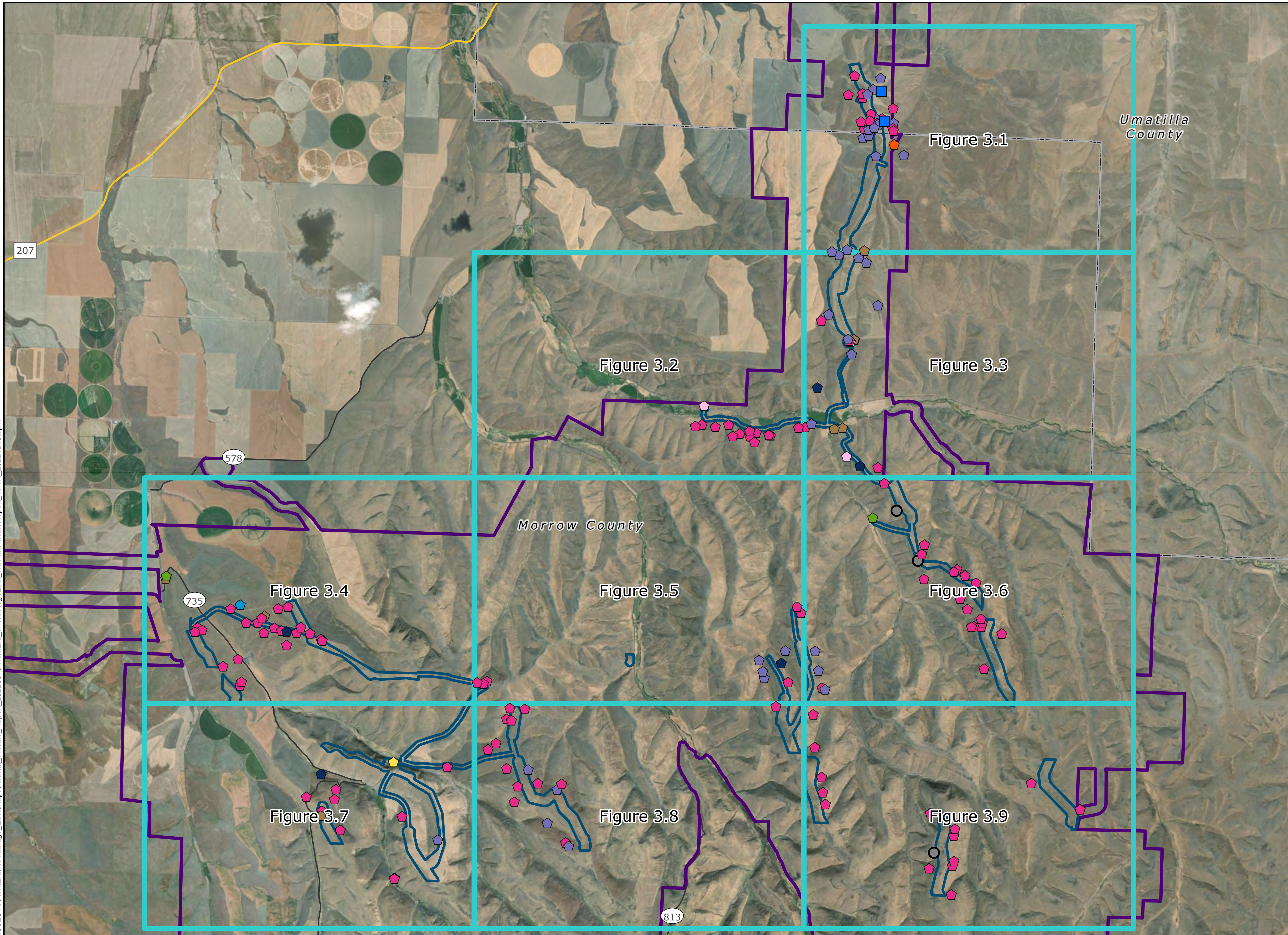

Wheatridge Renewable Energy Facility East

Figure 3
Special Status Species and Special Features

MORROW AND UMATILLA COUNTIES, OR

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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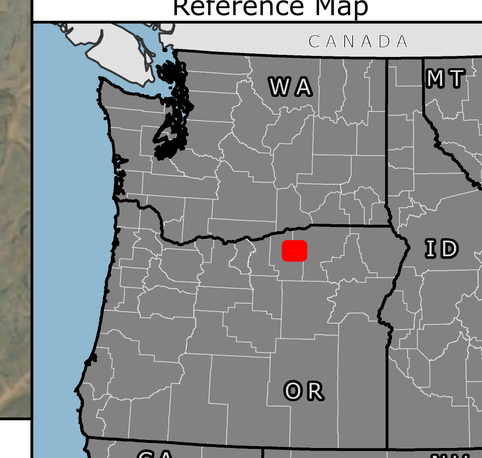
Reference Map



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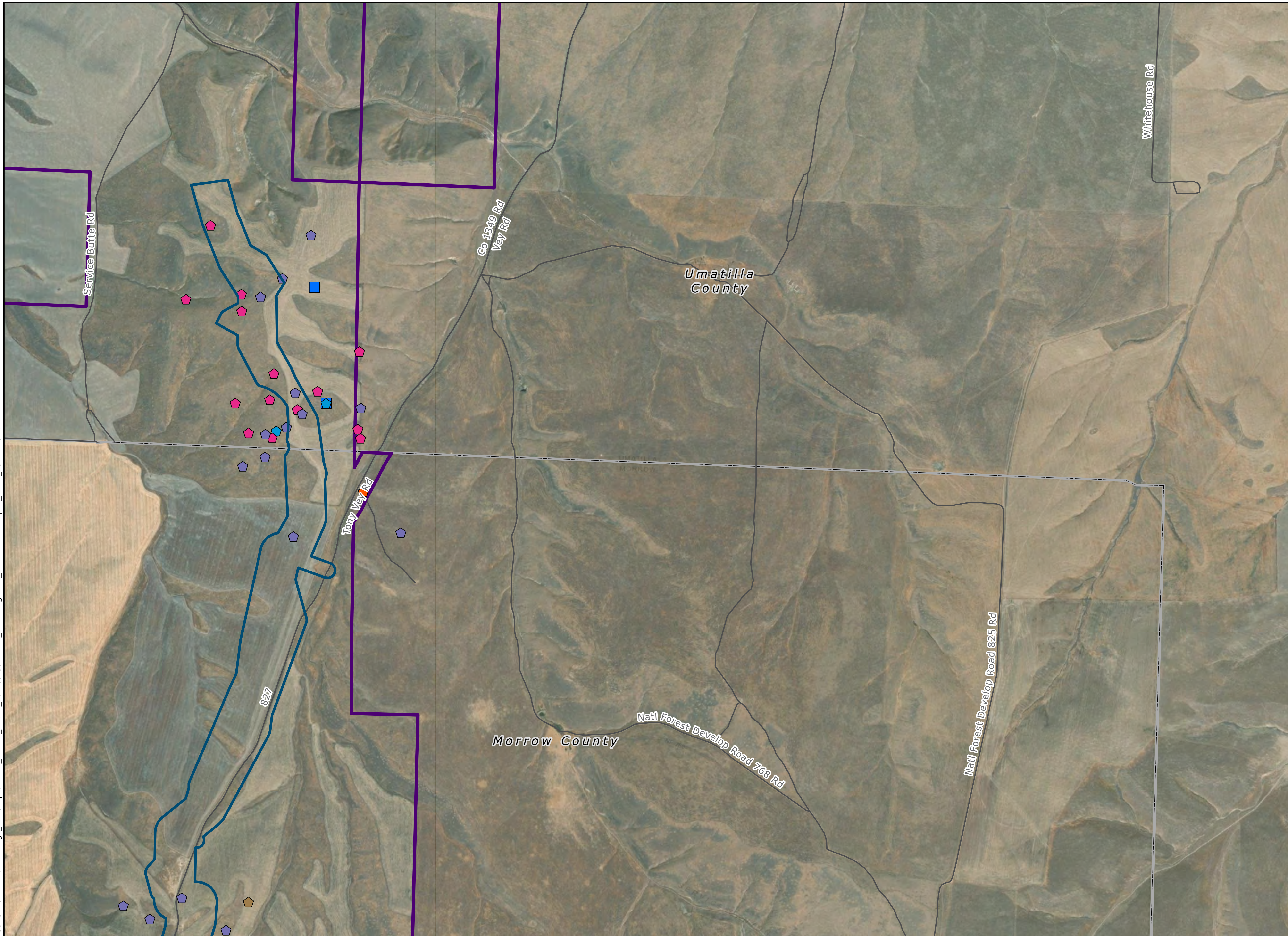

Wheatridge Renewable Energy Facility East

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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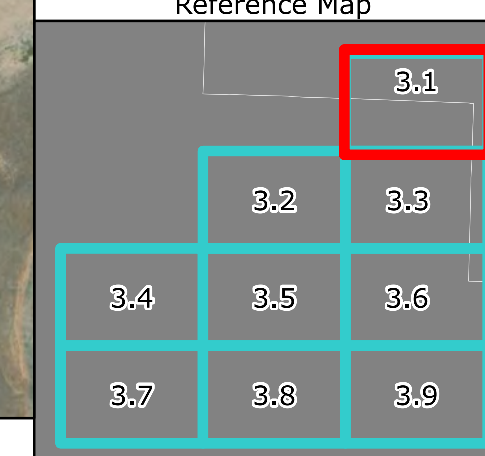
Reference Map



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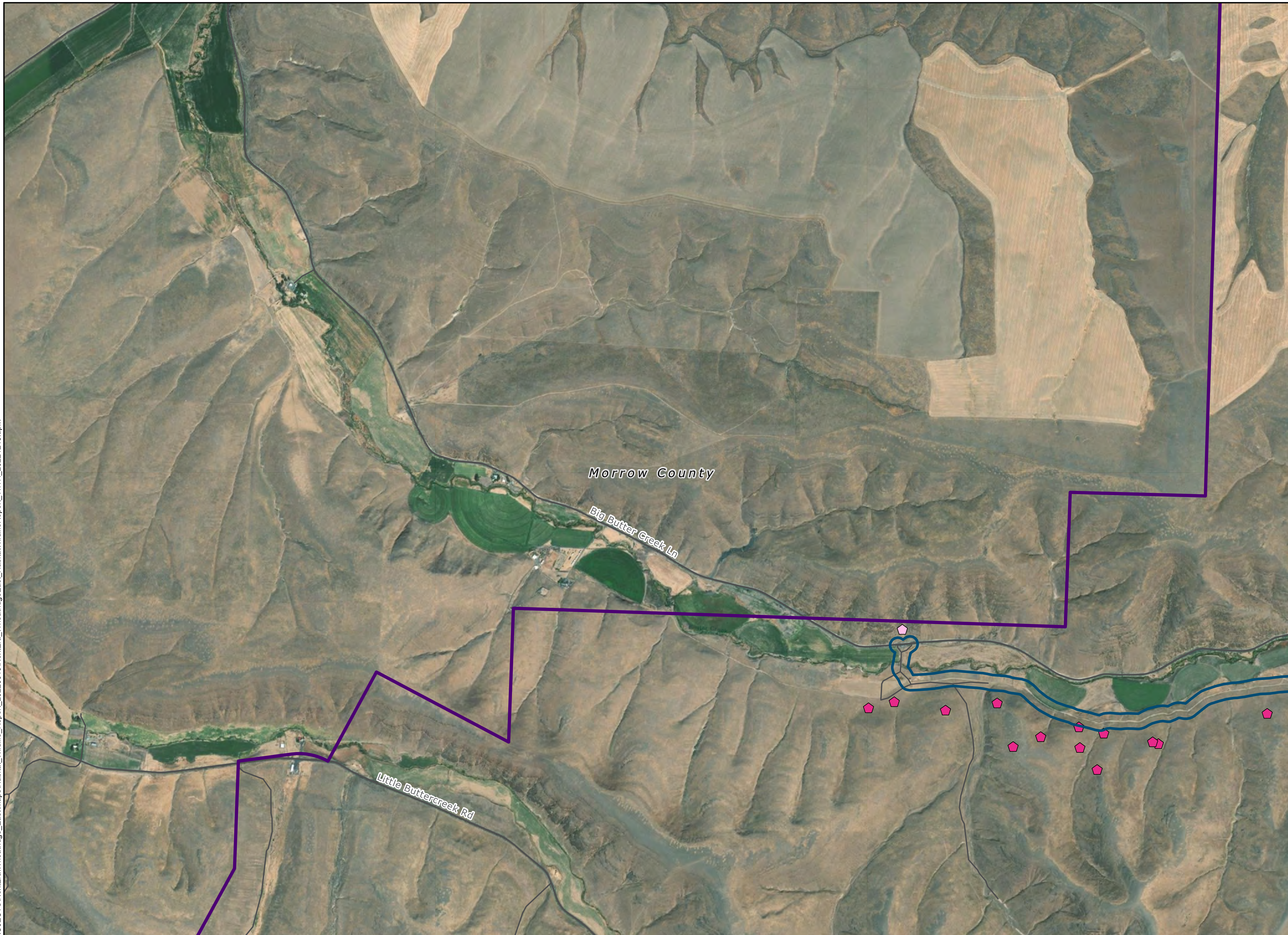
Wheatridge Renewable Energy Facility East

Figure 3.2
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

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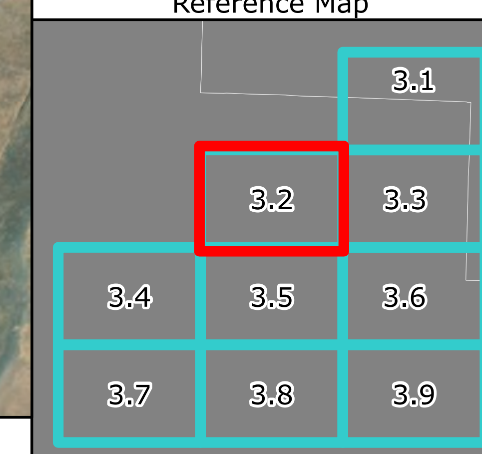
Reference Map



