Exhibit P

Fish and Wildlife Habitats and Species

Nolin Hills Wind Power Project
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Prepared for

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Acronyms and Abbreviations

APLIC	Avian Powerline Interaction Committee
ASC	Application for Site Certificate
AWWI	American Wind Wildlife Institute
AWWIC	American Wind Wildlife Information Center
Applicant	Nolin Hills Wind, LLC
BGEPA	Bald and Golden Eagle Protection Act
BPA	Bonneville Power Administration
CL	credible limit
CRP	Conservation Reserve Program
ECP	Eagle Conservation Plan
ECPG	Eagle Conservation Plan Guidance
EFSC, or Council	Oregon Energy Facility Siting Council
ESU	Evolutionarily Significant Unit
FSA	Farm Service Agency
GIS	Geographic Information System
GPS	Global Positioning System
HMP	Habitat Mitigation Plan
memo	memorandum
met tower	meteorological data collection tower
MW	megawatt
NOAA Fisheries	National Oceanic and Atmospheric Administration, National Marine Fisheries Service
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
OEF	Oregon Eagle Foundation
ORBIC	Oregon Biodiversity Information Center
Project	Nolin Hills Wind Power Project
RPS	Renewable Energy (Portfolio) Standard
SMU	species management unit

USFWS	U.S. Fish and Wildlife Service
WAGS	Washington ground squirrel
WEG	wind energy guidelines
WMP	Wildlife Monitoring Plan

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1.0 Introduction

Nolin Hills Wind, LLC (the Applicant) proposes to construct the Nolin Hills Wind Power Project (Project), a wind energy project with a nominal generating capacity of approximately 350 megawatts (MW) and up to 117 average MW of energy, in Umatilla County, Oregon. The Project comprises up to 116 wind turbine generators, depending on the turbine model selected and the final layout determined during the micrositing process. If larger turbines are selected, fewer turbines will be installed. The Project will interconnect to the regional grid via either a transmission line leading from the northern Project substation northwest to Cottonwood Substation in Hermiston, or a new 230-kilovolt transmission line to the proposed Bonneville Power Administration (BPA) Stanfield Substation, north of the town of Nolin. Other Project components include electrical collection lines, substations, site access roads, one operations and maintenance (O&M) building, meteorological data collection towers (met towers), and temporary construction yards. These facilities are all described in greater detail in Exhibit B.

Exhibit P provides information about the fish and wildlife habitats and species, other than the species addressed in Exhibit Q, that could be affected by the Project. This exhibit demonstrates that the Project can comply with the approval standard in Oregon Administrative Rule (OAR) 345-022-0060:

OAR 345-022-0060 Fish and Wildlife Habitat

> *[T]he Council must find that the design, construction and operation of the facility, taking into account mitigation, are consistent with the fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025 in effect as of September 1, 2000.*

1.1 Analysis Area

In accordance with OAR 345-001-0010(59)(c) and as stated in the January 2018 Project Order, the Analysis Area for fish and wildlife habitat and species consists of the Site Boundary and the area within 0.5 mile from the Site Boundary. The Site Boundary is defined in detail in Exhibits B and C. The Fish and Wildlife Habitat Analysis Area is shown on Figure P-1. A portion of the Site Boundary is designated as the micrositing corridor, where Project components may be located.

1.2 Agency Consultation

The Applicant has consulted regularly with the Oregon Department of Fish and Wildlife (ODFW) and other agencies regarding the appropriate protocols for documenting the presence of state sensitive species as required in OAR 345-021-0010(1)(p)(D) and the classification of fish and wildlife habitat as required in OAR 345-021-0010(1)(p)(B). A summary of this consultation process is provided below with documentation provided in Attachment P-1.

- The Applicant submitted their proposed Washington ground squirrel (WAGS; *Urocitellus washingtoni*) survey protocol to ODFW District Biologist Greg Rimbach in May 2017 and received approval prior to surveys.
- In June and September 2017, the Applicant submitted requests for information on threatened, endangered, and sensitive species and habitats at the Project to Oregon Biodiversity Information Center (ORBIC), ODFW, U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), and subsequently corresponded with Greg Rimbach (ODFW), Rebecca Viray (NOAA Fisheries), and Suzanne Anderson (USFWS) regarding these species and habitats.
- In October 2017, the Applicant discussed in a phone call with Bob Meinke, Program Leader of Native Plant Conservation at the Oregon Department of Agriculture (ODA), the role ODA would play in reviewing the Project's Energy Facility Siting Council (EFSC, or Council) application. Mr. Meinke declined an invitation to participate in a site visit to the Project and indicated that ODA does not have authority to regulate listed plant species on private land.
- The preliminary survey results were discussed in an October 2017 site visit to the Project. Agency personnel in attendance included Katie Clifford (Oregon Department of Energy [ODOE]), Sarah Reif (ODFW), and Greg Rimbach (ODFW).
- The results of the 2017 avian surveys (eagle nest, raptor nest, eagle use, avian use) and methods proposed for 2018 surveys were presented to ODFW (Greg Rimbach, Sarah Reif, Brian Laughlin) and USFWS (Suzanne Anderson) on a conference call in February 2018. Matt Stuber (USFWS) was unable to attend but was provided the survey protocol for review via email. ODFW and USFWS staff provided concurrence on the avian survey protocols.
- The Applicant coordinated with ODFW via phone and email regarding impact avoidance and minimization to WAGS and Category 1 habitat from February through May 2018.
- The Applicant presented the results of the 2017 WAGS, pedestrian wildlife, habitat categorization, bat, and botanical surveys in a March 2018 meeting with ODFW in The Dalles, Oregon. The Applicant also described the upcoming biological surveys for 2018 and discussed the EFSC application. Agency personnel in attendance or on the phone included Katie Clifford (ODOE), Greg Rimbach (ODFW), and Steve Cherry (ODFW). ODFW approved the 2018 survey protocols.
- In May of 2018, ODFW provided ODOE with a memorandum (memo) that summarized ODFW's recommendations for avoiding impacts to foraging raptors and their habitat along Alkali Canyon. In July of 2018, the Applicant responded to the ODFW memo stating that they will implement ODFW's recommendations for a 656-foot (200-meter) turbine setback from the rim of Alkali Canyon.
- The Applicant provided updated survey reports to ODFW and ODOE in December 2019, prior to the submittal of the Preliminary Application for Site Certificate (ASC).

2.0 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;*

This section describes the biological and botanical surveys conducted in support of this exhibit as required under OAR 345-021-0010(1)(p)(A), including the timing and scope of each survey. Biological and botanical surveys included an initial desktop information review followed by field surveys.

2.1 Information Review

2.1.1 Initial Desktop Review

Preparation for the biological and botanical surveys included a review of available desktop information on special status species (e.g., federal and state endangered, threatened, proposed, and candidate species, species of concern, birds of conservation concern, sensitive, and sensitive-critical species) occurrence and habitat requirements and special habitats that could occur within the Analysis Area. ORBIC was queried to identify special status species that may occur within the Analysis Area (ORBIC 2017; Attachment P-1). ORBIC maintains a geospatial database of occurrence records for rare, listed, and sensitive species in Oregon; but it should be noted that this database represents voluntarily documented and submitted records and does not represent a systematic survey effort. Therefore, the Applicant also consulted other data resources (e.g., Csuti et al. 2001; Marshall et al. 2003; NatureServe 2017; ODFW 2016, 2019; ORBIC 2019; StreamNet 2018). Pre-survey site visits to the Project and aerial photographic interpretation were used to identify preliminary habitat types to assist the field habitat categorization effort.

Prior raptor nest results within the Analysis Area were also reviewed, including the results of raptor nest surveys conducted at the Project in 2011, historical nest records from ODFW and local birders, and bald and golden eagle nest location information for 2012-2018 obtained from the Oregon Eagle Foundation (OEF) from their statewide golden eagle nest survey (Isaacs 2017, 2018, 2019a, 2019b). Prior to conducting bat acoustic surveys, the Applicant reviewed information on bat hibernacula in the vicinity of the Project, and the migratory status of bat species with potential to occur at the Project. The Applicant also reviewed the results of a Critical Issues Analysis (SWCA 2010) and Site Characterization (NWC 2012a) conducted for the Project to answer the Tier 2 questions in the USFWS voluntary land-based wind energy guidelines (WEG; USFWS 2012), the

results of which informed the Tier 3 biological field surveys that were subsequently performed as described in Section 2.2, below.

2.1.2 Washington Ground Squirrel Desktop Review

The Applicant conducted a desktop review of WAGS habitat in areas that could not be field surveyed due to access restrictions or because they were added following surveys in 2019, but that are within 1,000 feet of potential ground-disturbing activities. Based on coordination with ODFW, the Applicant reviewed aerial photographs, Natural Resources Conservation Service soil data, and the results of a records query to ORBIC. The Applicant additionally viewed these areas from within accessible adjacent parcels or public roads when possible, to identify the likely habitat type. The results of this review were provided to ODFW as a memo in December 2019, and are included in Attachment P-1.

2.2 Field Surveys

The Applicant conducted field surveys for the Project from 2017 through 2019 with a focus on the micrositing corridor for pedestrian surveys (e.g., wildlife, wetland, and botanical surveys), at select representative locations for point surveys (e.g., eagle use, avian use, and bat acoustic surveys), and within appropriate buffers of the Project for nest surveys (e.g., raptor nest and eagle nest surveys), as described below. As each year's survey results were processed, locations of Project infrastructure were modified to avoid impacts to sensitive resources, resulting in the need in some cases for additional surveys during the following season. The Applicant will continue to conduct surveys as needed, including surveys for WAGS in 2020 in areas added to the micrositing corridor or granted access following WAGS surveys in spring 2019, and surveys for plants, habitat, and other wildlife where access was not previously available.

Preliminary surveys were also conducted on a previous iteration of the Project in 2010 and 2011 (NWC 2012a, 2012b, 2012c). Methods for all studies were consistent with standards presented in the Oregon Columbia Plateau Ecoregion wind energy siting and permitting guidelines (ODFW et al. 2008). Table P-1 provides a summary of field surveys conducted within the Analysis Area. This exhibit details field surveys conducted 2017-2019; these biological survey reports are included in Attachment P-2.

Table P-1. Summary of Field Surveys Conducted within the Analysis Area between 2010 and 2019

Survey	Year	Reference	Extent
Washington ground squirrel surveys	2017-2019	Tetra Tech 2019a[1]	1,000-foot buffers on Project infrastructure in suitable Washington ground squirrel habitat where accessible.
Pedestrian wildlife surveys	2017-2019	Tetra Tech 2019b[1]	1,000-foot buffers on Project infrastructure in suitable Washington ground squirrel habitat where accessible (conducted concurrently with WAGS surveys).

Survey	Year	Reference	Extent
Botanical surveys	2017-2019	Tetra Tech 2019c[1]	Micrositing corridor, where accessible.
Habitat categorization surveys	2017-2019	Tetra Tech 2019b[1]	Micrositing corridor, where accessible, and remainder of Site Boundary where visible from roads and the micrositing corridor (conducted concurrently with botanical surveys).
Bat acoustic survey	2017	Tetra Tech 2018[1]	Five stations distributed within the Site Boundary.
Raptor nest survey	2019	NWC 2019a[1]	0.5-mile buffer on transmission line corridors where not surveyed in 2017 or 2018.
	2018	NWC 2018a[1]	2-mile buffer on Site Boundary at the time of surveys.
	2017	NWC 2017[1]	2-mile buffer on Site Boundary at the time of surveys.
	2011	NWC 2012a, 2012b, 2012c	2-mile buffer on Site Boundary at the time of surveys.
Eagle nest survey	2018	NWC 2018b[1]	10-mile buffer on Site Boundary at the time of surveys.
	2017	NWC 2018c[1]	10-mile buffer on turbine layout at the time of surveys
	2011	NWC 2012a, 2012b	10-mile buffer on Site Boundary at the time of surveys.
Avian use surveys	2017-2018	NWC 2020[1]	Sixteen 0.5-mile (800-meter) radius survey points within the Site Boundary.
	2010	NWC 2012a, 2012b, 2012c	Seventeen 0.5-mile (800-meter) survey points within the Site Boundary.
Eagle use surveys	2017-2019	NWC 2019b[1]	Twenty-four 0.5-mile (800-meter) survey points within the Site Boundary.
Wetlands and waters surveys	2017-2019	Tetra Tech 2019d	Micrositing corridor, where accessible, excluding some long linear features paralleling Project roads that will be avoided.
1. Also included in Attachment P-2.			

2.2.1 Washington Ground Squirrel Surveys

The Applicant conducted WAGS surveys in 2017, 2018, and 2019 (Attachment P-2). WAGS field surveys involved a team of surveyors walking linear transects spaced 165 to 230 feet (50 to 70 meters) apart within WAGS survey area, documenting and mapping WAGS and their sign (e.g., scat and burrows). The WAGS survey area included 1,000-foot buffers on Project infrastructure (i.e., a 2,000-foot corridor encompassing transmission lines, access roads, collector lines, turbines, substations, and operations and maintenance facilities) in potential WAGS habitat. Potential habitat included non-agricultural habitats and non-developed lands. WAGS surveys were initiated in 2017 and conducted in the vicinity of Project infrastructure as proposed at that time; surveys in 2018

and 2019 primarily included additional areas in the vicinity of revised infrastructure locations as well as fallow agricultural fields that had recently enrolled in the U.S. Department of Agriculture Conservation Reserve Program (CRP).

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). Potential habitat was surveyed twice during the survey period. Due to the harsh winter conditions and late spring in 2017, the ODFW approved survey dates for this Project of May 15 to June 9, 2017 (Tetra Tech 2019a). As a result, the WAGS survey area was surveyed once in May and once in June of 2017. In 2018, WAGS surveys occurred between April 10 and May 14, divided over two phases and spaced by one month. In 2019, WAGS surveys occurred between April 13 and May 31, 2019, divided over two phases and spaced by 2 to 3 weeks. In all years, the second phase of surveys included transects offset from the first phase transects, to increase coverage by traveling in between the transect paths walked during the first phase of surveys. WAGS surveys are further discussed in Exhibit Q. The results of WAGS surveys informed habitat categorization as described in this exhibit.

2.2.2 Pedestrian Wildlife Surveys

Pedestrian wildlife surveys targeted special status species including federal and state endangered, threatened, proposed, and candidate species, species of concern, birds of conservation concern, sensitive, and sensitive-critical species. The Applicant prepared a list of the special status species potentially occurring within the Site Boundary prior to conducting surveys to ensure surveyor familiarity with the species. Surveyors also documented special habitats and unique features if encountered. These included raptor nests, big game, cliffs, rimrock, rock outcrops, and talus slopes.

The Applicant conducted surveys for wildlife concurrently with targeted surveys for the state endangered WAGS (discussed in Exhibit Q), which included walking transects within non-cultivated and non-developed land within 1,000 feet of proposed Project infrastructure. Special status wildlife and unique features were recorded along these transects, as well as elsewhere within the Site Boundary if observed while driving roads and traveling on foot between transects.

The Applicant conducted special status pedestrian wildlife surveys May 15 through June 9, 2017, April 10 through May 14, 2018, and April 13 through May 31, 2019. These survey dates coincide with a period of high biological activity of neotropical migrant and breeding birds, foraging and breeding animal species, and other taxa. Surveyors recorded the Global Positioning System (GPS) location of special status wildlife species (or recognizable sign) and recorded information on the number of individuals, behavior, and habitat characteristics. The results of pedestrian wildlife surveys informed habitat categorization and sensitive species presence and habitat use described in this exhibit.

2.2.3 Botanical Surveys

The Applicant conducted field surveys for listed and candidate plant species in 2017, 2018, and 2019 (Attachment P-2). Surveyors used an intuitive controlled transect methodology to locate

plants. Surveys were conducted within the micrositing corridor, which included buffers on Project infrastructure (i.e., 500-foot buffers on each side of turbine strings and 150-foot buffers on each side of transmission lines, access roads, collector lines, substations, and operations and maintenance facilities) as proposed prior to surveys, and excluding active agricultural fields as they do not support target species, resulting in a variable 300 to 1,000-foot-wide corridor. When an area with high potential for target plants was encountered, 100 percent of that area was surveyed for target plants. In addition to recording observations of special status plant species, surveyors also noted the presence of ODA-listed noxious weed species (ODA 2019).

Field surveys were scheduled to coincide with the identification period for the three target species with potential to occur within the Survey Area: Laurence's milkvetch (*Astragalus collinus* var. *laurentii*), dwarf evening-primrose (*Eremothera* [*Camissonia*] *pygmaea*), and sessile mousetail (*Myosurus sessilis*). Botanical surveys were conducted from June 26 through July 20, 2017, from July 9 through July 13, 2018, and from June 24 through July 12, 2019.

The results of botanical surveys and a discussion of potential adverse impacts to listed and candidate plant species are discussed in Exhibit Q. The presence and relative abundance of noxious weeds documented during botanical surveys informed the habitat categorization described in this exhibit.

2.2.4 Habitat Categorization Surveys

The Applicant categorized habitats based on field survey results within the Site Boundary with a focus on the micrositing corridor. Outside of the Site Boundary, areas within the Analysis Area were primarily categorized based on desktop analysis.

Habitat types for the Project were adapted from *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001). The characteristics of each habitat type and conditions of habitat type used to assign an ODFW habitat category are described in Table P-1. In the field, surveyors digitized polygons of relatively homogenous vegetation over aerial photos, and characterized the composition and structure on the field datasheet. Each delineated vegetation polygon was assigned a habitat type, sub-type, and habitat quality category as outlined in Table P-2 (see Section 3.1). Habitat types and categories were not assigned to wetlands and waters in the field as they were derived from data collected during wetlands and waters surveys where available. A minimum mapping unit of 1 acre was implemented, except for specialized habitat types such as cliffs.

Habitat categorization surveys were conducted concurrently with botanical surveys, which included walking meandering transects within non-cultivated land within 150 to 500 feet of proposed Project infrastructure. While walking these transects, surveyors digitized habitats within these focused corridors, and also scanned the landscape and digitized habitats within the viewshed in order to map and categorize 100 percent of the Site Boundary. Additional mapping was also conducted by driving Project roads and digitizing habitat from vantage points that allowed extensive views across the open landscape at the Project. Where access permission was restricted,

primarily along the transmission line corridors, surveyors mapped habitats from public roads as feasible.

Following field surveys, the digitized boundaries were downloaded and processed in a Geographic Information System (GIS), and the field datasheets were incorporated into the spatial data. Data were reviewed for quality control and processed to incorporate wetlands and waters data. Documented use of habitat by special status wildlife such as WAGS was also incorporated into the data following field surveys.

Where habitat was categorized based on desktop analysis, this analysis included: 1) the preliminary classification of habitats through the use of *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001) and the *NW Regional Gap Analysis Project* (Aycrigg et al. 2013) data layers, and 2) final classification and categorization through aerial photograph interpretation and the use of other available data layers, such as National Wetland Inventory (USFWS 2017) and National Hydrography Dataset (USGS 2001).

2.2.5 Bat Acoustic Surveys

The Applicant conducted bat acoustic monitoring at the Project May 18 to November 8, 2017, using three ground-based bat detectors (Wildlife Acoustics Song Meter Monitoring Systems; SM2BAT+) and two detectors (SM3BAT) installed on met towers with high and low microphones. Ground-based microphones were mounted at a height of 7 feet (2 meters) to avoid ground vegetation and to elevate the zone of detection; high met tower microphones were hoisted to a height of approximately 98 feet (30 meters) and 148 feet (45 meters) at the two met tower stations, respectively. The survey spanned the spring migration, summer, and fall migration periods for Oregon's bat species, including migratory and non-migratory species. Sampling sites were located in representative habitats within the Site Boundary, in areas with potential for high bat activity and diversity, and in accessible areas. Microphones were oriented in line with suspected flight paths to increase the potential number of call pulses and quality of recordings. Following field surveys, the bat acoustic data were analyzed using a two-phased approach: 1) filter data to remove non-bat sounds and assign an initial species or group classification with a USFWS-approved software program (see USFWS 2016a), and then 2) manually review and cross-validate a subset of this data using an additional, independent echolocation software program to confirm species presence. These data were filtered and initially classified using Kaleidoscope Pro (Wildlife Acoustics, Inc.) version 4.2.0, with the classifier "Bats of North America 4.2.0" for species of bats in Oregon.

After filtering and initial classification of the acoustic data, species presence was cross-validated and manually confirmed for a subset of the data using SonoBat (SonoBat, Inc.) version 4.2.1 with the eastern Oregon regional classifier. During manual review, a recording was considered suitable for species level identification if the recording included search phase pulses, individual call pulses within the bat pass were not oversaturated, and preferably included the presence of harmonics. For species with a low volume of bat passes auto-classified to the species level, such as pallid bat (*Antrozous pallidus*) and Yuma myotis (*Myotis yumanensis*), all passes were manually reviewed. For the remainder of the recordings classified to the species level, bat passes were filtered based on two

parameters (recordings with more than five pulses and a matching pulse ratio greater than 66 percent) to ensure only high-quality bat passes were considered. Bat passes lacking detail to be identified at the species level (e.g., too far from the microphone or noise interference) were classified as "high frequency species" if the characteristic frequency was greater than 35 kilohertz and "low frequency" if the characteristic frequency was lower than 35 kilohertz. For each species, at least one bat pass was manually confirmed per species per station per month. The results of bat acoustic surveys were used to inform state sensitive bat species presence and habitat use described in this exhibit.

2.2.6 Raptor and Eagle Nest Surveys

The Applicant conducted a general aerial raptor nest survey on June 2 and June 6, 2017 and May 1, 2018 of the Site Boundary plus a 2-mile buffer. On May 15, 2019, the Applicant conducted a general raptor nest survey of the proposed transmission line corridors plus a 0.5-mile buffer, excluding areas surveyed in 2017 and 2018. During these topography-based aerial surveys, all potential nesting areas were examined, including trees, rock formations, and transmission line towers. All raptor and corvid nests were recorded using a hand-held GPS unit. Determination of activity status (active or inactive) was made using a combination of visual clues, such as adult behavior, presence of eggs or young, or presence or absence of whitewash (excrement). Ground-based observations of a few nests (active nests within the Site Boundary or along roads leading to the Project) were made during avian use and eagle use studies that began in late March and continued through the raptor breeding season. The results of raptor nest surveys were used to inform the assessment of state sensitive raptor species use of the Project for breeding, as well as turbine siting and potential timing restrictions during construction.

Eagle nest surveys and monitoring occurred between March 28 and June 20, 2017, and March 30 and July 13, 2018, and included both helicopter surveys and ground monitoring as possible based on site access. All survey and monitoring followed standard protocols and guidelines (Pagel et al. 2010; USFWS 2013, 2016b). For territories that could only be surveyed and monitored from the air (i.e., where ground access was precluded), occupancy could be documented—by observing one or more eagles—but non-occupancy could not be confirmed. The survey covered the Site Boundary and all suitable breeding substrate within 10 miles of proposed turbines (known as of March 2017) in 2017, and within 10 miles of the Site Boundary in 2018. Due to property access limitations outside the Site Boundary, surveys were primarily conducted from a helicopter. The results of eagle nest surveys were used to inform the assessment of eagle use of the Project for breeding described briefly in this exhibit.

2.2.7 Avian and Eagle Use Surveys

The Applicant conducted weekly avian use surveys from March 27, 2017 through March 19, 2018 using methods consistent with recommendations in the WEG (USFWS 2012). Surveys were conducted during diurnal hours using a variable circular-plot method (Reynolds et al. 1980) to obtain information on seasonal use, relative abundance, and flight altitudes of bird species within

the Site Boundary. Sixteen 0.5-mile (800-meter) radius survey points were established in such a distribution as to be representative of the types and proportions of the habitat and of the topographic situations within the Site Boundary, inclusive of the turbine strings as proposed at the time of surveys. Points were non-overlapping, and were chosen by the avian biologist to provide excellent viewing conditions and thorough sampling of the proposed turbine strings. Experienced observers positioned at the center of the point recorded all vertebrate wildlife seen or heard during 20-minute point counts. Survey starting point locations and times of day were alternated among surveys to reduce spatial and temporal bias. Species, number, flight height, weather, habitat association, behavior, and other general data were recorded. The results of avian use surveys were used to inform the assessment of impacts to state sensitive species described in this exhibit.

The Applicant performed eagle use surveys from March 27, 2017 through March 15, 2019 using methods consistent with USFWS Eagle Conservation Plan Guidance Module 1 – Land Based Wind Energy (ECPG; USFWS 2013; see Attachment P-2). In 2017, 24 half-mile (800-meter) radius survey points were established to provide a minimum of 30 percent coverage of the March 2017 proposed turbine locations and a 0.6-mile (1-kilometer) buffer around them. In 2018, half of the survey locations were moved to provide a minimum of 30 percent coverage of the March 2018 proposed turbine locations and a 0.6-mile (1-kilometer) buffer. Points were non-overlapping and were representative of the habitat types and variation in topography within the Site Boundary. Surveys were performed at each point for 1 hour every other week (generally 12 points per week), and survey starting point locations and times of day were alternated among surveys to minimize spatial and temporal bias. Survey points consisted of a cylinder with a 0.5-mile (800-meter) radius and 656-foot (200-meter) height above ground. Surveys were not conducted when weather precluded visibility of the entire survey cylinder. The surveyor recorded all eagles seen or heard during hour-long surveys, whether inside or outside the points, including observations of flight paths and the number of minutes spent flying within the cylinder (exposure minutes). Eagle flight paths were subsequently digitized into a GIS database. The results of eagle use surveys were used to inform the assessment of eagle use of the Project described briefly in this exhibit.

2.2.8 Wetlands and Waters Surveys

The Applicant conducted wetlands and waters surveys within the micrositing corridor in 2017, 2018, and 2019 (see Wetland Delineation Report, Attachment J-2 to Exhibit J). Field delineations were performed July 17–22 and September 19–22 of 2017; April 23–27 and July 17–21 of 2018; and July 8–12 of 2019. The Applicant 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 habitat categorization and the determination of state sensitive species presence described in this exhibit.

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

3.1 Description of Habitat Types and Categories within the Analysis Area

Table P-2 describes habitat categories and types found within the Analysis Area, including the vegetation and other characteristics of each habitat type and category. During field surveys, the Applicant identified habitat that met the definitions for Category 2, 3, 4, 5, and 6 habitats (Attachment P-2). Based on consultation with ODFW, the Applicant mapped suitable WAGS habitat within 785 feet of active WAGS colonies as Category 1 habitat, and suitable habitat within 4,921 feet of WAGS Category 1 habitat as Category 2 habitat. The Applicant also mapped a small area outside the Site Boundary but within the Analysis Area within ODFW-designated Mule Deer Winter Range (ODFW 2013) as Category 2 habitat.

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Table P-2. Habitat Types within the Analysis Area

Habitat Type[1]	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Active WAGS Colony Overlay applies to sub-types Eastside Grasslands, Shrub-Steppe, Irrigated Pastures and Hay Meadows, and select Planted Grasslands (i.e., excluding Planted Grasslands recently converted from wheat cultivation as they are not irreplaceable, essential, or limited)		Active WAGS colony with a 785-foot buffer (area required for squirrel survival) in suitable habitat.	Additional 4,921-foot (1.5-km) buffer (area of potential WAGS use) of WAGS Category 1 habitat except where there are habitat barriers to dispersal.	N/A	N/A	N/A	N/A
Big Game Winter Range Habitat Overlay applies to all habitat sub-types except for cropland (i.e., Orchards, Vineyards, Wheat Fields, Other Row Crops) and developed areas (i.e., Urban and Mixed Environs)		N/A	Mule Deer Winter Range as designated by ODFW (2013).	N/A	N/A	N/A	N/A
Open Water – Lakes, Rivers, Streams	Permanent Ponds/Lakes Open water areas, including natural lakes, reservoirs, stock ponds, beaver ponds	N/A	N/A	Most other open water areas with lower-quality habitat (for example, some habitat requisites missing or bullfrogs abundant).	Highly degraded open water area, dominated by non-native vegetation or no vegetation around margins (for example, highly degraded stock pond).	N/A	N/A
	Seasonal Ponds Open water areas that contain water part of the year	N/A	Seasonal ponds with high quality, mostly native vegetation.	Seasonal ponds with lower-quality habitat that is still dominated by native plant species.	Highly degraded, with a higher proportion of non-native vegetation or no vegetation around margins (for example, a seasonal stock pond).	Habitat almost completely dominated by non-native plant species or otherwise highly degraded.	N/A
	Perennial Streams Streams mapped by USGS having permanent (year-round) flow	N/A	Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data.	N/A	N/A	N/A
	Intermittent or Ephemeral Streams Streams mapped by USGS as intermittent	N/A	Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels that drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.	Non-fish-bearing ephemeral streams or excavated channels with high restoration potential, including canals; not important habitat.	N/A

Habitat Type[1]	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Wetlands	Emergent Wetlands Emergent wetlands with herbaceous vegetation	N/A	N/A	Mixture of native and non-native plant species and low to moderate disturbance	N/A	Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	N/A
	Scrub-shrub Wetlands Wetlands with woody vegetation less than 20 feet tall	N/A	High quality habitat, dominated by native plant species;	Mixture of native and non-native plant species and low to moderate disturbance	N/A	N/A	N/A
	Forested Wetlands Forests (defined as areas with a minimum of 40% canopy closure > 20 feet tall), dominated by wetland indicator species	N/A	N/A	Mixture of native and non-native plant species at sapling, pole, sawtimber stage	N/A	N/A	N/A
Riparian Forest and Natural Shrubland Complexes	Eastside Riparian	N/A	High quality, diverse riparian areas that are not degraded.	Typical mid-seral riparian, provides wildlife habitat.	Provides marginal habitat; somewhat degraded.	N/A	N/A
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands Grassland areas with few shrubs (not irrigated or cultivated/planted)	N/A	N/A	Moderately disturbed habitat with a mix of natives and non-natives (i.e., between 50 and 75% ground cover is native), or highly disturbed habitat (i.e., between 15 and 50% ground cover is native) that contains a sagebrush component.	Highly disturbed habitat with a high percentage of non-native plant species (i.e., between 15 to 50% ground cover is native), or very highly disturbed habitats (i.e., less than 15% ground cover is native) that contain a sagebrush component.	Very highly disturbed habitats with a high percentage of non-native plant species (i.e., less than 15% ground cover is native), but which do not contain a sagebrush component.	N/A
	Shrub-steppe Grassland and shrubland mosaic	N/A	N/A	Habitat that is limited within the area (e.g., relatively undisturbed habitat); high degree of cover; moderate cover by weeds, moderate structure/forage for wildlife.	Important wildlife habitat that is moderately to heavily degraded and weedy habitat.	Very low quality dominated by non-native species with high restoration potential.	N/A
Agriculture, Pasture, and Mixed Environs	Planted Grasslands	N/A	N/A	Croplands planted to grassland with characteristics necessary to potentially provide habitat for sensitive wildlife due to cover and forage quality.	Croplands planted to grassland that lack later seral stage vegetative communities or are of less importance as wildlife habitat due to management or location.	Croplands planted to grassland that lack later seral stage vegetative communities and are highly disturbed or degraded, and have high restoration potential.	N/A
	Orchards, Vineyards, Wheat Fields, Other Row Crops	N/A	N/A	N/A	N/A	N/A	Active agricultural areas with low potential for restoration.
	Irrigated Pastures and Hay Meadows	N/A	N/A	N/A	N/A	Potential habitat for wildlife.	N/A
Cliffs, Caves, and Talus		N/A	N/A	Sites without bat colonies.	N/A	N/A	N/A
Urban and Mixed Environs		N/A	N/A	N/A	N/A	N/A	All developed areas.

Note: habitat types and categories not found within the Analysis Area prior to the application of wildlife overlays are not described here; for comparative purposes, see Attachment P-2 for descriptions of habitat types and categories considered but not found within the Analysis Area.

1. Definitions were meant to serve as a guide, but ODFW definitions of each category type were always considered.

3.2 Quantity of Habitat Types and Habitat Categories within the Analysis Area

Table P-3 shows the acreages within the Analysis Area of each habitat type and assigned habitat category. The location of each habitat type and category within the Analysis Area are shown on Figures P-2 and P-3, as directed by OAR 345-021-0010(1)(p)(C). Presence of a particular habitat category within the Analysis Area does not indicate that this habitat will necessarily be impacted by the Project. A table of the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and habitat type are presented in Section 6 with the discussion on potential impacts to fish and wildlife habitat.

Table P-3. Acres of Habitat Types and Habitat Categories within the Analysis Area

Habitat Type	Habitat Sub-type	Total Acres within Analysis Area	Acres within Analysis Area[1]					
			Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Open Water - Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	382	-	6	90	261	25	-
	Perennial Streams	198	-	198	<1	-	-	-
	Permanent Ponds/Lakes	1	-	-	1	<1	-	-
	Seasonal Ponds	7	-	<1	4	<1	3	-
Wetlands	Emergent Wetlands	67	-		58	-	9	-
	Scrub-shrub Wetlands	3	-	1	2	-	-	-
	Forested Wetlands	20	-		20	-	-	-
Riparian Forest and Shrubland Complexes	Eastside Riparian	319	-	1	185	133	-	-
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	39,270	1,362	12,207	10,504	10,655	4,542	-
	Shrub-steppe	1,134	12	312	657	20	132	-
Agriculture, Pasture and Mixed Environs	Planted Grasslands	10,560	16	829	2,650	2,704	4,361	-
	Orchards, Vineyards, Wheat Fields, Other Row Crops	25,322	-	-	-	-	-	25,322
	Irrigated Pastures and Hay Meadows	53	-	19	-	-	35	-
Cliffs, Caves, and Talus	N/A	70	-	-	70	-	-	-
Urban Mixed Environs	N/A	1,213	-	-	-	-	-	1,213
Totals		**78,618**	**1,391**	**13,573**	**14,240**	**13,772**	**9,107**	**26,535**

Note: numbers may not sum correctly due to rounding. "-" means no acres while <1 means greater than zero but less than 0.5 acres present within the Analysis Area.
1. Acres represent area within the Analysis Area not impact areas. Impacts are discussed in Section 6.

4.0 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;

4.1 Identification of State Sensitive Species

Based on the information review and field surveys (see Section 2.0), 25 state sensitive and two eagle species have the potential to occur within the analysis area (Table P-4; ODFW 2019). State endangered, threatened, and candidate species are addressed in Exhibit Q. Of these 25 species, 9 are sensitive-critical species and 16 are sensitive species in the Columbia Plateau Ecoregion (Table P-4). While not state sensitive species, bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are addressed briefly in this document as a species of concern protected under the Bald and Golden Eagle Protection Act (BGEPA).

Fish species determined by ODFW to be sensitive are described through species management units (SMUs) per the Native Fish Conservation Policy (OAR 635-007-0504(6)). The Analysis Area includes the Umatilla River and Butter Creek. Some fish species' distribution is not well known, so ODFW lists them as sensitive range-wide by ecoregion. Fish species determined by ODFW to be sensitive in the Columbia Plateau Ecoregion are included in Table P-4. Fish that ODFW has designated as sensitive in the Umatilla SMU, Middle Columbia SMU, or range-wide that occur within the Columbia Plateau Ecoregion are also included in Table P-4.

Table P-4. State Sensitive Species with the Potential to Occur within the Analysis Area

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Mammals						
hoary bat	*Lasiurus cinereus*	SOC	S	Found in forested upland habitats, including junipers. Long-distance migrant.	Detected during acoustic bat surveys.	Limited habitat available. Probable transient during migration periods.
pallid bat	*Antrozous pallidus*	SOC	S	Caves/karst, desert scrub, grassland, and shrubland. Non-migratory.	Detected during acoustic bat surveys.	Limited potential summer and winter habitat available, including karst formations present within rock outcrops and cliffs.
silver-haired bat	*Lasionycteris noctivagans*	SOC	S	Associated with older Douglas-fir/western hemlock and ponderosa pine forests as well as juniper woodland habitat near streams, ponds and lakes. Roosts in tree cavities, under loose bark, caves, mines and in abandoned buildings. Long-distance migrant.	Detected during acoustic bat surveys.	Limited habitat available. Probable transient during migration periods.
spotted bat	*Euderma maculatum*	SOC	S	Uses crevices in cliffs, caves and canyon walls for day and nights roosts. Will also roost in trees at night and typically forage in meadows, shrub-steppe, or water sources. Regional migrant.	Not detected during acoustic bat surveys. Not expected to occur as the Analysis Area is outside of modeled habitat and there are no large cliffs available for roosting.	Limited habitat available. Potential transient.

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Townsend's big-eared bat	*Corynorhinus townsendii*	SOC	SC	Found in natural caves, mines, and buildings in the summer. Hibernates October to April in caves and mines. Regional migrant.	Not detected during acoustic bat surveys. Not expected to occur as the Analysis Area is outside of modeled habitat.	Limited habitat available. Potential transient.
Birds						
bald eagle	*Haliaeetus leucocephalus*	BCC, BGEPA	–	Nests in forested areas adjacent to large bodies of water. Nests in trees, rarely on cliff faces and ground nests in treeless areas. Known to scavenge opportunistically on carcasses in otherwise unsuitable habitat particularly during migration.	Observed during surveys.	Umatilla River could provide foraging habitat. Livestock rangeland could provide occasional carcasses for scavenging.
Brewer's sparrow	*Spizella breweri*	BCC	S	Abundant east of the Cascades in sagebrush communities.	Observed once during pedestrian wildlife surveys.	Limited sagebrush habitat available.
burrowing owl	*Athene cunicularia hypugaea*	SOC	SC	Nests in earthen burrows in open shrub-steppe regions and grasslands.	Observed during surveys. Nesting/breeding activity confirmed in the Analysis Area.	Breeding and foraging habitat available throughout the Analysis Area.
common nighthawk	*Chordeiles minor*	–	S	Nests in open landscapes with little ground cover and is most abundant in sagebrush and rock scablands of eastern Oregon.	Observed during surveys. Nesting activity confirmed in the Analysis Area.	Nesting and foraging habitat available.

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
ferruginous hawk	*Buteo regalis*	BCC, SOC	SC	Occurs in the open landscapes east of the Cascades, most common in the foothills of the Blue Mountains. Nests on the ground or in lone or peripheral trees.	Observed during surveys. Nesting activity confirmed in the Analysis Area.	Nesting and foraging habitat available.
golden eagle	*Aquila chrysaetos*	BCC, BGEPA	-	Usually nests on cliffs but also can nest in trees. Breeds in open and semi-open habitats at a variety of elevations, in tundra, shrublands, grasslands, woodland-brushlands, and coniferous forests, farmland and riparian areas. Typically forages in open habitats like grasslands, areas with steppe-like vegetation.	Observed during surveys.	Limited cliff and tress nesting habitat available. Foraging habitat available throughout most of Analysis Area.
grasshopper sparrow	*Ammodramus savannarum*	-	S	Prefers open grasslands, found in scattered colonies along unforested northern slopes of the Blue Mountains.	Most common sensitive species observed during pedestrian wildlife surveys. Individuals observed in grassland and agricultural habitat types as well as shrub-steppe.	Breeding and foraging habitat available throughout the Analysis Area.

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Lewis's woodpecker	*Melanerpes lewis*	BCC, SOC	SC	Formerly widespread in Oregon, it is currently common year-round only in the white oak-ponderosa pine belt east of Mt. Hood. It also breeds in low numbers in open habitat along east Oregon river and stream valleys.	Not observed during surveys. Potential to occur in low numbers in riparian forests along the Umatilla River crossed by the BPA transmission line.	Riparian forest along the Umatilla River provides potential breeding and foraging habitat.
loggerhead shrike	*Lanius ludovicianus*	BCC	S	Breeds in open habitats east of the Cascades.	Observed during surveys in agricultural and shrub-steppe habitat types.	Limited potential habitat.
long-billed curlew	*Numenius americanus*	BCC	SC	Locally common breeder in open grassland areas east of the Cascades. It is most abundant in the Columbia River basin.	Observed during surveys. Individuals observed in grassland and agricultural habitat types.	Breeding habitat available throughout the grassland habitat.
sagebrush sparrow	*Artemisiospiza nevadensis*	BCC	SC	Widespread throughout the extensive shrub-steppe of eastern Oregon. Usually associated with big sagebrush.	Observed twice during surveys.	Limited sagebrush habitat available.
Swainson's hawk	*Buteo swainsoni*	-	S	Prefers bunchgrass prairies of eastern Oregon and common in the foothills of the Blue Mountains. Nests typically in solitary tree, bush, or small grove.	Observed during surveys. Nesting activity confirmed in the Analysis Area.	Limited trees available for breeding. Foraging habitat available throughout the Analysis Area.

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Reptiles						
California mountain kingsnake	*Lampropeltis zonata*	SOC	S	Pine forests, oak woodlands, and chaparral. Usually found in, under, or near rotting logs in open wooded areas near streams.	Not observed during surveys. Not expected to occur. No potential habitat occurs in the Analysis Area.	None expected
northern sagebrush lizard	*Sceloporus graciosus*	SOC	S	Found in sagebrush habitat, but also chaparral, juniper woodlands, and coniferous forests.	Not observed during surveys. Expected to occur as sagebrush habitat exists in the Analysis Area. However, sagebrush habitat is limited and therefore few individuals are expected to occur.	Limited sagebrush habitat available and no chaparral, juniper woodlands, or coniferous forests present.
western painted turtle	*Chrysemys picta bellii*	-	SC	Found in marsh ponds, small lakes, slow-moving streams, and quiet, off-channel portions of rivers.	Not observed during surveys. Expected to occur as habitat is present at lower elevations of the Umatilla River subbasin.	Potential use limited to off-channel portions of the Umatilla River.
Fish						
bull trout (Umatilla Species Management Unit [SMU])	*Salvelinus confluentus*	T	SC	Cold freshwater streams with abundant low silt pools and riffles for rearing and spawning or lakes for rearing. Streams with free passage for spawning and migration.	Known to occur. Adult bull trout rear and overwinter in the lower reaches of the Umatilla River and migrate upstream to spawning habitat.	Potential breeding habitat available within Umatilla River.

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
fall chinook (Mid-Columbia River SMU)	*Oncorhynchus tshawytscha*	-	S	During birth, rearing, and spawning: cool to cold freshwater streams with abundant low silt pools and riffles. Migration: streams with free passage. Adulthood: ocean.	Known to occur. While Umatilla River populations became extinct in the early 1900s, reintroduction efforts have re-established a population. Spawning and rearing habitat occurs in the Umatilla River.	Potential breeding habitat available within Umatilla River.
spring chinook (Middle Columbia SMU/ Evolutionarily Significant Unit [ESU])	*Oncorhynchus tshawytscha*	-	S	During birth, rearing, and spawning: cool to cold freshwater streams with abundant low silt pools and riffles. Migration: streams with free passage. Adulthood: ocean.	Known to occur. While Umatilla River populations became extinct in the early 1900s, reintroduction efforts have re-established a population. Rearing and migration habitat occurs in the Umatilla River.	Potential breeding habitat available within Umatilla River.
steelhead (Middle Columbia River SMU/ESU, summer run)	*Oncorhynchus mykiss*	T	SC	During birth, rearing, and spawning: cool to cold freshwater streams with abundant low silt pools and riffles. Migration: streams with free passage. Adulthood: ocean.	Known to occur. Umatilla River used for rearing and migration and Butter Creek is used for spawning and rearing.	Potential breeding habitat available within Umatilla River and Butter Creek.

Common Name	Scientific Name	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Pacific lamprey	*Entosphenus tridentatus*	SOC	S	During birth, rearing, and spawning: freshwater streams. Migration: streams with free passage. Adulthood: ocean.	Known to occur. Recent reintroductions have resulted in returns of anadromous adults passing Three Mile Falls Dam and spawning has been documented in the Umatilla River.	Potential breeding habitat available within Umatilla River.
western brook lamprey	*Lampetra richardsoni*	-	S	Riffles and side channels for spawning, silty backwater habitats for rearing.	Expected to occur. Species mostly known from coastal streams but found inland through the Columbia River and its tributaries as far as the Yakima River.	Potential breeding habitat available within Umatilla River.
western river lamprey	*Lampetra ayresii*	SOC	S	Spawn in gravel bottomed streams with riffles. Low velocity large deep-water rivers with a silt or sand substrate for rearing. Adulthood: ocean.	Not expected to occur. Distribution of the species is described, in part, as inland in the Columbia River to the Columbia Gorge. Presence in the Umatilla River or other streams in the Analysis Area is unlikely.	Potential but unlikely breeding habitat available within Umatilla River.

Sources: Bat Conservation International 2020; Csuti et al. 2001; Institute for Natural Resources 2018; Kostow 2002; ODFW 2005, 2018, 2019; StreamNet 2018; USFWS 2008; Ward et al. 2012; and Western Bat Working Group 2020. See Attachment P-2 for observed occurrences during field surveys.

1. Federal Status: T = Threatened, SOC = Species of Concern, BCC = Bird of Conservation Concern, BGEPA = Bald and Golden Eagle Protection Act.

2. Oregon Department of Fish and Wildlife (ODFW) Status: SC = Sensitive-Critical Species, S = Sensitive Species.

4.2 Site-Specific Issues Identified by ODFW

ODFW identified Alkali Canyon, which bisects the central portion of the Analysis Area, as a significant area of raptor use relative to the surrounding landscape. In a May 30, 2018 memo (Attachment P-1), ODFW stated that it is likely that juvenile raptors will attempt to forage on the uplands above the canyon rims and will try to achieve foraging altitudes by taking advantage of weak thermal uplift coming up off the gentle slopes of the canyon putting them at risk for turbine strike. Based on this concern, ODFW recommended a 656-foot (200-meter) setback of wind turbines from the rim of Alkali Canyon. In the case of Alkali Canyon, rim refers to the rocky breaks about three-quarters up the slope of the canyon.

5.0 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;*

The use of habitat in the Analysis Area by state sensitive species is described in Table P-5. The table also includes a description of each species' habitat requirements and a brief description of the known or expected occurrence of the species in the Analysis Area. To determine if each species was expected to use the habitat within the Analysis Area for breeding, foraging, or other important activities, the Applicant analyzed the known habitat and range information for each species and compared this to the habitats mapped within the Analysis Area.

Project surveys documented state sensitive species' use of the Analysis Area. Details on the survey methodology are summarized in Section 2.0. Additional details on the methods, as well as the results, are provided in Attachment P-2. Observations of state sensitive species during all field surveys for the Project are summarized in Table P-5.

5.1 Pedestrian Wildlife Surveys

State sensitive species and eagles observed during pedestrian wildlife surveys at the Project are shown on Figure P-4 and described in Table P-5, below. The probability of detection of individual species is dependent on many factors including activity patterns of the species, timing of surveys, amount of time surveyors were present in a particular area, and detectability of the species. The number of observations for each species shown on Figure P-4 should not be interpreted as a measure of the number of individuals present within the Analysis Area. It is the number of independent observations of a species, with multiple individuals tallied when observed together. Independent observations could represent repeated observations of the same individual at different times.

Table P-5. Habitat Use of State-Sensitive Species and Documented within the Analysis Area during Pedestrian Wildlife Surveys 2017-2019

Species	Oregon Status[1]	Number of Individual Observations Within Analysis Area[2]	Habitat Subtypes Where Observed
ferruginous hawk *Buteo regalis*	SC	14	Eastside Grasslands (10); Urban and Mixed Environs (2); Orchards, Vineyards, Wheat Fields, Other Row Crops (1); Planted Grasslands (1)
grasshopper sparrow *Ammodramus savannarum*	S	1,142	Eastside Grasslands (705); Planted Grasslands (420); Shrub-steppe (9); Cliffs, Caves, and Talus (3); Intermittent or Ephemeral Streams (2); Planted Grasslands; Orchards, Vineyards, Wheat Fields, Other Row Crops (2); Urban and Mixed Environs (1)
loggerhead shrike *Lanius ludovicianus*	S	16	Shrub-steppe (11); Urban and Mixed Environs (3); Irrigated Pastures and Hay Meadows (1); Eastside Riparian (1)
long-billed curlew *Numenius americanus*	SC	174	Eastside Grasslands (119); Planted Grasslands (25); Orchards, Vineyards, Wheat Fields, Other Row Crops (21); Shrub-steppe (7); Intermittent or Ephemeral Streams (2)
Swainson's hawk *Buteo swainsoni*	S	32	Eastside Grasslands (14); Planted Grasslands (5); Orchards, Vineyards, Wheat Fields, Other Row Crops (4); Intermittent or Ephemeral Streams (3); Eastside Riparian (3); Urban and Mixed Environs (3)
sagebrush sparrow *Artemisiospiza nevadensis*	SC	2	Planted Grasslands (2)
golden eagle *Aquila chrysaetos*	-	4	Eastside Grasslands (1); Planted Grasslands (3)
burrowing owl *Athene cunicularia hypugaea*	SC	3	Eastside Grasslands (2); Planted Grasslands (1)
Brewer's sparrow *Spizella breweri*	S	1	Eastside Grasslands (1)
bald eagle *Haliaeetus leucocephalus*	-	1	Eastside Grasslands (1)

1. SC = Sensitive-Critical Species, S = Sensitive Species
2. The number of observations shown tallies multiple individuals per location in some instances and may include multiple counts of the same individual within and between years.

In addition to documenting sensitive species, pedestrian wildlife surveys also documented raptor nests, with a focus on ground-nesting species that are not typically detected during aerial raptor nest surveys such as burrowing owl (*Athene cunicularia hypugaea*). In 2019, one active burrowing

owl burrow was observed within the Site Boundary. The Applicant observed two adult burrowing owls along with whitewash and owl pellets at a burrow, which was located in Eastside Grassland in the southern portion of the proposed Site Boundary (Figure P-5; Attachment P-2).

5.2 Bat Acoustic Surveys

A total of 11,408 bat passes were recorded and identified to the species level during bat acoustic surveys conducted in 2017, resulting in an overall activity rate of 10.1 bat passes/detector-night. Activity rates across all detectors ranged from 0 bat passes/detector-night to 295 bat passes/detector-night, with the greatest rate occurring at Station ORNH-02, located in Alkali Canyon which runs northwest-southeast through the center of the Site Boundary (see Figure S-1 in Exhibit S). State sensitive bat species detected during acoustic surveys for the Project included hoary bat (*Lasiurus cinereus*: 15 percent of the total passes recorded), silver-haired bat (*Lasionycteris noctivagans*; 10 percent of the total passes recorded), and pallid bat (less than 1 percent of total passes). Other species detected included little brown bat (*Myotis lucifugus*; 6 percent of the total passes recorded), canyon bat (*Parastrellus hesperus*; 6 percent of the total passes recorded), California myotis (*Myotis californicus*; 3 percent of the total passes recorded), unidentified myotis species and long-legged myotis (*Myotis volans*; 2 percent of the total passes recorded), and big brown bat (*Eptesicus fuscus*; 1 percent of the total passes recorded). Overall mean activity rates for each species are provided in Table P-6.

Table P-6. Overall Mean Activity Rates (Bat Passes/Night) Recorded per Species

Species	Overall Mean (All Detectors)	Standard Error of Overall Mean
pallid bat *	0.01	<0.01
big brown bat	0.14	0.02
hoary bat *	1.54	0.28
silver-haired bat *	0.97	0.16
California myotis	0.29	0.06
western small-footed myotis	5.47	0.6
little brown bat	0.63	0.06
fringed myotis	<0.01	<0.01
long-legged myotis	0.21	0.03
Yuma myotis	0.01	<0.01
canyon bat	0.6	0.08
myotis species	0.2	0.02
unidentified high frequency species	0.01	<0.01
unidentified low frequency species	0.05	<0.01
*State sensitive species in the Columbia Plateau (ODFW 2019).		

The bat species detected within the Site Boundary during the acoustic surveys are common species in the western rangelands of the United States. Habitat variables such as available roost types (trees, rocks, buildings) and the accessibility of roosts, food, and water greatly influence species composition in a given area. The lack of trees within the Site Boundary likely influenced species composition in favor of Myotis species, which utilize features such as rocky outcroppings or buildings as roost sites rather than trees and foliage, which are preferred by tree bats. Migration patterns, which vary based on species life history characteristics, can be grouped into three basic categories: non-migratory (big brown bat), regional migrants (Myotis species), and long-distance migrants (silver-haired bat and hoary bat; Fleming and Eby 2003). The acoustic surveys at the Project indicate that the Site Boundary is used by non-migratory bats, and long distance and regional migrants in the late spring, summer, and fall. These findings are consistent with known migration patterns of tree bats in this region of the United States (Cryan 2003).

Three of the sensitive bat species with potential or known occurrence within the Site Boundary readily hibernate during the winter period: pallid bat, Townsend's big-eared bat (*Corynorhinus townsendii*), and spotted bat (*Euderma maculatum*). The pallid bat is closely associated with desert scrub and shrubland and is a common species of the Columbia Plateau. Townsend's big-eared bat is widespread throughout the state but are not known to congregate in large numbers, and utilizes caves, mines, and buildings as roost sites (Harvey et al. 2011). Spotted bats are also geographically widespread, but may be one of the rarest of all bat species in the western United States because the species relies on the presence of large cliffs for roosting, resulting in very patchy distributions (Luce and Keinath 2007). The greatest concentration of caves occurs in central Oregon and these are formed by lava tubes. Six closed mines are located near Pendleton, Oregon but details on type and whether they are utilized by bats are lacking (The Diggings, no date).

The hoary bat and silver-haired bat do not typically hibernate, but instead migrate out of the Site Boundary during the fall to spend the winter in locations where insect prey is available (ODFW 2017). These two species occur in the greatest abundance across Oregon rangelands in May and September, suggesting biannual migration through the state. These tree-roosting species experience higher levels of mortality at wind facilities, particularly during fall migration (Arnett et al. 2008). Roosting habitat of the hoary bat and silver-haired bat are all associated with forested areas (Harvey et al. 2011), which account for a very small percentage of the Site Boundary.

5.3 Raptor and Eagle Nest Surveys

Raptor nest surveys conducted within 2 miles of the Site Boundary in 2017 documented 40 active nests by six species of raptors, including two species addressed in this exhibit: ferruginous hawk (*Buteo regalis*; 4 active nests) and Swainson's hawk (*Buteo swainsoni*; 3 active nests) (Figure P-5). Other active raptor nests documented during aerial raptor nest surveys included prairie falcon (*Falco mexicanus*; 2 active nests), osprey (*Pandion haliaetus*; 2 active nests), red-tailed hawk (*Buteo jamaicensis*; 27 active nests), and great horned owl (*Bubo virginianus*; 2 active nests) (Figure P-5; note that northern harrier [*Circus hudsonius*] and burrowing owl nests depicted were documented during pedestrian wildlife surveys, and short-eared owl [*Asio flammeus*] nests depicted were

documented during eagle use surveys). In addition, the 2017 survey identified two separate great blue heron (*Ardea herodias*) rookeries, each of multiple nests, along the Umatilla River and 14 active common raven (*Corvus corax*) nests. Fifty-one inactive nests originally built by ferruginous hawks were also documented, along with 31 other inactive stick nests. Inactive ferruginous hawk nests were identified by the size and arrangement of sticks and their characteristic placement on the ground atop rounded rock outcrops.

Raptor nest surveys conducted within 2 miles of the Site Boundary in 2018 documented 66 active nests belonging to nine species of raptors, including three species addressed in this exhibit: ferruginous hawk (5 active nests), Swainson's hawk (5 active nests), and golden eagle (1 active nest)(Figure P-5). Other active raptor nests documented included prairie falcon (4 active nests), osprey (2 active nests), long-eared owl (*Asio otus*; 1 active nest), red-tailed hawk (41 active nests), great horned owl (6 active nests), and barn owl (*Tyto alba*; 1 active nest) (Figure P-5). Similar to 2017 surveys, the 2018 raptor nest survey identified two separate great blue heron rookeries, each of multiple nests, along the Umatilla River and 16 active common raven nests (Figure P-5). Also documented were 62 inactive nests originally built by ferruginous hawks, and 37 other inactive stick nests.

Raptor nest surveys conducted within 0.5 mile of the transmission line corridor in 2019 identified 10 active nests by three species of raptors, including one species addressed in this exhibit: Swainson's hawk (4 active nests). Other active raptor nests documented included red-tailed hawk (5 active nests) and great horned owl (1 active nest) (Figure P-5). In addition, the 2019 survey identified a single active common raven nest and 5 inactive stick nests.

During eagle nest surveys in 2017, at least one eagle nest was found in each of three golden eagle territories and one active bald eagle nest was found within 10 miles of turbines as proposed at the time of surveys (see Attachment P-2). During eagle nest surveys in 2018, an occupied nest was found in each of three known golden eagle territories within 10 miles of the Site Boundary; one active bald eagle nest was found within 10 miles of the Site Boundary, and a second was found just beyond that distance (see Attachment P-2).

5.4 Avian Use Surveys

Fifty-two avian species were recorded at survey points during avian use surveys, none of which were state or federal endangered, threatened, or candidate species (Table P-7). Eleven species of raptor were recorded, including three species addressed in this exhibit: Swainson's hawk, ferruginous hawk, and bald eagle. Other state sensitive species recorded included long-billed curlew (*Numenius americanus*), loggerhead shrike (*Lanius ludovicianus*), grasshopper sparrow (*Ammodramus savannarum*), and common nighthawk (*Chordeiles minor*). Golden eagles were observed only while the surveyor was in-transit (Attachment P-2). The results of avian use surveys for birds in general and state sensitive species and eagles in particular are presented here in order to inform the Projects' anticipated overall impact on birds and specific impacts on state sensitive species and eagles.

5.4.1 Mean Use

Mean use (mean number of individuals within 0.5-mile [800 meter]/20-minute point count) is a metric that provides an index of the numbers of birds using the survey area (see Attachment P-2). Overall mean use across all seasons was dominated by passerines (Table P-7), with highest mean use values during winter season (13.43), followed by spring (13.03), fall (11.71), and then summer (6.34). More than half of all passerine use was by horned lark (*Eremophila alpestris*; Table P-7). Passerine mean use was highest at point U, located at the eastern edge of the Site Boundary in an active agricultural field, and lowest at point O, located in the central portion of the Site Boundary, on the border between Eastside Grassland and Planted Grassland (see Attachment P-2).

Raptor mean use was 0.23 in spring, when mean use consisted mainly of northern harrier (0.07), rough-legged hawk (*Buteo lagopus*; 0.06) and Swainson's hawk (0.04). Overall raptor mean use was 0.21 in summer, when use consisted mainly of Swainson's hawk (0.11) and red-tailed hawk (0.05). Overall raptor mean use was 0.19 in fall; use consisted mainly of red tailed hawk (0.06) and northern harrier (0.06). Overall raptor mean use was 0.39 in winter; use consisted mainly of northern harrier (0.15) and rough-legged hawk (0.12; Table P-7). Raptor mean use at each point varied from a low of 0.038 (at point E, located in Eastside Grassland in the central portion of the Site Boundary, north of Alkali Canyon) to a high of 0.923 (at point Q, located on the border between Eastside Grassland and Planted Grassland in the central portion of the Site Boundary, between Alkali Canyon and Speare Canyon; see Figure S-1 in Exhibit S). At point Q, the high mean use of raptors was mainly attributable to the presence within the point of an active Swainson's hawk nest; throughout the breeding season of this species, one or more adults or young were recorded on nearly all surveys at this point.

Table P-7. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups During Avian Use Surveys

Species	Spring (160 surveys)			Summer (160 surveys)			Fall (192 surveys)			Winter (320 surveys)		
	Mean Use[1]	% Comp[2]	% Freq[3]	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq
Raptor	**0.231**	**1.71**	**18.75**	**0.206**	**2.97**	**13.75**	**0.188**	**1.55**	**15.63**	**0.394**	**2.84**	**30.00**
Accipiter	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.005*	*0.04*	*0.52*	*0.000*	*0.00*	*0.00*
sharp-shinned hawk	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.000	0.00	0.00
Buteos	*0.150*	*1.11*	*12.50*	*0.156*	*2.25*	*10.00*	*0.083*	*0.69*	*7.29*	*0.197*	*1.42*	*17.19*
ferruginous hawk*	0.019	0.14	1.88	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
rough-legged hawk	0.056	0.42	5.00	0.000	0.00	0.00	0.005	0.04	0.52	0.119	0.86	10.94
red-tailed hawk	0.031	0.23	5.00	0.050	0.72	4.38	0.063	0.52	5.21	0.078	0.56	6.56
Swainson's hawk*	0.044	0.32	3.13	0.106	1.53	5.63	0.016	0.13	1.56	0.000	0.00	0.00
Eagle	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.006*	*0.05*	*0.63*
bald eagle*	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.006	0.05	0.63
Falcons	*0.013*	*0.09*	*1.25*	*0.025*	*0.36*	*2.50*	*0.036*	*0.30*	*3.13*	*0.025*	*0.18*	*2.50*
American kestrel	0.013	0.09	1.25	0.019	0.27	1.88	0.031	0.26	2.60	0.019	0.14	1.88
prairie falcon	0.000	0.00	0.00	0.006	0.09	0.63	0.005	0.04	0.52	0.006	0.05	0.63
Harriers	*0.069*	*0.51*	*6.25*	*0.025*	*0.36*	*2.50*	*0.063*	*0.52*	*6.25*	*0.153*	*1.10*	*11.25*
northern harrier	0.069	0.51	6.25	0.025	0.36	2.50	0.063	0.52	6.25	0.153	1.10	11.25
Owl	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.013*	*0.09*	*0.94*
great-horned owl	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.003	0.02	0.31
short-eared owl	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.009	0.07	0.63
Gamebirds	**0.106**	**0.79**	**8.13**	**0.063**	**0.90**	**3.75**	**0.094**	**0.78**	**2.08**	**0.009**	**0.07**	**0.94**
California quail	0.000	0.00	0.00	0.006	0.09	0.63	0.000	0.00	0.00	0.000	0.00	0.00
gray partridge	0.006	0.05	0.63	0.000	0.00	0.00	0.078	0.65	0.52	0.000	0.00	0.00
ring-necked pheasant	0.100	0.74	8.13	0.056	0.81	3.75	0.016	0.13	1.56	0.009	0.07	0.94
Shorebird	**0.069**	**0.51**	**5.00**	**0.031**	**0.45**	**1.88**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
long-billed curlew*	0.069	0.51	5.00	0.031	0.45	1.88	0.000	0.00	0.00	0.000	0.00	0.00
Wading bird	**0.000**	**0.00**	**0.00**	**0.006**	**0.09**	**0.63**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
great blue heron	0.000	0.00	0.00	0.006	0.09	0.63	0.000	0.00	0.00	0.000	0.00	0.00

Species	Spring (160 surveys)			Summer (160 surveys)			Fall (192 surveys)			Winter (320 surveys)		
	Mean Use[1]	% Comp[2]	% Freq[3]	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq
Doves	**0.069**	**0.51**	**2.51**	**0.250**	**3.60**	**5.63**	**0.094**	**0.78**	**1.56**	**0.031**	**0.23**	**0.63**
mourning dove	0.069	0.51	2.50	0.250	3.60	5.63	0.094	0.78	1.56	0.006	0.05	0.31
rock pigeon	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.025	0.18	0.31
Goatsucker	**0.000**	**0.00**	**0.00**	**0.044**	**0.63**	**2.50**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
common nighthawk*	0.000	0.00	0.00	0.044	0.63	2.50	0.000	0.00	0.00	0.000	0.00	0.00
Passerines	**13.025**	**96.44**	**100.00**	**6.344**	**91.36**	**86.88**	**11.714**	**96.90**	**91.15**	**13.431**	**96.82**	**87.81**
Songbirds	*12.788*	*94.68*	*100.00*	*6.069*	*87.40*	*86.25*	*11.526*	*95.35*	*90.10*	*13.084*	*94.32*	*85.94*
American goldfinch	0.000	0.00	0.00	0.000	0.00	0.00	0.047	0.39	1.56	0.009	0.07	0.94
American pipit	0.000	0.00	0.00	0.000	0.00	0.00	0.208	1.72	1.04	0.000	0.00	0.00
American robin	0.000	0.00	0.00	0.000	0.00	0.00	0.063	0.52	0.52	0.000	0.00	0.00
barn swallow	0.050	0.37	3.75	0.044	0.63	2.50	0.120	0.99	3.65	0.000	0.00	0.00
Brewer's blackbird	0.038	0.28	1.25	0.069	0.99	1.25	0.120	0.99	1.56	0.000	0.00	0.00
Bullock's oriole	0.019	0.14	0.63	0.069	0.99	1.25	0.000	0.00	0.00	0.000	0.00	0.00
cliff swallow	0.006	0.05	0.63	0.156	2.25	3.13	0.208	1.72	0.52	0.000	0.00	0.00
dark-eyed junco	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.094	0.68	0.94
eastern kingbird	0.000	0.00	0.00	0.013	0.18	1.25	0.000	0.00	0.00	0.000	0.00	0.00
European starling	0.075	0.56	3.13	0.038	0.54	1.88	0.469	3.88	4.69	0.666	4.80	4.06
golden-crowned kinglet	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.000	0.00	0.00
grasshopper sparrow*	0.119	0.88	7.50	0.144	2.07	8.13	0.000	0.00	0.00	0.000	0.00	0.00
horned lark	8.769	64.92	100.00	4.363	62.83	81.25	8.547	70.70	84.90	11.772	84.86	83.75
house finch	0.000	0.00	0.00	0.000	0.00	0.00	0.208	1.72	2.60	0.006	0.05	0.63
lapland longspur	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.031	0.23	0.94
loggerhead shrike*	0.000	0.00	0.00	0.038	0.54	1.25	0.005	0.04	0.52	0.003	0.02	0.31
mountain bluebird	0.000	0.00	0.00	0.006	0.09	0.63	0.005	0.04	0.52	0.000	0.00	0.00
red-winged blackbird	0.025	0.19	1.25	0.006	0.09	0.63	0.000	0.00	0.00	0.016	0.11	0.31
rock wren	0.019	0.14	1.25	0.013	0.18	1.25	0.042	0.34	3.65	0.000	0.00	0.00
sage thrasher	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.000	0.00	0.00
savannah sparrow	0.331	2.45	16.25	0.019	0.27	1.25	0.125	1.03	6.25	0.000	0.00	0.00

Species	Spring (160 surveys)			Summer (160 surveys)			Fall (192 surveys)			Winter (320 surveys)		
	Mean Use[1]	% Comp[2]	% Freq[3]	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq
Say's phoebe	0.006	0.05	0.63	0.031	0.45	2.50	0.005	0.04	0.52	0.003	0.02	0.31
tree swallow	0.000	0.00	0.00	0.019	0.27	0.63	0.000	0.00	0.00	0.000	0.00	0.00
tricolored blackbird	0.000	0.00	0.00	0.050	0.72	0.63	0.000	0.00	0.00	0.000	0.00	0.00
vesper sparrow	0.000	0.00	0.00	0.000	0.00	0.00	0.031	0.26	2.08	0.000	0.00	0.00
violet-green swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.010	0.09	0.52	0.000	0.00	0.00
western kingbird	0.056	0.42	1.88	0.044	0.63	1.88	0.000	0.00	0.00	0.000	0.00	0.00
western meadowlark	3.225	23.88	78.75	0.950	13.68	36.25	1.281	10.60	27.60	0.472	3.40	19.06
white-crowned sparrow	0.050	0.37	3.13	0.000	0.00	0.00	0.016	0.13	0.52	0.013	0.09	0.31
Corvids	*0.238*	*1.76*	*18.13*	*0.275*	*3.96*	*7.50*	*0.188*	*1.55*	*11.98*	*0.347*	*2.50*	*14.06*
black-billed magpie	0.019	0.14	1.25	0.056	0.81	1.25	0.016	0.13	1.04	0.016	0.83	2.15
common raven	0.219	1.62	17.50	0.219	3.15	6.25	0.146	1.21	10.94	0.231	1.67	11.88
western scrub-jay	0.000	0.00	0.00	0.000	0.00	0.00	0.026	0.22	0.52	0.000	0.00	0.00
Woodpecker	**0.006**	**0.05**	**0.63**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.006**	**0.05**	**0.63**
northern flicker	0.006	0.05	0.63	0.000	0.00	0.00	0.000	0.00	0.00	0.006	0.05	0.63
Totals	**13.506**	**100.00**		**6.944**	**100.00**		**12.089**	**100.00**		**13.872**	**100.00**	

1. Mean Use: mean number of individuals within 0.5-mile [800meter] point/20-minute point count.
2. % Comp: percent composition: mean use for a species/total use across all species, multiplied by 100.
3. % Freq: percent frequency of occurrence is the percentage of 20-minute surveys in which a species was detected within the survey point.
Seasons: Spring – March 27 through May 30, 2017; Summer – June 5 through August 8, 2017; Fall – August 15 through October 31, 2017; Winter – November 1, 2017 through March 19, 2018.
*Eagle or state sensitive species in the Columbia Plateau.

5.4.2 Percent Composition

Percent composition (mean use for a species/total use across all species, multiplied by 100) provides an estimate of the use of a particular species relative to the use by all other species. This metric is particularly useful for identifying whether any one species or group has a dominant presence in the survey area. Passerines dominated over all other species groups, with 96.44 percent of all detections in spring season, 91.36 percent in summer season, 96.90 percent in fall season, and 96.82 percent in winter season. Horned lark, in particular, was the passerine species that had the highest percent composition in all four seasons, with 64.92 percent in spring season, 62.83 percent in summer season, 70.70 percent in fall season, and 84.86 percent in winter season (Table P-7). All other passerine species that contributed more than 3 percent to overall composition in descending order were western meadowlark (*Sturnella neglecta*; 23.88 percent in spring season, 13.68 percent in summer, 10.6 percent in fall, 3.40 percent in winter), European starling (*Sturnus vulgaris*; 3.88 percent in fall and 4.80 percent in winter), mourning dove (*Zenaida macroura*; 3.60 percent in summer), and common raven (3.15 percent in summer) (Table P-7).

The raptor species with the highest percent composition were red-tailed hawk (0.72 percent) and northern harrier (0.36 percent) in summer, red-tailed hawk (0.52 percent) and northern harrier (0.52 percent) in fall, northern harrier (0.51 percent) and rough-legged hawk (0.42 percent) in spring, and rough-legged hawk (1.10 percent) and northern harrier (0.86 percent) in winter.

5.4.3 Frequency of Occurrence

Frequency of occurrence (percentage of 20-minute point counts in which a species was detected) provides an index of how often a species occurs in the survey area. Passerines were detected on 100 percent of spring season surveys, followed by 91.15 percent of fall season surveys, 87.81 percent of winter season surveys, and 86.88 percent of summer season surveys. Horned larks were observed frequently during all seasons, with the highest percentage in spring season (100.00 percent) followed by fall (84.90 percent), winter (83.75 percent), and summer (62.83 percent). Western meadowlarks (*Sturnella neglecta*) were most frequently observed in the spring (78.75 percent), followed by summer (36.25 percent), fall (27.60 percent), and winter (19.06 percent). All other species having more than 10 percent frequency were common raven in spring (17.50 percent), winter (11.88 percent), and fall (10.94 percent), and savannah sparrow (*Passerculus sandwichensis*) in spring (16.25 percent).

Raptors were detected on 18.75 percent of spring season surveys, on 13.75 percent of summer season surveys, on 15.63 percent of fall season surveys, and on 30.00 percent of winter season surveys. In the spring, northern harrier (6.25 percent), rough-legged hawk (5.00 percent) and red-tailed hawk (5.00 percent) occurred more frequently than other species. In summer, Swainson's hawk (5.63 percent) and red-tailed hawk (5.21 percent) were more frequently observed. In fall, northern harrier (6.25 percent) and red-tailed hawk (5.21 percent) were detected most often among raptor species. In winter, northern harrier (11.24 percent) and rough-legged hawk (10.94 percent) were the raptors most frequently observed.

5.4.4 Raptors

Fifteen species of raptors were detected, either during point surveys, while the surveyor was in-transit, or both. Five species were relatively common: northern harrier (124 detections), red-tailed hawk (98), rough-legged hawk (76), Swainson's hawk (41) and American kestrel (*Falco sparverius*; 35). Northern harrier is a ground-nesting, open-country species that hunts by flying low over fields; its year-round presence is expected in the grasslands associated with the Project. Red-tailed hawk and American kestrel, which both breed and winter in the Columbia Plataea Ecoregion, require trees for nesting (and red-tailed hawk generally hunts from a perch). Both species were more frequently detected while the surveyor was in-transit—in woody draws—than during surveys of points, in most of which few perches exist. Rough-legged hawk is another open-country species; it breeds in the Arctic in late spring and summer and was observed at the Project in spring, fall, and winter. Swainson's hawks were detected mostly in summer, followed by spring, and left on migration relatively early in the fall.

Short-eared owl was detected on three occasions on survey points during winter surveys and on 18 occasions while the surveyor was in-transit. Prairie falcon, ferruginous hawk, and great horned owl breed on or near the Project, and were detected on nine, eight, and five occasions, respectively (including both point surveys and in-transit). For more detail on ferruginous hawk, see Section 5.4.6.1. Bald eagles were detected on five occasions (two observations during point surveys and three observations in-transit), all in winter, and golden eagles were detected on four occasions, all in winter, while the surveyor was in-transit. Raptor species having three or fewer detections during surveys or in-transit were sharp-shinned hawk (*Accipiter striatus*; 3), merlin (*Falco columbarius*; 2), Cooper's hawk (*Accipiter cooperii*; 1), and peregrine falcon (*Falco peregrinus*; 1).

One objective of fall season avian use studies is to identify any raptor migration corridors that might exist at the Project. Fall season surveys did not indicate any migration corridors. The topography is not conducive to southerly migratory flight, and no flights suggestive of migration were observed. The raptor species that comprise most of the southbound migration in the western United States were rarely observed (sharp-shinned hawk, merlin, peregrine falcon) or never observed (Cooper's hawk, osprey, turkey vulture [*Cathartes aura*], golden eagle, bald eagle) during fall season surveys.

5.4.5 Waterfowl and Wading Birds

A group of 11 American white pelicans (*Pelecanus erythrorhynchos*) was observed during spring while the surveyor was in-transit; these were flying an estimated 0.5 mile (800 meters) above the ground. One species of wading bird was detected on a point; this was a single individual great blue heron during summer. Herons nest communally in rookeries, two of which were found along the Umatilla River to the north of the Project during 2017 and 2018 raptor nest surveys (see Attachment P-2).

5.4.6 Special Status Species

There were two detections during point surveys and three in-transit detections of bald eagle. There were four in-transit detections of golden eagle. Eagles are further discussed in Section 5.5. Six state sensitive species were detected during the four-season avian use survey. These were ferruginous hawk, Swainson's hawk, long-billed curlew, loggerhead shrike, grasshopper sparrow, and common nighthawk. This section discusses each of the species' spatial use of the survey area. It describes number of observations and such factors as location, flight height, and habitat in order to assess risk of the Project to individuals of these species.

5.4.6.1 Ferruginous Hawk

Individual ferruginous hawks were detected within survey points three times during spring surveys, twice at point C (located in Eastside Grassland in the northern portion of the Site Boundary) and once at point V (located on the border of Eastside Grassland and active agricultural fields, on the north side of Speare Canyon; see Attachment P-2). Maximum flight height during these three detections was 49 feet (15 meters), 10 feet (3 meters), and 33 feet (10 meters). At both points, flights took these individuals over both grassland and active agricultural land. No ferruginous hawks were detected within points during summer, fall, or winter surveys.

Individual ferruginous hawks were detected once in spring, three times in summer, and once in winter while the surveyor was in-transit in the survey area. Two of these (one spring and one summer) were adults likely associated with the active nest northwest of point Q described above.

5.4.6.2 Swainson's Hawk

Swainson's hawk was detected within survey points six times (seven birds) during spring season, twice each at points Q (described above) and H (along the southern border of the Site Boundary in active agricultural lands), and once each at points B (in the northwestern portion of the Site Boundary on the border between Eastside Grasslands and active agricultural fields) and R (in the central eastern portion of the Site Boundary, on the border between Eastside Grassland and Planted Grassland; See attachment P-2). Three of these individuals remained at flight heights below 49 feet (15 meters), whereas the other four had flight heights between 66 and 656 feet (20 and 200 meters). The two birds at point H were following farm machinery as it plowed the field.

During summer season, there were 11 detections (17 total birds) within survey points. Individual adults were observed once at point H (flying 3 feet [1 meter] high over developed agriculture, again following farm machinery) and once at point C (perched in grassland habitat). The other nine detections (15 birds) were at point Q, which contained an active nest of this species (in a dead locust tree approximately 1,148 feet (350 meters) from the point center and surrounded by Eastside Grassland and Planted Grassland habitat). Six detections involved the adults, either perched in the nest or nest tree (three times) or flying over (three times) at heights ranging from 98 to 984 feet (30 to 300 meters), screaming in apparent territorial defense at the surveyor. Six of the

detections involved one or both of the nestlings, the second of which did not fledge until the first week of August.

Individual Swainson's hawks were detected within survey points three times during fall season, once at point Q (flying below 33 feet [10 meters] over grassland habitat) and twice at point U (one flying below 7 feet [2 meters] and one flying between 33 and 98 feet [10 and 30 meters], both over developed agriculture).

Individuals or pairs of Swainson's hawks were detected on 11 occasions during spring, summer, and fall while the surveyor was in-transit in the survey area. All of these detections were over active agriculture or grassland habitat.

5.4.6.3 Long-billed Curlew

Long-billed curlew was detected eight times (11 total birds) within survey points during spring season. These detections occurred at points distributed within the Site Boundary, in both grasslands and active agriculture, and recorded flight heights varied between 0 and 164 feet (0 and 50 meters), with five of eight detections involving maximum flight heights of 33 feet (10 meters). During summer season, long-billed curlew was detected three times (five total birds) within survey points. Two detections were at point C (in the northern portion of the Site Boundary as described above) and one was at point I (in the southern portion of the Site Boundary, in active agriculture between Alkali Canyon and Slusher Canyon). Detections were in both grasslands and active agriculture, and maximum flight height varied between 0 and 33 feet (0 and 10 meters). This species was not detected during fall or winter seasons, as curlews abandon the breeding grounds in mid-summer to spend the remainder of the year in coastal habitats.

Individuals, pairs, or groups of long-billed curlews were detected on 12 occasions during spring and summer while the surveyor was in-transit in the survey area.

5.4.6.4 Loggerhead Shrike

During summer season, this species was detected twice, both within point J (in the southern portion of the Site Boundary, in active agriculture and Eastside Grasslands between Alkali Canyon and Slusher Canyon; see Attachment P-2). On one occasion, there was a single individual near the point center in active agriculture; on another, a family group of five was detected in Shrub-steppe habitat at the head of the canyon that extends to the north from this point. A single individual was recorded during fall season; this was in active agriculture within point V (north of Speare Canyon, as described above). A single individual was recorded during winter season; this was in developed agriculture within point J (north of Slusser Canyon, as described above). Maximum flight height for all of these detections was 7 feet (2 meters). No loggerhead shrikes were detected within survey points during spring season.

Individuals, pairs, or family groups of loggerhead shrikes were detected on 20 occasions (in all seasons) while the surveyor was in-transit on the survey area. Nearly all detections of loggerhead shrike were associated with two or three successful breeding attempts in the Shrub-steppe habitat

within and adjacent to Alkali Canyon. Maximum flight height of all in-transit detections was 7 feet (2 meters).

5.4.6.5 Grasshopper Sparrow

Grasshopper sparrows were detected on 12 occasions (19 individuals) during spring and 13 occasions (23 individuals) during summer within survey points. Most were singing males; most were associated with grassland or active agriculture habitats, with a smaller number in Shrub-steppe habitat. Maximum flight height for all grasshopper sparrow detections was 3 feet (1 meter). This species was detected at nine of the 16 points (Table 4), and had its highest mean use of 0.406 at point Q (between Speare Canyon and Alkali Canyon, as described above), which contained a high percentage of tall grasses. No detections occurred during fall or winter seasons, as this species migrates south relatively early and those that may remain longer cease singing; the last detections were on July 18. This species was not (and is not easily) detected while the surveyor was in-transit.

5.4.6.6 Common Nighthawk

Common nighthawks were detected on four occasions (7 individuals) during the summer. Flights heights varied between 131 to 984 feet (40 to 300 meters). This species was recorded at 4 of the 16 points, three points on the plateau north of Alkali Canyon within Eastside Grassland, Planted Grassland, and active agricultural lands (points O, D, and G; see Attachment P-2), and one point along Mud Springs road (point X; see Attachment P-2). In addition, a nest with two eggs was found within 66 feet (20 meters) of the center of point R (located in the eastern/central portion of the Site Boundary, along the border of Eastside Grassland and Planted Grassland). No detections occurred during spring, fall, or winter seasons, as this species migrates north relatively late and south relatively early; the first detection was on June 6 and the last detection was on July 18. This species was not detected while the surveyor was in-transit.

5.5 Eagle Use Surveys

Three bald eagles were detected during the first year of eagle use surveys, two of which were observed flying together. All three were recorded during the winter season, outside the eagle use points (see Attachment P-2). The observations were not concentrated in any one portion of the Site Boundary; one eagle was observed feeding on a sheep carcass outside the eagle use point along Alkali Canyon. Additionally, there were three bald eagles detected incidentally within the Site Boundary while the surveyor was in-transit, including one that was feeding on a deer carcass alongside a road at the eastern edge of the Site Boundary.

Four golden eagles were detected during the first year of eagle use surveys, all recorded during the winter season (see Attachment P-2). Only one golden eagle was observed in flight inside a survey point, flying low across the point from a cow carcass it had been feeding on in the northwest corner of the Site Boundary. A second golden eagle was detected flying outside of a survey point and feeding on the same sheep carcass in Alkali Canyon as the bald eagle noted above. The remaining two individuals were perched. Similar to those of bald eagles, the observations were not

concentrated in any one portion of the Site Boundary. Additionally, there were four golden eagles detected incidentally within the Site Boundary while the surveyor was in-transit, three of which were feeding on deer carcasses at the eastern edge and northeastern corner of the Site Boundary.

Three bald eagles were detected during the second year of eagle use surveys, one in spring and two in winter (see Attachment P-2). Consistent with the first year of surveys, detections were not concentrated in any one portion of the Site Boundary. Additionally, two bald eagles were detected incidentally within the Site Boundary while the surveyor was in-transit. None of the observations (during surveys or incidentally) were associated with visible carcasses.

Three golden eagles were detected during the second year of surveys, one in fall and two in winter (see Attachment P-2). Consistent with the first year of surveys, detections were not concentrated in any one portion of the Site Boundary. Additionally, nine golden eagles were detected incidentally within the Site Boundary while the surveyor was in-transit; most of these were clustered near the southern portion of the Site Boundary, particularly in the fall. None of the observations (during surveys or incidentally) were associated with visible carcasses.

6.0 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;

Construction and operation of the Project will result in both permanent and temporary impacts to wildlife and their habitats. As described in detail in Exhibit B, the Applicant proposes two turbine options (Turbine Options 1 and 2) to allow flexibility in the choice of wind turbines at the time of construction. Habitat mitigation and vegetation management associated with construction and operation are discussed in the Draft Habitat Mitigation Plan (HMP; Attachment P-3), and Draft Revegetation Plan (Attachment P-4), respectively.

Permanent impact areas are those that will be occupied by a permanent structure or otherwise used for the life of the Project; these areas will not be restored to pre-Project conditions. Examples of permanent impacts include impacts from permanent turbine foundations, support poles for the overhead collector lines, met tower foundations, permanent access roads, and an O&M Building for the Project. Temporary impact areas are those areas that will be disturbed during construction activities but that will then be restored and revegetated following construction. Examples of temporary impacts include impacts from temporary construction yards, temporary staging areas, buried collector lines, the temporary widening of existing roads, the temporary construction corridor around new access roads, temporary disturbance adjacent to the O&M Building, and a temporary disturbance corridor along the transmission line route. Exhibit C presents the temporary and permanent impacts of each Project component.

6.1 Potential Impacts to Fish and Wildlife Habitat

This section describes potential adverse impacts to fish and wildlife habitat from construction and operation of the Project. Some of these impacts will be avoided and/or minimized as described in Section 7.0. Impacts that cannot be avoided will be mitigated for as described in Section 7.0 and the Draft HMP (Attachment P-3).

Impacts to wetlands and Waters of the State (see Exhibit J) will be avoided. In some locations, the limits of disturbance overlap wetlands and waters and therefore appear to impact these habitats, as reflected in Table P-8, below. However, except for a small number of ephemeral streams (which are neither Waters of the State nor fish-bearing), impacts will be avoided by spanning these features (placing transmission poles on either side of the feature, for example) or otherwise reducing the impact area to avoid disturbance of these habitats. Similarly, impacts to Eastside Riparian habitat associated with the transmission line crossing of Alkali Canyon appear in Table P-8, below; however, Eastside Riparian habitat within Alkali Canyon will also be spanned, with poles placed on either side of the riparian vegetation such that no trees will need to be cleared or trimmed for underwire clearance.

Although poles will be placed outside of riparian vegetation at the proposed transmission line crossing of the Umatilla River, should that transmission option be selected, this analysis assumes that riparian vegetation will need to be cleared because the riparian vegetation under the existing transmission line appears to be maintained (this area was not accessible during 2017-2019 field surveys to verify this desktop assessment). Impacts to these Eastside Riparian habitats (as well as to fish and other water and riparian-associated species) as a result of this vegetation maintenance are described below.

Table P-8 provides the number of acres of each habitat type, sub-type, and category that will be permanently or temporarily impacted by the Project under either Turbine Option 1 or Turbine Option 2. These habitats are described in Section 3.0. The Applicant has minimized impacts to Category 2, 3, 4, and 5 habitats by micrositing facilities on Category 6 habitat to the extent feasible.

Table P-8. Potential Impacts by Habitat Category and Type

Habitat Category and Type	Habitat Sub-type	Turbine Option 1 Impacts (Acres)		Turbine Option 2 Impacts (Acres)	
		Temp	Perm	Temp	Perm
Category 2					
Agriculture, Pasture, and Mixed Environs	Irrigated Pastures and Hay Meadows	<1	-	<1	-
	Planted Grasslands	21	2	21	2
Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1*	-	<1*	-
	Perennial Streams	<1*	-	<1*	-
Riparian Forest and Natural Shrubland Complexes	Eastside Riparian	<1[1]	-	<1[1]	-

Habitat Category and Type	Habitat Sub-type	Turbine Option 1 Impacts (Acres)		Turbine Option 2 Impacts (Acres)	
		Temp	Perm	Temp	Perm
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	133	3	192	6
	Shrub-steppe	3	<1	3	<1
Category 3					
Agriculture, Pasture, and Mixed Environs	Planted Grasslands	68	7	79	8
Cliffs, Caves, and Talus	Cliffs, Caves, and Talus	<1	-	<1	-
Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1*	<1*	<1*	-
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	57	5	121	8
	Shrub-steppe	1	<1	1	<1
Wetlands	Emergent Wetlands	<1*	-	<1*	-
Category 4					
Agriculture, Pasture, and Mixed Environs	Planted Grasslands	39	4	49	4
Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1*	<1*	<1*	<1*
Riparian Forest and Natural Shrubland Complexes	Eastside Riparian	<1	-	<1	-
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	54	6	114	7
Category 5					
Agriculture, Pasture, and Mixed Environs	Irrigated Pastures and Hay Meadows	2	<1	2	<1
	Planted Grasslands	127	6	176	10
Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1*	-	<1*	-
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	39	2	39	1
	Shrub-steppe	2	<1	2	<1
Category 6					
Agriculture, Pasture, and Mixed Environs	Orchards, Vineyards, Wheat Fields, Other Row Crops	444	52	705	76
Urban and Mixed Environs	Urban and Mixed Environs	21	<1	28	<1
TOTAL		**1,012**	**87**	**1,532**	**123**

Note: Totals in this table may not appear to sum correctly due to rounding. "-" means no impact while <1 means greater than zero but less than 0.5 acres impact.

* Impacts to wetlands and Waters of the State will be avoided during final design (see Exhibit J).

1. Tall vegetation will be maintained for the life of the Project to allow underwire clearance, and thus this Category 2 Eastside Riparian habitat is conservatively considered permanently impacted for the purposes of mitigation as described in the Draft HMP (Attachment P-3).

The duration of habitat loss in permanent impact areas will be for the life of the Project, as these areas will contain permanent infrastructure and not be restored following construction. The duration of habitat loss in temporary impact areas varies among habitats, with shrub-steppe habitats generally taking more than 5 years to recover, and grassland up to 5 years (Bakker and van Diggelen 2006; McArthur and Stevens 2004; Pyke et al. 2015; Rosentreter 2005; Wambolt et al. 2001; Watts and Wambolt 1996). Restoration of the temporary impact areas will occur following construction, as described in the Draft Revegetation Plan (Attachment P-4).

6.1.1 Category 1 Habitat

The Applicant has microsited facilities to avoid impacts to Category 1 habitat. Category 1 habitat in the Analysis Area includes WAGS colonies plus a 785-foot buffer around each colony in suitable habitat, which is the area required for squirrel survival. The Applicant will continue to avoid Category 1 habitat during final design, including any WAGS Category 1 habitat identified following additional WAGS surveys that are anticipated prior to construction.

