EXHIBIT P
FISH AND WILDLIFE HABITATS AND SPECIES

OAR 345-021-0010(1)(p); OAR 345-022-0060

TABLE OF CONTENTS

Page

P.1 INTRODUCTION P-1

P.2 SUMMARY OF ANALYSIS RESULTS P-1

P.3 CONDITION COMPLIANCE P-2

P.4 GENERAL INFORMATION P-3
P.4.1 Analysis Area P-3
P.4.2 Agency Consultation P-3

P.5 BIOLOGICAL AND BOTANICAL SURVEY METHODS P-4
P.5.1 Desktop Survey and Information Review P-4
P.5.2 Field Surveys P-4
P.5.2.1 Plants P-5
P.5.2.2 Special-status Species P-6
P.5.2.3 Avian Use P-6
P.5.2.4 Acoustic Bat P-7
P.5.2.5 Raptor Nests P-8
P.5.2.6 Habitat Categorization P-9

P.6 BIOLOGICAL AND BOTANICAL FIELD SURVEY RESULTS P-9
P.6.1 Fish and Wildlife Habitat P-13
P.6.2 Habitat Category 1 ..... P-14
P.6.3 Habitat Category 2 ..... P-16
P.6.4 Habitat Category 3 ..... P-19
P.6.5 Habitat Category 4 ..... P-22
P.6.6 Habitat Category 5 ..... P-24
P.6.7 Habitat Category 6 ..... P-24
P.6.8 Habitat Types P-25

P.7 IDENTIFICATION OF SENSITIVE SPECIES AND SITE-SPECIFIC OREGON DEPARTMENT OF FISH AND WILDLIFE ISSUES P-28
P.7.1 Plants P-29
P.7.2 Wildlife P-29
P.7.2.1 Birds P-29
P.7.2.2 Raptors P-32
P.7.2.3 Bats P-34
P.7.2.4 Big Game P-34
P.7.2.5 Amphibians and Reptiles P-34

P.8 DESCRIPTION OF SIGNIFICANT POTENTIAL DISTURBANCES P-35
P.8.1 Potential Habitat Impacts P-35
P.8.1.1 Overview P-35

P.8.1.2 Detailed Impact Description P-35
P.8.1.3 Summary of Total Temporary and Permanent Habitat Impacts P-36
P.8.2 Potential Wildlife Impacts P-39
P.8.2.1 Birds/Raptors P-39
P.8.2.2 Bats P-42
P.8.2.3 Big Game P-44
P.8.2.4 Amphibians and Reptiles P-44

P.9 MEASURES TO AVOID, MINIMIZE, OR MITIGATE DISTURBANCES P-45
P.9.1 Avoidance, Minimization, and Mitigation During Construction P-45
P.9.1.1 Dust Control P-45
P.9.1.2 Erosion Control P-45
P.9.1.3 Environmental Training P-46
P.9.1.4 Limited Work Areas P-46
P.9.1.5 Speed Limits P-46
P.9.1.6 Fire Control P-46
P.9.2 Avoidance, Minimization, and Mitigation After Construction P-46
P.9.2.1 Habitat Restoration P-46
P.9.2.2 Habitat Conservation P-47
P.9.2.3 Fire Control P-47
P.9.2.4 Lighting P-47

P.10 MONITORING PLAN P-47

P.11 CONCLUSION P-47

P.12 REFERENCES P-47

ATTACHMENTS

P-1a 2017 Rare Plant Survey Report—Phase 1
P-1b 2017 Rare Plant Survey Report—Phase 2
P-1c 2018 Rare Plant Survey Report—Phase 1
P-1d Addendum to Rare Plant Survey and Washington Ground Squirrel and Habitat Mapping Reports—Phase 2
P-2a 2017 Washington Ground Squirrel Surveys and Habitat Mapping— Phase 1
Confidential and not for public distribution. Provided under separate cover.
P-2b 2017 Washington Ground Squirrel Surveys and Habitat Mapping— Phase 2
Confidential and not for public distribution. Provided under separate cover.
P-2c 2018 Washington Ground Squirrel Surveys and Habitat Mapping— Phase 1
Confidential and not for public distribution. Provided under separate cover.
P-3a Phase 1 Raptor Nest Survey Report (2017)
Confidential and not for public distribution. Provided under separate cover.
P-3b Phase 2 Raptor Nest Survey Report (2017)
Confidential and not for public distribution. Provided under separate cover.
P-4a Species Occurrence Data from Oregon Biodiversity Information Center (2017)
Confidential and not for public distribution. Provided under separate cover.
P-4b Species Occurrence Data from Oregon Natural Heritage Information Center (2010)
P-5 U.S. Fish and Wildlife Service Information for Planning and Consultation Resource List (2017)
P-6 Wildlife and Habitat Studies Report (2010)
Confidential and not for public distribution. Provided under separate cover.
P-7 Rare Plant Survey Report (2010)

P-8 Ecological Baseline Report for Baseline Wind Energy Facility (2011)
P-9 Supplemental Wildlife and Habitat Studies (2010)
Confidential and not for public distribution. Provided under separate cover.
P-10 Summary of 2010 Avian Use Surveys (2017)
P-11 Avian Use and Habitat Disturbance Supporting Data
P-12a Phase 2 Wildlife Monitoring and Mitigation Plan
P-12b Phase 2 Revegetation Plan
P-12c Phase 2 Habitat Mitigation Plan

TABLES

P-1 Summary of Field Surveys Conducted within Site Boundary Between 2008 and 2017 ..... P-5
P-2 Nonlisted Special-status Wildlife and Plant Species of Known or Potential Occurrence within Approved and Proposed Expanded Facility Site Boundary and 5-Mile Buffer P-9
P-3 Habitat Types within Approved and Proposed Expanded Site Boundary..... P-25
P-4 Total Temporary Habitat Impacts – Facility as Modified Compared to Approved Facility..... P-36
P-5 Total Permanent Habitat Impacts – Facility as Modified Compared to Approved Facility..... P-38

FIGURES

P-1 Analysis Area for Fish and Wildlife Habitat
P-2 Botanical Surveys
P-3 Sensitive Wildlife Locations
(*Confidential and not for public distribution; provided under separate cover*)
P-4 Avian Use Study Overview
P-5 Sensitive Raptor Species Nests
(*Confidential and not for public distribution; provided under separate cover*)
P-6 Habitat Types [Map Set]
P-7 Habitat Categories [Map Set]
P-8 Habitat Categories Impacts [Map Set]: Maximum Wind (Design Scenario A)
P-9 Habitat Categories Impacts [Map Set]: Solar (Design Scenario C)

P.1 INTRODUCTION

The Energy Facility Siting Council (EFSC; Council) previously approved construction of the 404-megawatt (MW) Montague Wind Power Facility (Facility)[1] and found that the Facility complies with the standards required in OAR 345-022-0060 and OAR 635-415-0025. Montague Wind Power Facility, LLC (Montague) is constructing the Facility in phases. Phase 1 consists of up to 81 wind turbines generating 202 MW of power within the approved site boundary. Montague has already begun construction of Phase 1 under the conditions of the existing Site Certificate. Phase 2 consists of an expanded site boundary, modification of turbine types and construction schedule, and addition of a solar array and battery storage. The analysis in this exhibit focuses on Phase 2 and the three design scenarios described in *Request for Amendment No. 4 Project Description and OAR Division 27 Compliance* (referred to herein as RFA 4).

P.2 SUMMARY OF ANALYSIS RESULTS

This exhibit presents an analysis of the impacts to fish and wildlife habitats and nonlisted, sensitive species[2] resulting from the modifications proposed in RFA 4 to demonstrate that the Facility, as amended, will still comply with regulatory requirements. The analysis results are summarized as follows:

- **Expansion of Site Boundary**: Expansion of the site boundary allows relocation of some facilities to Category 6 habitat, which results in a net decrease in impacts to higher-quality habitat types. The site boundary expansion does not include any new habitats or species that were not previously evaluated. Facilities previously included within the approved site boundary (wind turbines, access roads, electrical lines, substation, and operations and maintenance [O&M] building) will be relocated to new areas, but the types and quantities of impacts to sensitive species and fish and wildlife habitat will be the same or less than previously described.
- **Modification of Turbine Type:** Use of larger modern turbines under Design Scenario B will allow for the installation of fewer turbines to generate the same energy output for the Facility, in turn minimizing habitat impacts overall. Risk of avian collision with larger turbines is anticipated to be similar to the approved turbines sizes, and Montague will verify avian fatalities by completing post construction fatality monitoring.
- **Modification of Construction Schedule:** No new species have been listed by the Oregon Fish and Wildlife Commission as threatened or endangered since issuance of the Second Amended Sited Certificate,[3] which also extended construction deadlines.
- **Addition of Solar Array**: The solar array will occupy up to 1,189 acres in Category 6 habitat. Habitat loss for nonlisted, sensitive fish and wildlife species will be minimized by siting the solar array only in Category 6 habitat within the solar micrositing area. The conversion of agricultural land will result in the loss of marginal foraging opportunities for some bird species but is not expected to result in any new adverse impacts to fish and wildlife or avian species, including mule deer.

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[1] EFSC. 2017a. *Third Amended Site Certificate for Montague Wind Power Facility*. July 11.

[2] Consistent with OAR 635-100-0040(2), "sensitive species" are defined as nonlisted wildlife species (including fish), subspecies, or populations "that are facing one or more threats to their populations, habitat quantity, or habitat quality or that are subject to a decline in number of sufficient magnitude such that they may become eligible for listing on the state Threatened and Endangered Species List." This exhibit uses the terms "sensitive species" and "special-status species" interchangeably.

[3] EFSC. 2015. *Second Amended Site Certificate for Montague Wind Power Facility*. December 4.

- **Addition of Battery Storage**: The potential impact to nonlisted, sensitive fish and wildlife species by the construction and operation of the proposed solar facility is habitat loss. The battery storage system will occupy up to 6 acres of Category 6 habitat adjacent to Oregon Highway 19. This impact will be insignificant, accounting for less than 1 percent of the total impact for Phase 2. Additionally, the operational lighting at the battery storage area will include only shielded or downward-directed lighting that will minimize attraction to night-migrating birds, consistent with Site Certificate Condition 104.

P.3 CONDITION COMPLIANCE

The Third Amended Site Certificate imposes 11 conditions (91, 92, 93, 94, 95, 96, 97, 98, 99, 100, and 101) designed to reduce or avoid potential impacts to habitat and sensitive fish and wildlife resources. The conditions address requirements regarding finalization of the Wildlife Monitoring and Mitigation Plans (WMMPs), Revegetation Plans, and Habitat Mitigation Plans (HMPs), site restoration, and enhancement of the habitat mitigation area. The modifications proposed under RFA 4 do not affect Montague's ability to comply with the existing Site Certificate conditions. No new conditions are needed for protection of habitat and sensitive wildlife resources. However, Montague proposes modifications to Conditions 91, 92, and 93 to address construction of the Facility in phases, as shown below. The change reflects Montague's intent to prepare plans specific to each phase of the Facility. The modifications are represented by underline and strikeout. In addition to these modifications, Montague proposes the removal of Condition 44, which duplicates the language in Condition 92 and is not required as a mandatory condition prescribed in OAR 345-027-0020 or 345-027-0023. Condition 44 is shown in strikeout following Condition 93.

91 Prior to construction of the Facility or a phase of the Facility, the certificate holder shall finalize the Wildlife Monitoring and Mitigation Plans (WMMPs), based on the draft WMMP included as Attachment E of the Final Order on Request for Amendment #3, as approved by the Department in consultation with ODFW. The certificate holder shall conduct wildlife monitoring as described in the final WMMPs, as amended from time to time.

92 The certificate holder shall restore areas disturbed by facility construction but not occupied by permanent facility structures according to the methods and monitoring procedures described in the final Revegetation Plans for each phase of the Facility, as approved by the Department in consultation with ODFW. The final Revegetation Plans shall be based on the draft plan that is incorporated as Attachment F in the Final Order on Request for Amendment #3 as amended from time to time.

93 The certificate holder shall acquire the legal right to create, enhance, maintain and protect a habitat mitigation area as long as the site certificate is in effect by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department. Within the habitat mitigation area, the certificate holder shall improve the habitat quality as described in the final Habitat Mitigation Plans for each phase of the facility, as approved by the Department in consultation with ODFW. The final Habitat Mitigation Plans shall be based on the draft plan included as Attachment G to the Final Order on Request for Amendment #3 and updated based on Condition 31. The final Habitat Mitigation Plans may be amended from time to time.

~~44: During operation of the facility, the certificate holder shall restore areas that are temporarily disturbed during facility maintenance or repair activities using the same~~

~~*methods and monitoring procedures described in the Revegetation Plan referenced in Condition 92.*~~

P.4 GENERAL INFORMATION

OAR 345-021-0010(1)(p) *requires the following:*

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.

OAR 345-022-0060 *requires the following:*

"[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.

P.4.1 Analysis Area

In accordance with OAR 345-001-0010(59)(c), the fish and wildlife habitat analysis area encompasses all the area within the approved and expanded site boundary and the area within one-half mile from the site boundary (Figure P-1). The analysis in this exhibit supports an amendment request to expand the previously approved site boundary by approximately 13,339 acres to accommodate the development of the remaining 202 MW of power generation approved in the Third Amended Site Certificate.

P.4.2 Agency Consultation

Prior to conducting fieldwork for the proposed expanded site boundary, Montague consulted with wildlife agencies to verify survey methods. This consultation is summarized as follows:

- Oregon Department of Fish and Wildlife (ODFW) biologist Steve Cherry was contacted on February 1, 2017, to advise him of Montague's plan to conduct Phase 2 surveys. Included was a letter describing the phased construction approach and a report summarizing Washington ground squirrel (WGS) reconnaissance-level surveys conducted in 2016. Montague also requested a meeting to discuss plans for preconstruction wildlife surveys as well as surveys to be conducted in support of this amendment request. Mr. Cherry provided an email confirming that ODFW deemed the survey protocol acceptable.
- During a March 14, 2017, phone call between ODFW biologist Steve Cherry and Montague, the following topics were discussed:
  - ODFW considers the results of protocol-level WGS surveys valid for 3 years.
  - ODFW would not consider reconnaissance-level surveys to be sufficient to identify Category 1 habitat for purposes of the Phase 2 amendment request, even if full protocol-level surveys were implemented prior to construction.
  - ODFW recommends development of permanent infrastructure needed to access facilities (e.g., access roads for transmission line maintenance) in areas where potentially suitable WGS habitat occurs as it is difficult to predict where WGS will occur in the future.
- Tetra Tech requested locations of documented nests of eagles and other raptors within the survey area in March and April 2017 from the U.S. Fish and Wildlife Service (USFWS). On

April 4, 2017, USFWS provided locations of golden eagle nests within the survey area and stated that there are no known bald eagle nests within the survey area, although USFWS noted the bald eagle nest data have not been updated in recent years. Tetra Tech also provided the raptor nest survey protocol to ODFW before beginning surveys in April 2017, and received confirmation via email from Steve Cherry that the protocol was acceptable.

P.5 BIOLOGICAL AND BOTANICAL SURVEY METHODS

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.*

Response: Before initiating field surveys, a desktop survey and information search was completed for the entire analysis area. Information and data gathered during the desktop survey were then used to inform the planned field surveys in areas where facilities will be located. The desktop information review for state and federal special-status species included the approved and proposed expanded site boundary and conservatively extended beyond the analysis area to include a 5-mile buffer.

Biological and botanical surveys were conducted in Spring 2017 for the areas that could be affected by Phase 2. These surveys followed the same methods as those originally completed for the Facility in 2010, and as approved by ODFW in presurvey consultation, as described in the survey reports provided as Attachments P-1, P-2, and P-3. The purpose of biological and botanical surveys was to identify areas within the micrositing corridor that may contain suitable habitat for sensitive species, delineate habitat type per ODFW's categories, and search for rare plants within the construction footprint. Sections P.5.1 and P.5.2 summarize the updated desktop survey and information review, and the biological and botanical (habitat, wildlife, rare plants) field surveys completed specifically for the Facility.

P.5.1 Desktop Survey and Information Review

In winter and spring 2017, Montague reviewed and updated available information on nonlisted state and federal special-status species that may occur within the approved and proposed expanded site boundary and a 5-mile buffer, within the state of Oregon. Information for the desktop review was obtained from the Oregon Biodiversity Information Center (ORBIC) and Oregon Natural Heritage Information Center (ORNHIC) (Attachments P-4a [confidential and not for public distribution] and P-4b), the U.S. Fish and Wildlife Service (2017) (Attachment P-5), and prior studies conducted within the approved and proposed expanded site boundaries (Attachments P-6, P-7, P-8, P-9 [P-6 and P-9 are confidential and not for public distribution], and P-10).

P.5.2 Field Surveys

Field surveys were performed in 2017 to update and supplement surveys previously conducted in 2008-2011. Survey methods are described in detail in the relevant survey reports attached to this exhibit (Attachments P-1 through P-3) and summarized below.

Table P-1 summarizes field surveys that have been conducted within the Facility site boundary, between 2008 and 2017.

Table P-1. Summary of Field Surveys Conducted within Site Boundary Between 2008 and 2017

Date	Description
2017	Washington ground squirrel surveys
2017	Habitat mapping updates
2017	Raptor nest surveys
2017	Special-status plant surveys
2017	Wetland delineation surveys[a]
2016	Washington ground squirrel surveys
2010-2011	Golden eagle telemetry for the Baseline Wind Project
2010	Special-status plant surveys of the Montague site boundary
2010	Special-status wildlife surveys in areas not previously surveyed for the Montague Wind Power Facility
2010	Field verification of habitat types and reassessment of categories
2010	Aerial raptor nest survey
2010	Habitat mapping within the Baseline Wind Project site boundary
2010	Special-status plant surveys within Baseline Wind Project site boundary
2010	Special-status wildlife surveys within Baseline Wind Project site boundary
2010	Raptor nest survey of the Baseline Wind Project site boundary and a 2-mile radius
2010	Bat acoustic monitoring
2009–2010	Avian use surveys of six[b] plots within Montague site boundary beginning in fall in areas not covered by 2008-2009 avian use surveys
2009	Aerial raptor nest survey for a portion of the Montague site boundary
2009	Wildlife habitat mapping and categorization of area within the Montague site boundary
2009	Bat use review
2008–2009	Avian use surveys of five plots within Montague site boundary conducted from fall 2008 to summer 2009
2008	Special-status wildlife surveys for a portion of the Montague site boundary

[a] Wetland delineation surveys are described in Exhibit J.

[b] One survey plot was excluded from the final (summer 2010) survey as it was located outside of the Facility site boundary.

P.5.2.1 Plants

In 2017 and 2018, CH2M conducted surveys for special-status plants in all areas of the approved and proposed expanded site boundary where Phase 2 facilities are sited based on the preliminary design (CH2M, 2017c, 2017d, 2017e, 2018a; see Attachments P-1a, P-1b, P-1c, and P-1d) (Figure P-2). Surveys were floristic in nature and were conducted according to the *U.S. Department of Interior Bureau of Land Management Survey Protocols for Survey and Manage Strategy 2 Vascular Plants* (Whiteaker et al., 1998). Two survey methods were used. An Intuitive Controlled Survey was conducted throughout the Facility site, and a Complete Survey was conducted in areas of high potential habitat. For the Intuitive Controlled Survey, the field botanist traversed the Phase 2 study area over representative cross-sections of all the major habitats and topographic features, looking for the target species while en route between

different areas. When the field botanist arrived at an area of high potential (defined in the prefield review or encountered during the field visit), a survey for the target species was conducted. In areas with high probability of detecting sensitive species, the field botanist conducted a Complete Survey in which vascular plant taxa encountered were recorded in the field using standard references such as *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955–1969). Plant identification was also aided by current taxonomic guides and other standard references.

Surveys for state and federal special-status plants were previously conducted by Northwest Wildlife Consultants, Inc. (NWC) in spring 2006 (PPM Energy [PPM], 2006) and in spring 2009 (NWC, 2010a) (Attachment P-6 [confidential and not for public distribution]).

CH2M conducted additional special-status plant surveys within the approved site boundary in 2010 (CH2M HILL, 2010; see Attachment P-7) and NWC conducted botanical surveys within the proposed expanded site boundary in 2010 (NWC, 2011; see Attachment P-8). These prior surveys provided input to the iterative micrositing process, but the impact evaluation provided in this exhibit is based on 2017 plant surveys.

P.5.2.2 Special-status Species

Surveys for listed and nonlisted special-status wildlife species, which focused on the state-listed WGS, were conducted in 2016, 2017, and 2018 (Attachments P-2a through P-2c [confidential and not for public distribution]; Attachment P-1d); see Exhibit Q and Figure P-3 (confidential and not for public distribution) for more information about the 2016 and 2017 survey results.

WGS field surveys were conducted using a systematic transect approach, in which qualified biologists walked evenly spaced transects searching for burrow openings and WGS sightings, listening for vocalizations, and looking for other signs such as scat and soil disturbance. Transect surveys were completed twice, at least 2 weeks apart with the transects of the second-round survey perpendicular or offset to the first round. Biologists conducted burrowing owl surveys concurrently with WGS surveys in areas with suitable habitat and documented any observations or sign of burrowing owls. Burrowing owl habitat was considered active by an observation of at least one burrowing owl, or, alternatively, its molted feathers, cast pellets, prey remains, or eggshell fragments at or near a burrow entrance. Actively farmed areas are not considered suitable habitat for burrowing owl or WGS and areas determined to be actively farmed during the field investigation were not surveyed further.

Previously, surveys for nonlisted, special-status wildlife species were conducted by NWC in portions of the Facility site boundary in spring 2006 (PPM, 2006) and spring 2009 (NWC, 2010a) (Attachment P-6; see Figure P-3 [Attachment P-6 and Figure P-3 are confidential and not for public distribution]). Wildlife surveys focused specifically on the Montague site were conducted between 2008 and 2010 (NWC, 2009, 2010a [see Attachment P-6; confidential and not for public distribution]). Prior survey results provided input to the iterative micrositing process but the impact evaluation for WGS in this exhibit relies on the 2017 surveys.

P.5.2.3 Avian Use

From fall 2009 through spring 2010, 20-minute avian use surveys were conducted at six 800-m radius plots (see Attachments P-6 and P-9 [P-6 and P-9 are confidential and not for public distribution]). Avian use surveys were conducted at five of these six plots during summer 2010 because one plot was located outside of the site boundary at the time of the survey (CH2M,

2017d; see Figure P-4). Concurrent with the above surveys, avian use surveys were conducted by NWC at 18 800-m radius plots for the Baseline Wind Project (Baseline) from November 2, 2009, to October 26, 2010 (NWC, 2011; Figure P-4). A large portion of the surveyed Baseline area has become part of the extended Montague boundary.

The protocol for avian use surveys used a large plot point-count method designed to adequately detect birds of various size and habitat use patterns. Each circular study plot was 800 meters (approximately 0.5 mile) in radius. Plots were nonoverlapping and were chosen to provide excellent viewing conditions and thorough coverage of the survey corridors and topographical features. Experienced avian observers positioned at the center of the plot recorded all wildlife seen or heard over a 20-minute period, noting species, number of individuals, and distance from plot center, flight height, and habitats utilized for each observation. Flight paths of special status species and raptors were hand-plotted on topographic maps in the field to later aid in determination of spatial use of these species in relation to proposed turbine sites.

Before the fall 2009 – spring 2010 surveys, NWC conducted a full year of avian use surveys at five plots from September 4, 2008, to August 7, 2009 (NWC, 2009). Surveys in fall and winter seasons were previously reported as study plots in the "surrounding area within 5 miles" for the Leaning Juniper IIB (LJIIB) amended site boundary wildlife baseline study (Leaning Juniper Wind Power II LLC [LJWP], 2009; NWC, 2010a; see Attachment P-6 [confidential and not for public distribution]).The impact evaluation provided in this exhibit relies on the prior avian use survey data because avian use patterns are unlikely to have changed significantly during the time period that has elapsed, and the volume of data available from the 2008-2010 time period provide a substantial record on which to base the impact assessment.

P.5.2.4 Acoustic Bat

Acoustic bat surveys were completed for the Baseline Wind Project along the Rock Creek bluffs and rocky breaks near the proposed expanded site boundary (NWC, 2011; Attachment P-8). The objective of this 2010 (NWC) bat field study was to investigate bat species diversity in the area and to examine if there is a spatial (landscape) and temporal (seasonal) difference in bat species composition at various habitat areas along the breaks of Rock Creek within or adjacent to the site boundary.

The bat species acoustic monitoring was conducted from July 2010 to October 2010 at six sample locations spread along the upper breaks of the Rock Creek drainage. The survey captured the most active periods between mid-August and mid-October,

The acoustic monitors consisted of ultrasonic detectors capable of automatically recording the echolocation calls of bats. The acoustic monitors were programmed to turn on 1 hour before sunset and turn off 1 hour after sunrise to coincide with the timing of most bat activity. Downloaded calls were analyzed using SonoBat 3.0 acoustic identification software to identify bat species where possible.

The impact evaluation provided in this exhibit relies on the 2010 bat echolocation survey data because bat use patterns are unlikely to have changed significantly during the time period that has elapsed, and the volume of data available from the 2010 time period provides a sufficient record on which to base the impact assessment.

P.5.2.5 Raptor Nests

In 2017, raptor nest surveys were conducted for Phase 2. The aerial and ground-based surveys extended 2 miles from the Phase 2 turbines located within the approved and proposed expanded site boundary (Tetra Tech, 2017a and 2017b; see Attachments P-3a and P-3b and Figure P-5 [all are confidential and not for public distribution]).

The nest survey approach consisted of two rounds to facilitate a complete inventory and accurate occupancy determination of raptor nests within the survey area. An aerial nest survey was completed in the early season (between March 1 and April 15, 2017) before leaves emerged on trees. Then a ground-based survey was completed later in the season (between April 15 and May 30, 2017) to confirm use of nests found during the aerial nest survey and to search for new raptor nests.

During the aerial survey surveyors checked on the status of known nests, identified in past surveys or in agency databases, and searched for new raptor nests within the survey area. The helicopter flew along north to south oriented transects spaced 1-mile apart within the survey area.

The ground-based raptor nest survey was conducted within 30 days of the aerial survey. The surveyors checked on the status of raptor nests located during the aerial survey along with historical nests, and searched for and documented new raptor nests within the survey area.

A 2010 aerial raptor nest survey conducted for Baseline extended 2 miles from the Baseline site boundary, and includes a portion of the proposed expanded site boundary described in RFA 4. The area surveyed was approximately 136 square miles (NWC, 2011; see Attachment P-8).

An earlier 2009 Facility raptor nest survey area extended 0.5 mile from the Montague transmission line route and alternates and 2 miles from all other areas of the site boundary. The 2009 raptor nest survey covered an area measuring approximately 193 square miles. Approximately 50 percent of the site boundary had previously been surveyed for nesting raptors during studies conducted for Pebble Springs and Leaning Juniper II (LJII) (Figure 12 of PPM, 2006; LJWP, 2006; LJWP, 2009; Kronner et al., 2005; NWC, 2010a; see Attachment P-6 [confidential and not for public distribution]). In addition, approximately 35 percent of the 2-mile Facility raptor survey radius had been surveyed in 2009 for nesting raptors for adjacent wind facilities. Data were reviewed from several adjacent wind facilities surveyed for raptor nests in 2009 by NWC, including Leaning Juniper I (LJI), Leaning Juniper IIA (LJIIA), and LJIIB, and Pebble Springs.

Prior raptor survey results provided input to the iterative micrositing process but the impact evaluation for raptors in this exhibit relies on the 2017 surveys. Some nest sites identified in previous studies were not revisited in 2017 because no turbines are currently planned within 2 miles of those nest sites.