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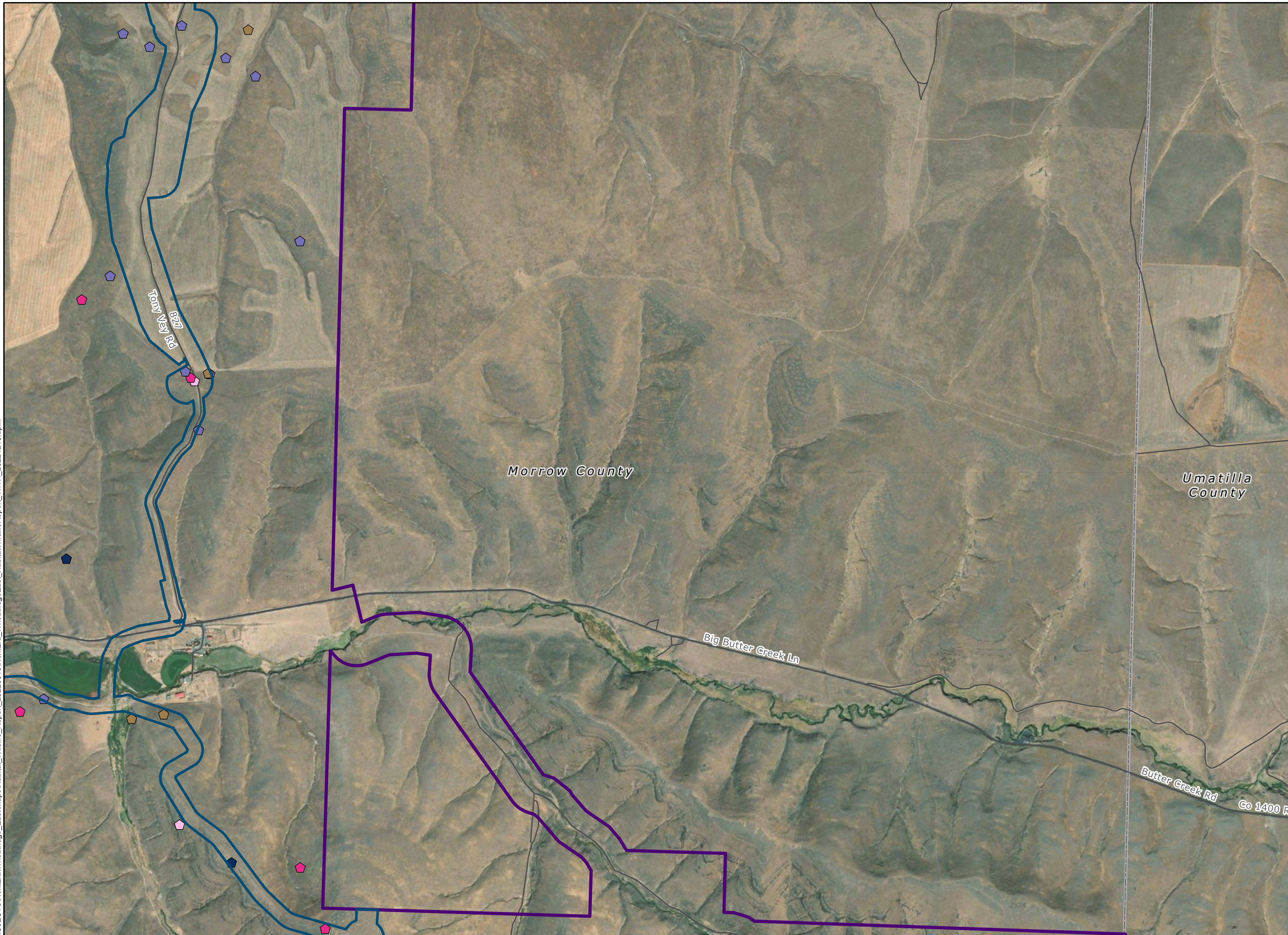
Wheatridge Renewable Energy Facility East

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

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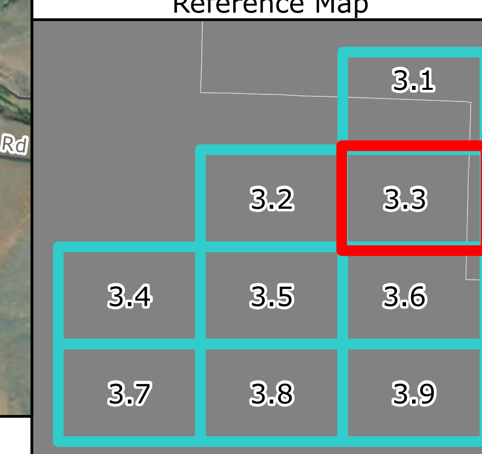
Reference Map



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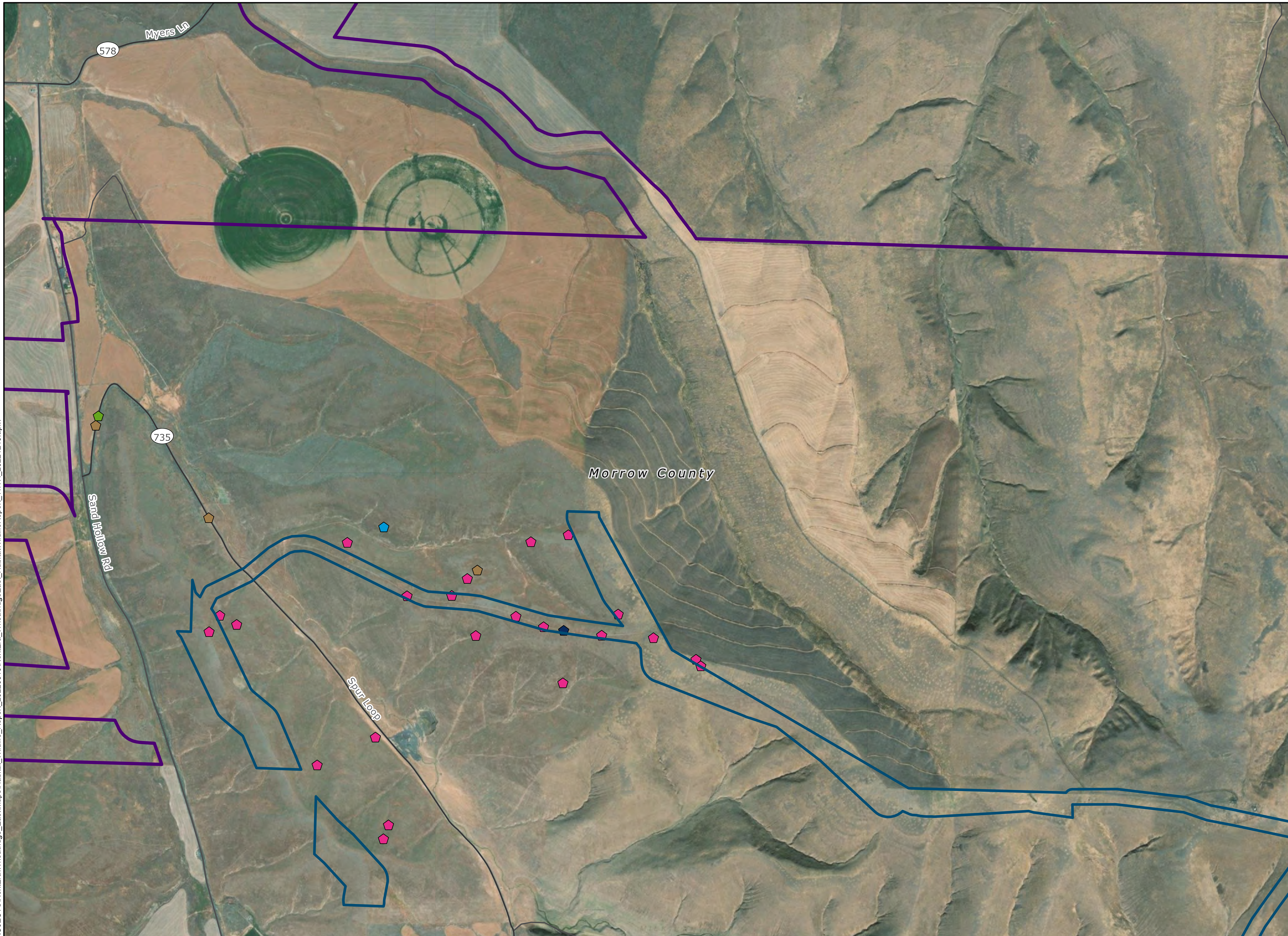


Wheatridge Renewable Energy Facility East

Figure 3.4
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

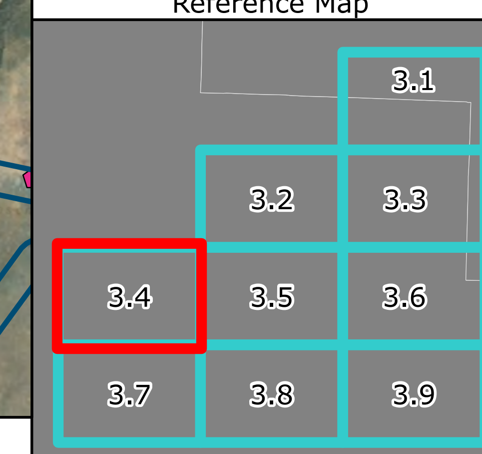
Amended Site Boundary
2022 Habitat Categorization Survey Area
County Highway
Local Roads
County Boundary

Special Status Species

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

TETRA TECH
NEXTera ENERGY RESOURCES

Reference Map



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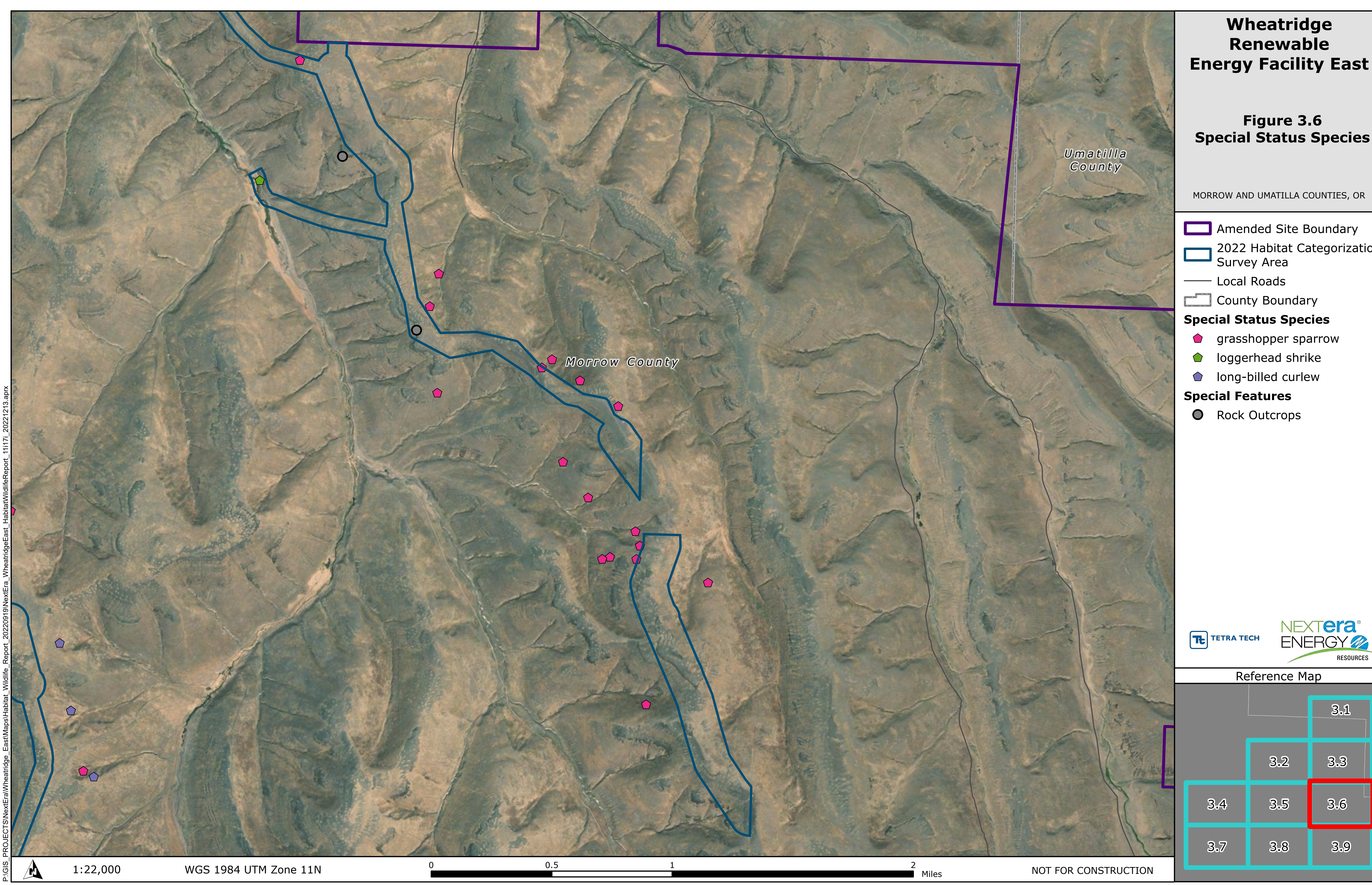

Wheatridge Renewable Energy Facility East

Figure 3.6
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

- 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

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

		3.1
	3.2	3.3
3.4	3.5	3.6
3.7	3.8	3.9

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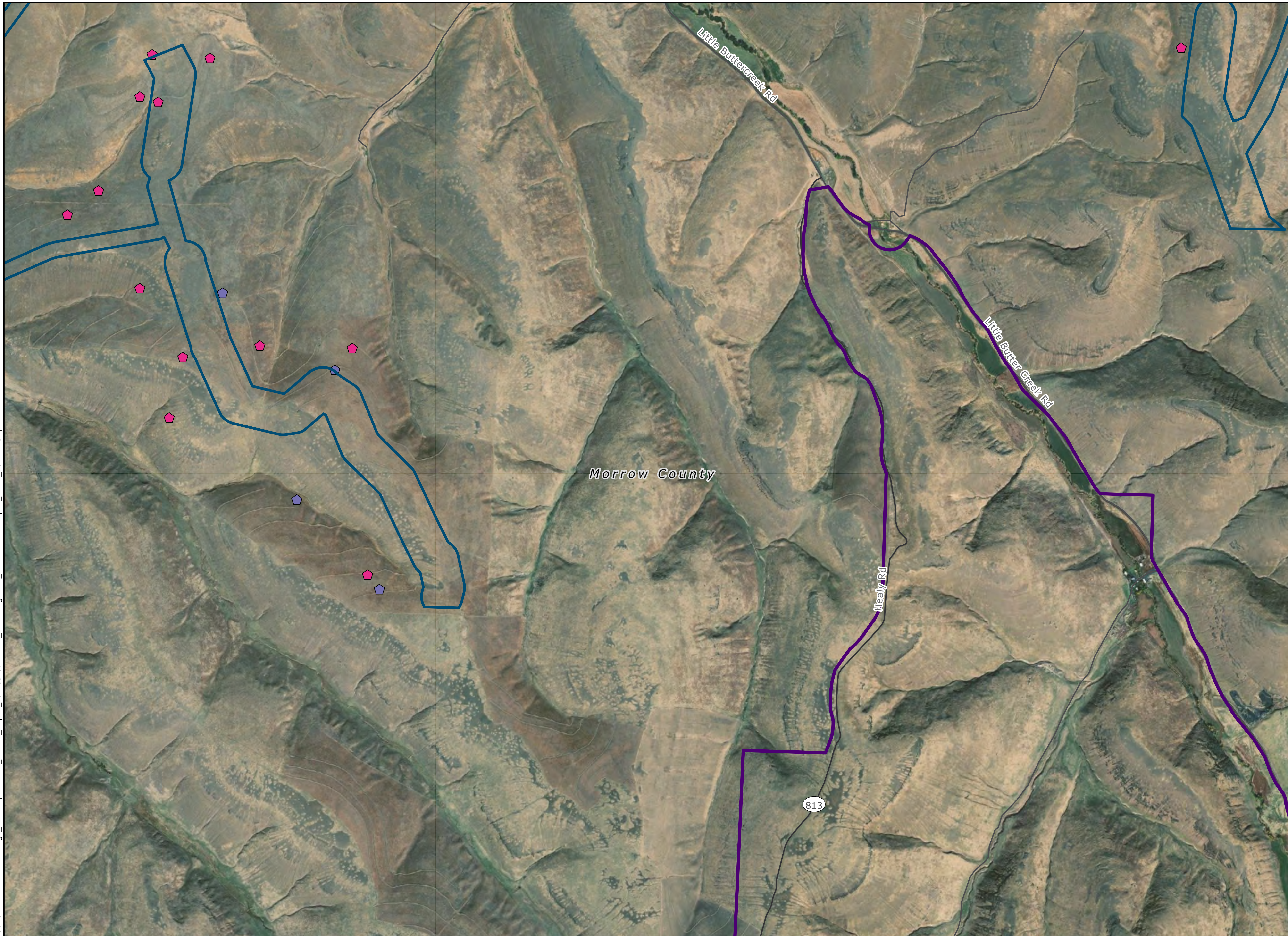