Habitat considered unsuitable for WAGS is typically limited to active agricultural fields and developed land. During habitat categorization and WAGS surveys conducted for the Project, the Applicant in 2017 initially identified several fields as in active (biennial) agricultural rotation that upon subsequent investigation and communication with the landowner in 2018 were identified as having been recently converted from wheat cultivation to CRP lands with a planned return to wheat production in 2023. Most of these areas were densely vegetated with cheatgrass (*Bromus tectorum*) and tall tumble mustard (*Sisymbrium altissimum*) and did not support WAGS at the time of surveys in 2018 or 2019 despite their close proximity to WAGS colonies documented in 2017 and 2018 in adjacent, higher quality native habitat that had not previously been tilled. The Applicant believes these CRP fields recently converted from wheat cultivation are not irreplaceable, essential, or limited habitat as defined in the ODFW Habitat Mitigation Policy (OAR 635-415-0025), and thus excluded these areas from consideration as Category 1 WAGS habitat during habitat categorization (see Figures P-2 and P-3 for the location Category 1 and 2 WAGS habitat and the location of the fallow wheat field/recently enrolled CRP lands excluded from consideration from these overlays).

The Habitat Mitigation Policy defines Category 1 Habitat as "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." As defined in the Fish and Wildlife Habitat Mitigation Policy, "irreplaceable" means that successful in-kind habitat mitigation to replace lost habitat quantity and/or quality is not feasible within an acceptable period of time or location, or involves an unacceptable level of risk or uncertainty, depending on the habitat under consideration and the fish and wildlife species or populations that are affected. "Acceptable," for the purpose of this definition, means in a reasonable time frame to benefit the affected fish and wildlife species (OAR 635-415-0005(14)).

Based on historical imagery available on Google Earth, the fields recently converted from wheat cultivation to CRP lands appear to contain till lines as recent as 2015 (see aerial photos in February 25, 2019 memo to ODFW in Attachment P-1). They are dominated by invasive species, lack later

seral stage vegetation characteristics, and may lack the soil stability to support deep burrowing by WAGS, as they have been tilled within the last 5-7 years. As a result, areas temporarily impacted within these fields, including within the 785-foot buffer of a WAGS colony, could be replaced by restoring the habitat to its condition prior to construction, which can likely be achieved in 1-3 years given its current disturbed condition. Areas permanently impacted in these fields (e.g., from roads and turbine pads) could be replaced by converting nearby actively-cultivated wheat fields to fallow fields, after which a similar habitat condition would likely be achieved in 1-3 years. Furthermore, enhancements to the existing habitat within the 785-foot buffer of colonies that is unaffected by the Project (such as invasive species control) could improve the overall quality of habitat available to WAGS foraging or dispersing from the colony. Because successful in-kind habitat mitigation for disturbances to these fields recently converted from wheat cultivation to CRP lands is feasible in this case, these areas do not meet the definition of "irreplaceable."

As defined in the Fish and Wildlife Habitat Mitigation Policy, "essential Habitat" means any habitat condition or set of habitat conditions which, if diminished in quality or quantity, would result in depletion of a fish or wildlife species (OAR 635-415-0005(3)). The fields recently converted from wheat cultivation to CRP lands are currently of diminished quality and of limited value to WAGS due to lack of preferred forage species, lack of predator visibility as a result of the dense vegetation, and a presumed lack of soil structure. Biologists identified cheatgrass, tall tumble mustard, alfalfa (*Medicago sativa*), crested wheatgrass (*Agropyron cristatum*), and Sandberg's bluegrass (*Poa secunda*) in the CRP fields in question. The current state of the CRP habitat includes dense, tall grasses and tall tumble mustard, with little to no bare ground visible (see memo to ODFW in Attachment P-1). WAGS that use this type of habitat would be sacrificing their ability to visually and audibly detect predators due to the nearly 100 percent cover of tall grasses and forbs. WAGS depend on their ability to detect predators and alert the rest of the colony to take refuge. Consequently, development of the Project (including permanent and temporary impacts) in these areas would not result in the depletion of WAGS, as the habitat condition in these areas is such that it currently offers minimal support to the species.

Additionally, it was only recently (i.e., within the last 5 to 7 years) that these fields were removed from wheat cultivation after years of active farming through which the local WAGS colonies persisted and thrived; thus, returning a portion of these fields back to Category 6 habitat, or "habitat that has low potential to become essential or important habitat for fish and wildlife" per OAR 635-415-0025(6), would not result in the depletion of WAGS. Any reduction in habitat quality or quantity to these fields could be offset by improving habitat quality elsewhere in the 785-foot Category 1 or 4,921-foot Category 2 buffer, thereby avoiding the "if diminished" portion of the definition for essential habitat.

As defined in the Fish and Wildlife Habitat Mitigation Policy, "limited habitat" means an amount insufficient or barely sufficient to sustain fish and wildlife populations over time (OAR 635-415-0005(15)). Neither CRP lands nor fallow wheat fields are limited on the landscape, either within the immediate Project vicinity or throughout the Columbia Plateau Ecoregion. Additionally, actively cultivated wheat fields are common both at the Project and within the Columbia Plateau Ecoregion

overall, and have the potential to become fallow should market conditions change. Therefore, the fields recently converted from wheat cultivation to CRP lands are not "limited" as it relates to the definition of Category 1 and Category 2 habitat.

Request for Statutory "Balancing"

As described in this Exhibit P, the Applicant has consulted with ODFW concerning the suitability of these specific CRP fields for WAGS habitat, and the scientifically supportable categorization of habitat on these recently converted CRP fields. The Applicant's biologists provided a memo to ODOE and ODFW, included in Attachment P-1 to this Exhibit P (see letter dated February 25, 2019), with ODFW's position documented in a response letter dated April 1, 2019 (also included in Attachment P-1). The Applicant believes that ODFW's position is neither well founded on the physical characteristics of the Project site and surrounding farmlands nor supported by the actual habitat attributes. The Applicant requests that, based on the information provided in this ASC, the Council find that the Project meets the Division 22 Fish and Wildlife and Threatened and Endangered Species Standards (OAR 345-022-0060 and -0070). Failing that, the Applicant requests that the Council apply the statutory "balancing" process to find compliance with EFSC Standards. Note that this request applies specifically to the fields recently converted from wheat and enrolled in the CRP (see Figure P-3). These areas are considerably lower quality habitat than the planted grasslands enrolled in CRP located elsewhere within the Site Boundary. The more established, higher-quality habitat planted grasslands are not included in this request and were mapped as Category 1 and 2 habitat as appropriate based on proximity to active WAGS colonies.

Recently Enrolled CRP Field Locations:

The locations at issue specifically include proposed locations for wind turbine generators and associated facilities such as roads within recently enrolled CRP fields where ODFW is seeking to impose the 785-foot Category 1 buffer from WAGS colonies. These recently enrolled CRP fields are depicted on Figure P-3 at a broad scale; the locations of proposed temporary and permanent impacts within 785 feet of WAGS colonies within these fields are depicted on Figures Q-2.7 and Q-3.7 of Exhibit Q for Turbine Option 1 and Turbine Option 2, respectively (see "WAGS 785-foot Colony Buffer Initially Considered" for areas within 785 feet of active WAGS colonies that were excluded due to lack of habitat suitability). Requiring application of the Category 1 WAGS buffer within these recently enrolled CRP fields will result in the elimination of one turbine under Turbine Option 1 and two turbines under Turbine Option 2. Although Figures Q-2.7 and Q-3.7 of Exhibit Q depict the currently proposed turbine layouts, this request also applies to these recently enrolled fields located throughout the micrositing corridor. This is because application of the Category 1 785-foot buffer in these fields will impair siting flexibility and could result in the elimination of additional wind turbine generators or associated facilities based on the results of pre-construction surveys if WAGS colonies are identified adjacent to recently enrolled CRP fields elsewhere within the micrositing corridor. Fields within and adjacent to the Site Boundary include fields in semiannual cropping rotation, CRP, and range. Typical annual crop rotation is one year of wheat followed by one year of fallow.

The U.S. Department of Agriculture, Farm Service Agency's (FSA) CRP is a voluntary program that contracts with agricultural producers so that certain environmentally sensitive agricultural land is not farmed or ranched, but instead is temporarily devoted to soil conservation benefits.[1] Generally, CRP participants establish long-term, resource-conserving plant species, such as approved grasses or trees (known as "covers"), to control soil erosion, improve water quality, and develop wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance. The contract duration for the fields at issue here is 10 years. The intent of the CRP is to reduce soil erosion, protect the Nation's ability to produce food and fiber, reduce sedimentation in streams and lakes, improve water quality, establish wildlife habitat, and enhance forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, trees, filterstrips, or riparian buffers. The land uses and practices allowed for CRP lands do not require use or dedication of the land for wildlife habitat at the exclusion of other authorized agricultural practices and sustainability objectives.

The CRP lands at issue were entered into the 10-year program under contracts with specific performance requirements. The contracts, among other things, require that the landowner plant grass to protect from water erosion. The CRP fields identified on Figure P-3 were placed into the CRP program in 2013 and will return to crop production in 2023 (Levy 2020). The landowner anticipates that in 2023 or 2024, the recently enrolled CRP fields discussed with ODFW will produce their first wheat crop after a long period of "rest." To the landowner's knowledge, the land is still considered "cropland" and has not attained some other conservation status that would impair a full return to wheat cultivation in 3 years. The most common purpose for placement of lands into CRP is soil conservation to enable long-term, sustainable agricultural practices. The landowner's motivation is economic rather than related to wildlife conservation, as a CRP contract can be more profitable than farming wheat (Levy 2020). Further, the FSA has informed the landowner specifically that these fields are designated as agricultural land and there are no requirements to avoid WAGS when the landowner commences farming of the land again in 2023.

Notwithstanding the understanding and plans of the landowner, ODFW remains firm that all lands previously tilled and farmed and enrolled in CRP that are within 785 feet from WAGS colonies are considered Category 1 habitat, with Category 2 habitat projecting 4,921 feet from the Category 1 buffer limits, regardless of the habitat condition of the fields. No WAGS have been found within any of the recently enrolled CRP fields shown on Figure P-3, and notwithstanding that the CRP locations will inevitably be returned to active farming as early as 2023, ODFW's position is that within these locations, the Applicant cannot meet the requirements of the Division 22 Fish and Wildlife and T&E Species Standards, OAR 345-022-0060 and -0070, for locations shown on Figures Q-2.7 and Q-3.7 in Exhibit Q. The Applicant and ODFW are at an impasse in resolving this issue. Consequently, the Applicant requests that EFSC exercise its authority under ORS 469.501(3)(a) to issue the site

[1] The CRP is authorized by the Food Security Act of 1985 and was reauthorized by the Agricultural Improvement Act of 2018 (the 2018 Farm Bill). The program is governed by regulations published in 7 CFR, part 1410.

certificate in consideration of the overall public benefits of the facility, weighed against improbable and insignificant impacts to this species.

Balancing Test Criteria:

ORS 469.501(3)(a) provides that the Council "may issue a site certificate for a facility that does not meet one or more of the applicable standards adopted under subsection (1) of this section if the council determines that the overall public benefits of the facility outweigh any adverse effects on a resource or interest protected by the applicable standards the facility does not meet." The Council has implemented this statutory authority by the following regulatory requirements:

OAR 345-022-0000 – General Standard of Review [Excerpt; Inapplicable Text Not Included]

(2) The Council may issue or amend a site certificate for a facility that does not meet one or more of the applicable standards adopted under ORS 469.501 if the Council determines that the overall public benefits of the facility outweigh any adverse effects on a resource or interest protected by the applicable standards the facility does not meet. The Council shall make this balancing determination only when the applicant has shown that the proposed facility cannot meet applicable Council standards or has shown, to the satisfaction of the Council, that there is no reasonable way to meet the applicable Council standards through mitigation or avoidance of any adverse effects on a protected resource or interest. The applicant has the burden to show that the overall public benefits outweigh any adverse effects on a resource or interest, and the burden increases proportionately with the degree of adverse effects on a resource or interest. The Council shall weigh overall public benefits and any adverse effects on a resource or interest as follows:

(a) The Council shall evaluate any adverse effects on a resource or interest by considering factors including, but not limited to, the following:

(A) The uniqueness and significance of the resource or interest that would be affected;

(B) The degree to which current or future development may adversely affect the resource or interest, if the proposed facility is not built;

(C) Proposed measures to reduce any adverse effects on a resource or interest by avoidance of impacts;

(D) The magnitude of any anticipated adverse effects on a resource or interest, taking into account any proposed mitigation.

(b) The Council shall evaluate overall public benefits by considering factors including, but not limited to, the following:

(A) The overall environmental effects of the facility, considering both beneficial and adverse environmental effects;

(B) The degree to which the proposed facility promotes Oregon energy policy as described in ORS 469.010 by demonstrating or advancing new efficiency or renewable

technology or by expanding electric generating capacity from renewable energy sources;

(C) Recommendations from any special advisory group designated by the Council under ORS 469.480;

(D) Evidence that the benefits are likely to occur only if the proposed facility is built;

(E) For facilities that are subject to a need standard, [need standard inapplicable].

(3) Notwithstanding section (2) of this rule, the Council shall not apply the balancing determination to the following standards: [NOT APPLICABLE]

(4) In making determinations regarding compliance with statutes, rules and ordinances normally administered by other agencies or compliance with requirements of the Council statutes if other agencies have special expertise, the Department of Energy shall consult with such other agencies during the notice of intent, site certificate application and site certificate amendment processes. Nothing in these rules is intended to interfere with the state's implementation of programs delegated to it by the federal government.

Adverse Effects on a Resource or Interest:

The "resource" at issue is the potential habitat and life history needs and attributes of WAGS. The land in question here that ODFW considers essential and irreplaceable for WAGS did not support WAGS either during surveys for the Project (see Attachment P-2) or historically (ORBIC 2017). The soil may currently lack the stability to support deep burrowing by WAGS. The Applicant believes that these recently enrolled CRP lands do not provide substantial benefits to this species. The land has historically been cultivated for wheat production. For the last 7 years, the landowner has allowed the land to "rest" for the purpose of agricultural sustainability. Within approximately 3 years from the date of this ASC, the landowner will resume wheat production, unconstrained by the CRP designation. As defined in the Fish and Wildlife Habitat Mitigation Policy, the land is not "limited habitat," "essential habitat," or "irreplaceable." These recently enrolled CRP fields simply are not Category 1 or Category 2 WAGS habitat, and the 785-foot Category 1 and 4,921-foot Category 2 buffer serves no meaningful species conservation purpose. Eliminating turbines within these CRP fields may result in the need to place turbines instead in other primarily native habitats that provide better burrowing and foraging habitat for WAGS over the long term, with the overall result being greater habitat loss for WAGS once the alternative area is cleared for turbine construction and the CRP fields in question are returned to wheat cultivation.

Similarly, "current or future development" will not adversely affect the "resource or interest" at issue if the Project is not built. No other non-agricultural development is anticipated or known. The future use of the agricultural lands at issue is the same regardless of whether the Project is built—the CRP contracts will expire, and the land will be cultivated within as few as approximately 3 years from the date of this ASC, and the ODFW Fish and Wildlife Habitat Mitigation Policy will be immaterial. Within the Site Boundary, the Applicant has proactively taken measures to remove wind turbine and other infrastructure locations where actual impacts to WAGS may occur. Given

the fact that WAGS colonies have not been found in the locations at issue, avoidance of impacts is not relevant, and with or without the Project, active wheat cultivation will soon continue in these locations.

Finally, given that there will be no anticipated adverse effects on WAGS, the "magnitude" of the impact cannot be reasonably assessed, and the Applicant will deploy mitigation strategies elsewhere where WAGS colonies do exist.

Evaluation of Overall Environmental Effects of the Facility:

The ASC evaluates overall environmental effects of the Project, demonstrating how the Project can comply with all EFSC Standards. The Project is proposed in an agricultural location and is designed to avoid, minimize, and mitigate land use and environmental effects. As noted, the impact of the Project on WAGS in the recently enrolled CRP fields in question is disputed. The landowners placed the land into CRP for soil conservation purposes to prolong sustained long-term agricultural use and soil preservation through regenerative forces of nature. The landowners did not place the lands into CRP to nurture WAGS colonies. What is known now is that CRP locations were recently converted to CRP and, unless the CRP conservation plans and contracts are renewed (which is not expected), the land will again be used for active agricultural purposes, unburdened by any mandatory habitat conservation or mitigation measures. That is true with or without the Project.

Evaluation of Overall Environmental and Public Benefits:

In promotion of the Oregon Energy Policy, ORS 469.010 was amended in 2017, with the following policy goals applicable to this request:

> *(1) Continued growth in demand for nonrenewable energy forms poses a serious and immediate, as well as future, problem. It is essential that future generations not be left a legacy of vanished or depleted resources, resulting in massive environmental, social and financial impact.*
>
> *(2) It is the goal of Oregon to promote the efficient use of energy resources and to develop permanently sustainable energy resources. The need exists for comprehensive state leadership in energy production, distribution and utilization. It is, therefore, the policy of Oregon:*
>
> > *(a) That development and use of a diverse array of permanently sustainable energy resources be encouraged utilizing to the highest degree possible the private sector of our free enterprise system.*
> >
> > *(b) That through state government example and other effective communications, energy conservation and elimination of wasteful and uneconomical uses of energy and materials be promoted. This conservation must include, but not be limited to, resource recovery and materials recycling.*
> >
> > *(c) That the basic human needs of every citizen, present and future, shall be given priority in the allocation of energy resources, commensurate with perpetuation of a free and productive economy with special attention to the preservation and enhancement of environmental quality.*

> *(d) That state government assist every citizen and industry in adjusting to a diminished availability of energy.*
>
> *(e) That energy-efficient modes of transportation for people and goods shall be encouraged, while energy-inefficient modes of transportation shall be discouraged.*
>
> *(f) That cost-effectiveness be considered in state agency decision-making relating to energy sources, facilities or conservation, and that cost-effectiveness be considered in all agency decision-making relating to energy facilities.*
>
> *(g) That state government shall provide a source of impartial and objective information in order that this energy policy may be enhanced.*

The 2017 amendments reflect and punctuate existing Oregon energy policy to rapidly transition the energy generation sector to predominantly renewable and sustainable energy sources.

The Oregon Renewable Energy Act of 2007, codified at ORS Ch. 469A, requires electric utilities and retail electric suppliers to ensure that the electricity sold to in-state retail customers comes from eligible renewable energy sources. Utilities must meet interim standards: 20 percent by the year 2020, 27 percent by the year 2025, 35 percent by the year 2025, and 45 percent by the year 2035. Smaller utilities must meet lower standards. Eligible renewable energy sources include solar energy, wind energy, hydroelectric power, wave and tidal power, geothermal energy, municipal solid waste, and biomass. Wind energy is by far the most abundant new renewable energy source deployed by utilities in response to the Renewable Energy (or Portfolio) Standard (RPS).
In 2016, Oregon's Legislature passed the Oregon Clean Electricity and Coal Transition Plan, Senate Bill 1547 (also known as the "Coal to Clean" bill). While the RPS requires utilities to provide 25 percent of the electricity customers use from qualifying renewable energy sources by 2025, under the new law, by 2040, half of all the electricity must be renewable, not including hydropower. Utilities must also transition Oregon off coal-fired electricity by 2035, making Oregon the first state to legislatively require coal generation retirement. Assuming a robust supply of utility scale renewable energy facilities, Oregon's electricity sector is on track to meet the state's RPS requirements as well as greenhouse gas reduction goals by reducing carbon emissions to 75 percent below 1990 levels by 2050.

The Project is one of a handful of new-generation Northwest wind energy facilities that will deploy technological advances, with turbines each capable of generating as much as 6 MW. This means that on a land use and megawatt generation basis, less land is committed to more power generation, reducing land use conversion and maximizing power generation in a location close to major Northwest regional grid infrastructure that will have ample capacity to handle new generation load.

Oregon is committed to addressing the perils of climate change. In this battle, every megawatt of clean energy is important, and for sites that are generally low impact on natural resources, it is essential that applicants can rely on sound science and reasonable application of policy to deliver clean energy. Compromising flexibility to site wind turbines within micrositing corridors and sacrificing generation locations due to unproven impacts on WAGS is contrary to the public interest to supply the maximum amount of renewable power on sites that can fulfill this public need.

The Applicant has undertaken significant and continuing efforts to site Project infrastructure, particularly turbines, well away from WAGS colonies. This effort has been in close coordination with ODFW and the landowners to minimize impacts to agricultural operations while also minimizing natural resource and habitat impacts. The micrositing corridor provides some opportunity to site turbines away from WAGS, but not a sufficient degree of flexibility to entirely avoid the recently enrolled CRP locations (Figure P-3).

6.1.2 Category 2 Habitat

All impacts to Category 2 habitat are associated with either WAGS potential areas of use (i.e., the 4,921-foot buffer on WAGS Category 1 habitat), or stream and riparian habitat associated with the Umatilla River and Butter Creek.

Permanent WAGS Category 2 habitat impacts are primarily to Eastside Grassland and Planted Grassland (approximately 5 and 6 percent of all permanently impacted areas for Turbine Options 1 and 2, respectively), followed by Shrub-steppe (less than 1 percent of all permanently impacted areas for either Option 1 or 2; Table P-9). The majority of WAGS Category 2 habitat associated with permanent impact areas under either turbine option was characterized as moderately disturbed habitat in the field, with a mix of natives and non-natives (i.e., Category 3; see Table P-2), with the remaining characterized as highly disturbed habitat with a high percentage of non-native plant species (i.e., Category 4). Similarly, temporary WAGS Category 2 habitat impacts are primarily to Eastside Grassland and Planted Grassland (approximately 15 and 14 percent of all temporarily impacted areas for Turbine Options 1 and 2, respectively), followed by Shrub-steppe and Irrigated Pastures and Hay Meadows (less than 1 percent of all temporarily impacted areas for either Option 1 or 2; Table P-9). The majority of WAGS Category 2 habitat associated with temporary impact areas was characterized as moderately disturbed habitat in the field, with a mix of natives and non-natives (i.e., Category 3). The remaining temporarily impacted areas in WAGS Category 2 habitat were characterized as highly or very highly disturbed habitat (i.e., Categories 4 and 5).

WAGS Category 2 habitat within the permanent and temporary impact areas was primarily Eastside Grassland dominated by Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and cheatgrass, and often contained a limited shrub component, typically green rabbitbrush (*Chrysothamnus viscidiflorus*) and gray rabbitbrush (*Ericameria nauseosa*). WAGS Category 2 Planted Grassland within the permanent and temporary impact areas was dominated by intermediate wheatgrass (*Thinopyrum intermedium*), Idaho fescue, bluebunch wheatgrass, crested wheatgrass, and cheatgrass, and often included shrubs such as green rabbitbrush and gray rabbitbrush. WAGS Category 2 Shrub-steppe within the permanent and temporary impact areas was dominated by big sagebrush (*Artemisia tridentata*), bluebunch wheatgrass, and cheatgrass, and was primarily located in the valley bottoms and toe slopes adjacent to existing roads. WAGS Category 2 Irrigated Pastures and Hay Meadows within the permanent and temporary impact areas includes an old farm and corral area dominated by intermediate wheatgrass adjacent to an existing gravel road.

Table P-9. Potential Impacts to WAGS Category 2 Habitat

Habitat Category and Type	Habitat Sub-type	Preliminary Habitat Category Impacts (Acres)					
		Category 3		Category 4		Category 5	
		Temp	Perm	Temp	Perm	Temp	Perm
Turbine Option 1							
Agriculture, Pasture, and Mixed Environs	Irrigated Pastures and Hay Meadows	-	-	-	-	<1	-
	Planted Grasslands	21	2	<1	-	-	-
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	103	3	30	<1	1	-
	Shrub-steppe	3	<1	-	-	-	-
Option 1 Total		***126***	***4***	***30***	***<1***	***1***	
Turbine Option 2							
Agriculture, Pasture, and Mixed Environs	Irrigated Pastures and Hay Meadows	-	-	-	-	<1	-
	Planted Grasslands	21	2	<1	-	-	-
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	134	5	58	1	1	
	Shrub-steppe	3	<1	-	-	-	-
Option 2 Total		***158***	***7***	***58***	***1***	***1***	

Note: numbers may not sum correctly due to rounding. "-" means no impact while <1 means greater than zero but less than 0.5 acres impact.

The Habitat Mitigation Policy defines Category 2 Habitat as "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." As described under Category 1 habitat, above, the Applicant believes the CRP fields within the Site Boundary recently converted from wheat cultivation are not essential or limited habitat as defined in the ODFW Habitat Mitigation Policy (OAR 635-415-0025), and therefore these areas were excluded from consideration as Category 2 WAGS habitat during habitat categorization (see Figures P-2 and P-3 for the location Category 2 WAGS habitat and the location of the fallow wheat field/recently enrolled CRP lands excluded from consideration from these overlays).

Although shown as temporary impact areas in Table P-8 above (less than 1 acre for either turbine option), impacts to Category 2 streams will be avoided by spanning of these habitats by the transmission line across the Umatilla River and Butter Creek, and placing poles outside of wetlands and Waters of the State. However, the Eastside Riparian habitat along the Umatilla River at the location of the proposed crossing will likely need to be cleared or trimmed to maintain underwire clearance. No riparian vegetation was mapped at the UEC transmission line crossing of Butter Creek, although this area was not accessible during field surveys; the location of the proposed transmission line crossing of Butter Creek is at an existing transmission line that will be upgraded

to support the Project. The Umatilla River and adjacent riparian vegetation was classified as Category 2 habitat due to the presence of special status fish species including bull trout (*Salvelinus confluentus*) and steelhead (Middle Columbia River SMU/Evolutionarily Significant Unit [ESU]; *Oncorhynchus mykiss*), both of which are federally threatened and state sensitive-critical species (see Table P-4). Butter Creek was classified as Category 2 habitat due to the presence of steelhead (Middle Columbia River SMU/ESU).

Although the location of the crossing of the Umatilla River (and surrounding vegetation) was not accessible during field surveys in 2017-2019, species present likely include cottonwood (*Populus* sp.) trees as well as noxious weeds due to the location adjacent a railroad, public road, agricultural fields, and a major river. Should this transmission line route be selected, areas of disturbance will be field verified prior to construction to determine vegetation height and species composition, and this description of the nature and duration of proposed impacts will be updated as needed. This Category 2 Eastside Riparian habitat is conservatively considered permanently impacted for the purposes of mitigation as described in the Draft HMP (Attachment P-3).

6.1.3 Category 3 Habitat

The majority of potential permanent and temporary impacts to Category 3 habitat under either turbine option are to Eastside Grasslands and Planted Grasslands habitats (Table P-8). Category 3 Eastside Grasslands within the permanent and temporary impact areas are dominated by Idaho fescue and bluebunch wheatgrass, and include a limited shrub component, typically green rabbitbrush and gray rabbitbrush. These areas are moderately disturbed by grazing and are dominated by a mix of native and non-native species. Other common species include gray horsebrush (*Tetradymia canescens*), grassy tarweed (*Madia gracilis*), rat-tail fescue (*Vulpia myuros*), and soft brome (*Bromus hordeaceus*). Category 3 Planted Grasslands within the permanent and temporary impact areas are dominated by intermediate wheatgrass, Idaho fescue, bluebunch wheatgrass, crested wheatgrass, and cheatgrass, and often included shrubs such as green rabbitbrush and gray rabbitbrush. These areas are former croplands planted to grassland with characteristics necessary to potentially provide habitat for sensitive wildlife due to cover and forage quality, and were moderately disturbed by grazing. Other common species in Category 3 Planted Grassland include cheatgrass, bulbous bluegrass (*Poa bulbosa*), and common yarrow (*Achillea millefolium*).

Other Category 3 habitats potentially impacted include Cliffs, Caves, and Talus, Intermittent or Ephemeral Streams, Emergent Wetlands, and Shrub-steppe. All four of these habitat sub-types have less than an acre of permanent and temporary Category 3 impacts (Table P-8). The Cliffs, Caves, and Talus potentially impacted includes a talus slope in the center of the Site Boundary crossed by the temporary impact corridor associated with the transmission line. Category 3 Intermittent and Ephemeral streams potentially impacted consist of non-fish-bearing natural stream channels that drain into fish-bearing streams (see Table P-2). Although the limits of disturbance overlap with these streams, impacts will generally be avoided by spanning these features with the transmission line or avoiding road widening in the direction of the stream (see Exhibit J). Category 3 Emergent

Wetlands potentially impacted consist of wetlands domination by a mixture of native and non-native herbaceous plant species with low to moderate disturbance. Similar to streams, impacts to wetlands will be avoided during final design (see Exhibit J). All Category 3 Shrub-steppe potentially impacted is associated with the proposed transmission lines; these areas are dominated by big sagebrush, green rabbitbrush, gray rabbitbrush, cheatgrass, bulbous bluegrass, and rat-tail fescue, and were lightly to moderately grazed.

Category 3 Shrub-steppe areas temporarily impacted during construction are anticipated to take greater than 5 years to recover; all other Category 3 habitat types are anticipated to take less than 5 years to recover (Bakker and van Diggelen 2006; McArthur and Stevens 2004; Pyke et al. 2015; Rosentreter 2005; Wambolt et al. 2001; Watts and Wambolt 1996).

6.1.4 Category 4 Habitat

The majority of potential permanent and temporary impacts to Category 4 habitat under either turbine option are to Eastside Grasslands and Planted Grasslands habitats (Table P-8). Category 4 Eastside Grasslands within temporary and permanent impact areas contain similar species as the Category 3 Eastside Grasslands described above, but are dominated by non-native species and are highly disturbed and often compacted. Similarly, the Category 4 Planted Grasslands within temporary and permanent impact areas contain similar species as the Category 3 Planted Grasslands described above, but are further invaded by cheatgrass and other non-natives, have less of shrub component and lack later seral stage vegetation.

Other Category 4 habitats potentially impacted include Intermittent or Ephemeral Streams and Eastside Riparian habitats. Both of these habitat sub-types have less than an acre of permanent and temporary Category 4 impacts under either turbine option (Table P-8). Category 4 Intermittent and Ephemeral streams potentially impacted consist of non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams (see Table P-2). Although the limits of disturbance overlap with these streams, impacts will generally be avoided by spanning these features with the transmission line or avoiding road widening in the direction of the stream (see Exhibit J). Similarly, impacts to Category 4 Eastside Riparian habitat will be avoided by spanning of this habitat by the transmission line across Alkali Canyon. Category 4 Eastside Riparian habitats were designated as such because they were relatively degraded due to grazing, invasive species, and proximity to roads and other human disturbance; these areas provide marginal habitat for wildlife despite their degraded condition due to the lack of trees on the landscape.

All Category 4 habitat types are anticipated to take less than 5 years to recover. Riparian habitat would take more than 5 years to recover if trees and/or shrubs are removed; however, these habitats will be avoided during final design as feasible. If avoidance is not possible due to other construction constraints, the Applicant will coordinate with ODFW and ODOE regarding riparian habitat and/or tree removal and provide mitigation for these impacts as appropriate.

6.1.5 Category 5 Habitat

Potential impacts to Category 5 habitat primarily include permanent and temporary impacts to Planted Grassland and Eastside Grassland habitats (Table P-8). Category 5 Planted Grassland potentially impacted consists of former wheat fields recently converted to CRP (see discussion under Section 6.1.1, above). These fields are dominated by alfalfa, tumble mustard, and cheatgrass, and may have been planted, but with only limited success. Category 5 Eastside Grasslands potentially impacted are very highly disturbed, dominated by non-native species, and generally isolated between active agricultural fields or located adjacent to roads. Category 5 Eastside Grasslands are dominated by cereal rye (*Secale cereale*), common hare-leaf, bulbous bluegrass, and cheatgrass, and are primarily located along the UEC transmission line corridor.

Other Category 5 habitats potentially impacted include Shrub-steppe, Irrigated Pastures and Hay Meadows, and Intermittent or Ephemeral Streams. Category 5 Shrub-steppe habitat within permanent and temporary impact areas is located entirely along the UEC transmission line corridor. Although these areas have a shrub component, they are very highly disturbed, dominated by non-native vegetation, and isolated between active agricultural fields and/or roads. Category 5 Irrigated Pastures and Hay Meadows within permanent and temporary impact areas includes an old farm and corral area at the southern end of the Site Boundary surrounded by existing roads and actively cultivated wheat fields. Category 5 Intermittent and Ephemeral Streams potentially impacted consist of non-fish-bearing ephemeral streams or excavated channels including canals (see Table P-2); these streams are located along the UEC transmission corridor.

All Category 5 habitat types are anticipated to take less than 5 years to recover.

6.1.6 Category 6 Habitat

There are potential temporary and permanent impacts to Category 6 habitat under either turbine option. Both Orchards, Vineyards, Wheat Fields, Other Row Crops (i.e., dryland wheat and circle-pivot irrigation) and Urban and Mixed Environs (i.e., paved roads and other developed areas) habitat types will be impacted.

6.2 Potential Impacts to State Sensitive Species

This section addresses potential impacts to state sensitive species identified in Section 4.0, as well as birds and bats in general including eagles. Habitat modification resulting from construction activities will occur in both temporary and permanent impact areas, and the associated impacts will vary by species. State sensitive terrestrial species are expected to be affected by permanent and temporary loss or modification of habitat from construction of the Project, injury to or loss (fatalities) of individuals due to collision with or crushing from construction equipment and vehicles, and general disturbance (noise and visual) from construction activity. General disturbance can interrupt normal wildlife behavior, which can have varying effects depending on the species and an individual's ability to tolerate such disturbance. In general, noise and visual disturbance may cause wildlife to avoid typical foraging and breeding areas, or distract them from those activities

within those areas, which can result in reduced fitness. The Applicant has proposed several measures to avoid, minimize, and mitigate these effects as described in Section 7.0.

In addition to these habitat-related impacts (e.g., habitat loss and modification), potential adverse impacts to sensitive species due to construction and operation may include turbine collision, potential nesting and breeding disturbance, electrocution, powerline collision, and vehicular collision. Routine maintenance activities during operation would typically involve the temporary presence of vehicles on roads, including heavy equipment, and human activity in and around the Project infrastructure. These activities are expected to affect state sensitive wildlife in a manner similar to that described for construction; however, the magnitude, frequency, and duration of operational disturbances will be less than during construction. The primary anticipated effect of operation of the Project is direct fatalities of birds and bats due to collision with turbine blades.

6.2.1 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. However, the proposed impact areas are not located within typical maternal or roosting habitat for these species (Table P-4). While areas of Cliffs, Caves, and Talus are located within the Analysis Area along canyon rims, construction and operation of the Project will have limited impacts to these roosting habitats. The majority of the Cliffs, Caves, and Talus are located along and adjacent to Alkali Canyon and the banks of the Umatilla River; the Applicant has set turbines back from both of these features, which will minimize impacts to bats and other wildlife. Similarly, impacts to foraging habitats such as wetlands and waters have been avoided. Additionally, construction activities will generally occur during daylight hours when bats are generally absent, and thus construction activities are not anticipated to disturb foraging bats.

Of the state sensitive species with potential to occur, hoary bat, silver-haired bat, and pallid bat were detected during acoustic bat surveys, although pallid bats were detected in less than 1 percent of the total bat passes (Table P-6). Spotted bats and Townsend's big-eared bats were not detected during surveys. During operation, any impacts to bats that do occur will likely be limited to late summer and fall, during the migratory period for tree-roosting bats. The hoary bat and silver-haired bat have been documented as fatalities at wind projects across North America, most frequently in late summer and early fall during migratory periods (Arnett et al. 2008; Kunz et al. 2007; Strickland et al. 2011). The hoary bat fatalities documented at wind energy facilities across North America recently prompted a modeling effort that questioned the long-term population viability of this species if development and fatalities continue at 2014 levels (Frick et al. 2017). Migratory bats (hoary and silver-haired bats) were observed at low activity rates during both the spring and summer during acoustic bat surveys for the Project, with higher activity levels during the fall migration period in September and October (see Attachment P-2). The greatest risk for migratory bats within the Site Boundary is likely to occur during migration periods when bats are moving between summer and winter areas.

A literature review of paired pre-construction acoustic sampling and post-construction fatality monitoring at wind projects indicated an average of 10.7 bat passes per detector night and an average of 1.3 bat fatalities per megawatt at 22 wind projects in the Great Basin/Southwest Open Range-Desert region, which includes eastern Oregon (Table P-10; Hein et al. 2013). The mean activity rate recorded at the Project (10.1 bat passes per detector night) aligns with the regional average. According to a report by Hein et al. (2013), no empirical evidence suggests a correlation between pre-construction bat activity (as measured by acoustic monitoring) and post-construction bat mortality; however, that report only examined overall bat activity rates and was not able to investigate species-specific activity and fatality rates. 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/megawatt/year. Of these fatalities, silver-haired bat and hoary bat accounted for 98 percent while Myotis species accounted for only 2 percent of the observed fatalities at 23 wind facilities. The American Wind Wildlife Institute (AWWI; 2018) found a similar trend based on a review of publicly available and confidential bat collision fatality records in the American Wind Wildlife Information Center (AWWIC). The USFWS Pacific Region (including Eastern Oregon) had the lowest range (0–4.2) and median (0.7) bat fatalities per megawatt per year compared to other USFWS Regions (based on 35 Pacific Region studies). Nationwide, hoary bat had the highest percentage of fatality incidents (32 percent) and the highest frequency of occurrences in post-construction monitoring studies (95 percent; 180 of 190 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.

Table P-10. Comparison of Pre-Construction Bat Activity Among Wind Projects in the United States

Region	Number of Sites Included	Bat Activity (Bat Passes/ Detector Night)		Bat Fatality (Bats/MW)	
		Mean	Minimum-Maximum	Mean	Minimum-Maximum
Northeastern Deciduous Forest	15	25.2	1.24–141.70	9.5	1.1-–35.6
Great Basin/Southwest Open Range-Desert	22	10.7	0.02–77.14	1.3	0.1–3.9
Midwestern Deciduous Forest-Agricultural	31	7.3	0.73–33.88	12.8	2.5–32.0
Great Plains	24	4.2	0.15–17.45	3.1	0.1–10.9
Nolin Hills Wind Power Project	**1**	**10.1**	**N/A**	**N/A**	**N/A**
Data summarized from Hein et al. (2013).					

The highest activity rates (90 percent of all bat passes) during acoustic bat surveys at the Project were recorded at Stations ORNH-02 and ORNH-03. Both stations were located in the bottoms of gulches (Alkali Canyon and Mud Springs, respectively) adjacent to trees and shrubs. These features

are indicative of higher moisture, which likely supports a higher concentration of insect prey in the area. In addition, rocky outcroppings were present on the hillsides adjacent to Station ORNH-02, which are preferred roosting and foraging locations for the western small-footed myotis, the most abundant species recorded during the surveys. These results suggest that activity is concentrated in areas with features suitable for roosting and foraging Myotis species (i.e., trees, water sources, rocky outcroppings). As noted above, turbines have been sited away from Alkali Canyon; similarly, the closest turbine to Station ORNH-03 in Mud Springs Canyon is over a mile away. Relatively low activity rates were observed at stations located amid grasslands and croplands (ORNH-01, ORNH-04, and ORNH-05), which coincide roughly with the proposed turbine locations as well as the habitat types where the majority of proposed turbines will be located under either turbine option.

Based on the Applicant's avoidance of typical maternal and roosting habitat (i.e., caves and cliffs) and foraging habitat (i.e., wetlands and waters) for the state sensitive species with potential to occur at the Project, the limited amount of trees and forested habitat within the Site Boundary, and the recorded mean activity rate consistent with the regional average, construction and operation of the Project are anticipated to have low to moderate impacts on bats, including state sensitive bat species, commensurate with fatality rates observed at other Projects in the region (Table P-10). The Applicant will monitor for bat fatalities during Project operation as described in the Draft Wildlife Monitoring Plan (WMP; Attachment P-5).

6.2.2 Birds

Ten state sensitive bird species and two eagle species have the potential to occur within the Analysis Area (Table P-4). Construction and operation of the Project 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 Project. However, breeding success could be affected by this displacement, and foraging opportunities may be reduced during construction. Habitat mitigation as described in the Draft HMP (see Attachment P-3) will provide compensatory mitigation for impacts to grassland birds. Raptors nesting within the Site Boundary could be disturbed during construction, although the Applicant will not conduct ground-disturbing activities within species-specific buffer distances of active raptor nests during the nesting season as feasible, as described in Section 7.2.

Avian mortality at the Project due to collision with turbines is anticipated. Collisions with power lines are unlikely because the majority of collection lines associated with the Project will be buried, and transmission lines will be constructed following the Avian Power Line Interaction Committee (APLIC) recommendations for collision avoidance (APLIC 2012). The risk of collision with vehicles will be minimized by the implementation of avoidance and minimization measures, such as roadside carcass removal and speed limits on Project roads (Section 7.0). Therefore, collision with operational turbines is likely the primary Project-related threat to bird species.

AWWI (2019) reviewed existing public and private data on avian mortality at operational wind facilities nationwide and determined small passerines constitute the largest percentage of fatalities,

followed by diurnal raptors, doves/pigeons, and upland gamebirds. These data included 167 studies from 115 wind projects and are used here to anticipate potential impacts at the Project from collision, also taking into consideration the Project's regional location, habitat, and the results of pre-construction surveys. In the 41 available studies reviewed by AWWI (2019) in the Northern Rockies avifaunal biome (derived from Bird Conservation Regions; includes eastern Oregon), small passerines accounted for 62 percent of fatalities, following by upland game birds at 9 percent of fatalities, and diurnal raptors and doves/pigeons at 5 percent of fatalities each (AWWIC 2019). Waterfowl accounted for 4 percent of fatalities in the Northern Rockies, and the remaining bird groups (excluding unidentified birds) accounted for approximately 1 percent of fatalities or less.

Nationwide, diurnal raptors appear over-represented as fatality incidents: diurnal raptors constituted 8 percent of all unadjusted fatality incidents in AWWIC, but less than 0.3 percent of bird abundance in North America (AWWI 2019). Passerine fatality incidents displayed distinct seasonal patterns with peaks during spring and fall migration seasons (AWWI 2019). Seasonality in raptor fatalities is subtler, but a peak in incidents in the fall was evident, presumably coincident with the fall migration season (AWWI 2019). The most common species reported as fatalities nationwide include horned lark (13 percent of fatalities), followed by mourning dove and red-eyed vireo (*Vireo olivaceus*; 5 percent each), and western meadowlark (4 percent). In the Northern Rockies avifaunal biome, horned lark accounted for 29 percent of fatalities (AWWI 2019). The USFWS Pacific Region (including Eastern Oregon) had the smallest range (0.173–3.55) of bird fatalities per megawatt per year compared to other USFWS Regions (based on 28 Pacific Region studies). The mean fatality rate for all birds in the Pacific Region was 1.84 birds per megawatt per year (AWWI 2019). The mean fatality rate for raptors in the Northern Rockies avifaunal biome was 0.09 birds per megawatt per year while the mean fatality rate for all birds was 1.74 birds per megawatt per year (AWWI 2019).

Similar trends in species and species groups fatalities are anticipated at the Project. Passerines had the highest mean use across all seasons during avian use surveys at the Project, and more than half of all passerine use was by horned lark. Other passerine species commonly observed included western meadowlark, European starling, mourning dove, and common raven, all of which have been observed as fatalities at wind projects (AWWI 2019). Based on their known use of the Site Boundary and documented fatalities at other wind projects, it is expected that passerines, in particular horned larks, will make up the largest proportion of fatalities.

Mean use for all birds (12.07 birds per 0.5-mile [800-meter] point per 20-minute point count) at the Project is consistent with pre-construction mean use at other wind projects in the area while mean use for raptors (0.28 birds per 0.5-mile [800-meter] point per 20-minute point count) is relatively low (e.g., see Iberdrola Renewables 2009). Raptor mean use at the Project was primarily by red-tailed hawk, northern harrier, rough-legged hawk, and Swainson's hawk (see Section 5.4). These species have been observed as fatalities at wind projects and therefore there is potential for them to occur as fatalities at the Project (AWWI 2019). However, as noted above and discussed here, turbines have been sited away from Alkali Canyon as recommended by ODFW to minimize impacts to raptors (see May 30, 2018 memo from ODFW in Attachment P-1).

Raptor nest surveys conducted in 2017-2019 identified active nests belonging to 14 species, including four state sensitive and eagle species (i.e., ferruginous hawk, golden eagle, Swainson's hawk, and burrowing owl; see Section 5.0 and Figure P-5). Based on the results of raptor nest surveys in 2017, ODFW noted that Alkali Canyon appears to serve as an area of high raptor use relative to the surrounding landscape, likely due to the increased availability of nest trees, and noted that juvenile raptors may attempt to forage on the uplands above the canyon rims putting them at risk of a turbine strike (see Section 4.2). As a result, the Applicant, in coordination with ODFW, implemented a 656-foot (200-meter) setback of wind turbines from the rim of Alkali Canyon (see July 30, 2018 memo from Tetra Tech in Attachment P-1) as a conservative impact avoidance measure to foraging raptor habitat.

The Applicant also avoided siting turbines within 0.25 mile of active ferruginous hawk and Swainson's hawk nests under both Turbine Option 1 and Turbine Option 2, to reduce both disturbance during nesting and risk of collision should these nests become occupied during construction and operation, respectively. Active nests belonging to red-tailed hawk, ferruginous hawk, and Swainson's hawk were documented during raptor nest surveys in 2017 and 2018 in trees adjacent to existing gravel roads (i.e., County Road 1363 and Speare Canyon Road) that will be used as transportation routes for turbine components and equipment during construction under either turbine option. These nests could experience disturbance, although these roads are currently frequented by farming trucks and equipment and were noted during biological surveys for the Project as having been re-graveled annually, which did not appear to dissuade raptors from nesting. Additionally, two of the locations used by a Swainson's hawk for nesting in 2017 and 2018 were dead locust trees, which have the potential to fall over and thus may no longer support nesting at the time of construction. The Applicant also sited permanent and temporary impact areas (not just turbines) to avoid impacting trees documented as containing active ferruginous hawk and Swainson's hawk nests during raptor nest surveys.

Turbine Option 1 consists of up to 58 Siemens-Gamesa 6.0-MW turbines, while Turbine Option 2 consists of up to 116 General Electric 3.03-MW turbines. The rotor diameter for Turbine Option 1 is 558 feet, with a minimum blade tip clearance of 98 feet, a maximum blade tip height of 656 feet, and a tower height of 337 feet. The rotor diameter for Turbine Option 2 is 459 feet, with a minimum blade tip clearance of 36.5 feet, a maximum blade tip height of 496 feet, and a tower height of 266 feet (see Table B-1 in Exhibit B). Miao et al. (2019) identified turbine tower height as positively associated with breeding bird abundance, while blade length was negatively associated with breeding bird abundance. Turbine Option 1 includes fewer turbines, taller towers, and longer blades compared to Turbine Option 2. Turbine Option 2 has lower blade tip clearance than Turbine Option 1, which could result in increased collisions resulting from birds flying between 36.5 and 98 feet above ground. Although Turbine Option 1 has a much higher maximum blade height (656 feet compared to 496 feet), limited bird activity was recorded above 500 feet and the Project is not a known migration corridor (see Section 5.4). Due to the greater number of turbines and lower tower and minimum blade clearance heights, Turbine Option 2 may result in slightly more bird fatalities and breeding bird displacement than Turbine Option 1.

Overall bird use was distributed within the Site Boundary and not concentrated on any particular survey point. Bird activity was primarily observed in grassland and agricultural fields, which are the dominant habitat types at the Project. Both overall bird use and raptor use was highest in the winter, followed by spring, and no migration corridors or patterns were detected during surveys. Based on these observations, it is anticipated that bird fatalities may be highest in the winter rather than peaking during spring and fall migration seasons as observed at other projects (AWWI 2019), and fatalities are not anticipated to be concentrated in particular portions of the Site Boundary or at particular turbines.

Based on the Applicant's avoidance of Alkali Canyon and the recorded mean use consistent with the regional average, construction and operation of the Project are anticipated to have moderate impacts on birds in general and raptors in particular, with anticipated fatality rates commensurate with those observed at other Projects in the region (AWWI 2019). The Applicant will monitor for bird fatalities during Project operation as described in the Draft WMP (Attachment P-5).

Impacts specific to sensitive bird species with the potential to occur within the Site Boundary are addressed below. Measures described in Section 7.0 will be used to minimize or avoid these potential impacts.

- **Bald eagle** (BGEPA). Bald eagles were observed within the Analysis Area during eagle use surveys for the Project as well as during pedestrian wildlife surveys. One active bald eagle nest is located within 10 miles of the Site Boundary (see Attachment P-2). Eagle use surveys indicate infrequent but occasional use of the Site Boundary by bald eagles. Seasonal patterns suggest strictly non-breeding use of habitat within the Site Boundary by bald eagles, often associated with scavenging behavior. Ten out of 11 bald eagle observations during eagle use surveys and incidental to eagle use surveys occurred during the winter, with several incidents of carcass scavenging noted by observers. While bald eagles are known to winter along the Umatilla River corridor, the location of observations across both winter survey periods do not reveal any spatial use pattern during winter within the Site Boundary.

  Although fish make up most of their diet, bald eagles consume a wide variety of prey, based on what is available in a given region. A review of 20 studies across North America found that the average nesting bald eagle diet consisted of 56 percent fish, 28 percent birds, 14 percent mammals, and 2 percent other (Stalmaster 1987 as cited in Buehler 2000). The Umatilla River is fish-bearing and is likely used by bald eagles for foraging. The McKay Reservoir, located approximately 10 miles east of the Site Boundary, is a known foraging and nesting area for bald eagles. Other sources of bald eagle prey in the vicinity of the Project likely include gamebirds and small and medium-sized mammals (Buehler 2000). While there are sources of eagle prey within the Site Boundary, these are not unique to the area. It is not expected that the prey availability within the Site Boundary would serve to attract eagles from the surrounding area.

  Turbine collision is the primary potential adverse impacts to bald eagles, mainly during migration and winter. The Applicant calculated predicted eagle fatality rates for the Project

in an Eagle Conservation Plan (ECP; Tetra Tech 2019e), developed to document minimization commitments and support an eagle take permit application if pursued. The Applicant preliminarily estimated a fatality rate of four bald eagles over 30-years of Project operation at the upper 80 percent credible limit (CL) (Tetra Tech 2019e). This is a relatively low level of collision risk compared to wind projects that have received eagle take permits (e.g., Normandeau 2014; USFWS 2018). Both collision and habitat impacts will be limited by avoidance and minimization measures, as described in Section 7.0.

- **Brewer's sparrow** (state sensitive). One brewer's sparrow was observed in the Analysis Area, in the spring of 2019, singing in Eastside Grassland adjacent to the proposed BPA transmission line (Figure P-4). Brewer's sparrows were not detected during avian use surveys at the Project. Brewer's sparrows are most closely associated with big sagebrush (OCS 2016), which was observed in limited amounts in canyon bottoms at the Project. Brewer's sparrows arrive in Oregon in April and breed by the end of the month; following the breeding season, adults and young often congregate into large wandering flocks (Csuti et al. 2001). While not recorded during avian use surveys at the Project, the detection during pedestrian wildlife surveys and the availability of habitat for this species suggests that this species may occur at the Project.

  Potential adverse impacts to this species due to the construction and operation of the Project include habitat loss, potential nesting disturbance, and collision with turbine blades. However, habitat loss for this species has been minimized by micrositing outside of sagebrush shrub-steppe habitat as feasible, as described in Section 7.0. Additionally, turbines are generally sited on ridges at the Project, away from Shrub-steppe habitat in the canyon bottoms that may be used by this species. Brewer's sparrows have been documented in only nine fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 193 studies reported in AWWI 2019). As a result, impacts to Brewer's sparrow from collisions with turbine blades are also anticipated to be minimal.

- **Burrowing owl** (state sensitive-critical). Burrowing owls were observed within the Analysis Area during pedestrian wildlife surveys for the Project in 2019. This species breeds in burrows excavated by other animals in open areas with a high proportion of bare ground (OCS 2016). Burrowing owls were observed at three locations (Figure P-4). One of these locations was an active burrowing owl burrow (Figure P-5), where two adult burrowing owls were observed along with whitewash and owl pellets during surveys in April as well as May 2019. The other two locations where burrowing owls were observed were also in the vicinity of burrows; however, owls were not present during subsequent visits and any owl sign around the burrows was old, indicating that burrowing owls were not actively breeding at these locations. This species is generally migrant, but a small proportion of breeding owls in neighboring Idaho and Washington have been found to overwinter in their nesting areas (Poulin et al. 2011). Arrival in Oregon likely occurs in March; egg-laying begins in April. Dispersal generally occurs in during September.

Potential adverse impacts to this species during construction and operation are nesting and foraging habitat loss (burrows and grassland, respectively), disturbance during the breeding season, and vehicle and turbine collision. However, the Applicant will not conduct ground-disturbing activities within 0.25 mile of active burrowing owl burrows during the nesting season as feasible as described in Section 7.2. Additionally, risk of collision with vehicles will be minimized by the implementation of speed limits on Project roads (Section 7.0). This species is not generally susceptible to collision with turbines; burrowing owls have been documented in only six fatality incidents at wind projects nationwide (i.e., 0.1 percent of fatality incidents based on 193 studies reported in AWWI 2019). As a result, impacts to burrowing owl from collisions with turbine blades are also anticipated to be minimal.

- **Common nighthawk** (state sensitive). Common nighthawks were observed within the Analysis Area during avian use surveys for the Project, on four occasions during the summer. A long-distance migrant, this species is only present in Oregon during its breeding season, arriving in mid- to late May (Brigham et al. 2011). No detections occurred during spring, fall, or winter seasons, as this species migrates north relatively late and south relatively early; the first detection was on June 6 and the last detection was on July 18. This species was recorded at three points on the plateau north of Alkali Canyon, one point along Mud Springs Road, and a nest with two eggs was also found north of Alkali Canyon.

  Construction and operation of the Project could pose a risk to these birds, which nest on a variety of substrates in open areas including bare ground, gravel, and lithosol. Males also tend to roost on gravel roads, and therefore may roost in temporary impact areas in use during construction such as staging areas. During construction and operation, nesting disturbance and collision with vehicles and turbine blades may adversely impact this species. Common nighthawks have been documented as fatalities at 5 wind projects studies in the northern Rockies avifaunal biome (i.e., 0.6 percent of fatality incidents based on 41 studies reported in AWWI 2019), and in 23 fatality incidents at wind projects nationwide (i.e., 0.3 percent of fatality incidents based on 193 studies reported in AWWI 2019). Flight heights observed for this species varied between 131 and 984 feet (40 and 300 meters), indicating it is at risk of collision with turbine blades under both Turbine Options 1 and 2.

- **Ferruginous hawk** (state sensitive-critical). This species was detected during avian use and pedestrian wildlife surveys for the Project, primarily in the spring (see Section 5.0). This ferruginous hawk activity was distributed within the Site Boundary (Figure P-4). This species occurs in open, 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). Active ferruginous hawk nests were documented at seven locations during surveys for the Project, of which three nests are located within the Site Boundary (see Figure P-5, although note that active ferruginous hawk nests may be obscured if subsequently occupied by a different species; see Attachment P-2 for nest locations each year of surveys). Within the

Site Boundary, ferruginous hawk nests were located in Alkali Canyon and within a small draw west of County Road 1363, which runs northwest-southeast through the Project. Ferruginous hawks can be present on breeding territories as early as late February to early March and can be found in Oregon in small numbers year-round (Ng et al. 2017; Sullivan et al. 2009).

During construction and operation, nesting disturbance and collision with turbine blades may adversely impact this species. Ferruginous hawks have been documented in 11 fatality incidents at wind projects nationwide (i.e., 0.2 percent of fatality incidents based on 193 studies reported in AWWI 2019). Maximum flight heights for the three individuals observed at points during avian use surveys were 10 feet (3 meters), 33 feet (10 meters), and 49 feet (15 meters), indicating there is some risk of collision with turbine blades, primarily under Turbine Option 2, which has lower blade clearance. However, in addition to siting turbines away from Alkali Canyon as requested by ODFW and described above, the Applicant also avoided siting turbines within 0.25 mile of active ferruginous hawk nests to reduce both disturbance during nesting and risk of collision should these nests become occupied during construction and/or operation. Additionally, the Applicant will not conduct ground-disturbing activities within 0.25 mile of active ferruginous hawk nests during the nesting season as feasible as described in Section 7.2.

- **Golden eagle** (BGEPA). Golden eagles were observed within the Analysis Area during eagle use surveys for the Project as well as during pedestrian wildlife surveys. An occupied nest was found in each of three known golden eagle territories within 10 miles of the Site Boundary during surveys in 2017 and 2018 (see Attachment P-2); however, none of these nests are located within the Site Boundary. Golden eagle use of habitat within the Site Boundary varied seasonally more so than bald eagle use; however, the data show some similarities. Twelve out of 20 golden eagle observations (during surveys and incidentally) occurred in the winter. Carcass scavenging behavior was observed; however, this behavior was less frequently noted than in bald eagle behavioral data. The number of observations during surveys and incidentally of immature golden eagles south of Alkali Canyon in the late summer/early fall of 2018 (second year of eagle use surveys) suggests use of this area by post-fledging individuals, potentially produced from the Butter Creek territory, which was successful in 2018 (see Attachment P-2). This pattern was not observed during 2017 surveys; neither of the Butter Creek Canyon territories had a breeding attempt in 2017 (see Attachment P-2).

  Although published research on golden eagle prey selection near the Project is unavailable, studies in southwestern Idaho and southeastern Oregon indicate that golden eagles prey upon ground squirrels, but that these squirrels make up a small proportion of prey items taken (Kochert et al. 2002). The Applicant mapped WAGS colonies, with Category 1 WAGS habitat delineated around colonies detected in 2017 and 2018 (Figure P-2). Other sources of golden eagle prey noted during the WAGS surveys included hares, rabbits, and gamebirds (e.g., ring-necked pheasants [*Phasianus colchicus*] and grouse). While there are sources of

eagle prey within the Site Boundary, these are not unique to the area. It is not expected that the prey availability within the Site Boundary would serve to attract eagles from the surrounding area.

Turbine collision is the primary potential adverse impacts to golden eagles, mainly during migration and winter. As described above under bald eagles, the Applicant calculated predicted eagle fatality rates for the Project in an ECP (Tetra Tech 2019e). The Applicant preliminarily estimated a fatality rate of three golden eagles killed over 30-years of Project operation at the upper 80 percent CL (Tetra Tech 2019e). This is a relatively low level of collision risk compared to wind projects that have received eagle take permits (e.g., Normandeau 2014, USFWS 2018). Both collision and habitat impacts will be limited by avoidance and minimization measures, as described in Section 7.0.

- **Grasshopper sparrow** (state sensitive). Grasshopper sparrows were observed numerous times during pedestrian wildlife surveys and avian use surveys, distributed within the Site Boundary (see Section 5.0; Figure P-4). This species uses dry grasslands with low shrub cover for breeding (OCS 2016) and is locally and regionally abundant. In Oregon, this species breeds primarily in native bunchgrass. Its breeding period generally begins in May (Vickery 1996). Fall migration timing is poorly understood for this secretive species, but data suggest migration is underway in September. Observations at the Project were limited to the spring and summer seasons. No detections occurred during fall or winter seasons, as this species migrates south relatively early and those that may remain longer cease singing; the last detections were on July 18.

  Construction and operation of the Project will result in the loss of suitable breeding and foraging habitat for grasshopper sparrow. Other potential impacts include disturbance during breeding and collision with turbine blades. However, maximum flight height for all grasshopper sparrow detections during avian use surveys was 3 feet (1 meter) indicating it may be at low risk of collision based on its flying behavior. Grasshopper sparrows have been documented in 18 fatality incidents at wind projects nationwide (i.e., 0.3 percent of fatality incidents based on 193 studies reported in AWWI 2019) and are not among one of the 25 most reported species fatalities in the northern Rockies avifaunal biome which includes eastern Oregon (AWWI 2019). As a result, impacts to grasshopper sparrows from collisions with turbine blades are anticipated to be minimal. Additionally, this species is able to use a variety of habitat types and as a result, grasshopper sparrows displaced by construction and operation of the Project are expected to relocate to other comparable habitat in the Project vicinity. Additionally, habitat mitigation as described in the Draft HMP (see Attachment P-3) will provide compensatory mitigation for habitat impacts to grassland birds including the grasshopper sparrow.

- **Lewis's woodpecker** (sensitive-critical). Lewis' woodpeckers were not observed during surveys for the Project. This woodpecker is associated with open forests, often at lower elevations, and nests in woodlands of the river valleys of eastern Oregon (Csuti et al, 2001). The only potential habitat for this species within the Analysis Area is the Eastside Riparian

habitat along the Umatilla River; this habitat may be cleared or trimmed during construction and maintained underneath the transmission line wires should this transmission line option be selected. Although ORBIC (2019) identifies this species as occurring in Umatilla County, Csuti et al. (2001) maps this distribution as at the far eastern edge of Umatilla County, approximately 50 miles from the Project. No records of Lewis' woodpecker were identified by an ORBIC query by the Applicant (ORBIC 2017). This species has limited potential to occur at the Project as a vagrant during migration.

- **Loggerhead shrike** (state sensitive). This species was detected both during avian use surveys and pedestrian wildlife surveys for the Project, in all seasons and primarily in the limited Shrub-steppe habitat within the Site Boundary (see section 5.0). This species uses patches of tall brush or trees in open habitats for nesting and roosting, and forages in open areas with grasses and bare ground (Csuti et al. 2001; OCS 2016). These birds nest early in the spring and produce two broods per year, and are present Oregon through September. Many of the detections of loggerhead shrike were associated with two or three successful breeding attempts in the Shrub-steppe habitat within and adjacent to Alkali Canyon.

  Potential adverse impacts to this species due to the construction and operation of the Project include habitat loss, potential nesting disturbance, and collision with turbine blades. However, habitat loss for this species has been minimized by micrositing outside of Shrub-steppe habitat as feasible, as described in Section 7.0. Maximum flight height for all detections during avian use surveys was 7 feet (2 meters) indicating it is at low risk of collision with turbine blades under either turbine option. Loggerhead shrikes have been documented in only 10 fatality incidents at wind projects nationwide (i.e., 0.2 percent of fatality incidents based on 193 studies reported in AWWI 2019). Additionally, turbines are generally sited on ridges at the Project, away from Shrub-steppe habitat in the canyon bottoms that are used by this species, including Alkali Canyon. As a result, impacts to loggerhead shrike from collisions with turbine blades are anticipated to be minimal.

- **Long-billed curlew** (state sensitive-critical). Long-billed curlew observations were distributed within the Site Boundary during pedestrian wildlife surveys and avian use surveys, in the spring and summer seasons (see Section 5.0; Figure P-4). This grassland-associated species prefers shorter grass, and can occur in dryland wheat (Dugger and Dugger 2002; OCS 2016). Long-billed curlews arrive in Oregon near the end of March (Csuti et al. 2001). This species was not detected during fall or winter seasons, as curlews abandon the breeding grounds in mid-summer to spend the remainder of the year in coastal habitats.

  Potential adverse impacts to this species due to the construction and operation of the Project 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 2002). Maximum flight height for most detections during avian use surveys was less than 33 feet (10 meters) indicating it is at low risk of collision with turbine

blades; however, flights heights up to 164 feet (50 meters) were observed indicating a slightly greater risk of collision under Turbine Option 2. Long-billed curlews have been documented in only 10 fatality incidents at wind projects nationwide (i.e., 0.2 percent of fatality incidents based on 193 studies reported in AWWI 2019).

- **Sagebrush sparrow** (state sensitive-critical). This species was observed twice during pedestrian wildlife surveys for the Project, once in May 2018 and once in May 2019 (Figure P-4). This species was not observed during avian use surveys. This often difficult-to-detect species is found in shrub-steppe habitat with high shrub cover, and is closely associated with big sagebrush communities (Martin and Carlson 1998; OCS 2016). Sagebrush sparrows can establish territories as early as late February, and can still be found migrating in Oregon in early November.

  Potential adverse impacts to this species due to the construction and operation of the Project include habitat loss, potential nesting disturbance, and collision with turbine blades. Habitat loss for this species has been minimized by micrositing outside of Shrub-steppe habitat as feasible, as described in Section 7.0. Additionally, turbines are generally sited on ridges at the Project, away from Shrub-steppe habitat in the canyon bottoms that may be used by this species. 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 193 studies reported in AWWI 2019).

- **Swainson's hawk** (state sensitive). This species was detected during avian use and pedestrian wildlife surveys for the Project, during the spring, summer, and fall (see Section 5.0). This Swainson's hawk activity was distributed within the Site Boundary (Figure P-4). Swainson's hawks are open-country specialists that hunt and forage in grassland, shrub-steppe, and agricultural areas, and often focus on row-crop agriculture. Nests are frequently in lone trees or isolated shrubs in open country. In the non-breeding season, particularly during fall migration in North America, they are often observed hunting in groups behind agricultural equipment (which was observed at the Project), opportunistically preying on rodents and insects (Bechard et al. 2010). Swainson's hawks typically establish breeding territories after arriving from South America in April, and complete breeding by early August (Csuti et al. 2001).

  Active Swainson's hawk nests were documented at 11 locations during surveys for the Project, of which 7 nests are located within the Site Boundary (see Figure P-5, although note that active Swainson's hawk nests may be obscured if subsequently occupied by a different species; see Attachment P-2 for nest locations for each year of surveys). Four of the 12 active Swainson's hawk nests were associated with the portion of the proposed UEC transmission line running between the existing Butter Creek Substation and the existing UEC Cottonwood Substation, where existing support poles will be replaced. Excluding these nests associated with the existing transmission line, Swainson's hawk nests located within the Site Boundary were associated with Alkali Canyon, Speare Canyon, and a small draw west of County Road 1363 that runs northwest-southeast through the Project. Much of the

Swainson's hawk activity detected during avian use surveys (both within points and when the surveyor was in-transit) as well as pedestrian wildlife surveys was associated with these active nests.

During construction and operation, nesting disturbance and collision with turbine blades may adversely impact this species. As described above, active nests belonging to Swainson's hawk were documented during raptor nest surveys in 2017 and 2018 in trees adjacent to existing gravel roads (i.e., County Road 1363 and Speare Canyon Road) that will be used as transportation routes for turbine components and equipment during construction under either turbine option. These nests could experience disturbance, although these roads are currently frequented by farming trucks and equipment and were noted as having been re-graveled annually during biological surveys for the Project which did not appear to dissuade hawks from nesting. Additionally, two of the locations used by a Swainson's hawks for nesting in 2017 and 2018 were dead locust trees, which have the potential to fall over and thus may no longer support nesting at the time of construction. The Applicant will not conduct ground-disturbing activities within 0.25 mile of active Swainson's hawk nests during the nesting season as feasible as described in Section 7.2.

Swainson's hawks have been documented as fatalities at 6 wind projects studies in the Northern Rockies avifaunal biome (i.e., 0.7 percent of fatality incidents based on 41 studies reported in AWWI 2019), and in 31 fatality incidents at wind projects nationwide (i.e., 0.5 percent of fatality incidents based on 193 studies reported in AWWI 2019). Maximum flight heights observed for Swainson's hawks at the Project varied by season. During spring, three individuals remained at flight heights below 49 feet (15 meters), while four had flight heights between 66 and 656 feet (20 and 200 meters); in summer, maximum flight heights ranged between 98 to 984 feet (30 to 300 meters); and in fall, maximum flight heights ranged between 33 feet and 98 feet (10 and 30 meters). This indicates Swainson's hawk are at risk of collision with turbine blades under either Turbine Option 1 or 2. Flight patterns observed during summer put the species at risk of collision primarily under Turbine Option 2, while flight patterns observed during the fall put the species at risk primarily under Turbine Option 1. Based on their known use of the area within the Site Boundary for breeding and documented fatalities at other wind projects, Swainson's hawks are anticipated as potential fatalities at the Project. The Applicant minimized impacts to Swainson's hawk by siting turbines away from Alkali Canyon, and also avoided siting turbines within 0.25 mile of active Swainson's hawk nests to reduce both disturbance during nesting and risk of collision should these nests become occupied during construction and/or operation. The Applicant will monitor for bird fatalities, including Swainson's hawk, during Project operation as described in the Draft WMP (Attachment P-5).

6.2.3 Reptiles

Three state sensitive reptile species have the potential to occur within the Analysis Area: northern sagebrush lizard, western painted turtle, and California mountain kingsnake (Table P-4). Targeted

surveys for reptiles were not conducted, but pedestrian wildlife surveys occurred after the hibernation periods for each species, and were conducted during the day, when diurnally active reptiles have the potential to be observed in the appropriate habitat. The northern sagebrush lizard may be present and potentially impacted by Project construction, as described below, although it was not observed during surveys. Habitat for the California mountain kingsnake is absent from the Analysis Area, and habitat for the western painted turtle is limited to the Umatilla River, which will not be impacted by the Project. Neither species was observed during surveys; no adverse impacts to California mountain kingsnakes or western painted turtles are anticipated.

- **Northern sagebrush lizard** (state sensitive). This species occurs in shrub-steppe and juniper woodland habitat with sandy soils and sparse vegetation in the grass/forb layer (OCS 2016). Northern sagebrush lizards were not observed during surveys, but are known to occur in Umatilla County (ORBIC 2019). Potential adverse impacts to this species include loss of habitat and disturbance during construction if individuals are present.
- **Western painted turtle** (state sensitive-critical). Potential habitat for this species includes slow-moving wetland areas near perennial streams, which consists of the Umatilla River and adjacent wetlands and waters in the Analysis Area; however, this habitat will not be impacted by the Project. No records of western painted turtles were identified within the Analysis Area by an ORBIC query submitted by the Applicant (ORBIC 2017); however, this species occurs within Umatilla County and is sensitive-critical in the Columbia Plateau Ecoregion (ORBIC 2019; ODFW 2019). While terrestrial dispersal of western painted turtles (1-2 miles) has been documented, the lack of records for this species in the Analysis Area and limited amount of habitat within the Analysis Area suggest that the occurrence of this species at the Project is unlikely. As a result, no adverse impacts to western painted turtles are anticipated as a result of Project construction and operation.
- **California mountain kingsnake** (state sensitive). This species occurs in oak and pine woodlands, which are absent from the Analysis Area (Table P-3; OCS 2016). No records of California mountain kingsnake were identified by an ORBIC query by the Applicant (ORBIC 2017) and this species is not known to occur in Umatilla County (ORBIC 2019). As a result, no adverse impacts to California mountain kingsnake are anticipated as a result of Project construction and operation.

6.2.4 Fish

Seven state sensitive fish species have the potential to occur within the Analysis Area: bull trout (Umatilla SMU), fall Chinook salmon (Mid-Columbia River SMU), spring Chinook salmon (Middle Columbia SMU/ESU), steelhead (Middle Columbia River SMU/ESU, summer run), Pacific lamprey, western brook lamprey, and western river lamprey (Table P-4). The Project will not result in any in-water work, and permanent infrastructure will not be placed in Eastside Riparian habitat. However, riparian vegetation may need to be cleared and maintained under the proposed transmission line across the Umatilla River, which is a fish-bearing stream. Therefore, impacts to state sensitive fish species are described here.

Riparian vegetation supports stream function by preventing soil erosion along the river bank, maintaining water temperature by providing shade, contributing large woody debris to streams, and helping maintain channel form by buffering runoff. Shade is critical for cooling because many fish species are sensitive to elevated stream temperatures (ODEQ 1995; Ecology 2002; EPA 2003). By removing or altering riparian vegetation, the Project could potentially reduce the woody debris supply, increase erosion, reduce filtration of runoff, destabilize stream banks, and reduce stream shade.

Increased turbidity and sedimentation in spawning areas could adversely affect state sensitive species by reducing egg survival and emergence success (Reiser and White 1988), because the eggs of many species require clean, sediment-free spawning gravel for proper development. Increased turbidity could adversely affect adults and juveniles by causing physiological stress, reducing food availability, and potentially causing mortality (Newcombe and Jensen 1996; Gregory and Levings 1998; Sweka and Hartman 2001). Turbidity and sedimentation not only affect the river section where the vegetation has been cut, but also areas downstream.

Woody debris provides hiding cover from predators for juveniles and adults, creates stream habitat complexity (i.e., slows down water and creates pool habitats), and moderates sediment movement (Bustard and Narver 1975; Bisson et al. 1987; Spence et al. 1996; Everest and Reeves 2007). By reducing the supply of woody debris through removing or altering riparian vegetation, the Project could impact state sensitive species by causing habitat degradation.

However, minimal Eastside Riparian habitat (less than an acre) will be removed or altered and maintained to allow underwire clearance at the crossing of the Umatilla River, and low-growing shrubs will be allowed to grow which may replace some of the lost function after tree removal. Due to this minimal impact to Eastside Riparian habitat should this transmission line option be selected, and avoidance of impacts to the Umatilla River, construction and operation of the Project are expected to have minor impacts to state sensitive fish.

7.0 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; and

The measures discussed here have been or will be implemented to avoid, minimize, and mitigate the effects on fish and wildlife habitat and state sensitive species from the loss of suitable habitat, from activities that can cause disturbance (e.g., behavioral avoidance) to wildlife during breeding or other critical periods, and from direct fatality associated with the turbine blades. The Analysis Area is not within the range of the sage grouse; therefore, the application of the Greater Sage-Grouse Conservation Strategy is not required.

7.1 Avoidance and Minimization

7.1.1 Prior to Construction

The Applicant has sited turbines and other Project infrastructure away from sensitive fish and wildlife resources to the extent possible during Project design and micrositing.

The Applicant avoided and minimized impacts to wildlife habitat through the following measures:

- avoidance of all Category 1 habitat;
- avoidance of Category 2 habitat where feasible;
- minimization of impacts to Category 3, 4, and 5 habitats by placing facilities in active agricultural (i.e., Category 6) habitat types; this includes minimizing impacts to grasslands, shrub-steppe, and other native habitats that are used for wildlife foraging and breeding; and
- avoidance of impacts to wetland, water, and most riparian habitats by spanning of Alkali Canyon and associated Eastside Riparian habitat, and otherwise micrositing away from delineated wetlands and Waters of the State.

During initial surveys for the Project in 2017, several WAGS colonies were documented in the central portion of the Project, along the ridges and shoulder slopes north and south of Alkali Canyon (Figure P-2; Attachment P-2) and coinciding with preliminary turbine, road, and other infrastructure locations. The Applicant modified the preliminary layout to avoid these WAGS colonies and their associated Category 1 buffers, also taking into consideration other resource constraints discussed elsewhere in this application such as rare plant and cultural resource avoidance.

The Applicant avoided and minimized impacts to wildlife in general and state sensitive species including raptors and other birds through the following measures:

- minimization of bird powerline collision and electrocution through implementation of APLIC recommendations for construction of overhead collector lines and transmission intraconnection lines, including installation of flight diverters on the BPA transmission line across the Umatilla River as feasible (APLIC 2006, 2012);
- minimization of nesting disturbance and collision risk to state sensitive raptors through implementation of a voluntary 0.25-mile setback of turbines from active ferruginous hawk and Swainson's hawk nests;

- minimization of collision risk and nesting disturbance to state sensitive raptors through implementation of the ODFW-requested 656-foot (200-meter) turbine setback along Alkali Canyon as a voluntary, conservative measure (Section 4.2); this will also minimize impacts to foraging habitat in Alkali Canyon;
- minimization of collision risk to raptors by siting turbines away from areas of relatively higher raptor use as identified during avian and eagle use surveys at the Project; a 459 -foot (140-meter) turbine setback was applied to contour lines containing topographical high points and distinct canyon edges associated with observed higher raptor use based on Murphy et al. (2018) who found significantly higher juvenile golden eagles use within 328 feet (100 meters) of a mesa's rim edge at a wind project in Texas, scaled to account for the larger turbines proposed at the Project; this exercise resulted in the voluntary, conservative elimination or movement of 12 turbines to avoid these potential areas of higher turbine collision risk to raptors;
- minimization of raptor nesting disturbance through elimination of a transportation route on Mud Springs Road located close to active raptor nests;
- minimization of raptor nesting disturbance through avoidance of trees with active state sensitive raptor species nests; and
- minimization of wildlife collision with guy wires by installing unguyed permanent met towers.

Additionally, pre-construction surveys will be performed to identify changes to habitat categorization and locations of state sensitive species to most effectively implement avoidance, minimization, and mitigation measures.

7.1.2 During Construction

Measures for avoiding and minimizing impacts to fish and wildlife habitat and to state sensitive and other wildlife species will be implemented during construction as follows:

- The Applicant will employ a construction monitor(s) familiar with sensitive biological resources (e.g., active raptor nests, WAGS colonies, rare plants, and wetlands) to ensure appropriate measures are implemented to avoid disturbance to these resources. The construction monitors will be responsible for placing flagging/temporary fencing around areas where no construction activities should occur (e.g., Category 1 habitat).
- The Applicant will not conduct ground-disturbing activities within the buffer distances of active raptor nests as identified in the spring prior to construction, as feasible and as recommended by ODFW in their comments on the Project Notice of Intent (included in Attachment P-1) and shown in Table P-11.

Table P-11. Raptor Nest Disturbance Buffers

Species	Spatial Buffer	Seasonal Restriction
ferruginous hawk	0.25 mile	March 15 – August 15
golden eagle	0.5 mile	February 1 – August 15
red-tailed hawk	300-500 feet	March 1 – August 15
prairie falcon	0.25 mile	March 15 – July 1
Swainson's hawk	0.25 mile	April 1 – August 15
burrowing owl	0.25 mile	April 1 – August 15

- The Applicant will develop and implement a Project-specific worker environmental training program throughout the construction of the Project. All employees and contractors working in the field will be required to attend the environmental training session prior to working on-site. This training will include information regarding the sensitive biological resources including raptor nests and WAGS colonies, restrictions, protection measures, individual responsibilities associated with the Project, and the consequences of non-compliance. Written material will be provided to employees at orientation and participants will sign an attendance sheet documenting their participation.
- The Applicant will establish driving speed limits on Project access roads during construction to minimize the potential for vehicle collisions with wildlife or livestock, which could attract foraging eagles and other wildlife, and to reduce the potential for wildlife-vehicle collisions.
- The Applicant will minimize impacts to habitat and wildlife by initiating revegetation efforts in areas of temporary ground disturbance as soon as practicable and within the appropriate season to facilitate germination, as described in the Draft Revegetation Plan (Attachment P-4). The Draft Revegetation Plan promotes native plant establishment, or non-invasive and non-persistent non-native species when native plants are not available, and contains measures to avoid and minimize the spread of noxious weeds due to Project disturbance. The Draft Revegetation Plan will be implemented during and following construction and will continue through operation as well.

7.1.3 During Operation

Following construction, measures for avoiding and minimizing impacts to fish and wildlife habitat and to state sensitive and other wildlife species will be implemented as follows:

- The Applicant will develop and implement a Project-specific worker environmental training program during operation of the Project, similar to the program to be implemented during construction. All employees and contractors working in the field will be required to attend the environmental training session prior to working on-site.

- The Applicant will perform post-construction fatality monitoring and adaptively manage as needed to further reduce and mitigate impacts as described in the Draft WMP (Attachment P-5).
- The Applicant will establish driving speed limits on Project access roads to minimize the potential for vehicle collisions with wildlife or livestock, which could attract foraging eagles and other wildlife, and to reduce the potential for wildlife-vehicle collisions during Project operation.

7.2 Mitigation

After avoidance and minimization measures have been implemented, some impacts to wildlife habitat and sensitive species will remain. Temporary[2] and permanent habitat loss will be mitigated for according to ODFW Habitat Mitigation Policy goals and standards, as described in the Draft HMP (Attachment P-3). Prior to construction, the Applicant will finalize the HMP pursuant to the ODFW Habitat Mitigation Policy. Compensatory mitigation actions will occur prior to or in conjunction with habitat-disturbing activities and provide the intended benefits for the duration of the Project.

8.0 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).*

The Applicant has prepared a Draft WMP (Attachment P-5), which proposes bird and bat fatality monitoring, raptor nest monitoring, and WAGS monitoring, and describes the wildlife reporting and handling system that will be implemented by operations personnel. As described in the Draft Revegetation Plan (Attachment P-4), restoration efforts will be monitored during operation to assess whether the Project is meeting revegetation success criteria, including control of noxious weeds.

9.0 Conclusion

As part of the Project siting process, the fish and wildlife habitats within the Analysis Area were identified and categorized pursuant to OAR 635-415-0025. Based on survey results, facilities were adjusted to avoid all impacts to Category 1 habitat, and minimize impacts to Category 2, 3, 4, and 5 habitats. Unavoidable habitat impacts will be mitigated consistent with OAR 635-415-0025. As discussed in this Exhibit P, the Applicant requests that the Council exercise its "balancing" authority pursuant to ORS 469.401 and ORS 469.503 to approve wind turbine generator and other facility

[2] Much of the area that will be temporarily impacted contains habitats for which restoration and regeneration is anticipated to be less than 5 years, and thus will be fully mitigated for through successful restoration. However, Shrub-steppe habitat will be impacted, some of which is anticipated to take greater than 5 years to recover, and thus will be mitigated for as described in the Draft HMP (Attachment P-3).

locations in identified CRP lands where the locations do not meet the standards in OAR 635-415-0050 as "irreplaceable," "essential," or "limited" habitat and will imminently be returned to active farming.

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 Project, taking into account the proposed mitigation measures, are consistent with the fish and wildlife mitigation goals and standards of OAR 635-415-0025. Accordingly, the Applicant demonstrates compliance with OAR 345-022-0060.