Additional raptor nest surveys will be conducted prior to construction in accordance with Site Certificate Condition 95(e), consistent with the methodology previously approved by ODFW on April 7, 2017 (see Attachment 2 to Attachment P-3b [confidential and not for public distribution]). The survey results will be documented in a preconstruction report submitted to ODFW and the Oregon Department of Energy (ODOE) to demonstrate compliance with Site Certificate Condition 95(e).

P.5.2.6 Habitat Categorization

In 2017, biologists reviewed previous habitat mapping information and collected data to update and supplement this information within the Phase 2 study area (see Attachment P-2b [confidential and not for public distribution]). Biologists conducted habitat mapping concurrently with WGS surveys in areas previously not surveyed, and previous habitat mapping was updated within the Phase 2 study area. To identify broad habitat types, biologists reviewed historical land cover maps from the Oregon Gap Analysis Program. Fine-scale habitat mapping, preliminary field reconnaissance, and verification were conducted within the Facility site boundary between 2008 and 2010, and reviewed during the current survey effort to determine whether changes had occurred. For previously unsurveyed areas, habitat category ratings were assigned pursuant to Oregon Administrative Rule (OAR) 635-415-0025, based on a combination of vegetative structure, habitat functionality, and overall ecological condition for wildlife.

P.6 BIOLOGICAL AND BOTANICAL FIELD SURVEY RESULTS

This section conveys the results of the biological and botanical field surveys. Table P-2 provides a list of species resulting from the desktop survey and information review that are not state or federally listed but have other special status. Exhibit Q provides additional detail on threatened and endangered species occurrence. The sections that follow the table describe the fish and wildlife habitat within the analysis area and the six ODFW habitat categories.

Table P-2. Nonlisted Special-status Wildlife and Plant Species of Known or Potential Occurrence within Approved and Proposed Expanded Facility Site Boundary and 5-Mile Buffer

Common Name and Scientific Name	Federal Status[a]/State[b, c]	Occurrence Within or Within 5 Miles of the Site Boundary[d, e, f] D = Documented N = Not Documented
White-tailed jackrabbit *Lepus townsendii*	--/SV	**D**—Documented within the site boundary during special-status wildlife surveys.
Western gray squirrel *Sciurus griseus*	--/SV	**N** – None observed; no suitable habitat.
Hoary bat *Lasiurus cinereus*	--/SV, CS	**D**—Documented during 2010 acoustic study. Suitable habitat present along Rocky Creek. Likely to occur during fall migration, based on acoustic study and fatality records at regional and nearby wind facilities.
Silver-haired bat *Lasionycteris noctivagans*	SoC/SV	**D**— Documented during 2010 acoustic study. Likely to occur during fall migration, based on acoustic study and fatality records at regional and nearby wind facilities.
Western small-footed myotis *ciliolabrum*	SoC/--	**D**— Documented during 2010 acoustic study. Roosts in rock crevices, caves, mines, talus slopes, and buildings (Kronner and Gritski, field notes 2005–2009).
Long-eared myotis *M. evotis*	SoC/--	**N**—More common in forests than in arid grassland and shrub-steppe. Roosts in rock crevices, tree cavities, under loose bark, tree stumps, caves, mines, buildings.
Fringed myotis *M. thysanodes*	SoC/SV, CS	**D**—Most common roosts are in caves, mines, and snags; there are no records of this species for the Columbia Basin. Recorded during acoustical monitoring conducted along Rock Creek, near Olex, in August 2009 (Kronner and Gritski, field notes 2009).
Long-legged myotis *M. volans*	SoC/SV, CS	**N**—More common in forests than in arid grassland and shrub-steppe. Roosts in tree cavities, under loose bark, rock crevices, and buildings.

Table P-2. Nonlisted Special-status Wildlife and Plant Species of Known or Potential Occurrence within Approved and Proposed Expanded Facility Site Boundary and 5-Mile Buffer

Common Name and Scientific Name	Federal Status[a]/State[b, c]	Occurrence Within or Within 5 Miles of the Site Boundary[d, e, f] D = Documented N = Not Documented
Yuma myotis *M. yumanensis*	SoC/--	**D**— Documented during 2010 acoustic study. May roost in rock crevices or old, abandoned buildings; most likely to forage near or over Rocky Creek.
Pallid bat *Antrozus pallidis*	SoC/SV, CS	**D –** Documented during 2010 acoustic study. Roosts in rock crevices, tree hollows, mines, caves, buildings and forages in rocky deserts, grasslands; take large insects, often from the ground.
Spotted bat *Euderma maculatum*	SoC/SV	**N –** Roosts in rock crevices in cliff faces. Nearest record is Cottonwood Creek at the John Day River. Forages in riparian areas, meadows, old agricultural fields, forest openings. This species has patchy distribution; it is difficult to capture, and many "sightings" are based on its audible echolocation signal.
Townsend's big-eared bat *Corynorhinus townsendii*	SoC/SC, CS	**N**—Habitat is typically coniferous forests, desert scrub, pinyon-juniper; sometimes found in arid grassland and agricultural areas. Appropriate roost sites (mines, caves, building) are mostly lacking, except for farm buildings, suitability unknown. One record for Gilliam County (although not an easily detected species) (Kronner and Gritski, field notes 2005–2009). Closest known breeding population in Klickitat County, Washington.
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	SoC/--	**N** – Appropriate roost sites are mostly lacking. No records of occurrence.
Greater sandhill crane *Grus canadensis tabida*	--/SV,CS	**N**—Not observed. May occur as migrant during migration seasons. Usually flies higher than rotor-swept area during migration.
Long-billed curlew *Numenius americanus*	BoCC/SV,CS	**D**—Numerous detections during avian use surveys conducted from 2008-2010.
Greater sage-grouse *Centrocercus urophasianus*	SoC/SV,CS	**N** – None observed; outside species' current range.
Mountain quail *Oreortyx pictus*	SoC/--	**N** – None observed; no suitable habitat.
Golden eagle *Aquila chrysaetos*	BGEPA, BoCC/--	**D**—Several observed during avian use surveys. Three historic nests within 1.88 and 5 miles of the Facility site; the nest closest to the Facility was not active in 2017.
Bald eagle *Haliaeetus leucocephalus*	BGEPA, BoCC/SV	**N –** Not observed
American peregrine falcon *Falco peregrinus anatum*	BoCC/SV,CS	**N**—Not observed onsite during surveys or in the immediate area.
Ferruginous hawk *Buteo regalis*	SoC, BoCC/SC,CS	**D**—Nests within the site boundary and within 2 miles of the Facility.
Swainson's hawk *B. swainsoni*	BoCC/SV,CS	**D**—Nests within Facility site boundary and within 2 miles of the Facility. Detected onsite during avian use surveys at all plots and all seasons

Table P-2. Nonlisted Special-status Wildlife and Plant Species of Known or Potential Occurrence within Approved and Proposed Expanded Facility Site Boundary and 5-Mile Buffer

Common Name and Scientific Name	Federal Status[a]/State[b, c]	Occurrence Within or Within 5 Miles of the Site Boundary[d, e, f] D = Documented N = Not Documented
Northern goshawk *Accipiter gentilis*	SoC/SV	**N** – None observed; no suitable habitat.
Western burrowing owl *Athene cunicularia*	SoC,BoCC/SC,CS	**D**—Observed in transit during 2009-2010 surveys of Baseline Wind Project study plots.
Loggerhead shrike *Lanius ludovicianus*	BoCC/SV,CS	**D**—Observed several times during avian use surveys conducted from 2008-2010
Lewis' woodpecker *Melanerpes lewis*	BoCC,SoC/SC,CS	**N**—Not observed. May fly through during migration.
White-headed woodpecker *Picoides albolarvatus*	BoCC,SoC/SC,CS	**N** – Not observed. No suitable habitat.
Willow flycatcher *Empidonax trailli adastus*	BoCC,BSoC/SV,CS	**N**—Not observed. May fly through during migration.
Olive-sided flycatcher *Contonpus cooperi*	SoC/SV,CS	**N** – None observed; no suitable habitat.
Yellow-breasted chat *Icteria virens*	SoC/SC,CS	**N**—Observed along Rock Creek near Olex (Kronner and Gritski field notes, 2009) in riparian habitat. May fly through the Facility site during local dispersal and migration, the Facility (Eightmile drainage) lacks perennial streams and riparian shrub cover sufficient to support this species breeding.
Sagebrush sparrow *Artemesiospiza belli*	BoCC/SC	**D**—Documented during special-status wildlife surveys in March 2008 in one location. Needs extensive sagebrush shrub habitat to support breeding populations.
Grasshopper sparrow *Ammodramus savannarum*	--/SV,CS	**D**—Observed during 2008-2009 surveys and during 2009-2010 Baseline Wind Project surveys. Requires sufficient grassland with good vertical structure for nesting cover and perching.
Northern sagebrush lizard *Sceloparus graciosus*	SoC/SV,CS	**D**—Not documented onsite. Suitable habitat where there is less dense grass cover; also found in sandy soils with sagebrush and juniper or sagebrush.
Western pond turtle *Clemmys marmorata*	SoC/SC	**N** – None observed; no suitable aquatic habitat.
Western toad *Bufo boreus*	--/SV,CS	**N**—One ORNHIC record within 5 miles of the Facility (ORNHIC, 2009). No suitable habitat.
Larch mountain salamander *Plethodon larselli*	SoC/SV,CS	**N** – None observed; outside known range.
Chinook salmon, Middle Columbia River ESU (spring run) *Onchorhynchus tshawytscha*	--/SV,CS	**N** – None observed; no suitable perennial stream habitat.
Redband trout *O. mykiss*	SoC/SV,CS	**N** – None observed; no suitable perennial stream habitat.
Westslope cutthroat trout *O. clarkii lewisi*	SoC/SC,CS	**N** – None observed; no suitable perennial stream habitat.
Pacific lamprey *Lampetra tridentata*	SoC/SV,CS	**N** – None observed; no suitable perennial stream habitat.

Table P-2. Nonlisted Special-status Wildlife and Plant Species of Known or Potential Occurrence within Approved and Proposed Expanded Facility Site Boundary and 5-Mile Buffer

Common Name and Scientific Name	Federal Status[a]/State[b, c]	Occurrence Within or Within 5 Miles of the Site Boundary[d, e, f] D = Documented N = Not Documented
River lamprey *L. ayresi*	SoC/CS	**N** – None observed; no suitable perennial stream habitat.
Margined sculpin *Cottus marginatus*	SoC/--	**N** – None observed; no suitable perennial stream habitat.
California floater mussel *Anodonta californiensis*	SoC/CS	**N** – None observed; no suitable habitat.
Giant Columbia River Limpet *Fluminicola nuttalli*	--/CS	**N** – None observed; no suitable habitat.
Lynn's clubtail dragonfly *Gomphus lynnae*	SoC/CS	**N** – None observed; no suitable stream habitat.
Robinson's onion *Allium robinsonii*	SoC/2-EX	**N** – None observed; no suitable habitat.
Stalked-pod milk-vetch *A. scleroscarpus*	--/3	**Y –** Documented in site boundary during surveys conducted for LJIIB.
Columbia milk-vetch *A. succumbens*	--/4	**Y –** Documented in site boundary during surveys conducted for LJIIB.
Long-bearded sego lily *Calochortus longebarbatus* var. *longebarbatus*	SoC	**N** – None observed; outside known range.
Gray cryptantha *leucophaea*	--/2	**Y** – Documented in 5-mile analysis area (ORNHIC, 2009), but outside site boundary. None observed in site boundary during focused surveys.
Sessile mousetail **Myosurus sessilis**	SoC/C	**Y –** Documented within site boundary during focused surveys.
Woven spore lichen *Texosporium sancti-jacobi*	SoC	**N** – Documented within analysis area (ORBIC, 2017). Potentially suitable habitats present; none observed during focused surveys.

[a] U.S. Fish and Wildlife Service, 2017 (Attachment P-5)

[b] Oregon Biodiversity Information Database (ORBIC), 2017 (Attachment P-4a [confidential and not for public distribution])

[c] Oregon Natural Heritage Information Center (ORNHIC), 2009 (Attachment P-4b)

[d] Source: NWC, 2009

[e] Source: NWC, 2010b

[f] Source: CH2M, 2017a, 2017b

Status Definitions

-- = No status.

Federal

SoC = Species of Concern.
BGEPA = Bald and Golden Eagle Protection Act.
BoCC = USFWS Birds of Conservation Concern (BCR 9, Great Basin).

Note: All migratory birds are protected by the Migratory Bird Treaty Act.

Oregon

CS = Oregon Conservation Strategy Species

Table P-2. Nonlisted Special-status Wildlife and Plant Species of Known or Potential Occurrence within Approved and Proposed Expanded Facility Site Boundary and 5-Mile Buffer

Common Name and Scientific Name	Federal Status[a]/State[b, c]	Occurrence Within or Within 5 Miles of the Site Boundary[d, e, f] D = Documented N = Not Documented

SV = Sensitive-vulnerable; listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring.

SC = Sensitive-critical; listing as threatened or endangered is pending or may be appropriate if immediate conservation actions are not taken.

SU = Sensitive-undetermined; status is unclear, may be susceptible to population decline of sufficient magnitude that the species could qualify for endangered, threatened, critical, or vulnerable status. Additional information is required before a determination can be made.

SP = Sensitive-peripheral or naturally rare; low population caused by naturally limiting factors; maintaining status quo for habitats and populations is minimum requirement.

Oregon Natural Heritage Program Listings:

1 – Oregon Biodiversity Information Center (ORBIC) Threatened or endangered throughout range.

2 – ORBIC Threatened, endangered, or extirpated from Oregon; secure elsewhere.

3 – ORBIC Review List (more information needed).

4 – ORBIC Watch List (currently stable).

Ex – Believed extirpated.

The list of species in Table P-2 differs slightly from the list identified in 2010. Nine species no longer appear on the list, and two species have been added. These changes occurred as a result of species status changes. In addition, several species were dropped from Table P-2 because they lack any protected status in Oregon. This RFA 4 excludes those species that have protected status only in Washington because Washington has no jurisdiction over the Facility and the analysis area for Exhibit P does not extend into the State of Washington. Those species found during the desktop survey not to occur within the facility or 5-mile buffer (e.g., there is no perennial stream habitat; therefore, there are no fish present) are not dealt with further in this exhibit.

Additionally, mule deer, which have no special status but are of management concern to ODFW, are addressed in this exhibit because a portion of the expanded site boundary overlaps designated mule deer winter range (ODFW, 2013).

P.6.1 Fish and Wildlife Habitat

OAR 345-021-0010(1)(p)(B) *Identification of all fish and wildlife habitat in the analysis area, classified by the habitat categories as set forth in OAR 635-415-0025 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).*

Response: Habitat types within the approved site boundary and in the surrounding area were described in Exhibit P of the ASC and summarized in the Final Order on the Application.[4]

[4] EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility.* pp. 100-106. September 10.

Predominant habitat types include cropland and other non-native disturbed sites; exotic annual and native perennial grasslands; and shrub-steppe. Riparian habitat is generally lacking as most drainages have intermittent flow. The results of the habitat mapping within the Facility site boundary are described below and shown on Figure P-6.

In general, no new unique habitat types exist within the proposed expanded site boundary that have not already been studied for the approved site boundary. Some habitat types found within the approved site boundary are not present within the proposed expanded site boundary, but are described below for completeness. The descriptions below provide a detailed description of the characteristics of each habitat type and subcategory as they appear within the approved and proposed expanded site boundary. Table P-3 in Section P.6.8 (Habitat Types) identifies acreage of each habitat type within the approved and proposed expanded site boundary.

OAR 635-415-002*5* *defines six habitat categories and establishes mitigation goals and implementation standards for each category. For reference, the six habitat categories and corresponding mitigation goals and implementation standards are as follows.*

P.6.2 Habitat Category 1

OAR 635-415-0025(1*)* *Habitat Category 1 is 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.*

(a) The mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality.

(b) The Department shall act to protect Category 1 habitats by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) No authorization of the proposed development action if impacts cannot be avoided.

ODFW defines the area within a 785-foot ring around the outside of the cluster of holes where the WGS are residing as Category 1 habitat (ODFW et al., 2008). Further, ODFW has indicated that habitat adjacent to a WGS "colony" (defined by ODFW as a "cluster of holes") is considered Category 2 habitat and "an area of potential [WGS] use" if it is of a similar habitat type and quality as the area occupied by the WGS (ODFW et al., 2008).

WGS detections (holes, pellets, individuals, or vocalizations) were observed in shrub-steppe and grassland habitat during the 2017 surveys within the Facility site boundary, as described in Exhibit Q. Based on these observations, habitat that would usually be characterized as Categories 2, 3, or 4, was reevaluated based on the presence of WGS. The locations of Category 1 WGS habitat within the site boundary are shown in Figure P-3 (confidential and not for public distribution). Four habitat types were identified as Category 1 within the site boundary: Shrub-steppe, Grassland, Woodland, and Developed.

Categories below are classified as Category 1 habitat where they provide irreplaceable, limited, and essential habitat for a wildlife species—in this case, the WGS.

Shrub-steppe

WGS burrows were detected in two subtypes of Category 1 Shrub-steppe within the site boundary: Sagebrush (Big Sage) Shrub-steppe (subtype SSA) and Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB). Shrub-steppe SSA and SSB habitat was also present within 785 feet of WGS burrows and is therefore considered Category 1 habitat.

Category 1 Sagebrush (Big Sage) Shrub-steppe (SSA) is similar in vegetative cover and ecological condition to the immediately adjacent Category 2 or 3 SSA habitat within the site boundary, but because of its proximity to known WGS burrows, the habitat is deemed Category 1. This habitat also offers high-quality breeding habitat for shrub obligate species including loggerhead shrike and white-tailed jackrabbit. Sage sparrow, Brewer's sparrow, and lark sparrow are present in larger blocks of both Category 1 and 2 SSA habitat. Sagebrush lizard and other reptiles are likely to be found in areas where more sandy soils are present. Commonly occurring species include western meadowlark and mourning dove.

Category 1 Rabbitbrush/Snakeweed Shrub-steppe (SSB) is similar in vegetative cover and ecological condition to the immediately adjacent Categories 2, 3, 4, or 5 SSB habitat within the site boundary. Category 1 SSB within the site boundary exists only because of its proximity to known WGS colonies. This habitat also provides foraging, cover, and/or nesting habitat for grasshopper sparrows and white-tailed jackrabbit, as well as common birds and mammals.

No Category 1 SSA or Category 1 SSB habitat was identified within the proposed expanded site boundary.

Grassland

WGS burrows were detected in two subtypes of Grassland within the site boundary: Exotic Annual (subtype GA) and Native Perennial (subtype GB). Grassland GA and GB habitat was also present within 785 feet of WGS burrows and is therefore considered Category 1 habitat.

Category 1 Exotic Annual Grassland (GA) is similar in vegetative cover and ecological condition to the immediately adjacent Categories 2, 3, or 4 GA habitat. Category 1 GA habitat within the site boundary exists only because of its proximity to known WGS colonies. This habitat also provides habitat for nesting long-billed curlew and commonly horned larks.

Category 1 Native Perennial Grassland (GB) is the same or similar in vegetative cover and ecological condition to the immediately adjacent Categories 2, 3, or 4 GB habitat. Category 1 GB habitat within the site boundary exists only because of its proximity to known WGS colonies. This habitat also provides essential foraging habitat to a variety of common resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl have been shown to use this habitat. Western meadowlark and horned lark occur commonly in this habitat. Native grasses and forbs provide forage for mule deer.

Within the proposed expanded site boundary, 0.2 acre of Category 1 GA was identified based on 2017 field investigations.

Woodland

Juniper Woodland (subtype WJ) habitat is located within 785 feet of WGS burrows; however, there were no WGS burrows in this type of habitat within the Facility site boundary.

No Category 1 Juniper Woodland was identified within the proposed expanded site boundary.

Developed

Developed CRP or Other Planted Grassland (subtype DC) habitat is located within 785 feet of WGS burrows; however, there were no WGS burrows in this type of habitat within the Facility site boundary. (See Figure P-7 in this Exhibit P and Figure 2b in Attachment P-9 [Attachment P-9 is confidential and not for public distribution].)

Category 1 DC share the same vegetative cover and ecological conditions as neighboring Category 3 DC habitat within the site boundary. Category 1 DC habitat within the site boundary exists only because of its proximity to known WGS burrows. This habitat also supports white-tailed jackrabbits and savannah sparrows as well as grasshopper sparrows and western meadowlarks that are commonly found in this habitat subtype.

There are approximately 7.5 acres of Category 1 DR habitat within the proposed expanded site boundary.

P.6.3 Habitat Category 2

OAR 635-415-0025(2) *Habitat Category 2 is 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.*

(a) The mitigation goal if impacts are unavoidable, is no net loss of either habitat quantity or quality and to provide a net benefit of habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 2 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality. In addition, a net benefit of habitat quantity or quality must be provided. Progress towards achieving the mitigation goals and standards shall be reported on a schedule agreed to in the mitigation plan performance measures. The fish and wildlife mitigation measures shall be implemented and completed either prior to or concurrent with the development action.

(c) If neither 635-415-0025(2)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action. I

Five habitat types were identified as Category 2 within the site boundary: Exposed Rock, Grassland, Shrub-steppe, Woodland, and Developed.

Exposed Rock

Escarpment (subtype ESC) is the only subtype of Category 2 Exposed Rock within the approved site boundary. It was not found within the proposed expanded site boundary. ESC is present along Rock Creek adjacent to the southwestern portion of the expanded site boundary. Category 2 Escarpment provides substrate for nesting raptors, roosting habitat for bats and owls, and habitat for some passerines. Category 2 Escarpments (ESC) are linear Columbia River Basalt outcroppings approximately 10 to 50 feet (3 to 15 meters) in height, found on steeper slopes that bound canyon edges and shoulders (i.e., Eightmile Canyon). Grazing pressure is light in ESC habitat, and when present, vegetative cover consists of Sandberg's bluegrass, non-native grasses, and various native and non-native forbs. Soils are absent or very shallow because of rock outcroppings and steep slopes. Pockets of deeper soils are present in swales located in areas with less exposed basalt and fewer cliffs. Category 2 ESC habitats provide critical nesting substrate and perching sites for raptors, crevices for bats, and habitat for some passerines. Escarpments provide shade and thermal cover for deer in summer and serve as good windbreaks. They may also provide home sites for wood rats and marmots.

No Category 2 ESC was identified within the proposed expanded site boundary.

Grassland

Category 2 Grasslands provide essential nesting/denning and foraging habitat for several special-status species. These grasslands also show fewer signs of impacts resulting from wildfires and domestic livestock grazing pressure, and have more native plant diversity and more intact soil surface crust than do the Category 3 and 4 habitats. There are two subtypes of Category 2 Grassland within the Facility within the approved and proposed expanded site boundary: Exotic Annual Grassland (subtype GA), and Native Perennial Grassland (subtype GB).

Category 2 Exotic Annual Grasslands (GA) in the site boundary are grasslands that are primarily non-native but extensive in size and support species of interest. The forb component is composed primarily of non-native weeds such as cheatgrass, tumble mustard, bulbous bluegrass, mustard, and cereal rye, with occasional patches of native bunchgrass, primarily Sandberg's bluegrass. The high weed content has been caused primarily by the recent hot fires, which burned native shrubs and bunchgrasses and were followed by heavy grazing and/or wind erosion. Lack of native grasses and the dense weed cover limit the ability of most wildlife species to use these areas for forage or cover. Category 2 GA grasslands are similar to Category 3 Exotic Annual Grassland in that they occur as a large contiguous area on a broad open flat. In addition, Category 2 GA grasslands were conservatively designated as such because of their proximity to areas with documented WGS use. These areas may provide suitable alternate habitat for cyclic expansion of WGS over time. Category 2 may also be used by long-billed curlews for nesting and foraging, and by grasshopper sparrows, and white-tailed jackrabbits; horned larks occur commonly in this habitat.

Category 2 Native Perennial Grasslands (GB) are composed primarily of perennial bunchgrasses, such as Sandberg's bluegrass (*Poa secunda*). Bluebunch wheatgrass (*Pseudoroegneria spicata*) is also present. Soils appear to be generally medium to deep. Other native species such as Idaho fescue (*Festuca idahoensis*) and western needle-and-thread grass (*Hesperostipa comata*) are occasionally present in the appropriate soil types for the species. Various native forbs and low shrubs such as gray rabbitbrush and, to a lesser extent, green rabbitbrush are present but are an inconspicuous component. Native vascular plants are diverse, and a variety of invertebrates can be found utilizing the plants throughout the growing season. Non-native grasses are present throughout and consist of cheatgrass (*Bromus tectorum*), bulbous bluegrass (*Poa bulbosa*), and

annual cereal rye (*Secale cereale*). Snakeweed (*Gutierrezia sarothrae*) is present but not dominant. The non-native grasses and the snakeweed are typical throughout the Columbia Basin, but non-native plants are generally less extensive in Category 2 Grasslands than in Category 3 and 4 Grasslands. Deep soil native bunchgrass sites in good-to-excellent condition are limited and becoming more limited in the general area. Category 2 GB grasslands provide essential foraging habitat to a variety of common resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl have been shown to use this habitat. Western meadowlark and horned lark occur commonly in this habitat. Native grasses and forbs provide forage for mule deer.

There is approximately 0.1 acre of Category 2 GA within the proposed expanded site boundary.

Shrub-steppe

Shrub-steppe is classified as Category 2 where it provides essential habitat to target species such as grasshopper sparrows. There are two subtypes of Category 2 Shrub-steppe: Sagebrush (Big Sage) Shrub-steppe (subtype SSA) and Rabbitbrush/Snakeweed (subtype SSB).

The Category 2 Sagebrush (Big Sage) Shrub-steppe (SSA) consists of an overstory of mature stage (large-structure) patches of basin big sagebrush (*Artemesia tridentata* v. *tridentata*) and may have occasional western juniper (*Juniperus occidentalis*) acting as a superstory vegetation component. Understory plants consist of a mix of native bunchgrasses and exotic annual grasses, depending largely on level of impact from disturbance. Common grasses are Sandberg's bluegrass, bluebunch wheatgrass, cheatgrass, and bulbous bluegrass. Category 2 SSA has a higher shrub density and greater plant health than does the similar but lesser-quality Category 3 Sagebrush (big sage) habitat. Category 2 SSA is found on deep soils throughout the site boundary, usually on slopes or in draws that prevent agricultural use. Category 2 SSA offers high-quality breeding habitat for shrub obligate species including loggerhead shrike and may support WGS and white-tailed jackrabbit. Sage sparrow, Brewer's sparrow, and lark sparrow are present in larger blocks of this habitat. Sagebrush lizard and other reptiles are likely to be found in areas where more sandy soils are present. Commonly occurring species include western meadowlark and mourning dove.

The Category 2 Rabbitbrush/Snakeweed Shrub-steppe (SSB) has an overstory dominated by low-growing gray rabbitbrush (*Ericameria nauseosa*) or, to a lesser extent, green rabbitbrush (*Chrysothamnus viscidiflorus*). Snakeweed is fairly extensive throughout and is the dominant mid-height structure. Small patches of big sagebrush are intermittent. Understory plants are primarily native and non-native bunchgrasses including Sandberg's bluegrass; western needle-and-thread grass; buckwheat; and annual, non-native grasses such as cheatgrass and bulbous bluegrass. Annual cereal rye is present in swales and deeper soils where disturbance has removed most of the native vegetation. Weeds are more common than Sagebrush (Big Sage) in parts of Rabbitbrush/Snakeweed habitat as a result of recent fires or land use practices. These weeds include Russian thistle (*Salsola kali*) and tumble mustard (*Sisymbrium altissimum*). Many sites contain small patches (<1 acre) of sagebrush (big sage). Category 2 SSB could also provide foraging, cover, and/or nesting habitat for grasshopper sparrows and white-tailed jackrabbit as well as common horned lark and western meadowlark.