Wheatridge Renewable Energy Facility East

Figure 3.8
Special Status Species

MORROW AND UMATILLA COUNTIES, OR

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

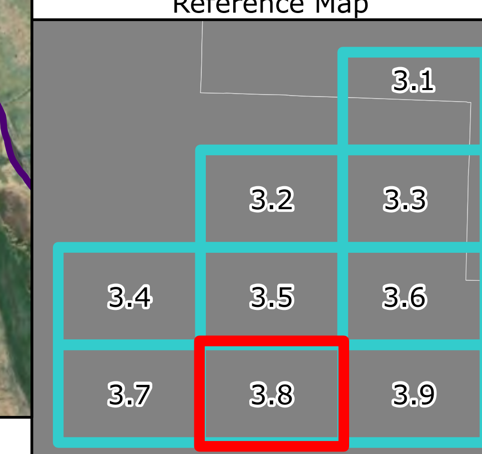
Special Status Species

grasshopper sparrow
long-billed curlew

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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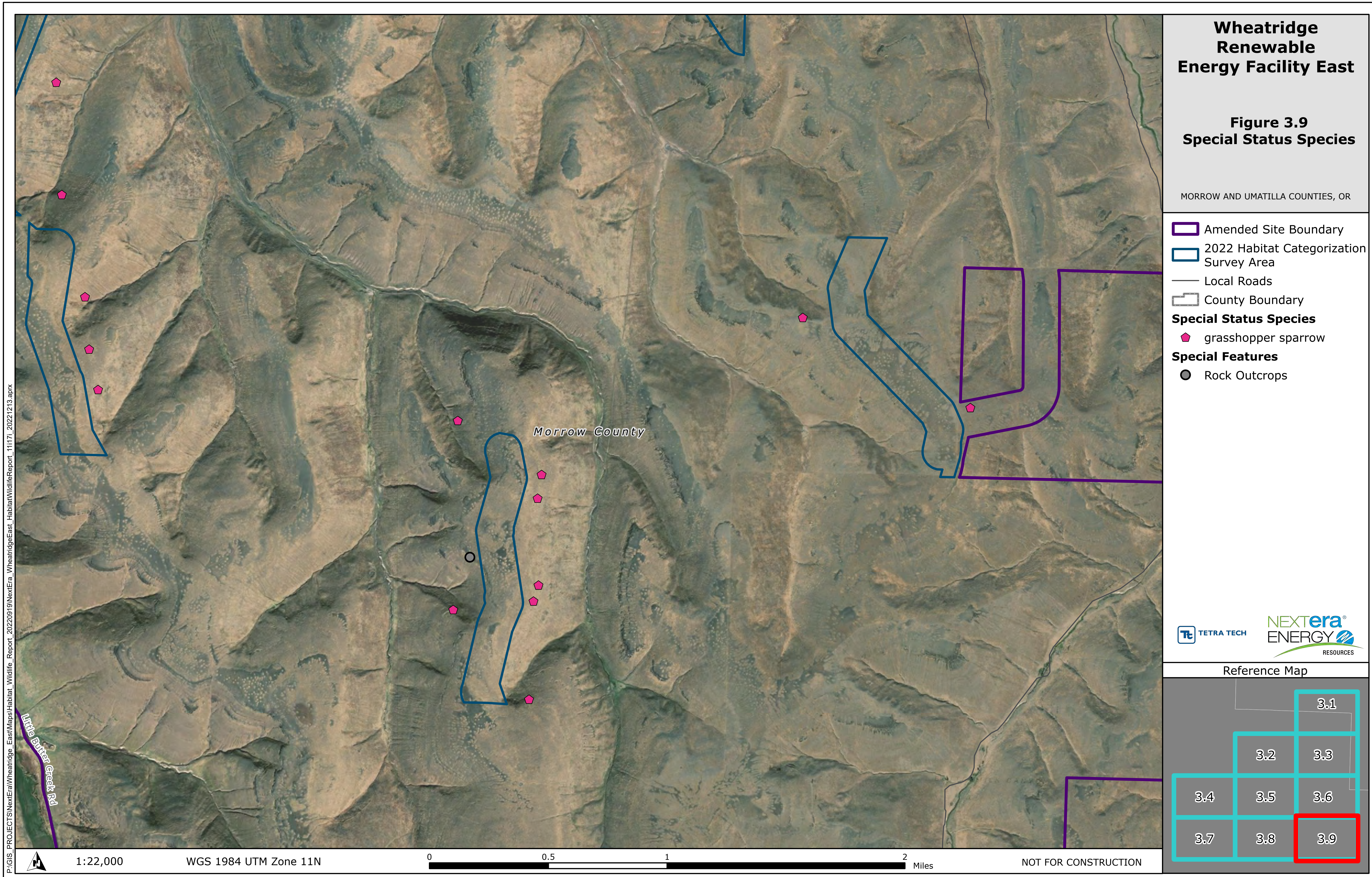
Morrow County
Little Butter Creek Rd
Wheatridge Renewable Energy Facility East
Figure 3.9
Special Status Species
MORROW AND UMATILLA COUNTIES, OR
Amended Site Boundary
2022 Habitat Categorization Survey Area
Local Roads
County Boundary
Special Status Species
grasshopper sparrow
Special Features
Rock Outcrops
TETRA TECH
NEXTera ENERGY RESOURCES
Reference Map
3.1
3.2
3.3
3.4
3.5
3.6
3.7
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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 ____

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

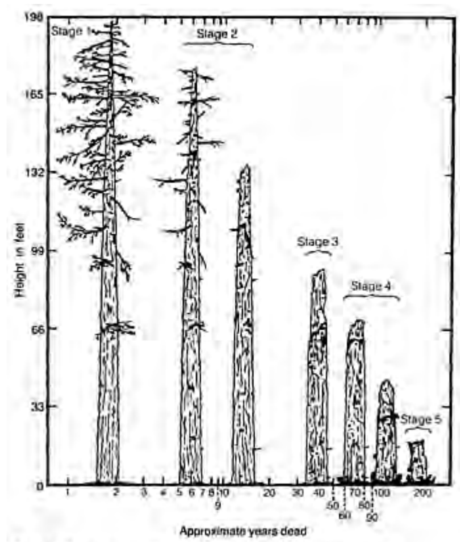


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

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

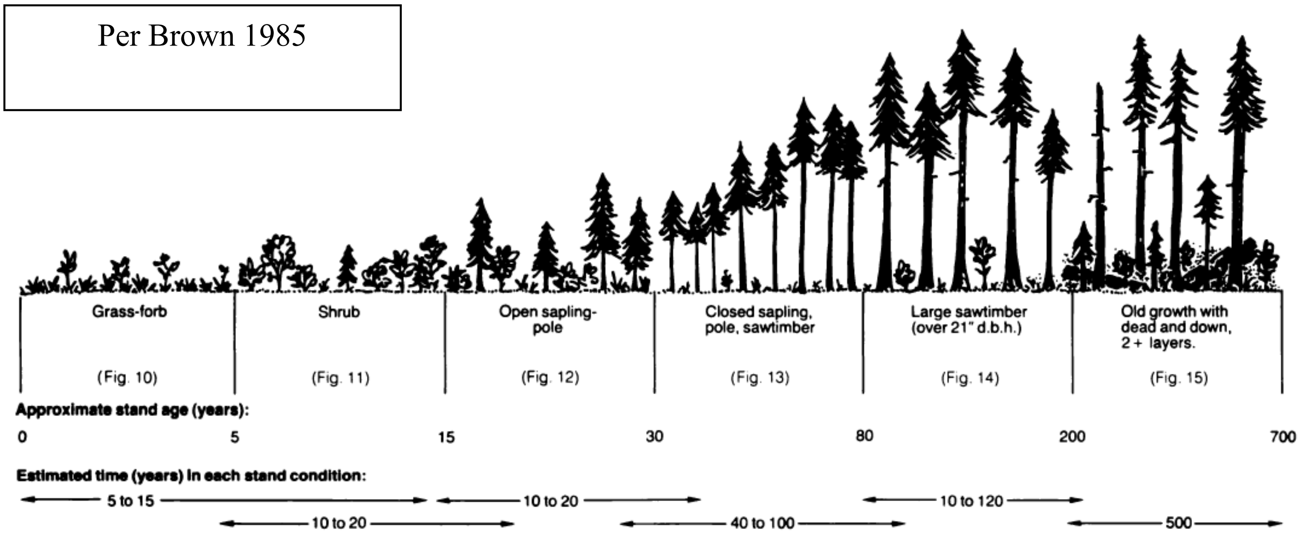
__Recreation, if so what kind? __________ Other (please specify) ________________________________

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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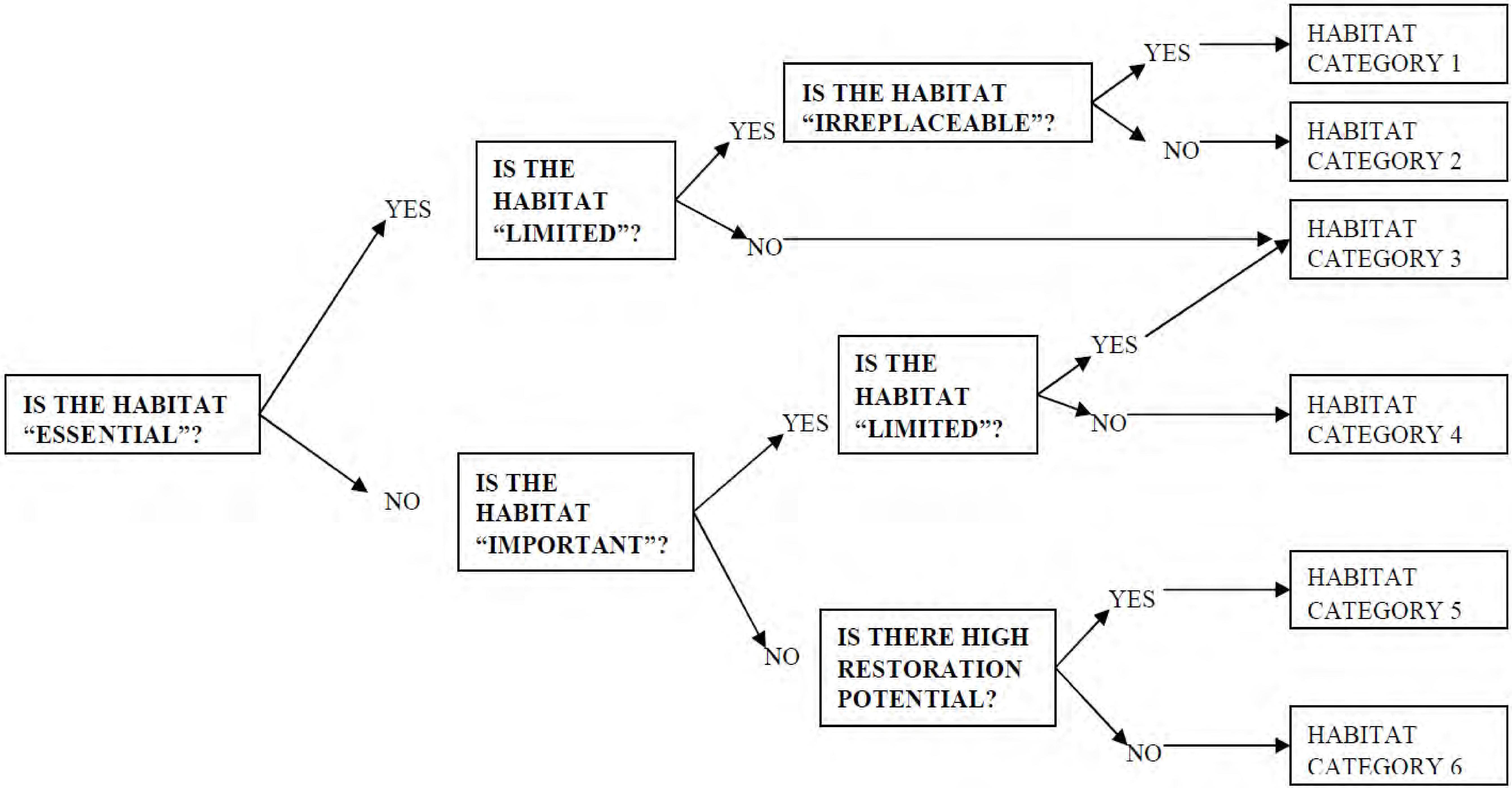
Habitat Type	Habitat Subtype	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
The First Two Rows are Overlays That Automatically Assigns Categories, Based on Species Presence, to One or More of the Habitat Types Described Below							
Active WAGS Colony Overlay applies to habitat types 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.

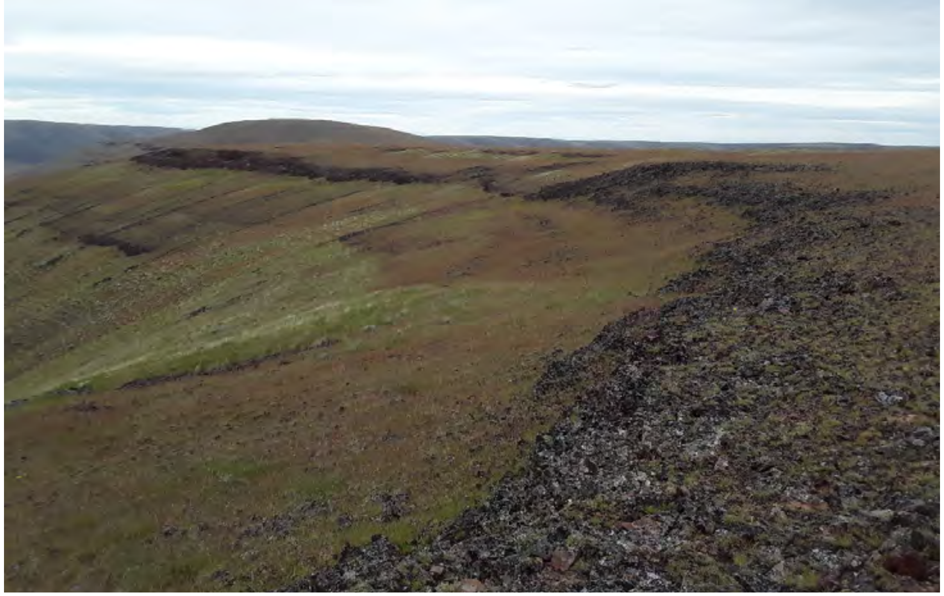

Photo 4. East Side - Category 2 - Grassland: Native Perennial. Rock outcrops along edge of ridgetop. 5/18/2022.

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.

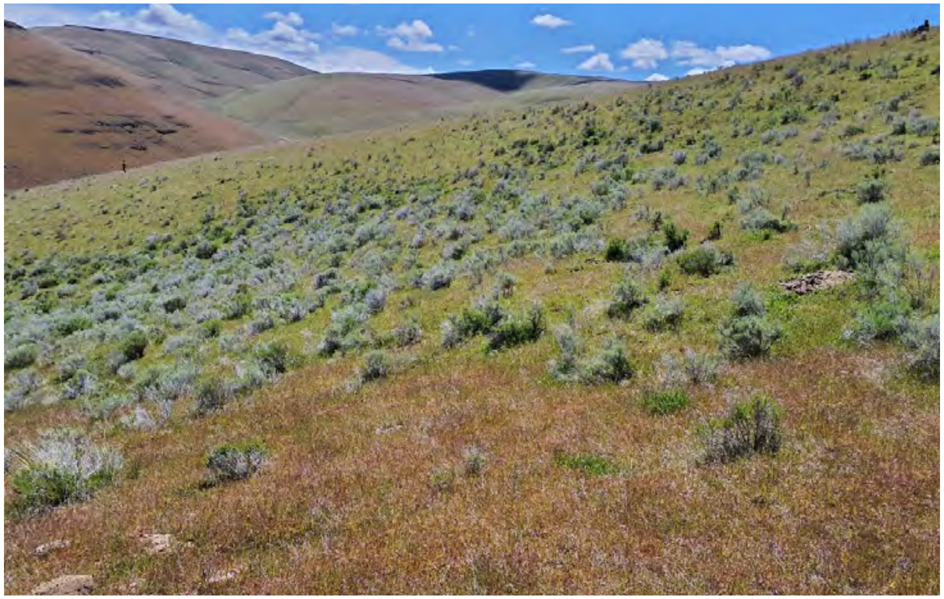

Photo 11. East Side - Category 1 - Shrub-Steppe: Rabbitbrush/Snakeweed. WAGS colony WREE01. 5/10/2022.