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Figures

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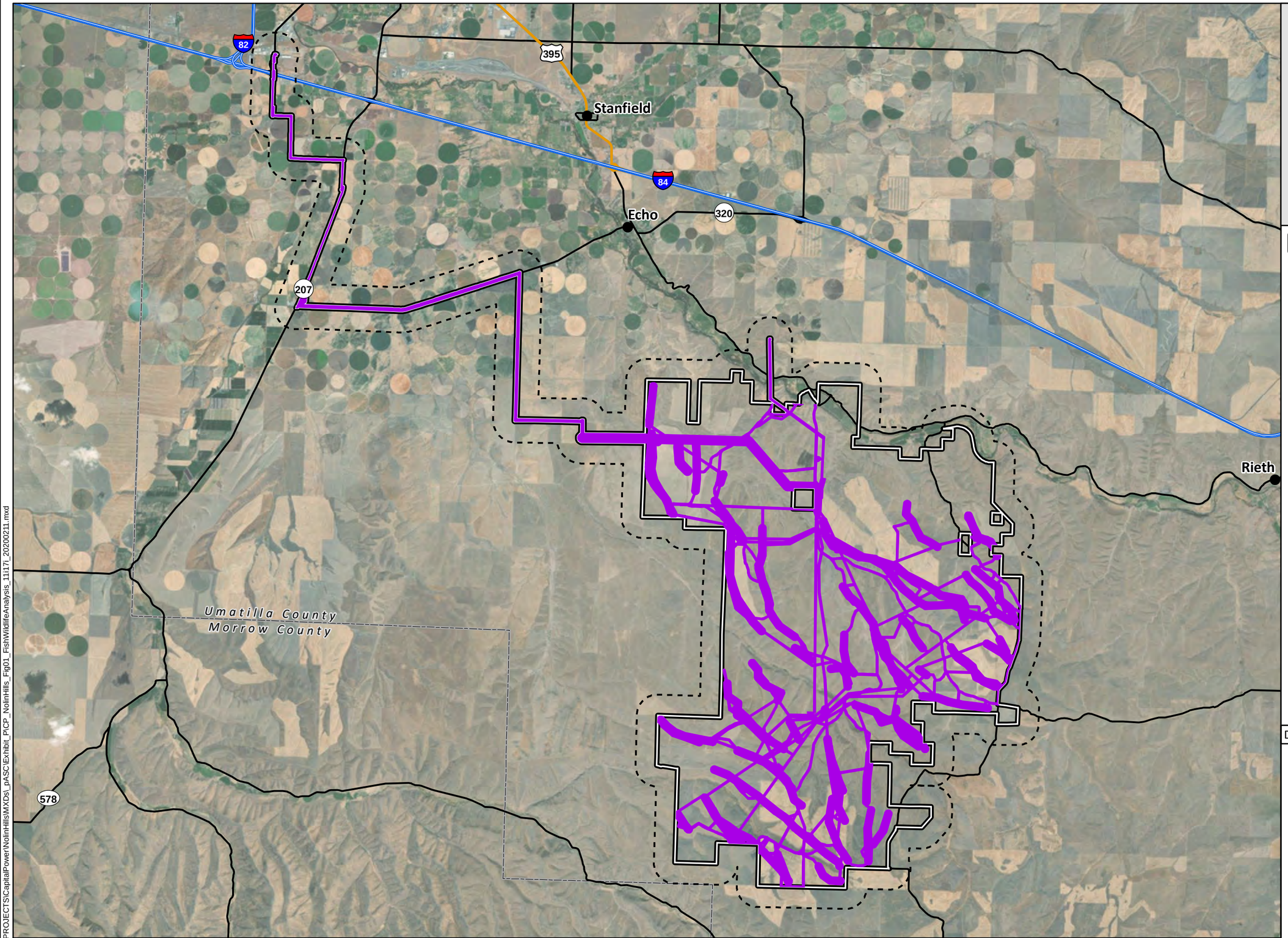
Nolin Hills Wind Power Project

Figure P-1
Fish and Wildlife Analysis Area

UMATILLA COUNTY, OREGON



- Proposed Site Boundary
- Analysis Area (0.5-mile Buffer)
- Micrositing Corridor
- City/Town
- Interstate Highway
- Secondary Highway
- Secondary Road
- County Boundary

TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map

1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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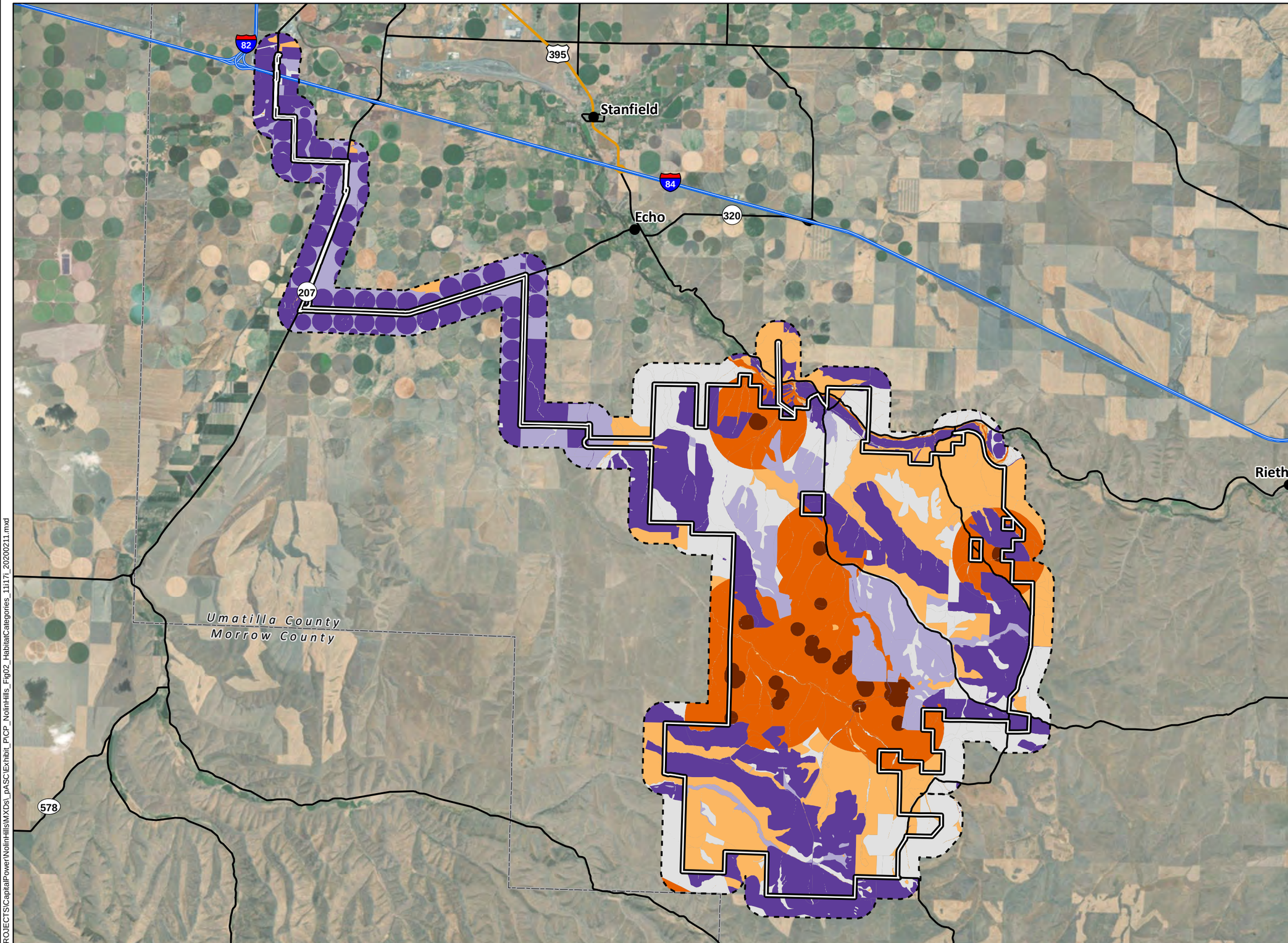
Nolin Hills Wind Power Project

Figure P-2
Habitat Categories within the Analysis Area

UMATILLA COUNTY, OREGON



Proposed Site Boundary
Analysis Area (0.5-mile Buffer)
City/Town
Interstate Highway
Secondary Highway
Secondary Road
County Boundary

Habitat Categories
- 1
- 2
- 3
- 4
- 5
- 6

TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map

1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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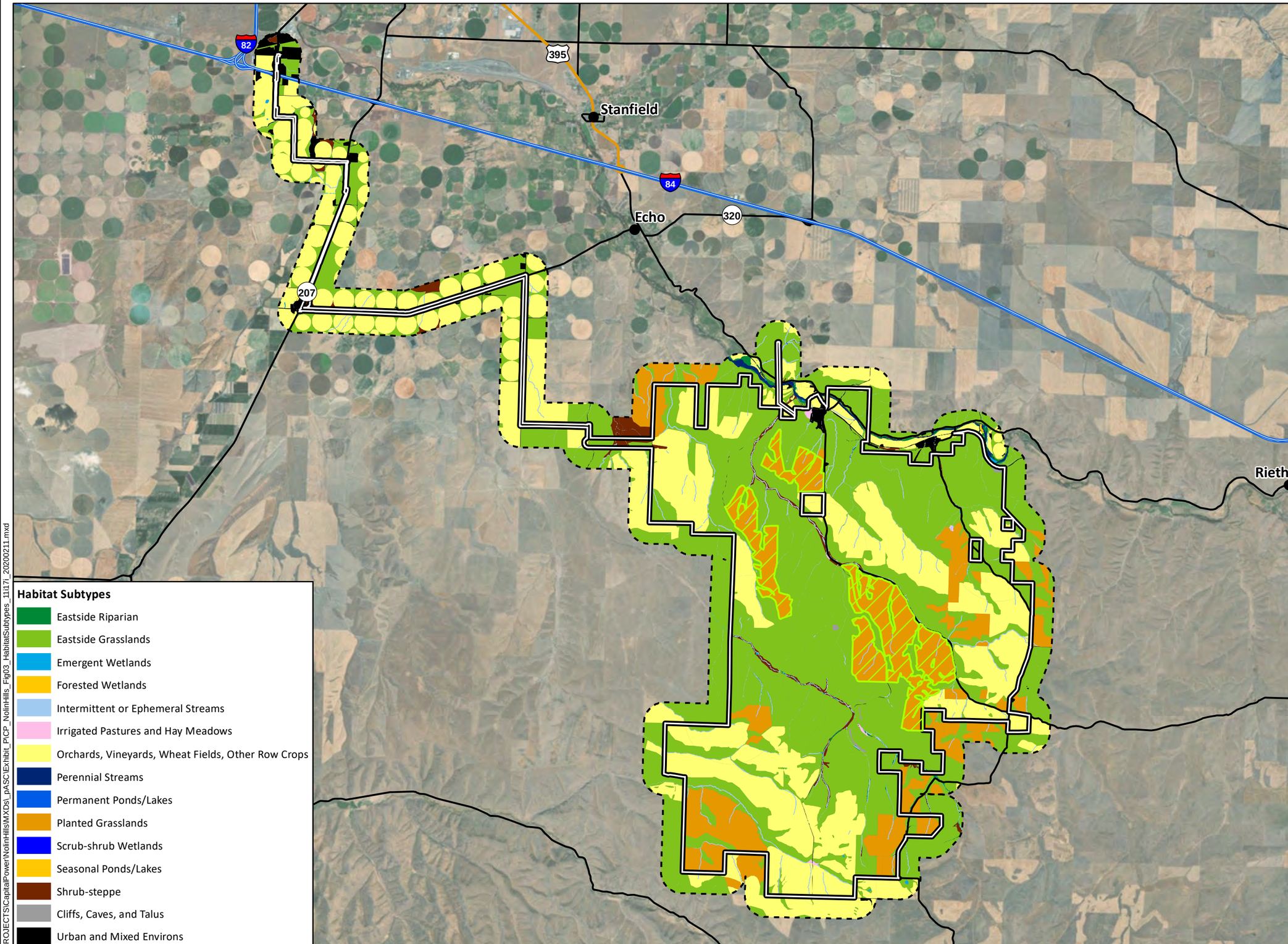
Nolin Hills Wind Power Project

Figure P-3
Habitat Subtypes within the Analysis Area

UMATILLA COUNTY, OREGON



NOT FOR CONSTRUCTION

- Proposed Site Boundary
- Analysis Area (0.5-mile Buffer)
- Fallow Wheat Field/Recently Enrolled Conservation Reserve Program (CRP) Lands
- City/Town
- Interstate Highway
- Secondary Highway
- Secondary Road

TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map

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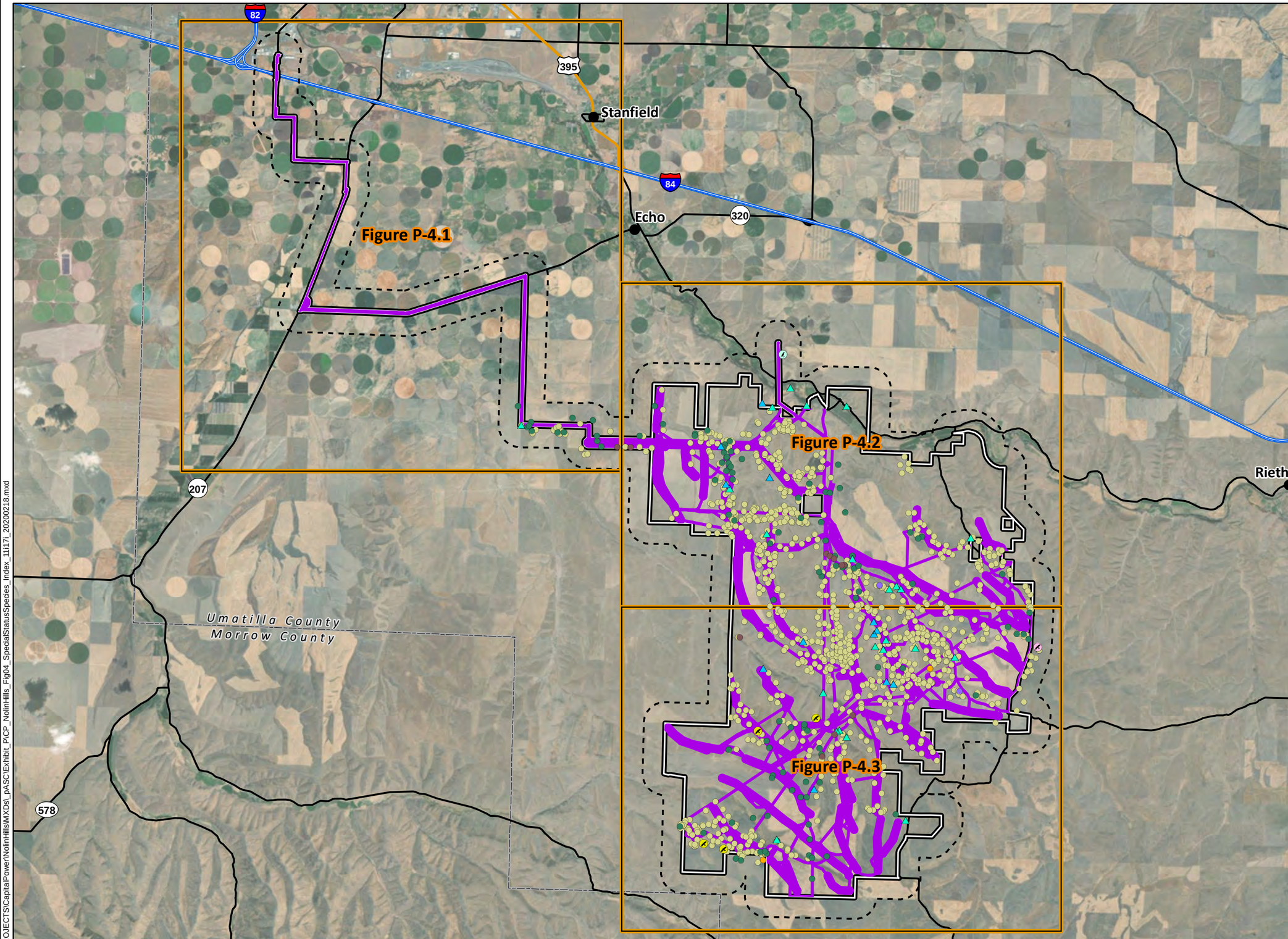
Nolin Hills Wind Power Project

Figure P-4
Special Status Species within the Analysis Area

UMATILLA COUNTY, OREGON



Map Grid
Proposed Site Boundary
Analysis Area (0.5-mile Buffer)
Micrositing Corridor
City/Town
Interstate Highway
Secondary Highway
Secondary Road
County Boundary

Species

Bald Eagle
Brewer's Sparrow
Burrowing Owl
Ferruginous Hawk
Golden Eagle
Grasshopper Sparrow
Loggerhead Shrike
Long-billed Curlew
Sagebrush Sparrow
Swainson's Hawk

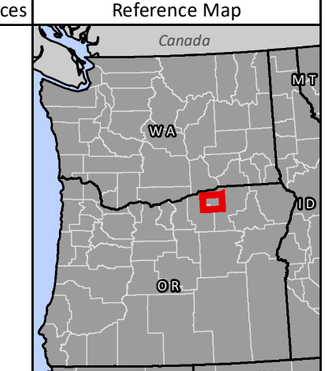
TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map



1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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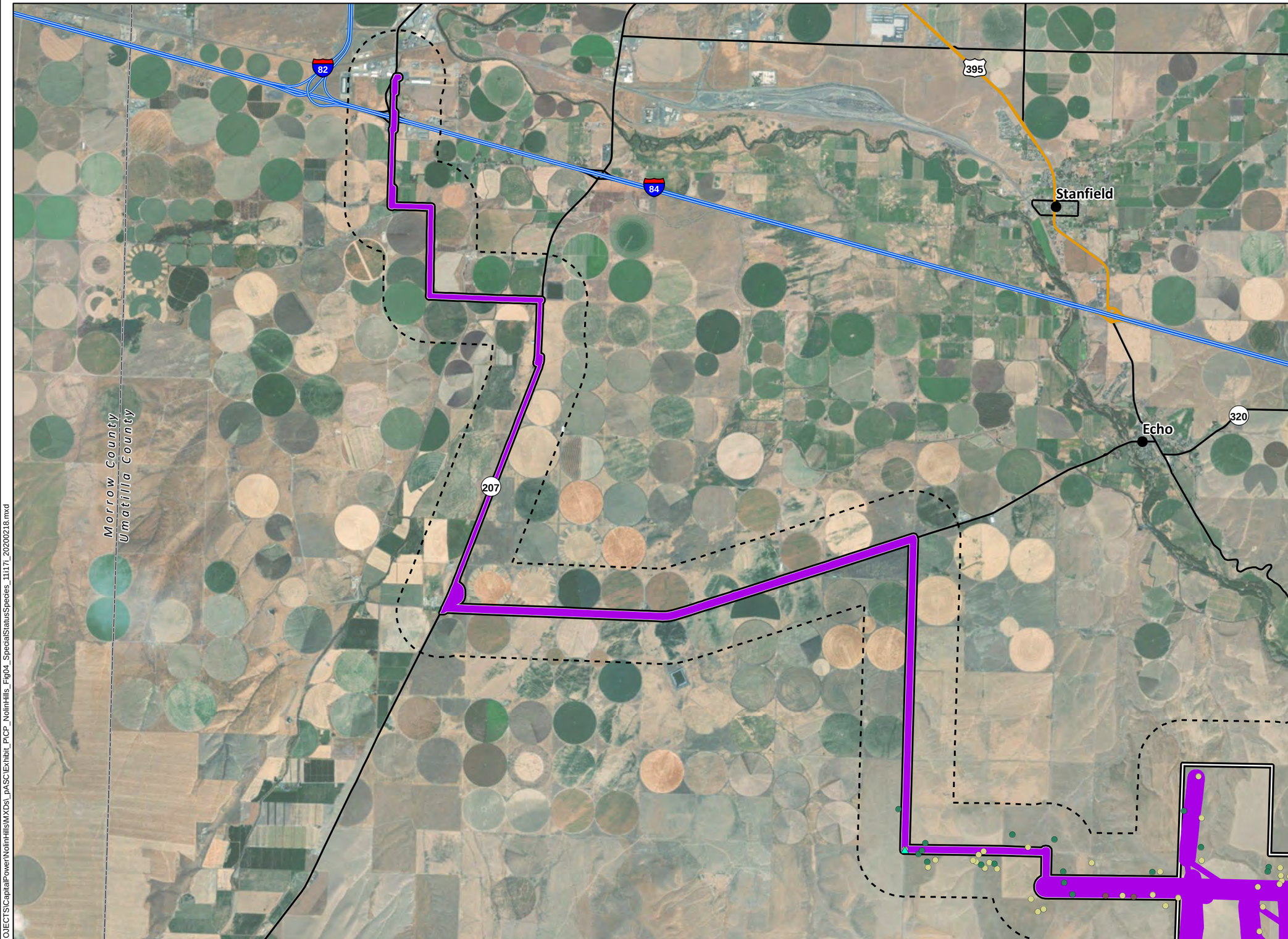
Nolin Hills Wind Power Project

Figure P-4.1
Special Status Species within the Analysis Area

UMATILLA COUNTY, OREGON



- Proposed Site Boundary
- Analysis Area (0.5-mile Buffer)
- Micrositing Corridor
- City/Town
- Interstate Highway
- Secondary Highway
- Secondary Road
- County Boundary

Species

- Bald Eagle
- Brewer's Sparrow
- Burrowing Owl
- Ferruginous Hawk
- Golden Eagle
- Grasshopper Sparrow
- Loggerhead Shrike
- Long-billed Curlew
- Sagebrush Sparrow
- Swainson's Hawk

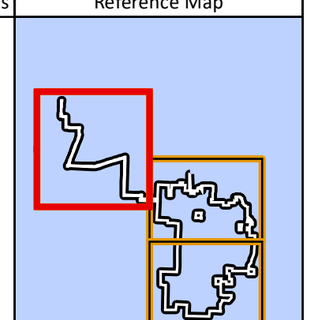
TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map



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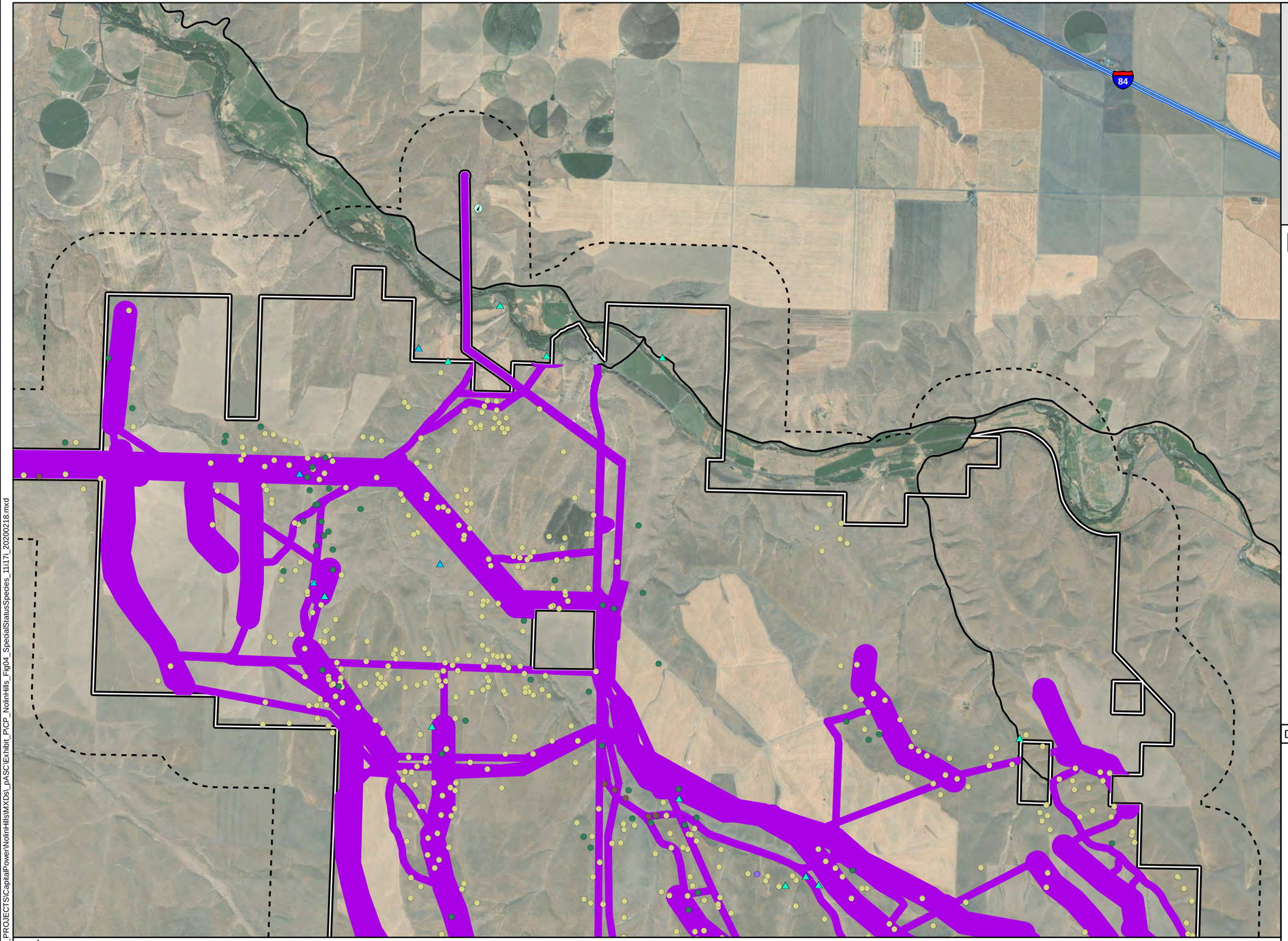
Nolin Hills Wind Power Project

Figure P-4.2
Special Status Species within the Analysis Area

UMATILLA COUNTY, OREGON



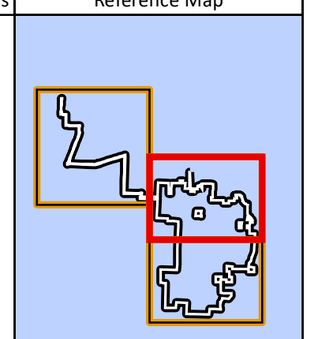
- Proposed Site Boundary
- Analysis Area (0.5-mile Buffer)
- Micrositing Corridor
- City/Town
- Interstate Highway
- Secondary Road
- County Boundary

Species

- Bald Eagle
- Brewer's Sparrow
- Burrowing Owl
- Ferruginous Hawk
- Golden Eagle
- Grasshopper Sparrow
- Loggerhead Shrike
- Long-billed Curlew
- Sagebrush Sparrow
- Swainson's Hawk

TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:48,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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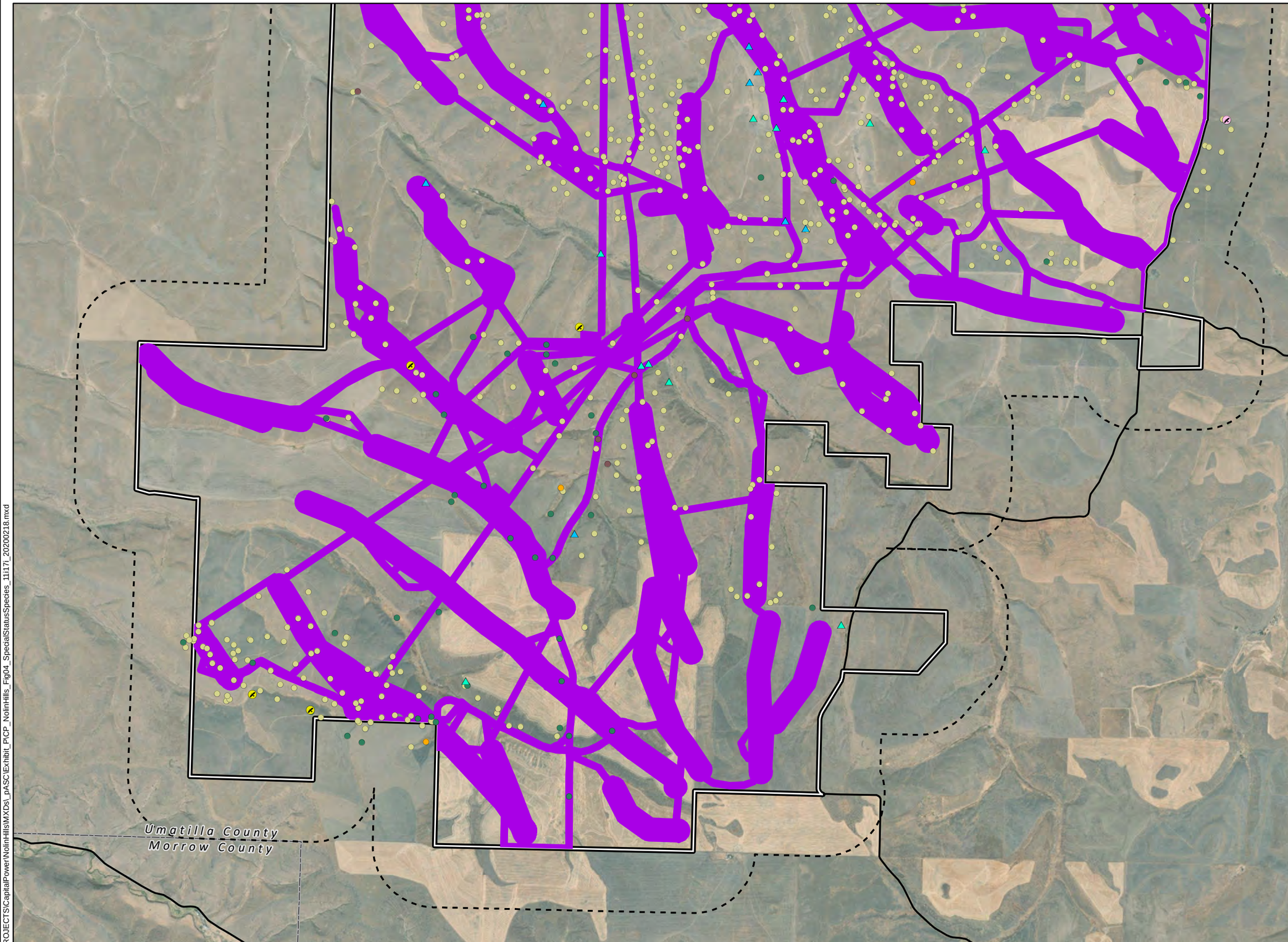
Nolin Hills Wind Power Project

Figure P-4.3
Special Status Species within the Analysis Area

UMATILLA COUNTY, OREGON



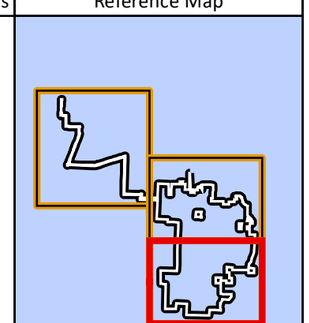
- Proposed Site Boundary
- Analysis Area (0.5-mile Buffer)
- Micrositing Corridor
- City/Town
- Secondary Road
- County Boundary

Species

- Bald Eagle
- Brewer's Sparrow
- Burrowing Owl
- Ferruginous Hawk
- Golden Eagle
- Grasshopper Sparrow
- Loggerhead Shrike
- Long-billed Curlew
- Sagebrush Sparrow
- Swainson's Hawk

TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:48,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Figure P-5 is confidential and has been provided under separate cover pursuant to ORS 192.501(13).

Attachment P-1. Agency Correspondence

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CONTENTS

- June 8, 2017 email from Tetra Tech to ORBIC Re: Umatilla County data request
- June 16, 2017 email letter from ORBIC to Tetra Tech Re: Results of rare, threatened, and endangered plant and animal record query
- September 19, 2017 email from Tetra Tech to ODFW Re: Request for Information on Threatened Endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon
- September 20, 2017 letter from Tetra Tech to NOAA Fisheries Re: Request for Information on Threatened Endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon
- September 20, 2017 letter from Tetra Tech to USFWS Re: Request for Information on Threatened Endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon
- October 2, 2017 email response from NOAA Fisheries to Tetra Tech Re: NMFS species list request
- October 18, 2017 email response from USFWS to Tetra Tech Re: Request for Information on Threatened endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon
- November 6, 2017 letter from ODFW to ODOE Re: Comments on the Notice of lntent to Apply for a Site Certificate for the Nolan Hills Wind Power Project
- May 30, 2018 Memo from ODFW to ODOE Re: Recommendations for Wind Turbine Setbacks from Alkali Canyon to Reduce Risk to Juvenile Raptors
- July 30, 2018 Tetra Tech response to ODFW May 30, 2018 Memo Re: Recommendations for Wind Turbine Setbacks from Alkali Canyon to Reduce Risk to Juvenile Raptors (confidential figure omitted)
- December 19, 2019 Memo from Tetra Tech to ODFW: Nolin Hills Washington Ground Squirrel Desktop Review of Areas Not Field
- February 25, 2019 Memo from Tetra Tech to ODFW and ODOE: Nolin Hills Washington Ground Squirrel Habitat
- April 1, 2019 ODFW response to Tetra Tech February 25, 2019 Memo re: Nolin Hills Washington Ground Squirrel Habitat

Bensted, Amy

From: Hurley, Susan
Sent: Thursday, June 08, 2017 2:23 PM
To: inrdata@pdx.edu
Cc: Konkol, Carrie; Bensted, Amy
Subject: Umatilla county data request
Attachments: SiteBoundary_plus_10mileBuffer.zip

Dear Ms. Wise,

Capital Power Corporation has hired Tetra Tech, Inc. (Tetra Tech) to assist in assessing biological issues of a potential project in Umatilla County, Oregon.

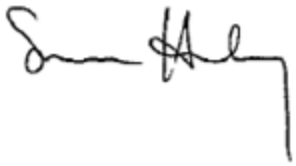
Tetra Tech requests GIS spatial data regarding any ecologically significant areas and/or listed endangered, threatened, or special concern species within and surrounding the data request area. In addition to sensitive species, Tetra Tech is interested in sensitive habitats, wildlife management areas, and any locations on the State Register of Natural Heritage Resources that may be located in or proximate to the proposed project area. Tetra Tech also requests data documenting any known bald or golden eagle nests in the request area.

An ArcGIS Shapefile in WGS1984 UTM10N that details the potential project area and research area buffer is attached to facilitate your data extraction.

Please include both the standard PDF database report as well as spatial data in the form of an ArcGIS Shapefile in your response.

Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at (503) 727-8076 or email at Susan.Hurley@tetratech.com.

Sincerely,



Susan Hurley
Project Biologist
Tetra Tech EC, Inc.

Attachments (1)
-WinZip file containing ArcGIS Shapefile of potential project area and research buffer

Susan Hurley | **Senior Biologist/Project Manager**
Direct: 503.727.8076 | Cell: 503.432.5974
susan.hurley@tetratech.com

Tetra Tech | **Sciences**
1750 SW Harbor Way, Suite 400 | Portland, OR 97201 | www.tetratech.com

Oregon Biodiversity Information Center

Institute for Natural Resources
Portland State University
Mail Stop: INR
Post Office Box 751
Portland, Oregon 97207
503.725.9950
http://orbic.pdx.edu

June 16, 2017

Susan Hurley
Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, OR 97701

Dear Ms. Hurley:

Thank you for requesting information from the Oregon Biodiversity Information Center (ORBIC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your Umatilla County Project in part of Umatilla County.

Eighty-three (83) element occurrence records were noted within your project area of interest and are included on the enclosed computer printout and GIS export.

This database search has returned records of Golden Eagle nests that originated with the US Fish and Wildlife Service, which makes the following disclaimers regarding this information:

1. No warranty is made by US Fish & Wildlife Service as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. The information may not meet National Map Accuracy Standards. This project was developed through digital means and may be updated without notification.
2. Golden eagle nest location data presented here is not intended for land use planning and analysis purposes and should be considered draft. Location data is provided solely for use in developing an inventory strategy intended to determine precise nest locations and develop a breeding population estimate for Oregon.
3. The data were based on reports from others, often second or third-hand interpretations from files, rather than original field work.
4. This data reflects only those nest sites that were reported through 2014.
5. The locations were described inconsistently, often covered large areas such as a square mile, and were not field-verified for accuracy.
6. Statewide coverage was unknown. There was no systematic survey of the landscape. Locations were gathered opportunistically or as part of local projects. Consequently, the absence of a location on the map does not mean that there was not a golden eagle nest in the area.
7. Current nest locations within breeding areas may be different from those portrayed on the maps, especially tree nests which are more ephemeral than cliff nests.
8. The nest use data were not collected annually or following an accepted protocol. Consequently, summaries or comparisons have little value.

Due to our agreement with the USFWS, locations for golden eagles are masked to the section level. For more information contact Larry Reigel at the US Fish and Wildlife Service at larry_reigel@fws.gov or 503-231-6179.

Washington ground squirrel (*Urocitellus washingtoni*) was found within your data search. Due to our agreement with the Oregon Department of Fish and Wildlife your report only includes general locational information for these records. If you need detailed locational information or have questions about Washington ground squirrel in your project area, please contact Arthur Rodriguez, Oregon Conservation Strategy GIS Analyst: arthur.h.rodriguez@state.or.us or 503-947-0126.

Please remember that a lack of rare element information from a given area does not necessarily indicate there are no significant elements present, only that there is no information known to us from the site. To ensure there are no significant elements present that may be affected by your project, you should inventory the site during the appropriate season.

This data is confidential and for the specific purposes of your project and is **not to be distributed**. Please also note that as our database is continually updated, the data in this report should be considered current for a maximum of one year from the date it was generated and should not be cited thereafter.

Please forward the included invoice to the appropriate party in your organization for payment.

If you need additional information or have any further questions, please do not hesitate to contact me.

Sincerely,

Lindsey Wise
Biodiversity Data Manager
lindsey.wise@pdx.edu
503.725.9951

encl.: **invoice (H-061617-LKW1)**
computer printout and data key

From:	Bensted, Amy
To:	Gregory Rimbach; "Sarah J Reif"; "Steve Cherry"
Cc:	Konkol, Carrie; "Jeff Sansom"; WOODS Maxwell * ODOE; Hurley, Susan
Subject:	Request for Information on Threatened Endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon
Date:	Tuesday, September 19, 2017 4:19:00 PM
Attachments:	Figure 1. Nolin Hills Project Vicinty Map.pdf

Greg,

Capital Power has hired Tetra Tech to assist in preparing technical reports in support of an Energy Facility Siting Council Application for Site Certificate (ASC) for the Nolin Hills Wind Power Project (Project) in Umatilla County, Oregon.

To assist Capital Power in this effort, Tetra Tech requests technical assistance regarding the location of any ecologically significant areas and the potential presence of listed endangered, threatened, or special species of concern within and surrounding the proposed Site Boundary. Tetra Tech would like to evaluate the potential impact to sensitive or listed species in order to avoid actions that may contribute to further listing decisions. In addition to protected wildlife species, Tetra Tech is interested in sensitive habitats and wildlife management areas that may be located within or in proximity to the proposed Site Boundary. Spatial information on sensitive natural resources has been requested from the Oregon Biodiversity Information Center, and the US Fish and Wildlife Service and National Oceanic and Atmospheric Administration Fisheries will be contacted regarding federal environmental resource concerns.

The Project's proposed Site Boundary is shown on the attached map (Figure 1). This map is provided to facilitate your review. Note that the Oregon Department of Energy anticipates issuing the Notice of Intent for the Project in early October. Tetra Tech is currently making arrangements for a site visit to the Project the week of October 16; **please let us know if you have availability to attend a site visit during that timeframe**.

It is our goal to perform a thorough analysis of environmental concerns within the proposed Site Boundary. We will use the information provided by ODFW to verify that we have addressed all sensitive species with the potential to occur in the proposed Site Boundary, which will be presented in Exhibits P and Q of the ASC. If possible, we would appreciate a response by October 10, 2017.

Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at (503) 222-4538 or email at amy.bensted@tetratech.com.

Thank you in advance for your assistance.

Sincerely,

Amy Bensted
Project Biologist

Amy Bensted | **Biologist**
Direct: 503.222.4538 | Cell: 503.459.7989
Amy.Bensted@tetratech.com

Tetra Tech, Inc. |
1750 SW Harbor Way, Suite 400 | Portland, OR 97201 | www.tetratech.com

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Date: September 20, 2017

TTCES-PTLD-2017-154

Kim Kratz
Assistant Regional Administrator

NOAA Fisheries
Oregon &Washington Coastal Office

1201 NE Lloyd Blvd., Suite 1100

Portland, OR 97232

Subject: **Request for Information on Threatened Endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon**

Dr. Kratz:

Capital Power Corporation (Capital Power) has hired Tetra Tech, Inc. (Tetra Tech) to assist in preparing technical reports in support of an Energy Facility Siting Council Application for Site Certificate (ASC) for the Nolin Hills Wind Power Project (Project) in Umatilla County, Oregon.

To assist Capital Power in this effort, Tetra Tech requests technical assistance regarding the location of any ecologically significant areas and the potential presence of listed endangered, threatened, or special species of concern within and surrounding the proposed Site Boundary. Tetra Tech would like to evaluate the potential impact to sensitive or listed species in order to avoid actions that may contribute to further listing decisions.

In addition to federally protected fish species, Tetra Tech is interested in critical habitats and fish management areas that may be located in, or proximate to, the proposed Site Boundary. Spatial information on sensitive natural resources has been requested from the Oregon Biodiversity Information Center, the Oregon Department of Fish and Wildlife has been contacted regarding state environmental resource concerns, and the US Fish and Wildlife Service has been contacted regarding other federal environmental resource concerns.

The Project's proposed Site Boundary is shown on the attached map (Figure 1). This map is provided to facilitate your review.

It is our goal to perform a thorough analysis of environmental concerns at the Project. We will use the information provided by NOAA Fisheries to verify that we have addressed all sensitive species

Tetra Tech, Inc.
1750 Harbor Way, Suite 400, Portland, OR 97201
Tel 503.221.8636 Fax 503.227.1287 www.tetratech.com

with the potential to occur in the vicinity of the Project, which will be presented in Exhibits P and Q of the ASC. If possible, we would appreciate a response by October 20, 2017.

Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at (503) 222-4538 or by email at amy.bensted@tetratech.com.

Thank you in advance for your assistance.

Sincerely,

Amy Bensted
Project Biologist
Tetra Tech, Inc.

Enclosure (1)
Figure 1 –Project Map

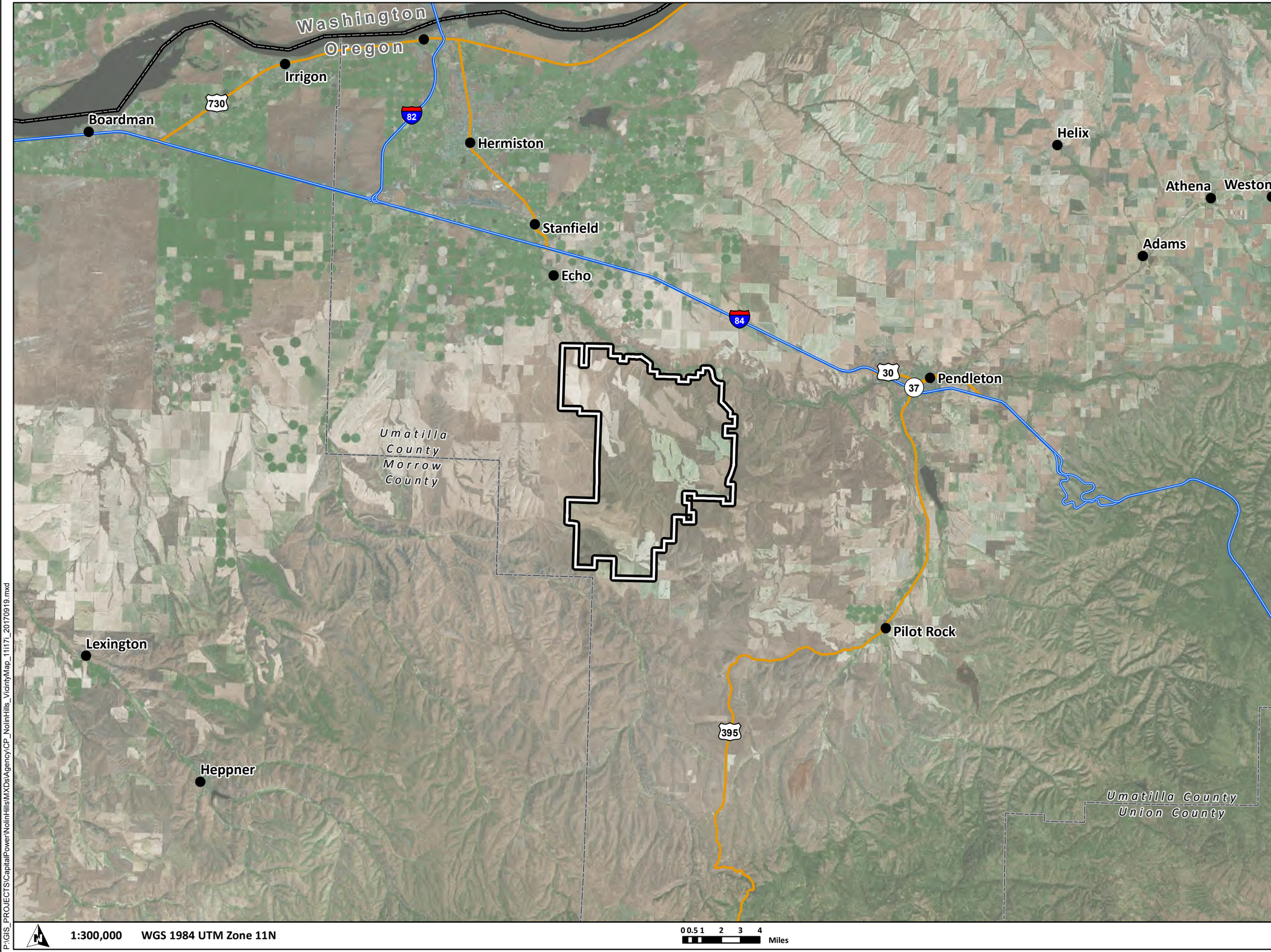


Figure 1

Nolin Hills Wind Power Project

Capital Power

Vicinity Map

UMATILLA COUNTY, OREGON

Proposed Site Boundary

Interstate

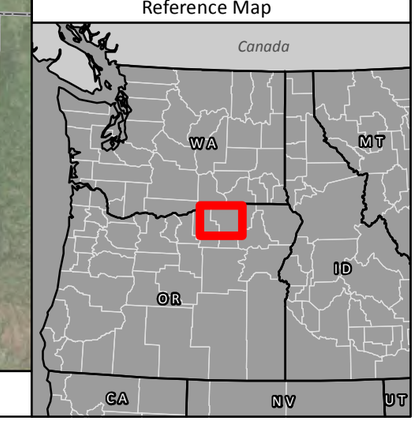
Secondary

State

County

TETRA TECH

Reference Map



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Date: September 20, 2017

TTCES-PTLD-2017-155

Joe Zisa
Energy, Infrastructure, and Ecosystems Services Division

United States Fish and Wildlife Service

2600 SE 98th Ave., Suite 100

Portland, OR 97266

Subject: **Request for Information on Threatened Endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon**

Mr. Zisa:

Capital Power Corporation (Capital Power) has hired Tetra Tech, Inc. (Tetra Tech) to assist in preparing technical reports in support of an Energy Facility Siting Council Application for Site Certificate (ASC) for the Nolin Hills Wind Power Project (Project) in Umatilla County, Oregon.

To assist Capital Power in this effort, Tetra Tech requests technical assistance regarding the location of any ecologically significant areas and the potential presence of listed endangered, threatened, or special species of concern within and surrounding the proposed Site Boundary. Tetra Tech would like to evaluate the potential impact to sensitive or listed species in order to avoid actions that may contribute to further listing decisions.

In addition to federally protected wildlife and plant species, Tetra Tech is interested in sensitive habitats and wildlife management areas that may be located in, or proximate to, the proposed Site Boundary. Spatial information on sensitive natural resources has been requested from the Oregon Biodiversity Information Center, the Oregon Department of Fish and Wildlife has been contacted regarding state environmental resource concerns, and the National Oceanic and Atmospheric Administration Fisheries has been contacted regarding other federal environmental resource concerns. Additionally, data specific to eagle nests has been requested from USFWS, and we are planning on coordinating with Matt Stuber at USFWS regarding eagle permitting.

The Project's proposed Site Boundary is shown on the attached map (Figure 1). This map is provided to facilitate your review.

It is our goal to perform a thorough analysis of environmental concerns at the Project. We will use the information provided by USFWS to verify that we have addressed all sensitive species with the

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Tel 503.221.8636 Fax 503.227.1287 www.tetratech.com

potential to occur in the vicinity of the proposed Site Boundary which will be presented in Exhibits P and Q of the ASC. If possible, we would appreciate a response by October 20, 2017.

Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at (503) 222-4538 or email at amy.bensted@tetratech.com.

Thank you in advance for your assistance.

Sincerely,

Amy Bensted

Project Biologist

Tetra Tech, Inc.

Enclosure (1)

Figure 1 –Project Vicinity Map

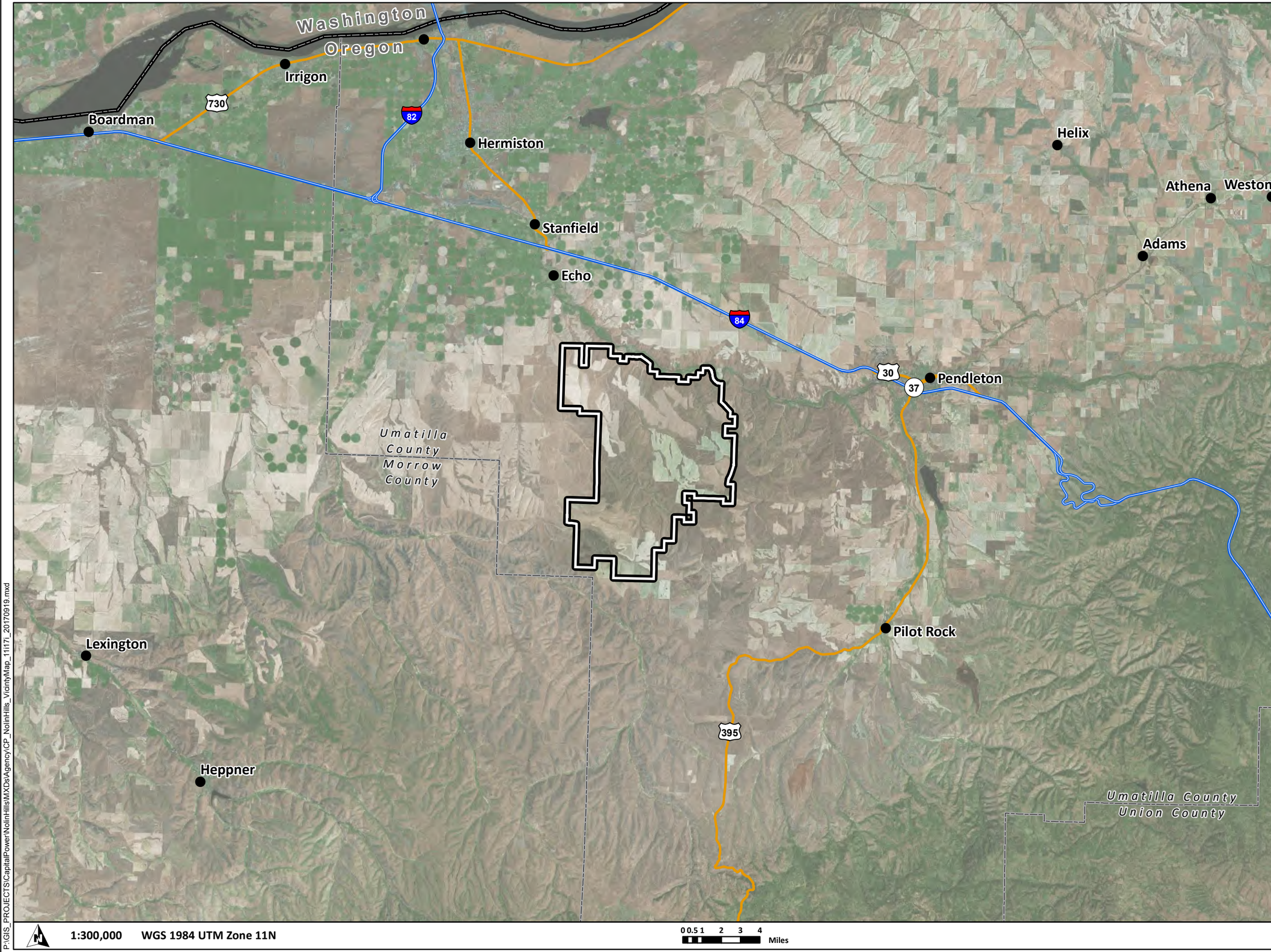


Figure 1

Nolin Hills Wind Power Project

Capital Power

Vicinity Map

UMATILLA COUNTY, OREGON

Proposed Site Boundary

Interstate

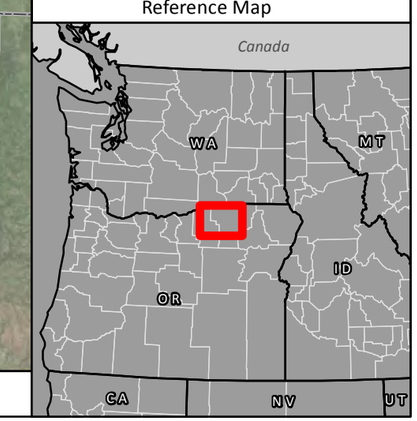
Secondary

State

County

TETRA TECH

Reference Map



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From: Rebecca Viray - NOAA Federal
To: Bensted, Amy
Subject: Nolin Hills Project NMFS species list request
Date: Monday, October 02, 2017 1:12:53 PM

Hello Amy,

I am the NMFS biologist assigned to the Umatilla Basin.

ESA-listed species under NMFS authority within Umatilla County include MCR steelhead and their critical habitat. Based on the map of the project location, I could not tell if you have any specific streams within your project area. MCR steelhead and their DCH are included on the Umatilla River, Birch Creek watershed and lower portions of Butter Creek.

Please let me know if you have any further questions.

Best Regards,
Rebecca

Rebecca Viray
Fish Biologist
Columbia Basin Area Office
NOAA Fisheries/ NMFS
3502 Hwy 30
LaGrande, Oregon 97850

phone: (541) 975-1835 ext 222
Fax: (541) 975-1973

October 18, 2017

To: Amy Bensted, Project Biologist, Tetra Tech, Inc.

From: Suzanne Anderson, USFWS

Subject: Request for Information on Threatened endangered and Sensitive Species and Habitats for Potential Wind Power Project, Oregon

1) How many acres and wind towers are proposed?

2) Are there any rivers or streams that run through the project?

3) Does the Project include the construction of a new transmission line or substation?

4) cc me regarding all correspondence with ODFW.

5) cc me regarding all correspondence with Matt Stuber, USFWS, regarding eagle permitting.

6) Use ODFW protocol to determine Washington ground squirrel habitat and presence.

7) Conduct two years of spring nesting raptor surveys and implement the following timing restrictions on activities that could cause disturbance or disruption of migratory bird breeding/nesting season (generally April 1 to July 15). Species specific timing restrictions are as follows:

- Ferruginous Hawk - March 1 to August 1
- Swainson's Hawk - April 1 to August 31
- Burrowing Owls - March 15 to September 30
- Construction buffers for active nests should be ½ mile in-line-of-site and ¼ mile if non-line of site

Thanks for the opportunity to provide initial comments on this Project. If you have any questions regarding these comments, please give me a call at (541) 962-8583.

Thanks, suz.

Oregon
Kate Brown., Governor

Department of Fish and Wildlife
John Day Watershed
Pendleton Field Office
73471 Mytinger Lane
Pendleton, OR 97801
Voice (541) 276-2344
FAX (541) 276-4414
www.dfw.state.or.us/

November 6, 2017

Katie Clifford, Senior Siting Analyst
Oregon Department of Energy
550 Capital St. NE
Salem, OR 97301

RE: Comments on the Notice of Intent to Apply for a Site Certificate for the Nolan Hills Wind Power Project.

Dear Katie:

Oregon Department of Energy (ODOE) has requested comments from the Oregon Department of Fish and Wildlife (ODFW) on the Notice of Intent (NOI) to Apply for a Site Certificate for the Nolin Hills Wind Power Project. This Letter contains: (A) ODFW contact information for the project; and (B) ODFW's comments on the NOI.

A. Contacts

I will be the main contact person for ODFW for the Energy Facility Siting Council (EFSC) permitting process. My contact information is:

Greg Rimbach
73471 Mytinger Lane
Pendleton, Oregon 97801
541.276.2344 (ext. 224)
gregory.p.rimbach@state.or.us

If possible, I would appreciate if you would ask the Applicant to send me hard copies of all future EFSC process documents.

Please also include our ODFW Energy Coordinator, Sarah Reif, on project notifications and documents for the Nolin Hills Wind Power Project. Electronic copies of all project documents are sufficient for Sarah, and she can be reached at sarah.j.reif@state.or.us and 503-947-6082.

B. Comments on the NOI

General Comments

Please find below a listing of the most applicable statutes, administrative rules and policies administered by ODFW that would pertain to the siting of this proposed facility. ODFW will review and make recommendations for the proposed project based on the following applicable statutes and rules.

Oregon Revised Statutes (ORS)

- ORS 496.012 Wildlife Policy
- ORS 506.036 Protection and Propagation of Fish
- ORS 496.171 through 496.192 Threatened and Endangered Wildlife and Fish Species. A listing of State and Federal threatened, endangered and candidate species can be found on ODFW's website at: http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp
- ORS 498.301 through 498.346 Screening and By-pass devices for Water Diversions or Obstructions
- ORS 506.109 Food Fish Management Policy
- ORS 509-140 Placing Explosives in Water
- ORS 509.580 through 509.910 Fish Passage; Fishways: Screening Devices- a listing of requirements under ODFW's Fish Passage Program can be found on ODFW's website at http://www.dfw.state.or.us/fish/passage/

Oregon Administrative Rules (OAR)

- OAR Chapter 635, Division 100 provides authority for adoption of the State sensitive species list and the Wildlife Diversity Plan, and contains the State list of threatened and endangered wildlife and fish species. A current list of State sensitive species can be found on ODFW's website at http://www.dfw.state.or.us/wildlife/diversity/species/sensitive_species.asp
- OAR Chapter 635, Division 415 (ODFW's Fish and Wildlife Mitigation Policy found on ODFW's website at: http://www.dfw.state.or.us/lands/mitigation_policy.asp describes six habitat categories and establishes mitigation goals and standards for

each wildlife habitat ranging from Category 1 (irreplaceable, essential, limited) to Category 6 (non-habitat)

- The Policy goal for Category 1 habitat is no loss of either habitat quantity or quality via avoidance of impacts through development alternatives, or an ODFW recommendation of denial of the proposed development action if impacts cannot be avoided. Categories 2-4 are essential for important but not irreplaceable habitats. Category 5 habitat is not essential or important habitat, but has a high restoration potential. The application for a site certificate must identify the appropriate habitat category for all affected areas of the proposed project on mapping; provide basis for each habitat category selection; and provide an appropriate mitigation plan; all subject to ODOE and ODFW review and comment. ODOE has adopted this rule into OAR 345-022-0060 as an energy facility siting standard for Applicants to meet in order to obtain a site certificate.

- ODFW also provides technical review and recommendations on compliance with Oregon EFSC rules, particularly OAR 345-02100010(1) (p) and (q) and 345-022-040, 060 and 070.

Specific Comments

Comment 1:
We would recommend that the Application include a map that shows the different vegetation classifications for the project area. This would help the Department to identify potential wildlife issues in areas of development across the project area, and will be useful for categorization of habitats according to the Fish and Wildlife Habitat Mitigation Policy (OAR 635 Division 415).

Comment 2:
We would recommend that Washington Ground Squirrel surveys are completed in suitable habitat within 1000 feet of all ground disturbing activities. Surveys would help the Applicant and the Department to cooperatively work together to avoid any impacts to Washington Ground Squirrels, which are a state endangered species.

Comment 3:
The Department recommends that raptor nest surveys are completed within a 2 mile radius of the project area. In the event that active raptor nests are discovered within the project area, the Department recommends avoiding disturbance of those sites during construction and consideration be given to those nest sites when categorizing habitats per the fish and wildlife habitat mitigation policy. Additionally, the Department recommends the applicant consult with the US Fish and Wildlife Service on those potential impacts to eagles and raptors because of their jurisdiction per the Golden and Bald Eagle Protection Act and the Migratory Bird Treaty Act. We would also recommend that no construction occur within a half mile of active raptor nests during the nesting season.

The Department's recommended disturbance buffers for raptor nests are as follows:

Species	Spatial Buffer	Seasonal Restrictions	Release Date if Unoccupied
ferruginous hawk	0.25 mile	Mar 15 - Aug 15	May 31
golden eagle	0.5 mile	Feb 1 - Aug 15	May 15
red-tailed hawk	300-500 ft	Mar 1 – Aug 15	May 31
prairie falcon	0.25 mile	Mar 15 - July 1	May 15
Swainson's hawk	0.25 mile	April 1 - Aug 15	May 31
burrowing owl	0.25 mile	April 1 - Aug 15	May31

Comment 4:
We recommend that the Applicant survey for any state sensitive species within the project area (OAR 635-100-0040); particularly those species which ODFW has documented in this vicinity, including burrowing owls, loggerhead shrikes, long billed curlews, grasshopper sparrows, and sagebrush sparrows, white-tailed jack rabbits, hoary bats, silver-haired bats, California myotis, fringed myotis, and long-legged myotis. The Department recommends the applicant provide a map showing the locations of the different species with respect to all proposed activities within the project area. Concentrations of state sensitive species would inform micro-siting and turbine layout to help avoid impacts or could help inform habitat categorizations per the Fish and Wildlife Habitat Mitigation Policy.

Comment 5:
The Application should clearly detail a monitoring plan for the project that addresses sensitive species and their habitats, as well as revegetation and habitat mitigation actions. The Department recommends monitoring of all known raptor nest sites in the project area for the life of the project. The Department also requests permission to conduct wildlife surveys on the project area that might help the Department better understand the long-term effects of the wind farm on the native wildlife.

Comment 6:
The Department recommends the Application include a mitigation plan that addresses the loss of habitat as a result of the construction of the proposed facility, according to the ODFW Fish and Wildlife Habitat Mitigation Policy and the EFSC Fish and Wildlife Habitat Standard (OAR 345-022-0060).

Comment 8
The Department would like the opportunity to also review the revegetation plan that gets submitted as part of the application, because of the bearing this has on temporary and permanent impacts to wildlife habitat. The plan should outline how the areas that are temporarily disturbed will be rehabilitated and returned to their pre-construction functionality, and should describe an approach to monitoring and adaptive management.

Respectfully,

Greg Rimbach
Umatilla District Wildlife Biologist – Pendleton, Oregon

Cc: Sarah Reif, ODFW Energy Coordinator, Salem
Suzanne Anderson, USFWS, La Grande
Carrie Konkol, Tetra Tech Senior Proj. Mngr., Portland
Amy Bensted, Tetra Tech Biologist, Portland

Memorandum

Oregon Department of Fish and Wildlife

Date: May 30, 2018

To: Katie Clifford, Siting Analyst, Oregon Department of Energy Siting Division

From: Sarah Reif (Energy Coordinator) and Greg Rimbach (District Wildlife Biologist)

Subject: Nolin Hills Wind Energy Project – Recommendations for Wind Turbine Setbacks from Alkali Canyon to Reduce Risk to Juvenile Raptors

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This memo is a follow up to the February 22, 2018 conference call between Capitol Power, ODOE, ODFW, USFWS, and TetraTech where we reviewed the 2017 raptor nest survey results for the Nolin Hills Wind Project. As an action item to that call, ODFW committed to exploring measures that would avoid impacts to raptors nesting within the project area. This memo provides a summary of ODFW's findings and recommendations to avoid impacts to foraging habitat for raptors (birds of prey).

During the aforementioned conference call, ODFW noted the density of raptor nests detected during the 2017 breeding season in and along Alkali Canyon, which bisects the central portion of the Nolin Hills Wind Project site boundary (see the map included as part of the November 2017 memo from Rick Gerhardt [Northwest Ecological Consultants] to Jeff Sansom [Nolin Hills Wind, LLC]).

While ODFW acknowledges that these results are based on only a single year of pre-construction monitoring, it appears that Alkali Canyon serves as a significant area of raptor use relative to the surrounding landscape. The attraction of this topographic feature is likely due to the increased availability of nest trees, and if raptor behavior in Alkali Canyon is similar to elsewhere in the West, it is likely that juvenile raptors will attempt to forage on the uplands above the canyon 'rims' and will try to achieve foraging altitudes by taking advantage of weak thermal uplift coming up off the gentle slopes of the canyon. These same wind forces have the potential to put juvenile raptors at risk of a turbine strike.

It was noted during the conference call that the applicant is in the process of designing the turbine layout for the Nolin Hills Wind Project. In an effort to avoid impacts to raptor habitat in the Alkali Canyon area (as per the EFSC Fish and Wildlife Habitat Standard and the ODFW Fish and Wildlife Habitat Mitigation Policy) and in an attempt to meet Nolin Hills Wind, LLC's planning timeline, ODFW recommended the applicant make use of the 2017 raptor nest survey results and consider setbacks from the 'rim' of Alkali Canyon. During this discussion, TetraTech asked ODFW for guidance regarding setback distance, and ODFW promised to provide a

recommendation after reviewing best available science. Those recommendations are provided below.

Based on consultation with current scientific literature and discussions with raptor and eagle scientists working in the Western U.S. (see a list of resources consulted, below), ODFW recommends a 200-meter setback of wind turbines from the 'rim' of Alkali Canyon within the Nolin Hills Wind Project area. Elsewhere in the west, turbine setbacks range from 50 meters to 250 meters, however some raptor mortality along canyon rims still occurs. Regional raptor scientists suggest a more conservative setback (200 meters) when canyon slopes are gentler and less vertical than the steep mesas of the southwest where researchers are testing the efficacy of 50-m and 100-m setbacks. It is fair to say that the science is not settled on the most effective distance for turbine setbacks, and because of this uncertainty ODFW errs on the side of caution by offering a conservative yet reasonable distance.

The quotations around canyon 'rim' are intentional because Alkali Canyon does not have a sharp vertical-to-horizontal transition; rather it is typically a gentler slope common to the topography of the Columbia Basin. However, for this particular site there are rocky breaks roughly 75% up the slope of the canyon, and it is this breaking feature that ODFW will be referring to when discussing the 'rim' of the canyon. Essentially, ODFW is not recommending a 200-meter setback from the crests of the hills above Alkali Canyon, but rather the breaks that occur prior to the crest of the hills. If the setback were to begin from the crest of the hills, such is the nature of the topography in the Columbia Basin that one would find themselves descending into the next draw or gully before achieving a 200-meter setback. This designation of the 'rim' at that 75% rough break is an attempt to offer a feasible avoidance measure while still optimizing turbine functionality. Recognizing this 'rim' designation is a fuzzy concept, ODFW would expect a sit-down work session with high-resolution aerial photos would be the appropriate next step.

Habitat condition above the rim is an important factor in determining foraging distances. Raptors do not typically forage in wheatfields, so anywhere that wheatfields exist above the canyon rim a smaller set back could be considered. In the case of Alkali Canyon, it does not appear to ODFW that there are wheatfields above the canyon within the Nolin Hills project boundary, and therefore ODFW recommends the 200-m setback throughout. If ODFW is mistaken and there is active wheatfield activity above the canyon, we can discuss a narrower setback in those areas.

Given the somewhat general nature of these recommendations, ODFW would be more than happy to sit down with ODOE and the applicant to flesh out the specifics of what a turbine setback would actually look like for the Nolin Hills Wind Project. Please do not hesitate to get in touch with any questions or to schedule a work session. Please contact either Greg Rimbach (541-276-2344; gregory.p.rimbach@state.or.us) or Sarah Reif (503-947-6082; sarah.j.reif@state.or.us).

Resources

Jim Watson, Personal Communication
Wildlife Research Scientist
Washington Dept of Fish and Wildlife
7759 Wilderness Dr.
Concrete, WA 98237

Barrios, L. and A. Rodriguez 2004. Behavioural and environmental correlates of soaring-bird mortality at on-shore wind turbines. Journal of Applied Ecology 41: 72-81.

Bureau of Land Management (BLM), 2010, Environmental Assessment for the White Mountain Wind Energy Project, Sweetwater County, Wyoming (February).

Jakle, A. 2012. Wind development and wildlife mitigation in Wyoming: a primer. Laramie, Wyoming: Reckelshaus Institute of Environment and Natural Resources.

Jones, A. 2012. Best Management Practices for siting developing, operating and monitoring renewable energy in the Intermountain West: A Conservationist's Guide. www.wildutahproject.org/resources

Murphy, B. B., Woodbridge, D. LaPlante, C. Boal, and D. Stahlecker. 2017. Buffering wind turbines from mesa rims to reduce risk of golden eagle blade-strike mortality. Poster presentation to Raptor Research Foundation Conference, Salt Lake City, Utah, October 7-11, 2017.

Wyoming Game and Fish Department. 2010. Wildlife protection recommendations for wind energy development in Wyoming. 72 pp. https://wgfd.wyo.gov/Habitat/Habitat-Information/Wind-Energy-Development

Watson, R.T., P.S. Kolar, M. Ferrer, T.Nygard, N. Johnston, W.G. Hunt, H.A. Smit-Robinson, C.J. Farmer, M. Huso, and T.E. Katzner. 2018. Raptor interactions with wind energy: case studies from around the world. Journal of Raptor Research 52: 1-18.

TETRA TECH

MEMO

To:	Sarah Reif and Greg Rimbach, Oregon Department of Fish and Wildlife
Cc:	Katie Clifford, Oregon Department of Energy Siting Division
From:	Julie Garvin, Ph.D., Tetra Tech, Inc. on behalf of Cyrus Tingley and Paul Wendelgass, Capital Power
Date:	July 30, 2018
Correspondence #	TTCES-PTLD-2018-125
Subject:	Nolin Hills Wind Energy Project – Recommendations for Wind Turbine Setbacks from Alkali Canyon to Reduce Risk to Juvenile Raptors

This memo serves as a response to the memo provided by ODFW to ODOE on May 30, 2018 regarding ODFW's recommendations to avoid impacts to foraging habitat for raptors. ODFW's recommendation is specific to the area of the Nolin Hills Wind Energy Project which overlaps Alkali Canyon, and appears to be the area of the Project with the greatest concentration of nesting raptors, most likely due to the availability of trees suitable for nesting. ODFW has suggested that Capital Power implement a setback of turbines from the rim of this section of Alkali Canyon to reduce collision risk to raptors, particularly juvenile raptors associated with nearby nests.

ODFW acknowledged that defining the rim of Alkali Canyon was difficult due to the gradual slopes of the canyon, and recommended defining the rim based on the areas of rocky breaks located roughly 75 percent up the slope of the canyon. Tetra Tech and Capital Power agree that defining the rim using the area of rocky breaks is a biologically sound rationale, particularly because the more vertical face of the rocky breaks will have a greater influence on the orographic lift available to soaring raptors, and these areas may also be used by raptors for nesting and perching. Due to the highly variable slopes and numerous draws that occur along this section of Alkali Canyon, the GIS exercise of drawing a line at 75 percent up the canyon slope resulted in a high degree of subjectivity (i.e., required an arbitrary selection of the top of the slope) and did not necessarily correspond to the rocky breaks. Therefore, Tetra Tech digitized using ArcGIS the areas of rocky breaks along Alkali Canyon from high-resolution aerial imagery and results of previous field surveys; this approach was consistent with the next step for defining the rim recommended by ODFW. The digitized area was then verified in the field by Northwest Wildlife Consultants. Tetra Tech and Capital Power propose to define the canyon rim based on the upper extent of this area (Figure 1).

Tetra Tech and Capital Power agree with ODFW that there is insufficient research regarding the most effective distance for turbine setbacks with respect to raptors. Nonetheless, Capital Power has agreed to

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implement ODFW's recommended 200-meter setback from the rim of Alkali Canyon (as defined on Figure 1) as being a conservative impact avoidance measure to foraging raptor habitat that is feasible at the portion of Alkali Canyon that lies within the Project. It is worth noting that the current locations of turbines have been constrained by the occurrence of other sensitive species in the Project area. Specifically, turbines have been sited away from areas occupied by Washington ground squirrels (State Endangered) which are a prey resource for raptors. The combination of siting turbines away from this raptor prey resource as well as the area of the Project with the highest raptor nest density (i.e., Alkali Canyon) is likely to be effective at minimizing Project impacts to raptors. Tetra Tech and Capital Power are happy to discuss any questions or comments that ODFW and ODOE may have on this voluntary avoidance measure.

TETRA TECH

MEMO

To:	Gregory Rimbach, Sarah Reif; ODFW
Cc:	Paul Wendelgass, Cyrus Tingley, Joseph Griffiths; Capital Power Linnea Fossum; Tetra Tech
From:	Amy Bensted, Tetra Tech
Date:	December 19, 2019
Correspondence #	TTCES-PTLD-2019-164
Subject:	Nolin Hills Washington Ground Squirrel Desktop Review of Areas Not Field Surveyed

This memorandum summarizes the results of Tetra Tech Inc.'s (Tetra Tech) desktop review of Washington ground squirrel (WAGS, *Urocitellus washingtoni*) habitat at the proposed Nolin Hills Wind Power Project (Project) in areas that were not surveyed in 2018 or 2019, but that are within 1,000 feet of potential ground disturbing activities (see attached figure). The reasons that these areas were not surveyed vary, either because that habitat was outside the proposed Site Boundary and not accessible for field surveys in 2018 or 2019, was added to the proposed Site Boundary in 2019 following field surveys due to Project infrastructure changes, or was determined to be potentially suitable habitat (i.e., not in active agricultural rotation) following field surveys in 2019.

This review is in response to an email from Greg Rimbach at the Oregon Department of Fish and Wildlife (ODFW) on March 21, 2018, recommending that Tetra Tech provide the following information for each of these areas in order for ODFW to be able to evaluate the likelihood of these un-surveyed areas providing suitable habitat to WAGS:

- The dimensions of each area;
- A description of the soil and habitat types in each area; and
- A desktop query of WAGS survey records.

Tetra Tech reviewed aerial photographs, Natural Resources Conservation Service soil data, and the results of a records query to the Oregon Biodiversity Information Center (ORBIC). Tetra Tech additionally viewed these areas from within accessible areas within the Site Boundary, when possible, to identify the likely habitat type. The results of Tetra Tech's review are included below in Table 1.

Tetra Tech, Inc.
1750 Harbor Way, Suite 400, Portland, OR 97201
Tel 503.221.8636 Fax 503.227.1287 www.tetratech.com

Based on this review, there is some potential for WAGS to occur within these areas. Some of the areas appear to contain habitat types that are consistent with the habitat types where WAGS have been documented within the Site Boundary. There are also areas Tetra Tech classified as habitat having low potential to support WAGS due to the presence of dense cereal rye (*Secale cereal*), an abundance of weeds, and their isolated location between active agricultural fields, major paved roads, or in otherwise disturbed areas. A photolog (attached) provides select photographs of areas that were not field surveyed. Six of these areas intersect with WAGS occurrences that have been documented according to ORBIC records, although these are all historic records from 1979 to 1988.

Table 1. Features of Areas Not Surveyed

Figure Labels	Acres	Width (Feet)	Length (Feet)	Likely Habitat/ Vegetation Type	Soils	Desktop WAGS Records	Access Notes
Tt_01	24	1,536	2,509	Eastside grasslands (scattered black locust trees and sagebrush species present).	Quincy loamy fine sand, gravelly substratum, 0 to 5 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_02	14	1,380	2,888	Eastside grasslands.	Quincy loamy fine sand, 0 to 5 percent slopes, Quincy loamy fine sand, gravelly substratum, 0 to 5 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_03	113	4,222	7,531	Eastside grasslands.	Adkins fine sandy loam, 0 to 5 percent slopes, Quincy fine sand, 0 to 5 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes, Taunton fine sandy loam, 1 to 7 percent slopes	Intersects ORBIC WAGS Polygon	No Access parcel
Tt_04	66	2,615	6,847	Eastside grasslands, shrub-steppe.	Adkins fine sandy loam, 0 to 5 percent slopes, Esquatzel silt loam, 0 to 3 percent slopes, Kimberly fine sandy loam, 0 to 3 percent slopes, Powder silt loam, 0 to 3 percent slopes, Quincy loamy fine sand, 5 to 25 percent slopes, Stanfield silt loam, reclaimed, 0 to 3 percent slopes	Intersects ORBIC WAGS Polygon	No Access parcel
Tt_05	211	2,955	8,229	Eastside grasslands.	Adkins fine sandy loam, 0 to 5 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes, Quincy loamy fine sand, 5 to 25 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_06	170	3,337	7,072	Eastside grasslands.	Adkins fine sandy loam, 0 to 5 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes, Quincy loamy fine sand, 5 to 25 percent slopes	Intersects ORBIC WAGS Polygon	No Access parcel
Tt_07	151	4,051	7,348	Eastside grasslands.	Adkins fine sandy loam, 0 to 5 percent slopes, Kimberly fine sandy loam, 0 to 3 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes	Intersects ORBIC WAGS Polygon	No Access parcel

Figure Labels	Acres	Width (Feet)	Length (Feet)	Likely Habitat/ Vegetation Type	Soils	Desktop WAGS Records	Access Notes
Tt_08	74	2,611	5,371	Eastside grasslands, shrub-steppe.	Adkins fine sandy loam, 0 to 5 percent slopes, Kimberly fine sandy loam, 0 to 3 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes	Intersects ORBIC WAGS Polygon	No Access parcel
Tt_09	146	5,288	10,748	Eastside grasslands.	Kimberly fine sandy loam, 0 to 3 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes, Sagehill fine sandy loam, 2 to 5 percent slopes, Taunton fine sandy loam, 1 to 7 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_10	315	4,210	6,549	Eastside grasslands, shrub-steppe.	Adkins fine sandy loam, 0 to 5 percent slopes, Burke silt loam, 1 to 7 percent slopes, Quincy loamy fine sand, 0 to 5 percent slopes, Sagehill fine sandy loam, 2 to 5 percent slopes, Taunton fine sandy loam, 1 to 7 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_11	152	2,662	11,026	Eastside grasslands.	Adkins fine sandy loam, 0 to 5 percent slopes, Burke silt loam, 1 to 7 percent slopes, Burke silt loam, 12 to 30 percent slopes, Sagehill fine sandy loam, 2 to 5 percent slopes, Shano very fine sandy loam, 2 to 7 percent slopes, Taunton fine sandy loam, 1 to 7 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_12	255	2,335	6,127	Eastside grasslands.	Prosser silt loam, 20 to 40 percent slopes, Ritzville silt loam, 7 to 12 percent slopes, Shano silt loam, 12 to 25 percent slopes, Shano silt loam, 2 to 7 percent slopes, Shano silt loam, 7 to 12 percent slopes, Xerofluvents, 0 to 3 percent slopes	Intersects ORBIC WAGS Polygon	No Access parcel
Tt_13	2	263	933	Eastside grasslands.	Cantala silt loam, 7 to 12 percent slopes, Lickskillet-Nansene association, 35 to 70 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel

Figure Labels	Acres	Width (Feet)	Length (Feet)	Likely Habitat/ Vegetation Type	Soils	Desktop WAGS Records	Access Notes
Tt_14	21	1,254	1,389	Eastside grasslands.	Lickskillet very stony loam, 7 to 40 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_15	10	639	1,130	Planted grassland and eastside grasslands.	Cantala silt loam, 12 to 20 percent slopes, Lickskillet very stony loam, 7 to 40 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_16	131	1,219	6,267	Primarily planted grassland with minor eastside grasslands component.	Cantala silt loam, 7 to 12 percent slopes, Condon silt loam, 1 to 7 percent slopes, Condon silt loam, 12 to 20 percent south slopes, Lickskillet very stony loam, 7 to 40 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_17	309	6,370	8,168	Planted grasslands dominated by alfalfa, cheatgrass, and crested wheatgrass.	Condon silt loam, 1 to 7 percent slopes, Condon silt loam, 12 to 20 percent north slopes, Condon silt loam, 12 to 20 percent south slopes, Condon silt loam, 7 to 12 percent slopes, Condon-Bakeoven complex, 2 to 20 percent slopes	Does Not Intersect ORBIC WAGS Polygon	Access approved
Tt_18	12	377	2,110	Planted grassland and eastside grasslands.	Condon silt loam, 1 to 7 percent slopes, Condon silt loam, 12 to 20 percent north slopes, Condon silt loam, 7 to 12 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel
Tt_19	35	1,438	3,451	Planted grassland and eastside grasslands.	Condon silt loam, 1 to 7 percent slopes, Condon-Bakeoven complex, 2 to 20 percent slopes, Lickskillet-Rock outcrop complex, 40 to 70 percent slopes	Does Not Intersect ORBIC WAGS Polygon	No Access parcel

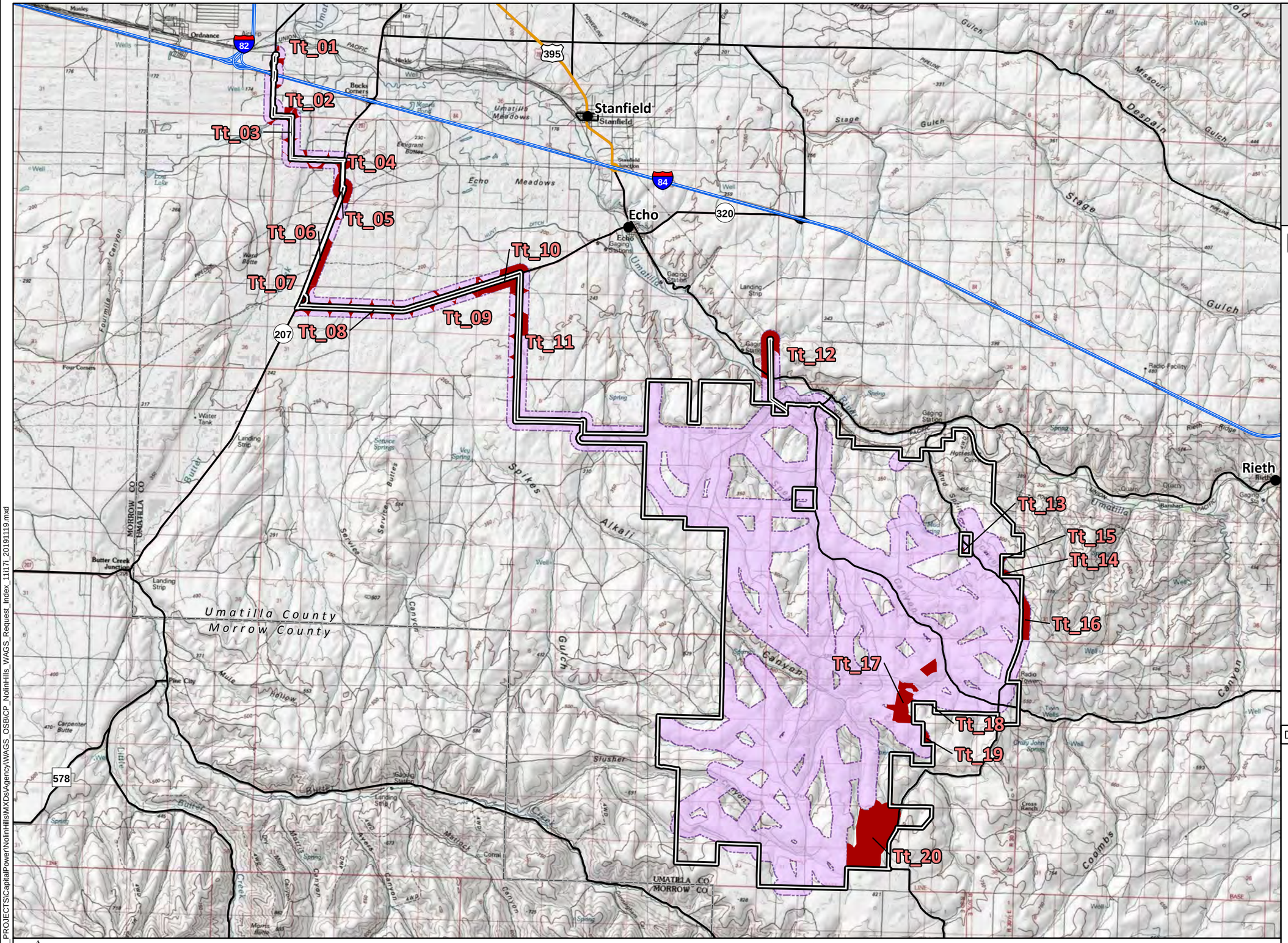
Figure Labels	Acres	Width (Feet)	Length (Feet)	Likely Habitat/ Vegetation Type	Soils	Desktop WAGS Records	Access Notes
Tt_20	940	7,826	9,551	Planted grassland. Southern portion dominated by bluebunch wheatgrass and cheatgrass and northern portion dominated by intermediate wheatgrass and cheatgrass.	Lickskillet very stony loam, 7 to 40 percent slopes, Morrow silt loam, 1 to 7 percent slopes, Morrow silt loam, 12 to 20 percent north slopes, Morrow silt loam, 12 to 20 percent south slopes, Morrow silt loam, 7 to 12 percent slopes, Morrow-Bakeoven complex, 2 to 20 percent slopes	Does Not Intersect ORBIC WAGS Polygon	Access approved

Figure

Nolin Hills Wind Power Project

Washington Ground Squirrel Survey Corridor Index

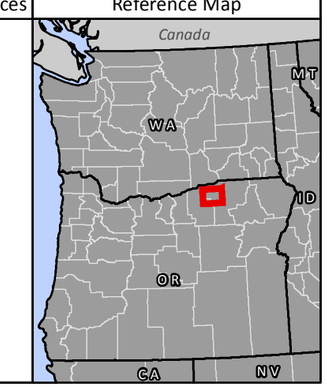
UMATILLA COUNTY, OREGON



Proposed Site Boundary (10/22/2019)
Interstate Highway
Secondary Highway
Secondary Road
County Boundary
WAGS Survey Corridor (2017-2019)
WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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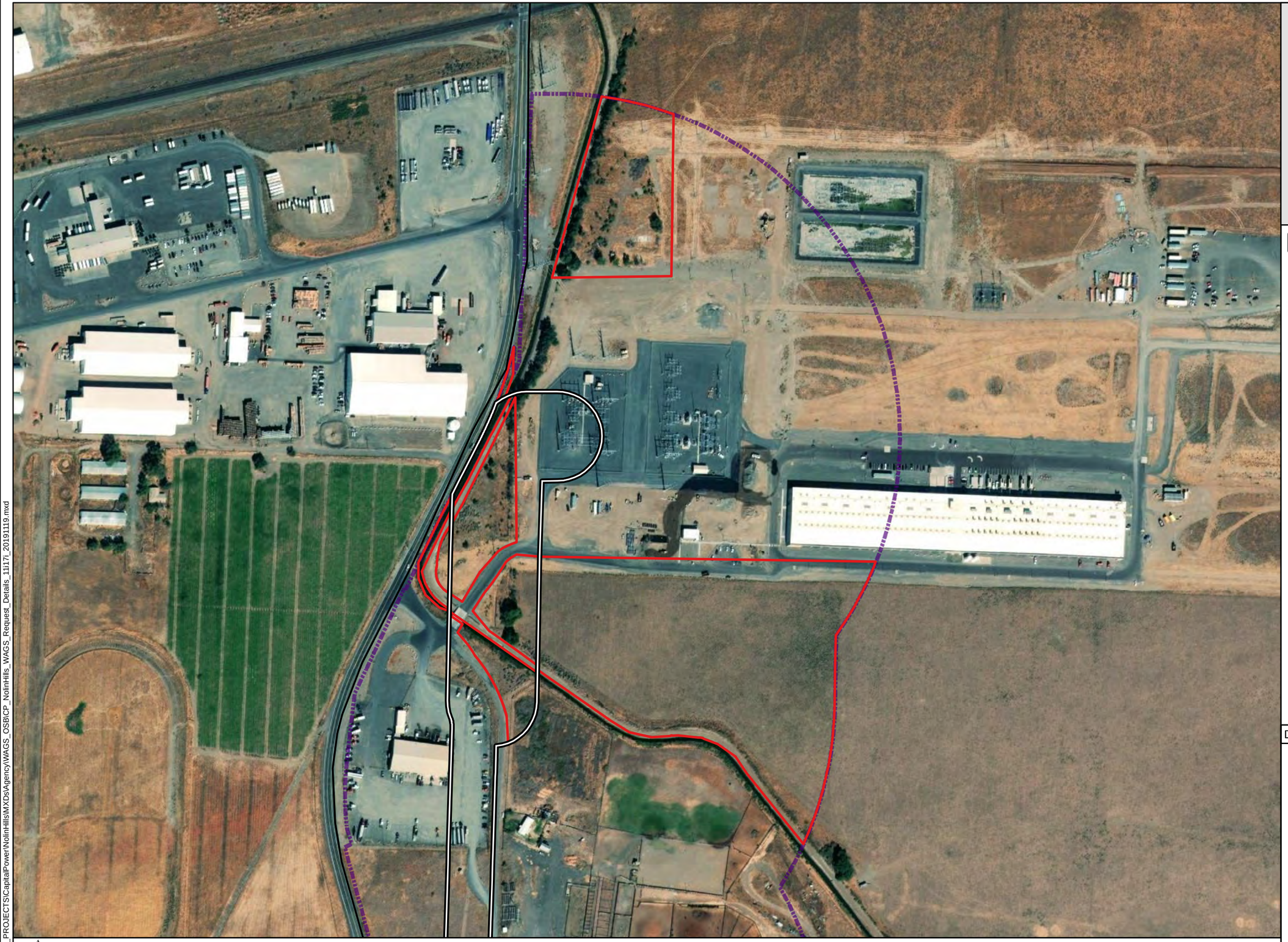
Nolin Hills
Wind Power Project

Washington Ground Squirrel Survey Corridor
Tt_01

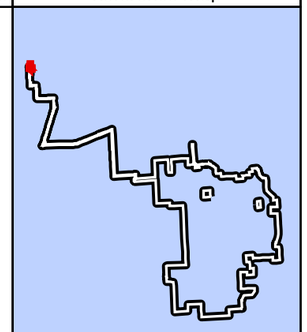
UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:3,730 WGS 1984 UTM Zone 11N

0 315 630 1,260 1,890 2,520 Feet

NOT FOR CONSTRUCTION

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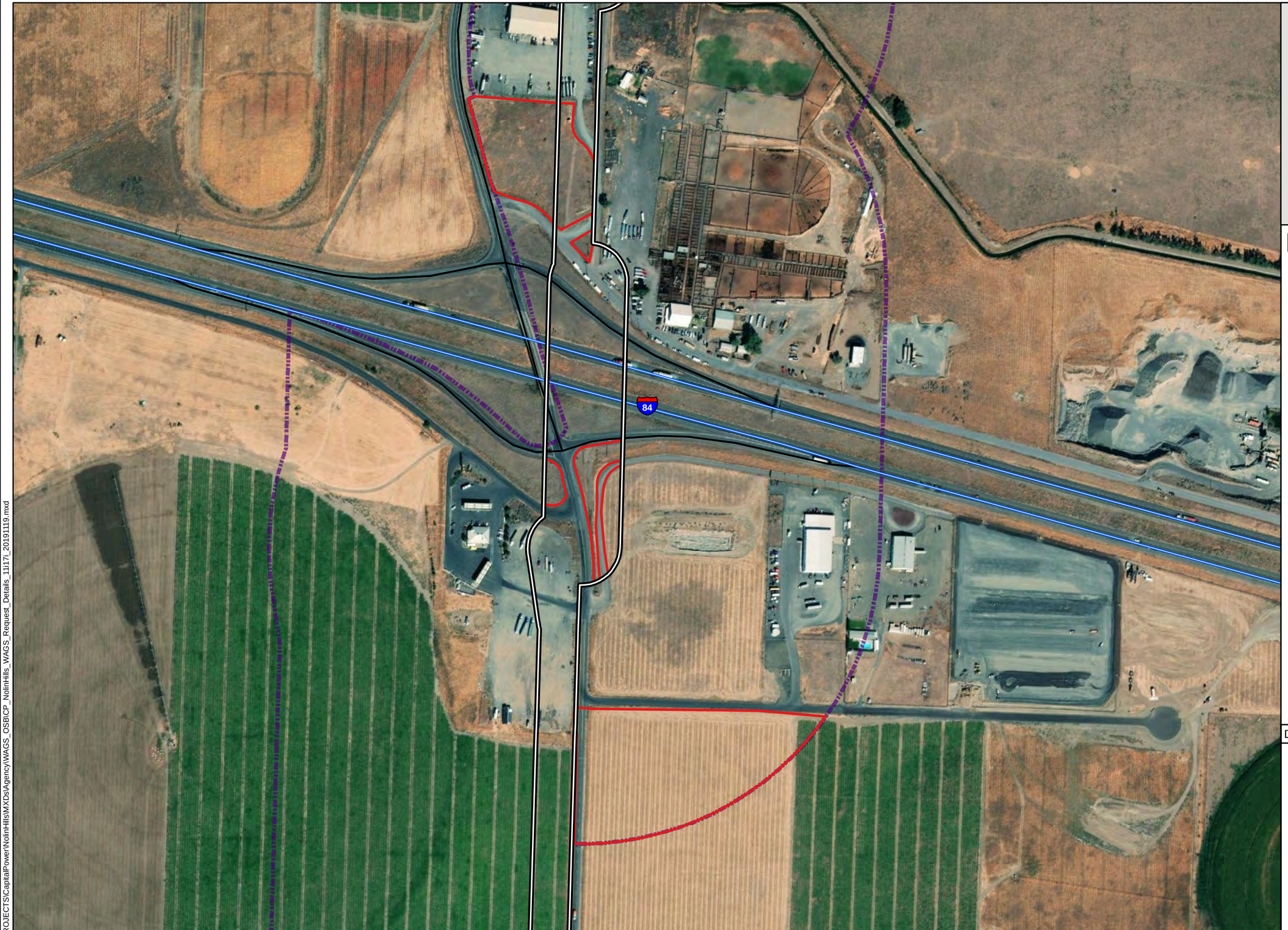
Nolin Hills
Wind Power Project

Washington Ground Squirrel Survey Corridor
Tt_02

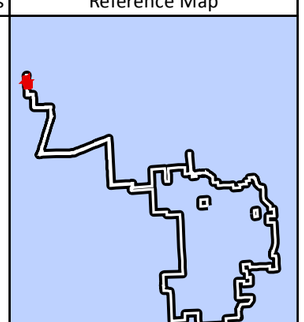
UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Interstate Highway
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:4,290

WGS 1984 UTM Zone 11N

0 360 720 1,440 2,160 2,880 Feet

NOT FOR CONSTRUCTION

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Nolin Hills
Wind Power Project

Washington Ground Squirrel Survey Corridor
Tt_03

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

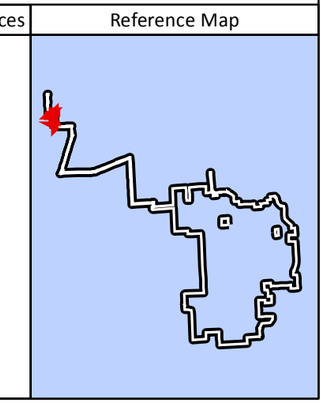
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map



1:11,190 WGS 1984 UTM Zone 11N

0 900 1,800 3,600 5,400 7,200 Feet

NOT FOR CONSTRUCTION

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Nolin Hills
Wind Power Project

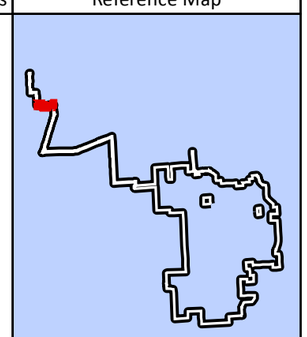
Washington Ground Squirrel Survey Corridor
Tt_04

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:7,500

WGS 1984 UTM Zone 11N

0 625 1,250 2,500 3,750 5,000 Feet

NOT FOR CONSTRUCTION

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Nolin Hills Wind Power Project

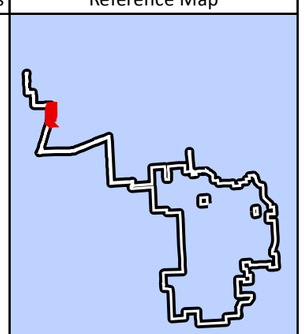
Washington Ground Squirrel Survey Corridor Tt_05