There are approximately 277 acres of Category 2 SSA habitat and 46 acres of Category 2 SSB habitat within the proposed expanded site boundary.

Woodland

Woodland is classified as Category 2 where it provides essential habitat (in part because of its general rarity) to special-status species such as ferruginous hawk, Swainson's hawk, and loggerhead shrike. There are two Category 2 subtypes of woodland habitat within the approved site boundary: Juniper Woodland (subtype WJ) and Riparian Woodland (subtype WR). No Category 2 WJ or Category 2 WR was identified within the proposed expanded site boundary.

Developed

Category 2 Developed habitats occur where former disturbances have ceased and have since attained sufficient ecological condition to become important or essential for wildlife, some having special status. Revegetated or Other Planted Grassland (subtype DR) is the only developed Category 2 subtype within the Facility site boundary.

Category 2 Revegetated or Other Planted Grasslands (DR) are mature planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Many are located near more diverse native habitats that add wildlife value to the less diverse Developed – Revegetated or Other Planted Grasslands. Some Developed – Revegetated or Other Planted Grasslands are the only patch of cover for wildlife in an extensive cropland landscape, increasing their value to wildlife during the breeding season or when wildlife pass through or use the habitat for critical escape cover. This habitat subtype is typically lower in native flora and fauna diversity than the native, less-disturbed grasslands. It is comprised mainly of native-like grass species, with less coverage comprised of just a few native grass species and forbs. The vegetative cover includes intermediate wheatgrass (*Thinopyrum intermedium)*, crested wheatgrass (*Agropyron cristatum*), Sherman big bluegrass (*Poa secunda ampla*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), and Sandberg's bluegrass (*Poa secunda*). Older planted grass stands may contain sparse coverage (always subordinate to grasses) of naturally-established shrubs such as green rabbitbrush (*Chrysothamnus viscidiflorus*), gray rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), or basin big sagebrush (*Artemisia tridentata ssp. tridentata*). Grasshopper sparrows and long-billed curlews were detected in this habitat subtype during 2010 special-status wildlife species surveys. Savannah sparrows may be supported by this habitat. Western meadowlarks are commonly found in this habitat subtype when shrubs are present.

There are approximately 150 acres of Category 2 DR within the proposed expanded site boundary.

P.6.4 Habitat Category 3

OAR 635-415-0025(3) *Habitat Category 3 is essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.*

(a) The mitigation goal is no net loss of either habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 3 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality. Progress towards achieving the mitigation goals and standards shall be reported on a schedule agreed to in the mitigation plan performance measures. The fish and wildlife mitigation measures shall be implemented and completed prior to or concurrent with the development action.

(c) If neither 635-415-0025(3)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

Four types of habitats were identified as Category 3 within the site boundary: Developed, Grassland, Shrub-steppe, and Woodland.

Developed

Category 3 Developed habitats are areas where former disturbances have ceased and the disturbed areas have attained sufficient ecological condition to become important or essential for wildlife. CRP or Other Planted Grassland (subtype DC) and Revegetated or Other Planted Grasslands (DR) are the two only developed Category 3 subtypes within the site boundary.

Category 3 CRP or Other Planted Grasslands (DC) are planted grasslands on previously farmed or other disturbed lands that may be enrolled in the federal CRP. This habitat subtype is composed mainly of native or native-like grasses such as bluebunch wheatgrass, intermediate wheatgrass, crested wheatgrass, big bluegrass, Idaho fescue, and Sandberg's bluegrass. Older plantings may contain a sparse (always subordinate), naturally seeded component of rabbitbrush, snakeweed, or sagebrush. White-tailed jackrabbits and savannah sparrows may be supported by this habitat. Grasshopper sparrows and western meadowlarks are commonly found in this habitat.

Category 3 Revegetated or Other Planted Grasslands (DR) are planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. This habitat subtype is comprised mainly of native or native-like grasses as described for Category 2 DR. Native vegetation in Category 3 DR is sparser and less well developed than in Category 2 DR. Category 3 DR have a higher composition of annual grasses and weeds than Category 2 DR. White-tailed jackrabbits and savannah sparrows may be supported by this habitat. Burrowing owls, grasshopper sparrows, long-billed curlews, and jackrabbit pellets were detected in this habitat subtype. This habitat subtype is important to grasshopper sparrows, and western meadowlarks are commonly found in it as well.

Category 3 DC and Category 3 DR are not present within the proposed expanded site boundary.

Grassland

Category 3 Grasslands provide essential or important foraging and nesting habitat for special-status birds and mammals as well as common native and non-native (gamebirds) avian species. Category 3 Native Perennial Grassland (subtype GB), is the only example of this Category 3 habitat in the site boundary.

Category 3 Native Perennial Grasslands (GB) are dominated by the same perennial grasses found in Category 2 GB; however, these habitats have been altered through land use or wildfires or are more sparsely vegetated. They generally have a higher composition of non-native vegetation (broad-leaf weeds and annual grasses) but are still mostly native vegetation sites. Category 3 GB generally occur on sites with shallower soils and harsher exposures, or in areas that have experienced livestock grazing or frequent fires. Category 3 is the most abundant category of GB within the site boundary. GB habitat provides essential foraging habitat to a variety of common

resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl have been shown to use this habitat. Western meadowlark and horned lark occur commonly in this habitat, and native grasses and forbs provide forage for mule deer.

There are approximately 516 acres of Category 3 GB within the proposed expanded site boundary.

Shrub-steppe

The primary differences in the Category 2 and 3 shrub-steppe habitats are in overall functionality of the habitat and in breeding season value for special-status wildlife species. In general, Category 3 shrub-steppe tends to be weedier, less biologically diverse, has obvious signs of prior or ongoing impacts, and is a habitat type relatively common in the general area.

Category 3 shrub-steppe habitat is abundant throughout the site boundary. Category 3 shrub-steppe habitat is similar to Category 2 shrub-steppe habitat subtypes, but has been affected more by wildfires, domestic livestock grazing, or other land use practices, resulting in less vascular and nonvascular vegetative diversity. The protective soil surface biotic crust of mosses, lichens, algae, and bacteria (cryptogamic layer) has been affected by land use, resulting in opportunities for non-native weedy plants to become established. Category 3 shrub-steppe habitat is important to wildlife species but is not as limited as Category 2 shrub-steppe, considering that much of the steppe habitat in the local region has experienced wildfires.

Two Category 3 shrub-steppe habitat subtypes are present: Sagebrush (Big Sage) Shrub-steppe (subtype SSA), and Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB).

Category 3 Sagebrush (Big Sage) Shrub-steppe (SSA) consists of big sagebrush at a mature stage (large structure). Patches of Category 3 SSA lack the density and plant health of Category 2 SSA or are in patches of very limited size. The overstory sagebrush in this type is often decadent or lacks full foliage. Understory vegetation in Category 3 SSA often tends toward annual grasses and low weeds. These areas historically were higher-quality habitats but are experiencing degradation caused by land use practices or frequent fires. However, the mature shrub cover still provides escape and resting cover for common wildlife and is limited in the immediate area and the region. Category 3 SSA offers high-quality breeding habitat for shrub obligate species including loggerhead shrike and may support WGS and white-tailed jackrabbit. Sage sparrow, Brewer's sparrow, and lark sparrow are present in larger blocks of this habitat subtype, while sagebrush lizard and other reptiles are likely to be found in areas where more sandy soils are present. Commonly occurring species include western meadowlark and mourning dove.

Category 3 Rabbitbrush/Snakeweed Shrub-steppe (SSB) is by far the most abundant Shrub-steppe subtype within the site boundary. Category 3 SSB areas have been more affected by recent fires and are in an earlier seral stage than is Category 2 SSB. Native rabbitbrush and other low-stature plants such as snakeweed and buckwheat are common. The understory is native Sandberg's bluegrass and non-native cheatgrass, bulbous bluegrass, and tumble mustard. Patches of native perennial grasses such as bluebunch wheatgrass and western needle-and-thread grass are present but to a lesser extent than in Category 2 SSB. Many of these areas contain small patches of sagebrush that are less than 1 acre in size. Category 3 SSB also provides foraging, cover, and/or nesting habitat for grasshopper sparrows and white-tailed jackrabbit, as well as common horned lark and western meadowlark. This habitat may also support WGS.

Approximately 458 acres of Category 3 SSA and 68 acres of Category 3 SSB exist within the proposed expanded site boundary.

Woodland

Category 3 Woodland habitats are smaller and less dense than Category 2 Woodland habitats. Trees in some sites appear unhealthy or have been affected by hot fires. One Category 3 Woodland habitat subtype occurs within the site boundary: Juniper Woodland (subtype WJ).

Category 3 Juniper Woodland (WJ) habitat is smaller in size and sparser in canopy cover and has weedier understories than does the Category 2 WJ habitat. Category 3 WJ habitat is limited and provides potential nesting habitat for ferruginous and Swainson's hawks and potential foraging and nesting habitat for loggerhead shrikes. This habitat also provides potential foraging and breeding habitat for short-horned and sagebrush lizards. American robins, Townsend's solitaire, waxwings, and mountain bluebirds utilize this habitat for wintering and while migrating. Mourning doves commonly nest in this habitat as well.

No Category 3 WJ habitat is present within the proposed expanded site boundary.

P.6.5 Habitat Category 4

OAR 635-415-0025(4) *Habitat Category 4 is important habitat for fish and wildlife species.*

(a) The mitigation goal is no net loss in either existing habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 4 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through reliable in-kind or out-of-kind, in-proximity or off-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality. Progress towards achieving the mitigation goals and standards shall be reported on a schedule agreed to in the mitigation plan performance measures. The fish and wildlife mitigation measures shall be implemented and completed prior to or concurrent with the development action.

(c) If neither 635-415-0025(4)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

Category 4 habitat is important wildlife habitat that is not limited and could include areas that have been moderately to highly grazed or show signs of other disturbance and have moderate structure and forage for wildlife. These areas are usually weedy and contain a high percentage of non-native grasses. There are three types of Category 4 habitat within the site boundary: Developed, Grassland, Shrub-steppe.

Developed

There are two subtypes of developed Category 4 habitat within the site boundary: Old Field (subtype DB) and Revegetated or Other Planted Grasslands (DR).

Category 4 Old Field (DB) habitat consists of a small area in the northern portion of the site boundary that was cultivated previously and has been left to reseed naturally. The area is currently occupied by a variety of common non-native and native vegetation. Common species are cheatgrass, Russian thistle, tumble mustard, annual cereal rye, and bulbous bluegrass. Native vegetation, when present, is a minor component. Category 4 DB provides foraging habitat for horned larks and western meadowlarks.

Category 4 Revegetated or Other Planted Grasslands (DR) are planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Category 4 DR have sparse vegetative cover and a very sparse native grass component. Category 4 DR are dominated by cheatgrass, bulbous bluegrass, annual cereal rye, tumblemustard, and Russian thistle. White-tailed jackrabbits and savannah sparrows may be supported by this habitat. Grasshopper sparrows and western meadowlarks are commonly found in this habitat subtype.

There are approximately 65 acres of Category 4 DR within the proposed expanded site boundary. No Category 4 DB habitat is present within the proposed expanded site boundary.

Grassland

There are two subtypes of Category 4 Grassland in the site boundary: Exotic Annual Grassland (subtype GA) and Native Perennial Grassland (subtype GB).

Category 4 Exotic Annual Grasslands (GA) found within the site boundary are non-native grasslands with a very high weed component and disturbed or less nutrient-rich soils. The forb component is composed primarily of non-native weeds such as cheatgrass, tumble mustard, bulbous bluegrass, mustard, and cereal rye, with occasional patches of native bunchgrass, primarily Sandberg's bluegrass. The high weed content has been caused primarily by recent hot fires, which burned native shrubs and bunchgrasses and were followed by heavy grazing and/or wind erosion. Some of these sites support long-billed curlew. Horned-larks occur commonly in this habitat. Category 4 GA habitat is found throughout the site boundary and is found commonly throughout the Columbia Basin. Category 4 GA provides important habitat to common species, but the lack of native grasses and the dense weed cover limits the ability of most wildlife species to use this habitat for forage or cover. In addition, the weed cover, often dominated by annuals such as cheatgrass, makes the slopes in this area more susceptible to erosion and soil damage from grazing, because of a lack of the robust root structure found in perennial species such as the native bunchgrasses.

Few small patches of Category 4 Native Perennial Grassland (GB) occur within the site boundary. Category 4 GB is ecologically similar to Category 3 GB but is classified as Category 4 because its small size and isolated nature limit its value to wildlife. Category 4 GB provides important foraging habitat to a variety of common resident and migratory birds as well as common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl have been shown to use this habitat. Western meadowlark and horned lark occur commonly in this habitat, and the native grasses and forbs provide forage for mule deer.

There are approximately 38 acres of Category 4 GB and 519 acres of Category 4 GA within the proposed expanded site boundary.

Shrub-steppe

Category 4 Shrub-steppe habitat is important to wildlife. Sagebrush (Big Sage) Shrub-steppe (SSA) and Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB) are the two Category 4 Shrub-steppe subtypes in the site boundary.

Category 4 Sagebrush (Big Sage) Shrub-steppe (SSA) consists of big sagebrush at a mature stage (large structure) that has been affected to varying degrees from recent wildfires. These areas historically were higher-quality habitats, but they are experiencing degradation caused by land use practices or frequent fires. However, the Category 4 SSA provides escape and resting cover for common wildlife and is limited in the immediate area and the region.

Category 3 and Category 4 Rabbitbrush/Snakeweed Shrub-steppe (SSB) support the same plant species, but differ in composition. Category 4 SSB has a greater weed and annual grass component than does Category 3 SSB. While aspect and soils may contribute somewhat to this circumstance, disturbances to livestock grazing and fires have far greater effects. Category 4 SSB provides foraging and/or nesting habitat for grasshopper sparrows and white-tailed jackrabbits, as well as common horned larks and western meadowlarks. This habitat may also support WGS.

The proposed expanded site boundary contains 0.02 acre of Category 4 SSA habitat. No Category 4 SSB habitat was identified within the proposed expanded site boundary.

P.6.6 Habitat Category 5

OAR 635-415-0025(5) *Habitat Category 5 is habitat for fish and wildlife having high potential to become either essential or important habitat.*

(a) The mitigation goal, if impacts are unavoidable, is to provide a net benefit in habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 5 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through actions that contribute to essential or important habitat.

(c) If neither 635-415-0025(5)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

There is no Category 5 habitat identified within the approved and proposed expanded Facility site boundary. Fire- and grazing-affected native habitats are likely to become more important for wildlife as the vegetation recovers, but land use practices are likely to influence that process (the effects could be negative or positive but are unknown at this stage). More fire or grazing-impacted habitats were conservatively rated as Categories 2, 3, or 4 because of their ecological condition/functionality and documented use by wildlife.

P.6.7 Habitat Category 6

OAR 635-415-0025(6) *Habitat Category 6 is habitat that has low potential to become essential or important habitat for fish and wildlife.*

(a) The mitigation goal is to minimize impacts.

(b) The Department shall act to achieve the mitigation goal for Category 6 habitat by recommending or requiring actions that minimize direct habitat loss and avoid impacts to offsite habitat.

Category 6 habitat is nonessential wildlife habitat with limited potential to become important or essential in the foreseeable future. There is one type of Category 6 habitat with the expanded Facility site boundary: Developed.

Developed

There are three subtypes of Developed habitat within the expanded site boundary: Irrigated Agriculture (subtype DI), Dryland Wheat (subtype DW), and Other (subtype DX).

Category 6 Irrigated Agriculture (DI) habitat consists of agricultural crop or pasture fields that are irrigated for all or a portion of the growing season. These fields are in the lower elevations along drainage bottoms such as Eightmile Canyon, not on higher-elevation sites within the site boundary where turbines will be placed

Category 6 Dryland Wheat (DW) habitat is the largest habitat subtype within the site boundary and is extensive throughout the site boundary. This subtype consists of agricultural fields that are currently in small grain production or fallow. Horned larks and mourning doves are common in winter stubble or when fallow.

Category 6 Other (DX) habitat includes farming/ranching home and shop sites, corrals, structures, feedlots, inactive and active gravel quarries, nonirrigated pastures, gravel and paved roads, rights-of-way, and waste areas associated with ongoing human activities.

Because of the high level of disturbance, no special-status/sensitive species are known or expected to occur with regularity in the Category 6 habitat subtypes. These areas are not considered to have important value to wildlife species and are unlikely to become important or essential wildlife habitat in the foreseeable future.

Approximately 10,651 acres of Category 6 habitat exist within the proposed expanded site boundary.

P.6.8 Habitat Types

Table P-3 summarizes the habitat categories and subtypes within the approved and proposed expanded site boundary.

Table P-3. Habitat Types within Approved and Proposed Expanded Site Boundary

General Land Cover Type and Codes	Specific Habitat Type ("Subtype") and Mapping Codes	Description	Acres within Approved Site Boundary	Acres within Proposed Expanded Site Boundary	Acres within Combined Site Boundary
Developed (D)	Old Field (DB)	Previously cultivated but likely not DC (see below), currently occupied by a variety of common non-native and native vegetation plants (rabbitbrush shrubs/annual grasses and weeds). Native vegetation is minor component. Common species: horned lark, western	7.6	0.0	7.6

Table P-3. Habitat Types within Approved and Proposed Expanded Site Boundary

General Land Cover Type and Codes	Specific Habitat Type ("Subtype") and Mapping Codes	Description	Acres within Approved Site Boundary	Acres within Proposed Expanded Site Boundary	Acres within Combined Site Boundary
		meadowlark foraging, may occasionally include savannah sparrow.			
	Conservation Reserve Program (CRP) or Other Planted Grassland (DC)	Planted grassland on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Residual (not previously plowed) native vegetation patches in a few locations. Old grass stands contain rabbitbrush or other shrubs but are not dominant (see SSB below). May support white-tailed jackrabbits. Common species include western meadowlark and grasshopper sparrow where grassland is mature.	927.3	7.6	934.9
	Irrigated Agriculture (DI)	Agricultural crop or livestock pasture fields that are irrigated for all or a portion of the growing season. The use was determined by presence of farm crop and onsite irrigation implements such as pipes, sprinklers, pumps, and motors.	533.7	508.4	1042.1
	Revegetated or Other Planted Grassland (DR)	Planted grassland on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Residual (not previously plowed) native vegetation patches in a few locations. Old grass stands contain rabbitbrush or other shrubs but are not dominant (see SSB below). May support white-tailed jackrabbits). Common species include western meadowlark and grasshopper sparrow where grassland is mature. This is an Oregon Conservation Strategy Habitat.	110.7	701.0	811.7
	Dryland Wheat or Other Small Grain (DW)	Agricultural fields currently in small grain production or fallow. Common species include horned lark and mourning dove in winter stubble or when fallow.	14435.7	10101.1	24536.8
	Other (DX)	Developed/disturbed areas including farming/ranching home and shop sites, corrals, structures, feedlots, inactive and active gravel quarries, pastures, roads, rights-of-way, and waste areas associated with ongoing human activities. Not considered of significant value to native wildlife species.	246.8	98.2	345.0
Exposed Rock	Escarpment (ESC)	Linear Columbia River Basalt	28.8	0.0	28.8

Table P-3. Habitat Types within Approved and Proposed Expanded Site Boundary

General Land Cover Type and Codes	Specific Habitat Type ("Subtype") and Mapping Codes	Description	Acres within Approved Site Boundary	Acres within Proposed Expanded Site Boundary	Acres within Combined Site Boundary
(ER)		outcroppings approximately 3 to 15 meters (10 to 50 feet) in height, found on steeper slopes that bound canyon edges and shoulders. Plant diversity and cover is very low on escarpments. Provides critical nesting substrate and perching sites for raptors and crevices for bats. Provides shade and thermal cover for deer in summer and serve as good windbreaks. May also provide home sites for wood rats and marmots.			
Grassland (G) Steppe dominated by native and/or non-native grasses (<20% shrub cover)	Exotic Annual Grassland (GA)	Dominated by exotic annual grass and/or weeds. Open, low shrubs present in larger blocks. Some GA sites support long-billed curlew, Washington ground squirrel. Common bird species include horned lark. This is an Oregon Conservation Strategy Habitat.	3320.3	519.2	3839.5
	Native Perennial Grassland (GB)	Dominated by native perennial bunchgrass. Shrubs, if present, are an inconspicuous component. May support Washington ground squirrel, white-tailed jackrabbit, burrowing owl. Important nesting habitat for ground-nesting birds such as grasshopper sparrow, savannah sparrow, and vesper sparrow. Common bird species include western meadowlark and horned lark. This is an Oregon Conservation Strategy habitat.	3375.2	554.2	3929.5
Shrub-steppe (SS) Steppe dominated by shrubs (>20% shrub cover)	Sagebrush Shrub-steppe (SSA)	Big sage sagebrush/bunchgrass-annual grass. Offers high-quality breeding habitat for shrub obligate species including loggerhead shrike. May also support Washington ground squirrel and white-tailed jackrabbit, Common species include western meadowlark and mourning dove. Sage sparrow, Brewer's sparrow and lark sparrow are present in larger blocks. This is an Oregon Conservation Strategy habitat.	2766.2	734.5	3500.7
	Rabbitbrush-Snakeweed Shrub-steppe (SSB)	Rabbitbrush-snakeweed-buckwheat/bunchgrass-annual grass. Most of these areas are formerly SSA (sagebrush-rabbitbrush-snakeweed/ bunchgrass - annual grass) attempting to recover from recent fire or are older DC/CRP and have significant	7710.2	114.7	7824.9

Table P-3. Habitat Types within Approved and Proposed Expanded Site Boundary

General Land Cover Type and Codes	Specific Habitat Type ("Subtype") and Mapping Codes	Description	Acres within Approved Site Boundary	Acres within Proposed Expanded Site Boundary	Acres within Combined Site Boundary
		shrub component. Many sites contain mature big sagebrush cover in patches approx. 2 acres and less in area. Can support long-billed curlew, white-tailed jackrabbit, and Washington ground squirrel. Common species include horned lark and western meadowlark. Lark sparrow occasionally found nesting.			
Woodland (W) With >10% tree cover	Juniper Woodland (WJ)	Open canopy woodland consisting of western juniper trees in more concentrated distribution (vs. scattered individual trees in other habitat types). Often with significant big sage and grass understory component. Potential habitat for nesting ferruginous hawk and Swainson's hawk, foraging and nesting loggerhead shrike, foraging and breeding short-horned and sagebrush lizards. Migrating and wintering habitat for American robins, Townsend's solitaire, waxwings, and mountain bluebirds. Mourning dove nesting habitat. Recent wildfires have killed some juniper trees in the Eightmile Canyon area.	252.1	0.0	252.1
	Riparian Woodland (WR)	Riparian woodland is limited to one narrow intermittent linear stream course in Eightmile Canyon. Willow is the dominant deciduous tree of the overstory. Provides important roosting habitat for bats; important thermal cover for mule deer; important nesting and migration habitat for passerines.	2.5	0.0	2.5
Total			**33,717**	**13,339**	**47,056**

Percent Agricultural and CRP: 27,325 acres, 58.1%

Percent Grassland: 7,769 acres, 16.5%

Note: Habitat acreage within the approved site boundary has been updated from the 2010 numbers based on updated habitat classifications and acreage added to the site boundary under subsequent change request processes.

P.7 IDENTIFICATION OF SENSITIVE SPECIES AND SITE-SPECIFIC OREGON DEPARTMENT OF FISH AND WILDLIFE ISSUES

OAR 345-021-0010(1)(p)(D) *Based on consultation with the Oregon Department of Fish and Wildlife 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.*

Based on an extensive literature review, a list of state and federal nonlisted sensitive species that might be present at the Facility was prepared, as shown in Table P-2 in Section P.6. Information about the desktop and field study methods is provided in Section P.5.2. Consultation with ODFW included 2017 review and approval of field study protocols for WGS and raptor surveys.

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

The results of the field investigations are provided in the following sections.

P.7.1 Plants

The ORBIC database had four records of nonlisted, special-status plants within 5 miles of the Facility site boundary: gray cryptantha, Columbia bladderpod, Watson's desert-parsley, and woven spore lichen (see Attachments P-4a [confidential and not for public distribution] and P-4b). Columbia bladderpod was identified in the vicinity, but outside the expanded Facility site boundary, during surveys for LJIIB (NWC, 2010a; see Attachment P-6 [confidential and not for public distribution]). In addition, two rare plant species identified by the natural heritage program, stalked-pod milk-vetch and Columbia milk-vetch, were identified within the expanded Facility site boundary during surveys for LJIIB (NWC, 2010a). Note that as described in Exhibit C, portions of the approved and proposed expanded Montague site boundary overlap with land included within the LJIIB site boundary. In 2017, field surveys were conducted throughout the approved and proposed expanded site boundaries in areas where Facility components are planned for construction (see Attachment P-7). No nonlisted, special-status plants were identified during these surveys.

P.7.2 Wildlife

P.7.2.1 Birds

Avian Use Study

ODFW and USFWS recommend avian use studies to characterize the communities of resident and migratory birds that may use a project site. The *Oregon Columbia Plateau Ecoregion Wind Energy Siting and Permitting Guidelines* (ODFW, 2008) recommends at least one full year of avian use surveys at a project site. For Phase 2, Montague referenced past avian use studies completed for Baseline, LJII, and the approved Montague site boundary as these studies cover the Phase 2 construction footprint, meet ODFW guidelines, and habitat conditions have not changed since these studies were last completed.

The overall objective of the studies was to collect baseline information on spatial and temporal use of the Facility by birds. Results from avian use surveys at adjacent and nearby sites were compared to results of the Facility avian use surveys. The greatest emphasis was placed on the seven study plots within the portion of the LJII site boundary for LJIIB because several of the LJIIB study plots intersect with the site boundary (Figure P-4) and results for the LJIIB avian use survey are assumed to be representative of the Facility owing to the proximity and similar habitats of the two areas.

During 2008 to 2010, NWC completed a full year of avian use surveys at eleven plots within and adjacent to the approved site boundary (as shown on Figure P-4; see also Attachments P-6 and P-9 [P-6 and P-9 are confidential and not for public distribution]). Concurrent with the survey

effort, avian use surveys were conducted by NWC at 18 plots for Baseline (NWC, 2011; Figure -4). In all, 935 20-minute avian use surveys were conducted during the period November 2009 to October 2010 in four seasons. A large portion of the area surveyed for Baseline has become part of the proposed expanded Montague site boundary.

The assessment of avian impacts included comparisons with other wind facility sites where wildlife data were collected between 2004 and 2009 (LJI, LJII, and Pebble Springs wind facilities), as well as assessment of avian fatality monitoring data collected from several operational wind facilities in the immediate area and in the ecoregion (see Attachments P-6 and P-9 [P-6 and P-9 are confidential and not for public distribution]). Table 1 in Attachment P-11 lists the species observed during a full year of avian baseline surveys conducted in three studies. Study details not provided in the table are in Attachment P-9.

No federally or state-listed or candidate species were observed during the avian use surveys conducted from 2008–2010. Table 2 in Attachment P-11 summarizes nonlisted, special-status species observed during the 2008-2010 avian use studies, including those observed in transit between survey plots. Focused raptor nest surveys were conducted separately from the avian point count surveys and are discussed further in the Raptor Nest Surveys discussion below.