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.

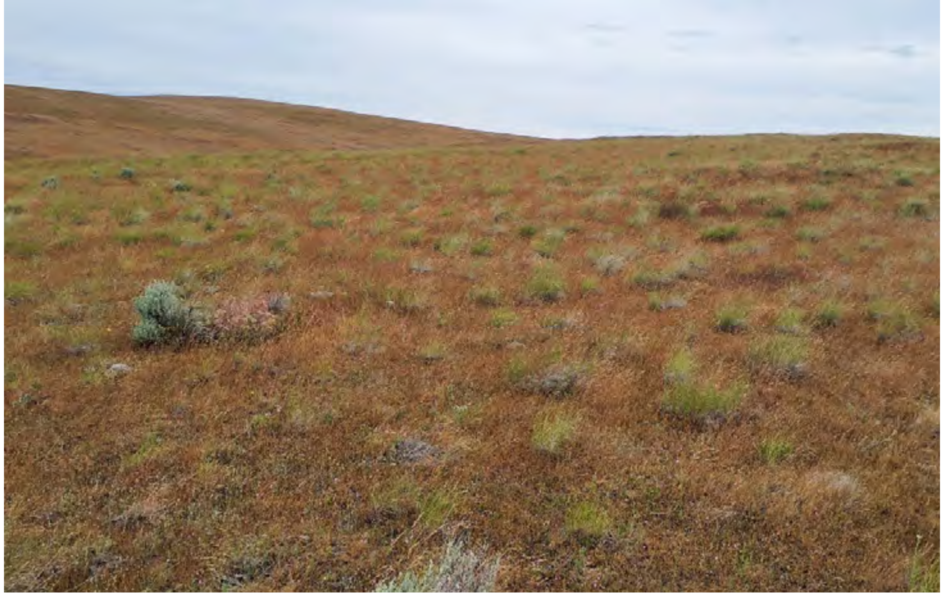

Photo 16. North End - Category 3 - Grassland: Native Perennial. Hilltop with high native composition. 5/23/2022.

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.

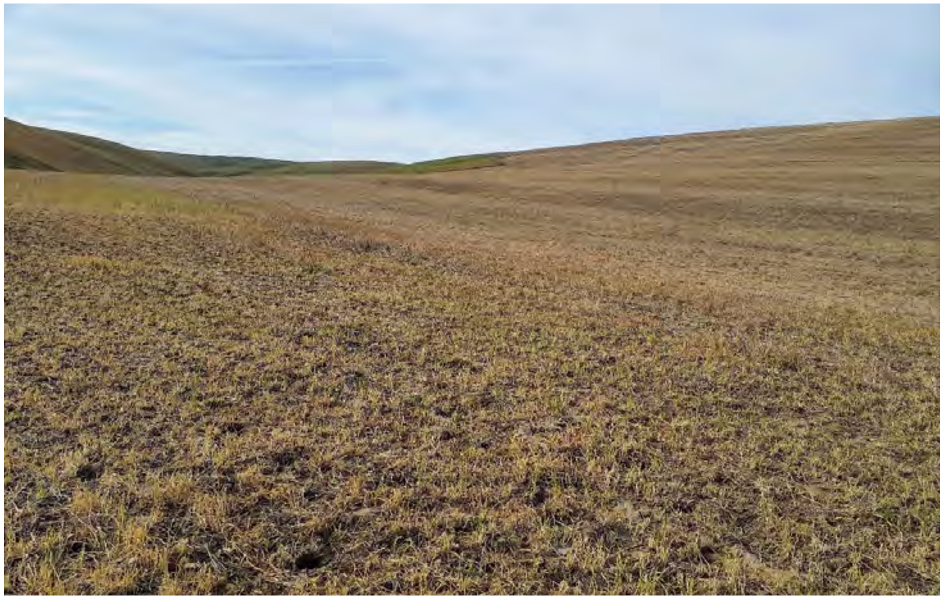

Photo 19. North End - Category 6 - Developed: Dryland Wheat. Stubble field. 5/26/2022.

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.

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

Tetra Tech, Inc.

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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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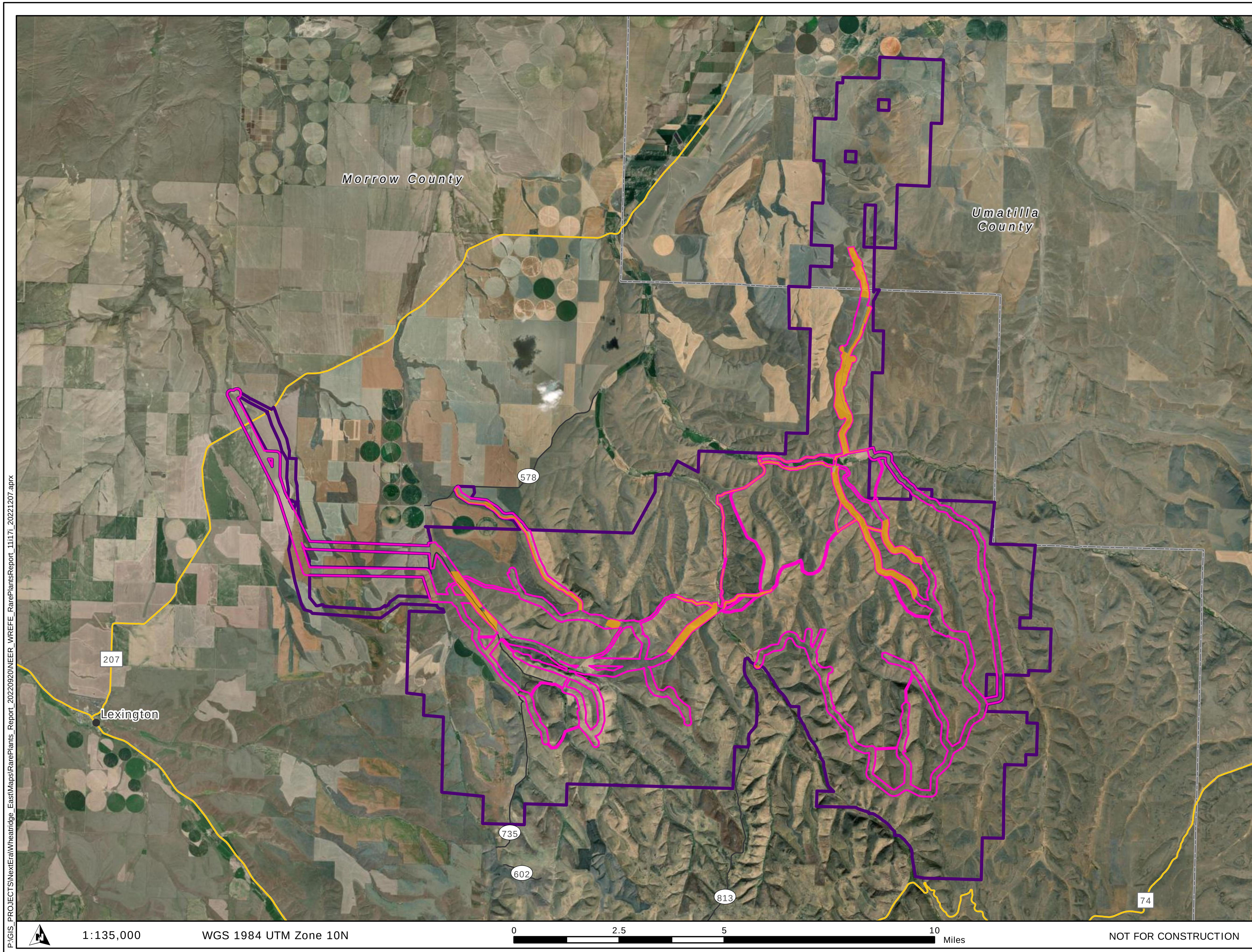
Wheatridge Renewable Energy Facility East

Figure 1
Botanical Survey Area

MORROW AND UMATILLA COUNTIES, OR

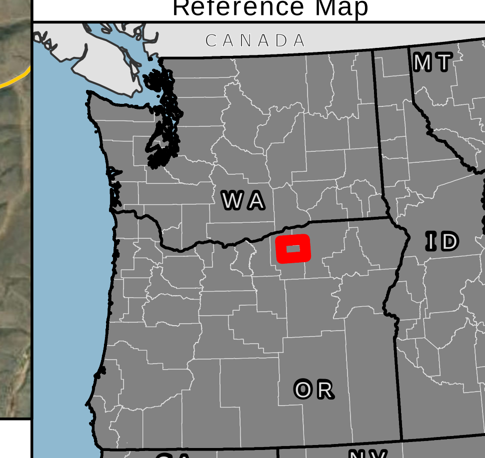


Amended Site Boundary
Botanical Survey Area
Botanical Survey Corridor
City/Town
County Boundary
State Highway
County Highway

TETRA TECH

NEXTera ENERGY RESOURCES

Reference Map



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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.

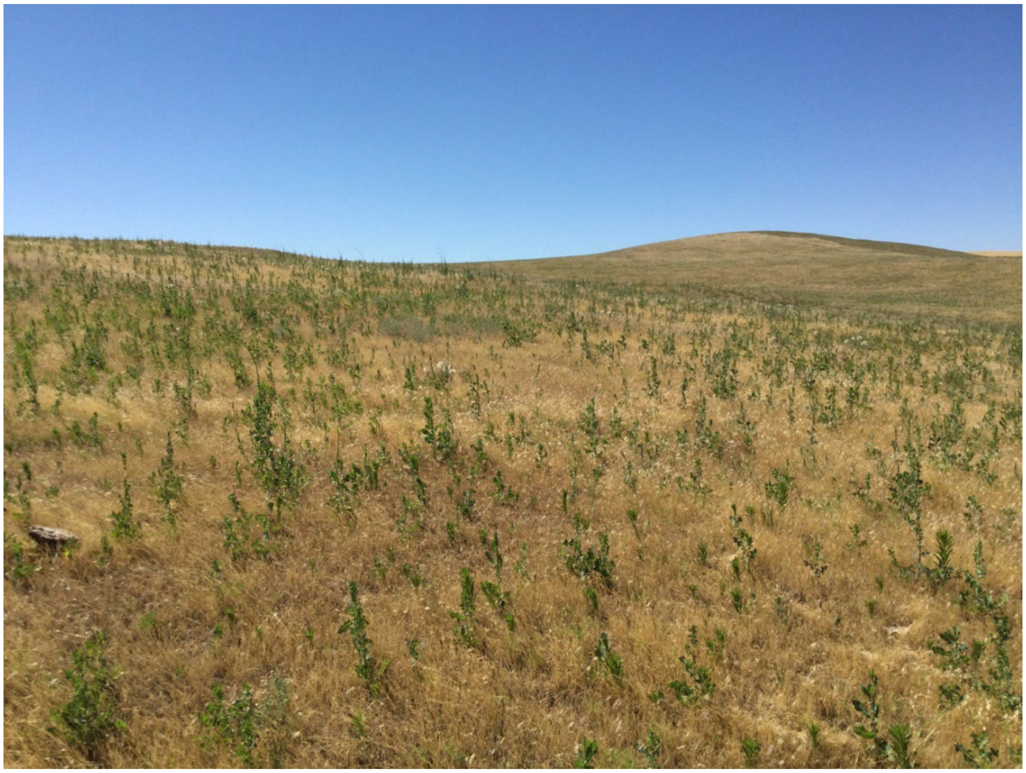

Photo 7. Former cultivated field habitat in northern end of Survey Area; contained no Laurence's milkvetch.

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

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

Thompson, J., M. Hoggatt, and R. Novy. 2023. 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, Juno Beach, Florida. Prepared by Western EcoSystems Technology, Inc. April 18, 2023.

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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.

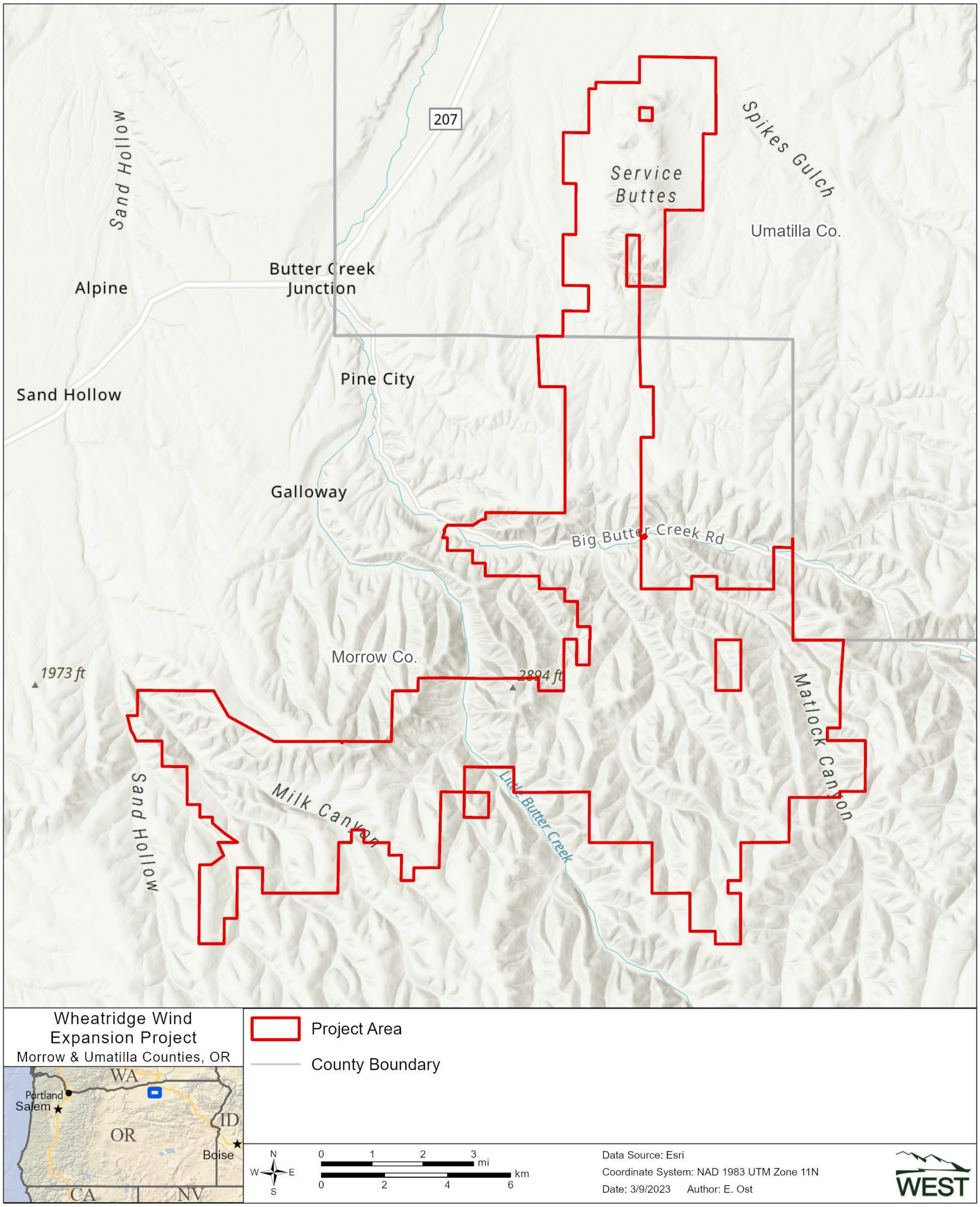

Figure 1. Location of the proposed Wheatridge Wind Energy Expansion Project Area.