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:12,230 WGS 1984 UTM Zone 11N

0 1,000 2,000 4,000 6,000 8,000 Feet

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Nolin Hills Wind Power Project

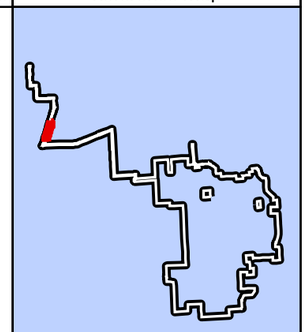
Washington Ground Squirrel Survey Corridor Tt_06

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:10,510 WGS 1984 UTM Zone 11N

0 875 1,750 3,500 5,250 7,000 Feet

NOT FOR CONSTRUCTION

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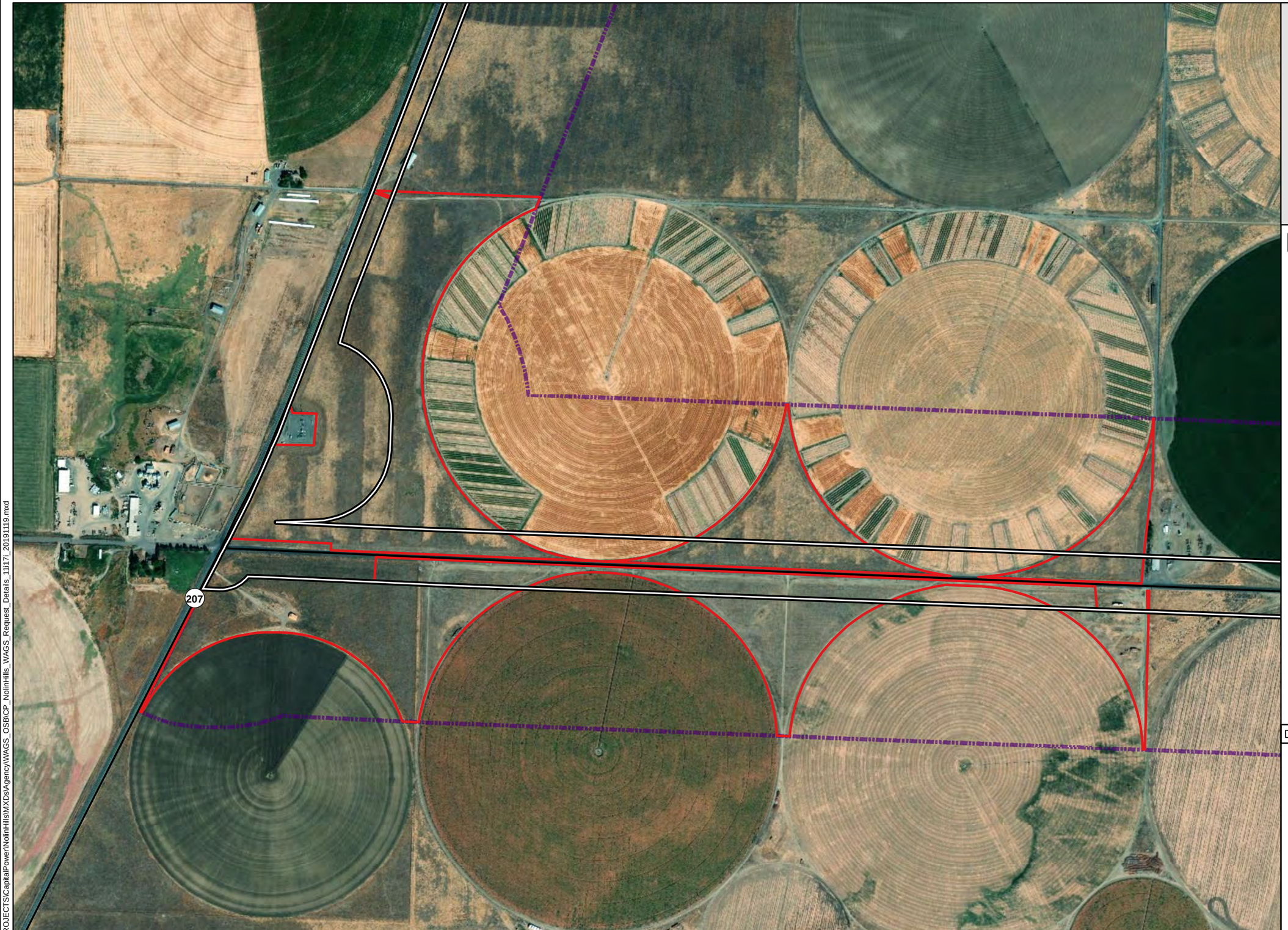
Nolin Hills Wind Power Project

Washington Ground Squirrel Survey Corridor Tt_07

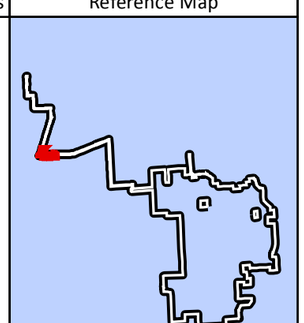
UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:8,050 WGS 1984 UTM Zone 11N

0 650 1,300 2,600 3,900 5,200 Feet

NOT FOR CONSTRUCTION

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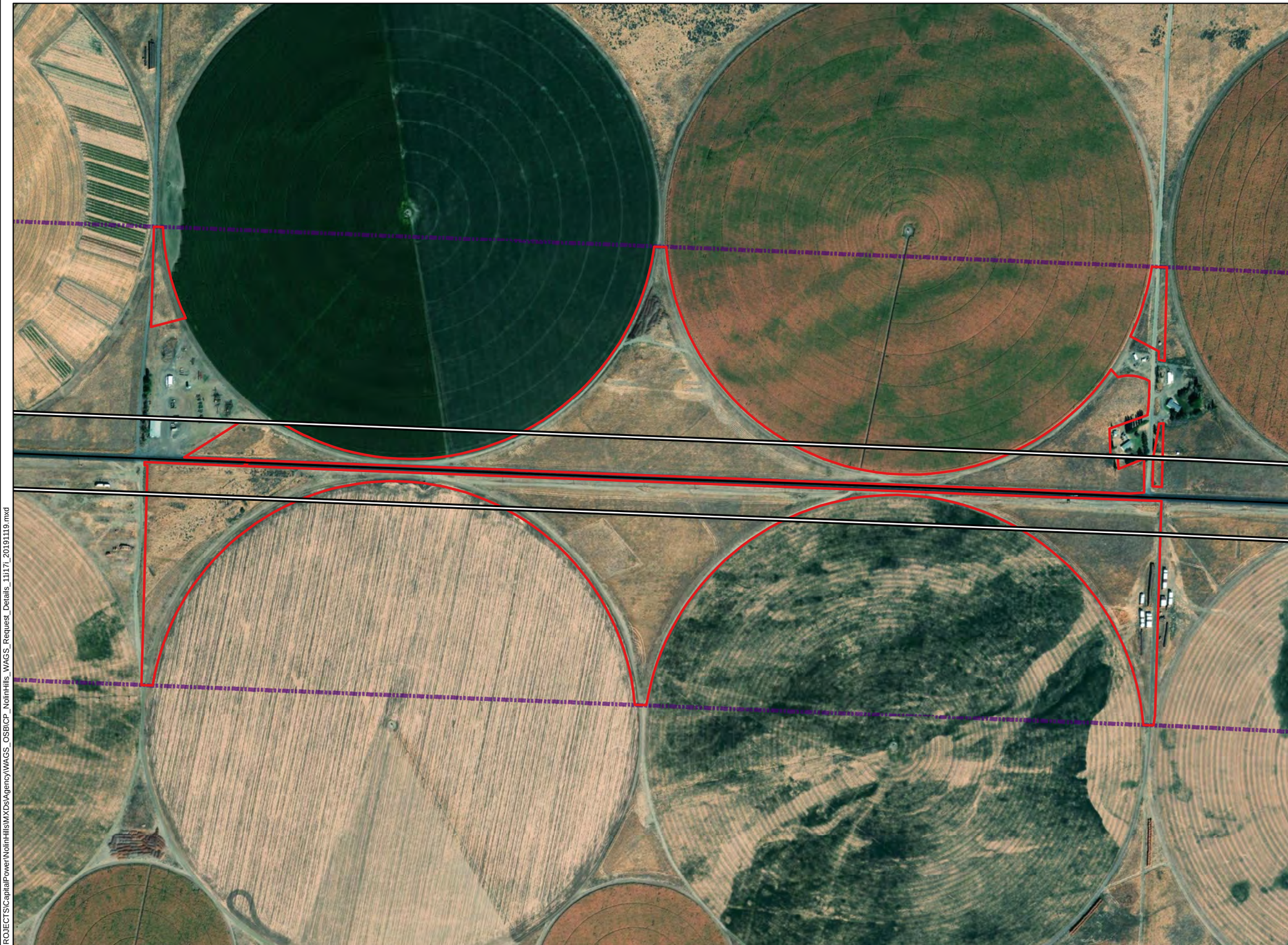
Nolin Hills Wind Power Project

Washington Ground Squirrel Survey Corridor Tt_08

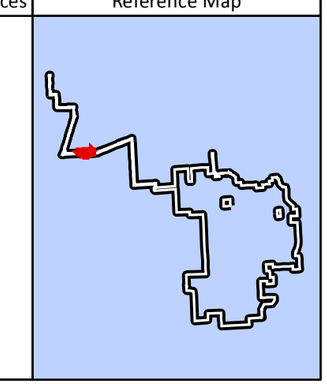
UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:5,880 WGS 1984 UTM Zone 11N

0 495 990 1,980 2,970 3,960 Feet

NOT FOR CONSTRUCTION

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Nolin Hills Wind Power Project

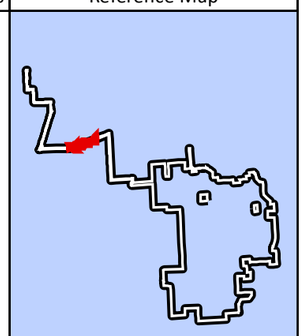
Washington Ground Squirrel Survey Corridor Tt_09

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:11,770 WGS 1984 UTM Zone 11N

0 1,000 2,000 4,000 6,000 8,000 Feet

NOT FOR CONSTRUCTION

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Nolin Hills
Wind Power Project

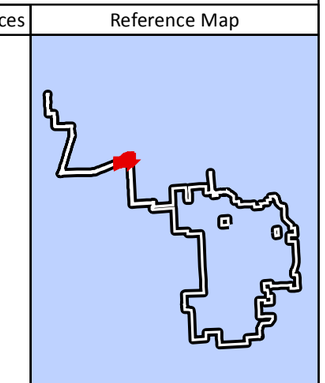
Washington Ground Squirrel Survey Corridor
Tt_10

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:7,170 WGS 1984 UTM Zone 11N

0 600 1,200 2,400 3,600 4,800 Feet

NOT FOR CONSTRUCTION

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Nolin Hills Wind Power Project

Washington Ground Squirrel Survey Corridor Tt_11

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

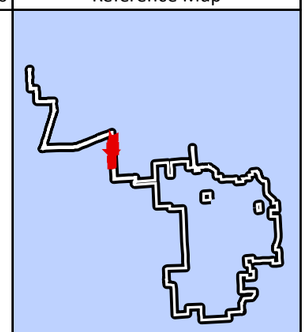
TETRA TECH

Capital Power

1:16,380 WGS 1984 UTM Zone 11N

0 1,375 2,750 5,500 8,250 11,000 Feet

NOT FOR CONSTRUCTION

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

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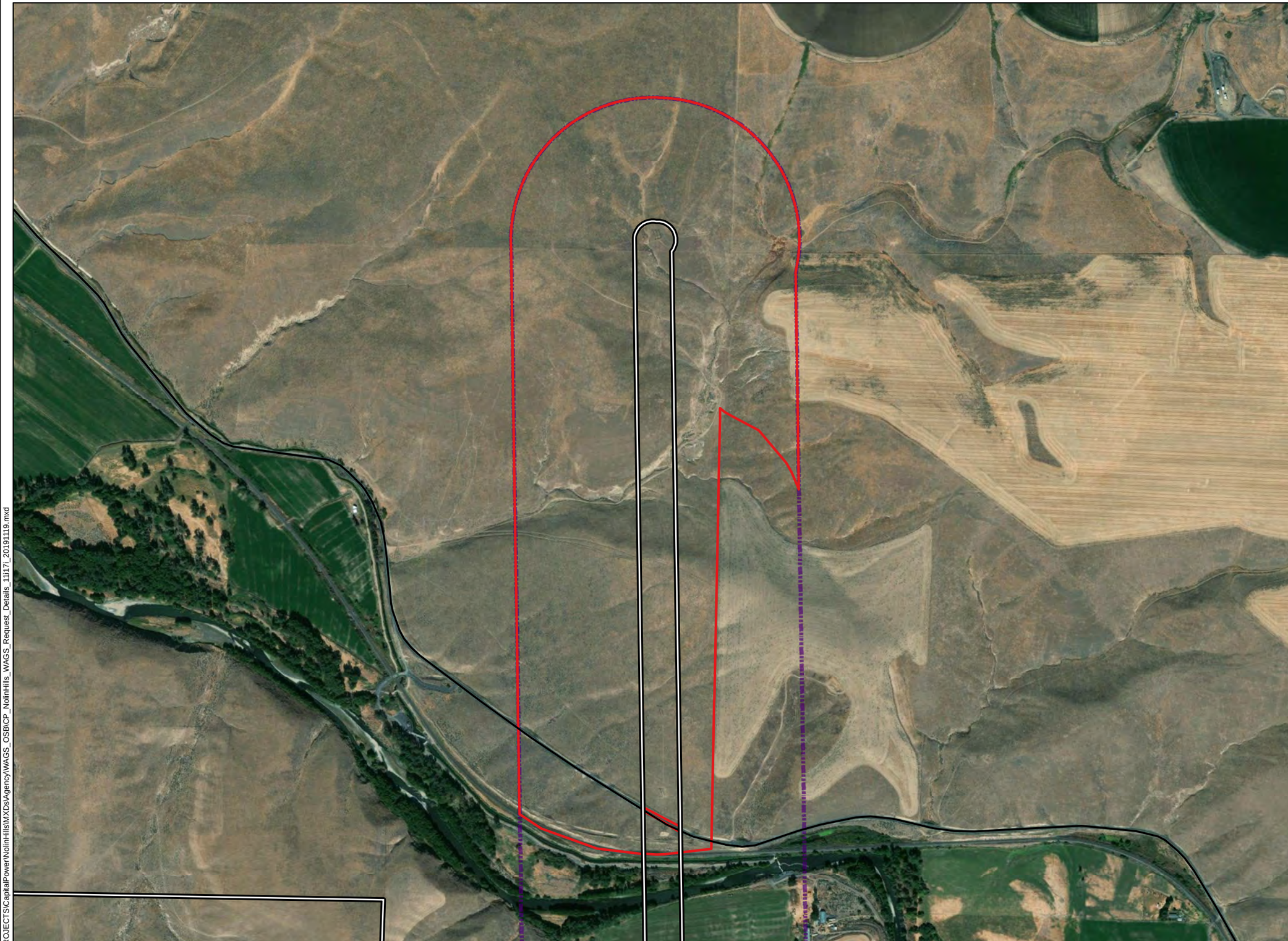
Nolin Hills
Wind Power Project

Washington Ground Squirrel Survey Corridor
Tt_12

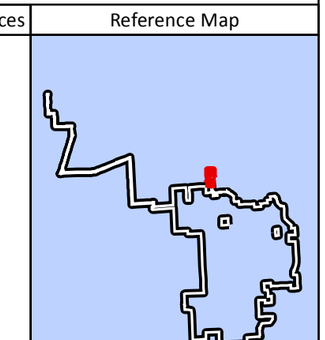
UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:9,100

WGS 1984 UTM Zone 11N

0 750 1,500 3,000 4,500 6,000 Feet

NOT FOR CONSTRUCTION

P:\GIS_PROJECTS\CapitalPower\NolinHills\MXDs\Agency\WAGS_OSB\CP_NolinHills_WAGS_Request_Details_11i17i_20191119.mxd

Nolin Hills
Wind Power Project

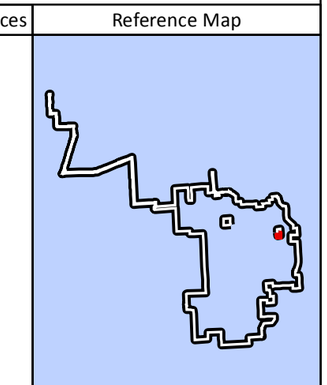
Washington Ground Squirrel Survey Corridor
Tt_13

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:1,390 WGS 1984 UTM Zone 11N

0 115 230 460 690 920 Feet

NOT FOR CONSTRUCTION

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Nolin Hills
Wind Power Project

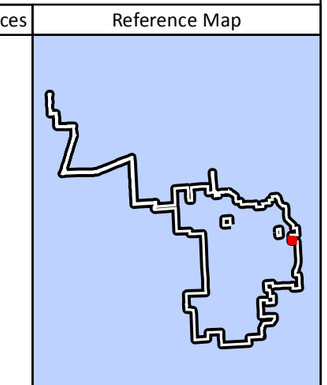
Washington Ground Squirrel Survey Corridor
Tt_14

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:1,750 WGS 1984 UTM Zone 11N

0 145 290 580 870 1,160 Feet

NOT FOR CONSTRUCTION

P:\GIS_PROJECTS\CapitalPower\NolinHills\MXDs\Agency\WAGS_OSB\CP_NolinHills_WAGS_Request_Details_11i17i_20191119.mxd

Nolin Hills
Wind Power Project

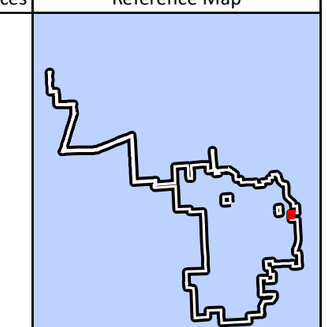
Washington Ground Squirrel Survey Corridor
Tt_15

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:1,670 WGS 1984 UTM Zone 11N

0 140 280 560 840 1,120 Feet

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Nolin Hills
Wind Power Project

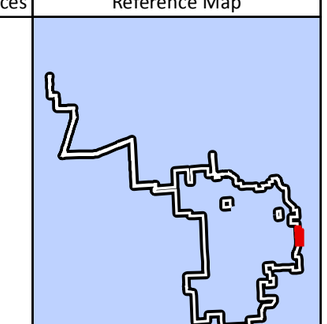
Washington Ground Squirrel Survey Corridor
Tt_16

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:9,310 WGS 1984 UTM Zone 11N

0 750 1,500 3,000 4,500 6,000 Feet

NOT FOR CONSTRUCTION

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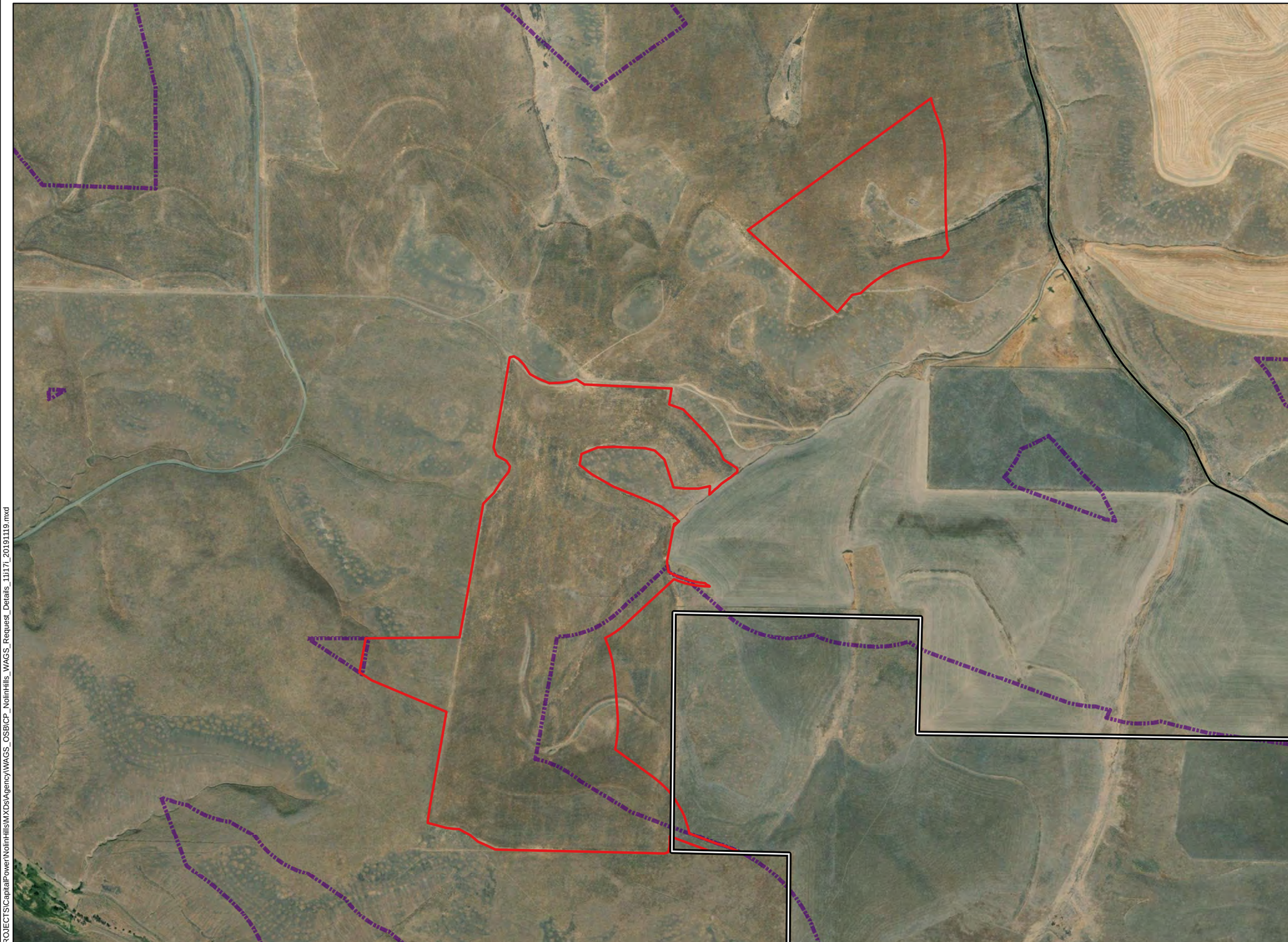
Nolin Hills
Wind Power Project

Washington Ground Squirrel Survey Corridor
Tt_17

UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

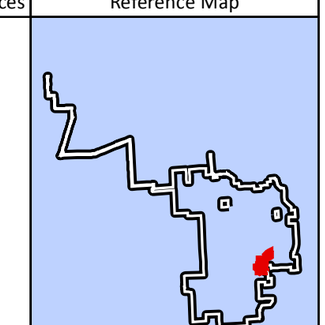
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map



1:12,140 WGS 1984 UTM Zone 11N

0 1,000 2,000 4,000 6,000 8,000 Feet

NOT FOR CONSTRUCTION

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Nolin Hills
Wind Power Project

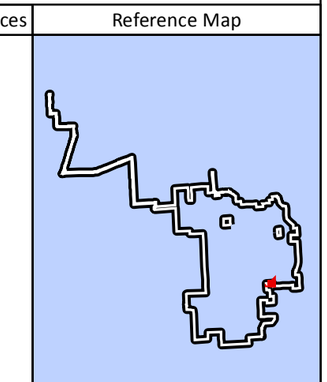
Washington Ground Squirrel Survey Corridor
Tt_18

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:2,310 WGS 1984 UTM Zone 11N

0 195 390 780 1,170 1,560 Feet

NOT FOR CONSTRUCTION

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Nolin Hills
Wind Power Project

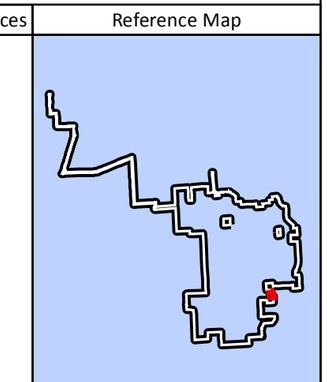
Washington Ground Squirrel Survey Corridor
Tt_19

UMATILLA COUNTY, OREGON

- Proposed Site Boundary (10/22/2019)
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:5,130 WGS 1984 UTM Zone 11N

0 435 870 1,740 2,610 3,480 Feet

NOT FOR CONSTRUCTION

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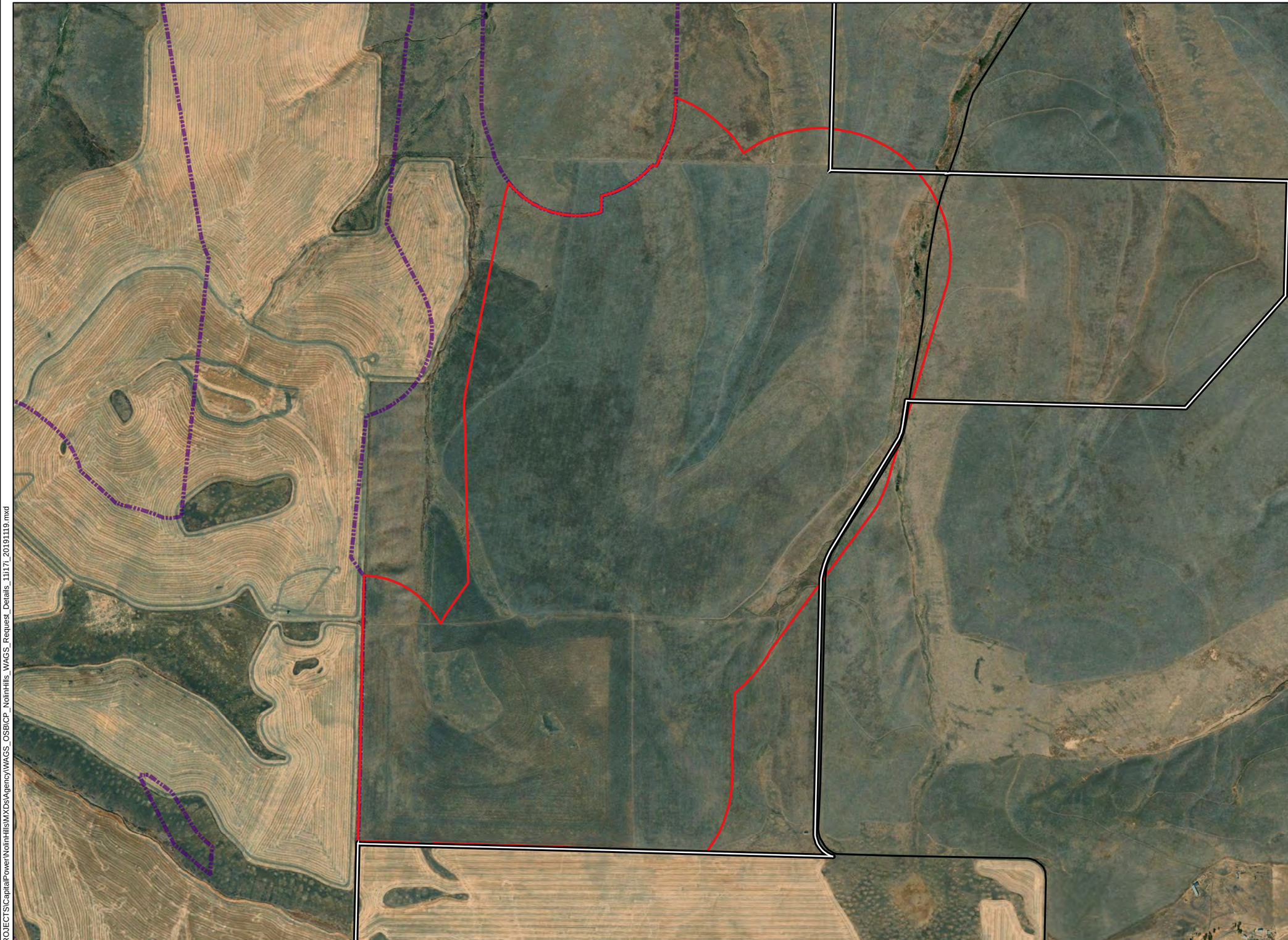
Nolin Hills Wind Power Project

Washington Ground Squirrel Survey Corridor Tt_20

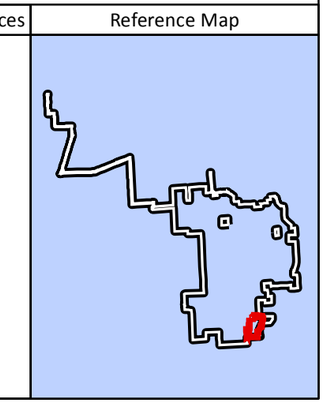
UMATILLA COUNTY, OREGON



- Proposed Site Boundary (10/22/2019)
- Secondary Road
- County Boundary
- WAGS Survey Corridor (2017-2019)
- WAGS Survey Corridor (2018-2019) Not Surveyed

TETRA TECH

Capital Power

Data Sources	Reference Map
Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads	

1:12,980 WGS 1984 UTM Zone 11N

0 1,100 2,200 4,400 6,600 8,800 Feet

NOT FOR CONSTRUCTION

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Photolog of Unsurveyed Areas

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Tt_01. Low potential WAGS habitat, grassland mixed with scattered trees and shrubs between paved and dirt roads and canal bordering substation.

Tt_01. Low potential WAGS habitat, grassland mixed with scattered trees and shrubs between paved and dirt roads and canal bordering substation.

Tt_01. Low potential WAGS Habitat, next to dirt roads, canal, and substation.

Tt_02. Low potential WAGS Habitat, mowed wheat/rye next to interstate and paved road.

Tt_05. Low potential WAGS habitat, cereal rye and weeds growing along hwy.

Tt_05. Low potential WAGS habitat, cereal rye and weeds growing along hwy.

Tt_05. Low potential WAGS habitat, cereal rye and weeds between hwy and active agriculture.

Tt_05. Low potential WAGS habitat, cereal rye between hwy and active agriculture.

Tt_06. Low potential WAGS habitat, cereal rye between hwy and active agriculture.

Tt_06. Low potential WAGS habitat, cereal rye and weeds growing along hwy.

Tt_07. Potential WAGS habitat, weedy grassland - south side of road.

Tt_07. Potential WAGS habitat, weedy grassland - south side of road (no habitat to west where development is occurring).

Tt_07. Potential WAGS habitat, weedy grassland - north side of road.

Tt_07. Low potential WAGS habitat, cereal rye and weeds between paved road and active agriculture - north side of road.

Tt_08. Low potential WAGS habitat, cereal rye and weeds between paved road and active agriculture.

Tt_08. Low potential WAGS habitat, cereal rye and sagebrush between paved road and active agriculture - south side of road.

Tt_08. Low potential WAGS habitat, cereal rye between paved road and active agriculture - south side of road.

Tt_09. Potential WAGS habitat, weedy grassland with some cereal rye - south side of road.

Tt_09. Potential WAGS habitat, weedy grassland - south side of road.

Tt_09. Potential WAGS habitat, weedy grassland - south side of road.

Tt_09. Potential WAGS habitat, weedy grassland - north side of road.

Tt_09. Potential WAGS habitat, weedy grassland - south side of road.

Tt_10. Potential WAGS habitat, sagebrush/rabbitbrush - north side of road.

Tt_10. Potential WAGS habitat, weedy grassland - north side of road.

Tt_10. Potential WAGS habitat, weedy grassland - west side of N-S gravel road.

Tt_10. Potential WAGS habitat, weedy grassland - east side of N-S gravel road.

Tt_10. Potential WAGS habitat, weedy grassland with some cereal rye - north side of road.

Tt_10. Potential WAGS habitat, weedy grassland with some cereal rye - north side of road.

Tt_10. Potential WAGS habitat, weedy grassland with some cereal rye growing inbetween gravel road and active agriculture along T-line right-of-way.

Tt_11. Potential WAGS habitat, weedy grassland with heavy cereal rye - east of gravel road.

Tt_14. Potential WAGS habitat, looking through survey area and into southwest corner of no access parcel.

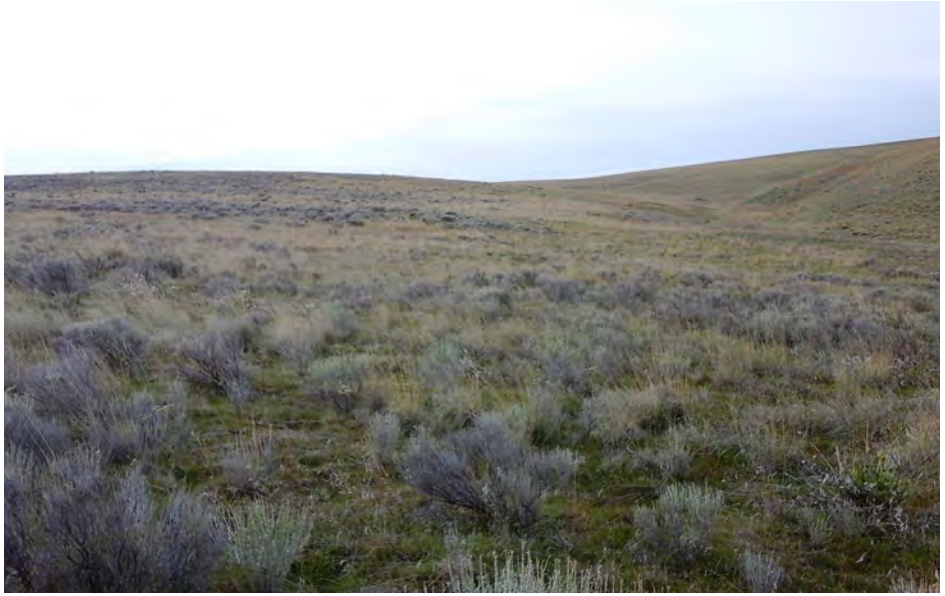
Tt_16. Potential WAGS habitat, northern portion of western fenceline looking east into no access parcel.

Tt_16. Potential WAGS habitat, central portion of western fenceline, looking northeast into no access parcel.

Tt_16. Potential WAGS habitat, southwest corner of no access parcel looking towards the northeast.

Tt_16. Potential WAGS habitat, southern fenceline looking north into no access parcel.

Tt_17. Low potential WAGS habitat, planted grassland dominated by alfalfa, cheatgrass, and crested wheatgrass.



Tt_18. Potential WAGS habitat, northern fenceline looking south into no access parcel.

MEMO

To:	Katie Clifford; Oregon Department of Energy (ODOE) Gregory Rimbach, Sarah Reif; Oregon Department of Fish and Wildlife (ODFW)
Cc:	Paul Wendelgass, Cyrus Tingley, Jeff Sansom; Capital Power Tim McMahan; Stoel Rives Susan Hurley, Linnea Fossum; Tetra Tech
From:	Amy Bensted, Tetra Tech
Date:	February 25, 2019
Correspondence #	TTCES-PTLD-2019-018
Subject:	Nolin Hills Washington Ground Squirrel Habitat

This memorandum summarizes Tetra Tech's approach to categorizing habitat in the vicinity of Washington Ground Squirrel (WAGS, *Urocitellus washingtoni*) colonies at Capital Power's proposed Nolin Hills Wind Power Project (Project). Specifically, this memo describes the rationale for excluding fields recently converted from wheat cultivation to US Department of Agriculture Conservation Reserve Program (CRP) lands from consideration as WAGS habitat on the basis that these fields are not irreplaceable, essential, or limited habitat as defined in the Oregon Department of Fish and Wildlife (ODFW) Habitat Mitigation Policy per Oregon Administrative Rules (OAR) 635-415-0025.

Washington Ground Squirrel Surveys

Tetra Tech conducted surveys for the Oregon endangered WAGS at the Project in 2017 and 2018. Prior to conducting surveys, Tetra Tech performed a desktop analysis to identify suitable WAGS habitat and excluded from consideration for surveys habitat that was unsuitable for WAGS, such as active agricultural fields and developed land (Figure 1). Agricultural areas identified during the initial desktop review of aerial imagery (Google Earth, National Agriculture Imagery Program) were confirmed in the field, and Tetra Tech noted that active agricultural fields included areas that were in various stages of crop rotation including fields that were freshly plowed, planted with wheat, freshly harvested, and fallow at the time of surveys in spring 2017. Correspondence with the

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landowner identified a typical annual crop rotation at the Project of 1 year of wheat followed by 1 year of fallow, and as a result, areas that appeared to be recently plowed in aerial imagery but were not planted or freshly plowed at the time of surveys were assumed to be fallow for the year but still within active agricultural rotation.

In 2018, some areas initially identified as fallow fields likely under biennial agricultural rotation appeared to remain fallow, and subsequent correspondence with the landowner identified these fields as having been recently enrolled in the CRP with a planned return to wheat production in 2023. Most of these areas were densely vegetated with cheatgrass (*Bromus tectorum*) and tall tumble mustard (*Sisymbrium altissimum*); in some areas the ground was not visible and was challenging for surveyors to traverse due to the density of vegetation (Figures 2 and 3). Following coordination with ODFW, Tetra Tech surveyed these recently converted CRP fields in May 2018 but did not detect any WAGS activity despite the close proximity of the fields to WAGS colonies documented in 2017 and 2018 in adjacent, higher quality native habitat that had not previously been tilled. These observations support Tetra Tech's understanding that plowing a field renders it unsuitable to WAGS for burrowing for a period of time. These recently converted fields were notably lower quality habitat than the CRP located elsewhere at the Project that appeared to have been out of agricultural rotation for at least 10 years and that Tetra Tech had considered suitable habitat for WAGS.

Habitat Categorization

In addition to WAGS surveys, Tetra Tech conducted habitat categorization surveys at the Project to support Exhibit P of the application for site certificate to the Oregon Energy Facility Siting Council (EFSC). Habitat categorization is performed per the ODFW Habitat Mitigation Policy (OAR 635-415-0025) and involves classifying habitat into one of six categories, with Category 1 habitat being the most important to a specific species and Category 6 being the least important. ODFW considers active WAGS colonies plus a 785-foot buffer in suitable habitat to be Category 1 habitat, with the 785-foot buffer encompassing the "area required for squirrel survival."[1] The Habitat Mitigation Policy defines Category 1 Habitat as "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." Similarly, ODFW considers an additional 4,921-foot buffer on WAGS Category 1 habitat to be Category 2 habitat. The Habitat Mitigation Policy defines Category 2 Habitat as "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."

Following habitat categorization and WAGS field surveys, Tetra Tech applied a 785-foot buffer to active WAGS colonies in suitable habitat and classified these areas as Category 1. Where these

[1] As described in the Application for Site Certificate for the Montague Wind Power Facility. Especially Montague's Exhibit P, page P-20. https://www.oregon.gov/energy/facilities-safety/facilities/Pages/MWP.aspx.

buffers intersected with active agricultural lands, Tetra Tech clipped the Category 1 habitat to exclude these areas, consistent with the precedent set on other EFSC projects regarding delineation of Category 1 WAGS habitat. Where these Category 1 buffers intersect the fallow fields that were recently converted to CRP (discussed above), Tetra Tech clipped the Category 1 habitat to also exclude these areas, as Tetra Tech believes that these areas are not irreplaceable, essential, or limited as defined in OAR 635-415-0005, as described below. Tetra Tech similarly applied a 4,921-foot buffer to identify areas of Category 2 habitat, excluding active agricultural lands and fallow fields recently converted to CRP, as Tetra Tech believes that these areas are not essential or limited as defined in the OAR 635-415-0005.

Irreplaceable Habitat

As defined in the Fish and Wildlife Habitat Mitigation Policy:

> "Irreplaceable" means that successful in-kind habitat mitigation to replace lost habitat quantity and/or quality is not feasible within an acceptable period of time or location, or involves an unacceptable level of risk or uncertainty, depending on the habitat under consideration and the fish and wildlife species or populations that are affected. "Acceptable", for the purpose of this definition, means in a reasonable time frame to benefit the affected fish and wildlife species (OAR 635-415-0005(14)).

Based on historical imagery available on Google Earth, the fields recently converted from wheat cultivation to CRP lands appear to have been last plowed in 2015 (Figure 1). They are dominated by invasive species, lack later seral stage vegetation characteristics, and likely lack the soil stability to support deep burrowing by WAGS, as they have been plowed within the last 5 years (Figures 2 and 3). As a result, areas temporarily impacted within these fields, including within the 785-foot buffer of a WAGS colony, could be replaced by restoring the habitat to its condition prior to construction, which can likely be achieved in 1-3 years given its current disturbed condition. Areas permanently impacted in these fields (e.g., from roads and turbine pads) could be replaced by converting nearby actively-cultivated wheat fields to fallow fields, after which a similar habitat condition would likely be achieved in 1-3 years. Furthermore, enhancements to the existing habitat within the 785-foot buffer of colonies (such as invasive species control) that is unaffected by the Project could improve the overall quality of habitat available to WAGS foraging or dispersing from the colony. Because successful in-kind habitat mitigation for disturbances to these fields recently converted from wheat cultivation to CRP lands is feasible in this case, these areas do not meet the definition of "irreplaceable."

Essential Habitat

As defined in the Fish and Wildlife Habitat Mitigation Policy:

> "Essential Habitat" means any habitat condition or set of habitat conditions which, if diminished in quality or quantity, would result in depletion of a fish or wildlife species (OAR 635-415-0005(3)).

The fields recently converted from wheat cultivation to CRP lands are currently of diminished quality and of limited value to WAGS due to lack of preferred forage species, lack of predator visibility as a result of the dense vegetation, and a presumed lack of soil structure. Biologists identified cheatgrass, tall tumble mustard, alfalfa (*Medicago sativa*), crested wheatgrass (*Agropyron cristatum*), and Sandberg's bluegrass (*Poa secunda*) in the CRP fields in question. The current state of the CRP habitat includes dense, tall grasses and tall tumble mustard, with little to no bare ground visible (see Figures 2 and 3, below). WAGS that use this type of habitat would be sacrificing their ability to visually and audibly detect predators due to the nearly 100 percent cover of tall grasses and forbs. WAGS depend on their ability to detect predators and alert the rest of the colony in order to take refuge. Consequently, development of the Project (including permanent and temporary impacts) in these areas would not result in the depletion of WAGS, as the habitat condition in these areas is such that it currently offers minimal support to the species. It's noteworthy that no WAGS were detected within these recently converted CRP fields in 2018, despite their close proximity to WAGS colonies documented in 2017 and 2018 in adjacent, higher quality native habitat that had not previously been tilled, indicating the current use of these fields by WAGS for either burrowing or foraging is limited.

Additionally, it's only recently (i.e., within the last 5 years) that these fields were removed from wheat cultivation after years of active farming through which the local WAGS colonies persisted and thrived; thus, returning a portion of these fields back to Category 6 habitat, or "habitat that has low potential to become essential or important habitat for fish and wildlife" per OAR 635-415-0025(6), would not result in the depletion of WAGS. Any reduction in habitat quality or quantity to these fields could be offset by improving habitat quality elsewhere in the 785-foot Category 1 or 4,921-foot Category 2 buffer, therefore avoiding the "if diminished" portion of the definition for Essential Habitat.

Limited Habitat

As defined in the Fish and Wildlife Habitat Mitigation Policy:

> "Limited habitat" means an amount insufficient or barely sufficient to sustain fish and wildlife populations over time (OAR 635-415-0005(15)).

Neither CRP lands nor fallow wheat fields are limited on the landscape, either within the immediate Project vicinity, or throughout the Columbia Plateau Ecoregion. Additionally, actively cultivated wheat fields are common both at the Project and within the Columbia Plateau Ecoregion overall, and have the potential to become fallow should market conditions change. Therefore, the fields recently converted from wheat cultivation to CRP lands are not "limited" as it relates to the definition of Category 1 and Category 2 habitat.

Conclusion

Oregon's Renewable Portfolio Standard requires that 50 percent of the electricity Oregonians use come from renewable resources by 2040. The ODFW Habitat Mitigation Policy incentivizes energy development to occur in previously disturbed landscapes such as Category 6 habitat, including developed areas, active agricultural lands, and other habitat that has low potential to become essential or important habitat, rather than in high quality habitats that provide greater value to wildlife. The consideration of recently converted wheat fields as suitable habitat for WAGS, and thus extending the Category 1 and 2 buffers into these fields, would prioritize the conservation of these low quality habitats over other, higher quality habitats, such as Category 3 and 4 shrub steppe and grasslands that provide more value to wildlife. As described above, Tetra Tech believes these recently converted fallow fields to CRP lands are not irreplaceable, essential, or limited as defined in OAR 635-415-0005. They also do not currently provide suitable soil structure for WAGS burrows, and will likely be plowed again before they are able to develop such soil structure and support WAGS colonies. As a result, Tetra Tech requests that ODFW and the Oregon Department of Energy allow these fallow, recently converted CRP fields to be excluded from consideration as suitable WAGS habitat in Capital Power's Application for Site Certificate for the Project.

Figure 1: Google Earth aerial imagery of a recently converted wheat field from June 2005, June 2013, and June 2015, respectively, showing agricultural use of the field through time. Tetra Tech documented WAGS in native grassland south and west of the field pictured, but not within the field itself. See Figure 2 below for a photo of the southern border of this field with native grassland.

Figure 2. Dirt road separating a recently converted wheat field dominated by cheatgrass and tall tumble mustard on the left from native grassland on the right.

Figure 3. Recently converted wheat field densely vegetated with cheatgrass and tall tumble mustard.

Oregon
Kate Brown, Governor

Department of Fish and Wildlife
John Day Watershed
East Region
73471 Mytinger Lane
Pendleton, Oregon 97801
(541) 276-2344
FAX (541)276-4414

Date: April 1, 2019

Amy Bensted
Tetra Tech, Inc.
1750 Harbor Way
Suite 400
Portland, OR 97201

Dear: Amy

Thank you for your efforts in coordinating the March 14, 2019 conference call in order to discuss the issue of Washington Ground Squirrels (WGS) and Conservation Reserve Program (CRP) lands within the Nolin Hills Wind Power project boundary. I believe it is important and beneficial for the Oregon Department of Fish and Wildlife (ODFW) to synthesize our previous discussions and interactions in order to generate a clear path forward. It is my understanding that Tetra Tech, based on your memo of February 25, 2019, believes that fields converted to the CRP should be excluded from consideration as Washington Ground Squirrel (WGS) habitat on the basis that these fields do not provide functioning habitat for WGS, and as such, could not meet the ODFW Habitat Mitigation Policy Category 1 or Category 2 habitat definitions.

During Tetra Tech's WGS surveys in 2017 and 2018, you identified multiple and active WGS colonies within the Nolin Hills Wind Power project boundary. In order to be consistent with ODFW's recommendation and policy guidance, a 785-foot Category 1 buffer and an additional 4,921-foot Category 2 buffer were overlaid around these identified WGS colonies. In some areas, these two buffers extended into what initially were thought to be active wheat fields but later were identified as CRP fields.

During a site visit on April 6, 2018 of the CRP field and surrounding areas, I determined that a habitat break did not exist within the identified Category 1 and 2 buffers as well as determining that the habitat in the CRP field could function as habitat for WGS. During this visit, I did not see any site conditions that would warrant a habitat break, whether it was the fence line, dirt road, or CRP field. As you know, WGS Category 1 and 2 buffers have the ability to be reduced in size if there is a break in habitat to WGS movements. Typical breaks in habitat include, but are

not exclusive to, active agricultural operations, linear rock rims or outcrops, and two-lane paved roads. I also observed within the CRP field vegetative components of annual grasses, bunch grass, and legumes/forbs actively growing that at the time appeared capable of providing forage-quality habitat for WGS. In addition, I observed fossorial mammal burrowing of an unknown species within the area in question, indicating that the soil structure could be suitable for WGS burrowing activity. Regardless of the quality of these CRP fields for WGS burrowing and foraging, ODFW has previously determined, and the Energy Facility Siting Council has previously concurred, that a decline in habitat quality does not constitute a habitat break for the purposes of delineating the Category 1 and 2 habitat buffers from WGS colonies. It is ODFW's determination that the CRP lands within the Nolin Hills Wind Project site boundary can function as habitat for WGS, and as such, are subject to the ODFW policy regarding Categories 1 and 2 habitat based on the buffer distances identified above.

Therefore, the current CRP fields within the Category 1 and Category 2 buffers have the potential to serve as functioning habitat requirements for the life history of WGS, and it is the proximity of these CRP fields to WGS colonies that determines these habitat categorizations. For this reason, and to remain consistent with ODFW recommendations on other energy development projects in the Columbia Basin, ODFW recommends the CRP fields be included in the 785-foot Category 1 buffer and the 4,921-foot Category 2 buffer surrounding the active WGS colony.

Due to the oversight that these CRP fields may have caused, I think it is important for Tetra Tech to re-evaluate if a 1,000 foot buffer has been surveyed at protocol level for all CRP areas within the Nolin Hills Wind Power project boundary. As always, protocol-level surveys should be conducted in all areas within the micrositing corridor and within a 1,000 foot buffer from the micrositing corridor except where a habitat break occurs.

I look forward to working with you in the future on these issues and encourage you to contact me anytime here in Pendleton.

Sincerely,

Greg Rimbach
Oregon Dept. of Fish & Wildlife
Umatilla Dist. Wildlife Biologist
73471 Mytinger Lane
Pendleton, OR 97801

c: Sarah Reif, Energy Coordinator, ODFW
Katie Clifford, Senior Siting Analyst, ODOE

Attachment P-2. 2017-2019 Biological Survey Reports

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CONTENTS

- 2017-2019 Washington Ground Squirrel Survey Report
- 2017-2019 Wildlife and Habitat Survey Report
- 2017-2019 Botanical Survey Report
- 2017-2019 Eagle Use Survey Report
- 2017-2018 Avian Use Survey Report
- 2019 Raptor Nest Survey Report
- 2018 Raptor Nest Survey Report
- 2018 Eagle Nest Survey Report
- 2017 Eagle Nest Survey Report
- 2017 Raptor Nest Survey Report
- 2017 Bat Acoustic Survey Report

2017–2019 Washington Ground Squirrel Survey Report

Nolin Hills Wind Power Project
November 2019

Prepared for

Nolin Hills Wind, LLC

Prepared by

TETRA TECH

Tetra Tech, Inc.

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Acronyms and Abbreviations

CRP	Conservation Reserve Program
ODFW	Oregon Department of Fish and Wildlife
ORBIC	Oregon Biodiversity Information Center
Project	Nolin Hills Wind Power Project
Tetra Tech	Tetra Tech, Inc.
USFWS	U.S. Fish and Wildlife Service
WAGS	Washington ground squirrel

1.0 Introduction

This summary report presents the methods and results for the 2017, 2018, and 2019 Washington ground squirrel (WAGS; *Urocitellus washingtoni*) surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Nolin Hills Wind Power Project (the Project). This survey is in support of Nolin Hills Wind, LLC's anticipated Application for Site Certificate through the Oregon Energy Facility Siting Council. The objective of these surveys was to identify WAGS colonies at the proposed Project, so Project impacts to WAGS may be avoided or minimized.

WAGS are a small ground squirrel associated with shrub-steppe habitats of the Columbia Basin ecoregion (Verts and Carraway 1998), and only occur in 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). Concern for the long-term viability of WAGS populations led to their listing by the Oregon Department of Fish and Wildlife (ODFW) as endangered in January 2000. On September 21, 2016, the U.S. Fish and Wildlife Service (USFWS) announced that listing the WAGS as endangered under the federal Endangered Species Act of 1973 was not warranted (USFWS 2016). Currently, WAGS are a USFWS species of concern.

2.0 Methods

2.1 Identification of Protocol

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). Prior to initially commencing surveys in 2017, Tetra Tech's protocol for the Project, as well as the survey dates of May 15 – June 9, 2017 were approved by ODFW (S. Cherry, personal communication, April 27, 2017 and G. Rimbach, personal communication, May 11, 2017). In 2018 and 2019, Tetra Tech conducted surveys during the standard survey window (i.e., generally between March 15 and June 1). Tetra Tech's approved protocol included transects spaced approximately 165 – 230 feet apart (consistent with Morgan and Nugent 1999) and allowed for approaching potential WAGS burrows that had been identified during the first round of surveys 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 done by Morgan and Nugent (1999).

2.2 Survey Area

The Project is located within Umatilla County, approximately 10 miles west of Pendleton, Oregon, near the small community of Nolin. The Project's proposed Site Boundary is approximately 47,030

acres (dated May 20, 2019), including approximately 29 miles of transmission line corridors that were added in 2019.

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, and an additional 4,921-foot buffer in suitable habitat as Category 2 habitat. To define the WAGS Survey Area, Tetra Tech included buffers of 1,000 feet from Project infrastructure 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. As a result, the 2017 – 2019 WAGS Survey Area consists of the remaining suitable WAGS habitat within 1,000 feet of Project infrastructure within and outside of the Site Boundary (Figure 2).[1] As each year's survey results were processed, locations of Project infrastructure were modified to avoid impacts to identified colonies and associated Category 1 buffers, resulting in the need for additional surveys during the following season.

2.3 Habitat Assessment and Delineation

WAGS are most common in shrub-steppe habitats with sandy or silt-loam soils that are deep and support the creation of burrows (Betts 1990, Yensen and Sherman 2003). Sagebrush habitats and bunchgrass grasslands have been found to contain the highest densities of WAGS, with lower densities 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*), may play a key role in their diet and survival (Tarifa and Yensen 2004).

Prior to commencing surveys, Tetra Tech identified suitable habitat for WAGS within the Survey Area based on aerial photography. Although WAGS are found in the highest densities in sagebrush habitats and bunchgrass grasslands that have few invasive species (Betts 1990), ODFW advised Tetra Tech that WAGS colonies can be found in all habitats, regardless of quality, except for active agricultural fields and developed land. As a result, suitable habitat included all non-agricultural habitats and non-developed land within the Survey Area. Starting in 2018, as a result of correspondence with ODFW (Greg Rimbach, personal communication, May 1, 2018), fallow fields that had been recently converted from wheat production and enrolled in the Conservation Reserve Program (CRP) were also surveyed. Due to the timing of this correspondence, these areas were only surveyed once in 2018, but were subsequently surveyed twice during the 2019 season to conform with the approved protocol.

[1] In 2018 and 2019, only infrastructure located within suitable WAGS habitat was buffered by 1,000 feet to create the Survey Corridor; infrastructure located within active wheat fields was not buffered per personal communication with Greg Rimbach April 4, 2018. Similarly, the 1,000-foot buffer was not extended beyond barriers to WAGS, including Highway 207 and the Umatilla River, per direction from ODFW.

2.4 Historical Data Review

In response to a formal request to the Oregon Biodiversity Information Center (ORBIC), Tetra Tech received element occurrence records for WAGS within 10 miles of the Site Boundary as of June 2017 (ORBIC 2017). Two of these occurrences were partially located within the Site Boundary; one within the northern extent of the Site Boundary consisting of a polygon for an historic colony of 20 – 40 squirrels within a 164-foot strip along a road that was originally observed in 1979 and last observed in 1987 (ORBIC 2017). The second was another polygon for an historic colony located on the western edge of the Site Boundary and extended into the southwestern corner, which was first observed in 2011 and last observed in 2012 (ORBIC 2017). The ORBIC polygons for these historic colonies do not show the exact location of the colonies, so it is unknown if the colonies occurred within 1,000 feet of any proposed Project infrastructure.

In addition to reviewing ORBIC element occurrence records, Tetra Tech reviewed results of WAGS surveys previously conducted within the vicinity of the Project (Tetra Tech 2011), which indicated the presence of WAGS in the vicinity of the Site Boundary.

2.5 Survey Schedule

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

The WAGS protocol requires two rounds of surveys to increase the likelihood of detecting their presence. The first round of surveys begins around April 1, with the next phase spaced at least 2 weeks later, and needs to be completed by the end of May or early June, prior to WAGS going into aestivation. This survey period corresponds to the time when juvenile squirrels emerge from the burrows and are most active, and when alarm calls are most frequent (Morgan and Nugent 1999).

Due to the harsh winter conditions and late spring in 2017, ODFW approved 2017 survey dates for this Project from May 15 through June 9, 2017 (G. Rimbach, personal communication, May 11, 2017). As a result, the 2017 Survey Area was surveyed once in May and once in June. The 2018 Survey Area was surveyed once in April and once in May (April 10 through May 14, 2018), with the exception of the fallow fields recently converted from wheat and enrolled in CRP noted above. The 2019 Survey Area was also surveyed once in April and once in May (April 13 through May 31, 2019). Surveyors visited a known, active WAGS colony located at the Nature Conservancy's Lindsay Prairie in Morrow County and coordinated with local biologists prior to commencing surveys each year to ensure WAGS were active before surveys were conducted.

2.6 Field Survey Methods

Prior to fieldwork, field personnel visited an active WAGS colony and received training on burrow, scat, alarm call, and squirrel identification, as well as guidance on the natural history, habitat, and survey protocol for WAGS. All field crew members also passed a hearing test to verify they were capable of hearing a frequency of 8 kilohertz, the typical frequency of alarm call vocalizations of ground-dwelling squirrels. The WAGS are the only species of ground squirrel known to occur in the vicinity of the Survey Area; therefore, confusing this species for similar species such as Belding's ground squirrel is highly unlikely. Additionally, WAGS have scat that can be differentiated from other burrowing animals by its characteristic size and shape.

Surveys commenced in the morning, beginning at least 1 hour after sunrise to allow for temperatures to increase sufficiently to support ground squirrel activity, and typically ended in the early afternoon. Anemometers were used to measure the wind speeds throughout the day. If the average wind speed exceeded 15 miles per hour, surveys were halted, unless the 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. General survey documentation was recorded each day; this included the names of field personnel, precipitation, average and max wind speed, wind direction, cloud cover, temperature, and a GPS location at the start, middle, and end of surveys.

Surveyors conducted pedestrian surveys by walking transects spaced approximately 165 – 230 feet apart. Field personnel walked transects at a similar pace to ensure there were no gaps in coverage. Each field crew member was able to communicate findings to the group via hand-held radios, thereby avoiding double-recording data. When surveyors observed potential WAGS burrows or heard a WAGS alarm call, they alerted the group and then searched that area for any squirrels or additional sign. A colony was confirmed active if at least two of the following were identified: positive auditory observation, fresh WAGS burrows, positive visual observation, or fresh WAGS scat. A potential WAGS burrow was defined as an appropriately-sized hole that was freshly dug (no vegetation or cobwebs) and structurally sound, with no additional WAGS sign (scat, visual, audio). During the first round of surveys, the surveyors collected the location of these potential WAGS burrows and they were revisited during the second round of surveys to determine if an active colony was present.

Information recorded for each active colony included habitat characteristics, locations of activity centers and colony boundaries using a sub-meter accuracy GPS unit, approximate number of burrows, time, and weather conditions under which the colony was discovered, how the colony was first discovered, and representative photographs of burrows, scat, and habitat (Appendix A).

The second round of surveys followed the same method as the first phase, except potential WAGS burrows identified during the first round of surveys were approached from roughly a perpendicular direction compared to the first round. The approach direction changed to account for topography and prevailing winds, which may affect detectability of WAGS from a given direction. The second round of surveys also included transects offset from the first round of transects, to

increase coverage by traveling in between the transect paths walked during the first round of surveys. During these surveys, existing colonies from the first round of surveys were also revisited to determine if the activity level or boundaries had changed.

3.0 Results

Tetra Tech conducted protocol-level WAGS surveys on approximately 10,604 acres in 2017, 3,979 acres in 2018, and 6,012 acres in 2019 (Table 1; Figure 2). A total of 29 active WAGS colonies were recorded during the 2017 and 2018 survey periods, primarily located within the central portion of the Site Boundary (Figure 3). No additional WAGS colonies were detected in 2019. Data collected at each colony are presented in Table 2, including date of observation, colony acreage, activity confirmation methods, and dominant plant species. Appendix B includes representative photos of WAGS colony habitat and sign observed during surveys.

Table 1. Surveyed Area 2017–2019

Survey Year	Surveyed to protocol (two rounds; acres)	Not surveyed to protocol (one round; acres)	Not surveyed (zero rounds; acres)	Total Survey Area[1]
2017	10,604	0	1,692	12,296
2018	3,979	1,624	286	5,889
2019	6,012	0	1,961	7,972

1. Numbers may not sum due to rounding.

Most of the recorded colonies were located in native bunchgrass habitats, with a few located in annual grassland habitat. Common grass species recorded at active colonies included Sandberg bluegrass, bluebunch wheatgrass (*Pseudoroegneria spicata*), and bulbous bluegrass (*Poa bulbosa*). Cheatgrass (*Bromus tectorum*), an invasive annual grass, was listed as a dominant species in all but three colonies. If a colony had a shrub component, rubber rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus viscidiflorus*) were the dominant shrub species recorded. The two most dominant forbs recorded throughout the colonies were western yarrow (*Achillea millefolium*) and redstem stork's bill (*Erodium cicutarium*).

In 2017, WAGS surveys occurred between May 15 and June 9, 2017, divided over two phases and spaced by 2 weeks. A total of 27 active WAGS colonies were recorded within the 2017 Survey Area. All but two of the WAGS colonies recorded during the first round of surveys in May had audio detections (19 colonies); the new colonies recorded in June had no audio detections (eight colonies). When the May colonies were revisited during the second round of surveys, there were auditory detections at only two of the 19 colonies. A total of 59 potential WAGS burrows were recorded across the Survey Area during the first round of surveys. All of these potential burrows were revisited during the second round of surveys, with no identified activity.

Due to the time constraints of the survey window for 2017 and the large size of the Survey Area, not all suitable habitat (including marginally suitable habitat) within the 12,296-acre 2017 Survey Area

received protocol-level surveys (two surveys within one season). Approximately 1,692 acres did not receive protocol-level surveys in 2017. This included strips of rocky habitat along the edges of agriculture fields, which were located on the southern portions of the Survey Area (and had low potential for supporting WAGS colonies), as well as planted grassland in the southwestern corner of the Site Boundary. These areas were covered during 2018 surveys where still within 1,000 feet of proposed Project infrastructure in suitable habitat.

In 2018, WAGS surveys occurred between April 10 and May 14, divided over two phases and spaced by one month. All areas not previously surveyed within the 2017 Survey Area, that were still within the proposed buffered Project infrastructure, were surveyed, as well as additional proposed infrastructure areas. Two active WAGS colonies were detected through audio detections within the 2018 Survey Area, one in April and one in May. No potential WAGS burrows were recorded in 2018.

Approximately 1,910 acres within the 5,889-acre 2018 Survey Area did not receive protocol-level surveys due to a lack of access or a determination made mid-way through the field surveys that previously identified wheat fields had been enrolled in CRP. After discussions with ODFW in May regarding these CRP-enrolled fallow fields, Tetra Tech surveyed approximately 1,624 acres of these poor-quality, former wheat fields during the May survey phase. Most of these areas were densely vegetated with cheatgrass and tumble mustard (*Sisymbrium altissimum*); in some areas the ground was not visible and posed a challenge for the surveyors to traverse. These recently converted fields were notably lower quality habitat than the planted grasslands enrolled in CRP located elsewhere within the Survey Area that did receive protocol level surveys. No WAGS activity was detected within these recently converted CRP fields despite their close proximity to WAGS colonies documented in 2017 and 2018 in adjacent higher quality native habitat that had not previously been tilled. The 1,910 acres that did not received protocol-level surveys in 2018 were covered in 2019 where they were still within 1,000 feet of proposed Project infrastructure in suitable habitat.

In 2019, WAGS surveys occurred between April 13 and May 31, 2019, divided over two phases and spaced by 2 - 3 weeks. No additional WAGS colonies were recorded. A total of 75 potential WAGS burrows were recorded across the Survey Area during the first round of surveys. All of these potential burrows were revisited during the second round of surveys, with no identified activity. The majority of the 2019 WAGS Survey Area consisted of the recently converted CRP fields initially surveyed in 2018, but also included areas of newly proposed infrastructure including the proposed transmission line and transmission line upgrades. Approximately 1,961 acres within the 7,972-acre 2019 Survey Area did not receive protocol-level surveys due to a lack of access at the time of the surveys.

4.0 Discussion

Based on Tetra Tech's experience throughout the Columbia Basin in Oregon, WAGS activity levels in 2017 were higher than observed in the preceding and following years. High levels of precipitation in the winter of 2016/2017 may have resulted in increases in food availability, and could have increased juvenile survival, resulting in a population increase for WAGS. Conversely, during the

winter of 2018/2019 the conditions were more harsh than normal in the area, with record snowfall levels and lower than normal temperatures during the month of February (East Oregonian 2019, NOAA 2019; N. Kessler, personal communication, April 25, 2019). These conditions may have led to decreased juvenile WAGS survival in 2019. During surveys in 2019, surveyors anecdotally noted reduced activity at colonies mapped in 2017, which was consistent with Tetra Tech's observations of reduced WAGS activity throughout the Columbia Basin in Oregon in 2019.

The majority of the recorded WAGS colonies were not located within predicted habitat based on the Institute for Natural Resources model (Figure 3; INR 2011). However, WAGS Habitat Concentration Areas with very high connectivity modeled[2] by the Washington Wildlife Habitat Connectivity Working Group (Figure 3; WHCWG 2012, WHCWG 2013) do overlap with the Project and the colonies mapped during surveys, indicating that there is variability in the modeling of WAGS habitat and their predicted presence within the Site Boundary.

No WAGS activity was detected in either 2018 or 2019 within the fallow fields recently converted from wheat and enrolled in CRP, despite their close proximity to WAGS colonies documented in adjacent higher quality native habitat that had not previously been tilled.

5.0 Conclusions

Coinciding with favorable winter and spring weather in 2017, WAGS appeared to become locally abundant within their limited range, as is common among *r*-selected species due to their high growth rates and fecundity (as defined by MacArthur and Wilson 1967). Conversely, coinciding with unfavorable winter and spring weather, WAGS abundance appeared to diminish in 2019.

Nolin Hills Wind, LLC will continue to design Project infrastructure to avoid active WAGS colonies and their associated Category 1 habitat and minimize impacts to Category 2 habitat. Prior to construction, protocol-level surveys will be conducted on any new areas of suitable habitat in the vicinity of revised infrastructure as appropriate.

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Tables

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Table 2. 2017-2019 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
1-1	5/16/2017	6/4/2017	4.25	Alarm call and scat	Silty loam	1-10%	Homogenous	Bunchgrass	Native	Sandberg bluegrass, rubber rabbitbrush, green rabbitbrush, moss/lichen, common yarrow, stone crop, cheatgrass	None	At least 3 calling WAGS, 75 burrows, most burrows with scat	No auditory detections, scat observed
1-2	5/17/2017	6/4/2017	0.33	Alarm call and scat	Silty loam	1-10%	Homogenous	Bunchgrass	Native	Sandberg bluegrass, bulbous bluegrass, buckwheat species, crazyweed species, rubber rabbitbrush, 6-week fescue, stork's bill, common yarrow, cheatgrass	Light grazing	34 closely spaced burrows	No active sign during revisit
1-3	5/18/2017	6/6/2017	0.32	Alarm call and scat	Silty loam	<1%	N/A	Bunchgrass	Neither native nor exotic dominant	Sandberg bluegrass, bulbous bluegrass, Idaho fescue, silver crazyweed, stork's bill, fiddleneck, common yarrow, cheatgrass, mustard species	None	Heard 2 calls, 25 burrows	10-12 burrows, no scat, recent badger activity
1-4	5/18/2017	6/6/2017	1.15	Alarm call and scat	Silty loam	<1%	N/A	Bunchgrass	Exotic	Idaho fescue, silver crazyweed, stork's bill, fiddleneck, common yarrow, cheatgrass, mustard species, Sandberg bluegrass	None	43 burrows	No active sign during revisit, just older looking burrows
1-5	5/18/2017	6/6/2017	0.42	Alarm call and scat	Silty loam	<1%	N/A	Bunchgrass	Exotic	Idaho fescue, silver crazyweed, stork's bill, fiddleneck, cheatgrass, mustard species, Sandberg bluegrass, bluebunch wheatgrass	None	12 burrows, 2 with scat, 1 call	Additional activity center outside of mapped polygon, 15-20 burrows with fresh scat, no auditory
1-6	5/19/2017	6/8/2017	4.31	Alarm call and scat	Silty loam	<1%	N/A	Bunchgrass	Native	Idaho fescue, silver crazyweed, cheatgrass, mustard species, Sandberg bluegrass, bluebunch wheatgrass	None	230 burrows, colony boundary extends past Survey Area to the SW, some burrows inactive with cobwebs and vegetation growing in many, a slight scent of death was smelled before colony was found by 2 observers	Calls heard, scat and burrows observed. Extended polygon boundaries to the south and southeast
1-7	5/22/2017	6/8/2017	2.17	Alarm call and scat	Silty loam	1-10%	Patchy	Bunchgrass	Exotic	Idaho fescue, cheatgrass, rubber rabbitbrush, Sandberg bluegrass, bluebunch wheatgrass	None	100 burrows	Auditory detection, several burrows with recent badger activity, fresh scat
1-8	5/23/2017	6/6/2017	5.06	Alarm call and scat	Silty loam	1-10%	Patchy	Bunchgrass	Native	Sandberg bluegrass, bluebunch wheatgrass, needle and thread grass, Idaho fescue, cheatgrass, wild phlox, common yarrow, green rabbitbrush	None	110 burrows	Auditory detection, fresh scat, several burrows 30+, extended polygon south from NE portion

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
1-9	5/23/2017	6/6/2017	0.43	Alarm call and scat	Silty loam	1-10%	Patchy	Bunchgrass	Native	Sandberg bluegrass, bluebunch wheatgrass, cheatgrass, green rabbitbrush	None	30 burrows	Several holes, 15-20 old scat, several recent badger hole among WAGS burrows
1-10	5/23/2017	6/6/2017	0.001	Alarm call	Silty loam	<1%	N/A	Bunchgrass	Native	Idaho fescue, bluebunch wheatgrass, cheatgrass, yarrow, mustard species, stork's bill, 6-weeks fescue, silver crazyweed	Light grazing	2 burrows, 2 calls	1 burrow, no scat
1-11	5/22/2017	6/6/2017	1.05	Scat	Silty loam	<1%	N/A	Bunchgrass	Neither native nor exotic dominant	Sandberg bluegrass, bulbous bluegrass, bluebunch wheatgrass, cheatgrass, silver crazyweed, stork's bill	None	65 burrows with scat	Slight extension to west, pics from fence line outside of mapped polygon, no auditory
1-12	6/4/2017	N/A	0.43	Scat	Silty loam	1-10%	Homogenous	Bunchgrass	Native	Sandberg bluegrass, bluebunch wheatgrass, cheatgrass, western fescue, annual wheatgrass, rubber rabbitbrush, stork's bill, common yarrow, lupine	Light grazing	N/A	20 burrows, 2 scat, fresh badger diggings
1-13	6/4/2017	N/A	1.01	Scat	Silty loam	1-10%	Homogenous	Bunchgrass	Native	Sandberg bluegrass, bluebunch wheatgrass, western fescue, rubber rabbitbrush, common yarrow, lupine, silver crazyweed, snakeweed	None	N/A	15 burrows, 2 scat
1-14	6/4/2017	N/A	0.27	Scat	Silty loam	11-20%	Patchy	Bunchgrass	Neither native nor exotic dominant	Sandberg bluegrass, bluebunch wheatgrass, western fescue, annual wheatgrass, rubber rabbitbrush, yarrow, lupine, snakeweed	Light grazing	N/A	14 burrows, no calls, 2 scat, trails
1-15	6/5/2017	N/A	0.02	Scat	Silty loam	1-10%	N/A	Bunchgrass	Neither native nor exotic dominant	Needle and thread grass, bluebunch wheatgrass, Idaho fescue, rubber rabbitbrush, common yarrow	Light grazing	N/A	12 burrows, 4 scat
2-1	5/22/2017	6/8/2017	1.50	Alarm call and scat	Silty loam	1-10%	Patchy	Bunchgrass	Native	Bluebunch wheatgrass, cheatgrass, poa species, cow parsnip, rabbitbrush, phlox	Light grazing	25 burrows, 2 scat	2 scat, burrows, trails, no calls, boundary same
2-2	5/21/2017	6/3/2017	7.74	Alarm call and scat	Silty loam	<1%	N/A	Annual grassland	Exotic	Cheatgrass, lupine, fiddleneck, tumble mustard species, stork's bill, phlox	Light grazing	Activity center 2a: 40 burrows, 2b: 231 burrows, 2c: 38 burrows. WAGS calling throughout.	Apparent activity center, several holes and scat
2-4	5/23/2017	6/4/2017	0.86	Alarm call and scat	Silty loam	<1%	Patchy	Bunchgrass	Neither native nor exotic dominant	Bluebunch wheatgrass, bulbous wheatgrass, cheatgrass, rabbitbrush, lupine, rattlesnake brome	Light grazing	25 burrows, lots of larger holes nearby potentially from active badger	Multiple badger holes, few WAGS burrows

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
2-5	5/21/2017	6/4/2017	9.01	Alarm call and scat	Silty loam	1-10%	Patchy	Annual grassland	Exotic	Bluebunch wheatgrass, cheatgrass, rabbitbrush, lupine, yarrow, stork's bill, mustard species	Light grazing	Colony 2-5a: 200 burrows, 2-5b: 18 burrows, a few calls heard, 2-5c: 20 burrows	Expanded boundary and combined colonies, no calls
2-6	5/21/2017	6/4/2017	0.73	Alarm call and scat	Silty loam	<1%	Patchy	Bunchgrass	Exotic	Bluebunch wheatgrass, bulbous bluegrass, cheatgrass, rubber rabbitbrush, fiddleneck, stork's bill	Light grazing	WAGS colony with approximately 30 holes, 1 scat, 1 call	Burrows and trails, no scat, no calls
2-12	6/4/2017	N/A	0.27	Scat	Silty sand	1-10%	Homogenous	Annual grassland	Exotic	Cheatgrass, unknown bunchgrass	None	N/A	25 burrows, 14 scat at 7 burrows, no auditory or visual, recent badger holes at activity center
2-13	6/6/2017	N/A	0.30	Scat	Silty loam	1-10%	Homogenous	Bunchgrass	Exotic	Cheatgrass, poa species	Anthropogenic	N/A	20 burrows, 8 fresh scat, no auditory
2-14	6/8/2017	N/A	1.36	Scat	Silty loam	11-20%	Homogenous	Bunchgrass	Exotic	Cheatgrass, bluebunch wheatgrass, artemisia species	None	N/A	45-50 burrows, 25-30 fresh scat found at 15-20 burrows, possible faint auditory
2-15	6/8/2017	N/A	0.20	Scat	Silty loam	1-10%	Homogenous	Bunchgrass	Exotic	Cheatgrass, bluebunch wheatgrass, slender wheatgrass	None	N/A	20 burrows, 14 scat, badger holes, trails, no calls
3-1	5/15/2017	6/3/2017	0.98	Scat	Silty loam	1-10%	N/A	Bunchgrass	Neither native nor exotic dominant	Needle and thread grass, cheatgrass, rabbitbrush	None	40 burrows, 1 fresh scat	No calls, scat found, boundary stayed the same, trails present, evidence of predator digging
3-6	5/21/2017	6/4/2017	0.06	Alarm call and scat	Silty loam	1-10%	Patchy	Bunchgrass	Neither native nor exotic dominant	Bluebunch wheatgrass, cheatgrass, stork's bill, lupine	Light grazing	3 burrows, possibly part of WAGS colony 4 and 5 to the north	3 burrows, scat, no calls, same boundary
3-7	5/21/2017	6/4/2017	0.77	Alarm call and scat	Silty	<1%	Patchy	Bunchgrass	Exotic	Idaho fescue, cheatgrass, Sandberg bluegrass, bluebunch wheatgrass	Light grazing	9 burrows, heard multiple WAGS alarm calls	No burrows or WAGS evidence observed
4-1	4/14/2018	5/11/2018	4.53	Alarm call and scat	Silty loam	11-20%	Homogenous	Sagebrush steppe	Neither native nor exotic dominant	Wyoming big sagebrush, rubber rabbitbrush, cheatgrass, bluebunch wheatgrass, tumble mustard, Eriogonum species	Moderate grazing	150 burrows, 65 with scat, calls heard throughout the colony	Still active, colony boundary has not encroached further into project

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
4-2	5/12/2018	N/A	0.08	Alarm call and scat	Silty loam	1-10%	Patchy	Bunchgrass	Exotic	Cheatgrass, bluebunch wheatgrass, rabbitbrush	Light grazing	N/A	10 burrows, one alarm call heard, 2 scat found at one burrow, several active burrows found with no scat and several found with other small mammal scat

Figures

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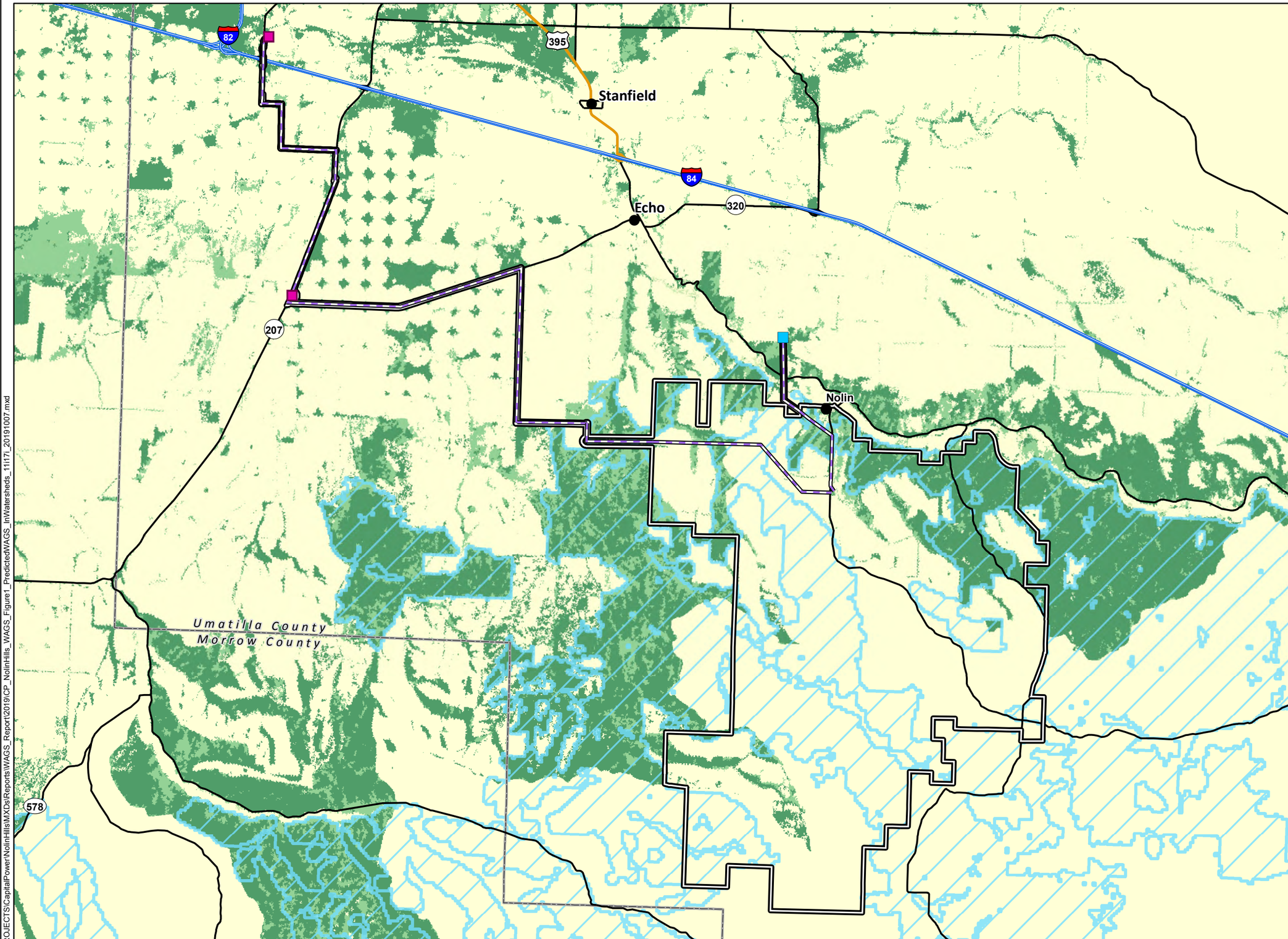
Nolin Hills Wind Power Project

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

UMATILLA COUNTY, OREGON



- Proposed Site Boundary (5/20/2019)
- Existing Substation
- Planned BPA Stanfield Substation (5/13/2019)
- Proposed Transmission Line
- City/Town
- Interstate Highway
- Secondary Highway
- Secondary Road
- County Boundary
- WAGS Habitat Concentration Areas with very high connectivity[2]

Predicted Habitat Quality[1]

- None
- Poor
- Fair
- Good

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

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Data Sources	Reference Map
Capital Power-Project Infrastructure; ESRI-Roads; Institute for Natural Resources, 2011	

1:135,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

LOCATION OF ALL FACILITIES IS APPROXIMATE AND SUBJECT TO CHANGE AS DESIGN INFORMATION IS REFINED.

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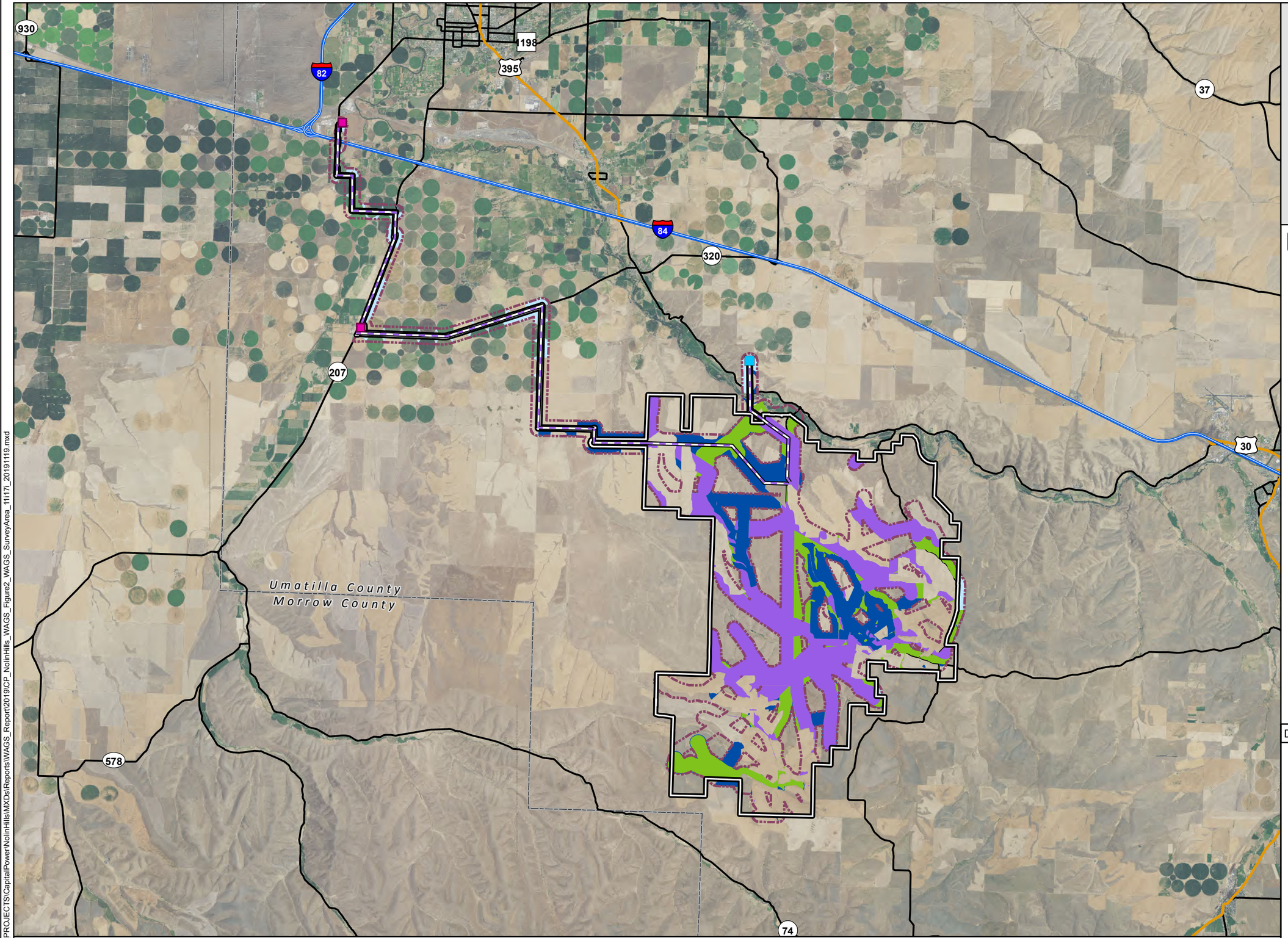
Nolin Hills Wind Power Project

Figure 2
Washington Ground Squirrel Survey Area

UMATILLA COUNTY, OREGON



- Proposed Site Boundary (5/20/2019)
- Existing Substation
- Planned BPA Stanfield Substation (5/13/2019)
- Proposed Transmission Line
- Interstate Highway
- Secondary Highway
- Secondary Road
- County Boundary
- 2017-2019 WAGS Survey Corridor

2019 WAGS Survey Area
- Surveyed to Protocol-level
- No Access

2018 WAGS Survey Area
- Surveyed to Protocol-level

2017 WAGS Survey Area
- Surveyed to Protocol-level

Survey Corridor = 1,000-ft buffer around areas of proposed Project infrastructure at the time surveys were conducted.
Survey Area = potentially suitable WAGS habitat within the survey corridor.

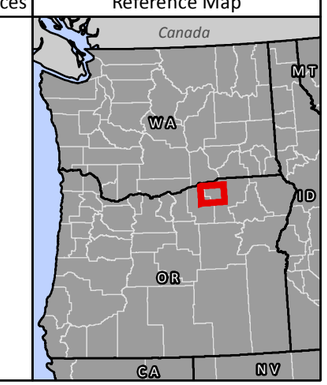
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; ESRI-Roads; Institute for Natural Resources, 2011

Reference Map



1:168,613 WGS 1984 UTM Zone 11N

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LOCATION OF ALL FACILITIES IS APPROXIMATE AND SUBJECT TO CHANGE AS DESIGN INFORMATION IS REFINED.

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Figure 3. Washington Ground Squirrel Colonies Overview

Provided under Confidential Cover Pursuant to ORS 192.501(13)

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Appendix A. Washington Ground Squirrel Colony Data Sheet

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Nolin Hills Washington Ground Squirrel Colony Datasheet

Date: _____ **Surveyor(s):** _____

Colony #_____

Wind: Direction from (circle one): N NE E SE S SW W NW n/a **Wind Speed (mph):**

Precipitation(circle one) none light rain rain snow sleet hail other **Temp (F):**_____**Cloud Cover:**_____

Site Occupancy:
[ ] Confirmed Active (1)
[ ] Confirmed Inactive (2)
[ ] Possible Activity (3)

Activity Confirmation (check all that apply):
[ ] Visual(1)
[ ] Alarm call (2)
[ ] Scat (3)

How was first colony discovered?:
[ ] Visual(1)
[ ] Alarm call (2)
[ ] Scat (3)

Habitat Characteristics

Soil Type:
[ ] Sandy (1)
[ ] Silty (2)
[ ] Silty Sand (3)
[ ] Silty loam (4)
[ ] Silty Sand or loam w/ Gravel (5)
[ ] Rocky (6)

Shrub Cover:
[ ] <1%(1)
[ ] 1-10% (2)
[ ] 11-20% (3)
[ ] 21-40% (4)
[ ] 41-60% (5)
[ ] 61-80% (6)
[ ] 81-100% (7)

Shrub Distibution:
[ ] Patchy (1)
[ ] Homogenous (2)
[ ] Unknown or N/A (0)

Plant Species Composition:
[ ] native species dominant (>60%)
[ ] exotic species dominant (>60%)
[ ] neither native or exotics dominate
[ ] native species present (percent ____)

General habitat type: (circle one) bunchgrass, sagebrush steppe, annual grassland, other_____

Grazing Intensity:
[ ] 0-25% Lightly Grazed (1)
[ ] 25-50% Moderately Grazed (2)
[ ] 50-75% Heavily Grazed (3)
[ ] 75-100% Overgrazed (4)

Dominant Plant Species:_____
_____
_____
_____

Disturbances (circle all that apply): Anthropogenic Off Road Vehicles Grazing Wind Fire Erosion None Other:_____

Activity Center Information

Number of Burrows:_____ **Photo Number(s):**_____
Number of Burrows with scat (approximate): _____
Number of scat found (approximate): _____ **Scat photo Number(s):** _____

Colony UTMs (Activity Center and Boundary):

N: 5xxxxxx	E: 02 or 07xxxxx	GPS unit # + wpt #	Description (i.e. alarm call, burrow, colony boundary, etc.)
N:	E:		
N:	E:		
N:	E:		
N:	E:		
N:	E:		
N:	E:		
N:	E:		
N:	E:		
N:	E:		

Notes:_____
_____
_____

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

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Appendix B: Photographs of Typical WAGS Habitat and Sign

Photo 1: WAGS colony in native bunchgrass habitat with cheatgrass throughout and a minor shrub component

Photo 2: WAGS colony in weedy annual grassland habitat

Appendix B: Photographs of Typical WAGS Habitat and Sign

Photo 3: WAGS colony in annual grassland habitat with squirreltail and rabbitbrush

Photo 4: WAGS colony in native bunchgrass habitat with cheatgrass

Appendix B: Photographs of Typical WAGS Habitat and Sign

Photo 5: WAGS burrow in active colony

Photo 6: WAGS burrow in active colony

Appendix B: Photographs of Typical WAGS Habitat and Sign

Photo 7: WAGS burrow in active colony

Photo 8: WAGS burrows in active colony

Appendix B: Photographs of Typical WAGS Habitat and Sign

Photo 9: WAGS scat at active colony

Photo 10: WAGS scat at active colony

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2017-2019 Wildlife and Habitat Categorization Survey Report

Nolin Hills Wind Power Project
November 2019

Prepared for
Nolin Hills Wind LLC

Prepared by

Tetra Tech, Inc.