Overall Use

Fifty avian species totaling 8,455 individuals in 3,339 flocks were observed during the four-season surveys of five plots (2008-2009 study at Montague), six plots (2009-2010 study at Montague), and 18 plots (2009-2010 study at Baseline). Overall mean use (number of birds per 20-minute survey) by season at the 2008–2009 plots ranged from 5.769 in winter season to 7.844 in fall season. Overall use was similar for fall, spring at 7.309, and summer season at 7.000 (Table 3 in Attachment P-11). During the 2009-2010 surveys at Montague, overall mean used ranged from 2.917 in spring to 12.727 in fall; the higher numbers being due primarily to an increase in passerines (Table 4 in Attachment P-11). At Baseline, average mean use ranged from 3.279 in spring to 9.523 in winter, again due primarily to an increase of passerines, specifically horned larks (Table 5 in Attachment P-11).

Passerines. Passerine use, including both songbirds and corvids, dominated during all seasons at the study survey plots; passerine varied significantly among seasons during the 2009-2010 surveys at Montague and Baseline, but not during the 2008-2009 surveys. During the 2008-2009 surveys, the lowest mean use was in winter (5.654 birds/20-min survey) and the highest mean use in fall (7.689 birds/20-min survey). In all seasons during the 2008-2009 surveys, horned lark had the highest use (3.128 to 3.467 birds/20-min survey) of all passerines that were identifiable to species, with similar use in each of the four seasons. In addition, European starling, an introduced species not protected by the MBTA, was abundant during all seasons.

Passerine use was significantly higher (12.432 birds/20-min survey) at the six fall season 2009 plots than at the same plots during the remainder of the 2009-2010 Montague study (2.431 to 3.614 birds/20-min survey) due to large flocks of unidentified passerines, with horned lark representing the highest mean use of all passerines that were identifiable to species.[5]

[5] "Unidentified passerine" is a group of unidentified birds and probably does not represent any one species.

During the 2009-2010 Baseline study, significantly higher mean use by passerines was recorded during winter 2009 (9,058 birds/20-min survey) compared to the other three seasons, where mean use ranged from 2.888 to 3.596 birds/20-min survey).

Shorebirds. During the 2008-2009 study, shorebird use, which was represented only by long-billed curlew, was the second highest group of birds observed during spring and summer seasons during the seasons (Table 3 in Attachment P-11). No shorebirds were observed during fall and winter seasons 2008–2009.

Similarly, no shorebirds were observed during fall or winter of the 2009-2010 Montague study; however, low use by long-billed curlew was recorded during spring and summer.

During the 2009-2010 Baseline study, two shorebirds, long-billed curlew and killdeer were observed. No curlews were recorded during winter and no killdeer were observed during fall.

Wading Birds. One wading bird species, great blue heron, was observed during fall 2009 of the 2009-2010 Montague study (Table 3 in Attachment P-11). Mean use for great blue heron was only 0.023 birds/20-min survey.

Game Birds. During the 2008-2009 Montague study, a single game bird species, California quail, was documented and only during fall season (Table 1 in Attachment P-11). During the 2009-2010 Montague study, ring-necked pheasant was the only game bird detected; pheasant were detected in small numbers during both spring and summer. At Baseline, both chukar and ring-necked pheasant were observed; both were observed in low numbers from winter through summer seasons (Table 5 in Attachment P-11).

All other avian groups. The remaining groups showed relatively low use overall (Tables 3, 4, and 5 in Attachment P-11). Waterfowl (i.e., Canada goose) were detected only in winter season during the 2008-2009 Montague study and the 2009-2010 Baseline study. Doves (i.e., mourning dove) were detected only during summer season during the 2008-2009 Montague study, were observed winter through summer during the 2009-2010 Montague study, and during all seasons during the 2009-2010 Baseline study.

Spatial Use

During the 2009 – 2010 Montague study, overall avian mean use was lowest at plot AA and highest at plot GG (Table 7 in Attachment P-11). Plot AA sits in the south-central portion of the Facility in a valley amidst shrub-steppe and grasslands while Plot GG is located in the far southeast corner of the Facility along a road amidst dry wheat agriculture.

During the 2009 – 2010 Baseline study, overall mean use was highest at plots F, B, P, and H (shrub-steppe and grassland habitat); plots F and B were located in the Phase 2 area. Overall mean use was lowest at plots C, I, E, and N (similar habitat except for plot E which sits amidst rolling wheat farms; plots C, I, and E were all located in the Phase 2 area (Table 8 in Attachment P-11).

During the 2008–2009 study, overall avian mean use ranged from lowest at plot J in winter season to highest at plot C in fall season; the high was attributable primarily to large numbers of horned larks (Table 6 in Attachment P-11). Plot C is located in the far western portion of the Facility amidst grasslands while Plot J is in the far eastern portion of the Facility by a canyon amidst shrub-steppe and grassland habitat. Neither plot C nor plot J were located in the Phase 2 area. No single plot showed consistently higher use than others in all seasons, although plots B

and C (NWC, 2009) both had relatively high use in several seasons. Plot B, along with Plot C occurs in the far western portion of the approved site boundary. Survey plots B and C are close to Rock Creek with its associated bluffs and variable terrain which can be sought after by birds as sources of uplift.

Passerines. At the 2009-2010 Montague plots, higher use of 2009 study plot GG was attributable primarily to higher passerine use (Table 7 in Attachment P-11; Attachment P-6 [confidential and not for public distribution]), particularly by unidentified passerines and European starlings. Plot GG was located in the southeast corner of the Facility, along Baseline Road, surrounded on both sides by wheat fields.

At the 2009-2010 Baseline study plots, passerine use was highest at plots B, H, and P, which are scattered throughout the Facility (northwest, northeast, and southeast, respectively); only plot B is located in the Phase 2 area (Table 8 in Attachment P-11).

During the 2008-2009 study, no plot had consistently higher use by passerines (songbirds or corvids) in all seasons (Table 6 in Attachment P-11). At 2008-2009 study plot J, in the northeast portion of the Facility, overall songbird abundance was lowest during spring season and highest in fall season (NWC, 2009).

All other avian groups. Waterfowl were detected only at 2008-2009 study plot B (NWC, 2009) and at 2009-2010 Baseline study plots A, B, D, E, and K (all of these plots located in the Phase 2 area) (Table 8 in Attachment P-11).

Shorebirds were detected at all 2008-2009 Montague study plots, with the highest use at plots B, C, and J (Table 6 in Attachment P-11) and only at 2009-2010 Montague study plots AA and BB (Table 7 in Attachment P-11). Shorebirds were recorded at 11 of the 2009-2010 Baseline study plots (Table 8 in Attachment P-11).

Game birds were detected only at 2008-2009 Montague study plot A, only at 2009-2010 Montague study plot EE (Tables 6 and 7 in Attachment P-11). Gamebirds were observed at nine of the 2009-2010 Baseline study plots.

Doves were detected only at 2008-2009 Montague study plot C and 2009-2010 Montague study plots EE, GG, and HH. Doves were recorded at nine of the 2009-2010 Baseline study plots (Table 8 in Attachment P-11).

Goatsuckers (i.e., common nighthawk) were recorded at three of the 2009-2010 Baseline study plots (J, K, and R) (Table 7 in Attachment P-11). This avian group was not recorded in any of the 2008-2009 or 2009-2010 Montague study plots.

P.7.2.2 Raptors

Raptor Nest Surveys

Raptor nest surveys were conducted in spring 2017 (Attachments P-10a and P-10b). A total of 20 raptor nests were detected within a 2-mile buffer from the proposed Montague Phase 2 turbines. These nests included 7 categorized as in-use (i.e., active), 9 categorized as inactive, 3 categorized as alternate (eagle-specific term), and 1 categorized as unknown nest status. The in-use nests were used by ferruginous hawks, prairie falcons, red-tailed hawks, Swainson's hawks, and great horned owls. There were no in-use eagle nests within the survey area.

Many of the raptor nests located during the ground-based nest survey were not identified during the aerial nest survey due to the difficulty in detecting raptor nests within coniferous trees (specifically, *Juniperus* spp.) from the air. A small portion of the survey area was not visible to surveyors during the ground-based nest surveys, but were covered during the aerial nest survey. Most of the known raptor nest locations from the 2010 survey effort were not detected during either round of the survey and are most likely no longer present.

As stated above, there appears to be one golden eagle territory within the survey area. The three alternate nests are located approximately 2 miles to the southeast of Phase 2 and varied in condition ranging from excellent to poor. No sign of use during the current breeding season was evident, nor were any golden eagles observed in the area.

Montague searched for burrowing owl nests during Washington ground squirrel surveys in spring 2017 but none were found (see Attachment P-2b [confidential and not for public distribution]). Surveyors revisited one area, Shutler Flat, where burrowing owl had previously been identified (Attachment P-9 [Attachment P-9 is confidential and not for public distribution]). This location was no longer active during 2017 surveys.

Avian Use Surveys

Avian use surveys conducted in 2008-2010 included documentation of raptor use. Raptor use was higher in summer season than in any other season during the 2008-2009 Montague avian use study (Table 3 in Attachment P-11). Raptors overall had the second highest frequency of occurrence as a group in summer but were seen with less frequency in spring, fall, and winter seasons. The Swainson's hawk was the most abundant species of raptor during the 2008-2009 Montague study, followed by northern harrier and red-tailed hawk, ferruginous hawk, American kestrel, and prairie falcon. Swainson's hawk and northern harrier also represented the highest use in spring season (Table 3 in Attachment P-11). Other raptors observed in 2008–2009 included rough-legged hawk and turkey vulture. Two additional species observed in transit to 2008–2009 avian use surveys were golden eagle and great-horned owl (Table 3 in Attachment P-11). All 2008–2009 study plots had some raptor use in at least two seasons surveyed (Table 6 in Attachment P-11). Overall raptor use was relatively low at each plot.

During the 2009-2010 Montague surveys, mean use by all raptors was highest in winter and lowest in spring (Table 4 in Attachment P-11). Red-tailed hawk was the most abundant species, followed by rough-legged hawk, northern harrier, Swainson's hawk, and American kestrel (Table 4 in Attachment P-11). During the 2009-2010 Montague study, golden eagle was observed twice in fall at Plot BB (near the northeastern edge of the site boundary) as well as five times incidentally during spring special-status wildlife surveys in the northern and central portions of the site boundary (NWC, 2010b; Attachment P-9 [Attachment P-9 is confidential and not for public distribution]). Raptor use was highest at plots BB, FF, and GG (northeast, central, and southeast portions of the Facility, respectively) and lowest at plots EE and HH (west central and east central portions of the Facility, respectively) (Table 7 in Attachment P-11).

During the 2009-2010 Baseline surveys, a single golden eagle was detected during spring at Plot J (northeastern edge of site boundary) (Attachment P-7). Raptor use was highest at plots F, G, J, and H (plots F and G were located in the Phase 2 area) and lowest at plots M, A, and P (plot A is located in the Phase 2 area) (Table 8 in Attachment P-11).

P.7.2.3 Bats

Acoustic monitoring detected 103 low-frequency passes and 356 high-frequency passes for a total of 459 bat passes recorded during the inventory period (NWC, 2011). The most commonly identified species were canyon bat (formerly western pipistrelle), western small-footed myotis, hoary bat, and silver-haired bat. Additional species detected in low numbers were little brown bat, California myotis, Yuma myotis, pallid bat, and big brown bat (NWC, 2011).

Of identified calls, canyon bat was most frequently recorded at location C1, where this species comprised the majority of high-frequency passes during August (NWC, 2011). This location was in close proximity to Rock Creek and rock cliff faces suitable for roosting and hunting by this species. Hoary bat and silver-haired bat were also more frequently identified at location C1 than other locations, and these species had low detection rates at location A1, south of the Facility (NWC, 2011). All October records of hoary bat were recorded at location A2 (also south of the Facility), which represented the only location with both a tree and standing water nearby (NWC, 2011). Western small-footed myotis was the most commonly identified species at location B1 (in the northwest portion of the Facility), which accounted for 86 percent of this species' passes (NWC, 2011).

The timing of passes corresponded with the timing of bat fatalities at existing wind farms in the Columbia Plateau Ecoregion (NWC, 2011). There were five passes in July, 176 in August, 238 in September, and 40 in October (mostly during the first week; NWC, 2011). Canyon bat numbers peaked in August in contrast to other species detected at Baseline in sufficient numbers to determine timing (NWC, 2011). Western small-footed myotis, hoary bat, and silver-haired bat numbers peaked in September, which relates to the timing of fatalities found and identified in other nearby Columbia Plateau Ecoregion projects (NWC, 2011).

P.7.2.4 Big Game

Mule deer winter range is mapped within portions of the proposed expanded site boundary (ODFW, 2013). Mule deer and evidence of mule deer have been observed broadly throughout the site boundary by biologists during 2017 habitat mapping, rare plant, and WGS surveys. Higher concentrations of mule deer were not observed in areas where ODFW-mapped mule winter range overlaps the site boundary. Montague used field data, aerial photography, topographic maps, and ODFW-mapped mule deer range maps to determine Category 2 habitat and the mule deer winter range boundary. Mule deer winter range is within the "breaks" of Rock Creek and does not encompass any of the uplands above the breaks of the canyon. Habitat categories depicted on Figures P-7 through P-9 show Category 2 habitat within the breaks of Rock Creek to demonstrate that no portion of the Facility occurs within the breaks of Rock Creek, and, accordingly, that the Facility will not impact ODFW mule deer winter range.

P.7.2.5 Amphibians and Reptiles

Records of two special status reptiles (Northern sagebrush lizard, Western pond turtle) and two special status amphibians (Western toad, Larch mountain salamander) were identified within 5 miles of the site boundary. No state sensitive amphibians or reptiles or suitable habitat were identified within the site boundary, with the exception of sagebrush lizard. No sagebrush lizard are documented within the site boundary, but potentially suitable habitat exists for sagebrush lizard within the site boundary.

P.8 DESCRIPTION OF SIGNIFICANT POTENTIAL DISTURBANCES

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.*

Response: Construction of Phase 2 will result in temporary and permanent disturbances to wildlife.

P.8.1 Potential Habitat Impacts

P.8.1.1 Overview

As described in the Final Order on the Application,[6] potential impacts on wildlife habitat from construction of the Facility include temporary and permanent habitat loss, and alteration and disturbance during construction and operation. Because Montague seeks layout and configuration flexibility (i.e., Design Scenarios A, B, and C), as well as micrositing flexibility for the Facility as described in Exhibit C, temporary and permanent habitat impacts were calculated based on the maximum wind turbine (81 2.5-MW turbines) Design Scenario A Facility layout and the solar layout of Design Scenario C, both of which have larger footprints than Design Scenario B (48 4.2-MW wind turbines).

P.8.1.2 Detailed Impact Description

Temporary and permanent impacts by habitat type and category for Phase 1, as previously approved, are provided in Tables P-4 and P-5, respectively. Impacts for each of the three proposed designs for Phase 2 are provided in Tables 9, 10, and 11 in Attachment P-11. As calculated in Exhibit C, at each tower, a circular area will be permanently affected by the tower itself and the surrounding graveled area, ranging up to approximately 1,809 square feet at each tower location. During construction, a larger area will be used to lay down the rotors and maneuver the cranes during turbine assembly. To calculate the temporary footprint for the area of disturbance around each tower for staging turbine blades, a circular impact area with a 225-foot radius was used, for a total area of approximately 158,338 square feet per turbine. A 12-foot temporary access path along the transmission and overhead collector line route was included in the temporary footprint. Staging areas will be used to stage construction and store supplies and equipment. Additional temporary impacts include construction-related impacts associated with the underground collection systems (24 feet in width along the underground collection line route), as described in detail in Exhibit C. These areas will be temporarily disturbed during construction and will be restored to preconstruction condition after the construction-related activities are complete.

Table 9 in Attachment P-11 summarizes the permanent and temporary impacts to wildlife habitat based on the Phase 2 Design Scenario A maximum wind layout (Figure P-8). Table 10 in Attachment P-11 summarizes the permanent and temporary impacts to wildlife habitat based on the Phase 2 Design Scenario B minimum wind layout.

Design Scenario C impacts are based on a 1,189-acre solar layout, plus related or supporting facilities as described in RFA 4. For the Design Scenario C impacts, only one temporary staging area is included. Although the assumptions used for Design Scenario C and shown in Table 11 in

[6] EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility.* pp. 98-99. September 10.

Attachment P-11 include construction of a solar array occupying 1,189 acres, the final design location of the solar array could shift within the solar micrositing area and result in less impacts.

Table 11 in Attachment P-11 summarizes the temporary and permanent impacts to wildlife habitat based on the Design Scenario C solar layout, as shown on Figure P-9.

The Facility as approved included estimated impacts up to approximately 1,937 acres, including 220 acres of permanent impacts and 1,717 acres of temporary impact.[7] Most of the impacts for the Facility as approved (92 percent) are to Category 6 habitat.

For Phase 2, Design Scenario C has the greatest total acreage of impacts because construction of the solar array occupies more land than wind turbines. For the purpose of this analysis, the solar area occupies 1,189 acres but Montague may choose to construct a smaller solar area anywhere within the solar micrositing area. Although the size of the solar array may change, Montague will limit the solar array impacts to Category 6 habitat. As presented here, approximately 99 percent of the total impact from Design Scenario C is to Category 6 habitat. Although the total acreage of impacts from Design Scenario A is less, a higher percentage of the impacts affects higher-quality habitat; 94 percent of total impacts from Design Scenario A are to Category 6 habitat. Therefore, Design Scenario A is carried forward in this evaluation.

P.8.1.3 Summary of Total Temporary and Permanent Habitat Impacts

Tables P-4 and P-5 show the total combined temporary and permanent impacts, respectively, from Phase 1 and Phase 2 compared to the original estimated impacts from the Facility. As a result of adding new lands to the site boundary, the combined impacts of Phase 1 and Phase 2 to Categories 2, 3, and 4 habitat types are significantly less than previously approved for the Facility, as shown in Table P-4. Temporary impacts to Category 2 habitat were reduced by 87 percent, Category 3 habitat impacts were reduced by 96 percent and Category 4 habitat impacts were reduced by 77 percent. Instead, Montague has relocated facilities onto Category 6 habitat in the expanded site boundary. As such, the impacts on Category 6 habitat will increase by 37 percent. Overall, the total temporary impacts across all habitat categories see a net decrease, from 1,777 acres to 1,157 acres.

Permanent impacts from the modified Facility are similarly reduced across higher-quality habitats, as shown in Table P-5. Permanent impacts to Category 2 habitat are reduced from 50.74 acres to 5.86 acres, and impacts to Categories 3 and 4 are similarly reduced. Permanent impacts to Category 6 are increased somewhat, from 107.34 acres for the approved Facility to 132.45 acres for the Facility as modified by RFA 4. Total permanent impacts across all categories also see a net decrease under Design Scenario A, from a total of 255 acres for the approved Facility to a total of 146.48 acres for the proposed modified Facility.

Table P-4. Total Temporary Habitat Impacts – Facility as Modified Compared to Approved Facility

Habitat Category and Subtype	Design Scenario A	Phase 1	Total Phase 1 and Phase 2 (Modified Facility)	Total (Approved Facility)
Habitat Category 2				

[7] EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility.* pp. 98-99. September 10.

Table P-4. Total Temporary Habitat Impacts – Facility as Modified Compared to Approved Facility

Habitat Category and Subtype	Design Scenario A	Phase 1	Total Phase 1 and Phase 2 (Modified Facility)	Total (Approved Facility)
ESC – Exposed Rock on Slopes – Escarpment	0	0	0	0.34
DR - Revegetated or Other Planted Grassland	11.03	0	11.03	
GA - Exotic Annual Grassland	10.22	1.11	11.33	81.26
GB - Native Perennial Grassland	0	0.88	0.88	21.66
SSA - Basin Big Sagebrush Shrub-steppe	0.20	1.43	1.63	96.30
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0	12.39	12.39	77.60
Woodland – Juniper	0	0	0	16.33
Habitat Category 2 Total	**21.45**	**15.80**	**37.25**	**293.49**
Habitat Category 3				
DC - Developed-CRP or Other Planted Grassland	0.14	1.44	1.58	91.88
DR - Developed-Revegetated or Other Planted Grassland	7.82	1.02	8.84	
GA – Exotic Annual Grassland	0	0	0	132.82
GB - Native Perennial Grassland	0.01	13.94	13.95	91.10
SSA - Basin Big Sagebrush Shrub-steppe	0.09	0.53	0.62	3.32
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0	2.71	2.71	321.49
WJ – Woodland Juniper	0	0	0	0.30
Habitat Category 3 Total	**8.06**	**19.64**	**27.70**	**640.91**
Habitat Category 4				
DR - Developed-Revegetated or Other Planted Grassland	0	1.75	1.75	0
GA - Exotic Annual Grassland	0.76	4.24	5.00	36.91
GB – Native Perennial Grassland	0	0	0	2.28
SSA – Shrub-steppe – Sagebrush (Big Sage)	0	0	0	0.04
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0	5.23	5.23	12.96
Habitat Category 4 Total	**0.76**	**11.21**	**11.97**	**52.19**
Habitat Category 6				
DW - Developed-Dryland Wheat	460.41	607.90	1068.31	770.27
DI - Developed Irrigated Agriculture	5.98	0	5.98	6.32
DX - Developed-Other	2.58	3.27	5.85	14.61
Habitat Category 6 Total	**468.97**	**610.90**	**1079.87**	**791.20**
Grand Total	**499.24**	**657.55**	**1156.79**	**1,777.79**

Table P-4. Total Temporary Habitat Impacts – Facility as Modified Compared to Approved Facility

Habitat Category and Subtype	Design Scenario A	Phase 1	Total Phase 1 and Phase 2 (Modified Facility)	Total (Approved Facility)

Notes:

Phase 1 impacts were provided to ODOE as part of a preconstruction submittal on August 31, 2017.

Impacts from the approved Facility appear in: EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility.* pp. 96-97. September 10.

Table P-5. Total Permanent Habitat Impacts – Facility as Modified Compared to Approved Facility

Habitat Category and Subtype	Design Scenario A	Phase 1	Total Phase 1 and Phase 2 (Modified Facility)	Total (Approved Facility)
Habitat Category 2				
ESC – Exposed Rock on Slopes – Escarpment	0	0	0	0.09
DR - Revegetated or Other Planted Grassland	1	0	1	0
GA - Exotic Annual Grassland	1.1	0	1.1	13.36
GB - Native Perennial Grassland	0	0.75	0.75	2.25
SSA - Basin Big Sagebrush Shrub-steppe	0	0.13	0.13	20.11
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0	2.88	2.88	14.93
WJ – Woodland Juniper	0	0	0	1.99
Habitat Category 2 Total	**2.1**	**3.76**	**5.86**	**50.74**
Habitat Category 3				
DC - Developed-CRP or Other Planted Grassland	0	0.61	0.61	15.25
DR - Developed-Revegetated or Other Planted Grassland	0.44	0.22	0.66	0
GA – Exotic Annual Grassland	0	0	0	14.75
GB - Native Perennial Grassland	0	2.35	2.35	12.35
SSA - Basin Big Sagebrush Shrub-steppe	0	0.09	0.09	3.65
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0	2.04	2.04	42.12
WJ – Woodland Juniper	0	0	0	0.3
Habitat Category 3 Total	**0.44**	**5.31**	**5.75**	**88.42**
Habitat Category 4				
DR - Developed-Revegetated or Other Planted Grassland	0	2.04	2.04	0
GA - Exotic Annual Grassland	0.09	0	0.09	6.3
GB – Native Perennial Grassland	0	0	0	0.59
SSA – Shrub-steppe – Sagebrush (Big Sage)	0	0	0	0
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0	0.29	0.29	1.64
Habitat Category 4 Total	**0.09**	**2.33**	**2.42**	**8.53**
Habitat Category 6				
DW - Developed-Dryland Wheat	64.28	67.16	131.44	94.2
DI - Developed Irrigated Agriculture	0.85	0	0.85	2.77
DX - Developed-Other	0.13	0.03	0.16	10.37
Habitat Category 6 Total	**65.26**	**67.19**	**132.45**	**107.34**

Table P-5. Total Permanent Habitat Impacts – Facility as Modified Compared to Approved Facility

Habitat Category and Subtype	Design Scenario A	Phase 1	Total Phase 1 and Phase 2 (Modified Facility)	Total (Approved Facility)
Grand Total	**67.89**	**78.59**	**146.48**	**255.03**

Notes:

Phase 1 impacts were provided to ODOE as part of a preconstruction submittal on August 31, 2017.

Impacts from the approved Facility appear in: EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility.* pp. 96-97. September 10.

Note: Because some Facility impact areas overlap or are shown on existing county and noncounty roads, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as represented in Exhibit C. The total areas in Exhibit C are not exact estimates of the Facility's total impact to land and habitat, as they do not account for overlapping impact areas and include existing road areas. Consequently, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables using geographic information systems (GIS), overlapping impact areas were not double-counted and existing county and noncounty road areas were removed. As a result, the tables in Exhibit P provide a more accurate total calculation of impacts to habitat.

P.8.2 Potential Wildlife Impacts

P.8.2.1 Birds/Raptors

Resident and migratory birds may be impacted from construction, operation, and retirement of Phase 2. Council previously analyzed potential impacts on birds in the context of fatality monitoring data in the region. The study on which that analysis was based was in draft form at the time of the analysis and has subsequently been finalized (WEST, 2011). The updated report identified fatalities representing 98 bird species, and identifies a higher total cumulative bird mortality across all wind facilities in the region of 15,276 birds annually. As previously identified by Council, these impacts are spread across numerous species and bird groups, as well as across seasons, and the overall impact to any given species or population is substantially less. The most commonly affected bird is the horned lark, whose breeding population in the region is estimated at 2.2 million. An estimated annual average of 4,703 cumulative horned lark fatalities is projected from operation of 6,700 MW of wind energy projects in the region (WEST, 2011).

Although the specific numbers for horned lark and other species were updated in the final report, the general findings hold true and the report finds that cumulative impacts of wind energy facilities on identified species groups would not be significant.

This will remain true for the Facility as modified by RFA 4 because the bird species are the same as previously described but fewer turbines will be constructed and in lower-quality habitat. Therefore, impacts from the wind turbines proposed under Phase 2 will be similar to or less than the impacts previously analyzed by Council. As such, the sections immediately below focus on Design Scenario C and specifically the potential for impacts to birds from the solar array.

Construction and Retirement

Impacts from the construction and retirement of the Facility under Design Scenario A are anticipated to be slightly lower than those previously approved by the Council, given that less ground disturbance will occur than previously approved. By comparison, construction and retirement of Design Scenario C could include impacts to more contiguous land, required for installation of a solar array, than proposed in Design Scenario A or in the originally approved Facility. However, since the habitat loss will be primarily Category 6 developed habitat, no significant modification in impacts to birds is expected and the proposed Facility modifications do not affect the Council's prior findings.

Potential mortality from construction equipment is expected to be low. Equipment used in wind and solar facility construction (for example, cranes) generally move at slow rates or are stationary for long periods. The risk of direct mortality from construction to avian species is most likely limited to potential destruction of a nest for ground- and shrub-nesting species. Construction trucks traveling the site could collide with small birds using roads and road shoulders.

Disturbance-type impacts can be expected if construction activity occurs near an active nest or a primary foraging area. Birds displaced from these areas might move to areas with less disturbance, depending on availability of an unoccupied territory, the stage of pair bonding or nesting, or other factors. However, breeding effort and fledging success could be affected, and foraging opportunities might be altered during the construction period.

Construction may also disturb nesting raptors. There are currently 20 documented active raptor nests within 2-miles of the turbines within the Phase 2 area: Swainson's hawk, red-tailed hawk, ferruginous hawk, prairie falcon, and great-horned owl. The red-tailed hawk and the great-horned owl are not special-status species. There were no in-use eagle nests within the survey area.

Site Certificate Condition 96 requires Montague to avoid construction activity during sensitive periods within 1,300 feet of potentially active nests sites of Swainson's hawk, ferruginous hawk, and burrowing owl. No active raptor nests were detected within a 1,300-foot buffer of Phase 2 infrastructure.