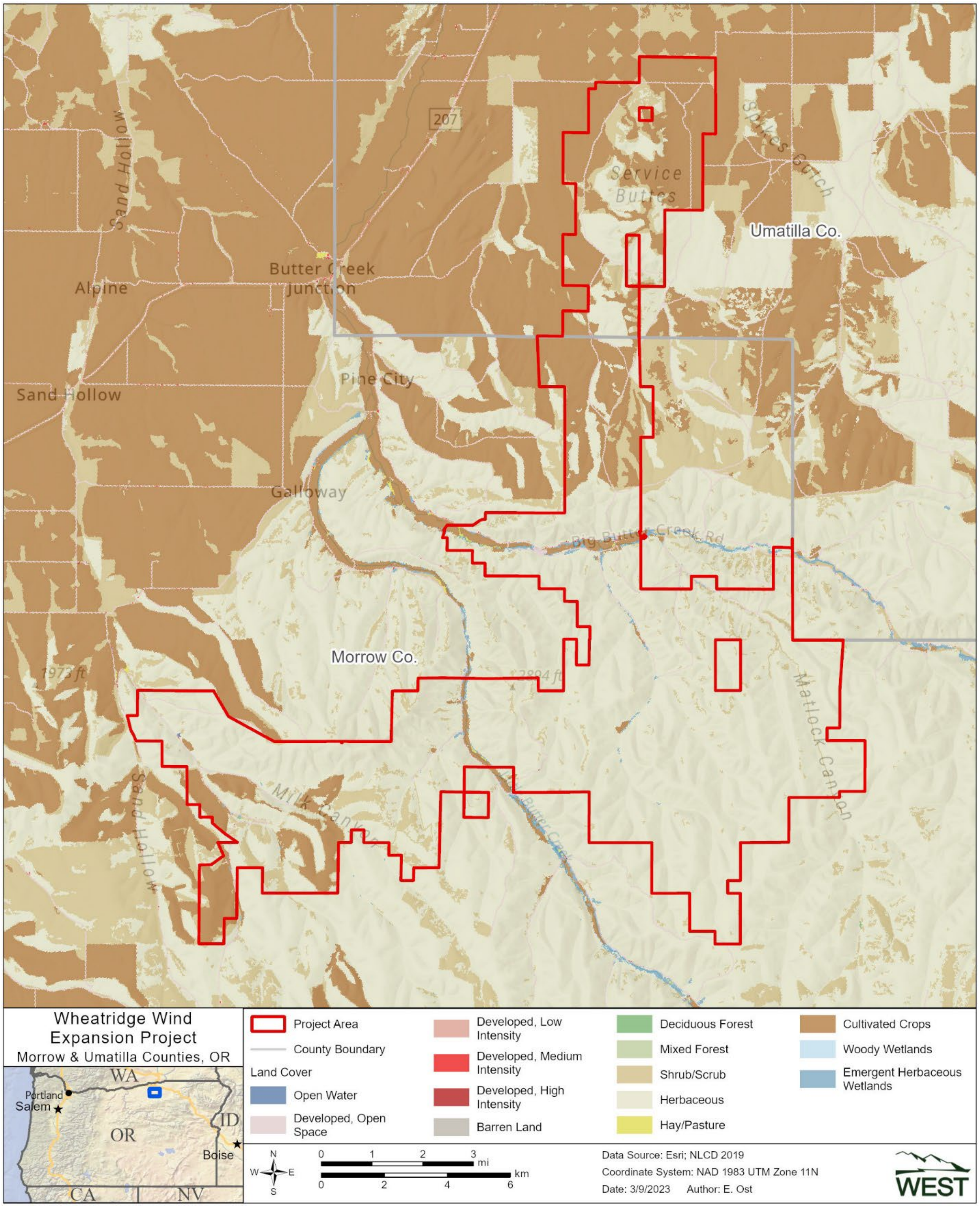

Figure 2. Land cover types and coverage within the proposed Wheatridge Wind Energy Expansion Project Area.

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.

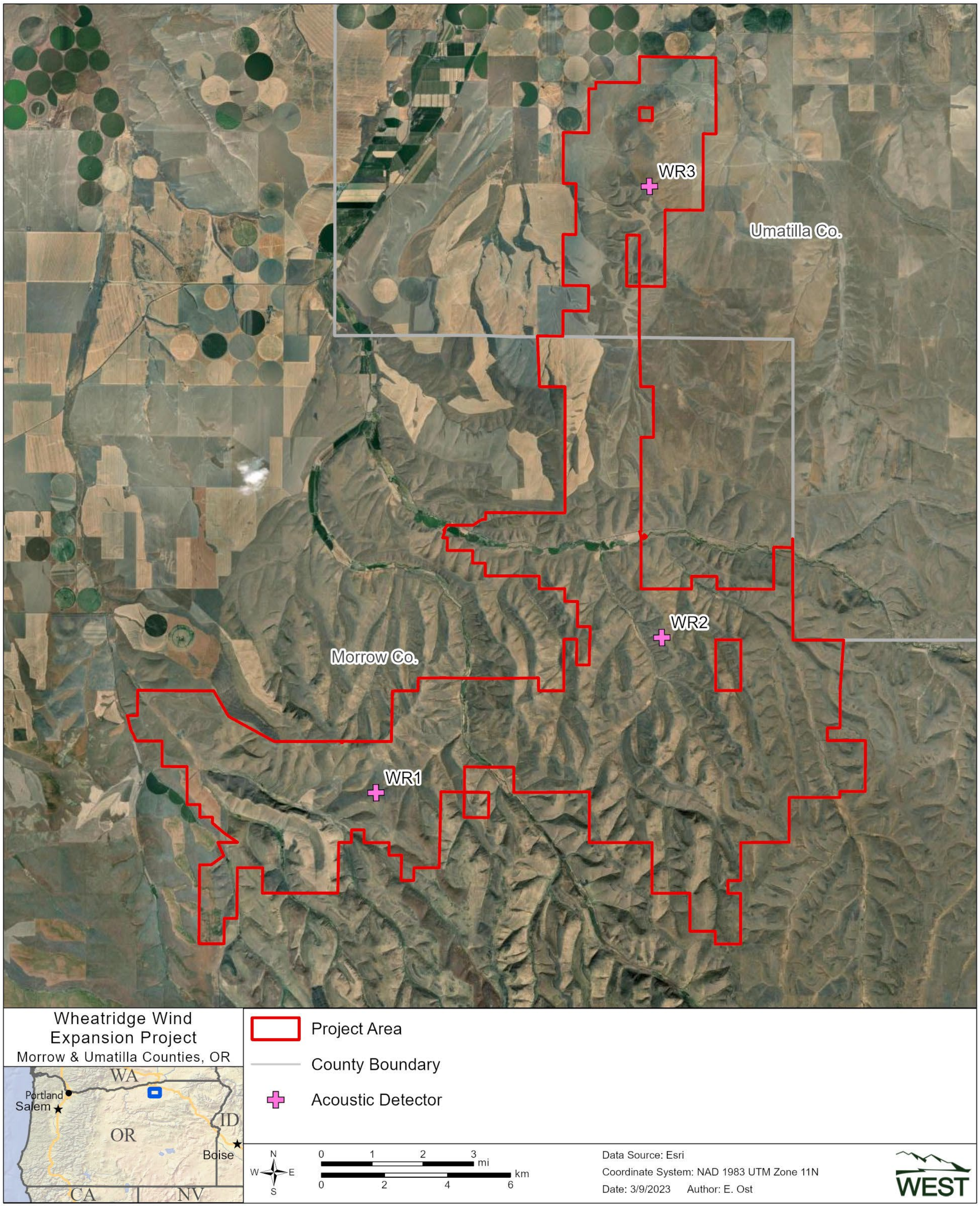

Figure 3. Location of the bat activity stations at the proposed Wheatridge Wind Energy Expansion Project Area.

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).

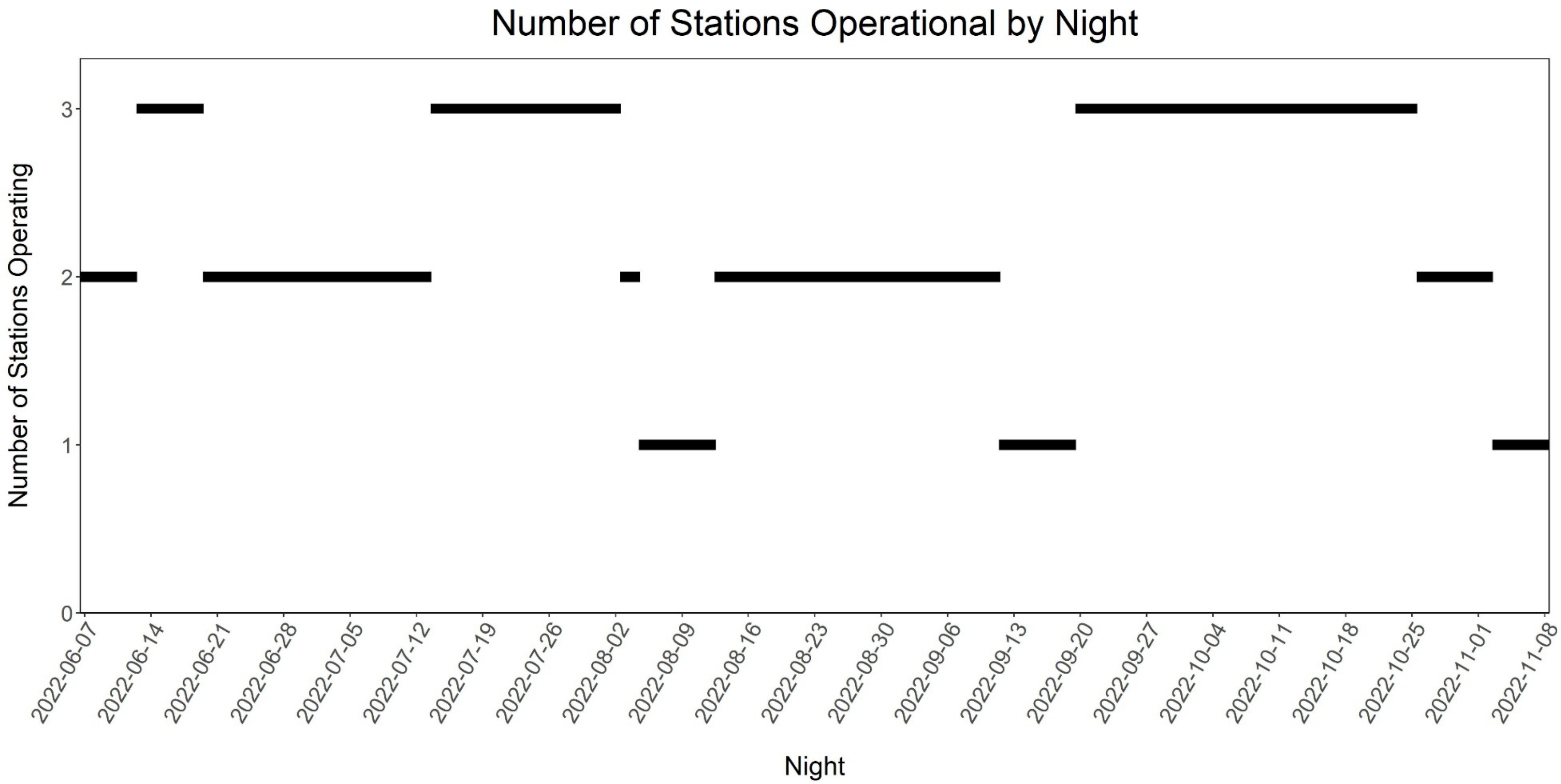

Figure 4. Operational status of Wildlife Acoustics Song Meter SM4BAT ultrasonic detectors (n = 3) at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

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.

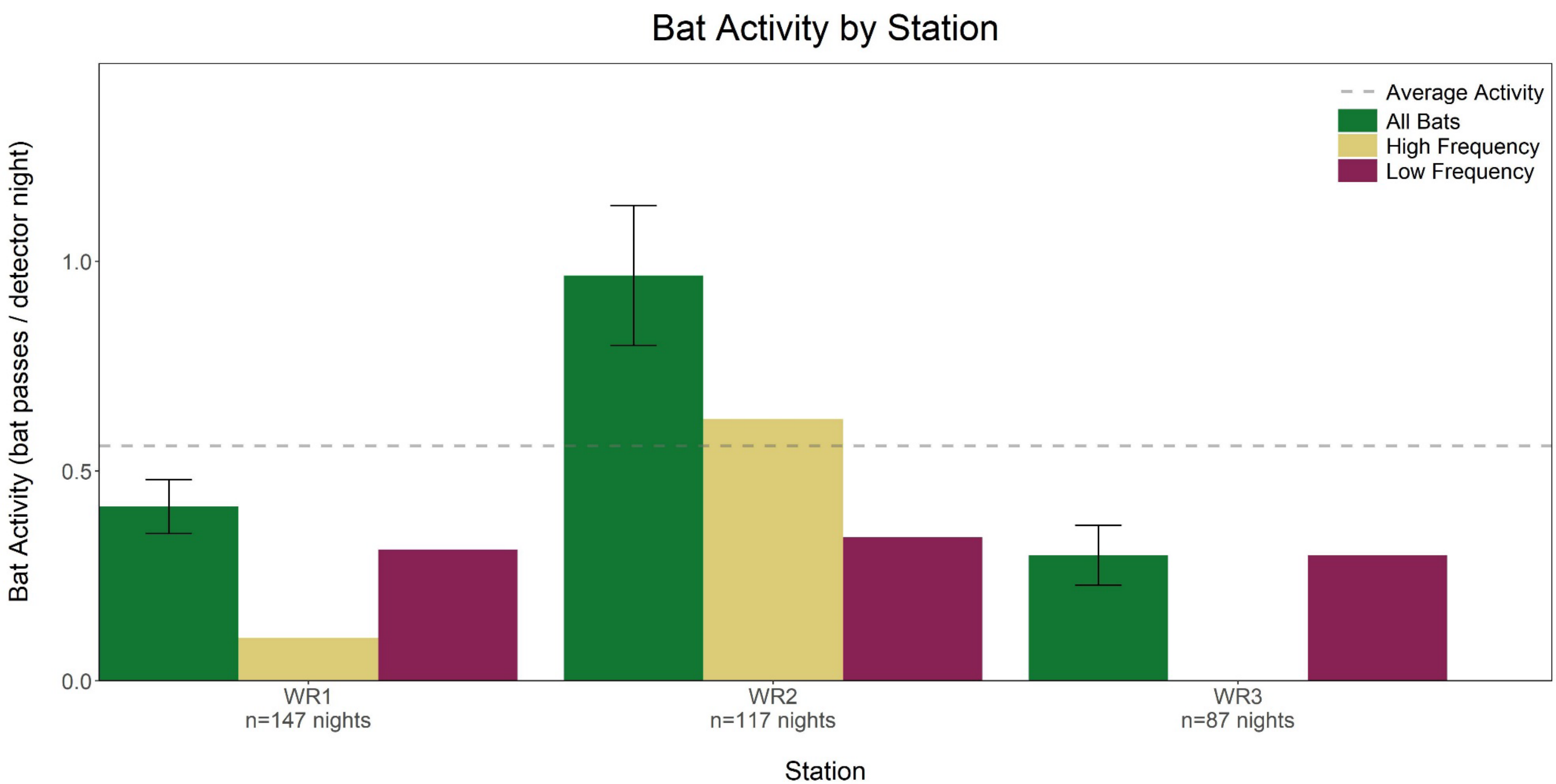

Figure 5. Number of high frequency and low frequency bat passes per detector-night recorded at stations within the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