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2.3 Habitat Categorization 2
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Figure 2. Habitat Categories
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List of Attachments

Attachment 1. Special Status Wildlife Species Potentially Occurring at Nolin Hills
Attachment 2. Habitat Categorization Field Datasheet
Attachment 3. Draft Nolin Hills Habitat Types and Subtypes Potentially Occurring within the Proposed Site Boundary
Attachment 4. Select Photographs of Habitats and Wildlife Species Taken during 2017-2019 Surveys

Acronyms and Abbreviations

ODFW	Oregon Department of Fish and Wildlife
Project	Nolin Hills Wind Power Project
Tetra Tech	Tetra Tech, Inc.

1.0 Introduction

Nolin Hills Wind, LLC is developing the Nolin Hills Wind Power Project (the Project) in Umatilla County, Oregon. This summary report presents the methods and results of the 2017–2019 general wildlife and habitat categorization surveys conducted for the Project by Tetra Tech, Inc. (Tetra Tech). The purpose of these surveys was to document the habitat at the Project, including type and quality according to Oregon Department of Fish and Wildlife's (ODFW) Habitat Mitigation Policy, and identify the presence of special status wildlife species, their habitats, and other unique features in support of Exhibits P and Q of the Project's anticipated Application for Site Certificate through the Oregon Energy Facility Siting Council.

2.0 Methods

2.1 Survey Area

The Project is located within Umatilla County, approximately 10 miles west of Pendleton, Oregon (Figure 1). The Project's proposed Site Boundary (dated 6/25/2019) is approximately 48,159 acres, including approximately 29 miles of transmission line corridors that were added to the scope of the Project in 2019. The Survey Area consisted of the proposed Site Boundary, with a focus on areas in proximity to proposed Project infrastructure (e.g., transmission lines, access roads, collector lines, turbines, substations, and operations and maintenance facilities).

2.2 Wildlife

Wildlife surveys targeted special status species, including federal and state endangered, threatened, proposed, and candidate species, species of concern, birds of conservation concern, and sensitive and sensitive-critical species. Special status plants are discussed in the Botanical Survey Report (Tetra Tech 2019a). A list of these special status wildlife species that had the potential to occur within the proposed Site Boundary was prepared prior to conducting surveys to ensure surveyor familiarity with the relevant species (ODFW 2016, ODFW 2017, ORBIC 2016; Attachment 1). Surveyors recorded the Global Positioning System location of special status wildlife species (or recognizable sign) with a Samsung Galaxy tablet using ArcGIS Collector software, and recorded information on the number of individuals and their behavior on the tablets and field datasheets. Surveyors also documented special habitats and unique features if encountered. These included raptor nests, big game, cliffs, rimrock, rock outcrops, and talus slopes.

Wildlife surveys were concurrent with targeted surveys for the state endangered Washington ground squirrel, which included walking transects within non-cultivated and non-developed land within 1,000 feet of proposed Project infrastructure. Although transects were conducted on this focused area, special status wildlife were recorded throughout the proposed Site Boundary if observed, including while driving roads and travelling on foot between transects. Special status

wildlife and unique features were also recorded if observed during botanical and habitat categorization surveys.

2.3 Habitat Categorization

Prior to field surveys, Tetra Tech conducted a desktop habitat assessment for the Project. Tetra Tech adapted habitat types for the Project from *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001), and then further modified them based on aerial photography and pre-survey site visits to reflect Project conditions. Prior to field surveys, Tetra Tech identified preliminary habitat breaks based on aerial photography to assist the field habitat delineation effort.

In the field, surveyors digitized polygons of relatively homogenous vegetation over aerial photos on Samsung Galaxy tablets that used ArcGIS Collector software and characterized the composition and structure on field datasheets (Attachment 2). Inspection of high-resolution aerial photos was used to ensure that surveyors visited areas with unique vegetation or habitat features. In the field, each delineated vegetation polygon was assigned a habitat type, subtype, and habitat quality category guided by the draft habitat categorization table (Attachment 3). Habitat was classified into one of six quality categories, with Category 1 habitat being the most important to fish and wildlife species and Category 6 being the least important, per the ODFW Habitat Mitigation Policy (OAR 635-415-0025). Habitat types and categories were not assigned to wetlands and waters in the field as they were derived from data collected during wetlands and waters surveys (Tetra Tech 2019b). Data characterizing a particular habitat subtype and quality represented the average condition of all such polygons. A minimum mapping unit of 1 acre was implemented, except for specialized habitat types such as cliffs or rock outcrops.

Habitat categorization surveys were conducted concurrently with botanical surveys, which included walking meandering transects within non-cultivated land within 150–500 feet of proposed Project infrastructure. While walking these transects, surveyors digitized habitats within these focused corridors, and scanned the landscape and digitized habitats within the viewshed to map and categorize the proposed Site Boundary. Additional mapping was also conducted by driving Project roads and digitizing habitat from vantage points that allowed extensive views across the open landscape. In 2019, Tetra Tech surveyed the newly proposed transmission line corridors by walking meandering transects where access was granted and driving public roads where access was not granted.

Following field surveys, the digitized habitat boundaries were downloaded and processed in Geographic Information System software, and information from the field datasheets were incorporated into the spatial data. Data were reviewed for quality control and processed to incorporate wetlands and waters data (Tetra Tech 2019b). Documented use of habitat by special status wildlife such as Washington ground squirrels and special status raptors (for nesting) was also incorporated into the data following field surveys.

3.0 Results

Habitat categorization surveys covered 99.9 percent of the Survey Area, with a focus on areas in proximity to proposed Project infrastructure. A small portion (35 acres) of the Site Boundary north of the Umatilla River was not accessible and not visible from public roads due to the hilly terrain. Tetra Tech conducted habitat categorization surveys June 26–July 1 and July 17–20, 2017, July 9–13, 2018, and June 24–27, 2019. Tetra Tech conducted special status wildlife surveys May 15–23 and June 3–9, 2017, April 10–15 and May 9–14, 2018, and April 13-30 and May 5–31, 2019. These survey dates were planned to coincide with the period of highest biological activity of neotropical migrant and breeding birds, foraging and breeding animal species, and other taxa.

Tetra Tech mapped 15 habitat subtypes within the proposed Site Boundary: (1) eastside grassland, (2) shrub-steppe, (3) eastside (interior) riparian, (4) irrigated pastures and hay meadows, (5) orchards, vineyards, wheat fields, other row crops, (6) planted grasslands, (7) urban and mixed environs, (8) cliffs, caves, and talus, (9) emergent wetlands, (10) scrub-shrub wetlands, (11) forested wetlands, (12) permanent ponds/lakes, (13) seasonal ponds, (14) intermittent or ephemeral streams, and (15) perennial streams (Figure 1).

The dominant habitat subtypes mapped within the proposed Site Boundary included eastside grasslands (24,778 acres), followed by the orchards, vineyards, wheat fields, other row crops habitat subtype (13,344acres), and the planted grasslands habitat subtype (8,703 acres). Eastside grasslands were dominated by Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and cheatgrass (*Bromus tectorum*), and often contained a limited shrub component, typically green rabbitbrush (*Chrysothamnus viscidiflorus)* and gray rabbitbrush (*Ericameria nauseosa*). The orchards, vineyards, wheat fields, and other row crops habitat consisted primarily of wheat fields that are typically grown on a two-year wheat-fallow cycle.

The planted grasslands were either lands that appeared to have been successfully planted, or fallow fields recently taken out of agricultural rotation. The former were dominated by intermediate wheatgrass (*Thinopyrum intermedium*), Idaho fescue, bluebunch wheatgrass, crested wheatgrass (*Agropyron cristatum*), and cheatgrass, and often included shrubs such as green rabbitbrush and gray rabbitbrush. The fallow fields were dominated by alfalfa (*Medicago sativa*), tumble mustard (*Sisymbrium altissimum*), and cheatgrass, and may have been planted, but with only limited success.

Other habitat sub-types less common on the landscape but of importance to wildlife included shrub-steppe habitat; riparian habitat; cliffs, caves, and talus slopes; emergent, scrub-shrub, and forested wetlands; permanent and seasonal ponds; and perennial, intermittent, or ephemeral streams. Habitat within the proposed Site Boundary was moderately to highly disturbed as a result of grazing, ongoing quarry activity, invasive plants, farm buildings, and the use of existing dirt and gravel roads. Based on habitat categorization field surveys (i.e., not included post-field incorporation of wildlife overlays), the proposed Site Boundary includes Category 2 through 6 habitats (Figure 2). Photos of select habitat types and categories are provided in Attachment 4.

Tetra Tech observed a total of 12 special status wildlife species during surveys, including 11 special status bird species and one special status mammal species, the Washington ground squirrel for which targeted surveys were conducted and reported separately (Table 1; Figure 3; Tetra Tech 2019c).

Table 1. Special Status Wildlife Species Observed During Surveys

Taxa	Common Name	Scientific Name	Federal[1]	Oregon[2]
Bird	bald eagle	*Haliaeetus leucocephalus*	BCC	S
Bird	brewer's sparrow	*Spizella breweri*	BCC	S
Bird	burrowing owl	*Athene cunicularia hypugaea*	-	SC
Bird	ferruginous hawk	*Buteo regalis*	BCC	SC
Bird	golden eagle	*Aquila chrysaetos*	BCC	-
Bird	grasshopper sparrow	*Ammodramus savannarum*	-	S
Bird	loggerhead shrike	*Lanius ludovicianus*	BCC	S
Bird	long-billed curlew	*Numenius americanus*	BCC	SC
Bird	Swainson's hawk	*Buteo swainsoni*	-	S
Bird	sagebrush sparrow	*Artemisiospiza nevadensis*	-	SC
Bird	sage thrasher	*Oreoscoptes montanus*	BCC	-
Mammal	Washington ground squirrel	*Urocitellus washingtoni*	SOC	E

1. Federally Status: SOC = Species of Concern, BCC = Bird of Conservation Concern.
2. Oregon Department of Fish and Wildlife Status in the Columbia Plateau: E = Endangered, SC = Critical Sensitive Species, S = Sensitive Species.

Field biologists identified and mapped special habitats and unique features, including active and inactive raptor nests, big game, rimrock, rock outcrops, and talus slopes. Surveyors documented active raptor nests belonging to red-tailed hawks, ferruginous hawks, Swainson's hawks, northern harriers, burrowing owls, short-eared owls, and great horned owls, as well as observations of big game, including elk, mule deer, white-tailed deer, and pronghorn. Except for ground-nesting species, raptor nest observations made during wildlife surveys, as well as during targeted raptor nest surveys are reported separately in annual reports from 2017 to 2019 (NWC 2017, NWC 2018, NWC 2019). In 2019, one active burrowing owl burrow was observed within the Survey Area. Tetra Tech observed two adult burrowing owls along with whitewash and owl pellets at a burrow, which was located in eastside grassland in the southern portion of the proposed Site Boundary; activity was documented during two visits, on April 27 and May 15, 2019.

Photographs of select species, special habitats, and unique features are included in Attachment 4. The final categories of habitats within the proposed Site Boundary, taking into consideration wildlife overlays, will be provided in the anticipated Application for Site Certificate.

During wildlife and habitat categorization surveys, biologists also documented noxious weeds. The presence of noxious weeds was considered in making habitat quality determinations. Noxious weed distribution is discussed in the Botanical Survey Report (Tetra Tech 2019a).

4.0 References

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Tetra Tech. 2019c. Nolin Hills Wind Power Project Washington Ground Squirrel Survey Report. October 2019.

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Figures

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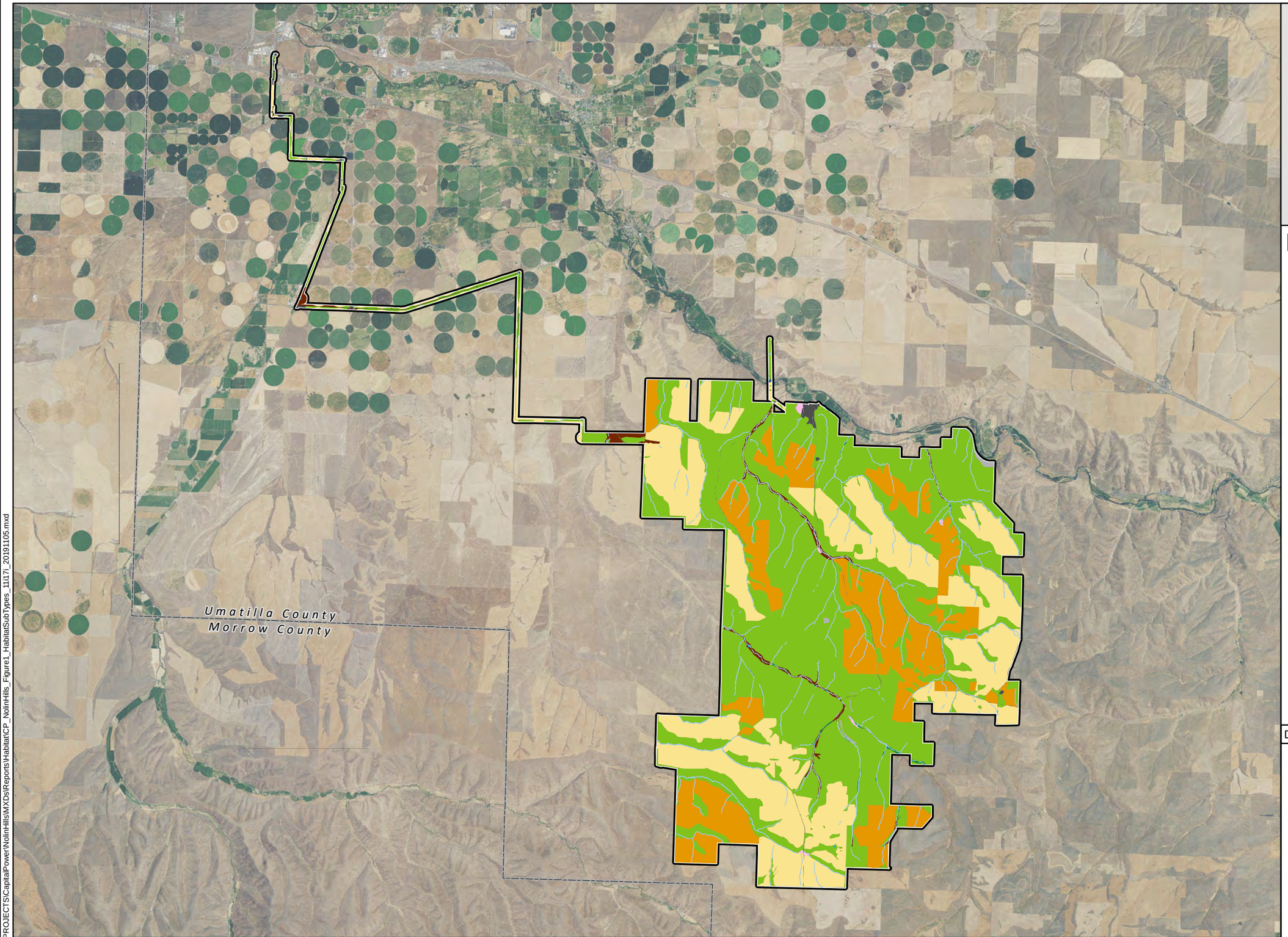
Nolin Hills Wind Power Project

Figure 1
Habitat Subtypes

UMATILLA COUNTY, OREGON



Proposed Site Boundary
County Boundary

EFSC Subtypes

- Cliffs, Caves and Talus
- Eastside Grasslands
- Eastside (Interior) Riparian
- Emergent Wetlands
- Forested Wetlands
- Intermittent or Ephemeral Streams
- Irrigated Pastures and Hay Meadows
- Orchards, Vineyards, Wheat Fields, Other Row Crops
- Perennial Streams
- Permanent Pond/Lakes
- Planted Grasslands
- Scrub-shrub Wetlands
- Seasonal Ponds
- Shrub-steppe
- Urban and Mixed Environs

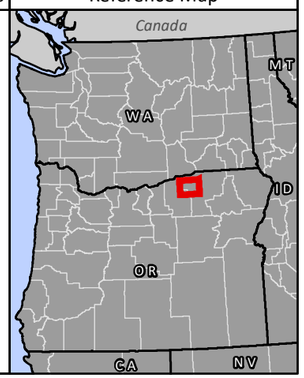
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; Enterprise-County Boundary

Reference Map



1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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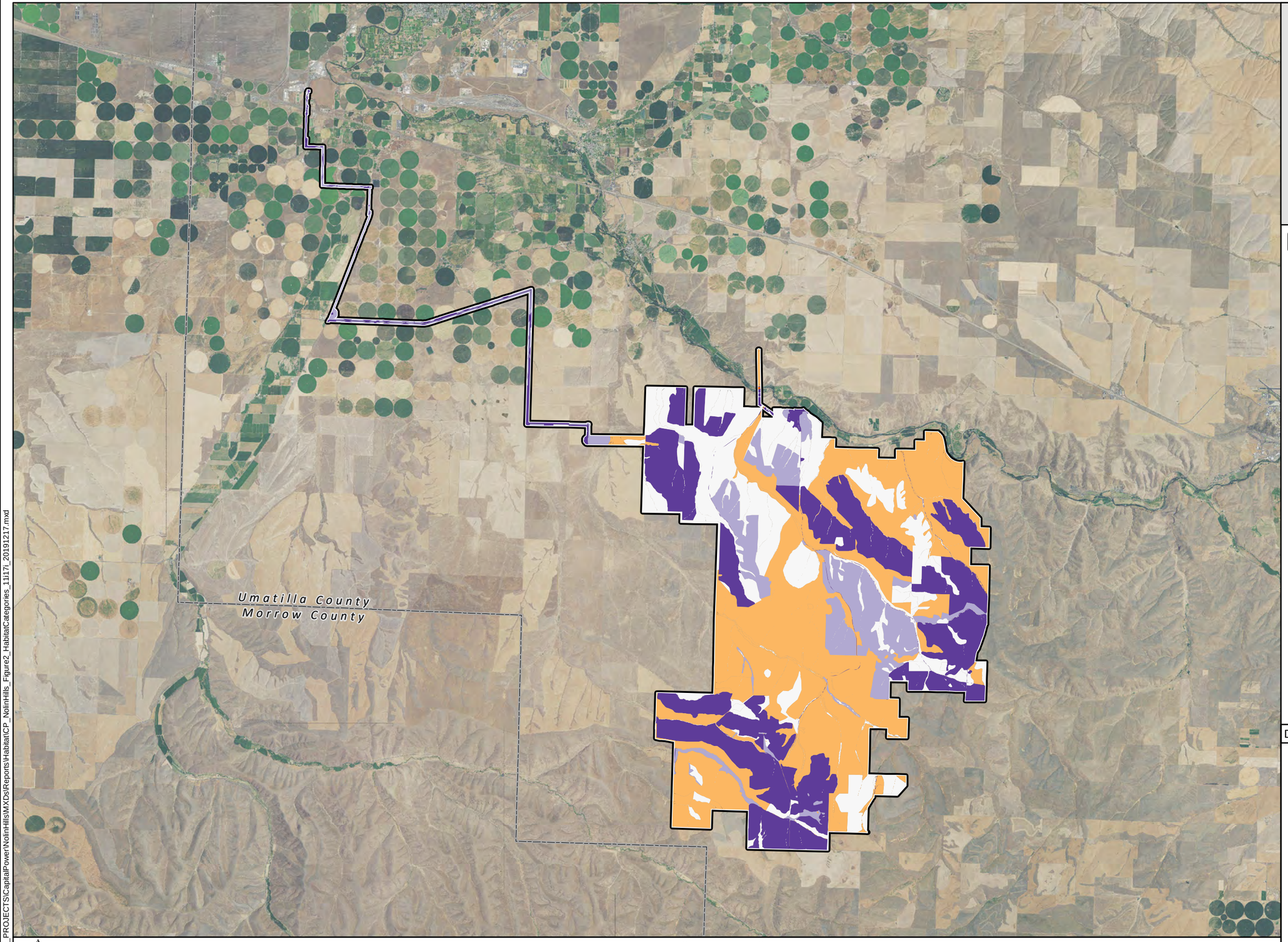
Nolin Hills Wind Power Project

Figure 2
Habitat Categories

UMATILLA COUNTY, OREGON



Proposed Site Boundary

County Boundary

Habitat Categories*

- 2
- 3
- 4
- 5
- 6

*Habitat Categories are presented in order of relative importance to fish and wildlife species per the Habitat Mitigation Policy (OAR 635-415-0025).

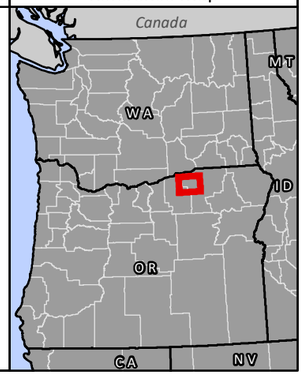
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; Enterprise-County Boundary

Reference Map



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0 0.5 1 2 3 4 Miles

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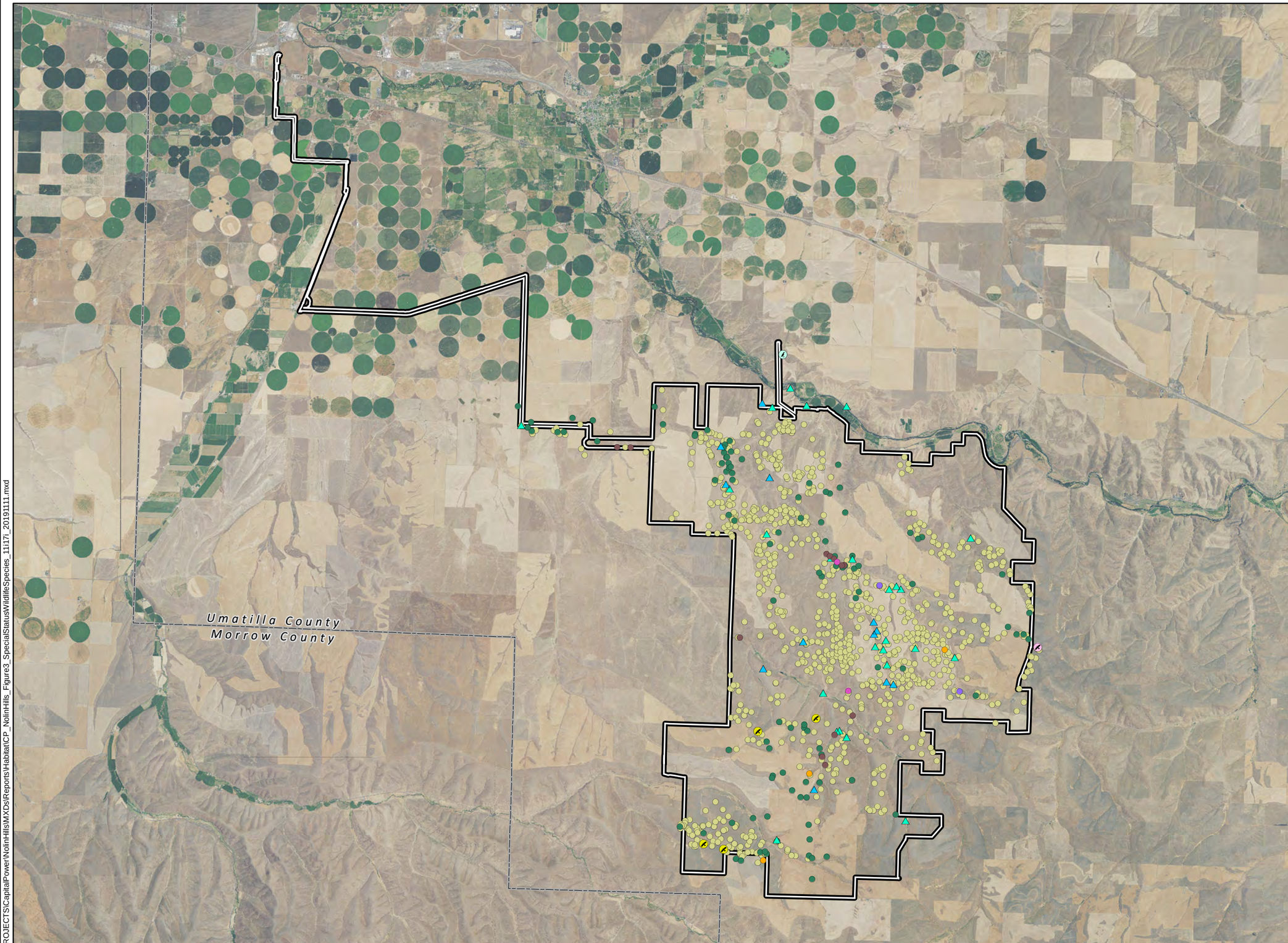
Nolin Hills Wind Power Project

Figure 3
Special Status Wildlife Species

UMATILLA COUNTY, OREGON



Proposed Site Boundary
County Boundary

Special Status Species

- Bald eagle
- Brewer's sparrow
- Burrowing owl
- Ferruginous hawk
- Golden eagle
- Grasshopper sparrow
- Loggerhead shrike
- Long-billed curlew
- Sage sparrow
- Sage thrasher
- Swainson's hawk

TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; Enterprise-County Boundary

Reference Map

1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

P:\GIS_PROJECTS\CapitalPower\NolinHills\MXDs\Reports\Habitat\CP_NolinHills_Figure3_SpecialStatusWildlifeSpecies_11i17i_20191111.mxd

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Attachment 1.
Special Status Wildlife Species Potentially Occurring at Nolin Hills

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Common Name	Scientific Name	Taxa	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Occurs in Umatilla County per ORBIC 2016	Comments
American peregrine falcon	*Falco peregrinus anatum*	bird	BCC	S	Yes	
bald eagle	*Haliaeetus leucocephalus*	bird	BCC	S	Yes	
brewer's sparrow	*Spizella breweri breweri*	bird	BCC	S	Yes	
burrowing owl	*Athene cunicularia hypugaea*	bird	-	SC	Yes	
ferruginous hawk	*Buteo regalis*	bird	BCC	SC	Yes	
flammulated owl	*Otus flammeolus*	bird	BCC	-	Yes	
golden eagle	*Aquila chrysaetos*	bird	BCC	-	Yes	
grasshopper sparrow	*Ammodramus savannarum*	bird	-	S	Yes	
Lewis's woodpecker	*Melanerpes lewis*	bird	BCC	SC	Yes	
loggerhead shrike	*Lanius ludovicianus*	bird	BCC	S	Yes	
long-billed curlew	*Numenius americanus*	bird	BCC	SC	Yes	
mountain quail	*Oreortyx pictus*	bird	SOC	-	Yes	
sage thrasher	*Oreoscoptes montanus*	bird	BCC	-	Yes	
sagebrush sparrow	*Artemisiospiza nevadensis*	bird	-	SC	Yes	
Swainson's hawk	*Buteo swainsoni*	bird	-	S	Yes	
tricolored blackbird	*Agelaius tricolor*	bird	BCC, SOC	-	Yes	
white-headed woodpecker	*Picoides albolarvatus*	bird	BCC	-	Yes	
willow flycatcher	*Empidonax traillii adastus*	bird	BCC, SOC	-	Yes	
yellow rail	*Coturnicops noveboracensis*	bird	BCC	-	Yes	
yellow-billed cuckoo	*Coccyzus americanus*	bird	T, BCC	-	Yes	
Canada Lynx	*Lynx canadensis*	mammal	T	-	Yes	Occurs in Umatilla County, per USFWS
gray wolf	*Canis lupus*	mammal	E	-	Yes	Occurs in Umatilla County, per USFWS
hoary bat	*Lasiurus cinereus*	mammal	-	S	Yes	
pallid bat	*Antrozous pallidus*	mammal	SOC	S	Yes	
silver-haired bat	*Lasionycteris noctivagans*	mammal	SOC	S	Yes	
spotted bat	*Euderma maculatum*	mammal	SOC	S	Yes	
Townsend's big-eared bat	*Corynorhinus townsendii*	mammal	SOC	SC	Yes	

Common Name	Scientific Name	Taxa	Federal Status[1]	ODFW Status in Columbia Plateau[2]	Occurs in Umatilla County per ORBIC 2016	Comments
Washington ground squirrel	*Urocitellus washingtoni*	mammal	SOC	E	Yes	
wolverine	*Gulo gulo*	mammal	-	T	Yes	
northern sagebrush lizard	*Sceloporus graciosus graciosus*	reptile	SOC	S	Yes	
western painted turtle	*Chrysemys picta bellii*	reptile		SC	Yes	
Columbia spotted frog	*Rana luteiventris*	amphibian	SOC	-	Yes	

1. Federal Status: E = Endangered, T = Threatened, SOC = Species of Concern, BCC = Bird of Conservation Concern
2. ODFW Status: E = Endangered, T = Threatened, SC = Critical Sensitive Species, S = Sensitive Species.

Attachment 2.
Habitat Categorization Field Datasheet

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Data Sheet Id: _____

NOLIN HILLS HABITAT CATEGORIZATION

HABITAT CATEGORY ☐

Date _____ Surveyor _____

Site description:

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

Open water-lakes, rivers, streams: Permanent ponds/lakes(PL)/ Seasonal ponds(SP)/ Perennial(PS)/ Intermittent(IS)
Wetlands: Emergent wetlands(EW)/ Scrub-shrub wetlands(SW)/ Forested wetlands(FW)
Riparian forest and shrubland complexes: Eastside (interior) riparian(ER)
Upland grassland, shrub-steppe and shrubland: Eastside grassland(EG)/ Shrub-steppe(SS)
Upland forests and woodlands: Eastside oak and ponderosa pine forest and woodland(EO)/ Western juniper and mountain mahogany woodlands(JW)
Agriculture, pasture, and mixed environs: CRP lands(CR)/ Orchards, vineyards, wheat fields, other row crops, irrigated poplar plantations(AG)/ Irrigated pastures and hay meadows(PA**)**
Cliffs, caves and talus(CT)
Urban and mixed environs(UR)

Notes if confusion _____

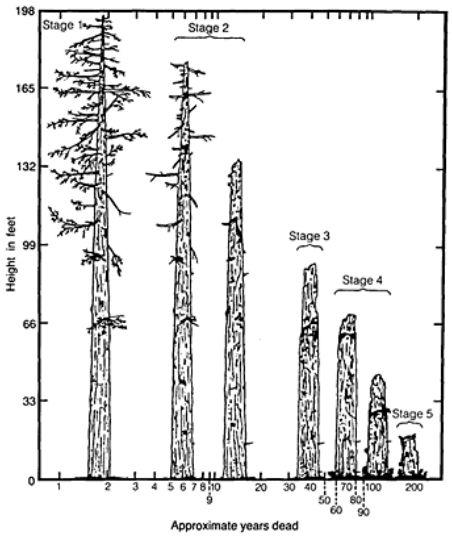


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

Detailed vegetation measurements:

**Dominant ≥20%, Subdominant 10-20%

Trees

Dominant species _____

Subdominant species _____

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

Percent native cover _____ Percent bare ground or duff _____

Stumps present? Yes No

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

Forest phase per Brown: GF SHR OSP CSPS LGSAW OGDD

Shrubs

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover _____ Percent bare ground _____

Percent crytobiotic crust (if applicable)_____

Herbs & Grasses

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover:_____ Percent bare ground or duff ____

Percent crytobiotic crust (if applicable)_____

Other descriptions:

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

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

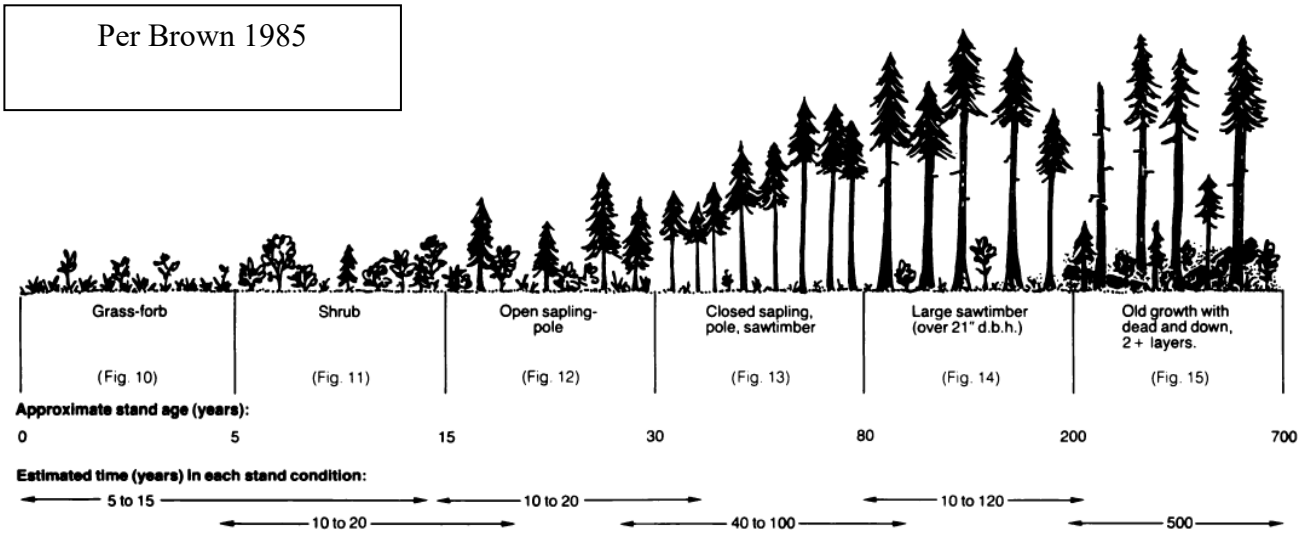
__Recreation, if so what kind? _____ Other (please specify) _____

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

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

Any additional notes:

Per Brown 1985



Attachment 3.
Draft Nolin Hills Habitat Types and Subtypes Potentially Occurring within the Proposed Site Boundary

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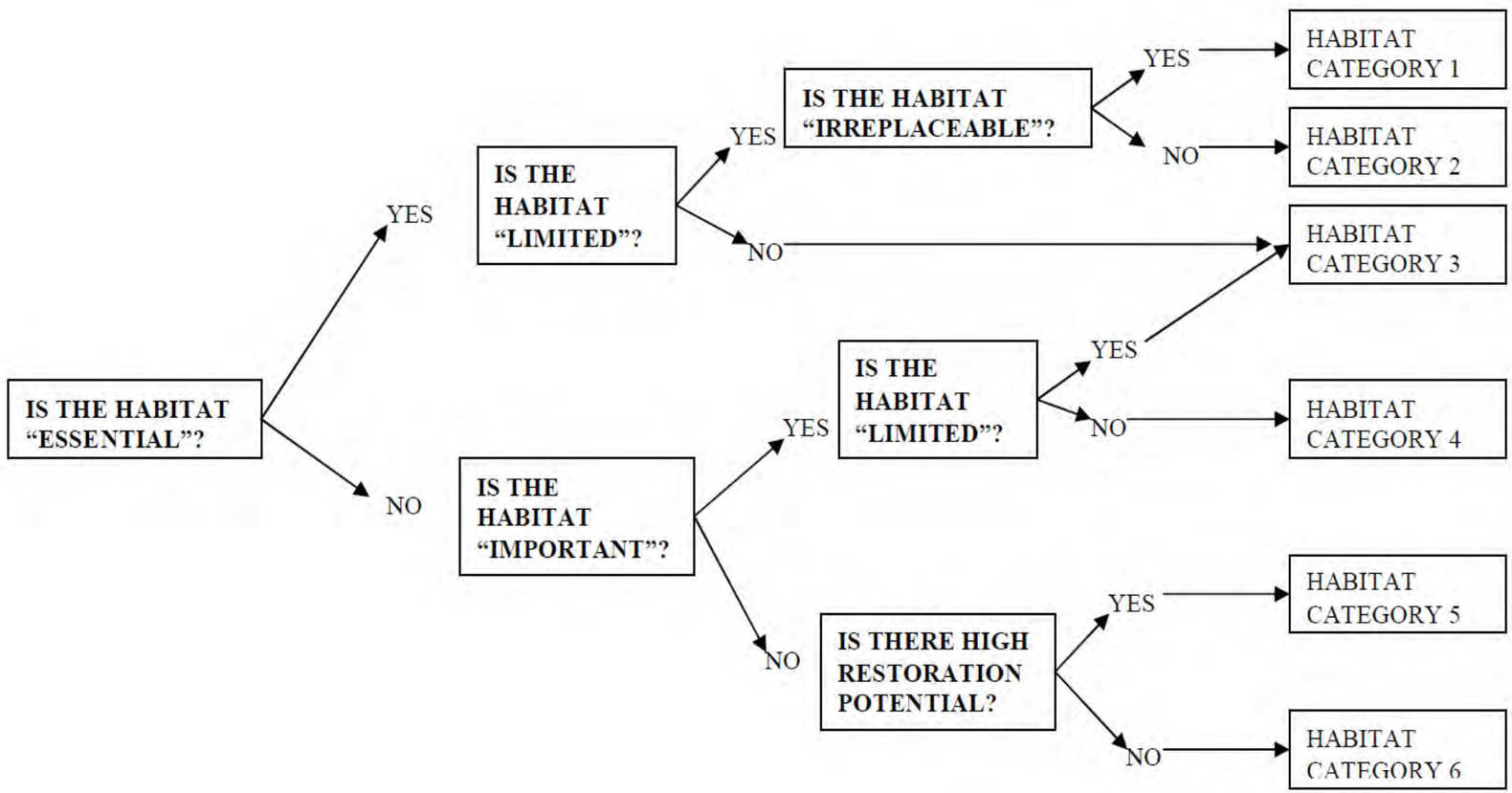
Draft Nolin Hills Habitat Types and Sub-types Potentially Occurring Within the Proposed Site Boundary

Habitat Type	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
The First Two Rows Are Overlays That Automatically Assign Categories, Based On Species Presence, To One Or More Of The Habitat Types Described Below							
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands and Shrub-Steppe Habitats	Active Washington ground squirrel colony with a 785-foot buffer of suitable ground squirrel habitat.	Additional 4,921 foot (1.5km) buffer on WAGS Category 1 habitat except where there are habitat barriers to dispersal.				
All Habitats	All	Trees or structures with eagle or state sensitive or state or federal listed raptor species nests present.					
Open Water – Lakes, Rivers, Streams	Permanent Ponds/Lakes Open water areas, including natural lakes, reservoirs, stock ponds, beaver ponds		Natural lakes or beaver ponds with high-quality habitat.	Most other open water areas with lower-quality habitat (for example, some habitat requisites missing or bullfrogs abundant).	Highly degraded open water area, dominated by non-native vegetation or no vegetation around margins (for example, highly degraded stock pond).		
	Seasonal Ponds Open water areas that contain water part of the year		Seasonal ponds with high quality, mostly native vegetation.	Seasonal ponds with lower-quality habitat that is still dominated by native plant species.	Highly degraded, with a higher proportion of non-native vegetation or no vegetation around margins (for example, a seasonal stock pond).	Habitat almost completely dominated by non-native plant species or otherwise highly degraded.	
	Perennial Streams Streams mapped by USGS having permanent (year-round) flow		Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.		
	Intermittent or Ephemeral Streams Streams mapped by USGS as intermittent		Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.	Non-fish-bearing ephemeral streams or excavated channels with high restoration potential; not important habitat.	

Habitat Type	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Wetlands	Emergent Wetlands Emergent wetlands with herbaceous vegetation	Any bog or fen.	High quality habitat, dominated by native species	Mixture of native and non-native plant species and low to moderate disturbance		Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	
	Scrub-shrub Wetlands Wetlands with woody vegetation less than 20 feet tall	Any bog or fen.	High quality habitat, dominated by native plant species;	Mixture of native and non-native plant species and low to moderate disturbance		Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	
	Forested Wetlands Forests (defined as areas with a minimum of 40% canopy closure > 20 feet tall), dominated by wetland indicator species	Any bog or fen.	Exceptional habitat; well-buffered, with few or no non-native plant species, relatively undisturbed surroundings, or part of a large wetland complex, old-growth, or large sawtimber stage	Mixture of native and non-native plant species at sapling, pole, sawtimber stage			
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.	
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands Grassland areas with few shrubs (not irrigated or cultivated/planted)		Undisturbed habitat dominated by native species (i.e., greater than 75% ground cover is native), or moderately disturbed habitat (i.e., between 50 to 75% ground cover is native) that contains a sagebrush component	Moderately disturbed habitat with a mix of natives and non-natives (i.e., between 50 to 75% ground cover is native), or highly disturbed habitat (i.e., between 15 to 50% ground cover is native) that contains a sagebrush component	Highly disturbed habitat with a high percentage of non-native plant species (i.e., between 15 to 50% ground cover is native), or very highly disturbed habitats (i.e., less than 15% ground cover is native) that contain a sagebrush component	Very highly disturbed habitats with a high percentage of non-native plant species (i.e., less than 15% ground cover is native), but which do not contain a sagebrush component	
	Shrub-steppe Grassland and shrubland mosaic		High degree of cover; contains native shrubs and native grasses; good structure/forage for wildlife. Understory dominated by native species. More diversity than Category 3 habitat.	Habitat that is limited within the area (e.g., relatively undisturbed habitat); high degree of cover; moderate cover by weeds, moderate structure/forage for wildlife.	Important wildlife habitat that is moderately to heavily degraded and weedy habitat.	Very low quality dominated by non-native species with high restoration potential.	
Agriculture, Pasture, and Mixed Environs	Planted Grasslands			Croplands planted to grassland with characteristics necessary to potentially provide habitat for sensitive wildlife due to cover and forage quality.	Croplands planted to grassland that lack later seral stage vegetative communities or are of less importance as wildlife habitat due to management or location.	Croplands planted to grassland that lack later seral stage vegetative communities and are highly disturbed or degraded, and have high restoration potential.	
	Orchards, Vineyards, Wheat Fields, Other Row Crops						Active agricultural areas with low potential for restoration.
	Irrigated Pastures and Hay Meadows				Potential habitat for wildlife.		
Cliffs, Caves, and Talus		Sites with bat hibernacula.	Sites with known bat colonies.	Sites without bat colonies.			
Urban and Mixed Environs							All developed areas.


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

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Attachment 4.
Select Photographs of Habitats and Wildlife Species Taken during 2017-2019 Surveys

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Photo 1. Category 3 eastside grassland.

Photo 2. Category 6 orchards, vineyards, wheat fields, other row crops (i.e., freshly plowed cropland).

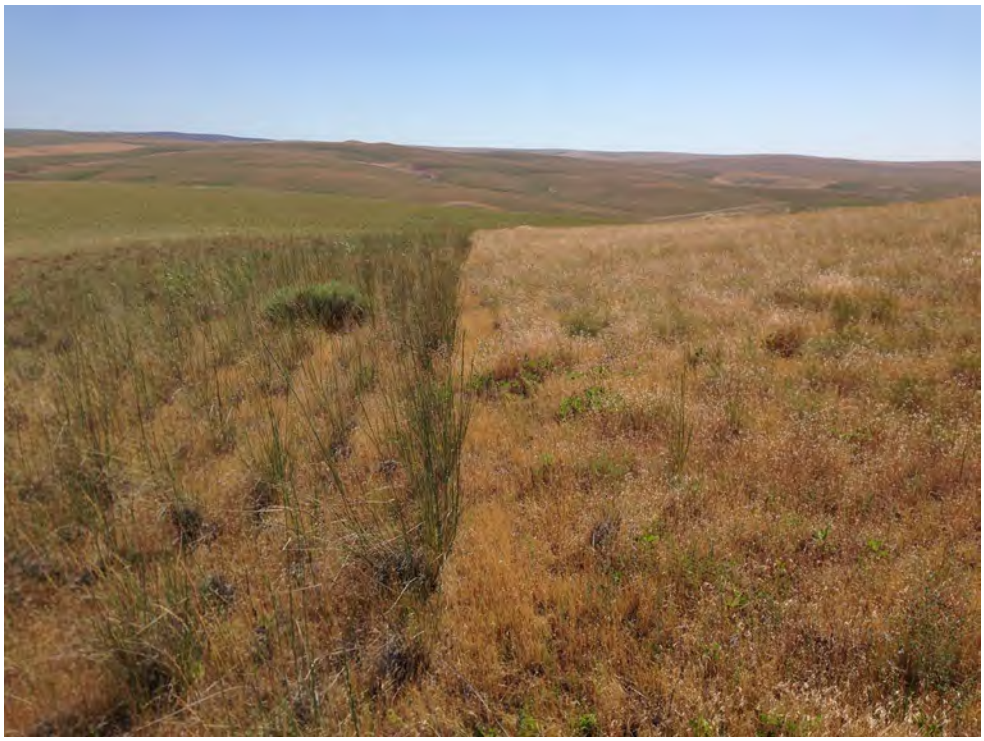

Photo 3. Habitat break between Category 3 planted grassland and Category 4 eastside grassland.

Photo 4. Category 3 shrub-steppe bisected by Category 6 urban and mixed environs (i.e., a gravel road).

Photo 5. Category 5 irrigated pastures and hay meadows.

Photo 6. Category 3 cliffs, caves, and talus.

Photo 7. Active red-tailed hawk nest in snag with 2 young and 2 adults flying above.

Photo 8. Swainson's hawk chicks in a nest.

Photo 9. Burrowing owl at burrow.

Photo 10. Category 5 planted grassland consisting of a fallow wheat field densely vegetated with cheatgrass and tall tumble mustard.

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2017-2019 Botanical Survey Report

Nolin Hills Wind Power Project
November 2019

Prepared for
Nolin Hills Wind, LLC

Prepared by

TETRA TECH

Tetra Tech, Inc.

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Attachment 2. Vascular Plants Observed During the 2017-2019 Field Surveys
Attachment 3. Site Photographs

Acronyms and Abbreviations

ESA	Endangered Species Act
GPS	Global Positioning System
ODA	Oregon Department of Agriculture
ORBIC	Oregon Biodiversity Information Center
Project	Nolin Hills Wind Power Project
Survey Area	Botanical Survey Area
Tetra Tech	Tetra Tech, Inc.

1.0 Introduction

This summary report presents the methods and results for the 2017 through 2019 botanical surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Nolin Hills Wind Power Project (the Project), performed for Nolin Hills Wind, LLC. The Project is located within Umatilla County, approximately 10 miles west of Pendleton, Oregon (Figure 1). The Project's proposed Site Boundary (dated 6/25/2019) is approximately 48,159 acres, including approximately 29 miles of transmission line corridors that were added in 2019. The purpose of the botanical surveys was to document the presence of federal or state-listed endangered, threatened, or candidate vascular plant species and noxious weeds. This report is in support of Exhibits P and Q of the Project's Application for Site Certificate for 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, threatened, or candidates for listing by the US Fish and Wildlife Service under the federal Endangered Species Act (ESA), or by the Oregon Department of Agriculture (ODA) under the Oregon ESA. Tetra Tech reviewed this initial list to produce a final list of target species that included all federal and state-listed and candidate plant species that have the potential to occur within or near the Project based on known occurrences recorded by herbaria and other sources (Table 1).

Table 1. Federal and State Threatened, Endangered, and Candidate Vascular Plant Species with Potential to Occur at the Project

Scientific Name	Common Name	Federal Status[1]	State Status[2]	Survey Period
Astragalus collinus var. *laurentii*	Laurence's milkvetch	SOC	T	Fruits needed; late May – August
Eremothera (Camissonia) pygmaea	Dwarf evening-primrose	-	C	June – August
Myosurus sessilis	Sessile mousetail	SOC	C	March – May

Sources: Burke Museum of Natural History and Culture 2017, ODA 2017a, ORBIC 2017, ORBIC 2019, Oregon Flora Project 2017a, Oregon Flora Project 2017b, USFWS 2017, WDNR 2017.

1. SOC = Species of Concern.
2. T = Threatened, C = Candidate for listing.

Tetra Tech also identified 21 other vascular plant species tracked by the Oregon Biodiversity Information Center (ORBIC) that have the potential to occur at the Project (Attachment 1). ORBIC-tracked species are not protected under federal or state law but are species of conservation concern

or species for which more information is needed before their status can be determined (ORBIC 2019).

2.2 Survey Area

To identify the Botanical Survey Area (Survey Area), Tetra Tech initially created buffers on proposed Project infrastructure prior to surveys: 500-foot buffers on each side of turbine strings and 150-foot buffers on each side of transmission lines, access roads, collector lines, substations, and operations and maintenance facilities. This resulted in a variable 300 to 1,000-foot-wide Botanical Survey Corridor (Figure 1). Tetra Tech removed active agricultural fields from consideration for surveys, as they do not support target species. As a result, the 2017 – 2019 survey areas (Figure 1) consisted of the remaining uncultivated habitat within 150 to 500 feet of Project infrastructure within the Proposed Site Boundary. As each year's biological and other survey results were processed, locations of Project infrastructure were modified to avoid impacts to various resources, resulting in the need for additional surveys during the following season. Additionally, some areas initially identified as active agricultural fields in 2017 were later determined to have been converted to planted grassland and required surveys during the following season. Unless otherwise specified, the term "Survey Area" in this report refers to the combined 2017 - 2019 survey areas.

2.3 Habitat Suitability Analysis

Tetra Tech reviewed aerial imagery of the Project to preliminarily identify habitat suitable for target and ORBIC-tracked species. Tetra Tech also reviewed previous analyses conducted at the Project that identified potential habitat for target plant species (SWCA 2010, NWC 2012).

2.4 Background Review

Tetra Tech completed a review of existing literature, herbarium records, and other sources prior to field surveys to generate fact sheets for each target and ORBIC-tracked species (Burke Museum of Natural History and Culture 2017, ODA 2017a, ORBIC 2017, Oregon Flora Project 2017a, Oregon Flora Project 2017b, USFWS 2017, WDNR 2017). These fact sheets were used by surveyors in the field and included:

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

In response to a formal request to ORBIC, Tetra Tech also received vascular plant element occurrence records within 10 miles of the Proposed Site Boundary, which included three records for the state threatened Laurence's milkvetch (*Astragalus collinus* var. *laurentii*) within and

adjacent to the Proposed Site Boundary (ORBIC 2017). Surveyors visited the location of one of these Laurence's milkvetch element occurrences prior to commencing surveys in order to determine the current phenology of the species, and to provide an identification reference 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 2017b, ODA 2019).

2.5 Survey Schedule

The survey schedule was initially designed to cover the identification period for the two target species with identified suitable habitat within the Survey Area: Laurence's milkvetch and Dwarf evening-primrose (*Eremothera* [*Camissonia*] *pygmaea*). However, during early season wildlife surveys in 2017, Tetra Tech documented the presence of several vernal pools at the Project, which are suitable habitat for the third target species, sessile mousetail (*Myosurus sessilis*). As a result, Tetra Tech conducted surveys for sessile mousetail at these vernal pools in May 2017, and comprehensive surveys for Laurence's milkvetch and Dwarf evening-primrose in June and July 2017, July 2018, and June and July 2019. The June and July survey periods also coincided with the identification period for the majority of the ORBIC-tracked species that have the potential to occur at the Project. No additional vernal pools were identified in 2018 or 2019.

2.6 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, California Native Plant Society 2001, Nelson 1987). 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. Because this method focuses survey efforts on the parts of the landscape most likely to support target species, surveyors were required to be familiar with all information in each species' fact sheet before beginning surveys. At the beginning of each survey day, surveyors reviewed which species were likely to be in range of the area surveyed that day, and the flowering periods of those species.

When surveyors encountered a target species, they recorded the Global Positioning System (GPS) location with a tablet using ArcGIS Collector software. For individual plants or small patches of individuals, 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 population within the Survey Area, but extensions of the population beyond the Survey Area were noted and mapped if visible from within the Survey Area. Surveyors completed ORBIC siting forms for each population and took photos to serve as digital specimen vouchers to illustrate identifying characteristics, plant habits, and habitat.

Data for each population included the following:

- Species phenology;
- Number of plants observed;
- Age class;
- 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 1973, Hitchcock and Cronquist 2018). For quality control, species identifications were compared against location records of known observations and vouchered specimens (Oregon Flora Project 2017a, Oregon Flora Project 2018 , Oregon Flora Project 2019). Nomenclature follows the Oregon Vascular Plant Checklist, as used by the Oregon Flora Project (Jaster et al. 2017). The final vascular plant species list for the Survey Area is included as Attachment 2 in this report.

Surveyors also recorded observations of ODA-listed noxious weeds, which included A, B, and T listed species (ODA 2017b, ODA 2019). Surveyors documented all discrete populations of noxious weeds uncommon within the Survey Area. For common noxious weeds, large infestations were documented, and points were taken approximately every 500 feet, noting the number of individuals in the area.

3.0 Results

Tetra Tech conducted botanical surveys within the 2017 Survey Area June 26 – July 1 and July 17 – 20, 2017, covering a total of 4,349 acres (Figure 1). In 2018, surveys were conducted July 9 – 13 within the 2018 Survey Area, which covered a total of 2,432 acres. In 2019, surveys were conducted June 24 – 28 and July 12 within the 2019 Survey Area and covered a total of 2,563 acres (Figure 1). Approximately 210 acres within the 2019 Botanical Survey Corridor were not surveyed due to lack of access permission. All 210 acres are associated with the transmission line corridors.

Limited surveys within vernal pools were conducted on May 23, 2017 to target the early-blooming sessile mousetail. Surveys for Laurence's milkvetch and dwarf evening-primrose were comprehensive, meaning that all suitable habitat was assessed within these species' identification periods. Surveys for sessile mousetail were nearly comprehensive, meaning that most suitable habitat was surveyed within this species' identification period; however, Tetra Tech identified two additional vernal pools (see "potential sessile mousetail" in Figure 2) during wetland and botanical surveys in June and July 2017, following the end of the species' identification period. Thus, these locations could not be surveyed for this species in 2017. The vernal pool in the southeast portion of the Site Boundary was visited in late April 2018 to assess the presence of sessile mousetail.

However, at this time the vernal pool was still flooded with water and no vegetation was present. Project infrastructure was subsequently shifted and avoided these vernal pools; therefore, these vernal pools no longer lie within 500 feet of Project infrastructure.

Although target species were given priority, surveys were also comprehensive for several of the ORBIC-tracked species that have the potential to occur at the Project (Attachment 1). None of these species were observed during surveys.

Habitat within the Survey Area consists primarily of perennial grassland benches separated by intermittent and ephemeral draws and underlain by basalt. Shrub-steppe habitat also occurs within the Survey Area but is typically limited to areas adjacent to intermittent and ephemeral draws. The lowland areas, as well as the areas of planted grassland that had recently been converted from wheat cultivation, are generally dominated by invasive species, and show signs of disturbance due to historic and current farming and grazing activity. Higher elevation grassland benches, where not converted to agriculture, are more isolated from existing roads, and are generally dominated by native species. Occasional talus, road cuts, and vernal pools are present within the Survey Area.

3.1 Target Species

Tetra Tech documented two target plant species within the 2017 Survey Area: Laurence's milkvetch (state threatened; federal species of concern) and sessile mousetail (state candidate; federal species of concern) (Table 2). One target plant species, Laurence's milkvetch, was observed within the 2018 and 2019 survey areas. No other federal or state endangered, threatened, or candidate species, or ORBIC-tracked species, were observed within the Survey Area. Photos of Laurence's milkvetch and sessile mousetail plants and their associated habitat are included in Attachment 3.

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Table 2. Target Plant Species Occurrences within the Survey Area

Pop. #	Dates Observed	# of Plants	Area Occupied within Survey Area (Acres)	Habitat and Associated Species	Landscape Position	Phenology	Age Class	Aspect, Gradient	Notes
Laurence's milkvetch (*Astragalus collinus* var. *laurentii*)									
1	June 27, 2017	1	<0.01	Perennial grassland with scattered shrubs. *Pseudoroegneria spicata, Festuca idahoensis, Bromus tectorum, Vulpia myuros, Astragalus spaldingii, Tragopogon dubius*	Upper Slope	100% in fruit	100% mature	NE, Slight (0°-20°)	One individual, mostly fruiting, some stalks still in flower. Compacted soils.
2	June 27, 2017 June 24, 2019	85	13.09	Perennial grassland; *Festuca idahoensis, Pseudoroegneria spicata, Bromus hordeaceus, Bromus tectorum, Vulpia myuros, Achillea millefolium, Astragalus spaldingii, Madia gracilis, Plantago patagonica, Tragopogon dubius* Planted grassland: *Thinopyrum intermedium, Bromus hordeaceus, Bromus tectorum, Vulpia myuros, Achillea millefolium, Buglossoides arvensis, Madia gracilis, Tragopogon dubius.*	Crest	80% in flower 20% in fruit	100% mature	South, Slight (0°-20°)	Population stretches sporadically for approximately 1 mile on plateau within native perennial grassland and extending into planted grassland. Three additional disjunct locations observed within planted grassland to the south of the main population.
3	June 28, 2017	1	<0.01	Perennial grassland; *Festuca idahoensis, Hesperostipa comata* ssp. *comata, Calochortus macrocarpus, Chrysothamnus viscidiflorus, Ericameria nauseosa,*	Upper Slope	50% in flower 50% in fruit	100% mature	NW, Slight (0°-20°)	Plant flowering and turning to fruit, all leaves dropped.
4	June 29, 2017 July 9, 2018	150	5.30	North portion of the population polygon is disturbed perennial grassland adjacent to a gravel pit; south of the gravel pit habitat is less disturbed. *Pseudoroegneria spicata, Bromus tectorum, Poa bulbosa, Achillea millefolium, Balsamorhiza careyana, Calochortus macrocarpus, Lagophylla ramosissima, Tragopogon dubius, Ericameria nauseosa,*	Upper Slope and Mid-slope	55% in flower 35% in fruit 10% vegetative	30% 1st year 70% mature	NW, Slight (0°-20°)	Across gravel road from known ORBIC element occurrence, continues south of Survey Area. Sandy soils.
5	June 30, 2017	4	0.33	Perennial grassland; *Poa secunda, Pseudoroegneria spicata, Bromus tectorum, Poa bulbosa, Achillea millefolium, Balsamorhiza serrata, Sisyrinchium idahoense, Ericameria nauseosa. Eriogonum strictum*	Upper Slope	40% in flowe 60% in fruit	100% mature	SE, Moderate (20°-45°)	Rocky, sandy soils.
6	June 30, 2017 June 27, 2019 July 2, 2019	42	2.94	Perennial grassland; *Festuca idahoensis, Pseudoroegneria spicata, Poa secunda, Bromus hordeaceus, Bromus tectorum, Vulpia microstachys, Achillea millefolium, Astragalus purshii Astragalus spaldingii, Balsamorhiza serrata, Crepis* spp., *Erigeron pumilus, Plantago patagonica, Tragopogon dubius, Ericameria nauseosa, Eriogonum strictum.*	Mid-slope and Upper Slope	30% in flower 60% in fruit 10% vegetative	10% 1st year 90% mature	W, SW, NW Slight (0°-20°) to Moderate (20°-45°)	Plants observed in 3 locations approximately 1,200 feet apart. One location on rocky soils, the other two on sandy soils.
7	July 18, 2017 July 10, 2018	170	41.38	Perennial grassland with scattered rabbitbrush. *Festuca idahoensis, Pseudoroegneria spicata, Bromus tectorum, Poa bulbosa, Vulpia microstachys, Achillea millefolium, Antennaria dimorpha, Astragalus spaldingii, Plantago patagonica, Lupinus* spp., *Tragopogon dubius, Ericameria nauseosa, Chrysothamnus viscidiflorus, Tetradymia canescens.*	Upper Slope and Crest	95% in fruit 5% vegetative	5% 1st year, 95% mature	SW, N/A Slight (0°-20°)	Plants occur at two locations approximately 900 feet apart. Gravelly soils.
8	July 19, 2017	36	14.28	Perennial grassland; *Hesperostipa comata* ssp. *comata, Poa secunda, Pseudoroegneria spicata, Astragalus spaldingii, Achillea millefolium, Epilobium brachycarpum, Linum lewisii* var. *lewisii, Tragopogon dubius, Chrysothamnus viscidiflorus.*	Mid-slope	100% in fruit	100% mature	N, Slight (0°-20°)	Scattered through native perennial grassland adjacent to planted grassland.
9	July 20, 2017 July 10, 2018	275	29.35	Perennial grassland. *Festuca idahoensis, Poa secunda, Pseudoroegneria spicata, Bromus tectorum, Poa bulbosa, Achillea millefolium, Astragalus spaldingii, Allium* sp., *Balsamorhiza careyana, Chrysothamnus viscidiflorus, Ericameria nauseosa, Tetradymia canescens.*	Mid-slope	60% in fruit 40% vegetative	30% 1st year 70% mature	SW, W; Slight (0°-20°)	Plants scattered in patches of native perennial grassland adjacent to planted grassland.

Pop. #	Dates Observed	# of Plants	Area Occupied within Survey Area (Acres)	Habitat and Associated Species	Landscape Position	Phenology	Age Class	Aspect, Gradient	Notes
10	July 12, 2018	40	2.24	Perennial grassland. *Pseudoroegneria spicata, Bromus tectorum, Vulpia microstachys, Achillea millefolium, Balsamorhiza careyana, Astragalus purshii, Astragalus spaldingii, Plantago patagonica, Tragopogon dubius, Ericameria nauseosa, Tetradymia canescens*.	Upper Slope and Crest	30% in fruit 70% vegetative	20% 1st year 80% mature	S; Slight (0°-20°)	Plants scattered in native perennial grassland adjacent to an active agricultural field.
11	July 12, 2018	5	0.61	Perennial grassland. *Pseudoroegneria spicata, Bromus tectorum, Achillea millefolium, Balsamorhiza careyana, Astragalus purshii, Astragalus spaldingii, Eriogonum compositum, Plantago patagonica, Tragopogon dubius, Ericameria nauseosa, Chrysothamnus visicidiflorus,*	Upper Slope	70% in fruit 30% vegetative	10% 1st year 90% mature	SW; Slight (0°-20°)	Plants scattered in native perennial grassland adjacent to an active agricultural field; approximately 0.9 mile SE of population 10.
12	July 12, 2019	16	2.17	Perennial grassland. *Pseudoroegneria spicata, Bromus hordeaceus, Bromus tectorum, Vulpia myuros, Achillea millefolium, Lagophylla ramosissima, Plantago patagonica.*	Crest	100% in fruit	100% mature	NW, Slight (0°-20°)	Plants found in small area of native perennial grassland within an active agricultural field.
Sessile mousetail (*Myosurus sessilis*)									
1	May 23, 2017 (revisited July 19, 2017)	500	0.22	In rocky vernal pools within grassland community, adjacent to dirt road. *Navarretia intertexta, Polygonum aviculare, Psilocarphus elatior, Myosurus minimus.*	Crest	50% in flower, 50% in fruit	100% mature	N/A, Slight (0°-20°)	Dominant species within two of several vernal pools; some plants appear to be hybrids between *M. minimus* and *M. sessilis.*

3.1.1 Laurence's Milkvetch

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 2017c). Twelve populations (i.e., groupings of individuals) were documented within the Survey Area, ranging from 1 to 275 plants, and occupying less than 0.01 to 41.38 acres (Table 2). All 12 populations were located in the southern half of the Proposed Site Boundary, on open, dry sites (Figure 2). All but one of the populations were located within native perennial grassland habitat. While the majority of Population 2 was located within native perennial grassland, several individuals were also observed within planted grassland habitat adjacent to and south of the main population (Table 2; Figure 2).

Tetra Tech documented Laurence's milkvetch populations throughout the June and July 2017, 2018, and 2019 survey periods, and all populations had fruit present, which are required to differentiate this variety from similar species and varieties that occur in the 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 2). Frequent associated species included the perennial grasses bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), bulbous bluegrass (*Poa bulbosa*), and Sandberg bluegrass (*Poa secunda*); the annual grasses cheatgrass (*Bromus tectorum*), soft brome (*B. hordeaceus*), and rattail fescue (*Vulpia myuros*); the forbs common yarrow (*Achillea millefolium*), Spalding's milkvetch (*Astragalus spaldingii*), woolly plantain (*Plantago patagonica*), 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, all underlain by basalt. Most plants were found in relatively high quality native perennial grassland habitat dominated by native species; however, a few plants were located in highly disturbed habitat, including in an area heavily infested with the noxious weed yellow star-thistle (*Centaurea solstitialis*), and adjacent to a gravel pit and gravel road. Additionally, a few plants were located in planted grassland habitat. However, often plants were notably absent from planted grassland habitat within the Survey Area, even where populations directly abutted or surrounded high quality planted grassland habitat.

3.1.2 Sessile Mousetail

Sessile mousetail is a tiny annual species that occurs in vernal pools, wetlands, and alkali flats in Oregon and California (Hitchcock and Cronquist 1973, Hitchcock and Cronquist 2018, Oregon Flora Project 2017a). Tetra Tech documented one population of sessile mousetail within two adjacent vernal pools in the 2017 Survey Area during wildlife surveys for the Project in May 2017. The sessile mousetail plants within the 2017 Survey Area were located in two rocky vernal pools adjacent to a dirt road, planted grassland habitat, and an active agricultural field. Approximately 500 sessile mousetail plants, encompassing approximately 0.22 acres, were documented within these two vernal pools. Associated species included needleleaf navarretia *(Navarretia intertexta),* prostrate knotweed (*Polygonum aviculare),* meadow woollyheads (*Psilocarphus elatior*), as well as

least mousetail (*Myosurus minimus*). Some plants appeared to be hybrids between sessile mousetail and least mousetail, showing intermediate characteristics between the two species.

The two additional vernal pools identified within the 2017 Survey Area during the June and July 2017 botanical surveys were not surveyed for sessile mousetail during the species' identification period (April – May). However, the previously documented sessile mousetail plants within the vernal pools surveyed in May 2017 were still present and identifiable when the population was revisited during the June and July 2017 botanical surveys; indicating that if the species was present within the two vernal pools identified in June and July, it would likely have been observed. As sessile mousetail plants or remnants of plants were not observed within the two additional vernal pools (marked as "potential sessile mousetail" on Figure 2) during the June and July 2017 surveys, there's a high likelihood that these vernal pools do not contain this species. Furthermore, several vernal pools surveyed in May did not contain sessile mousetail, despite being adjacent to vernal pools with sessile mousetail and appearing otherwise to be similar habitat for this species, indicating that a limited number of vernal pools within the area contain this state candidate species. As noted above, due to changes in locations of Project infrastructure, these two vernal pools located during the June and July 2017 botanical surveys are no longer located within 500 feet of Project infrastructure and therefore were not within the 2018 or 2019 survey areas (Figure 2).

During the May 2017 wildlife surveys, individuals of sessile mousetail were also observed within four additional vernal pools 1.2 miles to the southeast of the two vernal pools where sessile mousetail was documented, as discussed above (Figure 2). However, these four additional vernal pools are located outside the botanical Survey Area, so are not discussed in this report.

3.2 Noxious Weeds

Tetra Tech recorded 16 ODA-listed (ODA 2017b, ODA 2019) noxious weed species within the Survey Area, and documented the location and the estimated number of plants or the extent of the populations observed. Noxious weeds were most abundant along roadsides, within drainages, and within active and abandoned farming/ranching structures and corrals. Table 3 lists the noxious weed species observed, their noxious weed designation, and the frequency of observations.

Table 3. Noxious Weeds Located within the Survey Area

Scientific Name	Common Name	Status[1]	Frequency
Aegilops cylindrica	jointed goatgrass	B	Occasional large patches
Bassia (*Kochia*) *scoparia*	kochia	B	Abundant
Centaurea diffusa	diffuse knapweed	B*	Occasional large patches
Centaurea solstitialis	yellow star-thistle	B*	Abundant
Centromadia (*Hemizonia*) *pungens*	spikeweed	B	Few small patches
Chondrilla juncea	rush skeletonweed	B*, T	Several small to medium-sized patches
Cirsium arvense	Canada thistle	B*	Few small patches
Cirsium vulgare	bull thistle	B*	Few small patches

Scientific Name	Common Name	Status[1]	Frequency
Conium maculatum	poison hemlock	B*	Several medium to large-sized patches along drainages.
Convolvulus arvensis	field bindweed	B*	Abundant
Cynoglossum officinale	hound's tongue	B	Few small to medium-sized patches along drainages
Hypericum perforatum	common St. John's wort	B*	Occasional small patches
Onopordum acanthium	Scotch thistle	B	Many small to medium-sized patches
Taeniatherum caput-medusae	medusahead	B	Scattered medium-sized patches
Tribulus terrestris	puncture vine	B*	Few small to large-sized patches
Ventenata dubia	ventenata grass	B	Occasional small to large patches

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 2019). Species marked with a (*) are targeted for biocontrol.

Four noxious weed species were abundant throughout the Survey Area: yellow star-thistle, kochia (*Bassia* [*Kochia*] *scoparia*), Scotch thistle (*Onopordum acanthium*), and field bindweed (*Convolvulus arvensis*). Tetra Tech primarily documented yellow star-thistle along roads, in fallow fields, within a gravel pit, and along drainages. This species was frequently observed in large patches of up to 1,000 individuals. Kochia was abundant in lowland areas throughout the Survey Area, often occurring in patches of 500 to over 1,000 individuals along roads, drainages, and as a dominant species within abandoned farming/ranching structures and corrals. Scotch thistle was scattered throughout the Survey Area in small to medium patches along roadsides, drainages, grasslands, and within a gravel pit. Surveyors observed field bindweed in small to large patches along roads and drainages, as well as along grassland ridges.

Four other noxious weed species were observed in several locations within the Survey Area: rush skeletonweed (*Chondrilla juncea*), medusahead (*Taenatherum caput-medusae*), jointed goatgrass (*Aegilops cylindrica*), and diffuse knapweed (*Centaurea diffusa*). Tetra Tech frequently observed rush skeletonweed in small to medium patches of 1 to 200 individuals throughout the Survey Area, generally near roads. Medusahead was observed in several patches of approximately 50 to over 1,000 individuals, primarily near agricultural fields. Jointed goatgrass was observed in large infestations of up to or exceeding 1,000 individuals along roadsides and adjacent to agricultural fields, and diffuse knapweed was observed in patches of 1 to 500 individuals, primarily along roads.

Four noxious weed species were primarily restricted to drainages and riparian areas, or roads adjacent to those areas. These included poison hemlock (*Conium maculatum*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), and hound's tongue (*Cynoglossum officinale*). Poison hemlock was observed in several patches of 10 to 500 individuals. Canada thistle was

observed in a few small patches within drainages. Bull thistle was observed in a few small patches in drainages and along roads, and hound's tongue was observed in a few small to medium patches along roads and drainages.

Common St. John's wort (*Hypericum perforatum*), spikeweed (*Centromadia* [*Hemizonia*] *pungens*), puncturevine (*Tribulus terrestris*), and ventenata (*Ventenata dubia*) were observed in only a few patches. Common St. John's wort and spikeweed were observed in occasional small patches on grassland slopes, along roads, and in agricultural fields, while puncturevine was observed in a few small to large patches along roads and ventenata was observed in a few small to large patches on grassland slopes.

All noxious weed species observed were "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 2017b). One species, rush skeletonweed, is also a "T" designated weed, meaning that ODA has targeted this species for prevention and control (ODA 2019).

4.0 Conclusions

Botanical surveys in 2017, 2018, and 2019 documented one state threatened species (Laurence's milkvetch) and one state candidate species (sessile mousetail) 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 16 noxious weed species within the Survey Area. Noxious weeds were observed primarily in disturbed areas, such as along roadsides, within drainages, and within both active and abandoned farming/ranching structures and corrals.

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Figures

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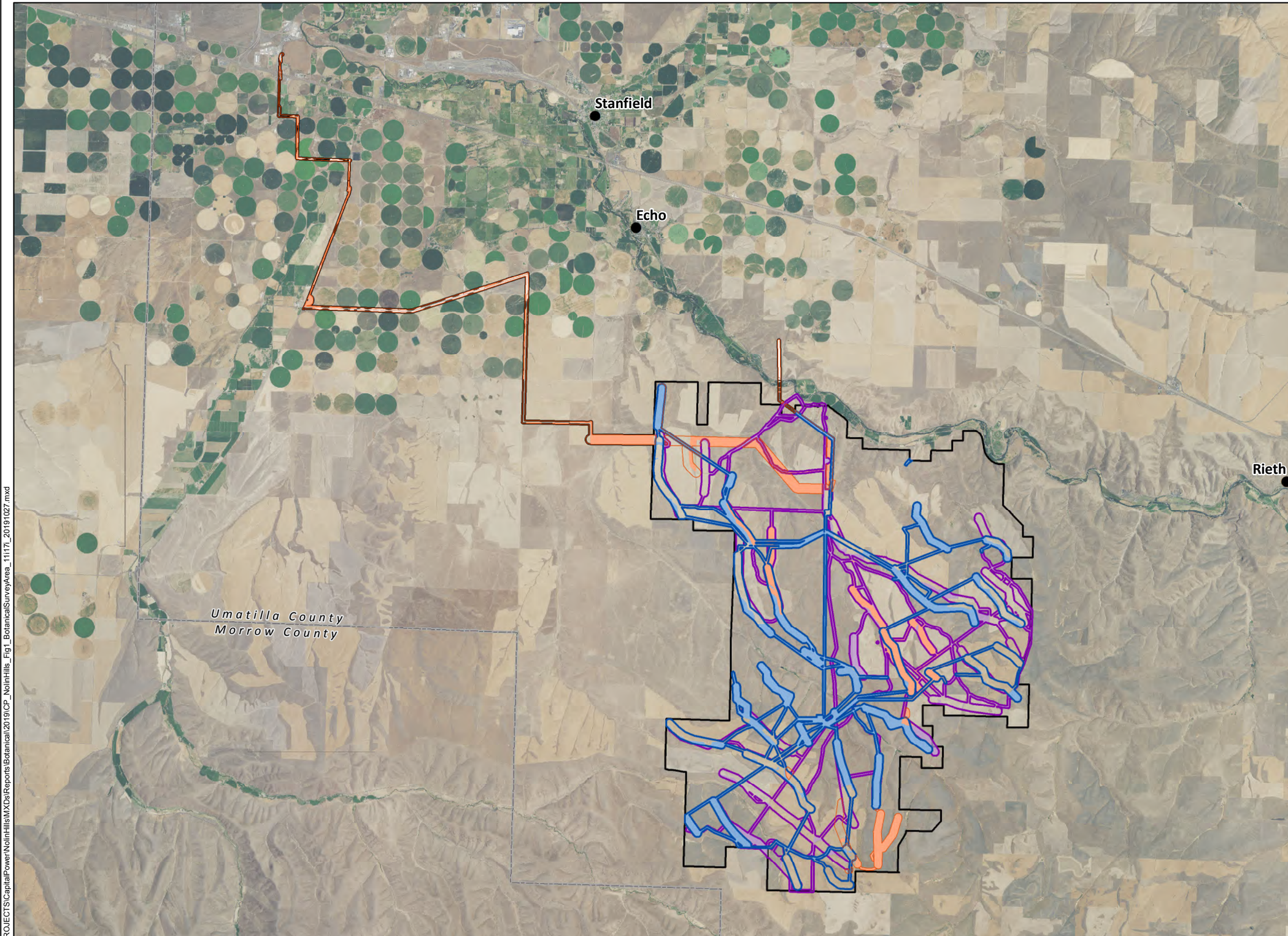
Nolin Hills Wind Power Project

Figure 1
Botanical Survey Area

UMATILLA COUNTY, OREGON

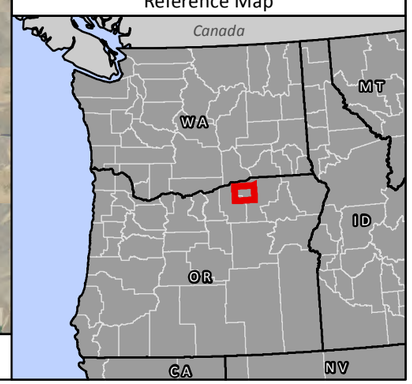


- Proposed Site Boundary (6/25/2019)
- County Boundary
- City/Town
- Botanical Survey Corridor (2017)
- Botanical Survey Area (2017)
- Botanical Survey Corridor (2018)
- Botanical Survey Area (2018)
- Botanical Survey Corridor (2019)
- Botanical Survey Area (2019)
- No Access (2019)

LOCATION OF SURVEY AREA IS APPROXIMATE AND SUBJECT TO CHANGE AS DESIGN INFORMATION IS REFINED.

TETRA TECH

Reference Map



1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Figure 2. Botanical Survey Results

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Attachment 1. Federal and State-Listed and ORBIC-Tracked Vascular Plant Species with the Potential to Occur at the Project

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Scientific Name	Common Name	Federal	State	ORBIC	Habitat	Survey Period
Abronia mellifera	white sand verbena			3	Dunes and sandy soils at low elevations (328-6562 feet).	Flowers May - July
Achnatherum richardsonii	Richardson needlegrass			2	Intermontane valley grasslands and meadows. Common on hillsides and dry plains, in open grassland or sagebrush benches, and in bottomlands, swales, and wooded slopes; also found on moraines and gravel outwash associated with streams.	July - September
Astragalus collinus var. *laurentii*	Laurence's milkvetch	SOC	T	1	Sandy or rocky soils overlying basalt on dry slopes mostly at elevations between 2,000 to 3,400 feet, although species has been reported at elevations as low as 400 feet.	Fruits needed; late May - August
Astragalus conjunctus var. *conjuctus*	Idaho milkvetch			3	Dry rocky slopes, scablands, and hilltops throughout the sagebrush desert, typically above 2,000 feet.	Bloom time typically April through June
Astragalus geyeri var. *geyeri*	Geyer's milkvetch			2	Depressions in mobile or stabilized dunes, sandy flats and valley floors.	April - July
Astragalus sclerocarpus	The Dalles milkvetch			4	Dunes and sandy barrens at low elevations; dry sandy banks and terraces in the steppe and lower montane zones.	Flowers in June
Astragalus succumbens	Columbia milkvetch			4	Sagebrush deserts, sandy barrens, and lower foothills.	Blooms April - June
Balsamorhiza rosea	rosy balsamroot			2	Dry, rocky slopes at low elevation.	Blooms April - May
Boechera cusickii	Cusick's rockcress			3	Sagebrush flats to open ponderosa pine forests, often on lithosol; basaltic bluffs, rocky slopes, rock crevices, gravelly hillsides, sagebrush hills, outcrops of volcanic rock at 1,965 -5,905 feet.	Blooms March - May

Scientific Name	Common Name	Federal	State	ORBIC	Habitat	Survey Period
Botrychium hesperium	western moonwort			2	Grassy mountain slopes, snow fields, road ditches with willows, and sand dunes at 656 to 9,186 feet.	Fertile late May - August
Botrychium lanceolatum	lanceleaf moonwort			4	Moist or wet places in the mountains, including moist open woodlands, meadows, and roadsides and occasionally canopy coniferous forests.	Leaves usually drying up in mid-summer
Carex cordillerana	Cordilleran sedge			2	Naturally disturbed, rocky slopes with organic layer and leaf litter in mesic mixed forests, or disturbed, open, grassy slopes; 1,640 - 7,874 feet.	Fruits late-May to late-July
Carex retrorsa	retrorse sedge			2	Swamps, wet thickets, often along streams, marshes, sedge meadows, shores of streams, ponds and lakes; 0-6234 feet.	May - September
Cryptantha rostellata	beaked cryptantha			3	Usually in scattered patches of a few individuals along dry, open drainages at 600 to 2,900 feet.	Flowers late April to May; identifiable through mid-June
Cypripedium montanum	mountain lady's slipper			4	Dry to moist open woods; low to mid-elevations in the mountains.	Blooms May - July (WTU) or Feb - Sept (FNA)
Eremothera (Camissonia) pygmaea	Dwarf evening-primrose		C	1	Found on dry plains and slopes with unstable soils or on gravel in steep talus, dry washes, banks and roadcuts at elevations of 490 to 1,970 feet.	June - August
Helianthus nuttallii	Nuttall's sunflower			3	Meadows and other moist places; low to moderate elevations in the mountains.	July - September
Heliotropium curassavicum	salt heliotrope			2	Saline places at low elevations, often in the beds of dried ponds.	June -September
Lygodesmia juncea	rush skeletonplant			3	Dry, open places, often in sandy soil.	June - September
Myosurus sessilis	Sessile mousetail	SOC	C	1	Vernal pools and alkali flats at elevations of 33 to 5,249 feet.	March - May

Scientific Name	Common Name	Federal	State	ORBIC	Habitat	Survey Period
Penstemon deustus var. *variabilis*	hot-rock penstemon			1	Dry foothills and lowlands, on open, dry, thin soils over basalt; 1,800 - 3,200 feet.	Blooms June to July
Symphyotrichum ericoides	white heath aster			3	Open, wet or dry places in the valleys and plains; tolerant of alkali.	July - September
Thelypodium sagittatum ssp. sagittatum	Arrow thelypody			3	Moist swales and meadows in sagebrush plains and scablands and moist alkaline meadows and salt flats that dry by mid-summer.	June - July
Trifolium douglasii	Douglas' clover	SOC		1	Moist to wet open meadows, forested wetlands, and stream banks.	Blooms June to July

Note: Highlighted species are target species (i.e., Federal and State Threatened, Endangered, and Candidate Vascular Plant Species with Potential to Occur at the Project).

Federal: SOC = Species of Concern

State: T= Threatened, C = Candidate

ORBIC List: 1=Threatened or Endangered Throughout Range, 2=Threatened or Endangered in Oregon but Secure Elsewhere, 3=Review, 4=Watch

Resources: http://oregonflora.org/rareplants.php, http://biology.burke.washington.edu/herbarium/imagecollection.php, http://www.dnr.wa.gov/NHPfieldguide, http://www.efloras.org/, https://inr.oregonstate.edu/sites/inr.oregonstate.edu/files/2019-rte-book.pdf, http://www.oregon.gov/ODA/programs/PlantConservation/Pages/ListedPlants.aspx

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Attachment 2. Vascular Plants Observed During 2017-2019 Field Surveys

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Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Achillea millefolium	common yarrow	N/I	
Achnatherum occidentale ssp. *pubescens*	common western needlegrass	N	
Aegilops cylindrica	jointed goatgrass	I	ODA Noxious Weed, B List
Agoseris grandiflora	large flowered agoseris	N	
Agoseris heterophylla var. *heterophylla*	annual agoseris	N	
Agropyron cristatum	crested wheatgrass	I	
Agrostis stolonifera	creeping bentgrass	I	
Allium sp.	wild onion	N	
Alyssum desertorum	desert alyssum	I	
Amaranthus albus	white pigweed, tumbling pigweed	I	
Ambrosia acanthicarpa	bur ragweed, annual bursage	N	
Amsinckia lycopsoides	bugloss fiddleneck, tarweed fiddleneck	N	
Antennaria dimorpha	low pussytoes	N	
Aristida purpurea	red three-awn, purple threeawn	N	
Artemisia tridentata	big sagebrush	N	
Astragalus collinus var. *collinus*	hillside milkvetch	N	
Astragalus collinus* var. *laurentii	**Laurence's milkvetch (Lawrence's milkvetch; Laurent's milkvetch)**	N	Threatened under the Oregon ESA.
Astragalus filipes	threadstalk milkvetch	N	
Astragalus lentiginosus	freckled milkvetch	N	
Astragalus purshii	woollypod milkvetch, Pursh's milkvetch	N	
Astragalus spaldingii	Spalding's milkvetch	N	
Balsamorhiza careyana	Carey's balsamroot	N	
Balsamorhiza serrata	serrate balsamroot, toothed balsamroot	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Bassia scoparia (*Kochia scoparia*)	kochia, burningbush	I	ODA Noxious Weed, B List
Bidens frondosa	leafy beggarticks. sticktight	N	
Brickellia oblongifolia	narrowleaf brickellia	N	
Bromus diandrus	ripgut brome	I	
Bromus hordeaceus (*B. mollis*)	soft chess; soft brome	I	
Bromus inermis	smooth brome	I	
Bromus japonicus (*B. arvensis*)	Japanese brome (field brome)	I	
Bromus tectorum	cheatgrass	I	
Buglossoides arvensis (*Lithospermum arvense*)	corn gromwell	I	
Calochortus macrocarpus var. *macrocarpus*	sagebrush mariposa lily	N	
Cenchrus longispinus	longspine sandbur	I	
Centaurea cyanus	cornflower, bachelor's button	I	
Centaurea diffusa	diffuse knapweed	I	ODA Noxious Weed, B List
Centaurea solstitialis	yellow star-thistle	I	ODA Noxious Weed, B List
Centromadia pungens ssp. *pungens* (*Hemizonia pungens*)	common spikeweed	I	ODA Noxious Weed, B List
Cerastium fontanum ssp. *vulgare*	common mouse-ear chickweed	I	
Ceratocephala testiculata	hornseed buttercup	I	
Chaenactis douglasii var. *douglasii*	dustymaidens, hoary false yarrow	N	
Chamaesyce glyptosperma (*Euphorbia glyptosperma*)	ribseed sandmat	N	
Chenopodium album	lamb's quarter, pigweed	I	
Chenopodium leptophyllum	slimleaf goosefoot, narrowleaf goosefoot	N	
Chondrilla juncea	rush skeletonweed	I	ODA Noxious Weed, B and T Designate

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Chorispora tenella	chorispora, purple field mustard, crossflower	I	
Chrysothamnus viscidiflorus	yellow rabbitbrush, green rabbitbrush	N	
Cirsium arvense	Canada thistle	I	ODA Noxious Weed, B List
Cirsium undulatum	wavy leaf thistle	N	
Cirsium vulgare	bull thistle	I	ODA Noxious Weed, B List
Collomia grandiflora	largeflowered collomia	N	
Collomia linearis	narrowleaf collomia	N	
Comandra umbellata	bastard toadflax	N	
Conium maculatum	poison hemlock	I	ODA Noxious Weed, B List
Convolvulus arvensis	field bindweed	I	ODA Noxious Weed, B List
Conyza canadensis	Canadian fleabane, horseweed	N	
Crepis atribarba	slender hawksbeard	N	
Crepis intermedia	intermediate hawksbeard, gray hawksbeard	N	
Croton setiger (*C. setigerus*)	dove weed, turkey mullein	N	
Cryptantha flaccida	weak stemmed cryptantha	N	
Cynoglossum officinale	common hound's tongue	I	ODA Noxious Weed, B List
Dieteria canescens var. *canescens* (*Machaeranthera canescens*)	hoary aster, hoary tansyaster	N	
Dipsacus fullonum (*D. sylvestris*)	Fuller's teasel, wild teasel	I	
Distichlis spicata	saltgrass	N	
Downingia bacigalupii	Bach's calico flower, Bach’s downingia	N	
Draba verna	spring whitlow grass, spring draba	I	
Echinochloa crus-galli	barnyard grass	I	
Elymus elymoides	squirreltail	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Elymus glaucus ssp. *glaucus*	blue wildrye	N	
Elymus trachycaulus ssp. *trachycaulus*	slender wheatgrass	N	
Epilobium brachycarpum	tall annual willowherb	N	
Epilobium campestre (*E. pygmaeum*)	smooth spikeprimrose	N	
Equisetum sp.	horsetail, scouring-rush	N	
Ericameria nauseosa	rubber rabbitbrush, gray rabbitbrush	N	
Erigeron filifolius	threadleaf fleabane	N	
Erigeron pumilus var. *intermedius*	shaggy fleabane	N	
Eriogonum compositum	arrowleaf buckwheat	N	
Eriogonum heracleoides var. *heracleoides*	parsnipflower buckwheat, Wyeth buckwheat	N	
Eriogonum niveum	snow buckwheat	N	
Eriogonum strictum var. *proliferum*	Blue Mountain buckwheat,	N	
Eriogonum strictum var. *strictum*	Blue Mountain buckwheat, strict buckwheat	N	
Eriogonum vimineum	wickerstem buckwheat, broom buckwheat	N	
Erodium cicutarium	redstem stork's bill, red-stemmed filaree	I	
Euthamia occidentalis (*Solidago occidentalis*)	western goldenrod	N	
Festuca idahoensis	Idaho fescue	N	
Festuca trachyphylla	sheep fescue, hard fescue	I	
Fritillaria pudica	yellow fritillary, yellow bells	N	
Gaillardia aristata	blanket flower, great flowered gaillardia	N	
Grindelia squarrosa var. *serrulata*	curlycup gumweed	N	
Gutierrezia sarothrae	broom snakeweed, matchweed	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Helianthus annuus	common sunflower	N	
Hesperostipa comata ssp. *comata (Stipa comata)*	needle-and-thread grass	N	
Heterotheca villosa var. *villosa*	hairy false goldenaster, hairy goldaster	N	
Hieracium scouleri (*H. cynoglossoides*)	Scouler's hawkweed, woolly weed	N	
Hordeum marinum ssp. *gussoneanum*	Mediterranean barley	I	
Hordeum murinum	wall barley, hare barley, mouse barley	I	
Hypericum perforatum	common St. John's wort, Klamathweed	I	ODA Noxious Weed, B List
Juncus bufonius	toad rush	N	
Juncus effusus	soft rush	N	
Juncus sp.	rush	N	
Juncus torreyi	Torrey's rush	N	
Koeleria macrantha	junegrass	N	
Lactuca serriola	prickly lettuce	I	
Lagophylla ramosissima	slender hareleaf, branched lagophylla	N	
Lamium amplexicaule	common deadnettle, henbit	I	
Lepidium perfoliatum	clasping pepperweed	I	
Leymus cinereus (Elymus cinereus)	Great Basin wildrye	N	
Limosella aquatica	mudwort, northern mudwort	N	
Linum lewisii var. *lewisii*	wild blue flax, western blue flax	N	
Lithospermum ruderale	western gromwell, Columbia puccoon	N	
Logfia arvensis (*Filago arvensis*)	field filago	I	
Lolium perenne	perennial ryegrass	I	
Lomatium papilioniferum (L. grayi)	Gray's lomatium, Gray's biscuitroot	N	
Lomatium sp.	desert-parsley, biscuit-root	N	
Lomatium triternatum	nineleaf biscuitroot	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Lupinus leucophyllus	velvet lupine	N	
Lycium barbarum	matrimony vine	I	
Madia exigua	little tarweed, threadstem madia	N	
Madia gracilis	slender tarweed, common tarweed	N	
Madia sativa	coast tarweed	N	
Marrubium vulgare	horehound	I	
Medicago sativa	alfalfa	I	
Melilotus officinalis	common yellow sweetclover, sweetclover	I	
Mentzelia laevicaulis	smoothstem blazingstar	N	
Myosurus x*alopecuroides*	mousetail (no common name)	N	
Myosurus minimus	least mousetail	N	
Myosurus sessilis	**sessile mousetail**	N	Candidate for listing under the Oregon ESA.
Nasturtium officinale	watercress	I	
Navarretia intertexta	needleleaf navarretia	N	
Oenothera pallida ssp. *pallida*	whitestem evening primrose	N	
Onopordum acanthium	Scotch thistle	I	ODA Noxious Weed, B List
Panicum capillare ssp. *capillare*	witchgrass	N	
Peritoma lutea (*Cleome lutea*)	yellow bee plant, yellow spiderflower	N	
Phacelia hastata	silverleaf phacelia, lanceleaf phacelia	N	
Phacelia heterophylla	varileaf phacelia, wand phacelia	N	
Phlox longifolia ssp. *longifolia*	longleaf phlox, long leaved phlox	N	
Phlox sp.	phlox	N	
Plagiobothrys leptocladus	slender branch plagiobothrys	N	
Plantago patagonica	woolly plantain, Indian wheat	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Plectritis macrocera	longspur white plectritis	N	
Poa annua	annual bluegrass	I	
Poa bulbosa	bulbous bluegrass	I	
Poa secunda	Sandberg's bluegrass	N	
Polygonum aviculare	prostrate knotweed	I	
Polypogon monspeliensis	rabbitsfoot grass, annual beardgrass	I	
Populus trichocarpa (P. balsamifera ssp. *trichocarpa*)	black cottonwood	N	
Pseudoroegneria spicata	bluebunch wheatgrass	N	
Psilocarphus elatior	tall woollyheads	N	
Robinia pseudoacacia	black locust	I	
Rosa woodsii var. *ultramontane*	Woods' rose, pearhip rose	N	
Rumex crispus	curly dock	I	
Rumex salicifolius	willow dock	N	
Salix amygdaloides	peach leaf willow	N	
Salix exigua	narrowleaf willow, coyote willow	N	
Salix lasiandra var. *lasiandra* (*S. lucida* ssp. *lasiandra*)	Pacific willow	N	
Salix sp.	willow	N	
Salsola tragus (S. kali)	prickly Russian thistle, tumbleweed	I	
Salvia dorrii	purple sage, gray ball sage	N	
Schedonorus arundinaceus (*Festuca arundinacea*)	tall fescue	I	
Schoenoplectus acutus	hardstem bulrush	N	
Schoenoplectus tabermaemontani	soft-stem bulrush	N	
Secale cereale	cereal rye, rye	I	
Sisymbrium altissimum	tumble mustard, tall tumblemustard	I	
Sisyrinchium idahoense	Idaho blue-eyed grass	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Solidago lepida	western Canada goldenrod	N	
Sphaeralcea grossulariifolia	gooseberry leaved globemallow	N	
Sphaeralcea munroana	whitestem globemallow, Munro's globemallow	N	
Sporobolus cryptandrus	sand dropseed	N	
Stellaria media	common chickweed	I	
Stephanomeria paniculate	stiff branched wirelettuce	N	
Taeniatherum caput-medusae	medusahead, medusahead rye	I	ODA Noxious Weed, B List
Tetradymia canescens	gray horsebrush, spineless horsebrush	N	
Thinopyrum intermedium ssp. *intermedium (Agropyron intermedium)*	intermediate wheatgrass	I	
Thinopyrum ponticum	tall wheatgrass	I	
Townsendia florifera	showy townsendia	N	
Tragopogon dubius	yellow salsify	I	
Tribulus terrestris	puncture vine, goat's head	I	ODA Noxious Weed, B List
Trifolium sp.	clover	N	
Triticum aestivum	wheat	I	
Typha latifolia	common cattail	N	
Urtica dioica	stinging nettle	N	
Ventenata dubia	ventenata, North Africa grass	I	ODA Noxious Weed, B List
Verbascum thapsus	flannel mullein, common mullein	I	
Verbena bracteata	bracted verbena	N	
Veronica anagallis-aquatica	water speedwell	I	
Veronica arvensis	corn speedwell	I	
Veronica peregrina	purslane speedwell	N	

Scientific Name (Synonym)	Common Name	Native or Introduced[1]	Notes
Vulpia microstachys	small fescue	N	
Vulpia myuros	rattail fescue, rat-tail six-weeks grass	I	
Xanthium strumarium	rough cocklebur	N	

Nomenclature and native status follow the Oregon Vascular Plant Checklist (Jaster et al. 2017) as used by the Oregon Flora Project (http://www.oregonflora.org/checklist.php).