Operation

Birds are known to occasionally collide with turbines. Birds flying near the Phase 2 Facility would be exposed to the risk of collisions depending on flight altitudes, flight patterns, weather, and turbine operation.

The estimate of operational impacts to birds from wind facilities is based on the site-specific measures of bird use, bird behavior, nesting, habitat, and topography, in combination with existing information on these same metrics in other locations, in addition to direct measures of impact (for example, mortality and displacement). The proposed Facility is located in the Columbia Plateau Ecoregion, a region where many wind facilities have been developed and studied. Baseline monitoring studies have been conducted at most of these wind facility locations, providing an existing comprehensive data source for predicting impacts to wildlife species (WEST, 2011). In general, population-level effects to individual species from wind facilities have never been observed. In addition, Phase 2 turbines have been sited to avoid bird concentration areas (e.g., cliffs, valleys, large waterbodies) to minimize collisions.

Turbines with longer blades and taller hub heights than previous models may pose increased collision risk to birds. However, relationships between longer turbine blades, taller hub heights, and collision risk to birds have not been consistently demonstrated. Turbines with longer blades have a corresponding larger rotor-swept area, and the requested change to lengthen the maximum blade tip height from 492 feet to 579 feet (150 meters to 182 meters) will increase the overall swept area, or collision risk area, by about 32 percent per turbine. Similarly, the requested change for a taller maximum blade tip height may cause the rotor-swept area to overlap with flight heights of migrating birds that were previously above shorter turbine models, leading to increased collision risk. Barclay et al. (2007) compared avian fatality data at wind farms using a range of turbine nameplate capacities from 0.04 to 1.8 MW, tower heights ranging from 79 to 308 feet (24 to 94 meters), and rotor diameters ranging from 49 to 263 feet (15 to 80 meters). Barclay et al. (2007) concluded that avian fatality rates were not affected by variation

in any of these turbine dimensions, stating "it might be expected that as rotor-swept area increased, more animals would be killed per turbine, but our analyses indicate that this is not the case." This study did not consider the new generation turbines that are much larger; but their conclusion is relevant to the Facility as it suggests that avian impacts predicted in the original assessment may not differ substantially with increased rotor-swept area. More recent meta-analyses have produced contrasting results, with a review by Loss et al. (2013) revealing increased avian mortalities with hub height, whereas Erickson et al. (2014) found no linear correlation between hub height and estimated avian fatality rates. Therefore, there remains uncertainty as to whether or not the proposed turbine model changes may result in increased avian collision risk. To help address this uncertainty, Montague will complete post-construction fatality monitoring, in coordination with ODFW, using search plots scaled to the turbine size, and will implement additional mitigation if fatality rates exceed the thresholds of concern for a species group, as outlined in the original analysis (see Attachment E, Wildlife Monitoring and Mitigation Plan, of the Final Order on Amendment #3).[8]

Avian activity within the previously approved site and the expanded site boundary are similar in the metrics mentioned above and as discussed in Section P.7.2.1. The Council previously approved the Facility with up to 269 1.5-MW turbines, whereas this amendment reduces the total number of turbines that could be constructed to 162 turbines. The increase in the overall swept area associated with the larger turbines, along with the reduction in total number of turbines for the modified Facility, is likely to result in similar or potentially lower collision rates for birds. Turbine F1 has been sited approximately 0.125 mile (660 feet) from the nearest breaks at Rock Creek canyon and turbines J16 and J17 have been sited approximately 0.5 mile (2,640 feet) from the nearest breaks at Rock Creek canyon. Montague has sited these turbines to reduce potential raptor mortality associated with raptors using updrafts in the area. The proposed solar array under Design Scenario C will significantly reduce collision rates for at-risk species. Thus, the proposed modifications do not affect the Council's original approval.

A 2016 article (Walston et al., 2016) summarizing existing literature on avian impacts at solar energy facilities suggests that some guilds (groups) of birds (i.e., waterbirds) may perceive PV solar facilities as waterbodies, ultimately leading to reported collisions and deaths (i.e., the hypothetical "lake effect"). To date, this hypothesis has not been tested, and anecdotal reports of waterbirds attempting to land on solar arrays have been largely confined to facilities located in the desert southwest and mortalities at solar PV facilities have included both landbird and waterbird species (Kagan et al., 2014). These results were further supported in an analysis by Western EcoSystems Technology (WEST; 2017) of publicly available fatality monitoring studies from utility-scale PV solar facilities with data collected under standardized monitoring protocols for at least 1 year at California Valley Solar Ranch (H. T. Harvey and Associates, 2014), Topaz (Althouse and Meade, 2014), and Desert Sunlight (WEST, 2016). However, even if the lake effect hypothesis is assumed to be true, the solar array is unlikely to cause significant impacts of this type because waterbirds and waterfowl, the avian groups surmised to be most affected, were rarely recorded during surveys conducted within the Facility site boundary. In addition, because the glass in solar modules has an antireflective coating, the amount of light reflected by the panels is less than the amount of light reflected by waterbodies. Results for operational monitoring at other solar projects suggest that the levels of avian mortality at solar facilities of all solar technology types (e.g., concentrated or PV) is much lower than mortality from other

[8] EFSC. 2017b. *Final Order on Request for Contested Case and Amendment #3 of the Site Certificate for the Montague Wind Power Facility.* July 12.

known anthropogenic sources such as fossil fuel plants, communication towers, vehicle collisions, and buildings (Walston et al., 2016).

Displacement Effects

The presence of wind turbines, the solar array, and associated access roads can alter the landscape so as to change wildlife habitat use patterns, thereby displacing wildlife from wind energy facilities. "Displacement" means that birds tend to avoid an area. However, avoidance of an area does not necessarily imply impacts on population parameters; although displacement effects have been documented for some species or groups in the U.S. and Europe, there is little information on whether displacement effects have any real impacts on population size, population trends, and reproduction.

The Council previously approved the Facility with up to 269 turbines. As noted above, the number of turbines will be reduced to (at most) 162, which could significantly reduce avian displacement below the 269 turbines anticipated for the Facility as originally analyzed. Under Design Scenario C, only a solar layout is proposed.

Studies of grassland bird displacement due to PV solar installations are rare; however, a 2014 article by DeVault et al., which compared avian use at PV solar sites and nearby grasslands at an airfield, found higher grassland species density, but lower species diversity at the PV sites. DeVault et al. suggested that one reason for lower densities at the airfield grasslands could be due to higher grass structure, which is maintained to discourage bird use. DeVault et al. (2014) also reported higher preconstruction use by corvids and raptors compared with post construction, similar to post-construction studies conducted for wind facilities (Erickson et al., 2004; WEST and NWC, 2007; Leddy et al., 1999; Osborn et al., 1998; Usgaard et al., 1997). Because Montague plans to install the solar array within the solar micrositing area, which consists of actively farmed land, grassland birds are not expected to be displaced.

In summary, the displacement effects from any of the three design scenarios are not expected to differ significantly from those previously approved by the Council.

P.8.2.2 Bats

This section describes the potential impacts to bats from construction, operation, and retirement of the Facility. Council previously found that the bat species most likely to be affected by wind energy development in the region are silver-haired bats and hoary bats.[9] These two bat species occupy forested habitats during the breeding season, and there is little forested habitat in the region. No forested habitat was identified within the proposed expanded site boundary; however, scattered large junipers within the Facility site boundary can provide shelter for these species and they were detected during the fall 2010 acoustic survey.

Construction and Retirement

Because foraging habitat and water sources are limited within the Facility site boundary, and because construction and retirement activities generally occur during daylight hours when bats are generally absent, the construction and retirement of the Facility is not anticipated to result in the loss or degradation of bat roosting and foraging habitat within the Facility site boundary.

[9] EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility*. pp. 83-84. September 10.

Operation

Because the proposed expanded site boundary is near Rock Creek, where bats are known to roost, there is a potential for a higher degree of impacts to bats than from the approved Facility. The approved Facility included some turbines near Rock Creek but all three design scenarios under review for this assessment include more wind turbines in the vicinity of Rock Creek than previously anticipated. The primary impact to bats during Facility operation will be direct mortality from turbine collision or barotrauma, which is rapid pressure changes that cause severe internal organ damage (Attachment P-8). Forty-six species of bats occur in the U.S., and 11 species comprise all known bat fatalities at U.S. wind projects (NWC, 2011 [Johnson, 2005]). The three most common species of migratory bats in the U.S. (hoary, eastern red, and silver-haired) comprised 77 percent of bat fatalities identified to species at 70 wind projects in North America (Attachment P-8 [Strickland et al., 2011]). Stationary, low-elevation solar panels are not expected to pose a risk to bats. Acoustic bat monitoring data collected near Rock Creek (NWC, 2011; Attachment P-8) confirmed that bats using the site are primarily nonmigratory species. Migratory hoary bats and silver-haired bats typically are the most vulnerable species at operating wind facilities (WEST, 2011), but comprised just 10 percent of the bats documented along Rock Creek.

While Townsend's big-eared bats, a state sensitive-critical species, are expected to occur along Rock Creek drainage (NWC, 2011), none were positively identified during the acoustical monitoring. Of the 630 bat fatalities found and identified at 19 Columbia Plateau Ecoregion wind projects, Townsend's big-eared bat has not been found. There is little suitable roosting habitat within the Facility site boundary or close to anticipated turbine locations.

The same changes to turbines dimensions that may increase collision risk to birds are likely true for bats. The analysis by Barclay et al. (2007) found that bat fatalities increased exponentially with increased tower height. In contrast, a recent meta-analysis by Zimmerling et al. (2016) found no relationship between bat mortality rates and height of wind turbines, with the caveat that there was relatively little variation in the maximum blade tip height of wind turbines within the available data (range of 117 m to 136 m). Flight altitudes of migratory bats are poorly known, especially for the migratory, tree-roosting bats that appear more prone to collisions with wind turbines (Reynolds, 2006). Hoary bats and silver-haired bats, known to occur in the vicinity of the Facility, are both species of long-range migrants that have been found as fatalities at wind power projects during their migratory periods, suggesting that at least some bats migrate below 492 feet (150 meters) above ground level. However, migratory bats have been documented at heights ranging from 151 to 8,032 feet (46 to 2,448 meters) above ground level (Allen, 1939; Altringham, 1996; Peurach, 2003), which is within and above the rotor-swept area originally evaluated as well as the proposed turbine specifications. If bats are present, they may be at increased risk of collision with wind turbines that have larger rotor-swept areas; however, any change to potential impacts is difficult to estimate because so little is known about the flight heights of these species. Plus, it is anticipated there will be fewer turbines to collide with, which may reduce exposure. Given the relatively small changes to the turbine specifications proposed in RFA 4, it is expected that any differences in bat impacts as a result of the proposed turbine model changes may be undetectable.

Throughout the Columbia Plateau Ecoregion, bat fatalities at operating wind projects have been comprised primarily of silver-haired and hoary bats mostly during the fall season. Spring and summer seasons contribute small numbers of fatalities. As with other Columbia Plateau Ecoregion projects, most bat mortality at the Facility will be expected to occur from July through

early fall (NWC, 2011). This time period coincides with the late summer dispersal and fall migration period for hoary and silver-haired bats, with the exception of a few fatalities found during May and June and a small number occurring during the early winter season. Bat species composition of fatalities at the Facility will likely be similar to fatalities found within the Columbia Plateau Ecoregion consisting primarily of silver-haired and hoary bats (both state sensitive-vulnerable). Actual fatality numbers may be higher or lower for each year over the life of the Facility.

Turbines near Rock Creek have been sited at least 656 feet (200 meters) from nearby cliffs to reduce the potential for bat collisions. The closest turbine is Turbine F1 which has been sited approximately 0.125 mile (660 feet) from the nearest breaks at Rock Creek canyon and turbines J16 and J17 have been sited approximately 0.5 mile (2,640 feet) from the nearest breaks at Rock Creek canyon. Montague has sited these turbines to reduce potential bat mortality associated with bats using updrafts in the area.

P.8.2.3 Big Game

The Council previously approved the Facility based in part on potential impacts to big game such as displacement and disruption of movements. Impacts to these activities are expected to be lower than those originally analyzed because significantly less higher-quality habitat will be lost that could support big game and other terrestrial mammals. A portion of the proposed expanded site boundary lies within areas mapped by ODFW as mule deer winter range. A portion of the solar array, along with one turbine and a length of buried collector line, are planned along the edge of the mapped mule deer winter range. The solar array is in Category 6 habitat, adjacent to Oregon Highway 19 and construction of the solar array in this area is not expected to have a significant adverse effect on mule deer.

One turbine and associated collector line are planned within grassland within the mapped mule deer winter range. Construction of these components will result in the loss of marginal foraging opportunities for mule deer, but is not expected to result in any new adverse impacts because little or no sign of mule deer were observed in these areas and because nearby grassland provides ample foraging opportunity. Designated mule deer winter range comprises approximately 50 percent of the land in Gilliam County, and the loss of habitat as a result of Phase 2 will be insignificant. For habitat impacts to designated mule deer winter range that cannot be avoided or minimized, mitigation will be developed as described in Section P.9.

In summary, the proposed modifications do not affect the Council's original approval.

P.8.2.4 Amphibians and Reptiles

As previously noted, the Council approved up to 269 turbines and the associated infrastructure. The analysis conducted for the Facility as approved concluded that no impacts to amphibians were anticipated, and impacts to reptiles are likely to be limited to direct mortality from vehicle collisions. The Council did not describe any impacts to amphibians and reptiles from the approved Facility.[10] The modifications proposed under RFA 4 will introduce no impacts to amphibians and reptiles because no new species have been identified within the analysis area and because construction and operation methods for Phase 2 will be substantially similar to

[10] EFSC. 2010. *Final Order on the Application for Site Certificate for the Montague Wind Power Facility*. September 10.

methods analyzed for the approved Facility. In addition, construction of the Facility as modified under RFA 4 will result in less habitat loss, with impacts primarily in habitats of lower quality, than previously approved by the Council. Operation and maintenance impacts are expected to be similar to those previously approved.

P.9 MEASURES TO AVOID, MINIMIZE, OR MITIGATE DISTURBANCES

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 ODFW mitigation goals described in OAR 635-415-0025 and a discussion of how the proposed measures would achieve those goals.*

Response: Construction and operation of the modifications proposed under RFA 4 will not create any significant new impacts on habitat and sensitive species resources. However, the WMMP, Revegetation Plan, and HMP have been modified to incorporate measures related to the solar array if it is constructed in a future phase, and to address current guidance from ODFW. Attachment P-12 contains the three plans. Additionally, Montague has committed to implementing protective measures for threatened and endangered species during and after construction, as summarized below.

Avoidance measures have been taken as part of the design to set turbine locations back at least 656 feet (200 meters) from cliffs where bats and raptors may roost or nest. By expanding the site boundary, the Phase 2 turbines, solar array, and related or supporting facilities will be shifted out of higher-quality habitat and into Category 6 habitat to reduce the potential for impacts to the higher-quality habitat and species that may use these areas.

P.9.1 Avoidance, Minimization, and Mitigation During Construction

Montague has committed to implementing protective measures during construction, as summarized below.

P.9.1.1 Dust Control

Montague proposes to mitigate impacts from dust deposition through water applications to disturbed ground during construction, by graveling of permanent roadways, by erosion control, by revegetation, and by imposition of construction and operation speed limits of 20 miles per hour. Spraying of water on disturbed ground is an effective dust deterrent, as is reduction of speeds on graveled roads. Water application to disturbed areas and vehicle speed limit impositions are expected to reduce dust during construction to levels without significant impact on vegetation or wildlife species. Upon completion of construction, many of the unimproved roads on the Facility site previously used for access to the area will have been graveled. Existence of these roads should significantly reduce traffic on the many unimproved roads and 4-wheel drive tracks now within the site boundary. It is likely that overall post-construction dust production from vehicular traffic on the site will be reduced from current conditions.

P.9.1.2 Erosion Control

To minimize impacts to the Facility habitat, Montague has prepared an Erosion and Sediment Control plan and obtained an NPDES 1200-C permit (see Exhibit I) and will require the contractor to install erosion and siltation controls near riparian areas and other appropriate locations as designated in this plan. The designated person will monitor the erosion and siltation controls onsite to ensure that they are in working condition.

P.9.1.3 Environmental Training

In compliance with Site Certificate Condition 100, Montague will provide an environmental training course for the construction contractors that will provide information on the sensitive species present onsite, the exclusion flagging/signage, permit requirements, and other environmental issues.

The training will also cover proper protocol for responding to dead or injured wildlife, as is described in the Phase 1 and 2 WMMPs for the Facility. The WMMPs have been developed and will be updated for Phase 2 in consultation with ODFW and ODOE, as required by the Site Certificate. Construction and operations personnel will be required to report any injured or dead wildlife detected while on the site to the biological monitor during construction or appropriate onsite manager during operations. Construction site personnel will be required to attend the environmental training in conjunction with hazard and safety training prior to working onsite. Montague's construction contractor will maintain a list of onsite construction personnel who have received the training.

P.9.1.4 Limited Work Areas

Construction work will be limited to the approved and surveyed areas shown on constraints maps. No working or driving cross-country within the site boundaries as shortcuts or for any other purposes will be permitted without prior approval from appropriate authorities.

P.9.1.5 Speed Limits

Construction personnel will be instructed to observe caution when driving through the Facility area and to maintain reasonable driving speeds of 20 miles per hour (particularly during the period from 1 hour before sunset to 1 hour after sunrise) so as not to harass or accidentally strike wildlife, particularly mule deer. Speed limits will be posted throughout the Facility construction area. This should serve to ameliorate effects to the only nonlisted, special-status reptile with the potential to occur in the Facility area, northern sagebrush lizard.

P.9.1.6 Fire Control

Conditions 60, 61, and 62 address fire-safety planning, training, and prevention measures. The measures are adequate to address the risk of fire at the proposed modified Facility that could impact the natural (wildlife habitat) environment.

P.9.2 Avoidance, Minimization, and Mitigation After Construction

Montague has committed to implementing additional protective measures after construction, and will work to restore the habitat to preconstruction standards, as summarized below.

P.9.2.1 Habitat Restoration

Montague will implement the Revegetation Plan for the Facility, as updated, and as required by Site Certificate Condition 92. In order to reestablish plant communities of most value to wildlife, native species will be used in nonagricultural areas to the maximum extent possible.

P.9.2.2 Habitat Conservation

For habitat impacts that cannot be avoided or minimized, mitigation will be developed by means of reliable methods and in compliance with OAR 345-022-0060, as described in Exhibit P. Montague will implement the HMP for the Facility, as modified for Phase 2, in compliance with Site Certificate Condition 93 (see Attachment P-12). The Plan describes the preservation and enhancement of a conservation area to mitigate for the impacts of the facility on wildlife habitat. The property already is protected under a conservation easement for the life of the Facility. The designated mitigation area for the Facility is located within the same 440-acre parcel identified for mitigation of habitat impacts from the LJII Facility. The parcel is located in a relatively remote setting where habitat protection and enhancement are feasible and sufficient land area is available to accommodate the size of the mitigation area, based on a worst-case estimate. The mitigation measures will likely result in conservation of suitable habitat for listed species such as the WGS, ensuring availability of undisturbed native habitat for the life of the Facility.

P.9.2.3 Fire Control

Site Certificate Condition 60 requires development of a fire safety plan in consultation with local authorities. The measure is adequate to address the risk of fire at the proposed modified Facility that could impact the natural (wildlife habitat) environment.

P.9.2.4 Lighting

In accordance with Site Certificate Condition 104, lighting at the Facility will consist of regimes that have been deemed less likely to attract birds. Lighting at the O&M building, substations, and battery storage area will be shielded or downward-directed. Turbine lighting will be the minimum required or recommended by the Federal Aviation Administration and is expected to consist of blinking red lights, which have been shown to be less attractive to birds (Patterson, 2012).

P.10 MONITORING PLAN

(H) A description of the applicant's proposed monitoring plans to evaluate the success of the measures described in (G).

Response: A proposed WMMP has been prepared for Phase 2 based on the approved Phase 1 WMMP to incorporate monitoring measures related to the solar array if it is constructed. Attachment P-12 contains the Phase 2 WMMP. No additional monitoring plans are proposed.

P.11 CONCLUSION

The information provided in this exhibit demonstrates that construction and operation of the Facility modified by RFA 4 will not result in significant adverse impacts to fish and wildlife habitats and sensitive species and, in fact, there will be fewer impacts under the scenarios proposed by RFA 4 than were previously approved by Council. Therefore, Montague has satisfied the requirements of OAR 345-022-0060 and OAR 635-415-0025.

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Figures

Figure P-1
Analysis Area for Fish and Wildlife Habitat
Montague Wind Power Facility

Klickitat County
Gilliam County
Sherman County
Morrow County
Roosevelt
Arlington
Ione
14
84
19
74
206

Legend

- Approved Site Boundary
- Approved Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- 0.5-mile Fish and Wildlife Habitat Analysis Area

Basemap Features

- Interstate/Highway
- County Boundary
- Town

N
W E
S

0 1.5 3 6
Miles

AVANGRID RENEWABLES

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Basemap Source: ESRI World Imagery

Figure P-2
Botanical Surveys
Montague Wind Power Facility

Legend

- Approved Site Boundary
- Approved Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- 2017 Botanical Field Investigation
- Supplemental Desktop Review Area

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

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Basemap Source: ESRI World Terrain Base

Figure P-3: Sensitive Wildlife Locations
Confidential and not for public distribution. Provided under separate cover.

Figure P-4
Avian Use Study Overview
Montague Wind Power Facility

Legend

- Approved Site Boundary
- Approved Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Avian Use Study Plot Centers

- Baseline Wind 2009–2010
- Leaning Juniper IIA 2004–2005
- Leaning Juniper IIB 2008–2009
- Montague 2008–2009
- Montague 2009–2010
- Pebble Springs 2006

Avian Use Study Plot Perimeters - 800-meter Buffer

- Baseline Wind 2009–2010
- Leaning Juniper IIA 2004–2005
- Leaning Juniper IIB 2008–2009
- Montague 2008–2009
- Montague 2009–2010
- Pebble Springs 2006

Basemap Features

- Interstate/Highway
- County Boundary
- Town

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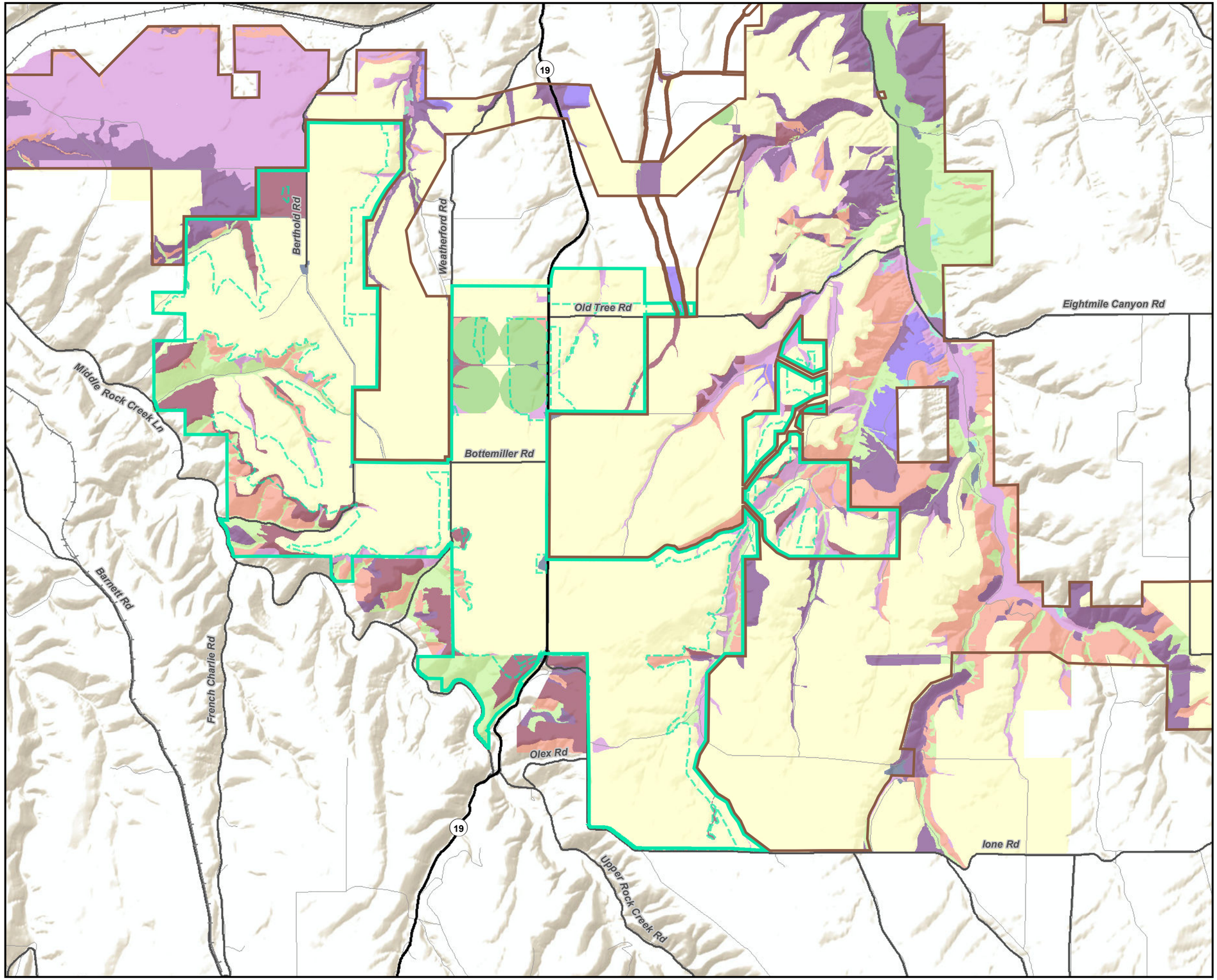
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Basemap Source: ESRI USA Topo Maps

Figure P-5: Sensitive Raptor Species Nests
Confidential and not for public distribution. Provided under separate cover.