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

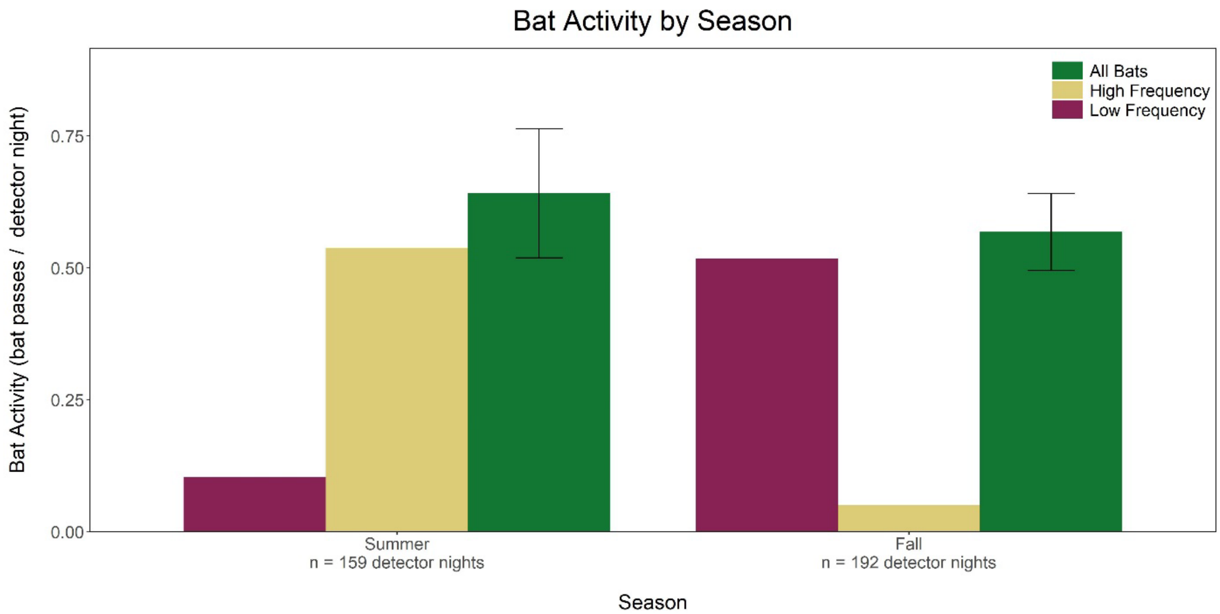

Figure 6. Seasonal bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

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

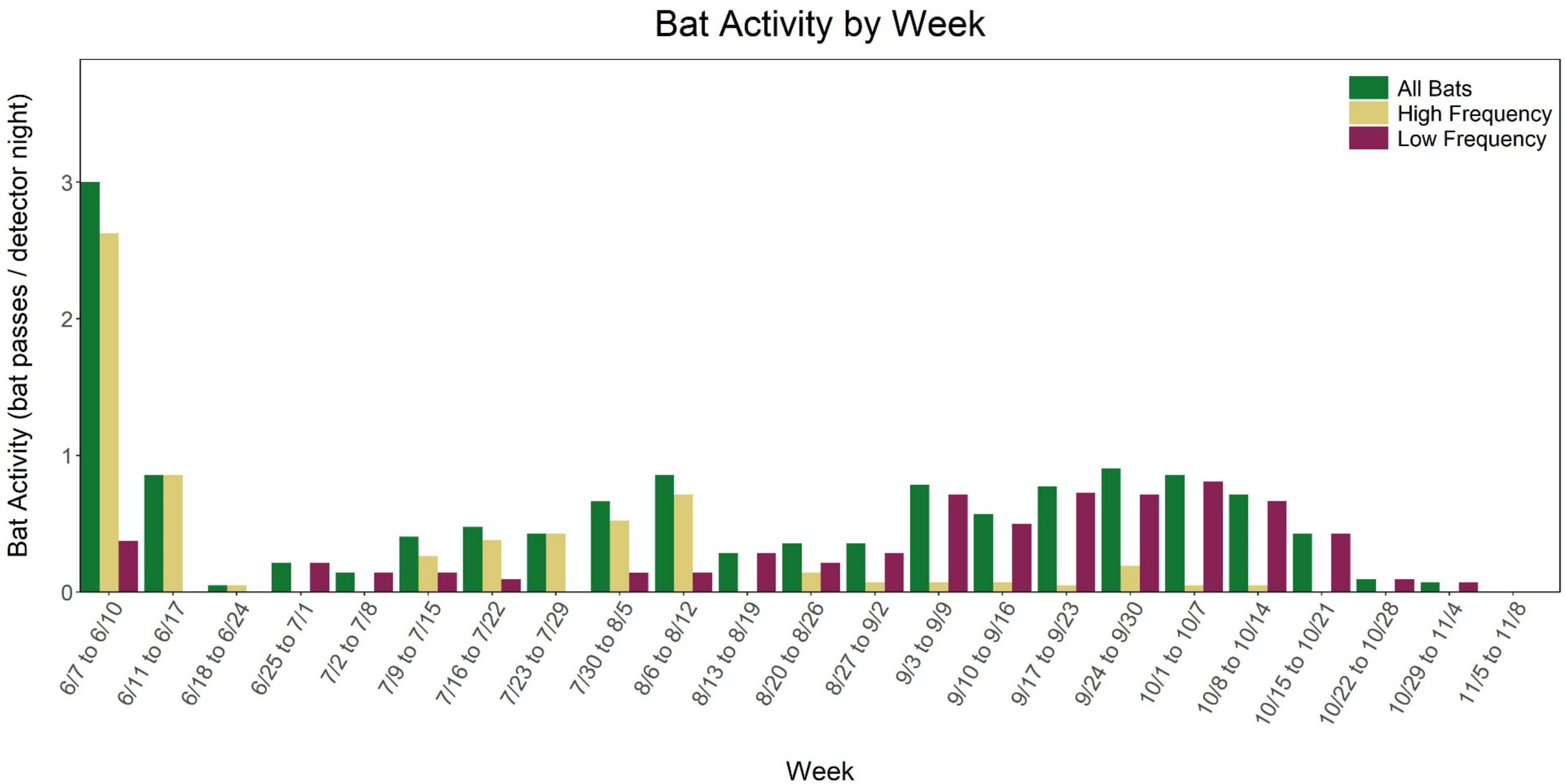

Figure 7. Weekly patterns of bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

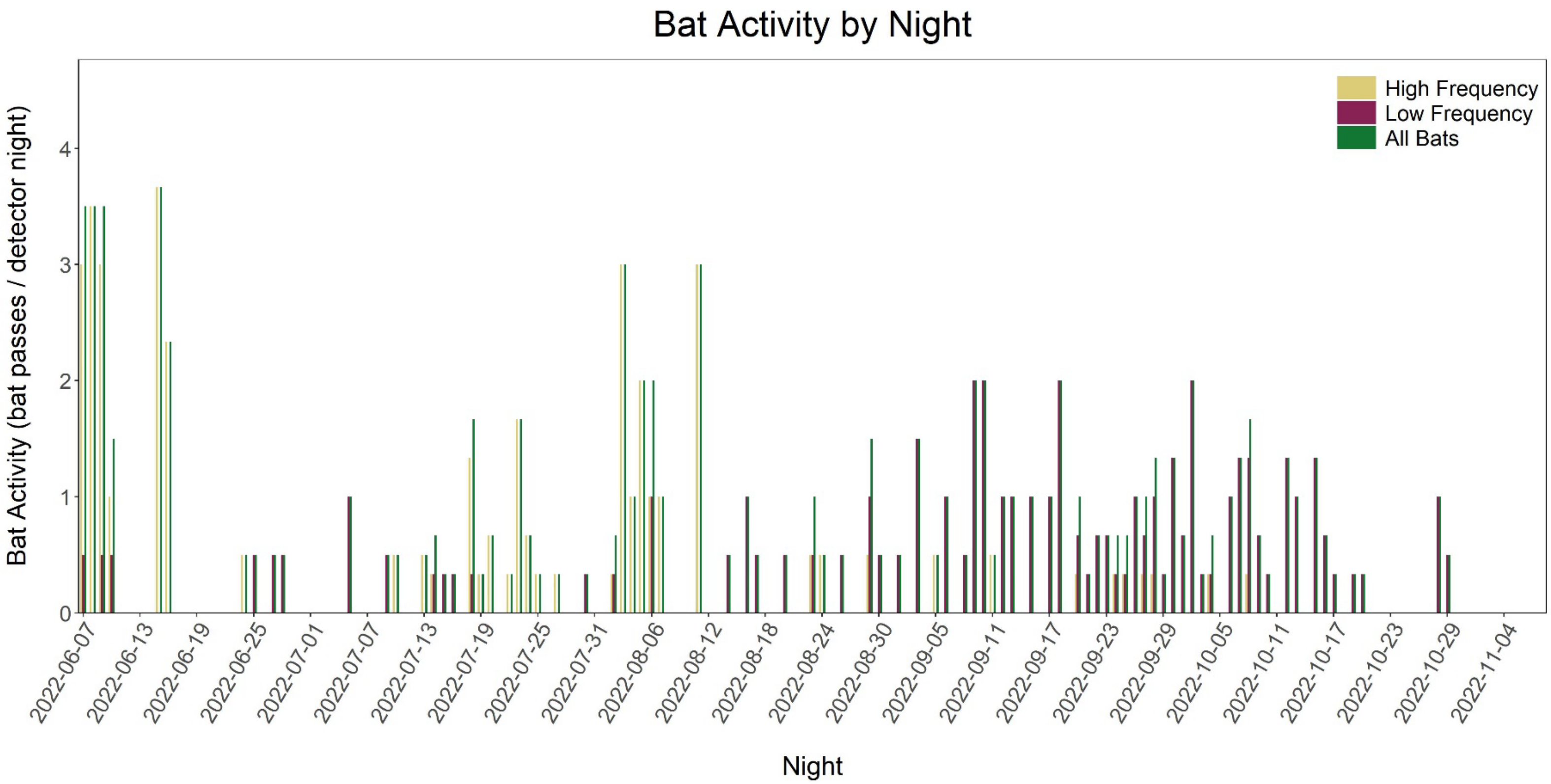

Figure 8. Daily patterns of bat activity by High Frequency, Low Frequency, and All Bats at the proposed Wheatridge Wind Energy Expansion Project Area, Morrow and Umatilla counties, Oregon, from June 7 – November 8, 2022.

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.

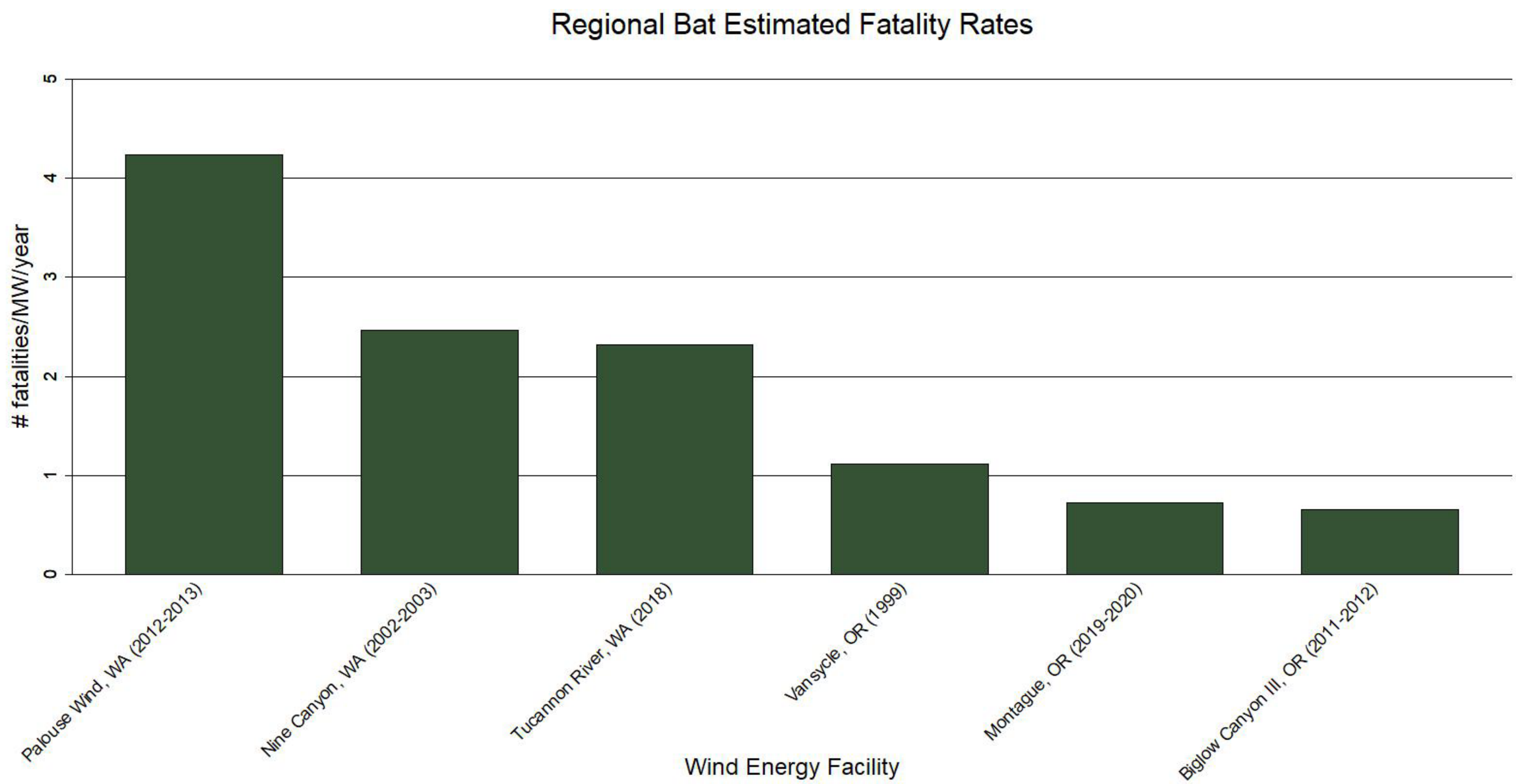

Figure 9. Fatality rates for bats (number of bats/megawatt [MW]/year) from publicly available studies at wind energy facilities in the US Pacific Northwest region of North America.