Red type indicates a special status species.

1. N=Native, I=Introduced.

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Attachment 3. 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. Sessile mousetail (*Myosurus sessilis*) in flower.

Photo 6. Sessile mousetail in rocky vernal pool habitat.

Photo 7. Sessile mousetail in fruit.

Photo 8. Vernal pool dominated by sessile mousetail.

Nolin Hills Wind Power Project
Eagle Use Study Final Report
For
Year One: Spring 2017 – Winter 2017-2018
and Year Two: Spring 2018 – Winter 2018-2019

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1.0 Introduction

In the spring of 2017, Northwest Wildlife Consultants, Inc. (NWC), based in Pendleton, Oregon, was contracted by Capital Power Corporation to conduct a study of eagle use of the proposed Nolin Hills Wind Power Project (Project) located in Umatilla County, Oregon. The Project site is south of Nolin and the Umatilla River within the Columbia Plateau Ecoregion (CPE). Facilities are proposed within a Project boundary of approximately 44,900 acres of private land, zoned exclusive farm use. The Project would have a generation capacity of up to approximately 350 megawatts.

Land cover is predominantly grasslands, developed agriculture (dryland wheat), and pasture lands. There are also small amounts of shrub-steppe habitat and ephemeral riparian habitat. Scattered trees such as cottonwood and black locust are present in the draws, and small rock outcrops and talus are found on the slopes.

This study is part of a Tier-III assessment of the Project, as described in the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS, 2012) and was designed to meet the Eagle Conservation Plan Guidance for Land-Based Wind Energy (USFWS, 2013). This report describes methods and summarizes results from year one and year two of the study.

2.0 Methods

2.1 Surveys

Methods conformed to those prescribed by the USFWS in the Eagle Conservation Plan Guidance for Land-based Wind Energy (USFWS, 2013) and in Eagle Permits; Revisions of Eagle Incidental Take Permits and Take of Eagle Nests (USFWS, 2016a). The methods incorporate input from Oregon Department of Fish and Wildlife (ODFW) and USFWS personnel during a meeting held November 7, 2012. Agency personnel at that meeting were Mark Kirsch, ODFW District biologist, Marissa Meyer, USFWS La Grande Field Office, and David Leal, USFWS Oregon State Office eagle lead. Then on February 22, 2018, Capitol Power and NWC personnel had a meeting with USFWS personnel to apprise them of the status, plans, and methods of ongoing avian studies—including this eagle use study—on and near the Project.

Twenty-four 800-meter-radius survey plots were established within the study boundary (Figure 1), which was defined using a 1-kilometer buffer of proposed turbines (as provided to NWC by Capital Power in March 2017). The turbine layout changed in March 2018 (between year 1 and year 2); therefore, seven of the survey plots were moved (Figure 2). The area within the 24 plots used in year one represented 40.2% of the area within that year's study boundary (USFWS guidance suggests a minimum of 30%; USFWS, 2013); the area within the 24 plots used in year two represented 31.2% of the area within that year's study boundary. Plots were established in such a distribution as to provide good coverage of the habitat types and variation in topography within the study boundary, inclusive of the proposed turbine strings. Plots were non-overlapping, and were chosen to provide optimal surveying, offering a complete view in every case of the area contained in a cylinder of 800 meters radius and 200 meters height above ground.

The NWC golden eagle specialist (as defined in Pagel et al., 2010) positioned himself at the center of the plot and recorded all eagles seen or heard whether inside or outside the plots

during hour-long point counts. The surveyor also recorded other birds of interest, including raptors, waterfowl, wading birds and special status avian species. For current status information on state and federally listed vertebrate wildlife species and species with special status, NWC personnel referred to the USFWS's species list for Oregon (USFWS, 2016b), the Oregon Department of Fish and Wildlife's sensitive species list (ODFW, 2016), and the Oregon Biodiversity Information Center's list of rare, threatened, and endangered species of Oregon (ORBIC, 2016). Short-eared owl and sage thrasher were added to the list of other birds of interest based on discussions held with Oregon ODFW personnel prior to the initiation of biological studies (Kirsch, 2012).

Species, number, flight height, weather, habitat association, behavior and other general data were recorded. For eagles, the number of minutes spent flying within the cylinder ("exposure minutes") was also recorded. Eagle locations and flight paths were drawn on the data sheet. Observations and flight paths were recorded both inside and outside of the survey cylinder. Eagle flight paths and locations of perched eagles and mammal carcasses were digitized into a Global Positioning System. Exposure minutes excluded time during which eagles were perched (USFWS, 2013). Each plot was surveyed for one hour every other week (generally 12 plots per week), and survey starting point locations and times of day were alternated among surveys to reduce spatial and temporal bias. Surveys were not conducted when weather precluded visibility of the entire survey cylinder.

2.2 In-Transit

Detections of eagles and other birds of interest were also recorded while the surveyor traveled onsite between survey plots ("in-transit") within the study boundary. Whenever feasible, the same information was recorded as during surveys with the exception of eagle exposure minutes. Note that in-transit observations are not included in Tables 1 and 2; those are limited to eagles observed during surveys.

3.0 Results

3.1 Year One

The following results are for the period March 27, 2017 through March 21, 2018. All surveys were conducted according to schedule; no surveys for year one were missed (Table 1). This effort represents a total of 624 survey hours (37,440 survey minutes, Table 1). There were 23 avian species of interest recorded during the year one study (during surveys and in-transit combined). In-transit observations are discussed in more detail in the Nolin Hills avian use study report for spring 2017 through winter 2018 (Gerhardt and Gritski, 2018). The avian use study was conducted during the same seasons as the first year of this eagle use study.

3.1.1 Surveys

Eagles

There were three bald eagle detections during the hour-long surveys; all of these were during the winter season. One of the three bald eagle detections was while the surveyor was conducting a survey at **plot N**; it was feeding on a carcass outside the eagle use plot. Two bald eagle detections were at **plot L** during one survey; these were also outside the eagle use plot. None of the bald eagle detections were recorded inside the eagle use plot; therefore no exposure minutes were recorded.

There were four golden eagle detections during the hour-long surveys; all of these were during the winter season. Individual golden eagles were recorded inside the eagle use plot

while the surveyor was conducting surveys at **plots E, W**, and **C**. At **plots E** and **W**, individual golden eagles were perched within the plot throughout the hour-long survey (and no exposure minutes were recorded). At **plot C** there was one golden eagle exposure minute recorded; this eagle flew low across the plot from a carcass it had been feeding on outside the plot. A single golden eagle was recorded outside of **plot N** where it was feeding on a carcass; no exposure minutes were recorded.

The year one eagle locations and flight paths are shown in Figure 3, and shapefiles of these locations and flight paths are being submitted separately.

Other Birds

There were 16 other birds of interest recorded during the hour-long surveys in addition to the bald and golden eagles. Raptor species commonly recorded were northern harrier (141 detections), red-tailed hawk (62), rough-legged hawk (62), and Swainson's hawk (26). Less frequently observed were American kestrel (13 detections), prairie falcon (9) and ferruginous hawk (5). Four raptor species were documented once each; these were merlin, short-eared owl, sharp-shinned hawk, and great horned owl.

Of the raptor species recorded, ferruginous hawk is a state Sensitive-Critical species (ODFW, 2016), Swainson's hawk is a state Sensitive species, and short-eared owl was recorded at the request of ODFW (Kirsch, 2012). Other special status avian species recorded were long-billed curlew (55 detections; state Sensitive-Critical and federal Bird of Conservation Concern) and loggerhead shrike (once; state Sensitive; federal Bird of Conservation Concern).

Three species of waterfowl were recorded; these were Canada goose (2 birds), snow goose (one flock of 33), and greater white-fronted goose (2 birds).

3.1.2 In-Transit

Eagles

There were three detections of bald eagles in the winter season during the time that the surveyor was in-transit within the eagle use study boundary. Bald eagles were recorded on two different occasions when the surveyor was between **plots A** and **G**. The third detection was of a bald eagle feeding on a carcass between **plots U** and **S**.

There were four detections of golden eagles in the winter season during the time that the surveyor was in-transit within the eagle use study boundary. One of the four golden eagle detections was while the surveyor was in-transit between **plots S** and **V**. A golden eagle was recorded on two different days feeding on a carcass while the surveyor was in-transit between **plots S** and **U**. The fourth was recorded north of **plot X**; this golden eagle was also feeding on a carcass.

The year one in-transit eagle locations, and flight paths are shown in Figure 3, and shapefiles of those locations and flight paths are being submitted separately. Note that in-transit observations are not included in Tables 1 and 2; those are limited to eagles observed during surveys.

Other Birds

There were five other birds of interest recorded in addition to the bald and golden eagles discussed above while the surveyor traveled between plots that were not detected during the surveys; two of these were raptors—peregrine falcon and Cooper's hawk. Other species

recorded included yellow-breasted chat (federal Bird of Conservation Concern), sage thrasher, and American white pelican.

3.1.3 Carcasses

Several of the eagles detected within the survey area were either feeding on or found near a mammal carcass. Both bald and golden eagles scavenge, particularly in the winter when other prey are scarce or unavailable. Carcasses on which eagles were observed during year one of this study were two mule deer, a sheep, and a cow (Figure 3). Both deer were near roads, and presumably died when colliding with a vehicle. The cow and sheep, both adults, were each part of the herds that were pastured on the land in winter and spring.

3.2 Year Two

The following results are for the period March 26, 2018 through March 15, 2019. Two summer-season plot surveys were omitted due to extreme fire danger, and six winter-season plot surveys were missed due to snow preventing access. Those completed represent a total of 616 survey hours (36,960 survey minutes, Table 2). There were 21 avian species of interest recorded during year two of the study (during surveys and in-transit combined).

3.2.1 Surveys

Eagles

There was one bald eagle recorded during spring, and two bald eagle detections occurred during winter. These were at **plots XX**, **NN**, and **H**, respectively. The spring detection at **plot XX** resulted in one exposure minute. The bald eagle detected at **plot NN** during winter was higher than 200 meters throughout, and so there were no exposure minutes. The winter detection at **plot H** resulted in two exposure minutes.

There was one golden eagle recorded during fall, and two golden eagle detections occurred during winter. These were at **plots MM**, **I**, and **T**, respectively. The golden eagle at **plot MM** was higher than 200 meters throughout, and so no exposure minutes were recorded. The golden eagle at **plot I** was perched initially, and one exposure minute was recorded when it flew from the plot. The golden eagle at **plot T** remained outside the plot, and so no exposure minutes were recorded.

The year two eagle locations and flight paths are shown in Figure 4, and shapefiles of these locations and flight paths are being submitted separately.

Other Birds

There were 15 other avian species of interest recorded in addition to the eagles during the hour-long surveys. Raptor species commonly recorded were northern harrier (176 detections), rough-legged hawk (122), red-tailed hawk (82), short-eared owl (57), American kestrel (25), and Swainson's hawk (22). Less frequently recorded were prairie falcon (8), burrowing owl (7), turkey vulture (2), and merlin (1).

Other special status avian species recorded were long-billed curlew (22 detections), Sandhill crane (four groups totaling 246 individuals), snow goose (one group of 85), Canada goose (3 groups totaling 27 individuals), and 2 common nighthawks.

3.2.2 In-Transit

Eagles

There were two detections of bald eagles in the winter season during the time that the surveyor was in-transit within the eagle use study boundary. A bald eagle was recorded when the surveyor was between **plots EE** and **WW**, and another detection occurred while the surveyor was east of **plot CC**.

There were nine detections of golden eagles during the time that the surveyor was in-transit within the eagle use study boundary; one of these detections was during the spring season, six were during the fall season, and two were during the winter season. The spring season golden eagle detection was while the surveyor was in-transit between **plots S** and **UU**. The six fall season detections were south of **plot EE**, between **plots J** and **NN**, north of **plot I**, west of **plot MM** (2 golden eagles), and northeast of **plot J**, respectively. The two winter in-transit detections were between **plots EE** and **WW** and southwest of **plot WW**.

The year two in-transit locations and flight paths are shown in Figure 4, and shapefiles of those locations and flight paths are being submitted separately. Note that in-transit observations are not included in Tables 1 and 2; those are limited to eagles observed during surveys.

Other Birds

There were four avian species of interest recorded while in-transit that were not detected during the surveys. Three were raptors—ferruginous hawk (7 detections), Cooper's hawk (1), and great horned owl (3)—whereas the other was a passerine, loggerhead shrike (5).

3.2.3 Carcasses

During year two of the study, no carcasses were observed in association with eagle detections. Nonetheless, there may have been carcasses nearby (but out of sight to the surveyor). In winter, scavenging on carcasses is likely the main source of food for either eagle species within the Project area. The bald eagle and golden eagle detected together between Plots EE and WW in winter were in close proximity to a large band of sheep newly moved to that area.

4.0 References

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Table 1. Eagle activity within 24 800-meter survey plots during eagle use surveys at the Nolin Hills Wind Power Project, Umatilla County, Oregon, spring 2017 through winter 2017-2018 (year one).

Survey Event	Survey Date	Survey Hours	Plots Missed or not Completely Surveyed	Number of Eagles Observed		Exposure Minutes	
				Bald Eagle	Golden Eagle	Bald Eagle	Golden Eagle
Spring 2017							
1	March 27-28-29, 2017	11	0	0	0	0	0
	April 3-4, 2017	13	0	0	0	0	0
2	April 10-11, 2017	12	0	0	0	0	0
	April 18-19, 2017	12	0	0	0	0	0
3	April 25-26, 2017	11	0	0	0	0	0
	May 2-3, 2017	13	0	0	0	0	0
4	May 8-9, 2017	12	0	0	0	0	0
	May 17-18, 2017	12	0	0	0	0	0
5	May 22-23, 2017	12	0	0	0	0	0
	May 29-30, 2017	12	0	0	0	0	0
Spring Total		**120**	**0**	**0**	**0**	**0**	**0**
Summer, 2017							
6	June 5-6-7, 2017	12	0	0	0	0	0
	June 12-13-14, 2017	12	0	0	0	0	0
7	June 19-20, 2017	12	0	0	0	0	0
	June 27-28, 2017	12	0	0	0	0	0
8	July 3-4, 2017	12	0	0	0	0	0
	July 10-11-12, 2017	12	0	0	0	0	0
9	July 17-18-19, 2017	12	0	0	0	0	0
	July 24-25, 2017	12	0	0	0	0	0
10	July 31-August 1, 2017	12	0	0	0	0	0
	August 7-8, 2017	12	0	0	0	0	0
Summer Total		**120**	**0**	**0**	**0**	**0**	**0**
Fall, 2017							
11	August 15-16, 2017	12	0	0	0	0	0
	August 23-24, 2017	12	0	0	0	0	0
12	August 28-29, 2017	12	0	0	0	0	0
	September 4-5, 2017	12	0	0	0	0	0
13	September 11-12-13, 2017	12	0	0	0	0	0
	September 19-20, 2017	12	0	0	0	0	0
14	September 26-27-28, 2017	12	0	0	0	0	0
	October 2-3-4, 2017	12	0	0	0	0	0
15	October 9-10-11, 2017	12	0	0	0	0	0
	October 16-17-18, 2017	12	0	0	0	0	0

Survey Event	Survey Date	Survey Hours	Plots Missed or not Completely Surveyed	Number of Eagles Observed		Exposure Minutes	
				Bald Eagle	Golden Eagle	Bald Eagle	Golden Eagle
16	October 23-24-25, 2017	16	0	0	0	0	0
	October 30-31, 2017	8	0	0	0	0	0
Fall Total		**144**	**0**	**0**	**0**	**0**	**0**
Winter, 2017-2018							
1	November 6-7-8, 2017	16	0	0	0	0	0
	November 13-14, 2017	8	0	0	0	0	0
2	November 20-21-22, 2017	12	0	0	0	0	0
	November 28-29-30, 2017	12	0	0	0	0	0
3	December 5-6-7, 2017	16	0	0	0	0	0
	December 11, 2017	5	0	0	0	0	0
	December 12, 2018	3	0	0	1	0	0
4	December 18-19-20, 2017	16	0	0	0	0	0
	December 26-27, 2017	8	0	0	0	0	0
5	January 3-4-5, 2018	21	0	0	0	0	0
	January 10, 2018	3	0	0	0	0	0
6	January 16-17-18, 2018	12	0	0	0	0	0
	January 22-23-24, 2018	12	0	0	0	0	0
7	January 29-30, 2018	8	0	0	0	0	0
	January 31, 2018	4	0	0	1	0	1
	February 5-6, 2018	12	0	0	0	0	0
8	February 12, 2018	5	0	1*	1*	0	0
	February 13, 2018	3	0	2*	0	0	0
	February 14, 2018	4	0	0	0	0	0
	February 19, 2018	5	0	0	1	0	0
	February 20, 2018	7	0	0	0	0	0
9	February 26-27-28, 2018	12	0	0	0	0	0
	March 6-7-8, 2018	12	0	0	0	0	0
10	March 15-16, 2018	6	0	0	0	0	0
	March 19-20-21, 2018	18	0	0	0	0	0
Winter Total		**240**	**0**	**3**	**4**	**0**	**1**
Spring, 2017 through Winter, 2018 Total		**624**	**0**	**3**	**4**	**0**	**1**

* Observed during survey but not within the 800-meter plot.

Table 2. Eagle activity within 24 800-meter survey plots during eagle use surveys at the Nolin Hills Wind Power Project, Umatilla County, Oregon, spring 2018 through winter 2018-2019 (year two).

Survey Event	Survey Date	Survey Hours	Plots Missed or not Completely Surveyed	Number of Eagles Observed		Exposure Minutes	
				Bald Eagle	Golden Eagle	Bald Eagle	Golden Eagle
Spring 2018							
1	March 26-27, 2018	14	0	1	0	1	0
	April 6-7, 2018	10	0	0	0	0	0
2	April 10-11, 2018	15	0	0	0	0	0
	April 18-19, 2018	9	0	0	0	0	0
3	April 25-27, 2018	13	0	0	0	0	0
	April 30, 2018	4	0	0	0	0	0
	May 2, 2018	7	0	0	0	0	0
4	May 7-9, 2018	16	0	0	0	0	0
	May 15, 2018	8	0	0	0	0	0
5	May 23-23, 2018	11	0	0	0	0	0
	May 29-30, 2018	13	0	0	0	0	0
Spring Total		**120**	**0**	**1**	**0**	**1**	**0**
Summer 2018							
1	June 4-6, 2018	12	0	0	0	0	0
	June 14-15, 2018	12	0	0	0	0	0
2	June 19-21,2018	12	0	0	0	0	0
	June 26-27, 2018	12	0	0	0	0	0
3	July 3-4, 2018	16	0	0	0	0	0
	July 13, 2018	8	0	0	0	0	0
4	July 17-18, 2018	18	0	0	0	0	0
	July 23, 2018	6	0	0	0	0	0
5	August 1-2, 2018	12	0	0	0	0	0
	August 9-10, 2018	10	2	0	0	0	0
Summer Total		**118**	**2**	**0**	**0**	**0**	**0**
Fall, 2018							
1	August 15-16, 2018	12	0	0	0	0	0
	August 22-23, 2018	12	0	0	0	0	0
2	August 28-29, 2018	13	0	0	1	0	0
	September 3-4, 2018	11	0	0	0	0	0
3	September 10-11, 2018	13	0	0	0	0	0
	September 19-20, 2018	11	0	0	0	0	0

Survey Event	Survey Date	Survey Hours	Plots Missed or not Completely Surveyed	Number of Eagles Observed		Exposure Minutes	
				Bald Eagle	Golden Eagle	Bald Eagle	Golden Eagle
4	September 26-27, 2018	12	0	0	0	0	0
	October 3, 2018	8	0	0	0	0	0
	October 5, 2018	4	0	0	0	0	0
5	October 9-10, 2018	12	0	0	0	0	0
	October 16-17, 2018	12	0	0	0	0	0
6	October 24-25, 2018	12	0	0	0	0	0
	October 30-31, 2018	12	0	0	0	0	0
Fall Total		**144**	**0**	**0**	**1**	**0**	**0**
Winter, 2018-2019							
1	November 7-8, 2018	13	0	1	0	0	0
	November 13-14, 2018	11	0	0	0	0	0
2	November 20-21, 2018	11	0	0	0	0	0
	November 27-28, 2018	13	0	0	0	0	0
3	December 4-5, 2018	13	0	0	0	0	0
	December 11-12, 2018	11	0	0	0	0	0
4	December 18-20, 2018	14	0	0	1	0	1
	December 28-29, 2018	10	0	0	0	0	0
5	January 10-12, 2019	16	0	0	0	0	0
	January 16-17, 2019	8	0	0	0	0	0
6	January 17-18, 2019	8	0	0	0	0	0
	January 22-24, 2019	16	0	0	0	0	0
7	January 29-31, 2019	12	0	0	1*	0	0
	February 6-7, 2019	12	0	0	0	0	0
8	February 19-20, 2019	14	0	0	0	0	0
	February 21-22, 2019	10	0	1	0	2	0
9	February 28, March 1, 2019	10	4	0	0	0	0
	March 4-5, 2019	10	0	0	0	0	0
10	March 13-15, 2019	22	2	0	0	0	0
Winter Total		**234**	**6**	**2**	**2**	**2**	**1**
Spring, 2018 through Winter, 2019 Total		**616**	**8**	**3**	**3**	**3**	**1**

* Observed during survey but not within the 800-meter plot.

Figure 1. Study plots used for year one of eagle use study at Nolin Hills Wind Power Project, Umatilla County, Oregon.

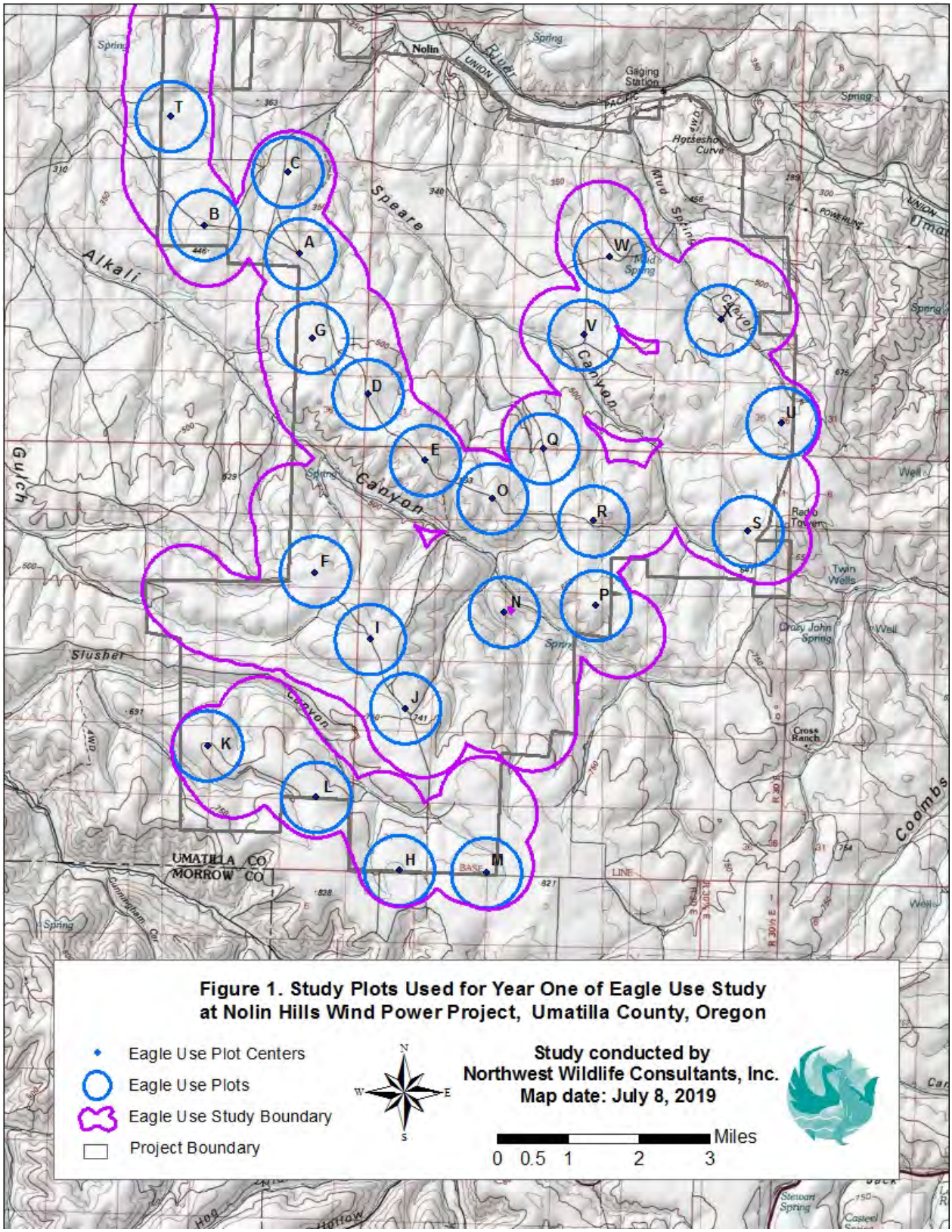


Figure 2. Study plots used for year two of eagle use study at Nolin Hills Wind Power Project, Umatilla County, Oregon.

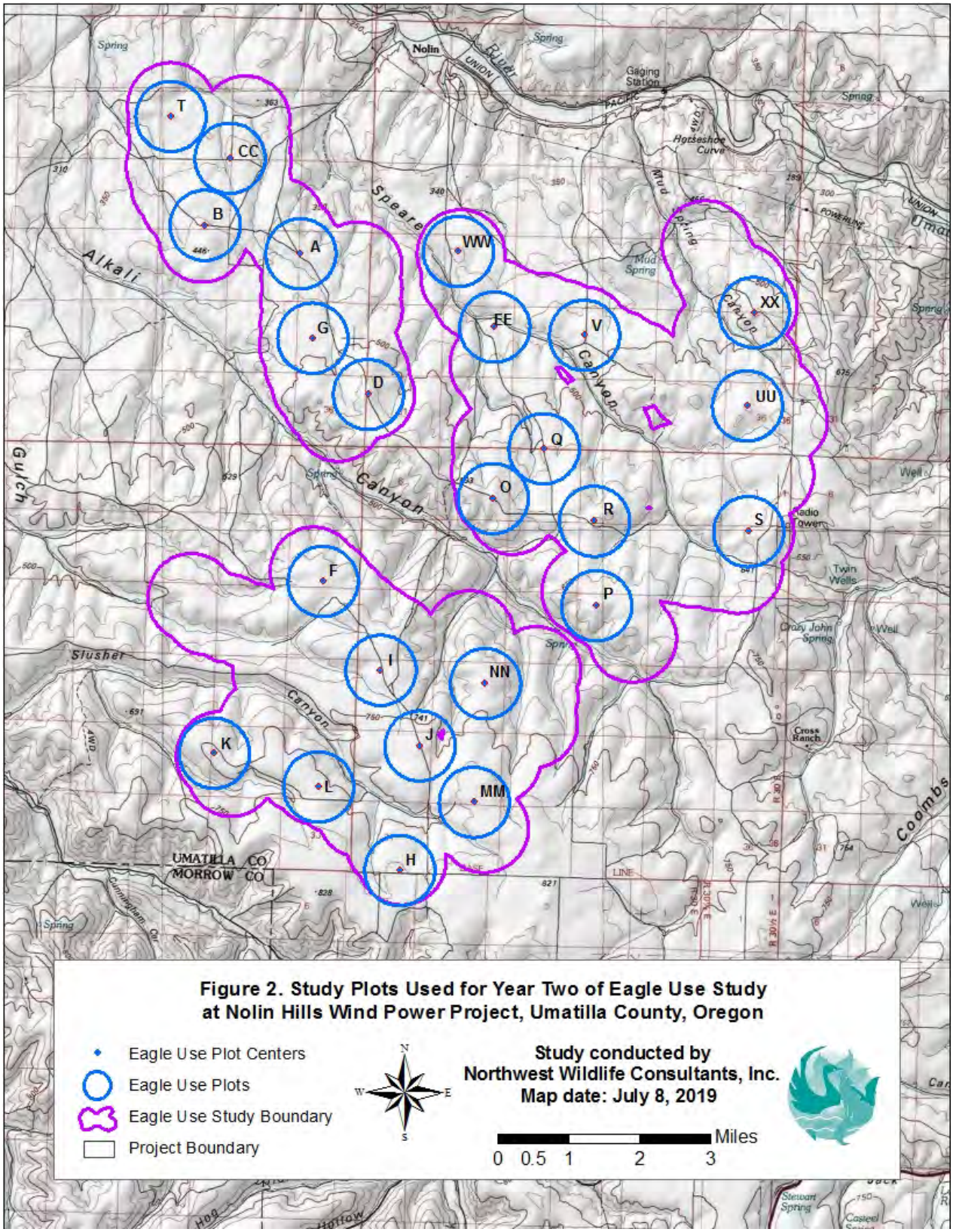


Figure 3. Eagle detections and flight paths during eagle use study at Nolin Hills Wind Power Project, spring 2017 – winter 2017-2018 (year 1).

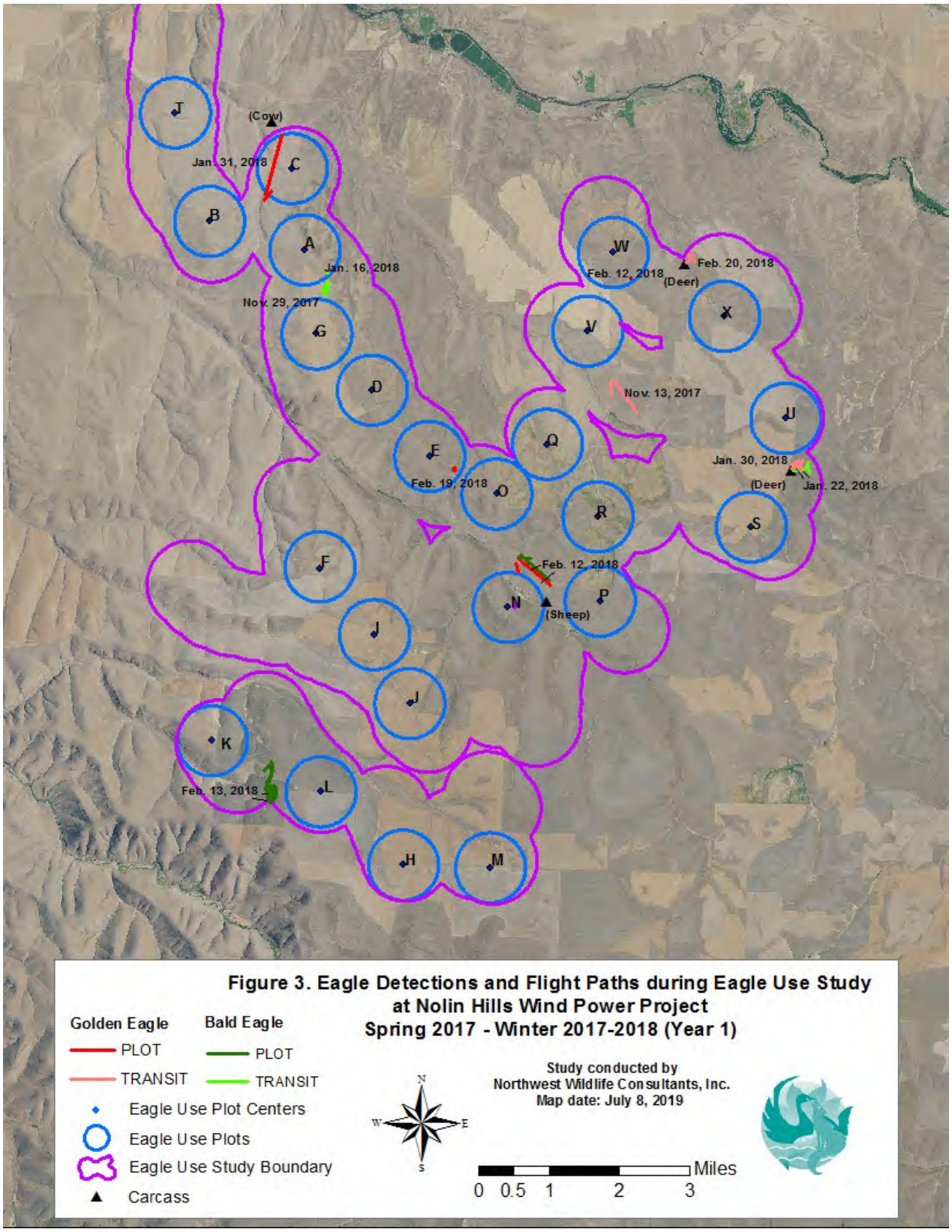
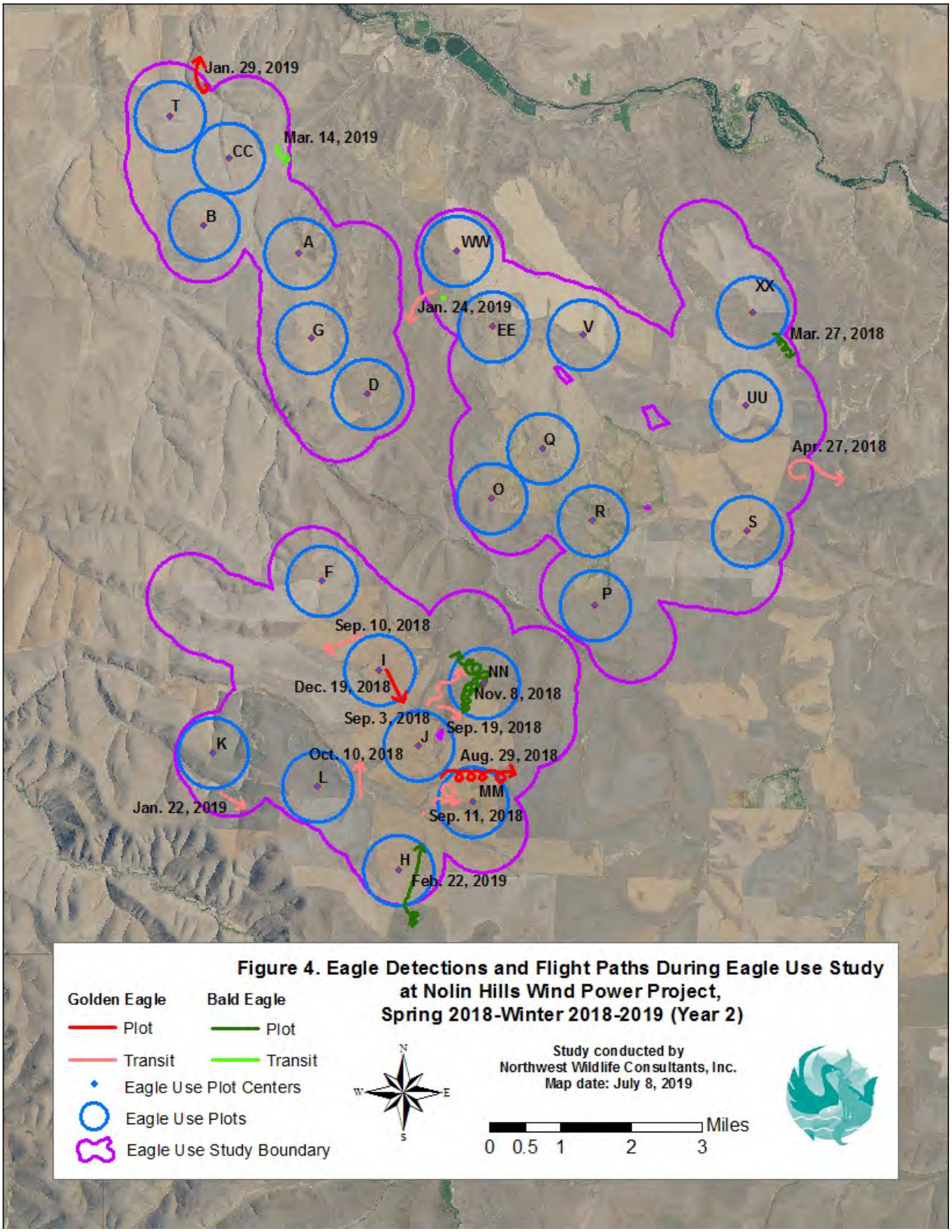


Figure 4. Eagle detections and flight paths during eagle use study at Nolin Hills Wind Power Project, spring 2018 – winter 2018-2019 (year 2).



Nolin Hills Wind Power Project
Avian Use Study Report
Spring, 2017 – Winter 2017-2018

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INTRODUCTION

In the spring of 2017, Northwest Wildlife Consultants, Inc. (NWC), based in Pendleton, Oregon, was contracted by Capital Power Corporation to conduct a study of avian use of the proposed Nolin Hills Wind Power Project (Project) located in Umatilla County, Oregon. The Project site is south of Nolin and the Umatilla River within the Columbia Plateau Ecoregion (CPE). Facilities are proposed within a Project boundary of approximately 44,900 acres of private land, zoned exclusive farm use (Figure 1). The Project would have a generation capacity of up to approximately 350 megawatts.

Land cover is predominately grasslands, developed agriculture (dryland wheat), and pasture lands. There are also small amounts of shrub-steppe habitat and ephemeral riparian habitat. Scattered trees such as black locust are present in the draws, and small rock outcrops and talus are found on the slopes.

This report describes the methods and results of avian use surveys initiated in late March 2017 and completed in late March 2018. Prior biological surveys conducted by NWC for the Project in 2010 and 2011 (November 2010 avian use surveys, 2011 raptor and eagle nest surveys) are not discussed in this report but are described in the site characterization study (Gerhardt, 2012).

The avian use study is part of a Tier-III assessment of the Project, as described in the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS, 2012). It follows objectives and methods originally described in the biological study plan (NWC, 2012) prepared for Element Power (who transferred the Project to Capital Power) and reviewed by personnel from the USFWS and the Oregon Department of Fish and Wildlife (ODFW) prior to and during a meeting held November 7, 2012. Agency personnel at that meeting were Mark Kirsch, ODFW district biologist, Marissa Meyer, USFWS La Grande Field Office, and David Leal, USFWS Oregon State Office eagle lead. NWC also conducted a Tier-II site characterization (Gerhardt, 2012) as described in the guidelines (USFWS, 2012), which helped inform the present study. Raptor nest surveys within the Project boundary and a 2-mile buffer were also conducted by NWC in 2017 (Gerhardt, 2017) and 2018 (Gerhardt, 2018), the results of which are relevant to understanding the results of this avian use study.

1.0 METHODS

1.1 Field Methods

Avian use surveys were conducted during diurnal hours using a variable circular-plot method (Reynolds et al., 1980) to obtain information on seasonal use, relative abundance, and flight altitudes of bird species within the Project boundary. Avian use is a metric that provides an index of the numbers of birds using the area within the Project boundary. Surveys were conducted weekly for an entire year.

Survey protocol of the avian use study was consistent with recommendations from the land-based wind energy guidelines (USFWS, 2012), and was originally described in a study plan (NWC, 2012) shared with personnel from ODFW and the USFWS prior to the initiation of studies. Survey methods were similar to those used at other CPE wind energy developments, including Echo Wind Farms (Gritski and Kronner, 2010), Rattlesnake Road Wind Farm (Kronner et al., 2007a), Wheat Field Wind Farm (Kronner et al., 2008), Willow Creek Wind Project (Kronner et al., 2007b), Leaning Juniper Phase 1 and Phase II Wind Projects (Kronner et al., 2005a; NWC, 2009), White Creek Wind Project (Kronner et al., 2005b), and Wheatridge Wind Project (Gerhardt and Anderson, 2014). Preconstruction studies conducted for these projects and at Nolin Hills involved recording each avian

detection (regardless of distance from observer or height), with data from within 800 meters (approx. 0.5 mile) used for most of the avian use analyses.

At the Project, sixteen 800-meter radius study plots were established in such a distribution as to be representative of the types and proportions of the habitat and of the topographic situations within the Project area, inclusive of the proposed turbine strings (Figure 1, in which the study area boundary represents a 1-km buffer of turbines as provided to NWC by Capital Power in April 2017). Plots were non-overlapping, and were chosen by an NWC avian biologist to provide excellent viewing conditions and thorough sampling of the proposed turbine strings. Experienced observers positioned at the center of the plot recorded all vertebrate wildlife seen or heard during 20-minute point counts. Survey starting point locations and times of day were alternated among surveys to reduce spatial and temporal bias. Species, number, flight height, weather, habitat association, behavior and other general data were recorded.

For current status information on state and federally listed vertebrate wildlife species and species with special status, NWC personnel referred to the U.S. Fish and Wildlife Service's species list for Oregon (USFWS, 2016), the USFWS list of Birds of Conservation Concern (USFWS, 2008), the ODFW sensitive species list (ODFW, 2016), and the Oregon Biodiversity Information Center's list of rare, threatened, and endangered species of Oregon (ORBIC, 2016). Collectively, these are referred to as special status species in this report. Species of interest for this avian use study include special status species as well as all raptor species and all waterfowl.

Flight paths of species of interest were hand-plotted on topographic maps in the field. Where meaningful patterns (migratory paths, breeding-season movements to and from nests, etc.) are detected, these flight paths may be used to illustrate such patterns for use in micrositing of turbines. Detections of species of interest were also recorded while the surveyor was in-transit, (i.e., traveling to and between survey plots).

All scheduled spring, summer, fall, and winter surveys were conducted (that is, there were no weather or road conditions that precluded the completion of any scheduled survey). In all, 864 20-minute avian use surveys were conducted, 160 between March 27, 2017 and May 30, 2017 (spring; 10 visits to each of the 16 plots), 160 between June 1, 2017 and August 14, 2017 (summer; 10 visits to each of the 16 plots), 192 between August 15, 2017 and October 31, 2017 (fall; 12 visits to each of the 16 plots), and 352 between November 1, 2017 and March 19, 2018 (winter; 22 visits to each of the 16 plots).

1.2 Data Metrics

Avian use metrics found in reports for wind power avian use studies conducted in the region (including those referenced above) were used in conducting the analyses for this Project. In all data analyses, only observations within 800 meters of the plot center were used. Standardized metrics were computed for avian species and species-groups; these included mean use, percent composition, and frequency of occurrence. Analyses are comparable to analyses performed for other regional proposed wind projects, many of which are now permitted and operational, and for some of which wind turbine avian fatality monitoring studies are completed. These comparisons will facilitate appropriate assessments of the potential risk to avian species of the operation of the proposed turbines. Such comparisons will, of course, involve region-wide differences among years (in species numbers) that cannot be controlled for or quantified.

2.0 RESULTS

2.1 Avian Use

Fifty-two avian species were recorded during 20-minute surveys of study plots (Table 1). None of these were state or federal Endangered, Threatened, or Candidate species. Eleven species of raptor were recorded, including three special status species, Swainson's hawk (state Sensitive; federal Bird of Conservation Concern), ferruginous hawk (state Sensitive-Critical; federal Bird of Conservation Concern), and bald eagle (federal Bird of Conservation Concern and protected under the Bald and Golden Eagle Protection Act [BGEPA]). Other special status species recorded were long-billed curlew (state Sensitive-Critical; federal Bird of Conservation Concern), loggerhead shrike (state Sensitive; federal Bird of Conservation Concern), grasshopper sparrow (state Sensitive), and common nighthawk (state Sensitive). One other species that is a federal Birds of Conservation Concern was detected during surveys of plots; a sage thrasher.

Twenty species of birds of interest were recorded while the surveyor was in-transit (Table 2). Six of these—golden eagle (protected under the BGEPA), peregrine falcon, yellow-breasted chat (all three being federal Birds of Conservation Concern), merlin, Cooper's hawk and American white pelican—were not recorded during surveys at plots.

2.1.1 Mean Use

Mean use (mean number of individuals within 800 m/20-min point count) is a metric that provides an index of the numbers of birds using the study area. Overall mean use across all seasons was dominated by passerines (Table 3), with highest mean use values during winter season (13.43), followed by spring (13.03), fall (11.71), and then summer (6.34). More than half of all passerine use was by horned lark (Table 3) with the highest mean use by horned larks in winter (11.77), followed by spring (8.77) fall (8.55) and summer (4.36). Horned larks were found in developed agriculture and grassland habitats, which together comprise the majority of the Project area, and in the less abundant shrub-steppe habitats; they were also detected at all study plots (Table 4). Additional passerines with the next highest mean use in descending order were western meadowlark (3.23 in spring, 0.95 in summer, 1.28 in fall, 0.47 in winter) followed by European starling, common raven and savannah sparrow all with a mean use value less than 0.50 in any one season.

Passerine mean use at each plot (Table 4) ranged between a low of 6.64 at **plot O** followed by 6.71 at **plot D** and 7.00 at **plot R** to a high of 24.17 at **plot U** trailed by 17.15 at **plot M** and 16.90 at **plot X**.

Raptor mean use was 0.23 in spring, when mean use was comprised mainly of northern harrier (0.07), rough-legged hawk (0.06) and Swainson's hawk (0.04). Overall raptor mean use was 0.21 in summer, when use was comprised mainly of Swainson's hawk (0.11) and red-tailed hawk (.05). Overall raptor mean use was 0.19 in fall; use was comprised mainly of red tailed hawk (0.06) and northern harrier (0.06). Overall raptor mean use was 0.39 in winter; use was comprised mainly of northern harrier (0.15) and rough-legged hawk (0.12; Table 3).

Raptor mean use at each plot (Table 4) varied from a low of 0.038 (at **plot E**) to a high of 0.923 (at **plot Q**). Plots with the next highest raptor mean use for the project were **M** (0.558) and **R** (0.462). At **plot Q**, the high mean use of raptors was mainly attributable to the presence within the plot of an active Swainson's hawk nest; throughout the breeding season of this species, one or more adults or young were recorded on nearly all surveys at this plot. In addition to **plot E**, the next lowest raptor mean use was recorded at **plot H** (0.096).

2.1.2 Percent Composition

Percent composition (mean use for a species/total use across all species, multiplied by 100) provides an estimate of the use of a particular species relative to the use by all other species. This metric is particularly useful for identifying whether any one species or group has a dominant presence in the study area. Passerines dominated over all other species groups, with 96.44% of all detections in spring season, 91.36% in summer season, 96.90% in fall season, and 96.82% in winter season. Horned lark, in particular, was the passerine species that had the highest percent composition in all four seasons, with 64.92% in spring season, 62.83% in summer season, 70.70% in fall season, and 84.86% in winter season (Table 3). All other passerine species that contributed more than 3% to overall composition in descending order were western meadowlark (23.88% in spring season, 13.68% in summer, 10.6% in fall, 3.40% in winter), European starling (3.88% in fall and 4.80% in winter), mourning dove (3.60% in summer), and common raven (3.15% in summer).

The raptor species with the highest percent composition were red-tailed hawk (0.72%) and northern harrier (0.36%) in summer, red-tailed hawk (0.52%) and northern harrier (0.52%) in fall, northern harrier (0.51%) and rough-legged hawk (0.42%) in spring, and rough-legged hawk (1.10%) and northern harrier (0.86%) in winter.

2.1.3 Frequency of Occurrence

Frequency of occurrence (percentage of 20-minute point counts in which a species was detected) provides an index of how often a species occurs in the study area. Passerines were detected on 100% of spring season surveys, followed by 91.15% of fall season surveys, 87.81% of winter season surveys, and 86.88% of summer season surveys. Horned larks were frequently observed during all seasons, with the highest percentage in spring season (100.00%) followed by fall (84.90%), winter (83.75%), and summer (62.83%). Western meadowlarks were most frequently observed in the spring (78.75%), followed by summer (36.25%), fall (27.60%), and winter (19.06%). All other species having more than ten percent frequency were common raven in spring (17.50%), winter (11.88%), and fall (10.94%), and savannah sparrow in spring (16.25%).

Raptors were detected on 18.75% of spring season surveys, on 13.75% of summer season surveys, on 15.63% of fall season surveys, and on 30% of winter season surveys. In the spring, northern harrier (6.25%), rough-legged hawk (5.00%) and red-tailed hawk (5.00%) occurred more frequently than other species. In summer, Swainson's hawk (5.63%) and red-tailed hawk (5.21%) were more frequently observed. In fall, northern harrier (6.25%) and red-tailed hawk (5.21%) were detected most often among raptor species. In winter, northern harrier (11.24%) and rough-legged hawk (10.94%) were the raptors most frequently observed.

2.2 Raptors

Fifteen species of raptors were detected, either during plot surveys (Table 1), while the surveyor was in-transit (Table 2), or both. Five species were relatively common; these were northern harrier (124 detections), red-tailed hawk (98), rough-legged hawk (76), Swainson's hawk (41) and American kestrel (35). Northern harrier is a ground-nesting, open-country species that hunts by flying low over fields; its year-round presence is expected in the grasslands associated with the Project. Red-tailed hawk and American kestrel, which both breed and winter in the CPE, require trees for nesting (and red-tailed hawk generally hunts from a perch). Both species were more frequently detected while the surveyor was in-transit—in woody draws—than during surveys of plots, in most of which few perches exist. Rough-legged hawk is another open-country species; it breeds in the Arctic in late spring and summer and was observed on the Project in spring, fall, and winter. Swainson's hawks were detected mostly in summer, followed by spring, and left on migration relatively early in the fall.

Short-eared owl was detected on three occasions on survey plots during winter surveys and on 18 occasions while the surveyor was in-transit. Prairie falcon, ferruginous hawk, and great horned owl breed on or near the Project (Gerhardt, 2017), and were detected on nine, eight, and five occasions, respectively (including both plot surveys and in-transit). (For more detail on ferruginous hawk, see section 2.4.1 below.) Bald eagles were detected on five occasions (two observations during plot surveys and three observations in-transit), all in winter, and golden eagles were detected on four occasions, all in winter, while the surveyor was in-transit. Raptor species having three or fewer detections during surveys or in-transit were sharp-shinned hawk (3), merlin (2), Cooper's hawk (1), and peregrine falcon (1).

Raptor Fall Migration

One objective of fall season avian use studies is to identify any raptor migration corridors that might exist on a proposed project (USFWS, 2012). At Nolin Hills, fall season surveys did not indicate any migration corridors. The topography is not conducive to southerly sailing flight, and no flights suggestive of migration were observed. The raptor species that comprise most of the southbound migration in the western United States were rarely observed (sharp-shinned hawk, merlin, peregrine falcon) or never observed (Cooper's hawk, osprey, turkey vulture, golden eagle, bald eagle) during fall season surveys.

2.3 Waterfowl and Wading Birds

A group of 11 American white pelicans was observed during spring while the surveyor was in-transit; these were flying an estimated 800 meters above the ground. One species of wading bird was detected on a plot; this was a single individual great blue heron during summer. Herons nest communally in rookeries, two of which were found along the Umatilla River to the north of the Project during 2017 and 2018 raptor nest surveys (Gerhardt, 2017; 2018).

2.4 Special Status Species

There were two detections during plot surveys and three in-transit detections of bald eagle (federal Bird of Conservation Concern and protected under the BGEPA). There were four in-transit detections of golden eagle (protected under the BGEPA). NWC is conducting a two-year study of eagle use of the Project, and further discussion of the presence on the Project of these two species can be found in the interim results of that study (Gerhardt and Gritski, 2018). Three other federal Birds of Conservation Concern were documented, sage thrasher (during surveys of plots; Table 1) and peregrine falcon and yellow-breasted chat (in-transit; Table 2).

Six ODFW special status avian species were detected during the four-season avian use study. These were ferruginous hawk, Swainson's hawk, long-billed curlew, loggerhead shrike, grasshopper sparrow and common nighthawk. This section discusses each of the species' spatial use of the study area. It describes number of observations and such factors as location, flight height, and habitat that might help assess risk of the Project to individuals of these species. The context in which to assess observed flight heights is that proposed turbine rotor tips would reach to a minimum height above the ground of 22 meters and a maximum height above the ground of 180 meters (as provided to NWC by Capital Power in June 2018).

2.4.1 Ferruginous Hawk

Surveys

Individual ferruginous hawks were detected within study plots three times during spring surveys, twice at **plot C** and once at **plot V** (Figure 1). Maximum flight height during these three detections was 15 meters, 3 meters, and 10 meters. At both plots, flights took these

individuals over both grassland and developed agricultural. No ferruginous hawks were detected within plots during summer, fall, or winter surveys.

In-transit

Individual ferruginous hawks were detected once in spring, three times in summer, and once in winter while the surveyor was in-transit in the study area. Two of these (one spring and one summer) were adults likely associated with the active nest northwest of **plot Q** (Gerhardt, 2017); flight heights of these two detections were 5 meters and 50 meters. One of the summer detections was near **plot S**; flight height was 15 meters over developed agriculture. The other summer detection was of an adult flying low (2 meters high) over developed agriculture northwest of **plot G** (Figure 1). The winter detection was in developed agriculture north of Plot B, and the flight height was 1 meter.

2.4.2 Swainson's Hawk

Surveys

Swainson's hawk was detected within study plots six times (seven birds) during spring season, twice each at **plots Q** and **H** (Figure 1), and once each at **plots B** (two adults together) and **R**. All of these were in developed agriculture or grassland habitats; three of these individuals remained at flight heights below 15 meters, whereas the other four had flight heights between 20 and 200 meters. The two birds at **plot H** were following farm machinery as they plowed the field.

During summer season, there were 11 detections (17 total birds) within study plots. Individual adults were observed once at **plot H** (flying 1 meter high over developed agriculture, again following farm machinery) and once at **plot C** (perched in grassland habitat). The other nine detections (15 birds) were at **plot Q**, which contained an active nest of this species (in a dead locust tree approximately 350 meters from the plot center and surrounded primarily by grassland habitat). Six detections involved the adults, either perched in the nest or nest tree (three times) or flying over (three times) at heights ranging from 30 to 300 meters, screaming in apparent territorial defense at the surveyor. Six of the detections involved one or both of the nestlings, the second of which didn't fledge until the first week of August.

Individual Swainson's hawks were detected within study plots three times during fall season, once at **plot Q** (flying below 10 meters over grassland habitat) and twice at **plot U** (one flying below 2 meters and one flying between 10 and 30 meters, both over developed agriculture).

Across all three seasons (Swainson's hawks spend our winter in South America), this species was detected at six of the sixteen study plots. Swainson's hawk mean use was highest (0.563) at **plot Q**, with the next highest mean use (0.094) at **plot H** (Table 4).

In-transit

Individuals or pairs of Swainson's hawks were detected on four occasions (six total birds) during spring while the surveyor was in-transit in the study area (Table 2). All of these detections were over developed agriculture or grassland habitat. One detection (of a pair of adults flying at approximately 100 meters high) was just south of **plot Q** (and the active nest); the other pair detection (also flying at approximately 100 meters) was near **plot D.** Detections of individuals were between **plots J and R** (flying at approximately 25 meters high) and between **plots I and J** (at approximately 150 meters high).

Individuals or pairs of Swainson's hawks were detected on five occasions (six total birds) during summer while the surveyor was in-transit in the study area (Table 2). All of these detections were over developed agriculture or grassland habitat. One detection (of a pair of

adults flying at approximately 100 meters high) was between **plots D and E**. Two detections were of perched birds to the northeast of **plot H** and one was of a perched bird northeast of **plot J**. The other detection was of an adult perched and then flying less than 2 meters high south of **plot Q** (and of the active nest).

There were two detections during fall while the surveyor was in-transit in the study area (Table 2). One (an adult flying less than 5 meters high) was south of **plot Q** and of the nest that had been active earlier in the year. The other was of an individual flying 1 meter above developed agriculture north of **plot B**.

2.4.3 Long-billed Curlew

Surveys

Long-billed curlew was detected eight times (11 total birds) within study plots during spring season. The species was detected twice at **plot C** and once each at **plots H, J, B, M, R, and U** (Figure 1). Detections occurred in both grasslands and developed agriculture, and recorded flight heights varied between 0 and 50 meters, with five of eight detections involving maximum flight heights of 10 meters. During summer season, long-billed curlew was detected three times (5 total birds) within study plots. Two detections were at **plot C** and one was at **plot I**. Detections were in both grasslands and developed agriculture, and maximum flight height varied between 0 and 10 meters. This species was not detected during fall or winter seasons, as curlews abandon the breeding grounds in mid-summer to spend the remainder of the year in coastal habitats.

In-transit

Individuals, pairs, or groups of long-billed curlews were detected on ten occasions (26 total birds) during spring while the surveyor was in-transit in the study area. Two detections were north of **plot V**, one was within **plot S**, and one was between **plots B and C**; the remainder were all between **plots J and I** or **northwest of I** (Figure 1). All of these detections were in either grasslands or developed agriculture; most involved flight heights of no more than 5 meters, but three detections involved maximum flight heights of 10 meters, 20 meters, and 25 meters. During summer, there were two detections—one of three birds and one of four birds—while the surveyor was in-transit traveling northwest of **plot I**. This family group was in both grasslands and developed agriculture, and maximum flight height associated with these two detections was 3 meters.

2.4.4 Loggerhead Shrike

Surveys

No loggerhead shrikes were detected within study plots during spring season. During summer season, this species was detected twice, both within **plot J** (Figure 1). On one occasion, there was a single individual near the plot center in developed agriculture; on another, a family group of five was detected in shrub-steppe habitat at the head of the canyon that extends to the north from this plot. A single individual was recorded during fall season; this was in developed agriculture within **plot V**. A single individual was recorded during winter season; this was in developed agriculture within **plot J**. Maximum flight height for all of these detections was 2 meters.

In-transit

Individual loggerhead shrikes were detected on six occasions during spring while the surveyor was in-transit within the study area (Table 2); all of these were in shrub-steppe habitat in the canyon between **plots J and Q**. Individuals, pairs, or family groups (36 birds total) were detected on ten occasions during summer while the surveyor was in-transit on the study area. All of these detections were in shrub-steppe habitat; one was of an individual northeast of **plot S**, and all others were in the canyon between **plots J and Q**.

There were three in-transit detections of individual loggerhead shrikes during fall season. Two of these were in developed agriculture and grassland habitats near **plot S**; the other was in shrub-steppe habitat in the draw to the northeast of **plot J**. There was one in-transit detection during winter season; this was in shrub-steppe habitat northeast of **plot J**. Nearly all detections of loggerhead shrike were associated with two or three successful breeding attempts in the shrub-steppe habitat within this single canyon. Maximum flight height of all in-transit detections was 2 meters.

2.4.5 Grasshopper Sparrow

Surveys

Grasshopper sparrows were detected on 12 occasions (19 individuals) during spring and 13 occasions (23 individuals) during summer within study plots (Table 1). Most were singing males; most were associated with grassland or developed agriculture habitats, with a smaller number in shrub-steppe habitat. Maximum flight height for all grasshopper sparrow detections was 1 meter. This species was detected at nine of the 16 plots (Table 4), and had its highest mean use of 0.406 at **plot Q**, which contained a high percentage of tall grasses. No detections occurred during fall or winter seasons, as this species migrates south relatively early and those that may remain longer cease singing; the last detections were on July 18.

In-transit

This species was not (and is not easily) detected while the surveyor was in-transit (Table 2).

2.4.6 Common Nighthawk

Surveys

Common nighthawks were detected on four occasions (7 individuals) during the summer. Flights heights varied between 40 and 300 meters. This species was recorded at four of the 16 plots (Table 4), and had a mean use of 0.125 at **plot D**. One detection occurred at each of **plots O, G, and X**. In addition, a nest with two eggs was found within 20 meters of the center of **plot R**. No detections occurred during spring, fall, or winter seasons, as this species migrates north relatively late and south relatively early; the first detection was on June 6 and the last detection was on July 18.

In-transit

This species was not detected while the surveyor was in-transit (Table 2).

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4.0 TABLES

Table 1. Species (groups and individuals) observed within 800-meter avian use plots at Nolin Hills Wind Power Project during the 2017-2018 four-season study

Species	Spring		Summer		Fall		Winter		Total	
	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind
Raptor		**37**		**33**		**36**		**126**		**232**
Accipiter		*0*		*0*		*1*		*0*		*1*
Sharp-shinned hawk	0	0	0	0	1	1	0	0	1	1
Buteos		*24*		*25*		*16*		*63*		*128*
Ferruginous hawk*	3	3	0	0	0	0	0	0	3	3
Rough-legged hawk	8	9	0	0	1	1	37	38	46	48
Red-tailed hawk	5	5	7	8	11	12	22	25	45	50
Swainson's hawk*	6	7	11	17	3	3	0	0	20	27
Eagles		*0*		*0*		*0*		*2*		*2*
Bald eagle*	0	0	0	0	0	0	2	2	2	2
Falcons		*2*		*4*		*7*		*8*		*21*
American kestrel	2	2	3	3	5	6	6	6	16	17
Prairie falcon	0	0	1	1	1	1	2	2	4	4
Harriers		*11*		*4*		*12*		*49*		*76*
Northern harrier	10	11	4	4	12	12	44	49	70	76
Owls		*0*		*0*		*0*		*4*		*4*
Great-horned owl	0	0	0	0	0	0	1	1	1	1
Short-eared owl	0	0	0	0	0	0	3	3	3	3
Gamebirds		**17**		**10**		**18**		**3**		**48**
California quail	0	0	1	1	0	0	0	0	1	1
Gray partridge	1	1	0	0	1	15	0	0	2	16
Ring-necked pheasant	13	16	6	9	3	3	3	3	25	31
Shorebird		**11**		**5**		**0**		**0**		**16**
Long-billed curlew*	8	11	3	5	0	0	0	0	11	16
Wading bird		**0**		**1**		**0**		**0**		**1**
Great blue heron	0	0	1	1	0	0	0	0	1	1
Doves		**11**		**40**		**18**		**10**		**79**
Mourning dove	4	11	11	40	3	18	1	2	19	71
Rock pigeon	0	0	0	0	0	0	1	8		8
Goatsucker		**0**		**7**		**0**		**0**		**7**
Common nighthawk*	0	0	4	7	0	0	0	0	4	7
Passerines		**2084**		**1015**		**2249**		**4298**		**9646**

Species	Spring		Summer		Fall		Winter		Total	
	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind
Songbirds		*2046*		*971*		*2213*		*4187*		*9417*
American goldfinch	0	0	0	0	3	9	3	3	6	12
American pipit	0	0	0	0	2	40	0	0	2	40
American robin	0	0	0	0	1	12	0	0	1	12
Barn swallow	6	8	4	7	7	23	0	0	17	38
Brewer's blackbird	2	6	2	11	3	23	0	0	7	40
Bullock's oriole	1	3	2	11	0	0	0	0	3	14
Cliff swallow	1	1	5	25	1	40	0	0	7	66
Dark-eyed junco	0	0	0	0	1	1	3	30	4	31
Eastern kingbird	0	0	2	2	0	0	0	0	2	2
European starling	5	12	3	6	9	90	13	213	30	321
Golden-crowned kinglet	0	0	0	0	1	1	0	0	1	1
Grasshopper sparrow*	12	19	13	23	0	0	0	0	25	42
Horned lark	160	1403	130	698	164	1641	517	3767	971	7509
House finch	0	0	0	0	6	40	2	2	8	42
Lapland longspur	0	0	0	0	0	0	3	10	3	10
Loggerhead shrike*	0	0	2	6	1	1	1	1	4	8
Mountain bluebird	0	0	1	1	1	1	0	0	2	2
Red-winged blackbird	2	4	1	1	0	0	1	5	4	10
Rock wren	2	3	2	2	7	8	0	0	11	13
Sage thrasher*	0	0	0	0	1	1	0	0	1	1
Savannah sparrow	26	53	2	3	12	24	0	0	40	80
Say's phoebe	1	1	4	5	1	1	1	1	7	8
Tree swallow	0	0	1	3	0	0	0	0	1	3
Tricolored blackbird	0	0	1	8	0	0	0	0	1	8
Vesper sparrow	0	0	0	0	4	6	0	0	4	6
Violet-green swallow	0	0	0	0	1	2	0	0	1	2
Western kingbird	3	9	3	7	0	0	0	0	6	16
Western meadowlark	126	516	58	152	53	246	61	151	298	1065
White-crowned sparrow	5	8	0	0	1	3	1	4	7	15
Corvids		*38*		*44*		*36*		*111*		*229*
Black-billed magpie	2	3	2	9	2	3	8	37	14	52
Common raven	28	35	10	35	22	28	39	74	79	172
Western scrub-jay	0	0	0	0	1	5	0	0	1	5
Woodpecker		**1**		**0**		**0**		**2**		**3**
Northern flicker	1	1	0	0	0	0	2	2	3	3
Totals	**443**	**2161**	**300**	**1111**	**346**	**2321**	**777**	**4439**	**1866**	**10032**

Seasons: Spring – March 27 through May 31, 2017; Summer – June 1 through August 14, 2017; Fall – August 15 through October 31, 2017; Winter – November 1, 2017 through March 19, 2018.

*Special status species; for state and federal status, refer to text in section 2.0.

Table 2. Species and number of observations recorded while surveyor was in-transit at Nolin Hills Wind Power Project during the 2017-2018 four-season study.

Species*	Observed Only In-Transit	Spring 2017	Summer 2017	Fall 2017	Winter 2017-18	Total
Waterfowl		**11**	**0**	**0**	**0**	**11**
American white pelican	X	11	0	0	0	11
Raptor		**44**	**40**	**41**	**76**	**201**
Accipiter		*0*	*0*	*2*	*1*	*3*
Cooper's hawk	X	0	0	0	1	1
Sharp-shinned hawk		0	0	2	0	2
Buteo		*28*	*25*	*13*	*29*	*95*
Ferruginous hawk**		1	3	0	1	5
Red-tailed hawk		10	16	10	12	48
Rough-legged hawk		11	0	1	16	28
Swainson's hawk**		6	6	2	0	14
Eagle					*7*	*7*
Bald eagle**		0	0	0	3	3
Golden eagle**	X	0	0	0	4	4
Falcon		*2*	*5*	*14*	*5*	*26*
American kestrel		2	4	9	3	18
Merlin	X	0	0	2	0	2
Peregrine falcon**	X	0	0	1	0	1
Prairie falcon		0	1	2	2	5
Harrier		*12*	*7*	*12*	*17*	*48*
Northern harrier		12	7	12	17	48
Owl		*2*	*3*	*0*	*17*	*22*
Great horned owl		1	0	0	3	4
Short-eared owl		1	3	0	14	18
Shorebird		**26**	**7**	**0**	**0**	**33**
Long-billed curlew**		26	7	0	0	33
Passerine		**6**	**40**	**3**	**1**	**50**
Loggerhead shrike**		6	36	3	1	46
Sage thrasher		0	3	0	0	3
Yellow-breasted chat**	X	0	1	0	0	1

Species*	Observed Only In-Transit	Spring 2017	Summer 2017	Fall 2017	Winter 2017-18	Total
Total		**96**	**124**	**58**	**77**	**295**

*Table includes avian species of interest (such as waterfowl, raptors and special status species) that were observed incidentally while traveling in-transit near survey plots. As with the plot observations, for species with more than one observation, individuals may have been counted more than once during the survey and/or during the season.

Seasons: Spring – March 27 through May 30, 2017; Summer – June 5 through August 8, 2017; Fall – August 15 through October 31, 2017; Winter – November 1, 2017 through March 19, 2018

**Special status species; for state and federal status, refer to text in section 2.0.

Table 3. Mean use, percent composition, and percent frequency of occurrence for avian groups observed during avian use study at Nolin Hills Wind Power Project during the 2017-2018 four-season study.

Species *Denotes Special Status	Spring (160 surveys)			Summer (160 surveys)			Fall (192 surveys)			Winter (320 surveys)		
	Mean Use[1]	% Comp[2]	% Freq[3]	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq
Raptor	**0.231**	**1.71**	**18.75**	**0.206**	**2.97**	**13.75**	**0.188**	**1.55**	**15.63**	**0.394**	**2.84**	**30.00**
Accipiter	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.005*	*0.04*	*0.52*	*0.000*	*0.00*	*0.00*
Sharp-shinned hawk	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.000	0.00	0.00
Buteos	*0.150*	*1.11*	*12.50*	*0.156*	*2.25*	*10.00*	*0.083*	*0.69*	*7.29*	*0.197*	*1.42*	*17.19*
Ferruginous hawk*	0.019	0.14	1.88	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
Rough-legged hawk	0.056	0.42	5.00	0.000	0.00	0.00	0.005	0.04	0.52	0.119	0.86	10.94
Red-tailed hawk	0.031	0.23	5.00	0.050	0.72	4.38	0.063	0.52	5.21	0.078	0.56	6.56
Swainson's hawk*	0.044	0.32	3.13	0.106	1.53	5.63	0.016	0.13	1.56	0.000	0.00	0.00
Eagle	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.006*	*0.05*	*0.63*
Bald eagle*	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.006	0.05	0.63
Falcons	*0.013*	*0.09*	*1.25*	*0.025*	*0.36*	*2.50*	*0.036*	*0.30*	*3.13*	*0.025*	*0.18*	*2.50*
American kestrel	0.013	0.09	1.25	0.019	0.27	1.88	0.031	0.26	2.60	0.019	0.14	1.88
Prairie falcon	0.000	0.00	0.00	0.006	0.09	0.63	0.005	0.04	0.52	0.006	0.05	0.63
Harriers	*0.069*	*0.51*	*6.25*	*0.025*	*0.36*	*2.50*	*0.063*	*0.52*	*6.25*	*0.153*	*1.10*	*11.25*
Northern harrier	0.069	0.51	6.25	0.025	0.36	2.50	0.063	0.52	6.25	0.153	1.10	11.25
Owl	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.013*	*0.09*	*0.94*
Great-horned owl	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.003	0.02	0.31
Short-eared owl	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.009	0.07	0.63
Gamebirds	**0.106**	**0.79**	**8.13**	**0.063**	**0.90**	**3.75**	**0.094**	**0.78**	**2.08**	**0.009**	**0.07**	**0.94**
California quail	0.000	0.00	0.00	0.006	0.09	0.63	0.000	0.00	0.00	0.000	0.00	0.00
Gray partridge	0.006	0.05	0.63	0.000	0.00	0.00	0.078	0.65	0.52	0.000	0.00	0.00
Ring-necked pheasant	0.100	0.74	8.13	0.056	0.81	3.75	0.016	0.13	1.56	0.009	0.07	0.94
Shorebird	**0.069**	**0.51**	**5.00**	**0.031**	**0.45**	**1.88**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
Long-billed curlew*	0.069	0.51	5.00	0.031	0.45	1.88	0.000	0.00	0.00	0.000	0.00	0.00
Wading bird	**0.000**	**0.00**	**0.00**	**0.006**	**0.09**	**0.63**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
Great blue heron	0.000	0.00	0.00	0.006	0.09	0.63	0.000	0.00	0.00	0.000	0.00	0.00
Doves	**0.069**	**0.51**	**2.51**	**0.250**	**3.60**	**5.63**	**0.094**	**0.78**	**1.56**	**0.031**	**0.23**	**0.63**
Mourning dove	0.069	0.51	2.50	0.250	3.60	5.63	0.094	0.78	1.56	0.006	0.05	0.31
Rock pigeon	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.025	0.18	0.31
Goatsucker	**0.000**	**0.00**	**0.00**	**0.044**	**0.63**	**2.50**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
Common nighthawk*	0.000	0.00	0.00	0.044	0.63	2.50	0.000	0.00	0.00	0.000	0.00	0.00
Passerines	**13.025**	**96.44**	**100.00**	**6.344**	**91.36**	**86.88**	**11.714**	**96.90**	**91.15**	**13.431**	**96.82**	**87.81**
Songbirds	*12.788*	*94.68*	*100.00*	*6.069*	*87.40*	*86.25*	*11.526*	*95.35*	*90.10*	*13.084*	*94.32*	*85.94*
American goldfinch	0.000	0.00	0.00	0.000	0.00	0.00	0.047	0.39	1.56	0.009	0.07	0.94

Species *Denotes Special Status	Spring (160 surveys)			Summer (160 surveys)			Fall (192 surveys)			Winter (320 surveys)		
	Mean Use[1]	**% Comp[2]**	**% Freq[3]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
American pipit	0.000	0.00	0.00	0.000	0.00	0.00	0.208	1.72	1.04	0.000	0.00	0.00
American robin	0.000	0.00	0.00	0.000	0.00	0.00	0.063	0.52	0.52	0.000	0.00	0.00
Barn swallow	0.050	0.37	3.75	0.044	0.63	2.50	0.120	0.99	3.65	0.000	0.00	0.00
Brewer's blackbird	0.038	0.28	1.25	0.069	0.99	1.25	0.120	0.99	1.56	0.000	0.00	0.00
Bullock's oriole	0.019	0.14	0.63	0.069	0.99	1.25	0.000	0.00	0.00	0.000	0.00	0.00
Cliff swallow	0.006	0.05	0.63	0.156	2.25	3.13	0.208	1.72	0.52	0.000	0.00	0.00
Dark-eyed junco	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.094	0.68	0.94
Eastern kingbird	0.000	0.00	0.00	0.013	0.18	1.25	0.000	0.00	0.00	0.000	0.00	0.00
European starling	0.075	0.56	3.13	0.038	0.54	1.88	0.469	3.88	4.69	0.666	4.80	4.06
Golden-crowned kinglet	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.000	0.00	0.00
Grasshopper sparrow	0.119	0.88	7.50	0.144	2.07	8.13	0.000	0.00	0.00	0.000	0.00	0.00
Horned lark	8.769	64.92	100.00	4.363	62.83	81.25	8.547	70.70	84.90	11.772	84.86	83.75
House finch	0.000	0.00	0.00	0.000	0.00	0.00	0.208	1.72	2.60	0.006	0.05	0.63
Lapland longspur	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.031	0.23	0.94
Loggerhead shrike*	0.000	0.00	0.00	0.038	0.54	1.25	0.005	0.04	0.52	0.003	0.02	0.31
Mountain bluebird	0.000	0.00	0.00	0.006	0.09	0.63	0.005	0.04	0.52	0.000	0.00	0.00
Red-winged blackbird	0.025	0.19	1.25	0.006	0.09	0.63	0.000	0.00	0.00	0.016	0.11	0.31
Rock wren	0.019	0.14	1.25	0.013	0.18	1.25	0.042	0.34	3.65	0.000	0.00	0.00
Sage thrasher*	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.04	0.52	0.000	0.00	0.00
Savannah sparrow	0.331	2.45	16.25	0.019	0.27	1.25	0.125	1.03	6.25	0.000	0.00	0.00
Say's phoebe	0.006	0.05	0.63	0.031	0.45	2.50	0.005	0.04	0.52	0.003	0.02	0.31
Tree swallow	0.000	0.00	0.00	0.019	0.27	0.63	0.000	0.00	0.00	0.000	0.00	0.00
Tricolored blackbird*	0.000	0.00	0.00	0.050	0.72	0.63	0.000	0.00	0.00	0.000	0.00	0.00
Vesper sparrow	0.000	0.00	0.00	0.000	0.00	0.00	0.031	0.26	2.08	0.000	0.00	0.00
Violet-green swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.010	0.09	0.52	0.000	0.00	0.00
Western kingbird	0.056	0.42	1.88	0.044	0.63	1.88	0.000	0.00	0.00	0.000	0.00	0.00
Western meadowlark	3.225	23.88	78.75	0.950	13.68	36.25	1.281	10.60	27.60	0.472	3.40	19.06
White-crowned sparrow	0.050	0.37	3.13	0.000	0.00	0.00	0.016	0.13	0.52	0.013	0.09	0.31
Corvids	*0.238*	*1.76*	*18.13*	*0.275*	*3.96*	*7.50*	*0.188*	*1.55*	*11.98*	*0.347*	*2.50*	*14.06*
Black-billed magpie	0.019	0.14	1.25	0.056	0.81	1.25	0.016	0.13	1.04	0.016	0.83	2.15
Common raven	0.219	1.62	17.50	0.219	3.15	6.25	0.146	1.21	10.94	0.231	1.67	11.88
Western scrub-jay	0.000	0.00	0.00	0.000	0.00	0.00	0.026	0.22	0.52	0.000	0.00	0.00
Woodpecker	**0.006**	**0.05**	**0.63**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.006**	**0.05**	**0.63**
Northern flicker	0.006	0.05	0.63	0.000	0.00	0.00	0.000	0.00	0.00	0.006	0.05	0.63
Totals	**13.506**	**100.00**		**6.944**	**100.00**		**12.089**	**100.00**		**13.872**	**100.00**	

[1] Mean Use: mean number of individuals within 800m plot/20-minute point count for each taxon provides an index of the magnitude of avian use, but it does not describe density.

[2] % Comp: percent composition: mean use for a species/total use across all species, multiplied by 100, which provides an estimate of the relative use of any particular species compared to the use by all species combined.

[3] % Freq: percent frequency of occurrence is the percentage of 20-minute surveys in which a species was detected within the survey plot, which provides an index of how often a species occurs in the study area.

Seasons: Spring – March 27 through May 30, 2017; Summer – June 5 through August 8, 2017; Fall – August 15 through October 31, 2017; Winter – November 1, 2017 through March 19, 2018

*Special status species; for state and federal status, refer to text in section 2.0.

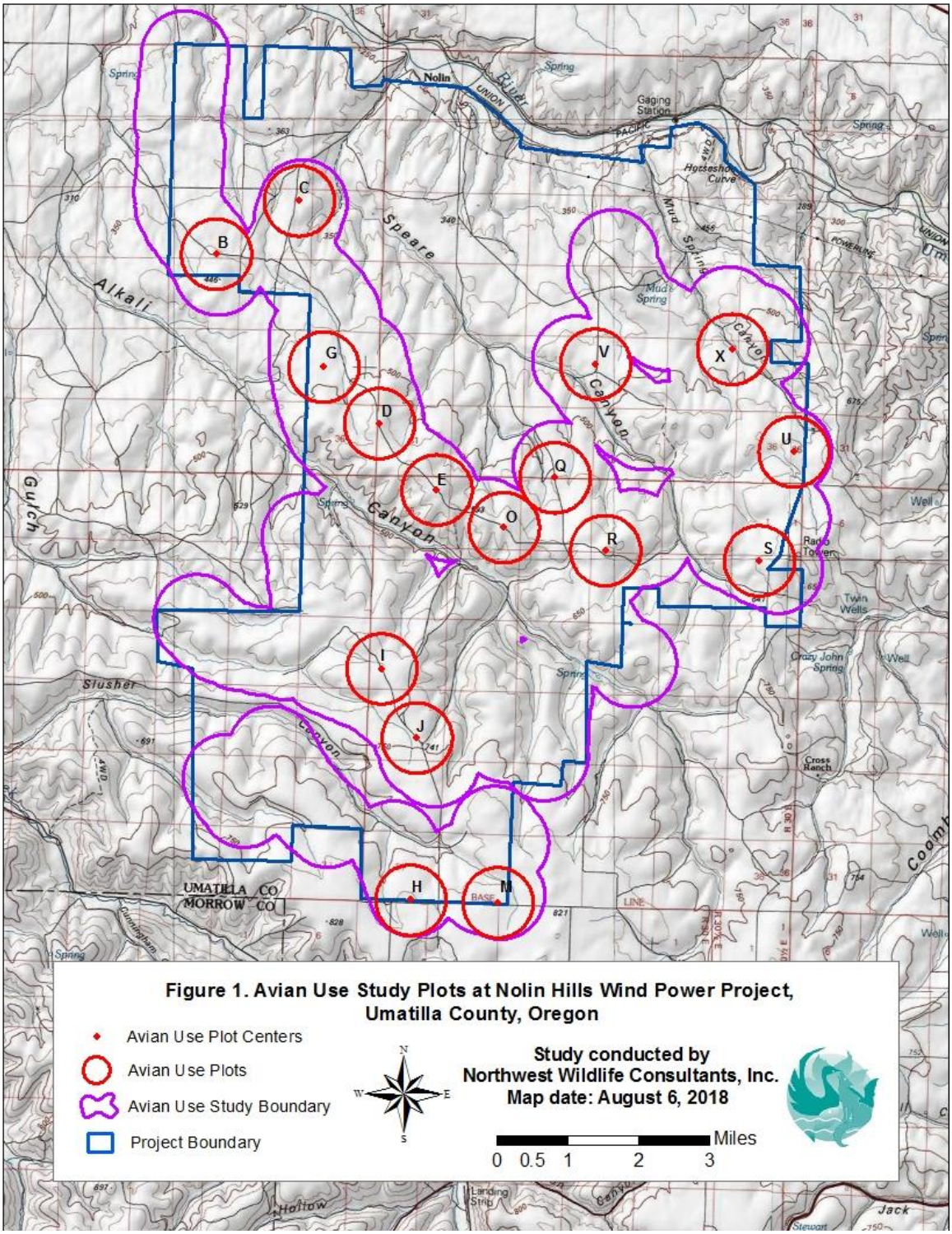
Table 4. Mean use by plot for species of interest observed within 800-meter avian use study plots at Nolin Hills Wind Power Project during the 2017-2018 four-season study.

Species	Plots (52 Surveys)															
	B	**C**	**D**	**E**	**G**	**H**	**I**	**J**	**M**	**O**	**Q**	**R**	**S**	**U**	**V**	**X**
All Raptors	**0.192**	**0.404**	**0.173**	**0.038**	**0.192**	**0.096**	**0.135**	**0.269**	**0.558**	**0.231**	**0.923**	**0.462**	**0.250**	**0.173**	**0.173**	**0.192**
Bald eagle*	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.000	0.000
Ferruginous hawk*	0.000	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000
Swainson's hawk*	0.038	0.019	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	0.346	0.019	0.000	0.038	0.000	0.000
Shorebirds	**0.019**	**0.154**	**0.000**	**0.000**	**0.000**	**0.019**	**0.019**	**0.019**	**0.019**	**0.000**	**0.000**	**0.019**	**0.000**	**0.038**	**0.000**	**0.000**
Long-billed Curlew*	0.019	0.154	0.000	0.000	0.000	0.019	0.019	0.019	0.019	0.000	0.000	0.019	0.000	0.038	0.000	0.000
Goatsuckers	**0.000**	**0.000**	**0.077**	**0.000**	**0.019**	**0.000**	**0.000**	**0.000**	**0.000**	**0.019**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.019**
Common nighthawk*	0.000	0.000	0.077	0.000	0.019	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.000	0.019
All Passerines	**12.462**	**11.346**	**6.712**	**8.154**	**8.692**	**7.135**	**14.692**	**13.288**	**17.154**	**6.635**	**10.231**	**7.000**	**9.462**	**24.173**	**13.154**	**16.904**
All Songbirds	12.346	10.923	6.596	7.942	8.596	7.058	14.615	12.981	17.077	6.231	10.077	6.885	9.308	23.712	12.654	14.096
Grasshopper sparrow*	0.000	0.000	0.096	0.115	0.019	0.000	0.115	0.000	0.000	0.000	0.250	0.077	0.038	0.058	0.000	0.038
Loggerhead shrike*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.135	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000
Horned lark**	9.173	7.731	5.058	6.654	7.481	6.365	12.788	10.173	15.904	5.135	6.904	5.577	7.981	22.577	10.673	4.231
All Birds	**12.769**	**11.942**	**6.962**	**8.269**	**8.904**	**7.250**	**14.981**	**13.981**	**17.885**	**6.942**	**11.308**	**7.577**	**9.712**	**24.385**	**13.154**	**16.904**

* Special status species; for state and federal status of each, refer to text in section 2.0
** Horned lark included to illustrate the extent to which this common species contributes to the overall mean use at each

5.0 FIGURE

Figure 1. Avian use study plots at Nolin Hills Wind Power Project, Umatilla County, Oregon.