Figure P-6
Habitat Types
Overview Map
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Types

- Developed-Old Field (DB)
- Developed-CRP or Other Planted Grassland (DC)
- Developed-Irrigated Agriculture(DI)
- Developed-Revegetated or Other Planted Grassland (DR)
- Developed-Dryland Wheat (DW)
- Developed-Other (DX)
- Escarpment (ESC)
- Exotic Annual Grassland (GA)
- Native Perennial Grassland (GB)
- Basin Big Sagebrush Shrub-steppe (SSA)
- Rabbitbrush/Snakeweed Shrub-steppe (SSB)
- Juniper Woodland (WJ)
- Riparian Woodland (WR)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

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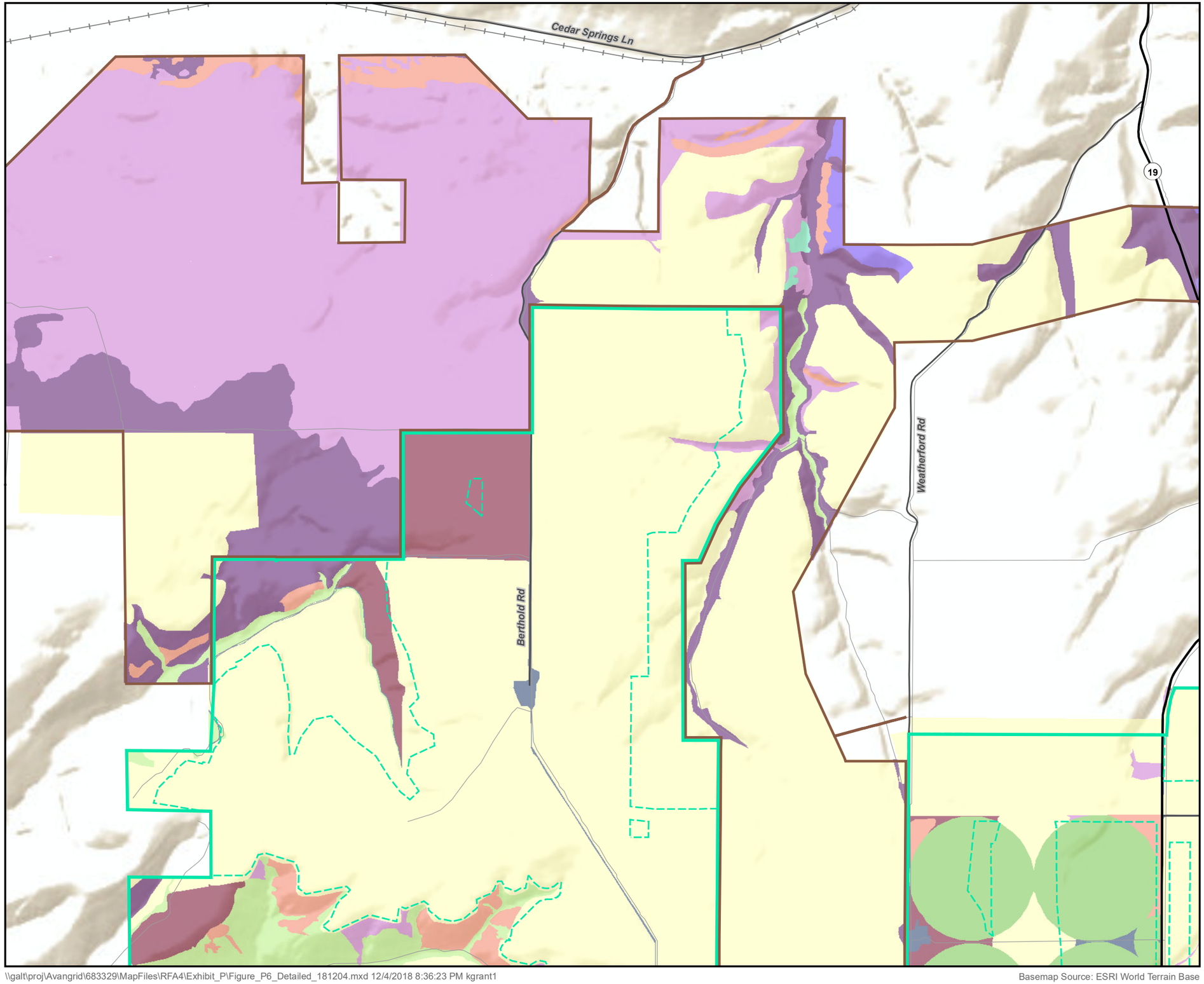
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Basemap Source: ESRI World Terrain Base

Figure P-6.1
Habitat Types
Detailed View
Montague Wind Power Facility



Legend

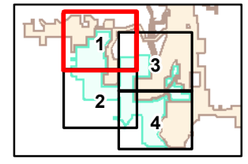
- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Types

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- Juniper Woodland (WJ)
- Riparian Woodland (WR)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line



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Basemap Source: ESRI World Terrain Base

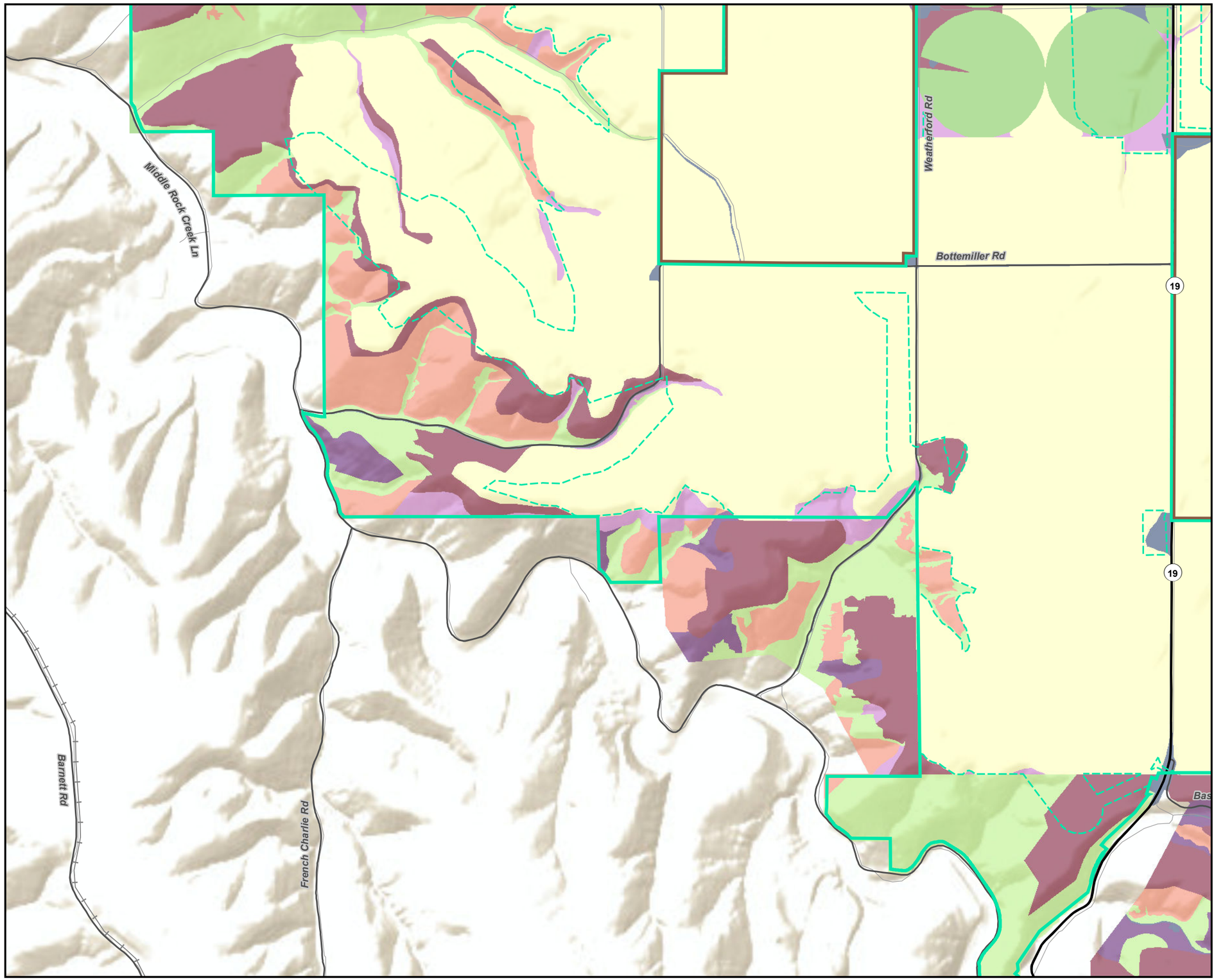


Figure P-6.2
Habitat Types
Detailed View
Montague Wind Power Facility

Legend

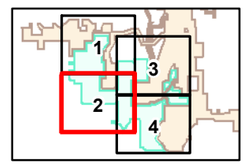
- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Types

- Developed-Old Field (DB)
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- Rabbitbrush/Snakeweed Shrub-steppe (SSB)
- Juniper Woodland (WJ)
- Riparian Woodland (WR)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line



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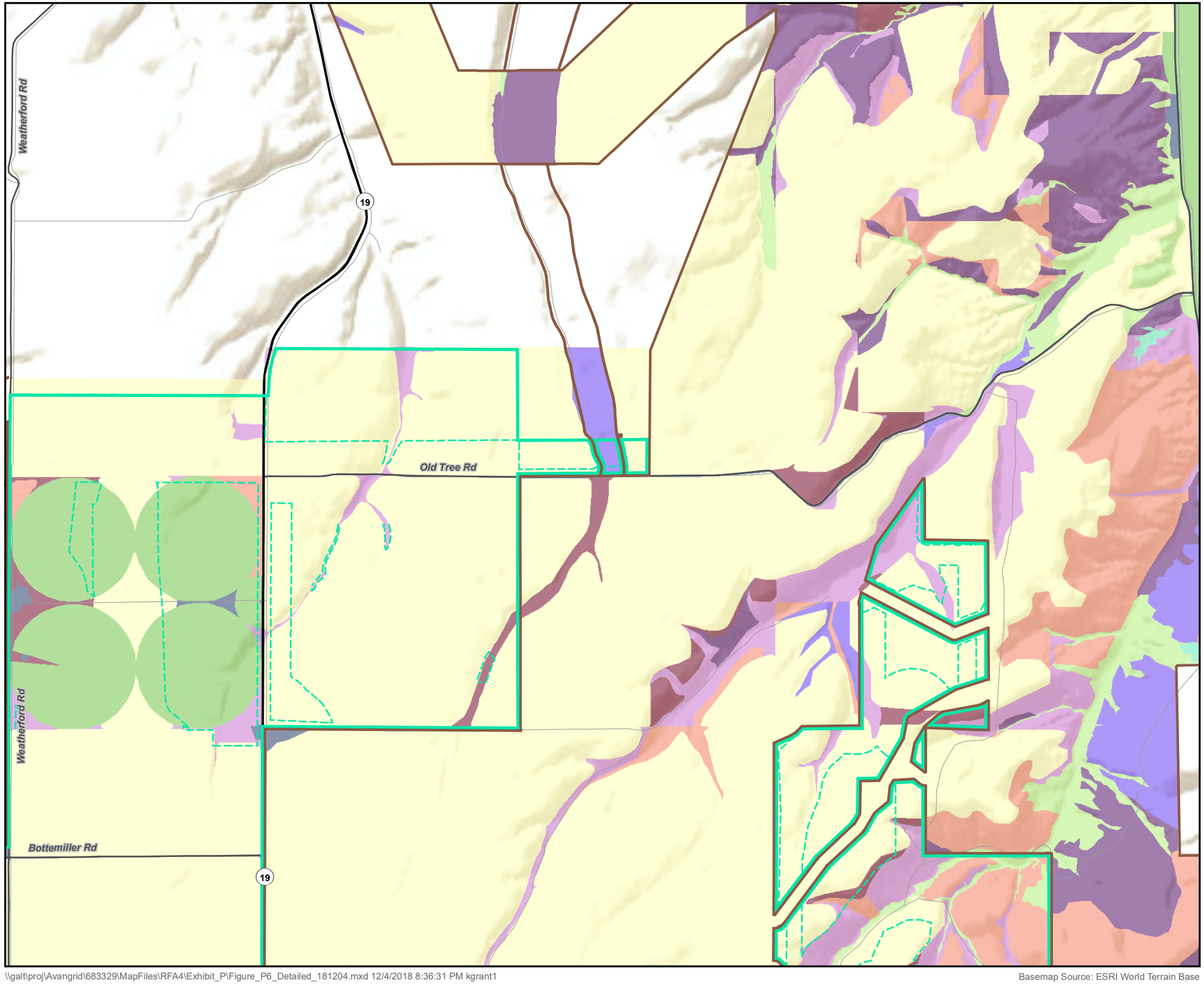
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Basemap Source: ESRI World Terrain Base

Figure P-6.3
Habitat Types
Detailed View
Montague Wind Power Facility



Legend

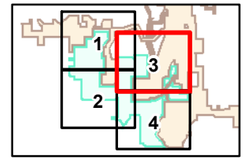
- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Types

- Developed-Old Field (DB)
- Developed-CRP or Other Planted Grassland (DC)
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- Rabbitbrush/Snakeweed Shrub-steppe (SSB)
- Juniper Woodland (WJ)
- Riparian Woodland (WR)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line



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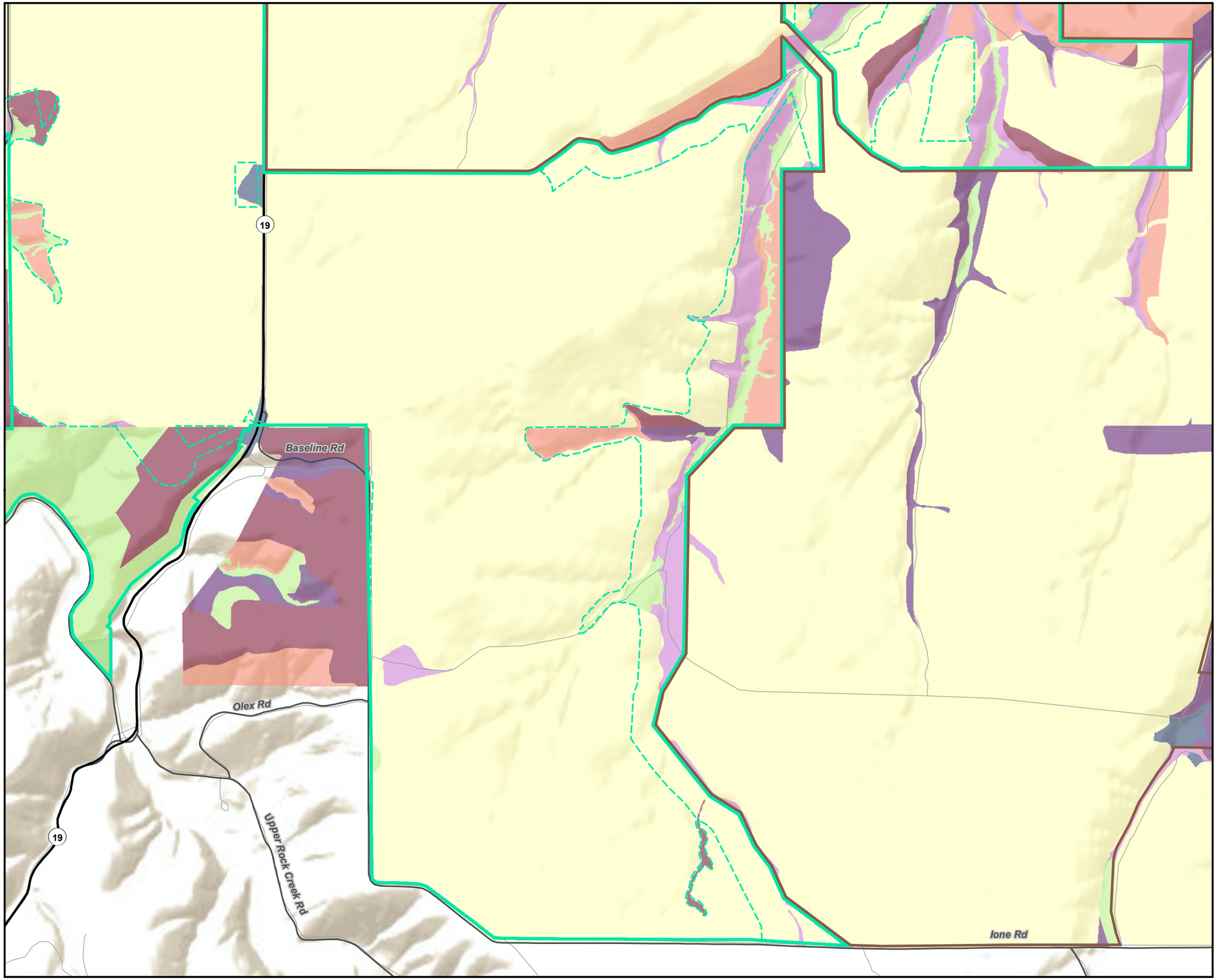
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Basemap Source: ESRI World Terrain Base

Figure P-6.4
Habitat Types
Detailed View
Montague Wind Power Facility



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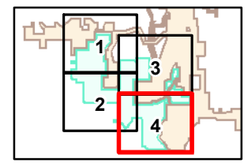
- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Types

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- Rabbitbrush/Snakeweed Shrub-steppe (SSB)
- Juniper Woodland (WJ)
- Riparian Woodland (WR)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line



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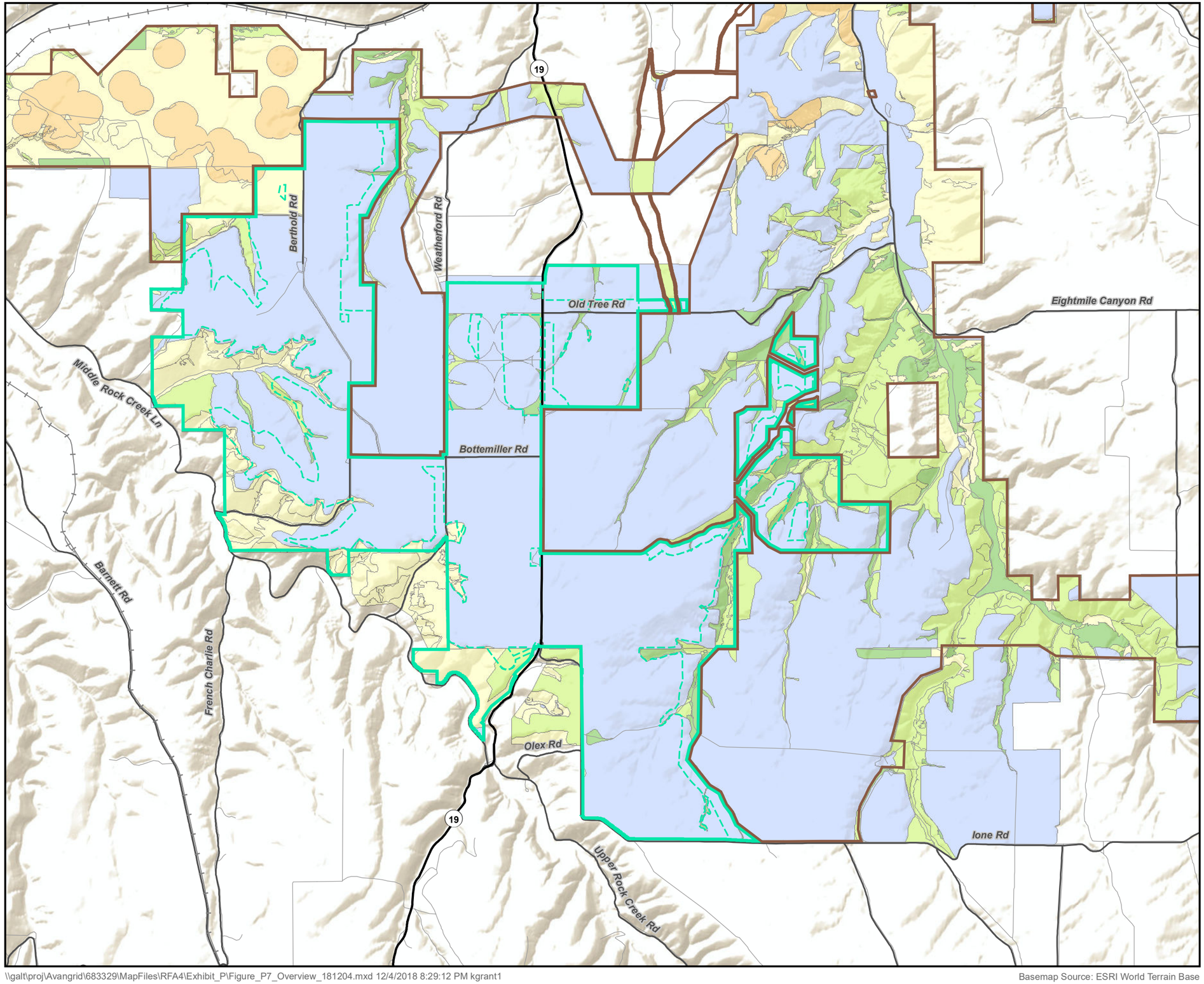
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Basemap Source: ESRI World Terrain Base

Figure P-7
Habitat Categories
Overview Map
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Categories

- 1 (DC, DR, GA, GB, SSA, SSB, WJ)
- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
- 4 (DB, DR, GA, GB, SSA, SSB)
- 6 (DI, DW, DX)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

Habitat Codes

DB: Developed-Old Field
DC: Developed-CRP or Other Planted Grassland
DI: Developed-Irrigated Agriculture
DR: Developed-Revegetated or Other Planted Grassland
DW: Developed-Dryland Wheat
DX: Developed-Other
ESC: Escarpment
GA: Exotic Annual Grassland
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SSB: Rabbitbrush/Snakeweed Shrub-steppe
WJ: Juniper Woodland
WR: Riparian Woodland

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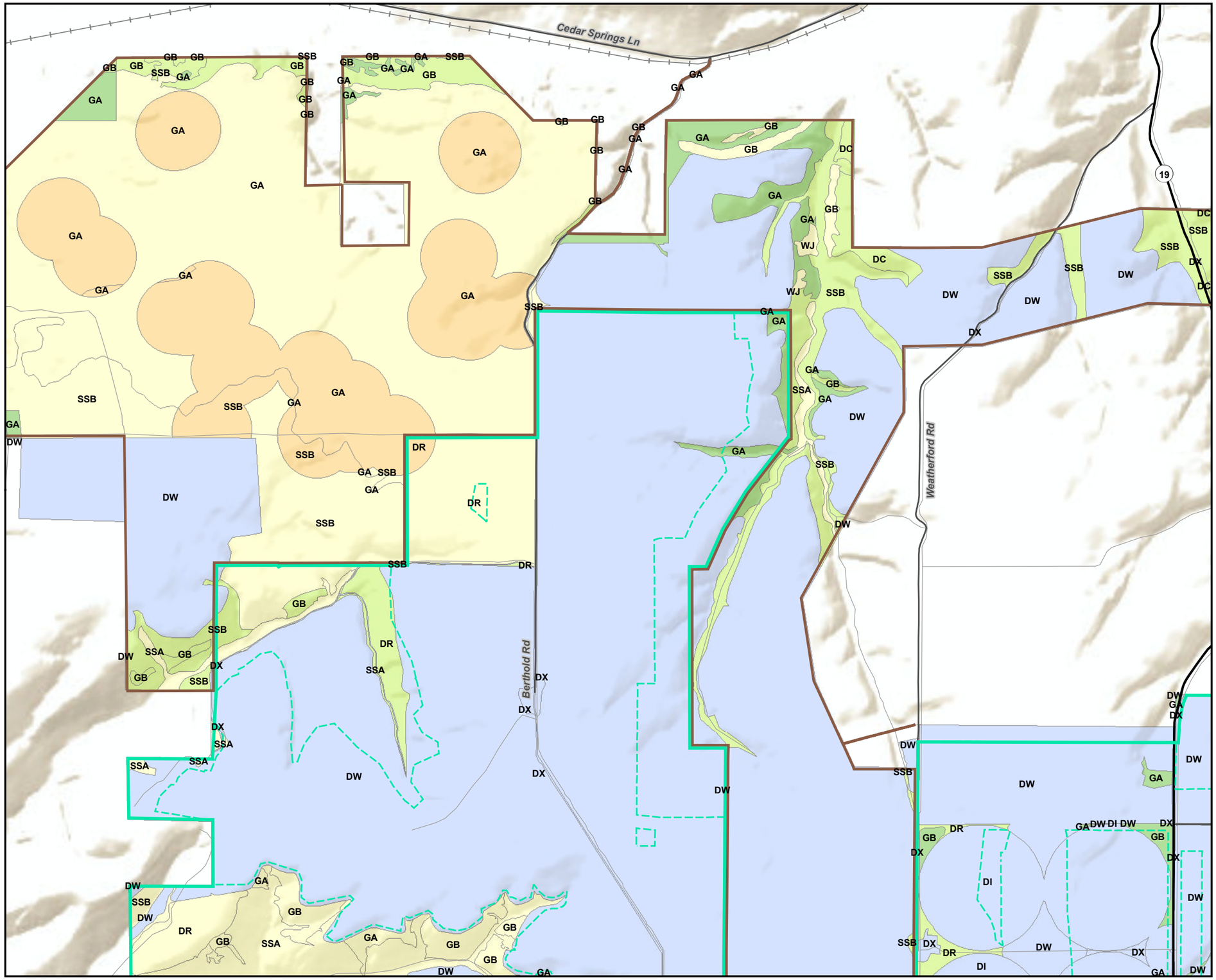
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Basemap Source: ESRI World Terrain Base

Figure P-7.1
Habitat Categories
Detailed View
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Categories

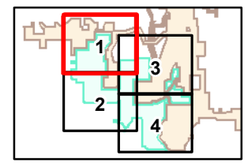
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- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
- 4 (DB, DR, GA, GB, SSA, SSB)
- 6 (DI, DW, DX)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

Habitat Codes

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WJ: Juniper Woodland
WR: Riparian Woodland



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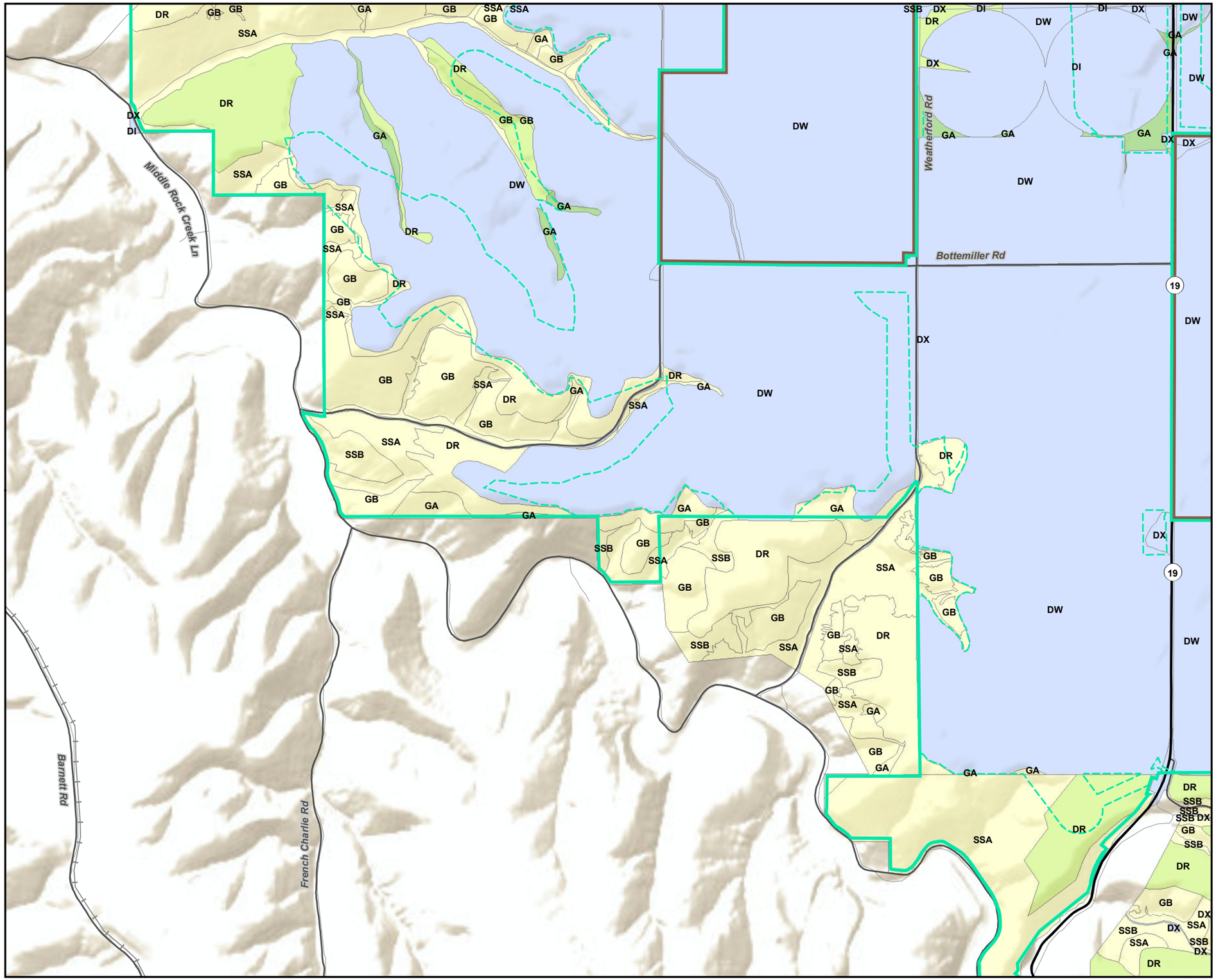
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Basemap Source: ESRI World Terrain Base