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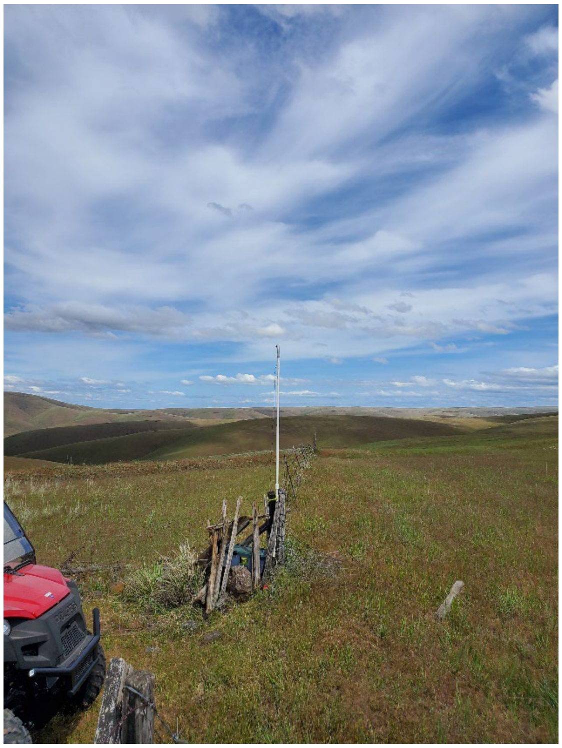
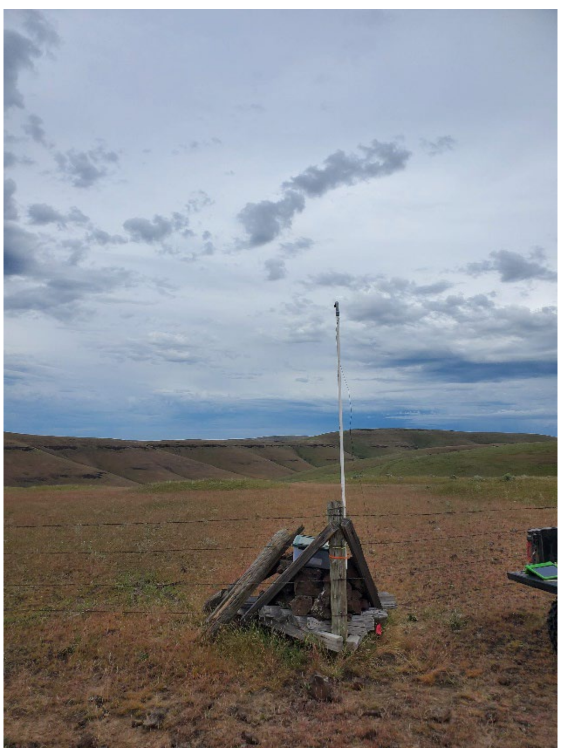
Appendix A. Site Photos for Bat Activity Surveys for the proposed Wheatridge Wind Energy Expansion Project Area, June 7 – November 8, 2022



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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Attachment P-2. Draft Habitat Mitigation Plan

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Wheatridge Renewable Energy Facility East

Draft Habitat Mitigation Plan

Prepared for

Wheatridge East Wind, LLC

245 W. Main Street, Suite 200

Ione, Oregon 97843

Prepared by:

TETRA TECH

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Portland, Oregon 97201

April 2023

(Approved at March 13, 2020 EFSC Meeting as part of the WREFII Site Certificate. Updated April 2023 as part of Wheatridge Renewable Energy Facility East RFA 1)

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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; 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 amended wind micrositing corridors within which 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 Rule (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 April 2023 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 will be 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*) 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 Washington ground squirrel 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 Washington ground squirrel 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 under Transmission Line A and Transmission Line B. Transmission Line A and Transmission Line B are defined in the Division 27 document.

Table 2. Temporary and Permanent Impacts by Habitat Category and Habitat Subtype (Option A and Option B)

Habitat Category	Habitat Type-Subtype	Option A (acres)		Option B (acres)	
		Perm.	Temp.	Perm.	Temp.
2	Grassland-Exotic Annual	12.0	54.0	12.0	53.6
	Grassland-Native Perennial	74.3	475.2	74.3	471.6
	Shrub-steppe-Basin Big Sagebrush	–	0.2	–	–
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	1.2	38.2	1.2	40.7
	Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	<0.1	4.0	<0.1	4.0
	Developed-Revegetated/Other Planted Grassland	10.7	72.1	10.7	72.1
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	0.3	<0.1	0.3
	Wetlands-Riverine Wetlands	<0.1	1.3	<0.1	2.4
	Wetlands-Emergent Wetlands	<0.1	0.2	<0.1	0.2
Total		**98.3**	**645.5**	**98.3**	**645.0**
3	Grassland-Native Perennial	2.5	31.6	2.5	29.2
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	0.7	4.5	0.7	7.2
	Developed-Revegetated/Other Planted Grassland	<0.1	13.5	0.1	16.2
	Wetlands-Riverine Wetlands	–	–	–	0.4
Total		**3.3**	**49.6**	**3.3**	**53.0**
4	Grassland-Exotic Annual	5.3	56.3	5.3	57.5

Habitat Category	Habitat Type-Subtype	Option A (acres)		Option B (acres)	
		Perm.	Temp.	Perm.	Temp.
	Grassland-Native Perennial	–	<0.1	–	<0.1
	Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	<0.1	0.1	<0.1	<0.1
Total		**5.3**	**56.3**	**5.3**	**57.6**
6	Developed-Dryland Wheat	41.5	285.2	41.6	273.9
	Developed-Irrigated Agriculture	<0.1	3.2	<0.1	3.2
	Developed-Other	0.4	4.8	0.4	5.9
Total		**42.0**	**293.2**	**42.0**	**283.0**
Grand Total		**148.8**	**1,044.6**	**148.9**	**1,038.5**
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 for both Option A and Option B. Table 4 and Table 5 show the methods for calculating mitigation for temporary impacts for Option A and Option B, respectively, including the results of slight departures in methods from the February 2020 version of this document based on subsequent coordination with ODFW and 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 (Option A & B)

Habitat Category	Impact Acres [1]	Mitigation Ratio[2]	Mitigation Need	Mitigation Description
Category 2	98.3	2:1	196.5	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	8.6	1:1	8.6	The mitigation goal for Category 3 & 4 habitat is "no net loss" in quantity or quality.
Category 6	42.0	0:1	0	The mitigation goal for impacts on Category 6 habitat is minimization; no compensatory mitigation proposed.
Grand Total	148.9	--	205.1	--

1. Option A and Option B would result in the same acres of impact to each category of habitat and thus the same mitigation need with the exception that the total impacts for Option A rounds to 148.9 acres while the Total impacts for Option B rounds to 148.8. This table conservatively lists the greater total (Option B), although the mitigation need is the same for both options.

2. Acres mitigation per acres impacted.

Table 4. Calculating Mitigation for Temporary Impacts (Option A)

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, Wetlands – Riverine Wetlands, Wetlands – Emergent Wetlands,	603.1	0:1	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	0.2	2:1	0.3	
	Shrub-steppe Rabbitbrush/Snakeweed Shrub-steppe	38.2	1:1	38.2	
	Riparian Forest and Natural Shrubland Complexes – Eastside (Interior) Riparian	4.0	2:1	8.0	
Category 3	Grassland – Native Perennial, Developed-Revegetated/Other Planted Grassland	45.0	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 loss of habitat functionality and meet the "no net loss" goal. Temporary disturbances to Category 3 and
	Shrub-Steppe Rabbitbrush/Snakeweed Shrub-steppe,	4.5	1:0.5	2.3	

Habitat Category	Habitat Subtype	Impact Acres	Mitigation Ratio[1]	Mitigation Needs	Mitigation Description
Category 4	Grassland – Native Perennial, Grassland – Exotic Annual, Open Water - Lakes, Rivers, Streams – Intermittent or Ephemeral Streams	56.3	0:1	0	Category 4 Grasslands are not mitigated beyond restoration.
Category 6	Developed-Dryland Wheat, Developed - Irrigated Agriculture, Developed-Other	293.2	0:1	0	The mitigation goal for Category 6 habitat is minimization; no compensatory mitigation is proposed.
Grand Total	**–**	**1044.6**	**–**	**48.8**	
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					

Table 5. Calculating Mitigation for Temporary Impacts (Option B)

Habitat Category	Habitat Subtype	Impact Acres	Mitigation Ratio[1]	Mitigation Needs	Mitigation Description
Category 2	Grassland – Exotic Annual, Grassland – Native Perennial, Developed-Revegetated/Other Planted Grassland, Open Water – Lakes, Rivers, Streams – Intermittent or Ephemeral Streams, Wetlands – Riverine Wetlands, Wetlands – Emergent Wetlands	600.2	0:1	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 Rabbitbrush/Snakeweed Shrub-steppe	40.7	1:1	40.7	
	Riparian Forest and Natural Shrubland Complexes – Eastside (Interior) Riparian	4.0	2:1	8.0	
Category 3	Grassland – Native Perennial, Developed-Revegetated/Other Planted Grassland, Wetlands-Riverine Wetlands	45.8	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
	Shrub-Steppe Rabbitbrush/Snakeweed Shrub-steppe,	7.2	1:0.5	3.6	

Habitat Category	Habitat Subtype	Impact Acres	Mitigation Ratio[1]	Mitigation Needs	Mitigation Description
Category 4	Grassland – Exotic Annual, Grassland – Native Perennial, Open Water - Lakes, Rivers, Streams – Intermittent or Ephemeral Streams	57.6	0:1	0	restoration of temporary disturbances, the proposed mitigation ratio is intended to account for the temporary 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	283.0	0:1	0	The mitigation goal for Category 6 habitat is minimization; no compensatory mitigation is proposed.
Grand Total	--	1038.5	--	52.4	

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 for permanent impacts under either Option A or Option B of 205.1 acres; temporary impacts under Option A would result in a mitigation need of 48.8 acres and under Option B a mitigation need of 52.4 acres. Therefore, the maximum total mitigation need (i.e., under Option B) is 257.5 acres. 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, Table 4, and Table 5 to provide an updated estimate of mitigation requirements.

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. Once the mitigation needs are finalized, any impacts to riparian habitat will be mitigated using acreage available along Rock Creek.

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 Washington ground squirrel 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.

5.2 Habitat Enhancement Actions

Habitat designated for mitigation will be conserved and protected from alteration 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 Washington ground squirrel 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 5 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 5 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 6 shows the success criteria for the habitat enhancement actions proposed in Section 8.2.

Table 6. 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. 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 7 includes a schedule for implementation of all mitigation actions, including those covered in other pre-construction compliance plans.

Table 7. 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. The Certificate Holder will consult with ODOE and ODFW to design a long-term monitoring schedule.	Noxious Weed Control Plan
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.	Habitat Mitigation Plan

Mitigation Action	Schedule	Associated Plan
	Then the Certificate Holder will consult with ODOE and ODFW to design a long-term monitoring schedule.	

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

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

Figures

(Figure 1 is confidential and provided under separate cover)

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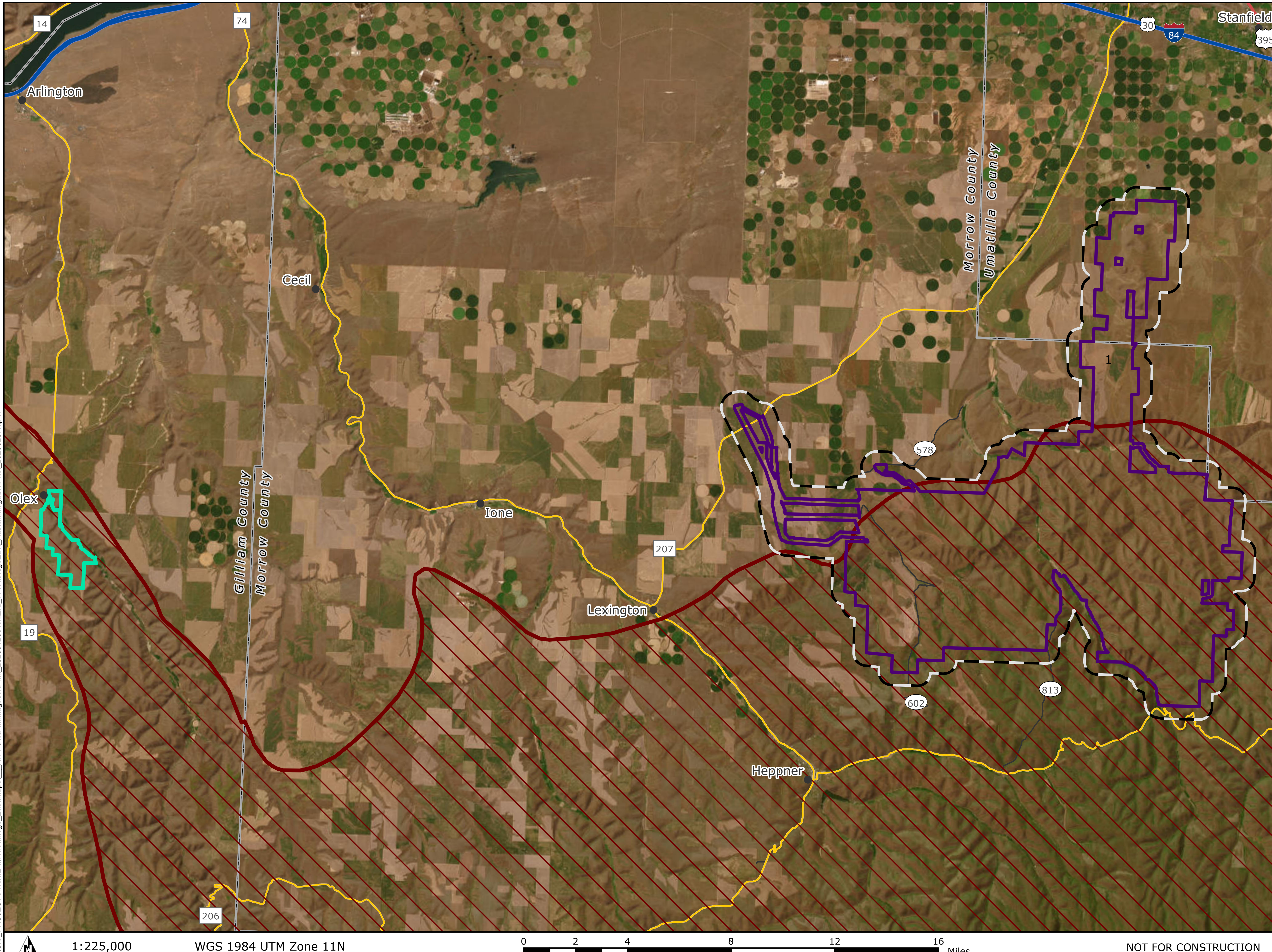


Wheatridge Renewable Energy Facility East

Figure 2
Habitat Mitigation Plan - Full 2100 Acre Parcel

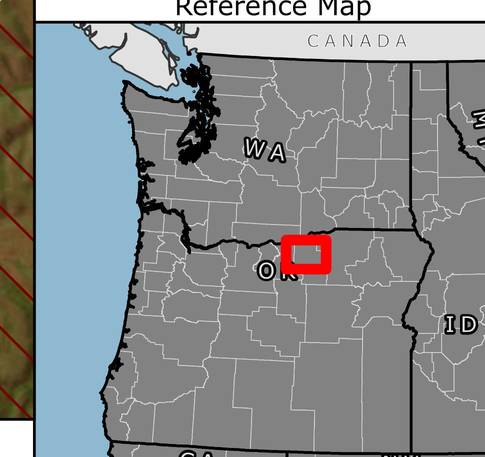
MORROW, UMATILLA AND GILLIAM COUNTIES, OR

- Amended Site Boundary
- Analysis Area (0.5-mile Buffer)
- 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



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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

TETRA TECH

Last Approved Date: February 2020

Updated: May 2023

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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 our agricultural lands, recreational areas, and natural resources from the degrading impact of exotic, invasive noxious weeds.

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 is 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).

Morrow County specifically recognizes 36 species of noxious weeds (Table 1; Morrow County 2022). Although not all of the Morrow County listed noxious weeds noted in Table 1 occur in the vicinity of the Facility, the Certificate Holder and its contractors should be aware of the entire 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.

Table 1. Morrow County Weed Department Weed Lists and Classifications

Scientific Name	Common Name	Morrow County Classification
Butomus umbellatus	flowering rush	A
Cardaria (*Lepidium*) *draba*	whitetop (hoary cress)	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
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
Acroptilon (Centaurea) repens	Russian knapweed	B
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
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

The Umatilla County Weed Board and approved by the Umatilla County Board of Commissioners specifically recognizes 39 species of noxious weeds (Table 2; Umatilla County 2022). Although not all of the Umatilla County listed noxious weeds noted in Table 2 occur within or near the Approved Site Boundary, the Certificate Holder and its contractors should be aware of the entire list while monitoring and controlling weeds. Noxious weeds known to occur within or near the Facility are discussed in Section 4.0.