Nolin Hills Wind Power Project
2019 Raptor Nest Survey
of the Proposed Transmission Line

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August 20, 2019

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Figure

Figure 1. Nolin Hills Wind Power Project – UEC Transmission Line 2019 survey for nests of raptors and other large birds. (Confidential; submitted separately) 3

1.0 Introduction

In the spring of 2019, Northwest Wildlife Consultants, Inc. (NWC) was contracted by Capital Power Corporation to conduct a survey for raptor nests on and near two potential transmission line routes—the BPA Stanfield route and the Umatilla Electric Cooperative (UEC) route to Cottonwood Station—associated with the Nolin Hills Wind Power Project located in Umatilla County near the city of Pendleton, Oregon. Both routes partially follow existing transmission lines. The objective was to document above-ground raptor nests (excluding cavity nests of small owls and falcons) both active and inactive within a buffer of the portion of the transmission lines that is outside the area surveyed for raptor nests in 2017 (Gerhardt, 2017a) and 2018 (Gerhardt, 2018a). Field methods followed those used in the 2011 raptor nest survey and described in the 2012 Nolin Hills Wind Project Biological Study Plan (NWC, 2012) and those used in 2017 (Gerhardt, 2017a) and 2018 (Gerhardt, 2018a). This study is part of a Tier-III assessment of the Project, as described in the United States Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS, 2012).

2.0 Methods

Prior to conducting the field survey, NWC personnel requested from the Oregon Eagle Foundation all available information regarding nesting by bald or golden eagles within the area to be surveyed and within Umatilla and Morrow Counties.

On May 7, 2019, Tetra Tech personnel provided to NWC a Geographic Information System (GIS) shapefile of the proposed transmission lines. NWC buffered these lines by 200 feet to accommodate for potential construction activity disturbance, and then buffered the resulting 400-foot-wide corridor by one-half mile. NWC personnel then deleted those portions of these areas that were already surveyed for raptor nests in 2017 and 2018 because no additional surveys were needed. The previously surveyed area included all of the Stanfield transmission line, its micrositing corridor and half-mile buffer. The resulting 2019 raptor nest Survey Area (Figure 1, submitted separately), consisted of the northernmost portion of the UEC line, its micro-siting corridor and half-mile buffer; this area encompassed 49.7 square kilometers (19.2 square miles).

A survey was conducted from a helicopter on May 15, 2019 of the entire Survey Area; Figure 1, submitted separately). The biologist that conducted the survey has more than 25 years of experience surveying for raptor nests in shrub-steppe, grassland, and canyon habitats in Umatilla and other counties of Oregon as well as eastern Washington. The helicopter pilot also has more than 15 years of experience at piloting raptor nest surveys in Umatilla County and other Oregon and Washington counties. Both conducted most of the prior nest surveys for the Nolin Hills Wind Project.

The aerial survey aimed to identify all above ground nests of large raptors and of corvids (whose nest sites could subsequently be used by raptors). Raptor species whose nests are not effectively detected through aerial surveys include ground-nesting species (burrowing and short-eared owls and northern harrier) and some cavity-nesting species (including American kestrel and small owl species). During the aerial survey, all potential nesting areas were examined, including trees, rock formations, and transmission line towers.

All raptor and corvid nests were recorded using a hand-held Global Positioning System (GPS) unit; locations were subsequently downloaded to a GIS for correction, storage, and display. Determination of nest activity status (active or inactive) was made using a combination of visual clues, such as adult behavior, presence of eggs or young, or presence or absence of whitewash (excrement).

3.0 Results

On January 15, NWC received from OEF current data regarding golden eagle nests within Umatilla and Morrow counties from statewide surveys and monitoring that was initiated in 2011 (Isaacs, pers. comm., 2019). There were no known golden eagle nests within the Survey Area. Moreover, the 2019 raptor nest Survey Area was surveyed specifically for nests of both bald and golden eagles in 2017 (Gerhardt, 2017b) and 2018 (Gerhardt, 2018b); none were found, and no suitable nesting habitat for either species was found within the 2019 Survey Area.

The 2019 aerial survey resulted in the detection of ten active nests by three species of raptors within the Survey Area (Figure 1, submitted separately); these were:

5 Red-tailed hawk	1 Great horned owl
4 Swainson's hawk	

In addition, the survey identified a single active common raven nest. Also documented were five inactive stick nests (two of which were so close together that they appear as a single symbol in Figure 1).

4.0 References

Gerhardt, R. 2012. Nolin Hills site characterization summary. Prepared for Element Power, Minneapolis, Minnesota. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

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Figure 1. Nolin Hills Wind Power Project – UEC Transmission Line 2019 survey for nests of raptors and other large birds. (Confidential; submitted separately)

Nolin Hills Wind Power Project
2018 Raptor Nest Survey

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August 8, 2018

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1.0 Introduction

In the spring of 2018, Northwest Wildlife Consultants, Inc. (NWC) was contracted by Capital Power Corporation to conduct a survey for raptor nests on and near their proposed Nolin Hills Wind Power Project (Project) located in Umatilla County near the town of Pendleton, Oregon. The objective was to document above-ground raptor nests (excluding cavity nests of small owls and falcons) both active and inactive within the Project Boundary and a two-mile buffer. A much larger area was surveyed in 2018 for eagle nests, as described in a separate report (Gerhardt, 2018a). Field methods followed those used in the 2011 raptor nest survey and described in the 2012 Nolin Hills Wind Project Biological Study Plan (NWC, 2012) and those used in 2017 (Gerhardt, 2017). This study is part of a Tier-III assessment of the Project, as described in the United States Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS, 2012) and meets 2018 study objectives (Gerhardt, 2018b) provided in February 2018 to the USFWS and the Oregon Department of Fish and Wildlife (ODFW).

The proposed Project will have a generating capacity of up to approximately 350 megawatts. The Project Boundary encompasses approximately 44,900 acres of private land, zoned exclusive farm use. The number, size and layout of the wind turbine generators have not yet been finalized.

2.0 Methods

Prior to conducting the field survey, NWC personnel reviewed results and records of surveys conducted within the same area by NWC in 2011 (Gerhardt, 2012) and 2017 (Gerhardt, 2017), and reviewed historical nest records in NWC's files that were obtained from ODFW and local birders.

A survey was conducted from a helicopter on May 1, 2018 of the entire Project Boundary plus a 3.2-kilometer (2-mile) buffer of the Boundary (Survey Area; Figure 1, submitted separately). The Survey Area encompassed 446 square kilometers (172 square miles). The biologist that conducted the survey has more than 25 years of experience surveying for raptor nests in shrub-steppe, grassland, and canyon habitats in Umatilla and other counties of Oregon as well as eastern Washington. Both before and after the aerial survey, the surveyor also recorded raptor nests found during avian and eagle use and nest studies being conducted for the Project (Gerhardt, 2018b; Gerhardt and Gritski, 2018; Gerhardt, 2018a).

The aerial survey aimed to identify all above ground nests of large raptors and of corvids (whose nest sites could subsequently be used by raptors). Raptor species whose nests are not effectively detected through aerial surveys include ground-nesting species (burrowing and short-eared owls and northern harrier) and some cavity-nesting species (including American kestrel and small owl species); where nests of these species were found incidentally during other studies being conducted, they were not included on Figure 1. During the topography-based aerial survey, all potential nesting areas were examined, including trees, rock formations, and transmission line towers.

All raptor and corvid nests were recorded using a hand-held Global Positioning System (GPS) unit; locations were subsequently downloaded to a Geographic Information System (GIS) for correction, storage, and display. Determination of nest activity status (active or inactive) was made using a combination of visual clues, such as adult behavior, presence of eggs or young, or presence or absence of whitewash (excrement). Ground-based observations of a few nests (active nests within the Project Boundary or along roads leading to the Project) were made during avian use (Gerhardt and Gritski, 2018) and eagle use (Gerhardt, 2018c) studies conducted on the Project area during the raptor breeding season.

3.0 Results

The survey resulted in the detection of 66 active nests by nine species of raptors within the Survey Area (Figure 1, submitted separately); these were:

1 Golden eagle	4 Prairie falcon
2 Osprey	1 Long-eared owl
41 Red-tailed hawk	6 Great horned owl
5 Ferruginous hawk	1 Barn owl
5 Swainson's hawk	

In addition, the survey identified two separate great blue heron rookeries, each of multiple nests, along the Umatilla River and 16 active common raven nests. Also documented were 62 inactive nests originally built by ferruginous hawks, some of them quite old, and 37 other inactive stick nests. Although some of the old ferruginous hawk nests were also still large, the defining features of these nests included the size and arrangement of sticks and their characteristic placement (on the ground atop rounded rock outcrops).

Raptor breeding density was 0.15/sq. km. (0.38/sq. mi.). For four species, breeding density was: red-tailed hawk 0.09/sq. km. (0.24/sq. mi.); ferruginous hawk, Swainson's hawk, and great horned owl 0.01/sq. km. (0.03/sq. mi.) each. Breeding density for each of the five other species was less than 0.005/sq. km. (0.013/sq. mi.)

Ferruginous hawk nests can persist for many years, and the number of old nests of this species and their arrangement within the Survey Area likely represents five or six historical breeding territories. Thus, the five active breeding attempts in 2018 are likely near the historical maximum for this species in the area surveyed.

The 2018 raptor breeding season was notable for the number of raptor species actively nesting and the overall number of active nests as compared to in 2011 (Gerhardt, 2012) and 2017 (Gerhardt, 2017). The survey area supported a large number of breeding attempts by the most common diurnal raptor, red-tailed hawk, and by great horned owls. Whereas many of these were situated in the riparian areas associated with Alkali Canyon, Butter Creek, and the Umatilla River, others were in isolated trees or small stands of trees in drier draws throughout the Survey Area.

Indeed, during spring of 2018, the raptor nesting density was likely near the maximum that the Survey Area can support. That is, given the relative dearth of suitable nesting trees, nesting density—of raptors in general and red-tailed hawks in particular—was remarkably high. The likely reason for the high density in 2018 compared to past years was the abundance in this survey year of voles (*Microtus montanus*), an irruptive species whose population numbers vary greatly between low and peak years of a multi-year cycle (Verts and Carraway, 1998).

It should also be noted that short-eared owls, whose ground nests are not reliably found through aerial nest surveys, were abundant on the survey area during spring of 2018 as documented during the eagle use study being conducted by NWC (Gerhardt, 2018b). This species is largely nomadic, following concentrations of voles, its primary prey, and its population numbers within the Columbia Plateau vary greatly among years. Many short-eared owls nested within the survey area in 2018, as evidenced by the finding of one nest (Photograph 1) and, later, the weekly documenting of numerous family groups composed of young incapable of sustained flight (NWC, unpublished data). During weekly avian use surveys in 2017, a single short-eared owl was encountered in spring and three detections occurred in summer (Gerhardt and Gritski, 2017).

4.0 References

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5.0 Photograph

Photograph 1. Ten uneaten voles at this short-eared owl nest testify to the abundance in spring 2018 of this raptor prey species at Nolin Hills.

Figure 1. Nolin Hills Wind Power Project 2018 raptor nest survey. (Confidential; submitted separately)

Nolin Hills Wind Power Project
2018 Eagle Nest Survey

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Figure 1. Nolin Hills Wind Power Project 2018 eagle nest survey 2011-2018 (Confidential; submitted separately). 8

1.0 Introduction

In the spring of 2018, Northwest Wildlife Consultants, Inc. (NWC) was contracted by Capital Power Corporation to conduct a survey for eagle nests on and near the proposed Nolin Hills Wind Power Project (Project) located in Umatilla County near the town of Pendleton, Oregon. The objectives were to identify eagle nests both in-use and alternate and, for in-use nests, to document outcome of breeding attempts. Eagle nest survey and monitoring was also conducted in 2017 (Gerhardt and Kronner, 2017).

The proposed Project will have a generating capacity of up to approximately 350 megawatts. It is located within a site boundary of approximately 44,900 acres of private land, zoned exclusive farm use. The number, size and layout of the wind turbine generators have not yet been finalized; for determining distances of eagle nests from the Project, this report utilizes a preliminary layout provided to NWC in July 2018. In compliance with USFWS guidance (USFWS, 2013), the Survey Area included all areas within the Project Boundary and all suitable nesting substrate within 16.2 kilometers (10 miles) of the Project Boundary.

This study is part of a Tier-III assessment of the Project, as described in the United States Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS, 2012). It generally follows objectives and methods originally described in the biological study plan (NWC, 2012) prepared for Element Power (who subsequently transferred the Project to Capital Power). The plan was reviewed by personnel from USFWS and the Oregon Department of Fish and Wildlife (ODFW) prior to and during a meeting held November 7, 2012. (Agency personnel at that meeting were Mark Kirsch, ODFW district biologist, Marissa Meyer, USFWS La Grande Field Office, and David Leal, USFWS Oregon State Office eagle lead.) NWC also conducted a Tier-II site characterization (Gerhardt, 2012) as described in the guidelines (USFWS, 2012), which helped inform the present study and meets 2018 study objectives (Gerhardt, 2018) provided in February 2018 to the USFWS and ODFW.

In addition to presenting the methods and results of the 2018 pre-field reviews, survey and monitoring, this report summarizes all eagle nest locations identified within the survey area. Where applicable, known nests within a breeding territory but located outside the 10-mile Survey Area are included.

Eagle nest information reviewed and described in this report includes information obtained in 2011 from a field survey conducted by NWC for Element Power of the Project area and a 16.2-kilometer (10-mile) buffer of the 2011 Project Boundary (results of which are briefly summarized in the site characterization; Gerhardt, 2012). For information prior to 2011, this report utilizes data gathered during an eagle nest historical information review (Gerhardt, 2011) also conducted by NWC for Element Power. That review was intended to supplement the 2011 NWC eagle nest field survey and the site characterization (Gerhardt, 2012). For the information review (Gerhardt, 2011), NWC requested and/or reviewed data received from several sources (the same sources upon which the USFWS depends for their eagle nest information in this area), including:

- Oregon Biodiversity Information Center database query for bald eagle information
- Oregon Biodiversity Information Center Point Observation Database for golden eagles
- Northwest Wildlife Consultants, Inc. raptor nest database (biologists' personal records, agency records, other sources)
- Oregon Eagle Foundation
- Oregon Department of Fish and Wildlife

For golden eagle nest information from 2012–2017, this report utilizes data obtained from the Oregon Eagle Foundation (OEF) from their statewide golden eagle nest survey (Isaacs, pers. comm., 2017; 2018). A local birder apprised NWC of a 2017 bald eagle nest at McKay Reservoir just outside the 10-mile Survey Area (A. Skirvin, pers. comm., 2018).

Territory and nest status and other terms used in this report are provided and defined in table footnotes.

2.0 Methods

Prior to conducting field surveys, NWC reviewed information from the sources described above. The Survey Area included the area within the Project Boundary and the area within 16.2 kilometers (10 miles) of the Project Boundary. Also monitored was a 2018 bald eagle nest at McKay Reservoir; the nest itself was just outside the Survey Area boundary, but suitable trees (that could be used for nesting by this pair in future years) lie within the Survey Area on the western shore of the same small reservoir. The 2018 field surveys were mostly conducted from a helicopter and used topography to efficiently cover the entire Survey Area. Survey and monitoring occurred between March 30, when the initial helicopter survey was conducted, and July 13, when the final ground monitoring was completed (Table 1). All survey and monitoring followed standard protocols and guidelines (Pagel et al., 2010; USFWS, 2011; USFWS, 2013) and was conducted by an eagle specialist (as outlined in Pagel et al., 2010) with extensive (30+ years) raptor nest surveying experience. At least two visits were conducted to each territory, the second to ensure that no late breeding attempts were missed. For territories that could only be surveyed and monitored from the air (that is, where ground access was precluded), occupancy could be documented—by observing one or more eagles—but non-occupancy could not be confirmed.

3.0 Results

In 2018, an occupied nest was found in each of three known golden eagle territories; one active bald eagle nest was found within 10 miles of the site boundary, and a second was found just beyond that distance (Table 1). One of the three golden eagle breeding attempts failed (Butter Creek Landing Strip territory), but the other two (Butter Creek and Lena territories) each resulted in the fledging of a single young. Of the two bald eagle breeding attempts, one (Echo territory) resulted in the fledging of three young, whereas the other (McKay territory; the nest just beyond 10 miles from the site boundary) resulted in failure. The Survey Area encompassed two other historical eagle territories (that is, for which there has been no documented sign of eagle use in the past five years)—one of bald eagles (Stanfield territory) and one of golden eagles (Dixie Canyon territory)—but no nests and no eagles were found at either of these in 2018.

The status of each territory (including the known historical territories) is described below and mapped on Figure 1 (submitted separately due to the sensitive nature of location information). Territory occupancy is described as occupied or unknown. Nest numbers are from NWC's database. For golden eagles, territory names and numbers are those used by the Oregon Eagle Foundation in their statewide database for breeding areas and nests. For bald eagles, territory names are those used by NWC. Turbine identification numbers are proposed turbines provided by Capital Power to NWC in July 2018.

3.1 Golden Eagles

<u>OEF Territory C0657, Butter Creek</u>

2018 Occupancy and Nests – This territory was surveyed from a helicopter on March 30 and June 1. The territory was occupied by a pair of adult eagles in 2018. The two nests (#3042 and #3345) are close to one another on a single cliff and both are in excellent condition. A successful breeding attempt took place in 2018 at nest #3042; incubation was documented on March 30, and a young of fledging age was documented in this nest on June 26 (Table 1).

History and Proximity to Other Territories – This territory has been occupied each year since at least 2011 (Table 2). Nest #3042 has been the site of breeding attempts each year between 2011 and 2016, though only the 2011 and 2014 (and now the 2018) breeding attempts resulted in fledged young (two, one, and one, respectively). The nest cliff is

approximately 5.0 km (3.1 mi) from the nearest turbine (V1), and approximately 10.2 km (6.3 mi) from the nearest neighboring golden eagle territory, the Butter Creek Landing Strip territory. (Because of the proximity of the two nests at the Butter Creek territory, they appear as a single star in Figure 1.)

OEF Territory C0065, Lena

2018 Occupancy and Nests –Nest #3494 in a live locust tree was documented as active during the aerial survey of March 30 (Table 1). One young reached fledging age by June 1 (as ascertained through aerial monitoring) and the breeding attempt was deemed successful. Another golden eagle nest also remains in this territory; nest #4035—site of a successful breeding attempt in 2012 and a failed attempt in 2016—is on a short section of rimrock.

History and Proximity to Other Territories – Though perennially occupied since 2011, the Lena territory has been productive only in 2012, 2017, and 2018 (Table 2). The nest site (#3040, located outside the 10-mile Survey Area) most frequently used historically (that is, prior to 2011) was in a cottonwood tree, but one of the two supporting branches fell during the (failed) 2011 breeding attempt. Since 2011, no nest has been present in this tree, but at least three other nests have been constructed in the territory; these are the two still present in 2018 (described above) and a third (#4327, located outside of the 10 mile Survey Area), which was constructed in early 2013 but in which no egg laying occurred (and which was no longer present by 2014).

The active nest, #3494, is approximately 15.7 km (9.7 mi) from the nearest turbine (V2), and approximately 13.0 km (8.1 mi) from the nearest known neighboring golden eagle territory, (OEF H0066AT) Skinner's Fork territory (to southwest and outside of the 2017 Survey Area).

OEF Territory C0658, Butter Creek Landing Strip

2018 Occupancy and Nests – The first aerial survey of March 30 did not yield any nests within this territory. Remnants were observed of an eagle nest (#4430) first identified in 2016 in a live cottonwood tree on the south side of Butter Creek; no activity was documented at this nest in 2018. During an aerial raptor nest survey on May 1, an incubating eagle was found in a new nest (#4593) in a cottonwood; this is within 75 meters of the site of an ephemeral nest (#3352). On the June 1 aerial nest monitoring, one or more small young (less than four weeks old) were observed, but by the July 13 ground monitoring, the nest was empty and the breeding attempt was deemed to have failed (Table 1).

History and Proximity to Other Territories – Nest #3352 was active in 2011 and again in 2015, but there was no sign of the nest in 2012, 2013, 2014, 2016, or 2017 (Table 2). This site, also a live cottonwood tree, is within 75 meters of the 2018 nest, both of which are approximately 2.2 km (1.4 mi) from the nearest turbine (U9) and 10.2 km (6.3 mi) from the nearest occupied neighboring golden eagle territory, the Butter Creek territory. Alternate nest #4430 was in-use in 2016, and fledged one young that year; this nest is approximately 5.1 km (3.2 mi) from the nearest turbine (U9) and 10.2 km (6.3 mi) from the nearest neighboring territory, the Butter Creek territory.

OEF Territory C0663, Dixie Canyon

2018 Occupancy and Nests – Aerial surveys were conducted on March 30 and June 1. No nest remains at the one historical nest site and no eagles were observed. Territory non-occupancy could not be confirmed because ground access for further assessment was not possible.

History and Proximity to Other Territories – The only documented breeding attempt at this territory is from 2011, when two young fledged from nest #3351 in a live cottonwood tree. There was no sign of that nest the following year or since, but active nests at the two nearest territories in that same 2011 breeding season established that this nest site was not

merely an alternate nest for one of those territories. No eagles have been observed in Dixie Canyon territory during aerial surveys since 2011 (Table 2). The single breeding attempt documented at this site (in 2011) likely represented an opportunistic event. During the winter of 2010-2011, the surrounding area experienced a great influx of raptors (because of unusually high numbers of voles), and golden eagles were present and preying upon some of these smaller raptors (NWC, unpublished field data). Though this territory is seemingly not golden eagle breeding habitat—it contains no cliffs, no rivers or streams, and only this lone cottonwood—it provided in that one year a structure in which a pair of eagles built a nest and successfully raised two young. The 2011 nest was 9.5 km (5.9 mi) from the nearest turbine (U9), and approximately 7.5 km (4.7 mi) from the nearest neighboring golden eagle territory, the Butter Creek Landing Strip territory.

3.2 Bald Eagles

Echo Territory

2018 Occupancy and Nests – During the aerial survey of March 30, bald eagles were found to be breeding at a nest along the Umatilla River near the town of Echo. An adult was incubating on nest #4548; this is in the top of the main trunk of a live cottonwood tree; in the several branches above it in the same tree were five active nests of great blue herons. This new nest was within 50 meters of the nest (#4428) active in 2017 (Gerhardt and Kronner, 2017). By the aerial monitoring flight of June 1, the nest contained three young very nearly of fledging age; the breeding attempt was deemed to have succeeded.

History and Proximity to Turbines – No eagle nests were found in this area prior to NWC's 2011 eagle nest information review (Gerhardt, 2011) or during surveys conducted by NWC for Element Power in 2011 (NWC, Gerhardt, 2012). Nest #4428 was occupied in 2017 (Gerhardt and Kronner, 2017), but that breeding attempt resulted in failure. Nests #4548 and #4428 are approximately 6.9 km (4.3 mi) from the nearest turbine (A1).

McKay Territory

2018 Occupancy and Nests – During the aerial survey of March 30, an adult bald eagle was documented incubating in a nest (NWC #4549) in a cottonwood along the eastern edge of McKay Reservoir. Whereas this nest is just outside the Survey Area, other cottonwood trees suitable for a bald eagle nest exist on the western shore and within the Survey Area. During the aerial survey of May 1, one or more young were seen in the nest, but by the monitoring flight of June 1 the nest was empty and the breeding attempt was deemed to have failed (Table 1).

History and Proximity to Turbines – Bald eagles nested along the eastern shoreline of McKay Reservoir in 2017 (A. Skirvin, pers. comm., 2018), and that is believed to be the first nesting activity there in recent years. That nest was approximately 100 meters south of the 2018 nest (#4549), and that breeding attempt resulted in failure. Nest #4549 is approximately 17.6 km (10.9 mi) from the nearest turbine (H6).

Stanfield Territory

2018 Occupancy and Nests – During the aerial survey of March 30, there was no sign of bald eagles or of an eagle nest along the stretch of the Umatilla River southwest of Stanfield that historically held a bald eagle nest.

History and Proximity to Turbines – An eagle nest (#4455) existed in a live cottonwood in 2001 and 2002 (Gerhardt, 2011). The only documented breeding attempt was in 2001; it resulted in failure. The nest was inactive in 2002, and the nest tree had blown down by the middle of the 2003 breeding season. No eagle nests were found in this area during surveys conducted by NWC for Nolin Hills in 2011 (Gerhardt, 2012) or 2017 (Gerhardt and Kronner, 2017). No other information is available to NWC for 2012–2017. The historical nest is approximately 12.7 km (7.9 mi) from the nearest turbine (A1).

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Table 1. Status of eagle territories and nests present in the 2018 Nolin Hills Wind Power Project eagle nest survey.

Territory Name Species	Territory Status[1]	Nest ID Number	Nest Substrate	Nest Condition	Nest Status from Surveys		Nest Status from Nest Monitoring			Nest Outcome and Productivity
					March 30 Aerial	May 1 Aerial	June 1 Aerial	June 26 Ground	July 13 Ground	
Butter Creek Golden Eagle	Occupied	3042	Cliff	Excellent	Active	Active	1 young	9 w.o. young		Fledged 1
		3345	Cliff	Excellent	Inactive		Inactive			
Lena Golden Eagle	Occupied	3494	Locust	Excellent	Active	1 young	9 w.o. young			Fledged 1
		4035	Rimrock	Poor	Inactive		Inactive			
Butter Creek Landing Strip Golden Eagle	Occupied	4593	Cottonwood	New	No nest	Incubating	3 w.o. young		Empty	Failed
		4430	Cottonwood	Poor	Inactive		Inactive			
Dixie Canyon Golden Eagle	Unknown Historical	(3351)	Cottonwood	Absent 7 years	No nest		No nest			
Echo Bald Eagle	Occupied	4548	Cottonwood	Excellent	Incubating adult	2+ young	3 large young			Fledged 3 young
McKay[2] Bald Eagle	Occupied	4549	Cottonwood	Excellent	Incubating adult	1+ small young	Empty			Failed
Stanfield Bald Eagle	Unknown Historical	(4455)	Cottonwood	Last found 2002	No nest		No nest			

[1] Territory Status:
Occupied – one or more adult eagles were observed
Unknown – no eagles were observed (but aerial surveying does not allow for confirmation of non-occupancy)
Historical – (nest ID number, no nest present) Dixie: no sign of eagle use has been observed since 2011. Stanfield: no evidence of eagle use since 2003 (but no information except from 2011 and 2017; see text).

[2] 2018 nest (#4549) was outside Survey Area (slightly more than 10 miles from Site Boundary). However, territory and other trees suitable for nesting are deemed to be within the Survey Area.

Table 2. Occupancy and productivity for the 2018 Nolin Hills Wind Power Project eagle nest survey (2012–2017 data from Oregon Eagle Foundation; Isaacs, pers. comm., 2017 and 2018; Gerhardt, 2011 and 2012).

Year		Territory			
		Butter Creek	**Lena**	**Butter Creek Landing**	**Dixie Canyon**
NWC Nest IDs (2011–2018):		3042, 3345	3040, 4035, 3494	3352, 4430, 4593	3351
2011	**Occupancy[1]**	Pair	Pair	Pair	Pair
	Active Nest[2]	3042	3040	3352	3351
	Outcome[3]	Fledged 2	Failed	Fledged 2	Fledged 2
2012	**Occupancy**	One or more	Pair	One or more	None
	Active Nest	3042	4035	None present	None present
	Outcome	Failed	Fledged 1	Not applicable	Not applicable
2013	**Occupancy**	One or more	Pair	None	None
	Active Nest	3042	No incubation	None present	None present
	Outcome	Failed	Not applicable	Not applicable	Not applicable
2014	**Occupancy**	Pair	Pair	None	None
	Active Nest	3042	No incubation	None present	None present
	Outcome	Fledged 1	Not applicable	Not applicable	Not applicable
2015	**Occupancy**	Pair	None	Pair	None
	Active Nest	3042	No	3352	None present
	Outcome	Failed	Not applicable	Failed	Not applicable
2016	**Occupancy**	Pair	Pair	Pair	None
	Active Nest	3042	4035	4430	None present
	Outcome	Failed	Failed	Fledged 1	Not applicable
2017	**Occupancy**	One or more	Pair	None	None
	Active Nest	No	3494	No	None present
	Outcome	Not applicable	Fledged 1	Not applicable	Not applicable
2018	**Occupancy**	Pair	Pair	Pair	None
	Active Nest	3042	3494	4593	None present
	Outcome	Fledged 1	Fledged 1	Failed	Not applicable

[1] Occupancy: Eagles observed.
None – no adult eagles observed (this is not a confirmation of non-occupancy).

[2] Active Nest: No – one or more nests were present but inactive;
No incubation – nest building was observed, but no egg laying occurred;
None present – no eagle nests were found.

[3] Outcome: Nest success and productivity.
Not applicable – no breeding attempt occurred.

Figure 1. Nolin Hills Wind Power Project 2018 eagle nest survey 2011-2018 (Confidential; submitted separately).

Nolin Hills Wind Power Project
2017 Eagle Nest Survey

Prepared for:

Nolin Hills Wind LLC
Capital Power Corporation
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Prepared by:

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February 15, 2018

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1.0 Introduction

In the spring and early summer of 2017, Northwest Wildlife Consultants, Inc. (NWC) was contracted by Nolin Hills Wind LLC ("Capital Power") to conduct a study for eagle nests on and near the proposed Nolin Hills Wind Power Project (the Project) located in Umatilla County near the town of Pendleton. The objectives were to identify eagle nests both active and inactive and for active nests, to document outcome of breeding attempts. An eagle nest survey and monitoring study is scheduled to occur in 2018 within 16.2 kilometers (10 miles) of the 2018 site boundary. Public data may be available from various sources and will be explored prior to commencing the 2018 nest survey.

The proposed Project will have a generating capacity of up to approximately 350 megawatts. It is located within a site boundary of approximately 44,900 acres of private land, zoned exclusive farm use. The number, size and layout of the wind turbine generators have not yet been determined. In compliance with standard guidelines (USFWS, 2013), the survey covered the Project area and all suitable breeding substrate within 16.2 kilometers (10 miles) of proposed turbines (known as of March 2017).

This study is part of a Tier-III assessment of the Project, as described in the United States Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS, 2012). It generally follows objectives and methods originally described in the biological study plan (NWC, 2012) prepared for Element Power (who subsequently transferred the Project to Capital Power). The plan was reviewed by personnel from USFWS and the Oregon Department of Fish and Wildlife (ODFW) prior to and during a meeting held November 7, 2012. (Agency personnel at that meeting were Mark Kirsch, ODFW district biologist, Marissa Meyer, USFWS La Grande Field Office, and David Leal, USFWS Oregon State Office eagle lead.) NWC also conducted a Tier-II site characterization (Gerhardt, 2012) as described in the guidelines (USFWS, 2012), which helped inform the present study.

In addition to presenting the methods and results of the 2017 survey and monitoring, this report summarizes all eagle nest locations identified within the survey area. Where applicable, known nests within a breeding territory, but located outside the 10-mile survey area are included.

Eagle nest information reviewed and described in this report includes information obtained in 2011 from a field survey conducted by NWC for Element Power of the Project area and a 16.2-kilometer (10-mile) buffer of the 2011 site boundary (results of which are briefly summarized in the site characterization; Gerhardt, 2012). For information prior to 2011, this report utilizes data gathered during an eagle nest historical information review (Gerhardt, 2011) also conducted by NWC for Element Power. The review was intended to supplement the 2011 NWC eagle nest field survey and the site characterization (Gerhardt, 2012). For the information review (Gerhardt, 2011), NWC requested and/or reviewed data received from several sources, including the:

- Oregon Biodiversity Information Center database query for bald eagle information
- Oregon Biodiversity Information Center Point Observation Database for golden eagles
- Northwest Wildlife Consultants, Inc. raptor nest database (biologists' personal records, agency records, other sources)
- Oregon Eagle Foundation (OEF)
- Oregon Department of Fish and Wildlife

For golden eagle nest information from 2012–2016, this report utilizes data obtained from the OEF from their statewide golden eagle nest survey (Isaacs, pers. comm., 2017).

Territory and nest status and other terms used in this report are provided and defined in table footnotes.

2.0 Methods

Prior to conducting field surveys, NWC reviewed information from the sources described above. The 2017 field surveys were mostly conducted from a helicopter and used topography to efficiently cover the entire survey area. Survey and monitoring occurred between March 28, when the initial helicopter survey was conducted, and June 20, when the final ground monitoring was completed (Table 1). All survey and monitoring followed standard protocols and guidelines (Pagel et al., 2010; USFWS, 2011; USFWS, 2013) and was conducted by an eagle specialist (as outlined in Pagel et al., 2010) with extensive (30+ years) raptor nest surveying experience. For territories that could only be surveyed and monitored from the air (i.e., where ground access was precluded), occupancy could be documented—by observing one or more eagles—but non-occupancy could not be confirmed.

3.0 Results

In 2017, at least one eagle nest was found in each of three golden eagle territories and one active bald eagle nest was found within 10 miles of proposed turbines (Table 1). A breeding attempt was confirmed in 2017 at one of the three golden eagle territories. This attempt resulted in the fledging of a single young. A breeding attempt was confirmed in 2017 at one bald eagle territory. This attempt apparently resulted in failure. The survey area encompassed two other historical eagle territories (i.e., for which there has been no documented sign of eagle use in the past five years)—one of bald eagles and one of golden eagles—but no nests and no eagles were found at either of these in 2017.

The status of each territory (including the historical ones) is described below and mapped on Figure 1 (submitted separately due to the sensitive nature of location information). Territory occupancy is described as occupied or unknown. Nest numbers are from NWC's database. For golden eagles, territory names and numbers are those used by the OEF in their statewide database for breeding areas and nests. For bald eagles, territory names are those used by NWC. Turbine identification numbers are proposed turbines provided by Capital Power to NWC in March 2017.

3.1. Golden Eagles

<u>OEF Territory C0657, Butter Creek</u>

2017 Occupancy and Nests – This territory was surveyed from a helicopter on March 28 and June 2. The territory was occupied by at least one adult eagle in 2017. There remain two nests (#3042 and #3345), both on a single cliff; though both were in excellent condition, neither was active (Table 1).

History and Proximity to Other Territories – This territory has been occupied each year since at least 2011 (Table 2). Nest #3042 has been the site of breeding attempts each year between 2011 and 2016, though only the 2011 and 2014 breeding attempts resulted in fledged young (two and one, respectively). The nest cliff is approximately 4.8 km (3.0 mi) from the nearest turbine (KK1), and approximately 10.2 km (6.3 mi) from the nearest neighboring golden eagle territory, the Butter Creek Landing Strip territory. Because of the proximity to one another of the two nests at the Butter Creek territory, they appear as a single star in Figure 1.

<u>OEF Territory C0065, Lena</u>

2017 Occupancy and Nests – An aerial survey was conducted on March 28, but didn't result in the finding of an active nest. Nest #3494 in a live locust tree was documented as active during ground monitoring on May 15 (Table 1). One young was found dead on the ground at between one and two weeks old, but another young reached fledging age by June 20 (as ascertained through ground monitoring) and the breeding attempt was deemed successful. Another golden eagle nest also remains in this territory; nest #4035—site of a successful breeding attempt in 2012 and a failed attempt in 2016—is on a short section of rimrock.

History and Proximity to Other Territories – Though perennially occupied since 2011, the Lena territory has not been productive most years (Table 2). The nest site (#3040, located outside the 10-mile survey area) most frequently used historically (i.e., prior to 2011) was in a cottonwood tree, but one of the two supporting branches fell during the (failed) 2011 breeding attempt. Since 2011, no nest has been present in this tree, but at least three other nests have been constructed in the territory. These are the two still present in 2017 (described above) and a third (#4327, located outside of the 10 mile survey area), which was constructed in early 2013, but in which no egg laying occurred (and which was no longer present by 2014).

Both remaining nests are approximately 15.7 km (9.7 mi) from the nearest turbine (KK3), and approximately 13.0 km (8.1 mi) from the nearest known neighboring golden eagle territory, (OEF H0066AT) Skinner's Fork territory (to southwest and outside of the 2017 survey area).

<u>OEF Territory C0658, Butter Creek Landing Strip</u>

2017 Occupancy and Nests – Aerial surveys were conducted on March 28 and June 2. An eagle nest (#4430) first identified in 2016 was still present in a live cottonwood tree on the south side of Butter Creek. No activity was documented at this nest. No eagles were observed, and the nest contained fewer sticks on the second monitoring flight than on the first (Table 1). Territory non-occupancy could not be confirmed because ground access for further assessment was not possible.

History and Proximity to Other Territories – The only other nest site (#3352) known from this territory is an ephemeral one; active in 2011 and again in 2015, there was no sign of the nest in 2012, 2013, 2014, 2016, or 2017 (Table 2). This site, also a live cottonwood tree, is 2.3 km (1.4 mi) from the nearest turbine (MM4). The territory itself is likely ephemeral; it contains no classic golden eagle nesting or roosting cliffs, and the occasional breeding attempts may not reflect year-round residency. The nest still present in 2017 is 5.1 km (3.2 mi) from the nearest turbine (MM4) and 10.2 km (6.3 mi) from the nearest occupied neighboring golden eagle territory, the Butter Creek territory.

<u>OEF Territory C0663, Dixie Canyon</u>

2017 Occupancy and Nests – Aerial surveys were conducted on March 28 and June 2. No nest remains at the one historical nest site and no eagles were observed. Territory non-occupancy could not be confirmed because ground access for further assessment was not possible.

History and Proximity to Other Territories – The only documented breeding attempt at this territory is from 2011, when two young fledged from nest #3351 in a live cottonwood tree. There was no sign of that nest the following year or since, but active nests at the two nearest territories in that same 2011 breeding season established that this nest site was not merely an alternate nest for one of those territories. No eagles have been observed in Dixie Canyon territory during aerial surveys since 2011 (Table 2). The single breeding attempt documented at this site (in 2011) likely represented an opportunistic event. During the winter of 2010-2011, the surrounding area experienced a great influx of raptors (because of unusually high numbers of voles), and golden eagles were present and preying upon some of these smaller raptors (NWC, unpublished field data). Though this territory is seemingly not golden eagle breeding habitat—it contains no cliffs, no rivers or streams, and only this lone cottonwood—it provided in that one year a structure in which a pair of eagles built a nest and successfully raised two young. The 2011 nest was 9.3 km (5.8 mi) from the nearest turbine (MM4), and approximately 7.5 km (4.7 mi) from the nearest neighboring golden eagle territory, the Butter Creek Landing Strip territory.

3.2. Bald Eagles

Echo Territory

2017 Occupancy and Nests – During the aerial survey of March 28, bald eagles were found to be breeding at a nest along the Umatilla River near the town of Echo. An adult was incubating on nest #4428. This nest is situated in the top of a live cottonwood tree on the edge of a large rookery of great blue herons. By the aerial monitoring flight of June 2, the nest was empty, with no sign of recent activity; the breeding attempt was deemed to have failed.

History and Proximity to Turbines – No eagle nests were found in this area prior to NWC's 2011 eagle nest information review (Gerhardt, 2011) or during surveys conducted by NWC for Element Power in 2011 (NWC, Gerhardt, 2012). Nest #4428 is approximately 5.3 km (3.3 mi) from the nearest turbine (A5).

Stanfield Territory

2017 Occupancy and Nests – During the aerial survey of March 28, there was no sign of bald eagles or of an eagle nest along the stretch of the Umatilla River southwest of Stanfield that historically held a bald eagle nest.

History and Proximity to Turbines – An eagle nest (#4455) existed in a live cottonwood in 2001 and 2002 (Gerhardt, 2011). The only documented breeding attempt was in 2001. This attempt resulted in failure. The nest was inactive in 2002, and the nest tree had blown down by the middle of the 2003 breeding season. No eagle nests were found in this area during surveys conducted by NWC for Nolin Hills in 2011 (Gerhardt, 2012). No other information is available to NWC for 2012–2016. The historical nest is approximately 11.1 km (6.9 mi) from the nearest turbine (A5).

4.0 References

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Table 1. Status of eagle nest territories and nests present in 2017 within ten miles of the Nolin Hills Wind Power Project, Umatilla County, Oregon.

Territory Name	Territory Status[1]	Nest ID Number	Eagle Species	Nest Substrate	Nest Condition	Nest Status from Surveys		Nest Status from Nest Monitoring		Nest Outcome and Productivity	Comments
						March 28 Aerial	May 15 Ground	June 2 Aerial	June 20 Ground		
Butter Creek	Occupied	3042 3345	Golden eagle	Cliff Cliff	Excellent Excellent	Inactive Inactive		Inactive Inactive			
Lena	Occupied	3494 4035	Golden eagle	Locust Rimrock	Excellent Poor	Unknown Inactive	1 young in nest 3494	1 young in nest 3494	1 young >8 weeks old	Successful 1 young	2nd young found dead on ground on May 15
Butter Creek Landing	Unknown	4430	Golden eagle	Cotton-wood	Poor	Inactive		Inactive			
Dixie Canyon	Unknown Historical	(3351)	Golden eagle	Cotton-wood	Absent 6 years	No nest		No nest			
Echo	Occupied	4428	Bald eagle	Cotton-wood	Excellent	Incubating adult		Empty		Failed 0 young	
Stanfield	Unknown Historical	(4455)	Bald eagle	Cotton-wood	Last found 2002	No nest		No nest			

[1] Territory Status:

Occupied – one or more adult eagles were observed;
Unknown – no eagles were observed (but aerial surveying does not allow for confirmation of non-occupancy);
Historical – (nest ID number, no nest present) Dixie: no sign of eagle use has been observed since 2011. Stanfield: no evidence of eagle use since 2003 (but no information except from 2011; see text).

Table 2. Occupancy and productivity 2011-2017 at golden eagle territories within 10 miles of proposed turbines at Nolin Hills Wind Power Project, Umatilla County, Oregon (2012–2016 data from Oregon Eagle Foundation; Isaacs, pers. comm., 2017 and NWC, 2012).

Year		Territory			
		Butter Creek	**Lena**	**Butter Creek Landing**	**Dixie Canyon**
NWC Nest IDs (2011–2017):		3042, 3345	3040, 4035, 3494	4430, 3352	3351
2011	**Occupancy[1]**	Pair	Pair	Pair	Pair
	Active Nest[2]	3042	3040	3352	3351
	Outcome[3]	Fledged 2	Failed	Fledged 2	Fledged 2
2012	**Occupancy**	One or more	Pair	One or more	None
	Active Nest	3042	4035	None present	None present
	Outcome	Failed	Fledged 1	Not applicable	Not applicable
2013	**Occupancy**	One or more	Pair	None	None
	Active Nest	3042	No incubation	None present	None present
	Outcome	Failed	Not applicable	Not applicable	Not applicable
2014	**Occupancy**	Pair	Pair	None	None
	Active Nest	3042	No incubation	None present	None present
	Outcome	Fledged 1	Not applicable	Not applicable	Not applicable
2015	**Occupancy**	Pair	None	Pair	None
	Active Nest	3042	None	3352	None present
	Outcome	Failed	Not applicable	Failed	Not applicable
2016	**Occupancy**	Pair	Pair	None	None
	Active Nest	3042	4035	4430	None present
	Outcome	Failed	Failed	Fledged 1	Not applicable
2017	**Occupancy**	One or more	Pair	None	None
	Active Nest	No	3494	No	None present
	Outcome	Not applicable	Fledged 1	Not applicable	Not applicable

[1] Occupancy: Eagles observed.
None – no adult eagles observed (this is not a confirmation of non-occupancy).

[2] Active Nest: No – one or more nests were present but inactive;
No incubation – nest building was observed, but no egg laying occurred;
None present – no eagle nests were found.

[3] Outcome: Nest success and productivity.
Not applicable – no breeding attempt occurred.

Figure 1. Nolin Hills Wind Power Project 2017 eagle nest survey. (Confidential; submitted separately)

Northwest
Wildlife
Consultants, Inc.

MEMORANDUM

Date: November 22, 2017

To: Jeff Sansom, Nolin Hills Wind LLC

From: Rick Gerhardt, Wildlife Biologist
Northwest Wildlife Consultants, Inc.

Subject: Nolin Hills Wind Power Project Area 2017 Raptor Nest Survey

---

In early June of 2017, Northwest Wildlife Consultants, Inc. (NWC) was contracted by Nolin Hills Wind LLC (Capital Power) to conduct a survey for raptor nests for the proposed Nolin Hills Wind Power Project (the Project). The objective was to document above-ground raptor nests (excluding cavity nests of small owls and falcons) both occupied and inactive within the Project site boundary and a two-mile buffer. A much larger area was surveyed for eagle nests, as described in a separate report. Apart from the survey timing, field methods followed those used in the 2011 raptor nest survey and described in the 2012 Nolin Hills Wind Project Biological Study Plan (NWC, 2012). This study is part of a Tier-III assessment of the Project, as described in the United States Fish and Wildlife Service Land-Based Wind Energy Guidelines (USFWS, 2012).

Methods

Prior to conducting the field survey, NWC personnel reviewed results and records of a survey conducted within the same area by NWC in 2011, and reviewed historical nest records in NWC's files that were obtained from Oregon Department of Fish and Wildlife (ODFW) and local birders. In addition, NWC integrated 2017 raptor nest information into the Project's nest database. This data was received from Tetra Tech personnel who were conducting ground-based biological surveys within the Project Site Boundary in spring of 2017.

A survey was conducted from a helicopter on June 2 and June 6, 2017 of the entire Project area plus a 3.2-kilometer (2-mile) buffer of the Site Boundary (Figure 1, submitted separately). The survey area encompassed 446 square kilometers (172 square mi). The biologist that conducted the survey has more than 25 years of experience surveying for raptor nests in shrub-steppe, grassland, and canyon habitats in Umatilla and other counties of Oregon as well as eastern Washington.

The aerial survey aimed to identify all above ground nests of large raptors and of corvids (whose nest sites could subsequently be used by raptors). Raptor species whose nests are not effectively detected through aerial surveys include ground-nesting species (burrowing and short-eared owls and northern harrier) and some cavity-nesting species (American kestrel and small owl species). These species are not discussed further in this report. During the topography-based aerial survey, all potential nesting areas were examined, including trees, rock formations, and transmission line towers.

All raptor and corvid nests were recorded using a hand-held Global Positioning System (GPS) unit and their locations were subsequently downloaded to a Geographic Information System (GIS) for correction, storage, and display. Determination of activity status (active or inactive) was made using a combination of visual clues, such as adult behavior, presence of eggs or young, or presence or absence of whitewash (excrement). Ground-based observations of a few nests (active nests within the Project area or along roads leading to the Project) were made during avian use and eagle use studies that began in late March and continued through the raptor breeding season and beyond.

Results and Discussion

The survey resulted in the detection of 40 active breeding attempts by six species of raptors within the survey area (Figure 1, submitted separately). These attempts are summarized as follows:

27 Red-tailed Hawk	2 Osprey
4 Ferruginous Hawk	2 Prairie Falcon
3 Swainson's Hawk	2 Great Horned Owl

In addition, the survey identified two separate great blue heron rookeries, each of multiple nests, along the Umatilla River and 14 active common raven nests. In addition, 51 inactive nests originally built by ferruginous hawks were documented. Some of these nests are quite old. Another 31 inactive stick nests were also observed. Although some of them were still large, the defining features of the inactive ferruginous hawk nests included the size and arrangement of sticks and their characteristic placement (on the ground atop rounded rock outcrops).

The large number of inactive ferruginous hawks is worth further discussion. These were densely situated, and likely represented no more than six separate territories. The presence of many nests attests to a long history of this species' breeding in these areas and suggests that nest sites are chosen in part for their protection from the wind (which enables them to persist for many years).

This nest survey was conducted slightly later than would have been ideal. A small number of those nests recorded as inactive may have had 2017 breeding attempts by red-tailed hawks, great horned owls, or common ravens that had failed by the time of the survey. More importantly, the cottonwood groves along the Umatilla River had completely leafed out by the time of this early-June survey, and a few nests might have potentially been hidden among these trees.

Nonetheless, the results of this survey provide an accurate understanding of the species and numbers of raptors breeding within the survey area. This is especially true within the Site Boundary, where all suitable nesting substrate could be examined closely and where both NWC and Tetra Tech personnel were conducting other surveys and recording raptor nests as encountered (beginning late March 2017). All such nests were incorporated into the resulting database and into this report and associated figure.

References

Northwest Wildlife Consultants, Inc. (NWC). 2012. Biological Study Plan for the Nolin Hills Wind Power Project, Umatilla County, Oregon. Prepared for Element Power, Minneapolis, Minnesota. Prepared by Northwest Wildlife Consultants, Pendleton, Oregon.

United States Fish and Wildlife Service (USFWS). 2012. U.S. Fish and Wildlife Service land-based wind energy guidelines. March 2012.

Figure 1. Nolin Hills Wind Power Project 2017 Raptor Nest Survey (CONFIDENTIAL; submitted separately)

Bat Acoustic Survey Report

Nolin Hills Wind Power Project
March 2018

Prepared for
Nolin Hills Wind LLC

Prepared by
Tetra Tech, Inc.

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1.0 Introduction

Nolin Hills Wind LLC, a wholly-owned subsidiary of Capital Power (US) Holdings Inc., is planning to develop the Nolin Hills Wind Power Project (the Project) in Umatilla County, Oregon (Figure 1). The Project consists of approximately 47,000 acres of private land near the unincorporated community of Nolin.

Nolin Hills Wind LLC contracted Tetra Tech, Inc. (Tetra Tech) to perform acoustic monitoring surveys to assess the use of the Project Area by resident and migratory bat species during the spring migration, summer, and fall migration periods in 2017 (May 18 – November 8). This report provides background information on the habitats and bat species that may occur in the Project Area and the results of the 2017 acoustic monitoring surveys. The report also identifies potential risks of the Project to bats.

1.1 Project Area Description

The Project Area is located in the Umatilla Plateau subregion of the Columbia Plateau ecoregion. This region is predominantly sagebrush steppe flanked by forested, mountainous areas that receive higher amounts of precipitation (EPA Level IV; Thorson et al. 2003). Soils are characterized by basalt overlain by loess deposits. In areas with adequate rainfall, the deep loess soils are cultivated for winter wheat, alfalfa, or barley. Rugged areas of the region with thinner soils are dominated by rangeland and grasslands. In the Wildlife and Habitat Categorization Survey Report for the Project, Tetra Tech identified and mapped 14 potential habitat subtypes within the Project Area (Tetra Tech 2018). The three most common habitat types that comprise the majority of the Project Area include grassland, croplands, and CRP (Conservation Reserve Program) lands (Figure 2).

The Umatilla River flows adjacent to the northern boundary of the Project Area. Other water sources, including intermittent washes and stock ponds, are present in the Project Area, but are limited to lower elevations within gulches. Trees and shrubs are restricted to these low-lying riparian areas. In addition to riparian areas, foraging and roosting opportunities for bats can be found along bands of rocky outcroppings flanking hillsides. Protected lands such as state parks or wildlife management areas are absent in the vicinity of the Project Area. The nearest protected lands include the Umatilla Indian Reservation approximately 15 miles to the east, and the Umatilla National Forest approximately 30 miles to the south, in the Blue Mountains ecoregion.

1.2 Bat Species Expected to Occur in the Vicinity of the Project

Fifteen bat species are known to occur in Oregon, and of these species, 14 have the potential to occur in the Project Area (Table 1) based on available information on known distribution ranges and documented occurrences in Umatilla or surrounding counties (ODFW 2017a). Bats of the genus Myotis are the most abundant group found in Oregon, and regional habitat use varies among these species (ODFW 2000). For example, long-eared myotis (*Myotis evotis*) is typically associated with coniferous forests, but can also occur in shrub steppe habitats (ODFW 2017a), whereas western

small-footed myotis (*Myotis ciliolabrum*) and canyon bat (*Parastrellus hesperus*) are found in drier habitats near cliff faces and rock outcroppings, features more common in the Columbia Plateau ecoregion. California myotis (*Myotis californicus*), little brown bat (*Myotis lucifugus*), and Yuma myotis (*Myotis yumanensis*) are typically associated with forests and open water, which are generally lacking within the Project Area. Fringed myotis (*Myotis thysanodes*) and long-legged myotis (*Myotis volans*) occur in a variety of habitats, but are more common in the Blue Mountains ecoregion south and east of the Project Area (ODFW 2017b).

The pallid bat (*Antrozous pallidus*) is closely associated with desert scrub and shrubland and is a common species of the Columbia Plateau. Big brown bats (*Eptesicus fuscus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) are widespread throughout the state but are not known to congregate in large numbers. Both species utilize caves, mines, and buildings as roost sites (Harvey et al. 2011). Spotted bats (*Euderma maculatum*) are also geographically widespread, but may be one of the rarest of all bat species in the western United States because the species relies on the presence of large cliffs for roosting, resulting in very patchy distributions (Luce and Keinath 2007).

Twelve of the 14 species potentially occurring within Project Area readily hibernate during the winter period. The two exceptions are the hoary bat and silver-haired bat described below. An extensive winter survey by Perkins et al. (1990) documented six of the potentially occurring Myotis species overwintering in mines and caves in Oregon, and big brown bats were commonly observed roosting in buildings. The greatest concentration of caves occurs in central Oregon and are formed by lava tubes. Six closed mines are located near Pendleton, Oregon but details on type and whether they are utilized by bats are lacking (The Diggings, no date).

The hoary bat (*Lasiurus cinereus*) and silver-haired bat (*Lasionycteris noctivagans*) do not typically hibernate, but instead migrate out of the Project Area during the fall to spend the winter in locations where insect prey is available (ODFW 2017a). These two species occur in the greatest abundance across Oregon rangelands in May and September, suggesting biannual migration through the state. These tree-roosting species experience higher levels of mortality at wind facilities, particularly during fall migration (Arnett et al. 2008). Roosting habitat of the hoary bat and silver-haired bat are all associated with forested areas (Harvey et al. 2011), which account for a small percentage of the Project Area.

Table 1. Potential Bat Species for the Project Area

Common Name	Scientific Name	Migratory Status[1,2]	Habitat Associations[1,2]	Federal Status[3]	State Status[4]
Big brown bat	*Eptesicus fuscus*	Non-migratory	Deciduous forests, and other habitats including agricultural croplands.	–	–
California myotis	*Myotis californicus*	Regional Migrator	Typically associated with forests and will use large snags as day roosts and can be found night-roosting under bridges.	SOC	SGCN, S
Canyon bat	*Parastrellus hesperus*	Non-migratory	Rocky canyons, cliffs, and outcroppings	–	–
Fringed myotis	*Myotis thysanodes*	Regional Migrator	Found in a wide variety of habitats including roosts in trees, snags, buildings, cave, rocks, cliffs, and bridges.	SOC	SGCN, S
Hoary bat	*Lasiurus cinereus*	Long-distance Migrator	Found in forested upland habitats, including junipers.	SOC	SGCN, S
Little brown bat	*Myotis lucifugus*	Regional Migrator	Found in a wide variety of forested habitats.	–	–
Long-eared myotis	*Myotis evotis*	Regional Migrator	Typically found in coniferous forests but can occur in shrub-steppe regions. Forages mainly in forests or adjacent to creeks.	–	–
Long-legged myotis	*Myotis volans*	Regional Migrator	Typically found in coniferous forests but can occur in desert and riparian habitats.	–	S
Pallid bat	*Antrozous pallidus*	Non-migratory	Caves/karst, desert scrub, grassland, and shrubland.	SOC	SGCN, S
Silver-haired bat	*Lasionycteris noctivagans*	Long-distance Migrator	Found in northern temperate conifer and mixed conifer-hardwood forest. Generally found in association with riparian areas.	SOC	SGCN, S
Spotted bat	*Euderma maculatum*	Regional Migrator	Uses crevices in cliffs, caves and canyon walls for day and nights roosts. Will also roost in trees at night and typically forage in meadows, shrub-steep, or water sources.	SOC	SGCN, S
Townsend's big-eared bat	*Corynorhinus townsendii*	Regional Migrator	Found in natural caves, mines, and buildings in the summer. Hibernates October to April in caves and mines.	SOC	SGCN, SC

Table 1. Potential Bat Species for the Project Area

Common Name	Scientific Name	Migratory Status[1,2]	Habitat Associations[1,2]	Federal Status[3]	State Status[4]
Western small-footed myotis	*Myotis ciliolabrum*	Regional Migrator	Found in dry climates, particularly near cliffs and rock outcroppings. Forages near cliff faces and hibernates in caves and mines.	–	–
Yuma myotis	*Myotis yumanensis*	Regional Migrator	Strong relationship with open water, and forages primarily near/over streams and ponds.	–	–

1. Western Bat Working Group 2015.
2. Bat Conservation International 2017
3. SOC = Species of Concern (USFWS 2016a).
4. SGCN = Species of Greatest Conservation Need (ODFW 2017c); S= Sensitive; SC= Sensitive-Critical (ODFW 2016)

1.3 Regulatory Framework

1.3.1 Federal Protection

Of the 45 species of bats known to occur in the continental United States, eight species are currently listed as endangered or threatened and protected under the federal Endangered Species Act. None of these federally listed species are known to occur in Oregon (ODFW 2017a).

1.3.2 State Protection

The State of Oregon maintains a list of threatened and endangered species that is managed by the Oregon Department of Fish and Wildlife (ODFW; ODFW 2017c). No bats are currently listed as threatened or endangered in the state (ODFW 2017c). In addition to state-listed species, ODFW monitors rare species and Species of Greatest Conservation Need (SGCN) or "Strategy Species." SGCN are species with small or declining populations that are at risk of becoming extinct or are of management concern (ODFW 2017d). Species may also be included on the ODFW Sensitive Species List, which is essentially a subset of species identified as SGCN, under one of two designations "Sensitive" or "Sensitive-Critical" (ODFW 2016). The Sensitive Species designation is a non-regulatory tool, but serves as reference in the Permit Review Standards (OAR 635 Division 42) (ODFW 2016). ODFW lists seven bat species as SGCN or Sensitive and one bat species as Sensitive-Critical throughout the state. All of these bat species have the potential to occur in the Project Area (Table 1).

2.0 Methods

Tetra Tech conducted bat acoustic monitoring in the Project Area from May 18 to November 8, 2017, using three ground-based bat detectors and two detectors installed on met towers with high and low microphones (Figure 3). The objective was to assess bat occurrence and use of the Project Area by local and migratory bat species. Standardized protocols to evaluate bat species' risk from wind projects have been established for pre-construction passive acoustic surveys. Tetra Tech designed the acoustic monitoring surveys at the Project Area in accordance with the recommendations outlined within Tier 3 of the voluntary U.S. Fish and Wildlife Service (USFWS) Land Based Wind Energy Guidelines (USFWS 2012).

2.1 Acoustic Detectors

Tetra Tech used Wildlife Acoustics Song Meter Monitoring Systems (SM3BAT and SM2BAT+) for the duration of the acoustic monitoring survey. Each bat detector station consisted of the acoustic detector powered by a 25 to 50-watt solar panel and a 12-volt battery, encased in a waterproof housing. A microphone (SMX-U1 or SMM-U1) was attached to the bat detector by a 3-meter microphone cable at ground-based units and a 50-meter cable for the high microphones. Biologists

used a Wildlife Acoustics Ultrasonic Calibrator to test the detectors and microphones prior to deployment and after survey completion to ensure that the equipment was functioning properly and that the device sensitivity was within the manufacturer's suggested thresholds.

After deploying the bat detectors, the field team conducted a test to ensure all connections and microphones functioned properly. Tetra Tech programmed each bat detector to record bat echolocation files using the following settings: trigger window = 2 seconds, sampling rate = 256k, gain = 12 decibels, and trigger max = 15 seconds. To ensure these surveys captured the greatest period of bat activity, the bat detectors began recording one hour before sunset and continued until one hour after sunrise each day. Trained technicians checked each bat detector manually approximately twice per month during the survey period.

Tetra Tech deployed three ground-based bat detectors (SM2BAT+) and two bat detectors (SM3BAT) installed on met towers within the Project Area in May 2017 (Table 2, Appendix A). Sampling sites were located in representative habitats within the Project Area, in areas with potential for high bat activity and diversity, and in accessible areas (Figure 3). Habitat descriptions are provided in Table 2, and site photographs of detector locations can be found in Appendix A. Ground-based microphones were mounted at a height of 2 meters to avoid ground vegetation and to elevate the zone of detection. High met tower microphones were hoisted to a height of approximately 30 meters using a pulley system rigged to the guy wires at ORNH-04, and approximately 45 meters using a fixed pulley system at ORNH-05. Microphones were oriented in line with suspected flight paths to increase the potential number of call pulses and quality of recordings. Microsite conditions determined the specific orientation of each microphone.

Tetra Tech used the bat detectors to survey the Project Area each night from May 18 through November 7, 2017. This allowed the survey to include the spring migration, summer, and fall migration periods for Oregon's bat species, including migratory and non-migratory species (Table 1). All stations remained in their original locations for the duration of the survey.

Table 2. Summary Station Descriptions and Survey Effort, 2017

Detector Station	Description	Survey Nights	Detector Nights	Percent of Nights Operational
ORNH-01	Located within grasslands and near croplands, and small rocky outcropping.	May 18–Nov 6, 2017	173	100%
ORNH-02	Located within a wet draw amid shrub/scrub. Adjacent hillsides comprised of grasslands with thin bands of rocky outcroppings.	May 18–Nov 6, 2017	173	100%

Table 2. Summary Station Descriptions and Survey Effort, 2017

Detector Station	Description	Survey Nights	Detector Nights	Percent of Nights Operational
ORNH-03	Located within a wet draw amid shrub/scrub. Adjacent hillsides comprised of grasslands. The Umatilla River lies ~1.2 miles to the north.	May 18–Nov 6, 2017	173	100%
ORNH-04L	Low microphone at met tower located amid vast croplands surrounded by grasslands.	May 18–Nov 6, 2017	173	100%
ORNH-04H	High microphone at met tower located amid vast croplands surrounded by grasslands.	May 18–Nov 6, 2017	173	100%
ORNH-05L	Low microphone at met tower station located in grasslands, surrounded by croplands. The Umatilla River lies ~2 miles to the northeast.	May 18–Jun 26, Jul 21–Nov 7, 2017	148	86%
ORNH-05H	High microphone at met tower station located in grasslands, surrounded by croplands. The Umatilla River lies ~2 miles to the northeast.	May 18–Jun 26 Jul 21-23, Sept. 5–Nov 7, 2017	107	62%
Overall	–	–	1120	92%

2.2 Data Quality Assurance and Control

Tetra Tech implemented quality assurance and quality control measures during all stages of data collection, analysis, and report preparation. Bat detector data were downloaded approximately twice every month. The incoming echolocation calls were recorded onto high-capacity data storage cards, which were then sent to a Tetra Tech biologist to be backed up on a server. Field technicians submitted data within seven business days of collection, and data were immediately reviewed by the bat biologist to confirm the operational status of the bat detectors.

2.3 Data Analysis

Bats emit pulses of high frequency sound to navigate in their environment and search for prey. A single pulse (or call) is generally not helpful for identifying species; however, a series of pulses (also known as an echolocation sequence or bat pass) can more reliably be used to assign a species classification. Tetra Tech defines a bat pass as an echolocation sequence with two or more call pulses separated by two or more seconds (Loeb et al. 2015). A bat pass, standardized per unit of

effort (one detector operational for one night equals one detector-night), is used to describe bat activity.

Tetra Tech analyzes bat acoustic data using a two-phased approach; 1) filter data to remove non-bat sounds and assign an initial species or group classification with a USFWS-approved software program (see USFWS 2016b), and then 2) manually review and cross-validate a subset of this data using an additional, independent echolocation software program to confirm species presence. Tetra Tech filtered and initially classified this data using Kaleidoscope Pro (Wildlife Acoustics, Inc.) version 4.2.0, with the classifier "Bats of North America 4.2.0" for species of bats in Oregon. A sensitivity level of "0 balanced/neutral" was used per Wildlife Acoustics and USFWS (2016b) recommendations. For filtering, signals of interest ranged from 16–120 kilohertz (kHz) with a duration of 2–500 milliseconds, and contained a minimum of two call pulses.

After filtering and initial classification of the acoustic data, Tetra Tech cross-validated and manually confirmed species presence for a subset of the data using SonoBat (SonoBat, Inc.) version 4.2.1 with the eastern Oregon regional classifier. SonoBat was used for this step because of its extensive reference library of known echolocation sequences and superior spectrogram platform for reviewing full-spectrum calls. During manual review, Tetra Tech considered a recording as suitable for species level identification if the recording included search phase pulses, individual call pulses within the bat pass were not oversaturated, and preferably included the presence of harmonics. For species with a low volume of bat passes auto-classified to the species level, such as pallid bat and Yuma myotis, all passes were manually reviewed. For the remainder of the recordings classified to the species level, bat passes were filtered based on two parameters (recordings with more than 5 pulses and a matching pulse ratio greater than 66 percent) to ensure only high-quality bat passes were considered. Bat passes lacking detail to be identified at the species level (e.g., too far from the microphone or noise interference) were classified as "high frequency species" if the characteristic frequency was greater than 35 kHz and "low frequency" if the characteristic frequency was lower than 35 kHz. For each species, at least one bat pass was manually confirmed per species per station per month.

3.0 Results

During the 2017 survey, 1,120 detector-nights (cumulative number of nights surveyed by all microphones) were sampled over the course of 174 calendar nights between May 18, 2017, and November 7, 2017 (Table 2). Station ORNH-05 experienced outages due to a suspected lightning strike and additional issues with the high met tower microphone at this station. The remaining stations remained operational throughout the survey period with no outages. A total of 11,408 bat passes were recorded and identified to the species level, resulting in an overall activity rate of 10.1 bat passes/detector-night (Table 3). Activity rates across all detectors ranged from 0 bat passes/detector-night to 295 bat passes/detector-night, with the greatest rate occurring at Station ORNH-02.

Table 3. Summary of Bat Passes Recorded, 2017

Station	Total # of Passes	Min	Max	Mean Activity Rate (Bat Passes/Detector Night)	Standard Error of Activity Rate
ORNH-01	309	0	12	1.78	0.17
ORNH-02	6,179	0	274	35.50	3.28
ORNH-03	4,132	0	108	23.74	1.46
ORNH-04H	186	0	18	1.07	0.17
ORNH-04L	167	0	16	0.96	0.15
ORNH-05H	121	0	12	1.13	0.23
ORNH-05L	314	0	26	2.09	0.26
Overall[1]	11,408	0	295	10.10	0.94

1. Represents cumulative values for detector-nights and total number of bat passes, and the overall mean activity rate across all detectors in the Project Area.

3.1 Species Presence and Activity Rates

Bat passes auto-classified at the species level included 11 species and three groups. Western small-footed myotis was the most commonly recorded species (54 percent of the total passes recorded), followed by hoary bat (15 percent), silver-haired bat (10 percent), little brown bat (6 percent), canyon bat (6 percent), California myotis (3 percent), unidentified myotis species and long-legged myotis (2 percent), and big brown bat (1 percent). The remaining species made up less than 1 percent of total passes. In addition to overall activity levels, species composition varied across detectors (Table 4). Western small-footed myotis had the greatest overall species activity rate, with 5.47 bat passes/detector-night over the duration of the survey period (Table 4).

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Table 4. Average Activity Rates (Bat Passes/Detector-Night) Recorded per Species at Each Detector

Station	Pallid Bat	Big Brown Bat	Hoary Bat	Silver-haired Bat	California Myotis	Western Small-footed Myotis	Little Brown Bat	Fringed Myotis	Long-legged Myotis	Yuma Myotis	Canyon Bat	Myotis Species	Unidentified High Frequency Species	Unidentified Low Frequency Species
ORNH-01	0.01	0.07	0.6	0.54	0	0.21	0.18	0	0	0	0.05	0.08	0.02	0.02
ORNH-02	0	0.39	3.95	2.09	1.55	22.78	2.32	0	1.16	0	0.37	0.73	0.03	0.13
ORNH-03	0.05	0.31	4.24	1.64	0.32	11.71	1.34	0	0.22	0.03	3.4	0.4	0	0.08
ORNH-04H	0	0.04	0.35	0.55	0	0	0.09	0	0	0	0	0.01	0.01	0.03
ORNH-04L	0	0.04	0.27	0.44	0	0.02	0.1	0	0	0	0.01	0.04	0.01	0.03
ORNH-05H	0	0.03	0.5	0.57	0	0.04	0	0	0	0	0	0	0	0.01
ORNH-05L	0	0.07	0.32	0.76	0.01	0.73	0.01	0.01	0	0	0.07	0.07	0.03	0.01
Overall Mean	0.01	0.14	1.54	0.97	0.29	5.47	0.63	<0.01	0.21	0.01	0.6	0.2	0.01	0.05
Standard Error of Overall Mean	<0.01	0.02	0.28	0.16	0.06	0.6	0.06	<0.01	0.03	<0.01	0.08	0.02	<0.01	<0.01

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3.2 Timing of Activity

The detectors recorded bat activity for nearly the entire survey period, with the highest activity rates recorded during the spring period (Appendix B). In particular, myotis species and western small-footed myotis accounted for the majority of activity in May and during the summer (Appendix B). Migratory tree bats were recorded throughout the survey period as well, but demonstrated spikes of activity in September and October (Appendix B).

4.0 Discussion

The bat species detected within the Project Area during the acoustic surveys are common species in the western rangelands of the United States. Habitat variables such as available roost types (trees, rocks, buildings) and the accessibility of roosts, food, and water greatly influence species composition in a given area. The lack of trees within the Project Area likely influenced species composition in favor of Myotis species, which utilize features such as rocky outcroppings or buildings as roost sites rather than trees and foliage, which are preferred by tree bats. Six of the 11 species of bats confirmed in the Project Area were Myotis species (western small-footed myotis, little brown bat, California myotis, fringed myotis, long-legged myotis, and Yuma myotis). The remaining species included pallid bat, big brown bat, canyon bat, and migratory tree bats (hoary bat and silver-haired bat). Of the seven species listed as SGCN or Sensitive in Oregon, five were confirmed in the Project Area (California myotis, Fringed myotis, hoary bat, pallid bat and silver-haired bat), and one additional Sensitive Species, the long-legged myotis. The Townsends's big-eared bat, the states only bat listed as Sensitive-Critical, was not detected.

Migration patterns, which vary based on species life history characteristics, can be grouped into three basic categories: non-migratory (big brown bat), regional migrants (Myotis species), and long distance migrants (silver-haired bat and hoary bat; Fleming and Eby 2003). The 2017 acoustic surveys indicate that the Project Area is used by non-migratory bats, and long distance and regional migrants in the late spring, summer, and fall. These findings are consistent with known migration patterns of tree bats in this region of the United States (Cryan 2003). The hoary bat and silver-haired bat have been documented as fatalities at wind projects across North America, most frequently in late summer and early fall during migratory periods (Arnett et al. 2008; Kunz et al. 2007; Strickland et al. 2011). The hoary bat fatalities documented at wind energy facilities across North America recently prompted a modelling effort that questioned the long-term population viability of this species if development and fatalities continue at 2014 levels (Frick et al. 2017). Migratory bats (hoary and silver-haired bats) in this study were observed at low activity rates during both the spring and summer, with elevated activity levels during fall migration period in September and October (Appendix B). The greatest risk for migratory bats within the Project Area is likely to occur during migration periods when bats are moving between summer and winter areas.

A literature review of paired pre-construction acoustic sampling and post-construction fatality monitoring at wind projects indicated an average of 10.7 bat passes per detector night and an average of 1.3 bat fatalities per megawatt at 22 wind projects in the Basin-Desert region, which includes eastern Oregon (Table 5; Hein et al. 2013). The mean activity rate recorded in the Project Area (10.1 bat passes per detector night) aligned with the regional average. According to a report by Hein et al. (2013), no empirical evidence suggests a correlation between pre-construction bat activity (as measured by acoustic monitoring) and post-construction bat mortality; however, that report only examined overall bat activity rates and was not able investigate species-specific activity and fatality rates. In a cumulative fatality study specific to the Columbia Plateau Ecoregion, Johnson and Erickson (2011) estimated that the bat fatality rate was 1.14 bats/megawatt/year. Of these fatalities silver-haired bat and hoary bat accounted for 98% while Myotis species accounted for only 1.5% of the observed fatalities at 23 wind facilities.

The highest activity rates (90 percent of all bat passes) were recorded at Stations ORNH-02 and ORNH-03. Both stations were located in the bottoms of gulches adjacent to trees and shrubs. These features are indicative of higher moisture, which likely supports a higher concentration of insect prey in the area. In addition, rocky outcroppings were present on the hillsides adjacent to Station ORNH-02, which are preferred roosting and foraging locations for the western small-footed myotis, the most abundant species recorded during the surveys. Our findings suggest that activity is concentrated in areas with features suitable for roosting and foraging Myotis species (i.e., trees, water sources, rocky outcroppings). Relatively low activity rates were observed at stations located amid grasslands and croplands (ORNH-01, ORNH-04, and ORNH-05), which also included the two met tower locations along the ridgetop where turbines are likely to be placed. Baseline studies at the Chopin Wind Energy Project in Umatilla County revealed a similar trend, with increased bat activity at a station located along a creek (74 bat passes/detector-night) compared to other stations in areas with fewer foraging opportunities (1 bat pass/detector-night; Enk et al. 2011).

Increasing concern may exist for cave roosting species, particularly the genus myotis, due to the westward spread of the fungal disease White Nose Syndrome (WNS). The disease is responsible for decimating populations of Myotis species in the eastern United States, and these declines prompted the listing of the formerly common northern long-eared bat, which is now federally listed as threatened under the Endangered Species Act. The western extent of the northern long-eared bat range is in eastern Montana and Wyoming, although other Myotis species that share similar life histories may be susceptible to the disease. The California, fringed, and long-legged myotis are species currently listed as Sensitive in Oregon without impacts by WNS. Two cases of WNS have been confirmed in Washington, impacting the little brown bat and Yuma myotis, and a silver-haired bat tested positive for carrying the fungus (WDFW 2017). The spread of WNS across western states may result in population declines and an increase in regulations to protect impacted species.

Table 5. Comparison of Pre-Construction Bat Activity Among Wind Projects in the United States

Region	Number of Sites Included	Bat Activity (Bat Passes/ Detector Night)		Bat Fatality (Bats/MW)	
		Mean	Minimum-Maximum	Mean	Minimum-Maximum
Northeastern Deciduous Forest	15	25.2	1.24–141.70	9.5	1.1-–35.6
Great Basin/Southwest Open Range-Desert	22	10.7	0.02–77.14	1.3	0.1–3.9
Midwestern Deciduous Forest-Agricultural	31	7.3	0.73–33.88	12.8	2.5–32.0
Great Plains	24	4.2	0.15–17.45	3.1	0.1–10.9
THIS PROJECT, eastern Oregon	**1**	**10.1**	**N/A**	**N/A**	**N/A**
Data summarized from Hein *et al.* 2013					

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Figures

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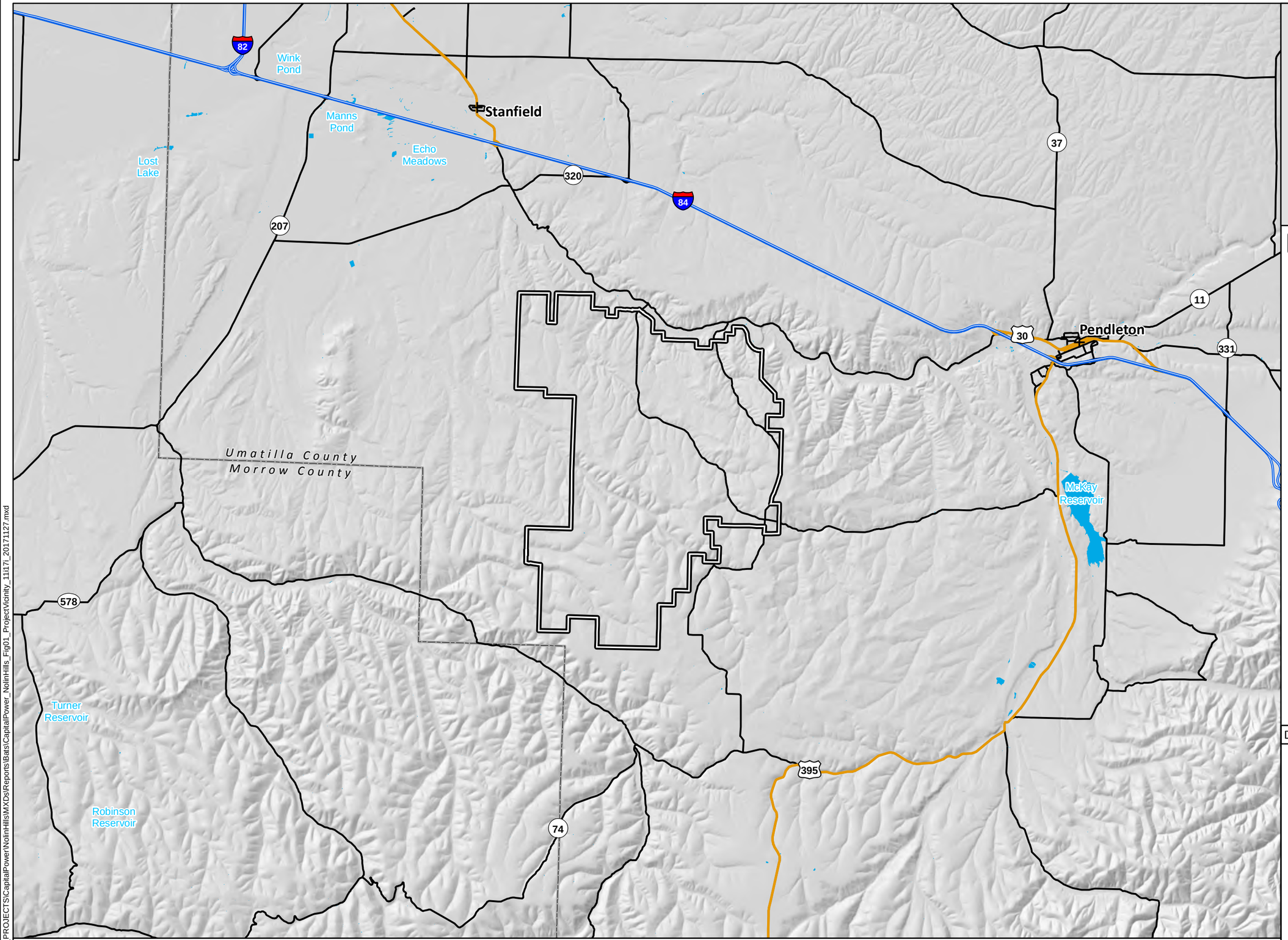
Nolin Hills Wind Power Project

Figure 1
Project Vicinity

UMATILLA COUNTY, OREGON



Proposed Site Boundary
City/Town
Interstate Highway
Secondary Highway
Secondary Road
County Boundary
NHD Waterbody

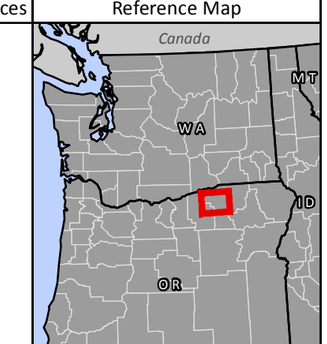
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USGS-NHD; ESRI-Roads

Reference Map



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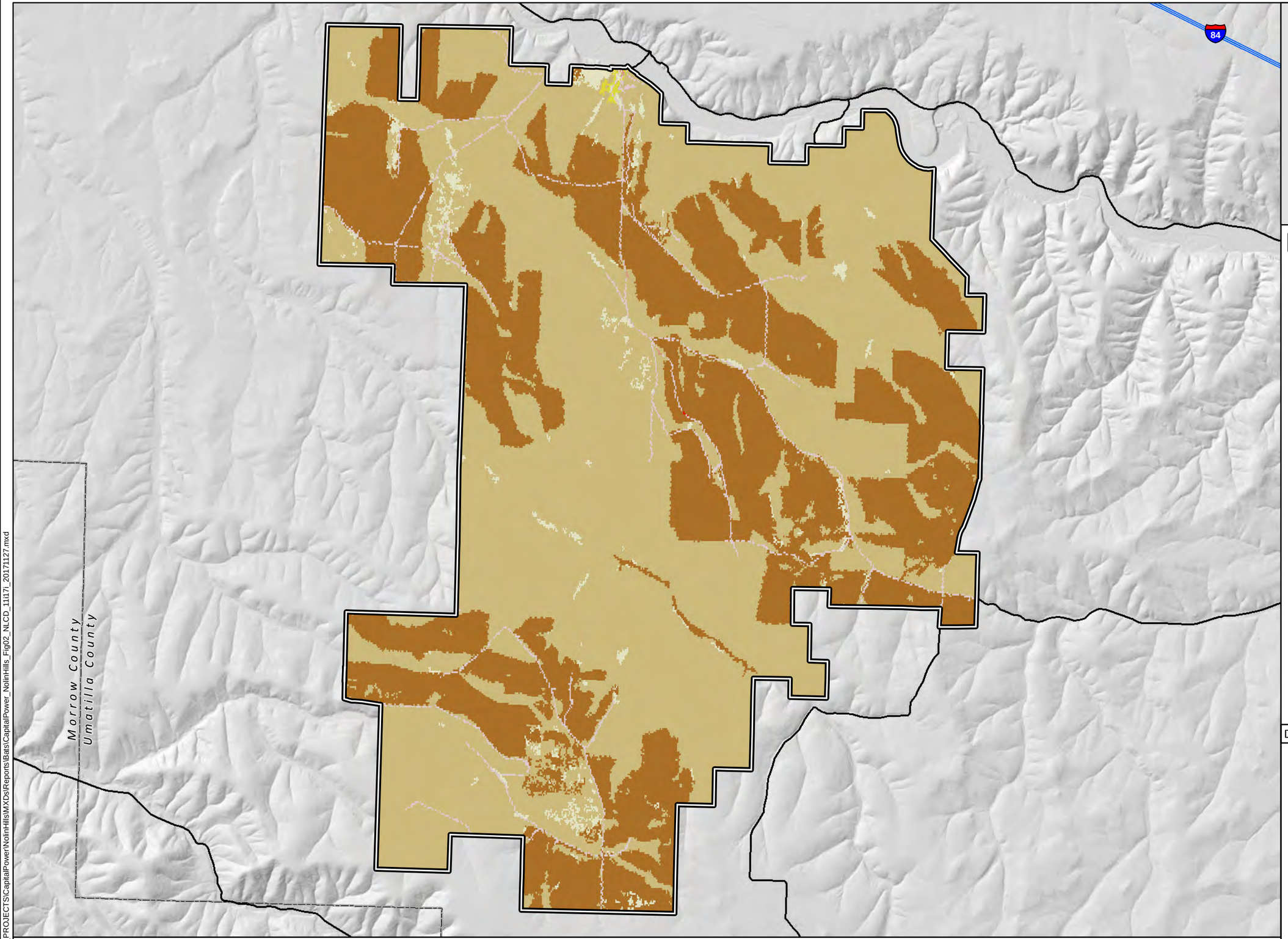
Nolin Hills Wind Power Project

Figure 2
NLCD Land Cover

UMATILLA COUNTY, OREGON



- Proposed Site Boundary
- Interstate Highway
- Secondary Road
- County Boundary

NLCD Land Cover

- Woody Wetlands
- Shrub/Scrub
- Open Water
- Mixed Forest
- Hay/Pasture
- Grassland/Herbaceous
- Emergent Herbaceous Wetlands
- Developed, Open Space
- Developed, Medium Intensity
- Developed, Low Intensity
- Cultivated Crops

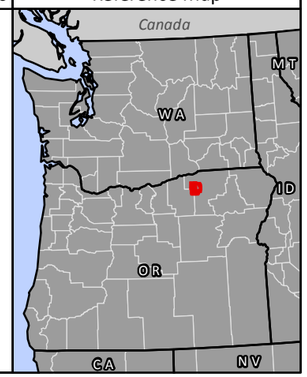
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USGS-NLCD; ESRI-Roads

Reference Map



1:80,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

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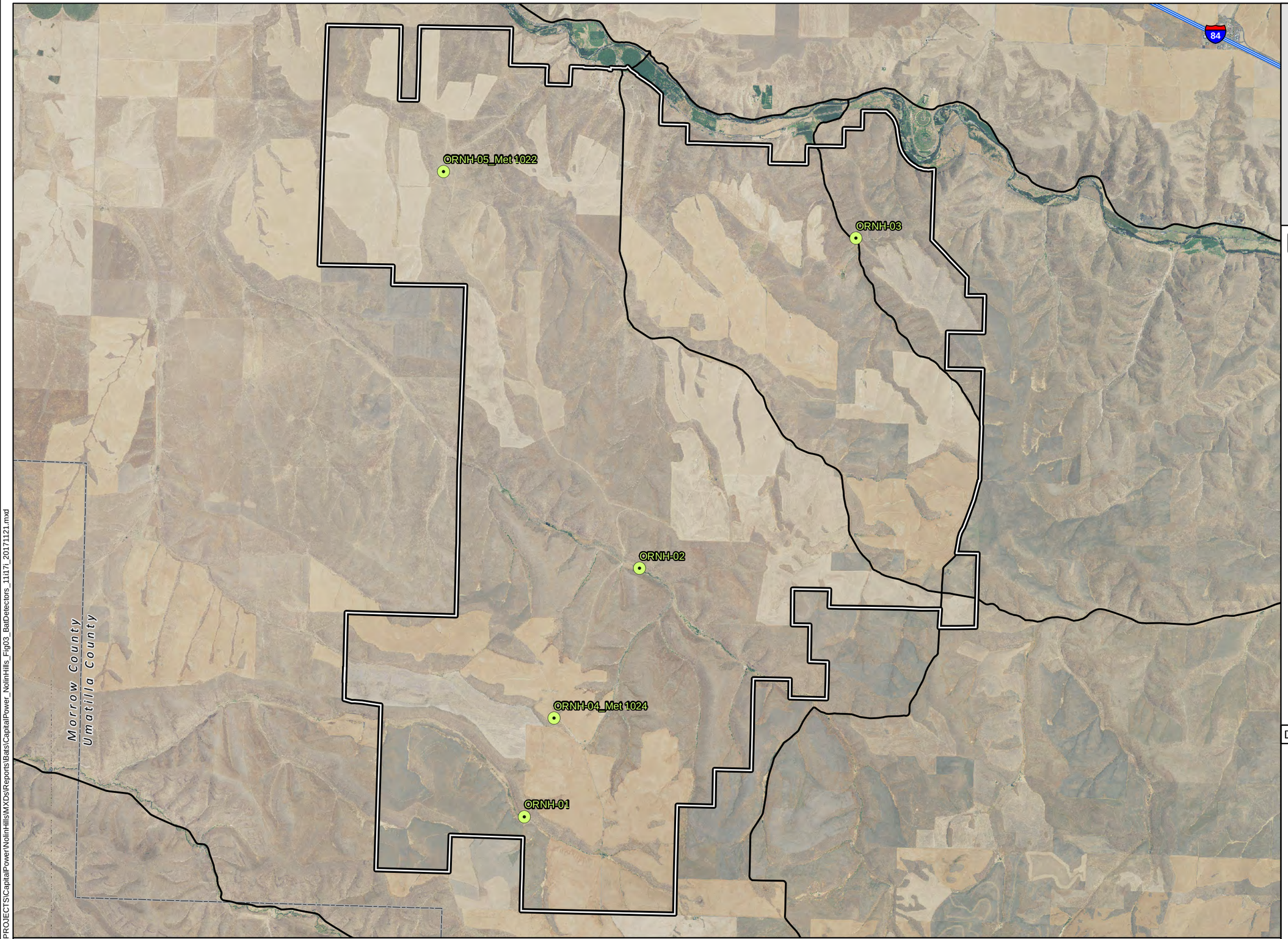
Nolin Hills Wind Power Project

Figure 3
Bat Detector Locations

UMATILLA COUNTY, OREGON



- Proposed Site Boundary
- Acoustic Bat Detector Location
- Secondary Road
- County Boundary

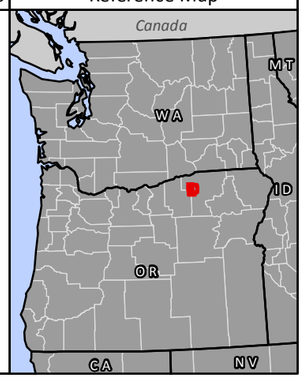
TETRA TECH

Capital Power

Data Sources

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads

Reference Map



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Appendix A. Site Photographs

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Photo 01. Station ORNH-01. May 18, 2017. Detector located in a slight gulch with tall grasses and shrubs. Station overview looking towards the northeast.