Figure P-7.2
Habitat Categories
Detailed View
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Categories

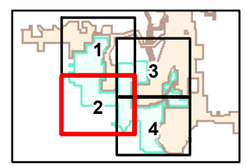
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Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

Habitat Codes

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Basemap Source: ESRI World Terrain Base

Figure P-7.3
Habitat Categories
Detailed View
Montague Wind Power Facility

Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Categories

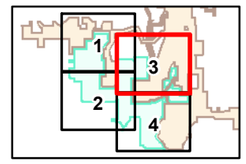
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Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

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Basemap Source: ESRI World Terrain Base

Figure P-7.4
Habitat Categories
Detailed View
Montague Wind Power Facility

Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Habitat Categories

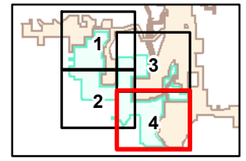
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Basemap Features

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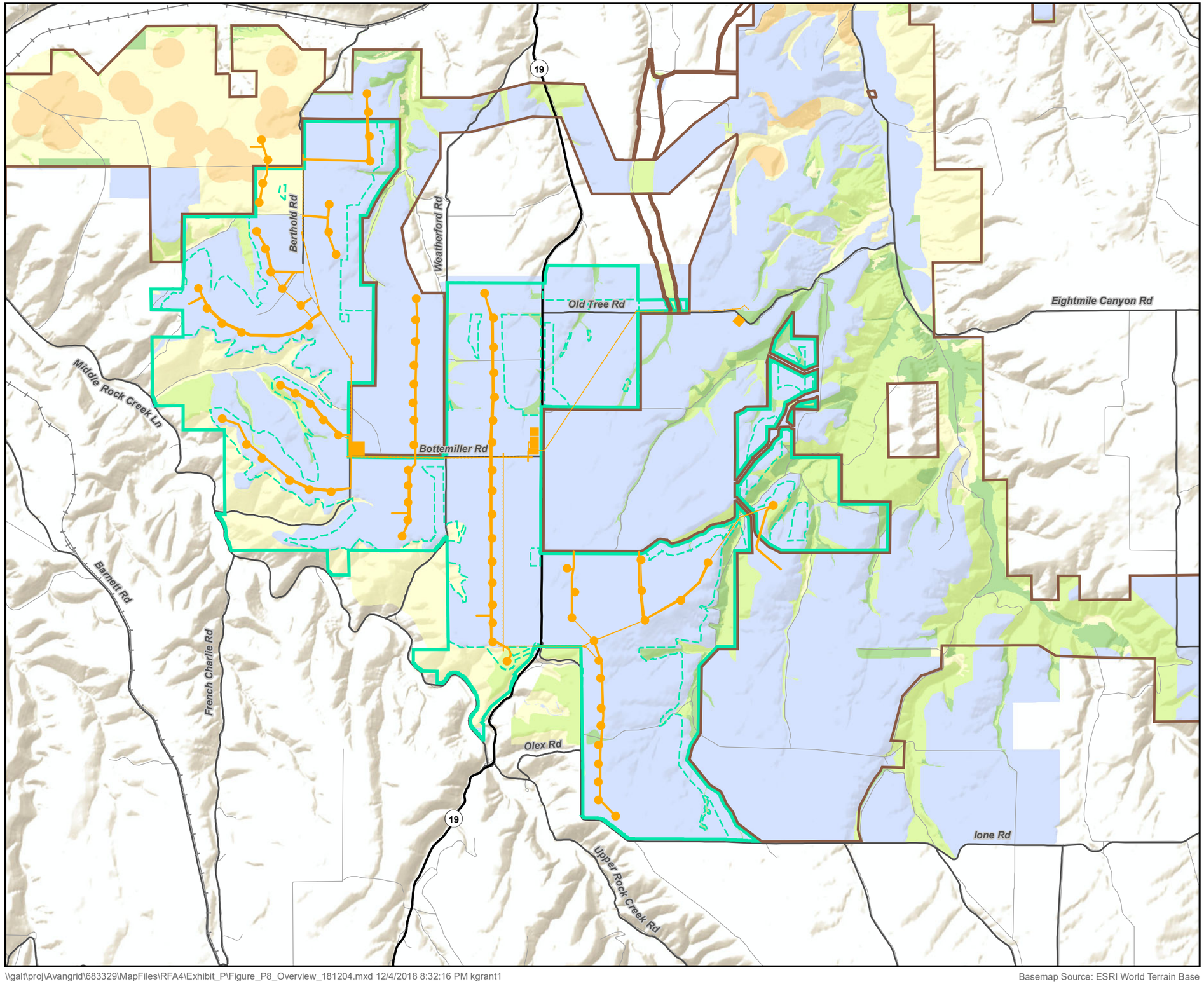
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Basemap Source: ESRI World Terrain Base

Figure P-8
Habitat Categories Impacts
Overview Map
Maximum Wind (Design Scenario A)
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

Habitat Categories

- 1 (DC, DR, GA, GB, SSA, SSB, WJ)
- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
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Basemap Features

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- Public Road
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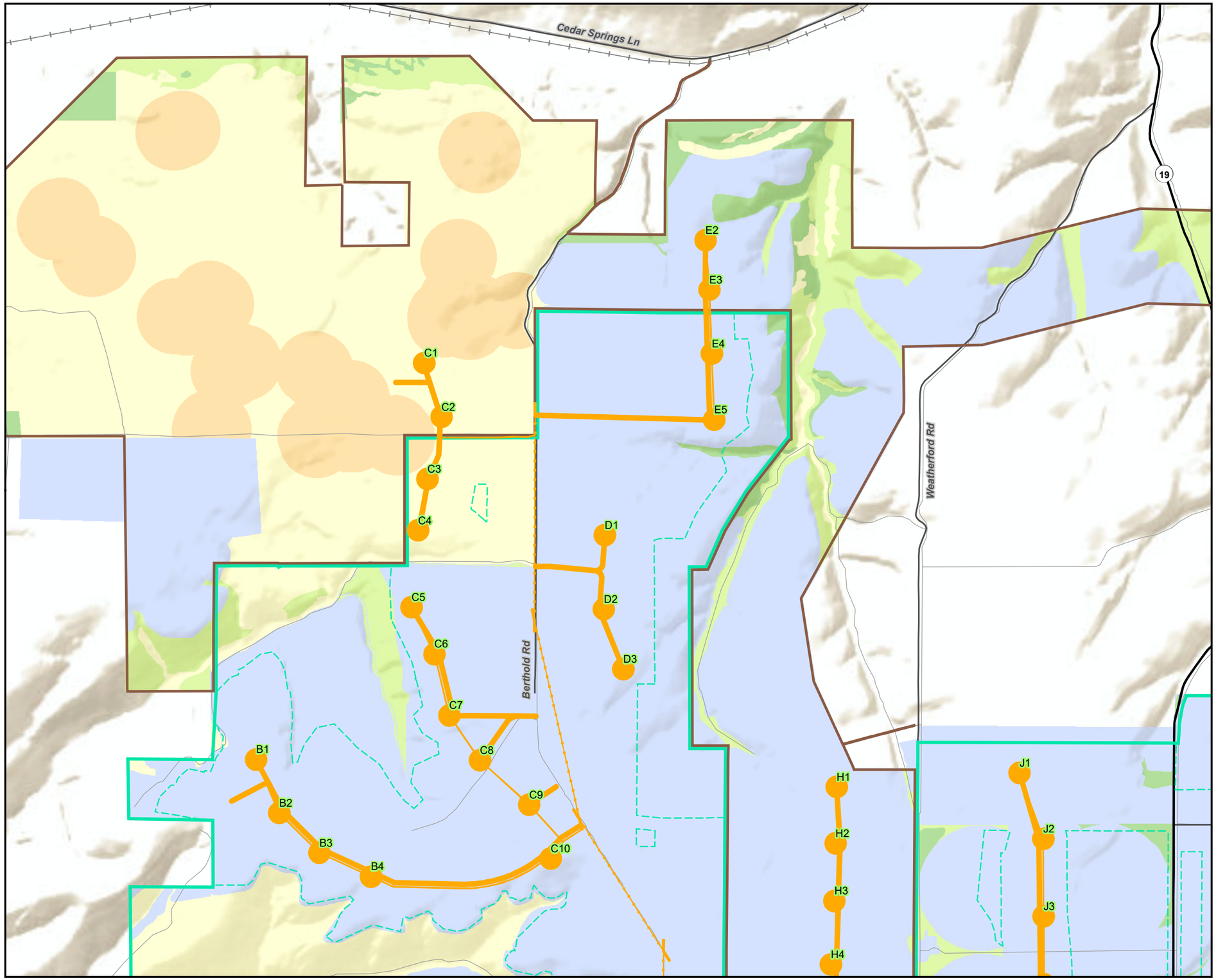
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Basemap Source: ESRI World Terrain Base

Figure P-8.1
Habitat Categories Impacts
Detailed View
Maximum Wind (Design Scenario A)
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

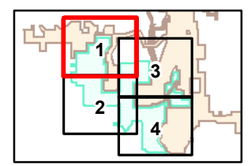
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GB: Native Perennial Grassland
SSA: Basin Big Sagebrush Shrub-steppe
SSB: Rabbitbrush/Snakeweed Shrub-steppe
WJ: Juniper Woodland
WR: Riparian Woodland



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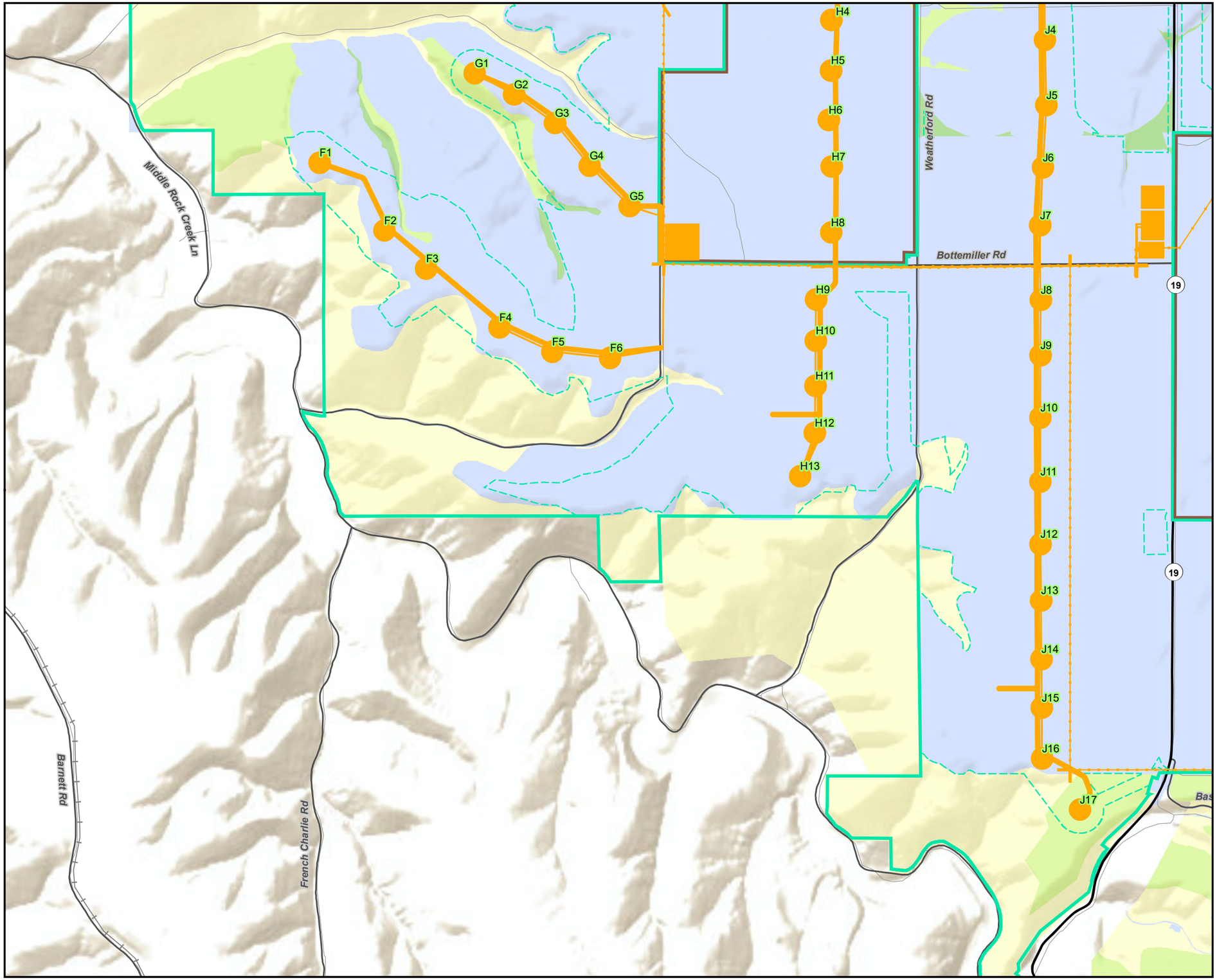
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Basemap Source: ESRI World Terrain Base

Figure P-8.2
Habitat Categories Impacts
Detailed View
Maximum Wind (Design Scenario A)
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

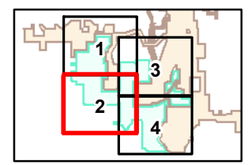
Habitat Categories

- 1 (DC, DR, GA, GB, SSA, SSB, WJ)
- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
- 4 (DB, DR, GA, GB, SSA, SSB)
- 6 (DI, DW, DX)

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

Habitat Codes
DB: Developed-Old Field
DC: Developed-CRP or Other Planted Grassland
DI: Developed-Irrigated Agriculture
DR: Developed-Revegetated or Other Planted Grassland
DW: Developed-Dryland Wheat
DX: Developed-Other
ESC: Escarpment
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SSB: Rabbitbrush/Snakeweed Shrub-steppe
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WR: Riparian Woodland



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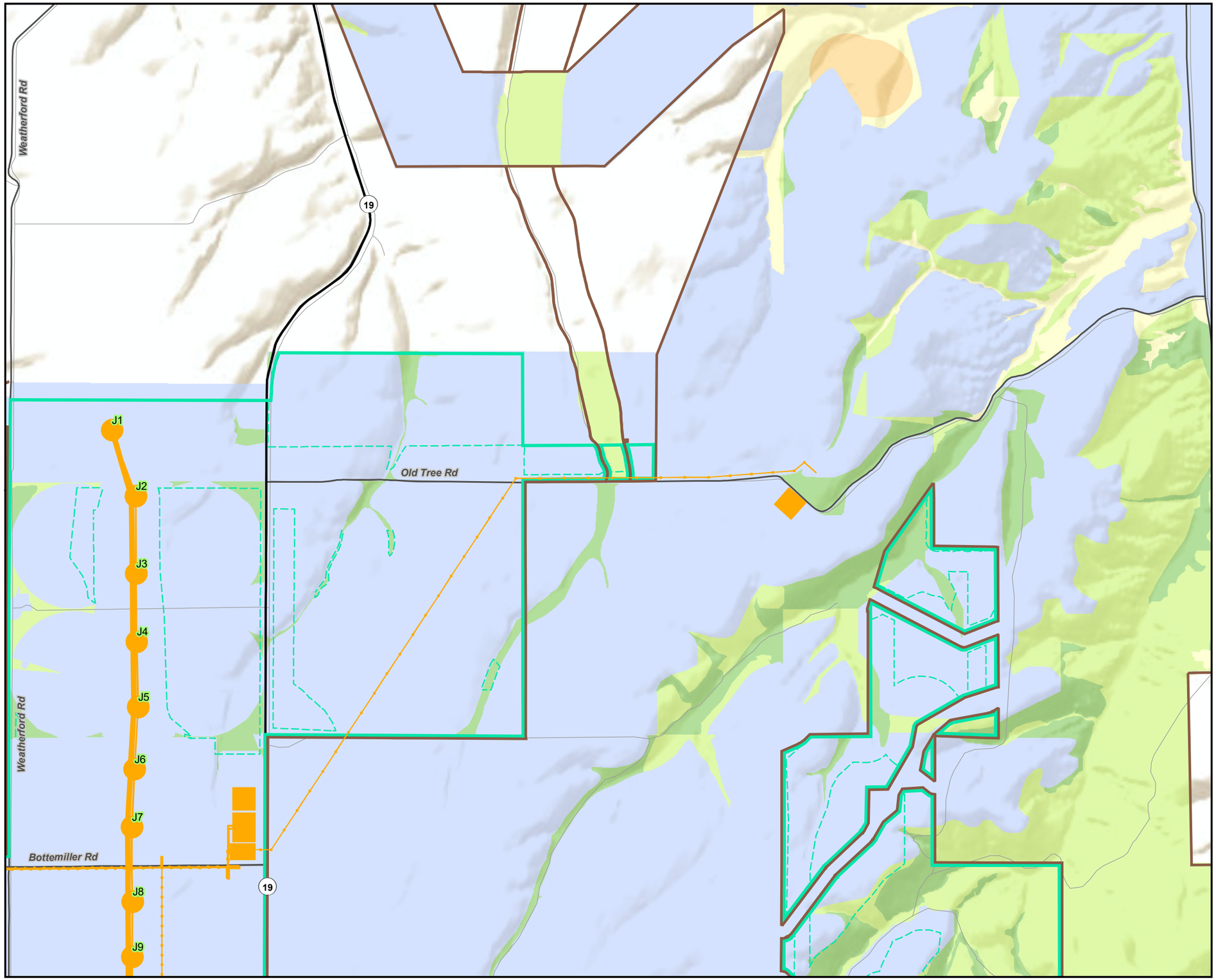
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Basemap Source: ESRI World Terrain Base

Figure P-8.3
Habitat Categories Impacts
Detailed View
Maximum Wind (Design Scenario A)
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

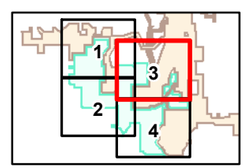
Habitat Categories

- 1 (DC, DR, GA, GB, SSA, SSB, WJ)
- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
- 4 (DB, DR, GA, GB, SSA, SSB)
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Basemap Features

- Interstate/Highway
- Public Road
- Other Road
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Habitat Codes
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Basemap Source: ESRI World Terrain Base

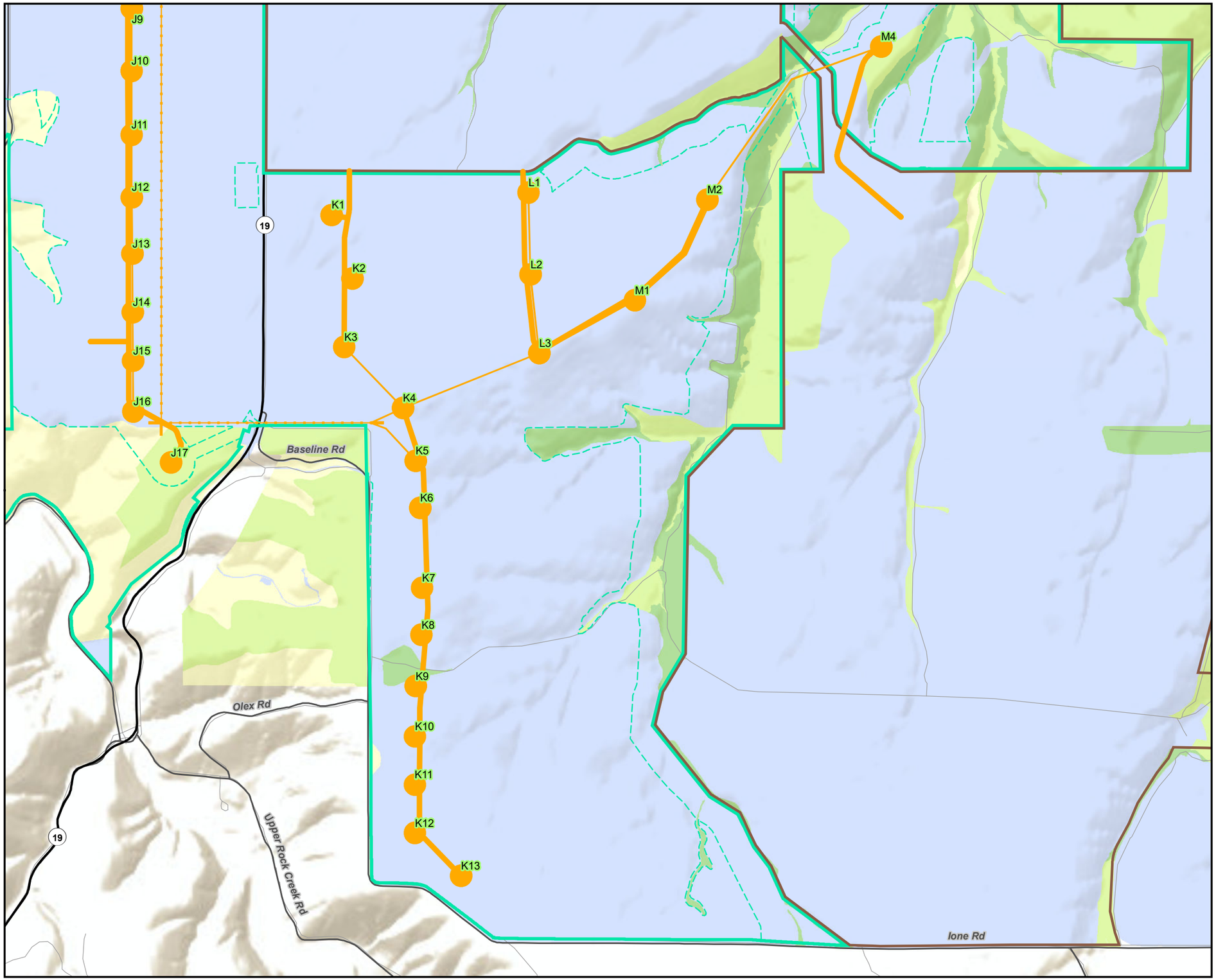


Figure P-8.4
Habitat Categories Impacts
Detailed View
Maximum Wind (Design Scenario A)
Montague Wind Power Facility

Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

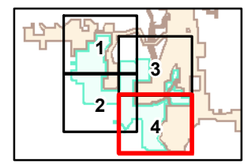
Habitat Categories

- 1 (DC, DR, GA, GB, SSA, SSB, WJ)
- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
- 4 (DB, DR, GA, GB, SSA, SSB)
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Basemap Features

- Interstate/Highway
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- Other Road
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Habitat Codes
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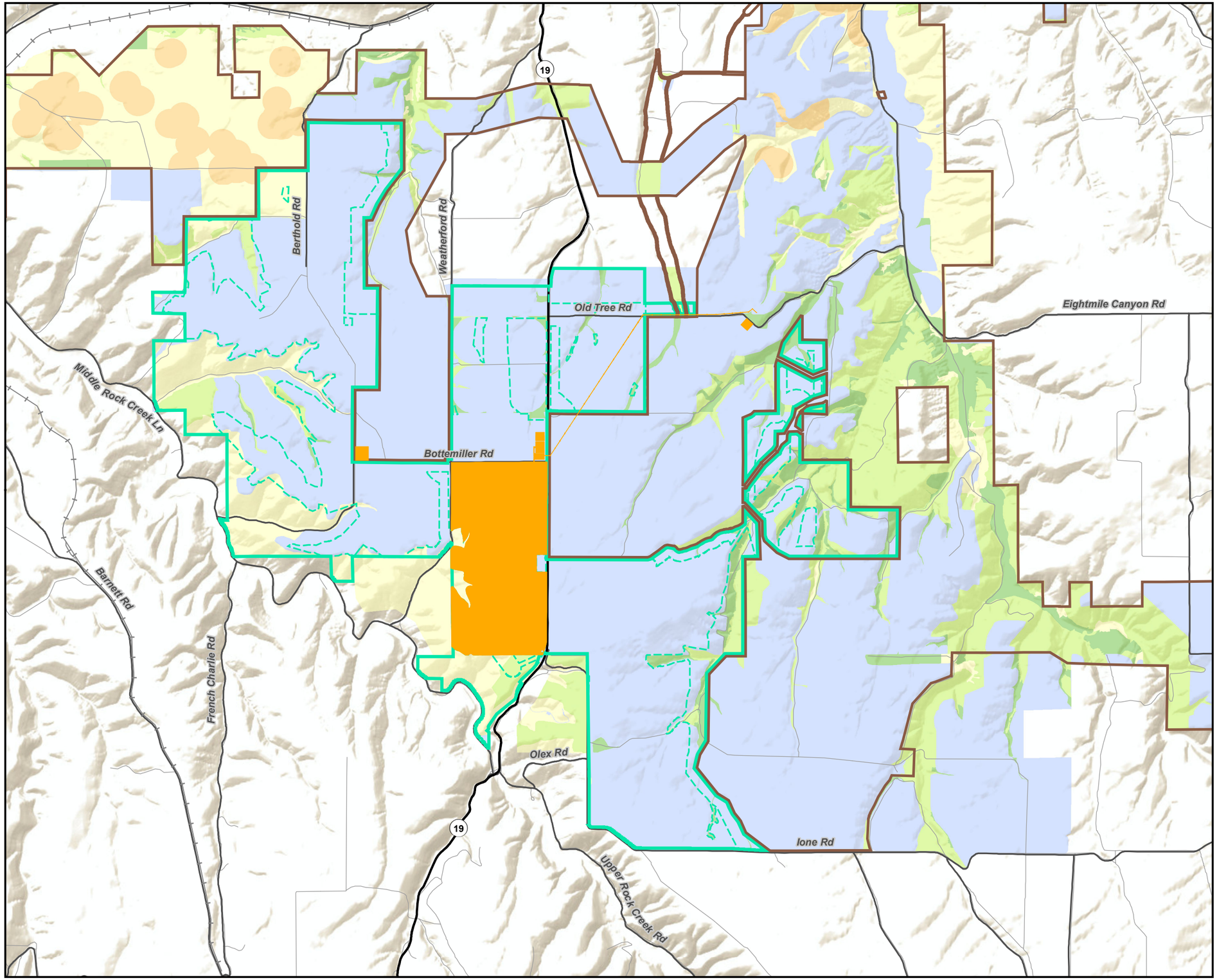
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Basemap Source: ESRI World Terrain Base

Figure P-9
Habitat Categories Impacts Overview Map
Solar
(Design Scenario C)
Montague Wind Power Facility



Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

Habitat Categories

- 1 (DC, DR, GA, GB, SSA, SSB, WJ)
- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
- 3 (DC, DR, GB, SSA, SSB, WJ)
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WR: Riparian Woodland

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Basemap Source: ESRI World Terrain Base