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
Botomus umbellatus	flowering rush	A
Cannabis sativa	marijuana	A
Centaurea calcitrapa	purple starthistle	A
Centaurea x *gerstlaueri (C. jacea XC. Nigra)*	meadow knapweed	A
Centaurea stoebe ssp. *micranthos*	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
Iris pseudacorus	yellow flag iris	A
Lythrum salicaria	purple loosestrife	A
Polygonum cuspidatum	Japanese knotweeds	A
Roripa sylvestris	creeping yellow cress	A
Senecio jacobaea	tansy ragwort	A
Acroptilon (Centaurea) repens	Russian knapweed	B
Aegilops cylindrica	jointed goatgrass	B
Agropyron repens	quackgrass	B
Ambrosia artemisiifolia	ragweed	B

Scientific Name	Common Name	Umatilla County Classification
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
Cuscuta pentagona	dodder	B
Hypericum perforatum	common St. John's wort	B
Linaria dalmatica	dalmatian toadflax	B
Onopordum acanthium	Scotch thistle	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

4.0 Noxious Weeds Identified at the Facility

The Amended Site Boundary consists of approximately 79,424 acres in Morrow and Umatilla counties. Tetra Tech identified areas within Amended Site Boundary that were areas of anticipated disturbance and then omitted agricultural fields. The resulting area is the Noxious Weed Survey Area. The entire Noxious Weed Survey Area was not able to be surveyed in 2022. As a result, the Noxious Weed Survey Area described in this report consists of 2,028 acres of uncultivated habitat surveyed in 2022 (Figure 1). The remaining portions of the Amended Site Boundary requiring survey will be surveyed in 2023 (see Exhibit Q).

Tetra Tech recorded 21 listed noxious weed species within the Noxious Weed 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 3 lists the noxious weed species observed, their noxious weed designation, and the frequency of observations.

Field surveys for the state-listed threatened plant species Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) were conducted for a portion of the Amended Site Boundary from July 11 – July 31, 2022 (see RFA 1 Exhibits P and Q; Tetra Tech 2023a). Noxious weeds were also recorded during these surveys, as well as during other biological surveys.

Table 3 identifies both state and county listed noxious weed species observed during these surveys, and their estimated frequency of occurrence. Noxious weed observation locations 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.

Table 3. Noxious Weeds Identified at the Facility

Scientific Name	Common Name	State Status (ODA)[1]	Morrow County Status [2]	Umatilla County Status [3]	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 x *gerstlaueri (C.* x *pratensis)*	meadow knapweed	**B**	**-**	**A**	Rare (<5 observations)
Centaurea diffusa	diffuse knapweed	**B**	**B**	**B****	Abundant (>100 observations)
Centaurea solstitialis	yellow starthistle	**B***	**A**	**B****	Infrequent (<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**	Infrequent (<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

Scientific Name	Common Name	State Status (ODA)[1]	Morrow County Status [2]	Umatilla County Status [3]	Frequency
Crupina vulgaris	common crupina	**B**	**A**	**A**	Rare (<5 observations)
Cuscuta indecora	bigseed dodder, collared dodder	**B**	**-**	**-**	Rare (<5 observations)
Hypericum perforatum	common St. John's wort	**B***	**B**	**B**	Rare (<5 observations). Small to medium patches.
Onopordium 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**	Infrequent (<20 observations) but moderate to high abundance in 10 of 16 observations where found.
Secale cereal	cereal rye, rye	**-**	**B**	**B**	Rare (<5 observations)
Solanum rostratum	buffalo bur, spiny nightshade	**B**	**-**	**-**	Rare (<5 observations)
Taeniatherum caput-medusae	medusahead	**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. "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 Weed: 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, livestock, 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 Noxious Weed 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 Noxious Weed 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 Noxious Weed 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 Noxious Weed Survey Area, and generally near roads. 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. 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, such as 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 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). 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" lists 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 of the Plan 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. Noxious weed control methods for the Facility described in this Plan have been developed utilizing information from the ODA Noxious Weed Control Program, the Morrow County Weed Control Program, and the Umatilla County Weed Control Board.

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.
- **Treatment:** 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; and

- Inspecting and certifying that the seed and straw mulch used for site rehabilitation and revegetation are free of noxious weed seed and propagules.
- Minimizing the introduction of noxious weeds or other invasive plant species by construction vehicles using a mobile wash station that will be placed in proximity to the main access points to occupied Laurence's milkvetch habitat. Vehicles will be washed prior to entering these areas.

5.3 Treatment

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.

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 (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.

Noxious weed control will continue until the disturbed areas meet the identified success criteria described in Section 6.0. Supplemental seeding of desirable species may be needed to achieve this goal. Fertilizer application will be limited in areas treated for noxious weeds, as fertilizer can stimulate the growth of noxious weeds, and the timing of revegetation activities will need to be coordinated with noxious weed treatments.

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 (Appendix B). 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 B 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 semi-annually assess noxious weed growth during the first five years of revegetation work and to make recommendations on noxious weed control measures. Semi-annual checks for noxious weed infestations will enable the Applicant to respond to new noxious weeds infestations in a timely manner and ensure the success of the revegetation plan. Reports will be submitted to the Certificate Holder, to ODOE, Oregon Department of Fish and Wildlife (ODFW), Morrow County, and Umatilla County following each annual inspection. Annual noxious weed inspections will occur across the entire Facility through visual inspection of revegetated areas while driving and/or walking. These inspections will be used to inform ongoing noxious weed control efforts. Noxious weed monitoring sites to be included in the annual reports will correspond with the reference sites identified for revegetation monitoring success, described below. Note that revegetation monitoring and reporting frequency differs from the noxious weed monitoring and reporting discussed in this Plan. As described in the revegetation plan (Tetra Tech 2023b), a qualified independent investigator (botanist or revegetation specialist) will inspect each revegetation area to assess the success of revegetation measures

In consultation with ODFW, revegetation reference sites—areas of habitat and quality similar to those found prior to disturbance at the areas to be revegetated—will be established to represent target conditions for revegetation areas. 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 desirable vegetation
- Species diversity and structural stage of desirable vegetation

The goal is to control noxious weeds so that the density is equal to or less than the density of noxious weeds in the reference sites. Based on the success of control efforts after the fifth year of annual monitoring, the Certificate Holder will consult with ODOE and ODFW to design a long-term weed control plan. The Certificate Holder may propose remedial actions or additional monitoring for noxious weed areas that have not met the success criteria. The Certificate Holder will maintain ongoing communication with individual landowners, the Morrow and Umatilla County Weed Control Supervisors, 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 Control Supervisor will be used and updated as needed:

Dave Pranger, Weed Control Supervisor

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 Supervisor

Umatilla County Road Department

3920 Westgate Street

Pendleton, OR 97801

(541) 278.5462

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Figures

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Appendix A. Oregon State Noxious Weed List

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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		

Appendix B. Recommended Timing and Control Methods

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<table>
<tr><th>Noxious Weed Species</th><th>Method and Timing of Control</th></tr>
<tr><td>Acroptilon (Centaurea) repens (Russian knapweed)</td><td>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)</td></tr>
<tr><td>Aegilops cylindrica
(jointed goatgrass)</td><td>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]</td></tr>
<tr><td>Bassia (Kochia) scoparia</td><td>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]</td></tr>
</table>

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 x gerstlaueri (C. x pratensis) (meadow 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 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]

Noxious Weed Species	Method and Timing of Control
	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] **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)

Noxious Weed Species	Method and Timing of Control
	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. • 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.

Noxious Weed Species	Method and Timing of Control
	• 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]
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.

Noxious Weed Species	Method and Timing of 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] **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.

Noxious Weed Species	Method and Timing of Control
	• 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. • 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

Noxious Weed Species	Method and Timing of Control
	• 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] •
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

May 2023

(Approved by ODOE on November 9, 2020 as part of WREFII Site Certificate; changes were presented at November 19-20, 2020 EFSC Meeting)

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List of Tables

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 for the Facility to address the pre-construction conditions described below.

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 for pre-construction compliance (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 Applicant 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 the Department for review and approval in consultation with the Umatilla Soil and Water Conservation District, the Morrow Soil & Water Conservation District, Oregon Department of Agriculture, Natural Resource Conservation Service or a third-party consultant with expertise in soils.

2.0 Site Description

The Facility is located in Umatilla and Morrow counties, Oregon. 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 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 five 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” (~22%) s and “habitat lands” (~77%). For further details, see descriptions in of land use categories in Exhibit K. The Amended Site Boundary includes some areas with soils defined as High Value Farmland by the NRCS (2021). See Exhibit K for a definition and analysis of the High Value Farmland present within the analysis area.

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	K-factor1	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)	19
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% 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 (12–20% 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% 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

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2.2 Existing Habitat

Habitat subtypes within Amended Site Boundary primarily consist of Native Perennial Grassland (65 percent; Grassland habitat type), Dryland Wheat (15 percent; Developed habitat type), Revegetated/Other Planted Grassland (7 percent; Developed habitat type), Exotic Annual Grassland (6 percent; Grassland 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. Outside Mule Deer Winter Range and Category 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. The three Category 6 habitat subtypes (Developed-Dryland Wheat, Developed-Irrigated Agriculture, and Developed-Other) are grouped together as cropland for the purposes of revegetation. Developed-Other habitat subtypes include 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
	Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe
	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
	Wetlands-Riverine Wetlands
	Wetlands-Emergent Wetlands
	Wetlands-Scrub-shrub Wetlands

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. Figures depicting the location of these temporary disturbances are available in Exhibit P. 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 5.4.

Table 3. Temporary Impacts to Cropland

Habitat Category and Habitat Type-Subtype	Temporary Impact (acres)[1]	
	Option A	Option B
Category 6		
Developed-Dryland Wheat	285.2	273.9
Developed-Irrigated Agriculture	3.2	3.2
Developed-Other	4.8	5.9
Subtotal Category 6	**293.2**	**283.0**
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. Figures depicting the locations of these wildlife habitats are available in Exhibit P. 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]	
	Option A	Option B
Category 2		
Grassland-Exotic Annual	54.0	53.6
Grassland-Native Perennial	475.2	471.6
Shrub-steppe-Basin Big Sagebrush Shrub-steppe	0.2	-
Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	38.2	40.7
Riparian Forest and Natural Shrubland Complexes-Eastside (Interior) Riparian	4.0	4.0
Developed-Revegetated or Other Planted Grassland	72.1	72.1
Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	0.3	0.3

Habitat Category and Habitat Subtype	Temporary Impact (acres)[1]	
	Option A	Option B
Wetlands-Riverine Wetlands	1.3	2.4
Wetlands-Emergent Wetlands	0.2	0.2
Subtotal Category 2	**645.5**	**645.0**
Category 3		
Grassland-Native Perennial	31.6	29.2
Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe	4.5	7.2
Developed-Revegetated or Other Planted Grassland	13.5	16.2
Wetlands-Riverine Wetlands	-	0.4
Subtotal Category 3	**49.6**	**53.0**
Category 4		
Grassland-Exotic Annual	56.3	57.5
Grassland-Native Perennial	<0.1	<0.1
Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams	0.1	0.0
Subtotal Category 4	**56.3**	**57.6**
Grand Total	**751.4**	**755.6**
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 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 Applicant will consult with ODA on revegetation, weed treatment, and restoration.

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 needs to 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 the revegetation 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. 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 which was updated as part of RFA 1 to the Facility Site Certificate updated (Tetra Tech 2023a).

Soil compaction is a concern for restoring agricultural soils to their pre-construction productivity. During construction of temporary facilities, the Certificate Holder would excavate and store soils by soil horizon, so that soils could be replaced and restored appropriately, including replacing topsoil. During post-construction restoration of temporary impacts to agricultural areas, the Certificate Holder would 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 or drill seeding.

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. Certified weed-free straw will be applied at a rate of approximately 2 tons per acre immediately after seeding. If certified weed-free straw is unavailable, the construction contractor will identify a local source of straw. The local source of the straw will be approved by the County Weed Supervisors and ODFW prior to purchase. This straw will either be crimped into the ground or applied with a tackifier. 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.

4.6 Seed Mixes and Shrub Plantings

Based on the botanical survey report (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 native grassland mix from a regional restoration company will be used for the seed mixes for revegetation of grasslands, such as the High Desert Seed Mix from BFI Native Seeds (BFI Native Seeds 2022), which contains three native species observed in grasslands (Table 5). The High Desert Seed Mix, or a similar commercially available seed mix from a regional restoration company, is proposed for revegetation efforts at the Facility and contains only 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 High Desert Seed Mix is commercially and regionally available, the process for seed mix ordering is not included in this Plan, as orders for the High Desert 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. High Desert Seed Mix

Common Name	Scientific Name	Percent of Mix
Bluebunch wheatgrass	*Pseudoroegneria spicata*	42
Bottlebrush squirreltail	*Elymus elymoides*	16
Sandberg's bluegrass	*Poa secunda*	12
Prairie junegrass	*Koeleria macrantha*	8
Idaho fescue	*Festuca idahoensis*	22

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 42.9 acres (Option A) or 47.9 acres (Option B) 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 habitat subtypes that will be temporarily disturbed by construction of the Facility:

- Cropland (Habitat Category 6):
  - Developed-Dryland Wheat
  - Developed-Irrigated Agriculture, and
  - Developed-Other;
- Wildlife Habitat (Habitat Category 2):
  - Open Water–Lakes, Rivers, Streams-Perennial Streams,
  - Open Water – Lakes, Rivers, Streams-Intermittent or Ephemeral Streams,
  - Shrub-steppe-Basin Big Sagebrush Shrub-steppe,
  - Wetlands-Riverine Wetlands (Big Game Winter Range overlay),
  - Wetlands-Emergent Wetlands (Big Game Winter Range overlay),
  - Grassland-Exotic Annual (Big Game Winter Range overlay)
  - Grassland-Native Perennial (Big Game Winter Range overlay),
  - Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe (Big Game Winter Range overlay),
  - 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-Riverine Wetlands,
  - Grassland-Native Perennial,
  - Shrub-steppe-Rabbitbrush/Snakeweed Shrub-steppe, 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
  - Grassland-Native Perennial.

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 2022 (see Table P-1 in Exhibit P; Tetra Tech 2022, Tetra Tech 2023b);
- 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 was determined first by multiplying the impact acreage by five percent and then converting the acreages into square feet. This square footage was then 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 using a stratified randomization process utilizing existing habitat mapping. Mile points will be assigned to each habitat subtype within the construction corridor linearly from north to south in 0.1-mile increments (CH2M 2019). A random number generator will then be used to assign monitoring locations using the 0.1-mile increments. Additional monitoring locations will be chosen, through the stratified randomization process, as alternative locations in case one of the original monitoring locations is deemed unacceptable during the first revegetation monitoring effort. Data collected during the first year of monitoring will serve as pilot data to determine if the chosen number of monitoring sites will provide results that are statistically robust. Additional monitoring sites will be added if statistical analysis of the first year's data indicates additional monitoring plots are needed.

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 units in the Amended Site Boundary, and eight soil units that make up 5 percent or more of the Amended Site Boundary. Construction would temporarily disturb up to approximately 1,045 acres. Sample sites will be paired within each impacted soil type 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, preferably during mid-growing season.	One infiltration test per sample site per year.
Nutrient testing	Nutrient tests will be taken at the same time as the infiltration measurements, annually.	Three nutrient 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 semi-annually assess noxious weed presence during the first 5 years of revegetation work and to make recommendations on noxious weed control measures. Semi-annual checks for noxious weed infestations will enable the Applicant 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 following each annual inspection. 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 6.5.

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]

[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.

- **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.

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.

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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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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