Photo 02. Station ORNH-01. May 18, 2017. Overview of surrounding habitat.

Photo 03. Station ORNH-02. May 18, 2017. Detector in a grassy gulch with trees and shrubs.

Photo 04. Station ORNH-02. May 18, 2017. Overview of surrounding habitat.

Photo 05. Station ORNH-03. May 18, 2017. Detector placed in gulch amid trees and sagebrush.

Photo 06. Station ORNH-03. May 18, 2017. Trees adjacent to Station 3.

Photo 07. Station ORNH-04. May 18, 2017. Detector set up at the base of the met tower.

Photo 08. Station ORNH-04. May 18, 2017. Vast grasslands and cropland surrounding Station 4.

Photo 09. Station ORNH-05. May 18, 2017. Vast grasslands and cropland surrounding Station 5.

Photo 10. Station ORNH-05. May 18, 2017. Vast grasslands and rolling topography surrounding Station 5.

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Appendix B. Number of Bat Passes per Detector-Night

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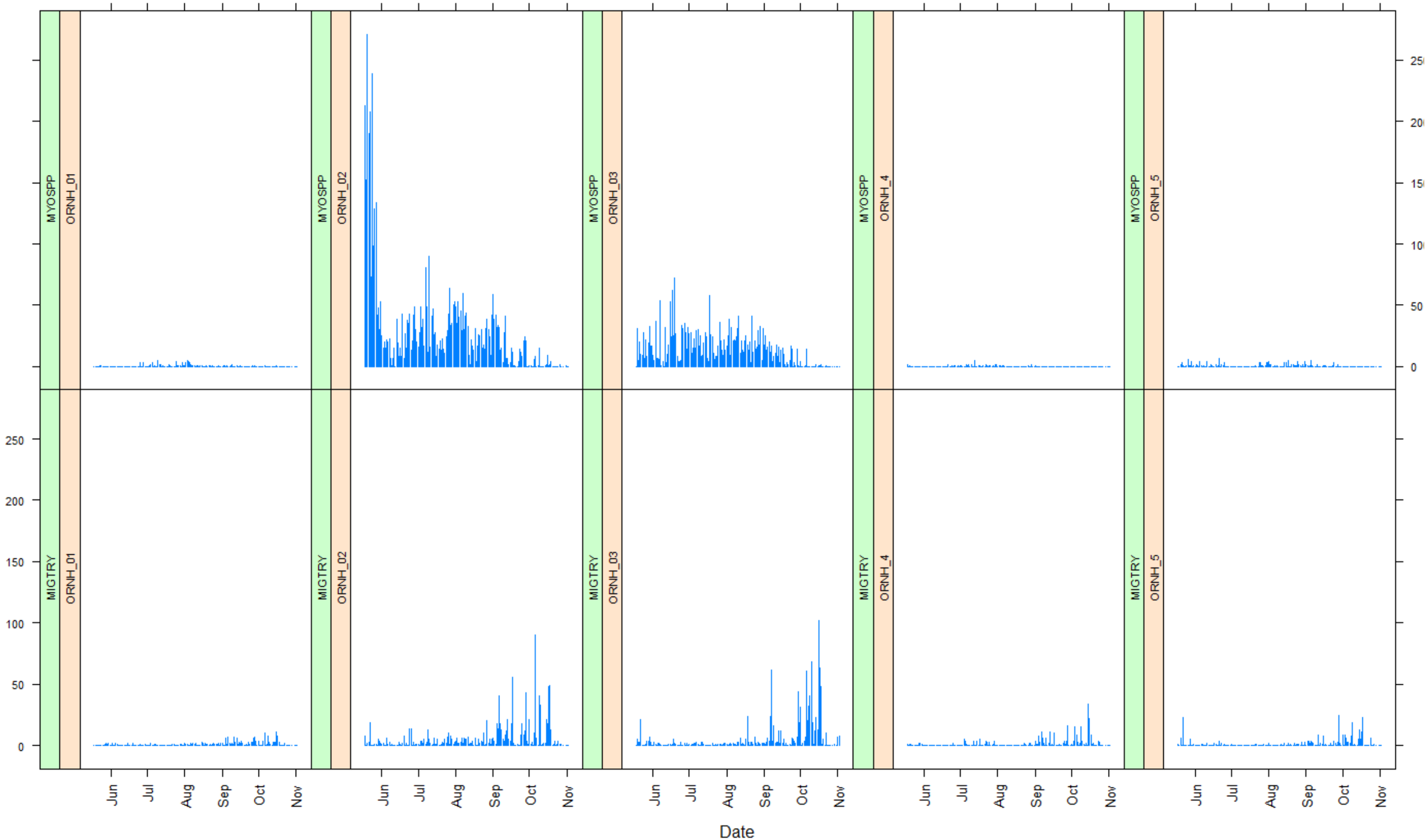
MYOSPP
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ORNH_02
ORNH_03
ORNH_4
ORNH_5
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50
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Aug
Sep
Oct
Nov
Date

UNLOSP
UNHISP
PARHES
MYOYUM
MYOVOL
MYOTHY
MYOSPP
MYOLUC
MYOCIL
MYOCAL
LASNOC
LASCIN
EPTFUS
ANTPAL
ORNH-01
ORNH-02
ORNH-03
ORNH-4H
ORNH-4L
ORNH-5H
ORNH-5L
0
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Jun
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Date

Attachment P-3. Draft Habitat Mitigation Plan

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Nolin Hills Wind Power Project

Draft Habitat Mitigation Plan

Prepared for

Nolin Hills Wind, LLC

Prepared by:

Tetra Tech, Inc.

February 2020

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1.0 Introduction

Nolin Hills Wind, LLC (the Applicant) proposes to construct the Nolin Hills Wind Power Project (Project), a wind energy project with a nominal generating capacity of approximately 350 megawatts (MW) and up to 117 average MW of energy, in Umatilla County, Oregon (see Figure C-1 in Exhibit C). The Applicant is currently considering a range of turbine options, and the two layouts described in Exhibit C (i.e., Turbine Option 1 and Turbine Option 2) represent the range of potential impacts. This Draft Habitat Mitigation Plan (HMP)[1] will be updated as needed to reflect the final layout once the turbine model(s) have been selected. The Project will interconnect to the regional grid via either a transmission line leading from the northern Project substation northwest to Cottonwood Substation in Hermiston, or a transmission line to the proposed Bonneville Power Administration Stanfield Substation, north of the town of Nolin. These facilities are all described in greater detail in Exhibit B.

This Draft HMP describes how the Applicant will mitigate for the unavoidable wildlife habitat impacts of the Project. Specifically, this HMP outlines how the Applicant will construct and operate the Project consistent with the Oregon Department of Fish and Wildlife (ODFW) Habitat Mitigation Policy. This HMP addresses mitigation for both the permanent impacts of Project components (permanent impacts) and the temporal impacts associated with Project construction (temporary impacts with a longer [5+ years] restoration timeframe). The Applicant proposes two mitigation options including 1) a payment-to-provide option with ODFW, and 2) acquisition of a conservation easement to protect and enhance a compensatory habitat mitigation area. As presented in this Draft HMP, Mitigation Option 1 is included to preserve a potential future mitigation option but the Applicant acknowledges that the appropriate procedures necessary to support a mitigation banking program have not been adopted by ODFW. Mitigation Option 2 is an Applicant-developed mitigation site; this HMP specifies habitat enhancement actions and monitoring procedures to evaluate the success of those actions, as applicable.

2.0 Description of the Impacts Addressed by the HMP

Within the Site Boundary, the Applicant established a 13,868-acre micrositing corridor within which Project facilities will be constructed. This approach allows some flexibility with specific component locations and design in response to site-specific conditions and engineering requirements that will be determined prior to construction. Construction of the Project will result in approximately 87 acres of permanent impacts under Turbine Option 1, and 123 acres under Turbine Option 2, although actual impacts may change depending on the final layout and turbine

[1] This HMP will be incorporated by reference in the site certificate for the Nolin Hills Wind Power Project and must be understood in that context. It is not a "stand-alone" document.

model(s). Turbine Option 2 represents the estimated maximum acreage of impact, as detailed in Table 1.

Table 1. Maximum Acres of Impact to Habitat Categories and Types (Turbine Option 2)

Final Habitat Category[1]	Preliminary Habitat Category	Habitat Type[2]	Habitat Subtype[2]	Temp Impact	Perm Impact
2	2	Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1[3]	-
			Perennial Streams	<1[3]	-
		Riparian Forest and Natural Shrubland Complexes	Eastside Riparian	<1[4]	-
	3	Agriculture, Pasture, and Mixed Environs	Planted Grasslands	21	2
		Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	134	5
			Shrub-steppe	3[5]	<1
	4	Agriculture, Pasture, and Mixed Environs	Planted Grasslands	<1	-
		Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	58	1
	5	Agriculture, Pasture, and Mixed Environs	Irrigated Pastures and Hay Meadows	<1	-
		Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	1	-
Category 2 Total				**217**	**8**
3	3	Agriculture, Pasture, and Mixed Environs	Planted Grasslands	79	8
		Cliffs, Caves, and Talus	Cliffs, Caves, and Talus	<1	-
		Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1[3]	-
		Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	121	8
			Shrub-steppe	1[5]	<1
		Wetlands	Emergent Wetlands	<1[3]	-
Category 3 Total				**201**	**16**
4	4	Agriculture, Pasture, and Mixed Environs	Planted Grasslands	49	4
		Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1[3]	<1[3]
		Riparian Forest and Natural Shrubland Complexes	Eastside Riparian	<1	-
		Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	114	7
Category 4 Total				**163**	**12**

Final Habitat Category[1]	Preliminary Habitat Category	Habitat Type[2]	Habitat Subtype[2]	Temp Impact	Perm Impact
5	5	Agriculture, Pasture, and Mixed Environs	Irrigated Pastures and Hay Meadows	2	<1
			Planted Grasslands	176	10
		Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	<1[3]	-
		Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands	39	1
			Shrub-steppe	2	<1
Category 5 Total				**217**	**12**
6	6	Agriculture, Pasture, and Mixed Environs	Orchards, Vineyards, Wheat Fields, Other Row Crops	705	76
		Urban and Mixed Environs	Urban and Mixed Environs	28	<1
Category 6 Total				**733**	**76**
GRAND TOTAL				**1,532**	**123**

Note: Totals in this table may not appear to sum correctly due to rounding. "-" means no impact while <1 means greater than zero but less than 0.5 acre impact.

1. Final Category following application of Washington ground squirrel Category 2 overlay.
2. Only impacted Habitat Types and subtypes present within the impact areas are represented.
3. Impacts to wetlands and Waters of the State will be avoided during final design.
4. Tall vegetation will be maintained for the life of the Project to allow underwire clearance and thus this Category 2 Eastside Riparian habitat is conservatively considered permanently impacted for the purposes of mitigation.
5. Temporally impacted Shrub-steppe habitat.

Temporary impacts will be mitigated through successful implementation of the Draft Revegetation Plan (Attachment P-4 to Exhibit P). However, some areas of Shrub-steppe that will be temporarily impacted include sagebrush stands that could take longer than 5 years to be restored. Even where restoration of this habitat subtype is successful, there is a loss of habitat function during the restoration period. Therefore, this HMP includes mitigation for both permanently impacted habitat and select areas of temporarily impacted Shrub-steppe habitat that results in a temporal loss of habitat quality (Table 1). The determination of temporal impacts to Shrub-steppe habitat was based on the vegetative characteristics of the habitat; therefore, temporally impacted Category 3 Shrub-steppe includes both Preliminary Category 3 Shrub-steppe habitat (i.e., before application of the Washington ground squirrel [*Urocitellus washingtoni*] Category 2 overlay) as well as Shrub-steppe habitat with both a Preliminary and Final Category 3 designation (see Table 1).

The Category 2 Eastside Riparian habitat shown as temporarily impacted in Table 1 is associated with the potential transmission line crossing of the Umatilla River. Although poles will be placed outside of riparian vegetation (as well as wetlands and Waters of the State; see Exhibit J of the Application for Site Certificate), should that transmission option be selected, riparian vegetation will likely need to be cleared or trimmed for underwire clearance and maintained for the life of the

Project. Therefore, this Draft HMP conservatively considers this Category 2 Eastside Riparian habitat as permanently impacted for the purposes of mitigation, as described below in Section 3.0.

The other permanently impacted areas at the Project are primarily wheat fields (76 acres; habitat type Agriculture, Pasture, and Mixed Environs; subtype Orchards, Vineyards, Wheat Fields, Other Row Crops), Planted Grasslands (24 acres; habitat type Agriculture, Pasture, and Mixed Environs; subtype Planted Grasslands), and Eastside Grassland (23 acres; habitat types Upland Grassland, Shrub-steppe and Shrubland; subtype Eastside Grassland), and may be used by various species (Exhibit P, Tables P-4 and P-5). All other habitat subtypes contain less than 1 acre of permanent impact area. No areas of Eastside Grassland or Shrub-steppe habitat were field-characterized as Category 2 habitat. The Project will not have any impacts on Category 1 habitat. No mitigation is required for impacts to Category 6 areas.

3.0 Methods for Calculating the Size of the Mitigation Area

The mitigation area for the Project will be determined based on the final design and actual habitat impacts. Before beginning construction, the Applicant will provide the Oregon Department of Energy (ODOE) with a map showing the final design configuration of the Project, and a table showing the estimated acres of permanent and temporary impacts by habitat category (Table 1). Mitigation calculations will be based on current habitat conditions that will be mapped and field verified by the Applicant during the spring prior to construction.

A mitigation ratio between greater than 1 and 2 acres for every 1 acre of Category 2 habitat permanently impacted will be used to ensure that the mitigation area is large enough to achieve “no net loss” of habitat quantity or quality. A “net benefit” in habitat quantity or quality for permanent impacts to habitat in Category 2 may be achieved through habitat enhancement actions or increased mitigation ratios. A mitigation ratio of 1 acre for every 1 acre of Category 3 and 4 habitat permanently impacted will be used to ensure that the mitigation area is large enough to achieve “no net loss” of habitat quantity or quality. A mitigation ratio of greater than zero acres but less than 1 acre for every acre of Category 5 habitat impacted will be used to ensure a “net benefit” in habitat quantity or quality. The Applicant will determine the final mitigation ratios in consultation with ODFW prior to construction based on the mitigation option selected (see Section 4.0), the type of mitigation, duration of mitigation (i.e., term vs. perpetuity), and the likelihood of mitigation success. No mitigation will be implemented for impacts on Category 6 habitat.

For temporary impacts that require mitigation, the mitigation area will include up to 0.5 acre for every 1 acre of Category 3 Shrub-steppe habitat subtype that is temporarily affected by construction activities (but outside the permanent impact area). The size of this portion of the mitigation area assumes that restoration of other disturbed habitat subtypes (e.g., Eastside Grassland habitat subtype) is successful, as determined under the Draft Revegetation Plan (Attachment P-4 to Exhibit P). Additional mitigation may be needed if restoration efforts of other habitat types are unsuccessful. As described above, temporary impacts to Category 2 Eastside Riparian habitat associated with the transmission line crossing of the Umatilla River are considered permanent here for the purposes of mitigation because any tall vegetation will be maintained for

the life of the Project to ensure underwire clearance. Table 2 identifies the maximum mitigation requirement based on the maximum habitat permanently and temporarily impacted (i.e., Turbine Option 2) and the maximum habitat mitigation ratios presented in this section.

Table 2. Mitigation Calculation

Impact Type and Habitat Category	Habitat Subtype	Estimated Maximum Impact (Acres)[1]	Maximum Mitigation Acres per Acres disturbed[2]	Total Estimated Mitigation (Acres)
Permanent Impacts Requiring Mitigation[3]				
2	All	7.9	2	15.8
3	All	16.0	1	16.0
4	All	11.6	1	11.6
5	All	11.6	0.5	5.8
Temporary Impacts Requiring Mitigation[4]				
2	Eastside Riparian	0.4	2[5]	0.9
3	Shrub-steppe	3.6	0.5	1.8
Total				**51.9**

Note: Totals in this table may not appear to sum correctly due to rounding.

1. Maximum potential Project disturbance, as reflected in Turbine Option 2.

2. Maximum potential mitigation ratios included here for illustrative purposes. For example, a mitigation ratio between >1:1 and 2:1 would achieve "no net loss" of habitat quantity or quality and a "net benefit" for permanent impacts to Category 2 habitat, so a maximum 2:1 ratio is shown here. Similarly, a mitigation ratio between >0:1 and <1:1 for permanent impacts to Category 5 habitat would achieve a "net benefit" in habitat quantity or quality; a maximum 0.5:1 ratio is shown here.

3. No mitigation required for Category 6 habitat.

4. Temporary impact areas require mitigation where vegetation will take longer than 5 years to recover (i.e., in Category 3 Shrub-Steppe habitat) or will be maintained for the life of the Project to ensure underwire clearance (i.e., in Category 2 Eastside Riparian habitat associated with the crossing of the Umatilla River). Other habitat types will be restored within 5 years following the methods described in the Draft Revegetation Plan and therefore do not require mitigation.

5. Areas with the temporary impact layer that will be maintained for the life of the Project are considered permanently impacted for the purposes of the mitigation and thus are assigned the applicable permanent impact mitigation ratio.

4.0 Mitigation Options

The Applicant has identified two options for addressing the mitigation obligation where habitat protection and enhancement and/or commensurate funding are feasible and consistent with this HMP. As described above, Mitigation Option 1 is not an available mitigation option at the time of Application for Site Certificate review, but the Applicant preserved the right to use Mitigation Option 1 should it be available in the future.

The final mitigation approach will offer enough suitable habitat to achieve the ODFW habitat mitigation goals of no net loss of habitat quantity or quality, and provide a net benefit in habitat quantity for impacts to Category 2 habitat, no net loss of habitat quantity or quality for impacts to

Category 3 and 4 habitat, and a net benefit in habitat quality or quantity for impacts to Category 5 habitat. Prior to operation, the Applicant will acquire the legal right to create, maintain, and protect the habitat mitigation area for the life of the Project by means of an outright purchase, conservation easement, or similar conveyance, and will provide a copy of the documentation to ODOE. The duration of Mitigation Option 1 would be in perpetuity (i.e., permanent conservation of habitat) whereas the duration of Mitigation Option 2 would be limited to the life of the Project (i.e., a limited term).

4.1 Mitigation Option 1: ODFW Payment-to-Provide

The Applicant understands that ODFW is considering a payment-to-provide program that could be used to mitigate habitat impacts related to energy facilities. However, at this time, this program is not yet available. Should such a program become available in the future, the Applicant could use a payment-to-provide mitigation option with the approval of ODOE and ODFW.

4.2 Mitigation Option 2: Habitat Mitigation Area

Under this option, the Applicant will establish a conservation easement(s) in the Columbia Plateau ecoregion. The Applicant has preliminarily identified areas that could be used for mitigation sites, where habitat enhancements could benefit Washington ground squirrels, raptors, and grassland birds. The Applicant has identified sufficient acreage of habitat to meet the maximum possible mitigation obligation described in Section 3.0.

4.2.1 Habitat Enhancement Actions

If Mitigation Option 2 is selected, the Applicant will develop a management plan for the selected mitigation site that includes habitat enhancement actions to improve the habitat conditions of the mitigation site. The objectives of habitat enhancement are to protect habitat within the mitigation area from degradation and to improve the habitat quality of the mitigation area. By achieving these objectives, the Applicant can address the permanent and temporal habitat impacts of the Project and meet the ODFW habitat mitigation goals. The Applicant may choose one or more of the following enhancement actions based on the needs of the selected habitat mitigation area to improve habitat conditions, as appropriate and feasible:

1. **Shrub Planting.** The Applicant will plant sagebrush or other native shrubs in locations within the habitat mitigation area(s) where existing native shrubs are in poor condition. The Applicant will determine the size of the shrub-planting areas and the shrub species based on the professional judgment of a qualified biologist after a ground survey of actual conditions. The shrub survival rate at 4 years after planting is an indicator of successful enhancement of habitat. The Applicant will complete the initial shrub planting within 1-2 years after the beginning of construction of the Project. Supplementing existing, but disturbed, sagebrush areas with sagebrush seedlings or transplanted mature plants will assist the restoration of this valuable shrub-steppe component. The Applicant will obtain shrubs from a qualified nursery, and will identify the area to be planted with sagebrush or

other native shrubs after consultation with ODFW, subject to final approval by ODOE. The Applicant will mark the planted shrub clusters at the time of planting for later monitoring purposes, and will keep a record of the number of shrubs planted. Plantings will generally be considered successful if a 20 percent survival rate is achieved after 4 years.

2. **Weed Control.** The Applicant will implement a weed control program within the habitat mitigation area(s). Under the weed control program, the Applicant will conduct a pre-management weed assessment to identify the type and percentage of non-native species within the habitat mitigation area(s). The Applicant will then monitor the mitigation area(s) to locate weed infestations. The Applicant will continue weed control monitoring, as needed, for the life of the Project. As needed, the Applicant will use appropriate methods to control weeds. Appropriate weed control methods shall include identification of noxious weeds within the mitigation area(s), timing, herbicides, and application mechanism and be based on consultation with the applicable County Weed Department. Weed control on the mitigation site(s) will reduce the spread of noxious weeds within the habitat mitigation area(s) and on any nearby Eastside Grassland, Planted Grassland, or cultivated agricultural land. Weed control will promote the growth of desirable native vegetation and planted sagebrush. The Applicant may consider weeds to be successfully controlled when weed clusters have been eradicated or reduced to a non-competing level. Weeds may be controlled with herbicides or hand-pulling. The Applicant will notify the landowner of the specific chemicals to be used on the site and when spraying will occur. To protect locations where young desirable forbs may be growing, spot-spraying may be used instead of total area spraying.
3. **Seeding.** The Applicant will plant an ODFW-approved seed mix within the habitat mitigation area(s) in areas that have been recently disturbed, if applicable (e.g., after weed treatments). The method for seed application will be determined primarily based on the size of the area to be seeded. The size of the seeded area will depend on the amount of recently disturbed area within the mitigation area. The Applicant will complete the initial seeding within 1-2 years after the beginning of construction of the Project. The Applicant will record and mark the seeded areas at the time of seeding for later monitoring purposes.
4. **Fire Control.** The Applicant will implement a fire control plan for wildfire minimization when Project staff are working within the mitigation area(s). The Applicant will provide a copy of the fire control plan to ODOE before starting habitat enhancement actions. The Applicant will include in the plan appropriate fire prevention measures, methods to detect fires that may occur and a protocol for fire response if a fire were to occur when Project staff were present. If any part of the mitigation area(s) is damaged by future wildfire, the Applicant will assess the extent of the damage and implement appropriate actions to restore habitat quality in the damaged area.
5. **Nest Platforms**. Within the habitat mitigation area(s) where and if structures suitable for raptor nesting are limited and increased raptor nesting is desirable, the Applicant will build and maintain nest platforms. The nesting platform design and location(s) will be approved by ODFW prior to construction. By providing additional nesting structures for raptors, the

Applicant will improve habitat quality for raptors. The number and type of nesting platforms will be determined based on the availability of suitable locations and the raptor use and need for nesting structures at the mitigation area(s).

6. **Restricted Grazing.** The Applicant will restrict and/or eliminate grazing within the habitat mitigation area(s), as appropriate for improvement of vegetation communities and maintaining high-quality habitat for wildlife species. A grazing management plan will be developed that considers the timing, duration, and intensity of grazing and how these factors impact desirable plant development and vegetation structure. Eliminating livestock grazing within the mitigation area(s) during most of the year will enable recovery of native vegetation where past grazing has occurred. If necessary, fences will be installed within or around the mitigation area(s) to exclude livestock. The increase in native vegetation and habitat complexity that will result from a reduction and/or elimination of livestock will benefit a variety of wildlife and plant species. Reduced livestock grazing in the early spring may be used as a vegetation management tool. Any grazing performed as a vegetation management tool will be approved by ODFW prior to implementation.
7. **Habitat Protection.** The Applicant will restrict uses of the mitigation area(s) that are inconsistent with the ODFW habitat mitigation goals.

4.2.2 Monitoring

For Mitigation Option 2, the Applicant will hire a qualified investigator (botanist, wildlife biologist, or revegetation specialist) to conduct a comprehensive monitoring program for the mitigation area(s), as appropriate. The purpose of this monitoring is to evaluate on an ongoing basis the protection of the habitat quality and the results of enhancement actions, especially during the wildlife breeding seasons.

The investigator will monitor the habitat mitigation area(s) for the life of the Project beginning in the year following the initial planting. Monitoring will occur annually during the first 5 years following initial planting, then will occur every 3 years thereafter. The Applicant will identify appropriate monitoring actions for the habitat mitigation area(s) and the habitat enhancement actions that are implemented in consultation with ODOE and ODFW. Depending upon specific habitat enhancement actions implemented, the investigator may carry out the following monitoring procedures:

1. Assess vegetation cover (species, structural stage, etc.) and progress toward meeting the success criteria;
2. Record environmental factors (such as precipitation at the time of surveys and precipitation levels for the year);
3. Record any wildfire that occurs within the mitigation area(s) and any remedial actions taken to restore habitat quality in the damaged area;
4. Assess the success of the weed control program and recommend remedial action, if needed; and

5. Assess the survival rate and growth of planted species.

The investigator will visit identified monitoring points within planted areas. Plantings will generally be considered successful if a 20 percent survival rate is achieved after 4 years. The investigator will report on the timing and extent of any livestock grazing that has occurred within the mitigation area since the previous monitoring visit.

5.0 Success Criteria

Mitigation of the permanent and temporal habitat impacts of the Project may be considered successful if the Applicant protects and enhances sufficient habitat to meet the ODFW habitat mitigation goals, or provides commensurate funding. For Mitigation Option 1, mitigation shall be considered successful in meeting the Applicant's obligations at the time of payment to ODFW. For Mitigation Option 2, the success will be based on improvement of habitat quality based on evidence of indicators such as survival of planted shrubs, natural recruitment of sagebrush, and/or successful weed control. If the Applicant cannot demonstrate that the habitat mitigation area(s) is trending toward the habitat quality goals described above within 5 years after the initial enhancement actions, the Applicant will propose remedial action. ODOE may require supplemental planting or other corrective measures.

6.0 Pre-Construction Reporting

Prior to construction, the Applicant shall provide to ODOE and ODFW a report identifying the mitigation option(s) selected to meet the Oregon Energy Facility Siting Council's (Council's) Fish and Wildlife Habitat standard for permanent and temporal habitat impacts. The report shall identify the mitigation ratios for permanent impacts. The report shall confirm that temporal impacts will be mitigated at a ratio of 0.5 acre for every 1 acre temporarily impacted that is anticipated to take 5 or more years to recover.

The report shall specify the methodology for evaluating the habitat subtype/quality within the areas of permanent and temporal disturbance and within the habitat mitigation area(s) for Mitigation Option 2. The report shall identify the enhancement actions to be implemented at the habitat mitigation area(s) and shall provide the metrics necessary to evaluate enhancement action success.

7.0 Amendment of the HMP

This HMP may be amended from time to time by agreement of the Applicant and the Council. Such amendments may be made without amendment of the site certificate. The Council authorizes ODOE to agree to amendments to this HMP. ODOE shall notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of this HMP agreed to by ODOE.

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Attachment P-4. Draft Revegetation Plan

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Nolin Hills Wind Power Project

Draft Revegetation Plan

Prepared for

Nolin Hills Wind, LLC

Prepared by:

Tetra Tech, Inc.

February 2020

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Appendices

Appendix A. Oregon Department of Agriculture Noxious Weed Policy and Classification System
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1.0 Introduction

Nolin Hills Wind, LLC (the Applicant) proposes to construct the Nolin Hills Wind Power Project (Project), a wind energy project with a nominal generating capacity of approximately 350 megawatts (MW) and up to 117 average MW of energy, in Umatilla County, Oregon (see Figure C-1 in Exhibit C). The Applicant is currently considering a range of turbine options and the two layouts described in Exhibit C (i.e., Option 1 and Option 2) represent the range of potential impacts. This Revegetation Plan (Plan) will be updated as needed to reflect the final layout once the turbine model(s) have been selected. The Project will interconnect to the regional grid via either a transmission line leading from the northern Project substation northwest to Cottonwood Substation in Hermiston, or a transmission line to the proposed Bonneville Power Administration Stanfield Substation, north of the town of Nolin. Other Project components include site access roads, one operations and maintenance (O&M) building, meteorological data collection towers, and temporary construction yards. These facilities are all described in greater detail in Exhibit B.

This Plan describes methods, success criteria, and monitoring and reporting requirements for the restoration and revegetation of areas temporarily disturbed during the construction of the Project. The objective of revegetation efforts is to restore temporarily disturbed areas to pre-disturbance conditions. Habitat mapping and categorization of the Site Boundary were conducted for the Project between 2017 and 2019. Details on habitat types, subtypes, and categories can be found in Exhibit P of the Project's Application for Site Certificate (ASC), especially Attachment P-2. Details on potential impacts to habitat from construction and operation of the Project, as well as avoidance and minimization measures, can be found in the ASC Exhibits P and Q.

The Project includes a 48,077-acre Site Boundary within which all Project facilities will be located. The Project lies within the Columbia Plateau Ecoregion at elevations from approximately 560 to 2,740 feet. The Project is sited entirely on private land primarily within eastside grassland, followed by active agriculture and planted grassland. Native vegetation within the Site Boundary has been modified not only through agricultural conversion, but also through historical and current livestock grazing, changes in fire regimes, and the introduction of exotic grasses and other non-native vegetation.

2.0 Description of Temporary Impacts

Within the Site Boundary, the Applicant established a 13,868-acre micrositing corridor within which Project facilities will be constructed. This approach allows some flexibility with specific component locations and design in response to site-specific conditions and engineering requirements that will be determined prior to construction. Construction of the Project will result in approximately 1,010 acres of temporary impacts under Turbine Option 1, and 1,530 acres under Turbine Option 2. Although actual impacts may change depending on the final layout and turbine model(s), Turbine Option 2 represents the estimated maximum acreage of impact.

Temporary impacts will occur in areas that will be disturbed during construction activities, but which will not be occupied by permanent facilities. Temporary disturbance will occur in association with the improvement of existing roads and the construction of aboveground and underground collector and transmission lines, new roads, substations, meteorological data collection towers, crane paths, an O&M building, and staging areas. The intensity of the construction impact will vary across the Project. In some areas, the impact will be relatively light, but in other areas, heavy construction activity will remove all vegetation, remove topsoil, and compact the remaining subsoil. Some areas of temporary disturbance, such as staging areas, will be graveled during construction, and will be reclaimed by removing the gravel surface, regrading to match adjacent contours, and reseeding.

Table 1 presents the anticipated temporary impacts associated with Turbine Option 2 to the habitat subtypes recorded during 2017-2019 field surveys and desktop analysis for areas with no access. This represents the estimated maximum acreage of impact; Table 1 will be updated prior to construction to reflect the final impact acreage by habitat subtype for the final layout, once a turbine model(s) has been selected. Additional details regarding habitat subtypes that will be temporarily and permanently disturbed during construction and operation are provided in Exhibit P of the ASC.

Table 1. Maximum Temporary Impacts by Habitat Subtype (Turbine Option 2)

Habitat Subtype	Temporary Disturbance (Acres) [1]
Orchards, Vineyards, Wheat Fields, Other Row Crops	705
Eastside Grasslands	466
Planted Grasslands	324
Urban and Mixed Environs	28
Shrub-steppe	5
Irrigated Pastures and Hay Meadows	2
Intermittent or Ephemeral Streams	1*
Eastside Riparian	1
Cliffs, Caves, and Talus	<1
Emergent Wetlands	<1*
Perennial Streams	<1*
Total	**1,532**

1. Total may not sum exactly due to rounding.
* Impacts to wetlands and Waters of the State will be avoided during final design (see Exhibit J of the ASC).

3.0 Agency Consultation

The Applicant will consult with the Oregon Department of Fish and Wildlife (ODFW), the Oregon Department of Energy (ODOE), and the Umatilla County Weed Department prior to construction to discuss areas to be revegetated, reference site location and conditions, topsoil restoration and revegetation methods, erosion and sediment control measures, and implementation schedule. Six

months prior to commercial operation of each Project phase[1], if applicable, the Applicant will meet with ODFW, ODOE, and the Umatilla County Weed Department to review the actual extent and conditions of temporarily impacted areas, to confirm the revegetation methods agreed to during pre-construction review are still appropriate, and to identify reference sites.

4.0 Revegetation Methods

This Plan addresses revegetation methods for temporary impacts to non-agriculture and non-developed habitat subtypes. Agriculture and developed habitat types will be restored with the landowner's direction and as discussed in Section 4.3. Revegetation will begin as soon as feasible following completion of construction. Seeding and planting will be done in a timely manner and within the appropriate season to facilitate germination. The Applicant will restore temporarily disturbed areas by re-establishing slope, surface stability, and drainage features, as needed, followed by soil preparation and seeding. Soil preparation and seeding techniques are described below.

4.1 Soil Preparation

Prior to seeding and/or planting of revegetation areas, soils will be prepared to facilitate revegetation success. Soil preparation will include standard, commonly used methods and will consider relevant site-specific factors, including slope, size of area, and erosion potential. In areas where soil is removed during construction, the topsoil will be stockpiled separately from subsurface soils, where possible. The stockpiled topsoil will be put back in place prior to revegetation activities. Additional site-specific soil preparation may be determined during the agency consultation period. The Applicant will use mulching, installation of geotextile products, and other appropriate practices to control erosion and sediment during revegetation efforts.

4.2 Seeding

Following preparation of the soil, an agency-approved seed mix will be applied. The seed mix will be selected based on the pre-construction conditions and land use and approved by the ODFW, ODOE, Umatilla County, and private landowners, as appropriate. Seeds will be obtained from a reputable supplier in compliance with the Oregon Department of Agriculture (ODA) Oregon Seed Laws. Table 3 shows an example seed mix for revegetation.

[1] The Applicant proposes to begin construction as soon as spring 2021, with a commercial operation target date of the end of 2022. However, given that construction could conceivably be delayed by weather or other unforeseen circumstances such as market changes, the Applicant has requested flexibility to build the Project in one or more phases, with a deadline for construction completion of 6 years from issuance of the site certificate.

Table 2. Example Seed Mix

Common Name	Scientific Name	Percent of Mix
Bluebunch wheatgrass	*Pseudoroegneria spicata*	45
Bottlebrush squirreltail	*Elymus elymoides*	15
Sandberg's bluegrass	*Poa secunda*	15
Thickspike wheatgrass	*Elymus lanceolatus*	15
Western yarrow	*Achillea millefolium* var. *occidentalis*	2
Shaggy fleabane	*Erigeron pumilis*	2
Desert parsley	*Lomatium dissectum*	2
Silky lupine	*Lupinus sericeus*	2
Lewis flax	*Linum lewisii*	2

The Applicant will choose seeding methods based on site-specific factors such as slope, erosion potential, and the size of the area in need of revegetation. Two common seed application methods that may be used are broadcast and drill seeding.

4.2.1 Broadcast Seeding

Broadcast seeding is the application of seed directly to the ground surface. This method may be chosen for areas with shallow and rocky soils, and the type of broadcast spreader would depend on the size of the area to be seeded and the terrain.

The agency-approved seed mix would be applied at the specified application rates. Where feasible, half of the total mix would be applied in one direction and the second half of the mix would be applied in the perpendicular direction. A tracking dye may be added to facilitate uniform seed application. Immediately following seed application, certified weed-free straw would be applied at a rate of 2 tons per acre. Straw would be crimped into the ground to a depth of 2 inches using a crimping disc or similar device. As an alternative to crimping, a tackifier (a chemical compound to increase the adhesiveness) may be applied using hydroseed equipment. Prior to mixing the tackifier, the tank would be visually inspected for cleanliness and, if remnants from previous applications exist, the tank would be washed.

4.2.2 Drill Seeding

Drill seeding can be used for larger areas with deeper soils and moderate to gentle terrain to accommodate mechanical equipment. This method provides the advantage of planting the seed at a uniform depth and may provide better soil to seed contact.

Using an agricultural or range seed drill, the agency-approved seed mix would be planted according to the application rates recommended by the seed supplier. Where feasible, half of the total mix would be applied in one direction and the second half of mix in the perpendicular direction. If mulch has been previously applied in heavy construction areas, it is possible for the seed to be drilled through the mulch, resulting in seed-to-soil contact conducive for seed germination.

4.3 Restoration of Cropland

Croplands will be reseeded with the appropriate crop or maintained as fallow in consultation with the landowner or farm operator. The Applicant will also consult with the landowner or farm operator to determine seed mix and application methods and rates for seed and fertilizer.

Soil compaction is a concern for restoring agricultural soils to their pre-construction productivity. During construction of temporary facilities, the Applicant will excavate and store soils by soil horizon, so that soils could be replaced and restored appropriately, including replacing topsoil, where possible. During post-construction restoration of temporary impacts to agricultural areas, the Applicant will loosen agricultural soil to an appropriate depth to reduce the potential effects of compaction.

5.0 Noxious Weed Prevention and Control

Throughout construction and revegetation activities, the Applicant will take appropriate actions to prevent the spread of noxious weeds. Where appropriate, and pursuant to consultation with the Umatilla County Weed Department, monitoring of noxious weeds and the effectiveness of weed control/eradication efforts will be performed concurrently with the revegetation monitoring described in this document.

5.1 Regulatory Framework

5.1.1 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 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 OSWB was established under ORS 561.650. It provides direction to control noxious weeds at the state level and develops and maintains the State Noxious Weed List. OSWB and the ODA classify noxious weeds in Oregon in accordance with the ODA Noxious Weed Classification System (ODA 2019a). Currently, there are 138 noxious weeds listed in Oregon (ODA 2019a; Appendix A). There are three designations for noxious weeds 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 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 selected and designated by the OSWB as the focus of prevention and control actions by the Noxious Weed Control Program. T-designated noxious weeds are selected annually from either the A or B list and the ODA is directed to develop and implement a statewide management plan for these species.

5.1.2 Umatilla County

Section 97 of the Umatilla County Code establishes Umatilla County as a weed control district, defines what is considered a noxious weed, identifies the responsibility of private land owners to control weeds, and outlines the authority of the weed control district and Umatilla County Board of Commissioners to enforce the ordinance. Per ORS 569.350 through 569.520, Umatilla County maintains a Umatilla County Noxious Weed Control List. This list, most recently updated in 2017, includes 39 noxious weed species that have been found currently or previously growing in the county (Umatilla County 2019; Appendix B). These 39 species are classified as either "A" or "B" designated weeds according to control requirement categories as follows:

- **"A" Designated Weed:** A weed of known economic importance which occurs 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/counties makes future occurrence seem imminent.
- **"B" Designated Weed:** A weed of known economic importance which 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 for which biological agents are available.

5.2 Noxious Weeds Identified in the Site Boundary

Fifteen noxious weed species were recorded within the Site Boundary during surveys conducted in 2017-2019 (Tetra Tech 2019; see Appendix P-2 to Exhibit P of the ASC). These species and their state and county weed status are presented in Table 3 below.

Table 3. Noxious Weeds Located within Site Boundary

Common Name	Scientific Name	State Status/ County Status [1]	Frequency
jointed goatgrass	*Aegilops cylindrica*	B/B	Occasional large patches

Common Name	Scientific Name	State Status/ County Status [1]	Frequency
kochia	*Bassia (Kochia) scoparia*	B/B	Abundant
diffuse knapweed	*Centaurea diffusa*	B*/B	Occasional large patches
yellow star-thistle	*Centaurea solstitialis*	B*/B	Abundant
spikeweed	*Centromadia (Hemizonia) pungens*	B/A	Few small patches
rush skeletonweed	*Chondrilla juncea*	B*, T/A	Several small to medium-sized patches
Canada thistle	*Cirsium arvense*	B*/B	Few small patches
bull thistle	*Cirsium vulgare*	B*/not listed	Few small patches
poison hemlock	*Conium maculatum*	B*/B	Several medium to large-sized patches along drainages
field bindweed	*Convolvulus arvensis*	B*/not listed	Abundant
hound's tongue	*Cynoglossum officinale*	B/not listed	Few small to medium-sized patches along drainages
common St. John's wort	*Hypericum perforatum*	B*/B	Occasional small patches
Scotch thistle	*Onopordum acanthium*	B/B	Many small to medium-sized patches
cereal rye	*Secale cereale*	Not listed/B	Abundant
medusahead	*Taeniatherum caput-medusae*	B/not listed	Scattered medium-sized patches
puncture vine	*Tribulus terrestris*	B*/B	Few small to large-sized patches
ventenata grass	*Ventenata dubia*	B/not listed	Occasional small to large patches
1. Species marked with a (*) are targeted for biocontrol.			

5.3 Noxious Weed Management

5.3.1 Prevention

Implementation of the following best management practices is intended to prevent the spread of noxious weeds during construction, revegetation efforts, and O&M activities.

- Educating workers of the importance of noxious weed prevention and treatment measures;
- Providing information regarding target noxious weed species at the O&M Building;
- Flagging areas of noxious weed infestations, where practical, prior to construction to alert construction personnel to their presence and limit or prevent access to those areas;
- Limiting vehicle access to designated routes, whether existing roads or newly constructed roads, and the outer limits of constructed-related disturbances;
- Limiting vehicle traffic in noxious weed-infested areas;
- Cleaning construction vehicles prior to entering the Project for the first time and upon completion of work at the Project;
- Cleaning vehicles after performing work in noxious weed-infested areas;

- Identifying topsoil and other soils that came from noxious weed–infested areas and placing next to the infested area so they are returned to their 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;
- Implementing noxious weed treatments via mechanical or chemical control;
- 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, during the normal course of revegetation maintenance of temporary work spaces, 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
- Purchasing seed and straw mulch (used for site rehabilitation and revegetation) that is certified free of noxious weed seed and propagules, if possible.

5.3.2 Treatment

Noxious weed treatment will focus on control of existing populations of noxious weeds within areas disturbed by construction. Additionally, if it is determined that noxious weeds have invaded areas adjacent to disturbance areas as a result of construction, the Applicant will contact the landowner and seek approval to treat those noxious weed populations. New noxious weeds detected during post-construction restoration will also be considered a result of construction activities and shall be controlled and treated accordingly.

Control of noxious weeds will be implemented through manual, mechanical, or chemical control measures. Manual control methods include hand-pulling and using hand tools to remove noxious weeds. Mechanical control includes mowing or disking with machinery. Chemical application is accomplished through use of herbicides targeted to the individual weed species. The Applicant will be responsible for hiring a qualified contractor to implement the treatment of noxious weeds.

The most appropriate control method depends on the noxious weed species being treated, the size of infestation, and the terrain and habitat needing treated. Standard treatment methods for noxious weeds can be found in the Pacific Northwest Weed Management Handbook (Peachey 2019), ODA's Oregon Noxious Weed Profiles (ODA 2019b), and Weed Control in Natural Areas in the Western United States (UC Davis 2013).

6.0 Revegetation Documentation

Records will be kept of revegetation efforts, both for croplands and other habitats; records will include:

- Date construction was completed in the area to be revegetated;
- Description of the affected area;
- Date revegetation work was initiated;
- Description of the revegetation work implemented; and
- Supporting figures representing the location, acres affected, and pre-disturbance condition of the revegetation area.

The Applicant will update these records periodically as revegetation work occurs and will provide ODOE with copies of these records with submission of the monitoring report required by the Site Certificate.

7.0 Monitoring

7.1 Reference Sites

Nearby reference sites, approximating pre-construction conditions of the revegetation areas, will be selected as targets toward which revegetation will aim. Reference sites will be chosen to represent each of the habitat types to be revegetated, as feasible. Land use patterns, soil types, terrain, and presence of noxious weeds will also be considered in selection of reference sites. Once reference sites are selected by the Applicant and approved by the ODOE and ODFW, the reference sites shall remain in the same location unless approval for use of a different reference site is obtained by the ODOE and ODFW.

Once the reference sites are approved by the ODOE and ODFW, the Applicant will employ a qualified investigator (botanist or revegetation specialist) to monitor those sites to establish baseline conditions as they relate to the success criteria for revegetation efforts. Documentation of baseline conditions at reference sites shall occur prior to commencement of revegetation efforts. If land use changes, wildfires, or other disturbances occur between the time of selection and monitoring of baseline conditions such that a chosen reference site is no longer representative of target conditions, new reference sites may be chosen. Following the selection of a new reference site, an updated table and latitude/longitudinal data will be provided to ODOE within a 6-month revegetation record report or the annual compliance report, whichever report is submitted first.

7.2 Monitoring Procedures

Following implementation of revegetation efforts, the Applicant will monitor the revegetation areas as described in this section, unless the landowner has converted the area to a use inconsistent with the success criteria. The Applicant will submit its vegetation monitoring methodology to ODFW and

ODOE for approval prior to assessing baseline conditions within reference sites and prior to the first annual monitoring of revegetation areas.

Monitoring of the revegetation areas will be conducted by a qualified investigator annually for 5 years, with the first monitoring period to occur the first growing season following initial seeding. Revegetation areas will be inspected to determine if the area is meeting and/or on track to meeting the success criteria as described in Section 7.3. The investigator will evaluate the following site conditions during annual monitoring:

- Extent of bare soil;
- Degree of erosion;
- Presence and abundance of noxious weeds;
- Vegetation density;
- Relative proportion of desirable vegetation (desirable vegetation includes those species included in the seed mix or native or native-like species, excluding noxious weeds); and
- Species diversity and structural stage of desirable vegetation.

Following annual monitoring, a monitoring report will be prepared and will include:

- The investigator's assessment of whether the revegetated areas are trending toward meeting the success criteria;
- Assessments of factors impacting the ability of the revegetated area to trend towards meeting the success criteria;
- Descriptions of appropriate weed control measures as recommended by ODOE, ODFW and the Umatilla County Weed Department; and
- Recommendations of remedial actions, if any.

The Applicant will report the investigator's findings and recommendations regarding wildlife habitat recovery and revegetation success within 60 days of the inspection to ODOE and ODFW.

7.3 Success Criteria

In each monitoring report, the Applicant will include an assessment of whether the revegetated areas are meeting or trending toward meeting the success criteria. An area will be deemed successfully revegetated when the habitat quality at a monitoring site is equal to or surpasses the habitat quality at the associated reference site, as follows:

- Vegetation density is equal to or greater than that of the reference site;
- Relative proportion of desirable vegetation is equal to or greater than that of the reference site;
- Species diversity of desirable vegetation is equal to or greater than that of the reference site; and

- The presence and density of noxious weeds is equal to or less than that of the reference site.

When ODOE and ODFW find that the condition of a revegetation area satisfies the criteria for revegetation success, ODOE and ODFW will conclude that the Applicant has met its restoration obligations for that area. If ODOE or ODFW finds that the landowner has converted a habitat area to a use that is inconsistent with these success criteria, ODOE and ODFW will conclude that the Applicant has no further obligation to restore the area.

In addition, success of cropland revegetation will have been achieved when production of the revegetated area is comparable to that of adjacent, non-disturbed croplands. Success determination will involve consultation with the landowner or farm operator, and the Applicant will report to ODOE on the success of cropland restoration efforts after the first growing season.

7.4 Remedial Action

After each monitoring visit, the Applicant's qualified investigator will report to the Applicant regarding the revegetation progress of each revegetation area. The investigator, in consultation with ODOE, ODFW, the Umatilla County Weed Department, and the revegetation contractor, will make recommendations to the Applicant for reseeding, weed control, or other remedial measures for areas that are not showing progress toward achieving revegetation success, if applicable. The investigator will provide a description of factors that may be contributing to the lack of revegetation success. ODOE may require reseeding, weed control, or other remedial measures in those areas that are not trending towards meeting the success criteria by Year 5.

If a revegetation area is damaged by wildfire during the first 5 years following initial seeding, the Applicant will work to restore the damaged area. The Applicant will continue to report on revegetation progress during the remainder of the 5-year period. The Applicant will report to ODOE and ODFW the area impacted by the fire (with a map or figure).

8.0 Plan Amendment

This Plan may be amended from time to time by agreement of the Applicant and Energy Facility Siting Council (Council). Such amendments may be made without an amendment of the Site Certificate. The Council authorizes ODOE to agree to amendments to this plan. ODOE shall notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendments of this plan agreed to by ODOE.

9.0 References

ODA (Oregon Department of Agriculture). 2019a. Noxious Weed Policy and Classification System. Noxious Weed Control Program. Salem, OR. Available online at: http://www.oregon.gov/ODA/shared/Documents/Publications/Weeds/NoxiousWeedPolicyClassification.pdf. Accessed July 2019.

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Umatilla County. 2019. Weed Control Board. Noxious Weed List. Available online at: http://www.co.umatilla.or.us/road/weedlist.html

Appendix A:
Oregon Department of Agriculture Noxious Weed Policy and Classification System

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Oregon Department of Agriculture

Noxious Weed Policy and Classification System 2019

Noxious Weed Control Program

Address: 635 Capitol Street NE, Salem, Oregon 97301

Phone: (503) 986-4621 **Fax:** (503) 986-4786

www.oregon.gov/ODA/programs/Weeds/Pages/AboutWeeds.aspx

Mission Statement

To protect Oregon's natural resources and agricultural economy from the invasion and proliferation of invasive noxious weeds.

Program Overview

The Oregon Department of Agriculture (ODA) Noxious Weed Control Program provides statewide leadership for coordination and management of state listed noxious weeds. The state program focuses on noxious weed control efforts by implementing early detection and rapid response projects for new invasive noxious weeds, implementing biological control, implementing statewide inventory and survey, assisting the public and cooperators through technology transfer and noxious weed education, maintaining noxious weed data and maps for priority listed noxious weeds, and assisting land managers and cooperators with integrated weed management projects. The Noxious Weed Control Program also supports the Oregon State Weed Board (OSWB) with administration of the OSWB Grant Program, developing statewide management objectives, developing weed risk assessments, and maintaining the state noxious weed list.

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Noxious Weed Control Policy and Classification System

Definition

"Noxious weed" means a terrestrial, aquatic or marine plant designated by the Oregon State Weed Board 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 become so thoroughly established and are spreading so rapidly on private, state, county, and federally owned lands, that they have been declared by ORS 569.350 to be a menace to public welfare. Steps leading to eradication, where possible, and intensive control are necessary. It is further recognized that the responsibility for eradication and intensive control rests not only on the private landowner and operator, but also on the county, state, and federal governments.

Weed Control Policy

Therefore, it shall be the policy of ODA to:

1. Assess non-native plants through risk assessment processes and make recommendations to the Oregon State Weed Board for potential listing.
2. Rate and classify weeds at the state level.
3. Prevent the establishment and spread of listed noxious weeds.
4. Encourage and implement the control or containment of infestations of listed noxious weed species and, if possible, eradicate them.
5. Develop and manage a biological weed control program.
6. Increase awareness of potential economic losses and other undesirable effects of existing and newly invading noxious weeds, and to act as a resource center for the dissemination of information.
7. Encourage and assist in the organization and operation of noxious weed control programs with government agencies and other weed management entities.
8. Develop partnerships with county weed control districts, universities, and other cooperators in the development of control methods.
9. Conduct statewide noxious weed surveys and weed control efficacy studies.

Weed Classification System

The purpose of this Classification System is to:

1. Act as the ODA's official guideline for prioritizing and implementing noxious weed control projects.
2. Assist the ODA in the distribution of available funds through the Oregon State Weed Board to assist county weed programs, cooperative weed management groups, private landowners, and other weed management entities.
3. Serve as a model for private and public sectors in developing noxious weed classification systems that aid in setting effective noxious weed control strategies.

Criteria for Determining Economic and Environmental Significance

Detrimental Effects

1. A plant species that causes or has the potential to cause severe negative impacts to Oregon's agricultural economy and natural resources.
2. A plant species that has the potential to or does endanger native flora and fauna by its encroachment into forest, range, aquatic and conservation areas.
3. A plant species that has the potential or does hamper the full utilization and enjoyment of recreational areas.
4. A plant species that is poisonous, injurious, or otherwise harmful to humans and/or animals.

Plant Reproduction

1. A plant that reproduces by seed capable of being dispersed over wide areas or that is long-lived, or produced in large numbers.
2. A plant species that reproduces and spreads by tubers, creeping roots, stolons, rhizomes, or other natural vegetative means.

Distribution

1. A weed of known economic importance which occurs in Oregon in small enough infestations to make eradication/containment possible; or not known to occur, but its presence in neighboring states makes future occurrence seem imminent.
2. A weed of economic or ecological importance and of limited distribution in Oregon.
3. A weed that has not infested the full extent of its potential habitat in Oregon.

Difficulty of Control

A plant species that is not easily controlled with current management practices such as chemical, cultural, biological, and physical methods.

Noxious Weed Control Classification Definitions

Noxious weeds, for the purpose of this system, shall be listed as either A or B, and may also be designated as T, which are priority targets for control, as directed by the Oregon State Weed Board.

- A Listed 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, but its presence in neighboring states make future occurrence in Oregon seem imminent (Table I).

  Recommended action: Infestations are subject to eradication or intensive control when and where found.

- B Listed Weed:

  A weed of economic importance which is regionally abundant, but which may have limited distribution in some counties (Table II).

  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.

- T-Designated Weed (T):

  A designated group of weed species that are selected and will be the focus for prevention and control by the Noxious Weed Control Program. Action against these weeds will receive priority. T-designated noxious weeds are determined by the Oregon State Weed Board and directs ODA to develop and implement a statewide management plan. T-designated noxious weeds are species selected from either the A or B list.

Weed Biological Control

Oregon implements biological control, or "biocontrol" as part of its integrated pest management approach to managing noxious weeds. This is the practice of using host-specific natural enemies such as insects or pathogens to control noxious weeds. The Oregon Department of Agriculture Noxious Weed Program has adopted the International Code of Best Practices for biological control of weeds. Only safe, effective, and federally- approved natural enemies will be used for biocontrol.

Table I: A Listed Weeds

Common Name	Scientific Name
African rue (T)	*Peganum harmala*
Camelthorn	*Alhagi pseudalhagi*
Cape-ivy (T)	*Delairea odorata*
Coltsfoot	*Tussilago farfara*
Common frogbit	*Hydrocharis morsus-ranae*
Cordgrass	
Common	*Spartina anglica*
Dense-flowered (T)	*Spartina densiflora*
Saltmeadow (T)	*Spartina patens*
Smooth (T)	*Spartina alterniflora*
Delta arrowhead (T)	*Sagittaria platyphyla*
European water chestnut	*Trapa natans*
Flowering rush (T)	*Butomus umbellatus*
Garden yellow loosestrife (T)	*Lysimachia vulgaris*
Giant hogweed (T)	*Heracleum mantegazzianum*
Goatgrass	
Barbed (T)	*Aegilops triuncialis*
Ovate	*Aegilops ovata*
Goatsrue (T)	*Galega officinalis*
Hawkweed	
King-devil	*Hieracium piloselloides*
Mouse-ear (T)	*Hieracium pilosella*
Orange (T)	*Hieracium aurantiacum*
Yellow (T)	*Hieracium floribundum*
Hoary alyssum (T)	*Berteroa incana*
Hydrilla	*Hydrilla verticillata*
Japanese dodder	*Cuscuta japonica*
Kudzu (T)	*Pueraria lobata*
Matgrass (T)	*Nardus stricta*
Oblong spurge (T)	*Euphorbia oblongata*
Paterson's curse (T)	*Echium plantagineum*
Purple nutsedge	*Cyperus rotundus*
Ravennagrass (T)	*Saccharum ravennae*
Silverleaf nightshade	*Solanum elaeagnifolium*
Squarrose knapweed (T)	*Centaurea virgata*

(T) T-Designated Weed (See page 4)

(Continued) Table I: A Listed Weeds

Common Name	Scientific Name
Starthistle	
Iberian (T)	*Centaurea iberica*
Purple (T)	*Centaurea calcitrapa*
Syrian bean-caper	*Zygophyllum fabago*
Thistle	
Plumeless (T)	*Carduus acanthoides*
Smooth distaff	*Carthamus baeticus*
Taurian (T)	*Onopordum tauricum*
Welted (curly plumeless) (T)	*Carduus crispus*
Woolly distaff (T)	*Carthamus lanatus*
Water soldiers	*Stratiotes aloides*
West Indian spongeplant	*Limnobium laevigatum*
White bryonia	*Bryonia alba*
Yellow floating heart (T)	*Nymphoides peltata*
Yellowtuft (T)	*Alyssum murale, A. corsicum*

(T) T-Designated Weed (See page 4)

Table II: B Listed Weeds

Common Name	Scientific Name
Armenian (Himalayan) blackberry	*Rubus armeniacus (R. procerus, R. discolor)*
Biddy-biddy	*Acaena novae-zelandiae*
Broom	
French*	*Genista monspessulana*
Portuguese (T)	*Cytisus striatus*
Scotch*	*Cytisus scoparius*
Spanish	*Spartium junceum*
Buffalobur	*Solanum rostratum*
Butterfly bush	*Buddleja davidii (B. variabilis)*
Common bugloss (T)	*Anchusa officinalis*
Common crupina	*Crupina vulgaris*
Common reed	*Phragmities australis ssp. australis*
Creeping yellow cress	*Rorippa sylvestris*
Cutleaf teasel	*Dipsacus laciniatus*
Dodder	
Smoothseed alfalfa	*Cuscuta approximata*
Five-angled	*Cuscuta pentagona*
Bigseed	*Cuscuta indecora*
Dyer's woad	*Isatis tinctoria*
Eurasian watermilfoil	*Myriophyllum spicatum*
False brome	*Brachypodium sylvaticum*
Field bindweed*	*Convolvulus arvensis*
Garlic mustard (T)	*Alliaria petiolata*
Geranium	
Herb Robert	*Geranium robertianum*
Shiny leaf	*Geranium lucidum*
Gorse* (T)	*Ulex europaeus*
Halogeton	*Halogeton glomeratus*
Houndstongue	*Cynoglossum officinale*
Indigo bush	*Amorpha fruticosa*
Ivy	
Atlantic	*Hedera hibernica*
English	*Hedera helix*
Johnsongrass	*Sorghum halepense*

* Biocontrol (See page 4) (T) T-Designated Weed (See page 4)

(Continued) Table II: B Listed Weeds

Common Name	Scientific Name
Jointed goatgrass	*Aegilops cylindrica*
Jubata grass	*Cortaderia jubata*
Knapweed	
Diffuse*	*Centaurea diffusa*
Meadow*	*Centaurea pratensis*
Russian*	*Acroptilon repens*
Spotted* (T)	*Centaurea stoebe (C. maculosa)*
Knotweed	
Bohemian	*Fallopia x bohemica*
Giant	*Fallopia sachalinensis (Polygonum)*
Himalayan	*Polygonum polystachyum*
Japanese	*Fallopia japonica (Polygonum)*
Kochia	*Kochia scoparia*
Lesser celandine	*Ranunculus ficaria*
Meadow hawkweed (T)	*Pilosella caespitosum (Hieracium)*
Mediterranean sage*	*Salvia aethiopis*
Medusahead rye	*Taeniatherum caput-medusae*
Old man's beard	*Clematis vitalba*
Parrot feather	*Myriophyllum aquaticum*
Perennial peavine	*Lathyrus latifolius*
Perennial pepperweed (T)	*Lepidium latifolium*
Pheasant's eye	*Adonis aestivalis*
Poison hemlock*	*Conium maculatum*
Policeman's helmet	*Impatiens glandulifera*
Puncturevine*	*Tribulus terrestris*
Purple loosestrife*	*Lythrum salicaria*
Ragweed	*Ambrosia artemisiifolia*
Ribbongrass (T)	*Phalaris arundinacea var. Picta*
Rush skeletonweed* (T)	*Chondrilla juncea*
Saltcedar* (T)	*Tamarix ramosissima*
Small broomrape	*Orabanche minor*
South American waterweed	*Egeria densa (Elodea)*
Spanish heath	*Erica lusitanica*
Spikeweed	*Hemizonia pungens*

*Biocontrol (See page 4) (T) T-Designated Weed (See page 4)

(Continued) Table II: B Listed Weeds

Common Name	Scientific Name
Spiny cocklebur	*Xanthium spinosum*
Spurge laurel	*Daphne laureola*
Spurge	
Leafy* (T)	*Euphorbia esula*
Myrtle	*Euphorbia myrsinites*
St. Johnswort*	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Swainsonpea	*Sphaerophysa salsula*
Tansy ragwort* (T)	*Senecio jacobaea (Jacobaea vulgaris)*
Thistle	
Bull*	*Cirsium vulgare*
Canada*	*Cirsium arvense*
Italian	*Carduus pycnocephalus*
Milk*	*Silybum marianum*
Musk*	*Carduus nutans*
Scotch	*Onopordum acanthium*
Slender-flowered*	*Carduus tenuiflorus*
Toadflax	
Dalmatian* (T)	*Linaria dalmatica*
Yellow*	*Linaria vulgaris*
Tree of heaven	*Ailanthus altissima*
Velvetleaf	*Abutilon theophrasti*
Ventenata grass	*Ventenata dubia*
Primrose Willow	
Large-flower (T)	*Ludwigia grandiflora*
Water primrose (T)	*Ludwigia hexapetala*
Floating (T)	*Ludwigia peploides*
Whitetop	
Hairy	*Lepidium pubescens*
Lens-podded	*Lepidium chalepensis*
Whitetop (hoary cress)	*Lepidium draba*
Yellow archangel	*Lamiastrum galeobdolon*
Yellow flag iris	*Iris pseudacorus*
Yellow nutsedge	*Cyperus esculentus*
Yellow starthistle*	*Centaurea solstitialis*

*Biocontrol (See page 4) (T) T-Designated Weed (See page 4)

Oregon
Department
of Agriculture

2/2019

Appendix B:
Umatilla County Noxious Weed List

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"A" Designated Weed List

These Class "A" weeds have been found as single plants or in very limited populations in the county. Prevention, early detection, and eradication is high priority. Cost share may be available at the Weed Board discretion.

Camelthorn (*Alhagi pseudalhagi*)
Common Bugloss (*Anchusa officinalis*)
Common Crupina (*Crupina vulgaris*)
Creeping Yellow Cress (*Rorippa sylvestris*)
Flowering Rush (*Butomus umbellatus*)
Garlic Mustard (*Alliaria petiolata*)
Japanese Knotweeds [fleece flower] (*Polygonum cuspidatum* [*Fallopia japonica*])
Leafy Spurge (*Euphorbia esula*)
Marijuana (*Cannabis sativa*)
Meadow Knapweed (*Centaurea jacea* X *C. nigra*)
Myrtle Spurge (*Euphorbia myrsinites*)
Purple Loosestrife (*Lythrum salicaria*)
Purple Starthistle (*Centaurea calcitrapa*)
Rush Skeletonweed (*Chondrilla juncea*)
Spike Weed (Centromadia [*Hemizonia*] *pungens*)
Spotted Knapweed (*Centaurea maculosa*)
Tansy ragwort (*Senecio jacobaea*)
Viper's bugloss (*Echium vulgare*)
Yellow flag iris (*Iris pseudacorus*)

RECOMMENDED ACTION: Infestations are subject to intensive control when and where found.

"B" Designated Weed List

Austrian Peaweed (*Sphaerophysa salsula*)
Canada Thistle (*Cirsium arvense*)
Cereal Rye (*Secale cereale*)
Dalmation Toadflax (*Linaria dalmatica*)
Dodder (*Cuscuta pentagona*)
Diffuse Knapweed (*Centaurea diffusa*)
Hoary Cress (*Cardaria draba*)
Johnsongrass (*Sorghum halepense*)
Jointed Goatgrass (*Aegilops cylindrica*)
Kochia (*Kochia* [*Bassia*] *scoparia*)
Mediterranean Sage (*Salvia aethiopis*)
Musk Thistle (*Carduus nutans*)
Puncturevine (*Tribulus terrestris*)
Poison hemlock (*Conium maculatum*)
Quackgrass (*Elymus* [*Agropyron*] *repens*)
Ragweed (*Ambrosia artemisiifolia*)
Russian Knapweed (*Acroptilon repens*)
Scotch Thistle (*Onopordum acanthium*)
St. Johswort (*Hypericum perforatum*)
Yellow Starthistle (*Centaurea solstitialis*)

RECOMMENDED ACTION: Limited to intensive control at state or county level as determined on a case-by case basis.

Enforcement emphasis groups; these groups of invasive plants have been targeted for additional enforcement throughout the County according to the land types and corresponding agricultural uses associated. Three land uses types have been identified and weed lists developed for each they are:

1) Dry Land Annual Cropping Areas: Emphasis weeds include Canada Thistle, Scotch Thistle, Yellow Starthistle, Goatgrass, and Kochia.

2) Irrigated Crops and Pastures: Emphasis weeds include Canada Thistle, Scotch Thistle, Bull Thistle, Musk Thistle, Yellow Starthistle, Diffuse Knapweed.

3) Dryland Range/Pasture/Timber: Emphasis weeds include Scotch Thistle, Bull Thistle, Canada Thistle, Spotted Knapweed, Diffuse Knapweed, Russian Knapweed.

Attachment P-5. Draft Wildlife Monitoring Plan

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Nolin Hills Wind Power Project

Draft
Wildlife Monitoring Plan

Prepared for

Nolin Hills Wind, LLC

Prepared by:

Tetra Tech, Inc.

February 2020

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Acronyms and Abbreviations

Applicant	Nolin Hills Wind, LLC
AWWI	American Wind Wildlife Institute
AWWIC	American Wind Wildlife Information Center
EFSC	Energy Facility Siting Council
GPS	global positioning system
MW	megawatt
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
Plan	Wildlife Monitoring Plan
Project	Nolin Hills Wind Power Project
USFWS	U.S. Fish and Wildlife Service
WAGS	Washington ground squirrel
WRHS	Wildlife Reporting and Handling System

1.0 Introduction

Nolin Hills Wind, LLC (the Applicant) proposes to construct the Nolin Hills Wind Power Project (Project), a wind energy project with a nominal generating capacity of approximately 350 megawatts (MW) and up to 117 average MW of energy, in Umatilla County, Oregon (see Figure C-1 in Exhibit C). The Project comprises up to 116 wind turbine generators, depending on the turbine model selected and the final layout during the micrositing process. If larger turbines are selected, fewer turbines will likely be installed. The Project will interconnect to the regional grid via either a transmission line leading from the northern Project substation northwest to Cottonwood Substation in Hermiston, or a new 230-kilovolt transmission line to the proposed Bonneville Power Administration Stanfield Substation, north of the town of Nolin. Other Project components include site access roads, one operations and maintenance building, meteorological data collection towers, and temporary construction yards. These facilities are all described in greater detail in Exhibit B.

This Wildlife Monitoring Plan (Plan) describes wildlife monitoring the Applicant shall conduct during operation of the Project. The Applicant shall use experienced and properly trained personnel to conduct the monitoring required under this Plan. For all components of this Plan except the Wildlife Reporting and Handling System (WRHS), the Applicant shall hire qualified and properly trained personnel to perform monitoring tasks.

This Plan has the following components:

1. Fatality monitoring program including:
    a. Standardized carcass searches
    b. Carcass removal trials
    c. Searcher efficiency trials
    d. Data analysis and fatality estimation
2. Raptor nesting surveys
3. WRHS
4. Washington ground squirrel (WAGS; *Urocitellus washingtoni*) monitoring
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 the Oregon Department of Energy (ODOE) determines that mitigation is needed, the Applicant shall propose appropriate mitigation actions to ODOE and shall carry out mitigation actions approved by ODOE, subject to review by the Energy Facility Siting Council (EFSC).

2.0 Fatality Monitoring Program

The objective of fatality monitoring is to estimate the number of bird and bat fatalities that are attributable to Project operation as an indicator of the impact of the Project. The Applicant shall hire qualified and properly trained personnel ("investigators") to perform fatality monitoring.

The science of fatality monitoring, particularly study design and fatality estimation, is an evolving one; therefore, the following methods may be modified prior to implementation of the program to reflect updated industry standards. Any updates to the study design or data analysis methodology will be detailed in the amended Plan approved by ODOE prior to implementation.

The program shall include: standardized carcass searches to detect fatalities at turbines; carcass removal trials to estimate the average length of time that a carcass remains in the field and is available for detection; searcher efficiency trials to estimate the proportion of carcasses detected by field technicians; estimation of the portion of the carcass spatial distribution that was searched; and estimation of the seasonal and annual rates of bird and bat mortality that account for the Project-specific sources of bias. Methods and results of all components of the fatality monitoring program will be reported to ODOE on an annual basis (Section 7.0).

If a biologist determines that a carcass found at the Project (during searches or incidentally) is a state or federally threatened or endangered or an otherwise protected species, agency reporting procedures and timelines specified in Section 5.0 shall be followed.

2.1 Standardized Carcass Searches

The objective of standardized carcass searches is to systematically search a representative sample of Project turbines for bird and bat fatalities attributable to collision with Project turbines.

2.1.1 Search Plot Dimensions and Sample Size

"Searchers" (personnel trained in proper search techniques) shall conduct fatality monitoring within defined search plots, with each search plot containing one turbine. Search plot dimensions may be squares centered on the turbine ("full-plot"), or search areas may be limited to the turbine pad and a portion of the access road buffered to a specific distance ("road-and-pad"). Search plot dimensions, whether full-plot squares, road-and-pad areas or some other configuration, will be determined with regard to turbine maximum blade tip height, habitat, search method, and species of concern. The Applicant shall provide spatial data of the search plots to ODOE before beginning fatality monitoring at the Project.

The sample size for standardized carcass searches is the number of plots searched per monitoring year. The Applicant shall select search plots based on a statistically robust sampling design that ensures that the selected search plots are representative of the various habitat conditions within the Project. Additionally, if more than one turbine type is selected, search plots will be selected such that they provide a representative sample of each turbine type. The total number of search plots needed to provide a robust sample size will be determined after taking into account the searched

area included within the plot (e.g., full-plot squares have a larger searched area than road-and-pad plots).

Prior to operation, the Applicant shall update the Plan to include the type, dimensions, distribution, and specific locations of search plots at the Project, as determined in consultation with an independent statistical expert and the Oregon Department of Fish and Wildlife (ODFW).

2.1.2 Scheduling

Fatality monitoring will begin at the start of the first season (Table 1) following commencement of commercial operation of the Project. Subsequent monitoring years will follow the same schedule (beginning in the same season in the subsequent monitoring year).

Over the course of one monitoring year, the investigators will conduct no fewer than 16 searches. The frequency of searches by season is shown in Table 1.

Table 1. Frequency of Fatality Monitoring Searches by Season

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

The Applicant, in consultation with an independent statistical expert and ODFW, may update the frequency of these searches to reflect considerations for specific species of concern and conditions at the Project (e.g., carcass removal rates).

2.1.3 Duration

The investigators shall perform 2 full years of fatality monitoring during the first and second years of Project operation (Year 1 and Year 2) consecutively.

When Year 1 of monitoring at the Project has been completed, the raw data will be compiled by the Applicant in a memo-style report, which will include any notable results from the year of monitoring including fatality estimates as specified in Section 2.6. The memo shall be provided to ODOE and ODFW following the completion of the Year 1 study period. When Year 2 of monitoring is complete, the data and analyses for Years 1 and 2 (individually and combined) will be compared and contrasted with other wind power facilities in the region within a comprehensive report.

If fatality rates for either Year 1 or Year 2 of monitoring at the Project materially exceed the thresholds of concern or the range of fatality rates found at other wind power facilities in the region (as available), the Applicant shall consult with ODOE and ODFW regarding potential mitigation. If ODOE and ODFW determine mitigation is appropriate, the Applicant shall propose mitigation for

ODOE and ODFW review within 6 months after reporting the fatality rates to ODOE. Furthermore, if the fatality rates from both Year 1 and Year 2 materially exceed the range of fatality rates found at other wind power facilities in the region, the Applicant shall perform an additional year of fatality monitoring in Year 5 of operation.

2.2 Carcass Removal Trials

The objective of the carcass removal trials is to estimate the length of time bird and bat carcasses remain in the search area. Estimates of carcass removal rates will be used to adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from the search area due to predation, scavenging, or other means, such as farming activity.

The investigators shall conduct carcass removal trials within each of the seasons defined in Table 1 during each year of fatality monitoring. For each trial, the investigators shall use 10 to 15 carcasses of small- and large-bodied species. Trial carcasses shall be distributed proportionately among search plot subtypes (e.g., turbine model and representative habitat types such as grassland/shrub-steppe and cultivated agriculture).

After Year 1 of fatality monitoring, the investigators may adjust the number of removal trials up or down, during any subsequent year of fatality monitoring, subject to the approval of ODOE. If a reduction in trials is made, the investigators must show that the reduction is justified based on a comparison of the Year 1 removal data with published removal data from nearby wind energy facilities, or the availability of other valid carcass removal data.

Where practicable, the investigators shall use legally obtained representative bird (e.g., raptors, songbird) and bat carcasses for the removal trials. The investigators may use suitable carcasses found in fatality monitoring searches. If representative trial carcasses are unavailable or impractical to obtain, the investigators shall use game birds or other legal sources of avian species as surrogate bird trial carcasses for the removal trials. Several small brown birds or mice may be used as surrogate bat trial carcasses. For bird and bat surrogates, the investigators shall select species with the same coloration and size attributes as species found within the Site Boundary.

Trial carcasses will be marked discreetly for recognition by investigators and other personnel. Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be:

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

The trial carcasses will be placed randomly within the carcass removal trial plots. Carcass removal trial plots may occur outside of search plots. Trial carcasses will be left in place until the end of the carcass removal 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 schedule may be extended to include longer persistence times after

initial placement (e.g., 60 or 90 days) to capture raptor and other large bird persistence. This schedule may also be adjusted depending on actual carcass removal 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.

2.3 Searcher Efficiency Trials

The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities available for detection that searchers are able to find. The investigators shall conduct searcher efficiency trials on the fatality monitoring search plots in representative habitat types (e.g., grassland/shrub-steppe and cultivated agriculture).

The investigators shall conduct searcher efficiency trials within each of the seasons defined in Table 1 during Year 1 of fatality monitoring. Each trial will involve up to 15 carcasses. The searchers will not be notified of carcass placement or test dates. The investigators shall vary the number of carcasses per trial so that the searchers will not know the total number of trial carcasses being used in any season or trial period. In total, approximately 80 carcasses will be used per year, or approximately 15 to 25 per season. The number of searcher efficiency trials for any subsequent year of fatality monitoring may be adjusted up or down, subject to the approval of ODOE.

For each trial, the investigators shall acquire and deploy carcasses as described in Section 2.2 for carcass removal trials. Similarly, trial carcasses will be marked discreetly for recognition by searchers and other personnel.

The Applicant shall distribute trial carcasses proportionately to the search plot subtypes within the site. On the day of a standardized fatality monitoring search (described below) but before the beginning of the search, proctors will place searcher efficiency trial carcasses (no more than three trial carcasses per search plot) randomly within search plots. If scavengers appear attracted by placement of carcasses, the carcasses will be distributed before dawn.

Efficiency trials will be spread over the entire season to incorporate effects of varying weather and vegetation growth. Carcasses will be placed in the same variety of postures to simulate a range of conditions as described in Section 2.2 for carcass removal trials.

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

2.4 Fatality Monitoring Search Protocol

The investigators shall perform fatality monitoring using standardized carcass searches according to the schedule described above (Section 2.1.2). The selected search methods will be consistent with ODOE and ODFW recommendations and current industry standards at the time of the monitoring. Possible search methods include: systematic searches of all or a subset of turbines by human searchers with or without the assistance of trained dogs, and/or searches of all or a subset of turbines using drones. Search methods will be the same for all bird and bat species. For all search methods, personnel trained in proper search techniques (i.e., "the searchers") will conduct the carcass searches by walking or flying drones within concentric or parallel transects (with transect width determined by the species of concern and search method) within search plots. Search area and speed may be adjusted for habitat types and search methods after evaluation of the first searcher efficiency trial.

Searchers shall flag all bird or bat carcasses discovered. Carcasses are defined as a complete carcass or body part, 10 or more feathers or three or more primary feathers in one location. When parts of carcasses and feathers from the same species are found within a search plot, searchers shall make note of the relative positions and assess whether these are from the same individual.

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

If the necessary permits have been acquired through appropriate state and federal wildlife agencies, each carcass will be bagged, labeled, and frozen for future reference or (if the carcass is fresh and intact) for use in trials. When assessment of the carcass is complete, all traces of it will be removed from the site. If permits are not acquired by the Applicant, the carcass will be left as found and clearly marked so that it can be distinguished from new fatalities.

The investigators shall calculate fatality rates using an appropriate statistical method as described in Section 2.6. In making these calculations, if carcasses were not cleared from study plots prior to the commencement of the study, the investigators may exclude carcass data from the first search of each turbine plot (to eliminate possible counting of carcasses that arrived prior to the monitoring period).

The investigators shall estimate the number of bird and bat fatalities attributable to operation of the Project based on the number of bird and bat fatalities found within search plots during scheduled searches. All carcasses located within search plots, regardless of species, will be recorded and, if possible, a cause of death determined. If a different cause of death is not apparent, the fatality

will be attributed to Project operation. The total number of bird and bat fatalities will be estimated by adjusting for removal and searcher efficiency bias and correcting for the proportion of the carcass distribution searched.

On an annual basis, the Applicant shall report an estimate of fatalities in eight categories, provided a sufficient number of detections are available to accurately determine estimates for each. Sufficient sample sizes for some of these groups (e.g., raptor species of special concern) may not be reached due to avoidance and minimization measures implemented during Project siting (Exhibit P). The minimum number of carcass detections varies based on the statistical estimator used (Section 2.6). The Applicant shall report annual fatality rates on both a per-MW and per-turbine basis. The eight potential categories are:

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

If a sufficient sample size has been reached to estimate fatality rates for individual bird or bat species (especially State Sensitive Species), these per-species rates shall also be calculated on both a per-MW and per-turbine basis.

2.5 Incidental Finds and Injured Birds

The objective of collecting data on bird and bat fatalities found "incidentally" is to gather qualitative data about species susceptible to mortality at the Project. Searchers might discover carcasses incidental to carcass searches ("incidental finds"), such as when driving through the Site Boundary. For each incidental find, the searcher shall identify, photograph, record data, and collect the carcass as would be done for carcasses detected within search plots during scheduled searches. If the incidental find is located in a search plot within a reasonable timeframe from when that plot was searched (e.g., same day), the fatality data will be included in the calculation of fatality rates. If the incidental find is found outside a search plot, the data will be reported separately.

2.6 Statistical Methods for Fatality Estimates

Several different estimators have been employed in the statistical analysis of fatality monitoring studies at wind facilities. In 2019, the American Wind Wildlife Institute (AWWI) published a wide-ranging meta-analysis of 193 post-construction bird fatality monitoring studies conducted in North America between 2002 and 2017 (AWWI 2019). Of this large dataset, 167 studies conducted at 115

wind projects or phases constructed or repowered between 2001 and 2016 were selected for specific analysis with respect to fatality estimation. AWWI found that while Shoenfeld (2004) was employed in the majority of the studies in this dataset, the Huso estimator (Huso 2011) was gaining traction over the last several years of available data. AWWI chose Huso (2011) estimates over Shoenfeld (2004) estimates when both were produced for a single study because Huso (2011) used an extensive simulation study to demonstrate that her estimator is more reliable than the Shoenfeld (2004) and the Erickson (i.e., naïve; Erickson et al. 2000) estimators (Korner-Nievergelt et al. 2011). Less-frequently employed estimators include Jain (Jain et al. 2007) and the naïve estimator (Erickson et al. 2000).

In 2018, the U.S. Geological Survey released a new fatality estimator program, GenEst (Dalthorp et al. 2018). This new software represents another step forward in the science of fatality estimation. GenEst provides the most current state-of-the-science fatality estimation by minimizing biases associated with fatality estimation and allowing users to select the most appropriate methods and assumptions for project-specific circumstances. Rigorous testing of the performance of GenEst compared to other estimators using simulated data has shown GenEst to be the least biased, enabling more precise fatality estimation and reliable comparison of fatality estimates among projects (Simonis et al. 2018).

Prior to operation, the Applicant will update this Plan to specify the estimation methodology for the analysis of the fatality monitoring data. Regardless of the specific methodology employed, the data collected during the monitoring period will be used to estimate annual and seasonal fatality rates for birds and bats. Fatality rate estimates will consider:

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 Project;
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 trials;
4. Searcher efficiency expressed as the probability that a trial carcass is found by investigators during searcher efficiency trials; and
5. The proportion of the carcass distribution searched at the Project.

Adjusted annual fatality rates will be estimated and will be expressed as fatalities per turbine per year and fatalities per MW per year, with corresponding 90 percent confidence intervals. The 90 percent confidence interval represents the upper and lower bounds of the range of fatality rates that have a 90 percent probability of containing the true fatality rate. The 90 percent confidence interval is useful in a management context as a means of assessing the range of fatality rates that are probable given the number of carcasses that were detected. Both the study design and resulting data can affect whether the study adheres to underlying project-specific assumptions, and fatality estimators become inherently unstable if the number of detections in a subgroup (e.g., size class, species) are small (Korner-Nievergelt et al. 2011; Huso et al. 2016). When few detections are found in a particular stratum, the estimate can suffer from bias, which makes confidence intervals large

and results difficult to interpret. The Applicant shall therefore provide estimates, regardless of estimator used, only for groups with three or more detections.

2.7 Mitigation

The Applicant shall use the best available science to resolve uncertainty in the fatality monitoring results to the extent practicable, and to determine whether the data indicate that additional mitigation should be considered. ODOE may require additional, targeted monitoring if the data indicate the potential for significant impacts that cannot be addressed by 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 Applicant shall calculate the average annual fatality rates for species groups after each year of monitoring, provided a sufficient number of detections 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 Project, the thresholds shown in Table 2 apply to the Project.

Table 2. Fatality Thresholds of Concern by Species Group

Species Group	Threshold of Concern[1] (Fatalities per MW)
Raptors[2] (All eagles, hawks, falcons, and owls, including burrowing owls)	0.12
Raptor species of special concern (Swainson's hawk, ferruginous hawk, 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 bird species listed under OAR 635-100-0040 (Excluding raptors listed above)	0.2
Bat species as a group[3]	2.5

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).
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 for individual state sensitive bird or bat species has been exceeded, the Applicant shall consult with ODOE and ODFW to determine whether mitigation is appropriate based on analysis of the data and consideration of any other significant information available at the time. If mitigation is determined

to be necessary, the Applicant shall 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 Applicant shall propose mitigation measures designed to benefit the affected species or species group.

Acceptable mitigation may include, but is not limited to, contributions to wildlife rehabilitators, 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 conjunction with raptor nest monitoring, habitat mitigation, or other components of this Plan or the Habitat Mitigation Plan (see Attachment P-3 of Exhibit P) would also benefit the affected species.

Regardless of the results of the fatality monitoring study, the Applicant will consider voluntarily contributing both years of bird and bat fatality monitoring data to the American Wind Wildlife Information Center (AWWIC). AWWIC is the most complete source of data on wildlife mortality at wind energy facilities in the United States. AWWIC is designed to capture key datasets in a format that can be analyzed and compared to improve and refine the collective knowledge regarding the risks for wildlife involved with wind energy development and operation, and how to reduce those risks, and can help guide decisions regarding the design, development, and operation of wind farms. The Applicant's contribution of fatality monitoring data from the Columbia Plateau Ecoregion to this critical dataset would be a valuable contribution to ongoing regional and national analyses of bird and bat fatalities at wind energy facilities.

3.0 Raptor Nesting Surveys

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

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

3.1 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 Project. The second monitoring season will be in the fourth year after construction is completed. The Applicant shall 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 2 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 initial aerial survey area shall include a 2-mile buffer around the final Project impact area within the portion of the Site Boundary associated with wind turbines. The survey area along the transmission corridor shall include the final Project impact area along this corridor, and a 0.5-mile buffer around this area. The ground surveys will be conducted within up to a maximum of 0.5 miles of final Project impact areas to determine nesting success; nests outside the leased Site Boundary will be checked from an appropriate distance where feasible, depending on permission from the landowner for access.

All nests discovered during pre-construction surveys and any nests discovered during post-construction surveys, whether active or inactive, will be given identification numbers. 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. For occupied nests, the Applicant shall determine nesting success by a minimum of one ground visit to determine species, number of young and young fledged. “Nesting success” means that the young have successfully fledged (reach advanced stage of development, the young are capable of independent movements). Nests that cannot be monitored due to the landowner denying aerial or ground access will be checked from a distance where feasible.

3.2 Long-Term Monitoring

In addition to the 2 years of post-construction short-term raptor nest surveys described in Section 3.1, the investigators shall conduct long-term raptor nest surveys at 5-year intervals for the life of the Project.[1] 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 3.1, excluding surveys associated with the transmission lines, and limiting surveys to a ground-based effort (i.e., no aerial survey), 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

[1] As used in this plan, “life of the Project” means continuously until the Project is restored and the site certificate is terminated in accordance with OAR 345-027-0110.

conducted in adjacent or overlapping areas. The investigators will analyze the data—as a way of determining trends in the number of raptor breeding attempts the Project supports and the success of those attempts—and will submit a report after each year of long-term raptor nest surveys.

4.0 Wildlife Reporting and Handling System

The WRHS is a program for maintenance personnel to report wildlife (including bird and bat) casualties found during operation of the Project. Maintenance personnel will be trained in the methods needed to carry out this program. This monitoring program includes the initial response, handling, and reporting of bird and bat carcasses discovered incidental to maintenance operations ("incidental finds").

All carcasses discovered by maintenance personnel will be photographed and recorded. If maintenance personnel find a carcass at the Project, they will notify a Project biologist who will identify the carcass. If state and or federal collection permits are acquired by the Applicant, the biologist will adhere to the terms of these permits and either leave the carcass in place after documentation is complete or collect the carcass according to the terms of the appropriate permit. If the biologist determines that a carcass is a state or federally threatened or endangered or otherwise protected species, agency reporting procedures and timelines specified in Section 5.0 shall be followed.

Prior to construction, the Applicant shall develop and implement a protocol for handling injured birds. Any injured native birds found at the Project may be carefully captured by a trained Project biologist or technician and transported to a qualified rehabilitation specialist approved by ODOE Alternatively, the Applicant may contact a qualified rehabilitation specialist approved by ODOE to respond to injured wildlife. The Applicant shall pay costs, if any, charged for time and expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to Project operations.

5.0 Reporting Listed and Protected Species

If at any time it is determined that a carcass found at the Project is a state or federally threatened or endangered or otherwise protected species (e.g., via the Bald and Golden Eagle Protection Act), the Applicant shall notify ODFW and the U.S. Fish and Wildlife Service (USFWS) within 48 hours of species identification. The Applicant shall coordinate collection of state endangered, threatened, or protected species with ODFW. The Applicant shall coordinate collection of federal endangered, threatened, or protected species with the USFWS.

6.0 Washington Ground Squirrel Monitoring

The Applicant shall conduct long-term post-construction surveys to collect data on WAGS activity documented during pre-construction surveys in the WAGS Monitoring Area, defined as suitable

habitat within 1,000 feet of final Project permanent impact areas. Qualified professional biologists will monitor the locations within the WAGS Monitoring Area where WAGS colonies were delineated in pre-construction surveys. The survey area will include the colonies (i.e., groups of active burrows) and a buffer of 785 feet in suitable habitat. The surveyors will walk linear transects spaced 165 to 230 feet (50 to 70 meters) apart two times between late March and late May or early June. Surveys of each location will be spaced at least 2 weeks apart. Surveyors will record locations of activity centers and colony boundaries using a sub-meter accuracy GPS unit; approximate number of burrows, time, and weather conditions under which the colony was discovered; and representative photographs of burrows and scat. Surveyors will describe habitat characteristics at each location and note any noticeable land use or habitat changes that may have occurred since pre-construction surveys. The investigators shall report any new WAGS detections but the boundaries of Category 1 habitat will not be revised from pre-construction boundaries.

The Applicant shall conduct surveys during the year following construction and every 5 years thereafter for the life of the Project. After each survey, the Applicant shall report the results to ODFW and to ODOE and shall include maps of the areas surveyed and detection locations. WAGS surveys will not be conducted if there are barriers to WAGS dispersal (i.e., active agriculture fields, highways, perennial waterbodies).

Any new colonies that are located during other monitoring activities within 1,000 feet of the final Project impact areas, such as raptor nest monitoring surveys, shall be documented and the extent of those colonies shall be delineated as well. These newly discovered colonies shall also be included in any future WAGS monitoring and reporting activities.

7.0 Data Reporting

The Applicant 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 and analyses, raptor nest survey data, WAGS monitoring data, WAGS incidental observations, and WRHS data. The Applicant 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 Applicant shall provide to ODOE any data or records generated in carrying out this Plan upon request by ODOE.

8.0 Amendment of the Plan

This Plan may be amended from time to time by agreement of the Applicant and EFSC. Such amendments may be made without an amendment of the Site Certificate. ODOE shall notify EFSC of all amendments.

9.0 Literature Cited

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