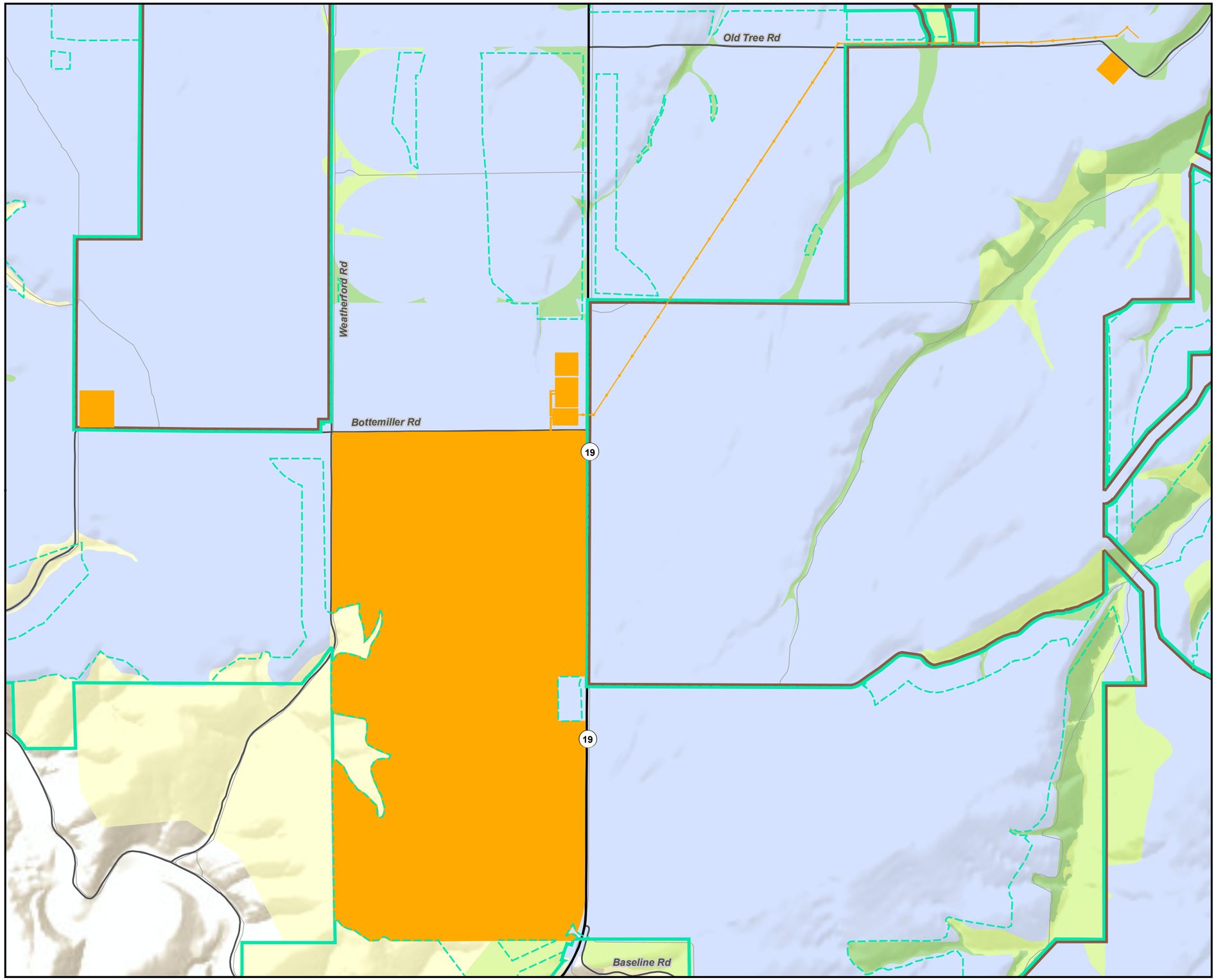


Figure P-9.1
Habitat Categories Impacts
Detailed View
Solar
(Design Scenario C)
Montague Wind Power Facility

Legend

- Approved Site Boundary/Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- Worst-Case Scenario Footprint (Permanent and Temporary Impacts)

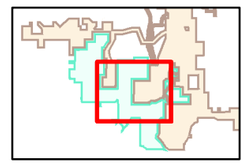
Habitat Categories

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- 2 (DR, ESC, GA, GB, SSA, SSB, WJ, WR)
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Basemap Source: ESRI World Terrain Base

Attachment P-1a
2017 Rare Plant Survey Report—Phase 1

SURVEY REPORT

2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Prepared for

Avangrid Renewables, LLC,
d/b/a Montague Wind Power Facility, LLC

July 2017

CH2M HILL Engineers, Inc.
2020 SW 4th Avenue, Suite 300
Portland, OR 97201

Contents

Section Page

Acronyms and Abbreviations ..... **v**

1.0 Introduction **1**

2.0 Methodology **1**
2.1 Data Search 1
2.2 Field Surveys 1
2.2.1 Survey Protocol 1
2.2.2 Survey Practice 2

3.0 Results **3**
3.1 Data Search 3
3.1.1 Database Search 3
3.1.2 Plant Species Information and Habitat Requirements 5
3.1.3 Adjacent Project Information 9
3.2 Field Surveys 9

4.0 Conclusion **12**

5.0 References **12**

Figure

1 2017 Rare Plant Survey Map

Tables

1 Special-status Plant Species Potentially Found in the Analysis Area for the Montague Facility 4
2 Rare Plant Species Information and Habitat Requirements 6
3 Plant Species Observed During Field Surveys Conducted May 23-26 and May 31-June 1, 2017 9

Acronyms and Abbreviations

CH2M	CH2M HILL Engineers, Inc.
d/b/a	doing business as
ESA	Endangered Species Act
Facility	Montague Wind Power Facility
LJIIA	Leaning Juniper IIA
LJIIB	Leaning Juniper IIB
Montague	Montague Wind Power Facility, LLC
NWC	Northwest Wildlife Consultants
ODA	Oregon Department of Agriculture
OESA	Oregon Endangered Species Act of 1987
ORBIC	Oregon Biodiversity Information Center
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

CH2M HILL Engineers, Inc. (CH2M) was retained by Avangrid Renewables, LLC, d/b/a Montague Wind Power Facility, LLC (Montague), to conduct rare plant surveys of all areas to be disturbed by construction of the proposed Montague Wind Power Facility Phase 1 (Facility) site boundary (Phase 1 study area) (Figure 1).

This report is intended to meet Condition 95(b) of the Montague Wind Power Facility Site Certificate (Energy Facility Siting Council, 2010) for potentially occurring threatened and endangered (rare) plant species. A separate report was prepared to address threatened and endangered wildlife in accordance with this condition (CH2M, 2017). This rare plant report summarizes the vegetation data collected within the Phase 1 study area during surveys completed between May 23 and June 1, 2017. The rare plant survey methodology and results are documented in this report.

2.0 Methodology

2.1 Data Search

In advance of the field surveys, CH2M consulted the U.S. Fish and Wildlife Service (USFWS) county lists of *Federally Listed and Proposed Endangered and Threatened Species, Candidate Species and Species of Concern for* (USFWS, 2017) for Gilliam County, Oregon, the Oregon Department of Agriculture (ODA) *Oregon Listed Plants by County* (ODA, 2017), and the Oregon Biodiversity Information Center (ORBIC) database (ORBIC, 2017), to identify special-status species that potentially occur within the Facility site boundary and a 5-mile-radius analysis area.

Information on special-status plants with potential to occur in the analysis area was compiled before the field surveys. The information included habitat requirements, any known associated species, and elevation ranges. Field botanists used this information to focus the level of survey intensity in areas where site conditions indicated species habitat requirements may occur.

In addition to reviewing the above information sources, CH2M reviewed the following documents from several previously studied wind energy facilities located near the proposed Facility:

- **Leaning Juniper IIA (LJIIA).** *Final Order for the Leaning Juniper II Wind Power Facility (*ODOE, 2007)
- **Leaning Juniper IIB (LJIIB)**. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Appended to the *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility* (NWC, 2009)
- **Shepherds Flat.** *Final Order for the Shepherds Flat Wind Farm* (ODOE, 2008)
- **Pebble Springs**. *Pebble Springs Wind Project: Application for Conditional Use Permit* (PPM Energy, 2006)

2.2 Field Surveys

2.2.1 Survey Protocol

Surveys were floristic in nature and were conducted according to the U.S. Department of Interior Bureau of Land Management *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants* (Whiteaker et al., 1998). Two survey methods were used. An Intuitive Controlled Survey was conducted throughout

the Facility site, and a Complete Survey was conducted in areas of high potential habitat. The protocol for these methods is described in Sections 2.2.1.1 and 2.2.1.2.

2.2.1.1 Intuitive Controlled Survey

An Intuitive Controlled Survey was conducted throughout the Phase 1 study area. The field botanist traversed the Phase 1 study area over representative cross-sections of all the major habitats and topographic features, looking for the target species while en route between different areas. When the field botanist arrived at an area of high potential (defined in the prefield review or encountered during the field visit), a survey for the target species was conducted.

2.2.1.2 Complete Survey

In areas with high probability of detecting sensitive species, the field botanist conducted a Complete Survey in which vascular plant taxa encountered were recorded in the field. Nearly all plant species found were identified to the level needed to determine whether they qualify as special-status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references such as *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955–1969). Plant identification was also aided by current taxonomic guides and other standard references.

2.2.2 Survey Practice

Plant surveys were conducted May 23 to 26 and May 31 to June 1, 2017, by teams led by qualified botanists with experience in vegetation of the Columbia Plateau region. The Phase 1 study area is defined as all areas within the proposed Facility footprint, as shown on Figure 1, not currently in agricultural production, or consisting of residential or farm operation facilities. The survey time was selected to coincide with the optimum bloom time for the target species. Lists of all vascular plant taxa encountered were recorded in the field. Plant species found were identified to the level needed to determine whether they qualify as special-status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references, including the following:

- *Field Guide to the Rare Plants of Washington* (WNHP, 2017)
- *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973)
- *Manual of Grasses of the United States* (Hitchcock, 1971)
- *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955-1969)
- *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness, 1973)
- *Northwest Weeds* (Taylor, 1990)
- *Oregon Flora Project Rare Plant Guide* (OFP, 2017)
- *Oregon Threatened or Endangered Plant Field Guide* (ORBIC, 2009)
- *Rare and Endangered Plants of Oregon* (Eastman, 1990)
- *Threatened and Endangered Vascular Plants of Oregon* (Meinke, 1982)
- *Weeds of the West* (Whitson, 2000)
- *Wetland Plants of Oregon and Washington* (Guard, 1995)

3.0 Results

3.1 Data Search

3.1.1 Database Search

A search of the USFWS county lists (USFWS, 2017), ODA state list (ODA, 2017), and ORBIC database (ORBIC, 2017) identified 27 special-status species as potentially occurring in the analysis area (Table 1). Review of habitat requirements for all species identified nine special-status species with potential to occur within the Phase 1 study area. Target species for the surveys consisted of three species listed as state or federally threatened or endangered or as candidates for such listing. These were the state-listed threatened plant species, Laurent's milk-vetch (*Astragalus collinus* var. *laurentii*), and the state candidate species, sessile mousetail (*Myosurus sessilis*) and dwarf evening primrose (*Camissonia pygmaea*).

Table 1. Special-status Plant Species Potentially Found in the Analysis Area for the Montague Facility
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Scientific Name	Common Name	Federal Status	ODA/ ORBIC Status	Potential Habitat Present
Abronia mellifera	White sand verbena	--	--/3	No
Allium robinsonii	Robinson's onion	SoC	-- / 2-ex	No
Artemesia borealis ssp. *Wormskioldi*	Northern wormwood	C	LE / 1-ex	No
Astragalus collinus var. *laurentii*	Laurent's milk-vetch	SoC	LT / 1	Yes
A. conjunctus var. *conjunctus*	Idaho milk-vetch	--	--/3	Yes
A. pulsiferaie var. suksdorfii	Ames' milk-vetch	SoC	-- / --	No
A. scleroscarpus	Stalked-pod milk-vetch	--	-- / 3	Yes
A. succumbens	Columbia milk-vetch	--	-- / 4	Yes
Boechera cusickii	Cusick's rockcress	--	--/3	Yes
Calochortus longebarbatus var. *longebarbatus*	Long-beared sego lily	SoC	-- / 4	No
Camissonia pygmaea	Dwarf evening primrose	SoC	C / 1	Yes
Cryptantha leucophaea	Gray cryptantha	--	-- / 2-ex	No
Cypripedium fasciculatum	Clustered lady's-slipper	SoC	C / 2	No
Lesquerella douglasii	Columbia bladderpod	--	-- / 3	Yes
Lomatium suksdorfii	Suksdorf's desert-parsley	SoC	C / 1	No
L. watsonii	Watson's desert-parsley	--	-- / 2	Yes
Meconella oregano	White meconella	SoC	C / 1	No
Mimulus evanescens	Disappearing monkeyflower	SoC	C / 1	No
Mimulus jungermannioides	Hepatic monkeyflower	SoC	C / 4	No
Myosurus sessilis	Sessile mousetail	SoC	C / 1	Yes
Penstemon barrerttiae	Barrett's beardtongue	SoC	C / 1	No
Pinus albicaulis	Whitebark pine	SoC	-- /	No
Ranunculus reconditus (= *triternatus*)	Obscure buttercup	SoC	LE / 1	No
Rorippa columbiae	Persistent sepal yellowcress	SoC	C / 1	No
Spiranthes diluvialis	Ute ladies'-tresses	LT	-- / --	No
Sysyrhinchium sarmentosum	Pale blue-eyed grass	SoC	C / 1	No
Texosporium sancti-jacobi	Woven spore lichen	SoC	-- / 2	No

Status Definitions

LE Listed Endangered. Taxa listed by the USFWS as endangered under the Endangered Species Act (ESA), or by the Oregon Departments of Agriculture (ODA) under the Oregon Endangered Species Act of 1987 (OESA). Endangered taxa are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

LT Listed Threatened. Taxa listed by the above agencies as threatened; defined as those taxa likely to become endangered within the foreseeable future.

C Candidate. Candidate taxa for which USFWS have sufficient information to support a proposal to list under the ESA,

Table 1. Special-status Plant Species Potentially Found in the Analysis Area for the Montague Facility
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Scientific Name	Common Name	Federal Status	ODA/ ORBIC Status	Potential Habitat Present

or which is a candidate for listing by the ODA under the OESA.

SoC Federal species of concern.

ORBIC List 1 – Threatened or endangered throughout range.

ORBIC List 2 – Threatened, endangered, or extirpated from Oregon; secure elsewhere.

ORBIC List 3 – Review.

ORBIC List 4 – Watch.

Ex – Believed extirpated.

3.1.2 Plant Species Information and Habitat Requirements

Information on special-status plants with potential to occur in or near the site boundary was compiled before the field visits. The information included habitat requirements, any known associated species, and elevation ranges (Table 2). This information was used to focus the level of survey intensity in areas where site conditions indicated species habitat requirements may occur.

Table 2. Rare Plant Species Information and Habitat Requirements

2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Abronia mellifera	White sand verbena	Nyctaginaceae	Shrub-steppe. Dunes and sandy soils at low elevations.	Unknown	Endemic to the Pacific northwestern states: Wyoming, Oregon, Washington, and Idaho. Locally common.
Allium robinsonii	Robinson's onion	Liliaceae	Sand and gravel deposits along the Columbia River from near Vantage, Washington, to about the mouth of the John Day River, Oregon, apparently restricted to the bottom and lower benches of the river valley.	60 to 650 feet	Believed extirpated from Oregon.
Artemesia borealis ssp. *wormskioldi*	Northern wormwood	Asteraceae	Arid sites generally supporting shrub-steppe vegetation. Grows on basalt, compacted cobble, and sand in generally flat terrain.	Unknown	Believed extirpated from Oregon.
Astragalus collinus var. *laurentii*	Laurent's milk-vetch	Fabaceae	Occurs on dry slopes, in sandy or rocky substrates. Endemic to the Columbia Plateau, in Gilliam, Morrow, and Umatilla counties, Oregon, and possibly Sherman County as well.	1,800 to 3,300 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
A. conjunctus var. *conjunctus*	Idaho milk-vetch	Fabaceae	Found on dry rocky slopes, scablands, and hilltops throughout the sagebrush desert.	Above 2,000 feet	None
A. pulsiferaie var. *suksdorfii*	Ames' milk-vetch	Fabaceae	Found in generally flat or very gentle terrain in coarse textured substrates; occurs in relatively open ponderosa pine forests with bitterbrush.	1,800 to 1,900 feet	None
A. scleroscarpus	Stalked-pod milk-vetch	Fabaceae	Dunes and sandy barrens.	200 to 600 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
A. succumbens	Columbia milk-vetch	Fabaceae	Sandy places and rocky sagebrush desert, from the Columbia River to the lower foothills.	300 to 700 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
Boechera cusickii	Cusick's rockcress	Brassicaceae	Sagebrush flats to open Ponderosa pine forests; often on lithosol.	1,970 to 5,900 feet	None
Calochortus longebarbatus var. *longebarbatus*	Long-beared sego lily	Liliaceae	Clay loams in vernally moist sites in meadows, forest meadow edges, and within semi-open areas within coniferous woods dominated by grasses and forbs.	1,800 to 3,000 feet	None
Camissonia pygmaea	Dwarf evening primrose	Onagraceae	Found on unstable soil or gravel in steep talus, dry washes, banks, and roadcuts. Occurs in habitats that are maintained in an open condition by erosion and the generally harsh	500 to 1,800 feet	Flowering period is extended enough so that flowers and fruits have been observed on the same plant. The species

Table 2. Rare Plant Species Information and Habitat Requirements
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
			environment.		is generally recognizable between June and August.
Cryptantha leucophaea	Gray cryptantha	Boraginaceae	Sandy substrate along the Columbia River within the Columbia Basin physiographic province; especially unstable sand dunes.	300 to 2,500 feet	Historical ORBIC record located outside of site boundary.
Cypripedium fasciculatum	Clustered lady's-slipper	Orchidaceae	Mid- to late-seral Douglas-fir forest.	1,200 to 5,000 feet	None
Lesquerella douglasii	Columbia bladderpod	Brassicaceae	Sandy and gravelly soils in sagebrush and into arid juniper or ponderosa pine woodlands.	200 to 800 feet	Documented outside of the site boundary during surveys conducted for Leaning Juniper IIB. Historical ORBIC record located outside of site boundary.
Lomatium suksdorfii	Suksdorf's desert-parsley	Apiaceae	Semi-open to open dry, rocky hillsides on moderate to steep slopes.	350 to 3,500 feet	None
L. watsonii	Watson's desert-parsley	Apiaceae	Arid, open, often rocky hillsides. Often found amongst sagebrush.	Unknown	Historical ORBIC record located outside of site boundary.
Meconella oregano	White meconella	Papaveraceae	Occurs in open grasslands and grassland/woodland mosaic on gentle to steeply sloping sites.	100 to 450 feet	None
Mimulus evanescens	Disappearing monkeyflower	Scrophulariaceae	Occurs within sagebrush-juniper-dominated vegetation zones. Occurs in drying pools, along streambeds, adjacent to pond margins, in wet areas near boulders, etc. Occurs in moist gravelly, rocky areas, and low, wet fields, in sagebrush-juniper zones.	3,900 to 5,600 feet	Only two existing sites: Moll Reservoir in Lassen County, California; and Drews Reservoir in Lake County, Oregon.
Mimulus jungermannioides	Liverwort monkeyflower	Scrophulariaceae	Occurs in basalt crevices in seepage zones of vertical cliff faces and canyon walls.	500 to 3,300 feet	Documented in Wasco County, Oregon. Moist, shaded basaltic cliffs adjacent to the water. Plants are generally under an overhanging area of rock; bottom slope; filtered shade; moist; basalt cliffs. Associated species: *Mimulus guttatus*, *Huechera cylindrica*.
Myosurus sessilis	Sessile mousetail	Ranunculaceae	Occurs in vernal pools and alkali flats.	Unknown	Documented within the site boundary during surveys conducted for Pebble Springs and LJIIB projects. Additional

Table 2. Rare Plant Species Information and Habitat Requirements
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
					areas of potentially suitable habitat identified within site boundary in 2009.
Penstemon barrerttiae	Barrett's beardtongue	Scrophulariaceae	Crevices along basalt cliff faces, on rock outcrop ledges, open talus, and occasionally on well-drained roadsides.	Below 3,200 feet	None
Pinus albicaulis	Whitebark pine	Pinaceae	Grows in exposed subalpine zone near treeline.	Subalpine zone	None
Ranunculus reconditus (= *triternatus*)	Obscure buttercup	Ranunculaceae	Upper elevations of Columbia Hills; meadow-steppe habitat dominated by perennial xerophytic bunchgrass and broad-leaved herbs.	2,240 to 3,220 feet	None
Rorippa columbiae	Persistent sepal yellowcress	Brassicaceae	Observed near all types of bodies of water. Known from a wide variety of soil types, including clay, sand, gravel, sandy silt, cobblestones and rocks. Individuals are usually found in open habitats that have low vegetative cover. A common feature of all of the known sites is inundation for at least part of the year.	3 to 7 feet	None
Spiranthes diluvialis	Ute ladies'-tresses	Orchidaceae	Grows along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers, as well as in wetlands and seeps near freshwater lakes or springs.	720 to 1,830 feet	None
Sysyrhinchium sarmentosum	Pale blue-eyed grass	Iridaceae	The species occurs in meadows and small openings.	1,600 to 4,200 feet	None
Texosporium sancti-jacobi	Woven spore lichen	Caliciaceae	Grows in arid to semi-arid shrub-steppe, grassland or savannah communities.	Up to 3,300 feet	None

3.1.3 Adjacent Project Information

During surveys of LJIIA, four populations of the Oregon candidate species, sessile mousetail, were identified in areas that overlap with the Montague site boundary (ODOE, 2007; ODOE, 2008). In addition, during the information review of Shepherds Flat, sessile mousetail was identified within the analysis area, but outside of the site boundary and outside of the Montague site boundary (Caithness Shepherds Flat, 2007).

In spring 2009, Northwest Wildlife Consultants (NWC) conducted surveys for state- and federally listed and nonlisted special-status plants in areas of the Montague site boundary that overlap with the site boundary for Pebble Springs (PPM, 2006). In spring 2009, NWC conducted similar surveys for LJIIB (NWC, 2009). One state-listed threatened plant species, Laurent's milk-vetch, was documented at LJIIB and within the Montague site boundary during surveys conducted for LJIIB. In addition, one population of the Oregon candidate plant species, sessile mousetail, was identified within the Montague site boundary during surveys conducted for LJIIB (NWC, 2009) and two populations of this species were identified within the site boundary during surveys conducted for Pebble Springs (PPM Energy, 2006).

Two rare plant species with no listed status that are monitored by the ORBIC, stalked-pod milk-vetch (*Astragalus scleroscarpus*) and Columbia milk-vetch (*Astragalus succumbens*), were identified within the Montague site boundary during surveys for LJIIB (NWC, 2009). Three additional rare species monitored by the ORBIC, Columbia bladderpod (*Lesquerella douglasii*) (historical – 1938), gray cryptantha (*Cryptantha leucophaea*) (historical – 1882), and Watson's desert parsley (*Lomatium watsonii*) (historical – 1938), were identified in the vicinity, but outside of the Montague site boundary, during surveys for LJIIB (NWC, 2009). Columbia bladderpod was also identified within the analysis area, but outside of the Montague site boundary during surveys conducted for LJIIB (NWC, 2009).

3.2 Field Surveys

The objective of the rare plant survey was to determine whether special-status plant species occur onsite. Field surveys were conducted May 23 to 26 and May 31 to June 1, 2017. All plant species encountered in the Phase 1 study area were identified to at least genus and to the level necessary to ensure that they were not special-status plant species. Table 3 provides a comprehensive list of all plant species encountered during the field surveys. No threatened or endangered plant species were found.

Table 3. Plant Species Observed During Field Surveys Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
Apiaceae	*Lomatium dissectum*	Fernleaf biscuitroot	X	
	Lomatium macrocarpum	Bigseed biscuitroot	X	
	Lomatium sp.	Biscuitroot	X	
Asteraceae	*Achillea millefolium*	Common yarrow	X	
	Antennaria dimorpha	Low pussytoes	X	
	Artemisia tridentata	Big sagebrush	X	
	Balsmorhiza caryana	Cary's balsamroot	X	
	Centaurea diffusa	Diffuse knapweed		X
	Centaurea sp.	Knapweed		X

Table 3. Plant Species Observed During Field Surveys Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
	Chaenactis douglasii	Douglas' dustymaiden	X	
	Cirsium undulatum	Wavyleaf thistle	X	
	Ericameria nauseosa	Gray rabbitbrush	X	
	Erigeron divergens	Spreading fleabane	X	
	Erigeron poliospermus	Purple cushion fleabane	X	
	Erigeron pumilis	Shaggy fleabane	X	
	Gutierrezia sarothrae	Broom snakeweed	X	
	Lactuca serriola	Prickly lettuce		X
	Lagophylla ramosissima	Branched lagophylla	X	
	Matricaria discoidea	Disc mayweed		X
	Nothocalais troximoides	Desert false-dandelion	X	
	Sonchus arvensis	Field sowthistle		X
	Tragopogon dubius	Yellow salsify		X
Boraginaceae	*Amsinckia lypcopsoides*	Tarweed fiddleneck	X	
	Amsinckia menziesii	Menzie's fiddleneck	X	
	Lappula occidentalis	Flatspine stickseed	X	
Brassicaceae	*Chorispora tenella*	Crossflower		X
	Crepis acuminata	Tapertip hawksbeard	X	
	Crepis modocensis	Modoc hawksbeard	X	
	Descurainia sophia	Herb sophis		X
	Lepidium perfoliatum	Clasping pepperweed		X
	Sisymbrium altissimum	Tall tumblemustard		X
Caryophyllaceae	*Holosteum umbellum*	Jagged chickweed		X
Chenopodiaceae	*Salsola tragus*	Russian thistle		X
Convolvulaceae	*Convolvulus arvensis*	Field bindweed		X
Cupressaceae	*Juniperus occidentalis*	Western juniper	X	
Fabaceae	*Astragalus collinus* var. *collinus*	Collin's milkvetch	X	
	Astragalus filipes	Basalt milkvetch	X	
	Astragalus purshii	Woolypod milkvetch	X	
	Lupinus argenteus	Silvery lupine	X	
	Lupinus lepidus	Pacific lupine	X	

Table 3. Plant Species Observed During Field Surveys Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
	Lupinus sericeus	Silky lupine	X	
	Oxytropus lagopus	Haresfoot locoweed	X	
Geraniaceae	*Erodium cicutarium*	Redstem stork's bill		X
Hydrophyllaceae	*Phacelia hastata*	Silverleaf phacelia	X	
Liliaceae	*Allium acuminatum*	Tapertip onion	X	
	Calochortus macrocarpus	Sagebrush mariposa lily	X	
Linaceae	*Linum lewisii*	Lewis flax	X	
Loasaceae	*Mentzelia albicaulis*	Whitestem blazingstar	X	
Malvaceae	*Sphaeralcea grossulariifolia*	Gooseberryleaf globemallow	X	
Onagraceae	*Epilobium brachycarpum*	Tall annual willowherb	X	
	Phlox diffusa	Spreading phlox	X	
Plantaginaceae	*Plantago patagonica*	Wooly plantain	X	
Poaceae	*Achnatherum hymenoides*	Indian ricegrass	X	
	Aegilops cylindrica	Jointed goatgrass		X
	Agropyron cristatum	Crested wheatgrass		X
	Bromus hordeaceus ssp. *hordeaceus*	Soft brome		X
	Bromus tectorum	Cheatgrass	X	
	Elymus elymoides	Squirreltail	X	
	Elymus lanceolatus	Thickspike wheatgrass	X	
	Festuca idahoensis	Idaho fescu		
	Hesperostipa comata	Needle and thread	X	
	Hordeum murinum	Mouse barley		X
	Koeleria macrantha	Prairie junegrass	X	
	Poa bulbosa	Bulbous bluegrass		X
	Poa secunda	Sandberg's bluegrass	X	
	Pseudoroegneria spicata	Bluebunch wheatgrass	X	
	Secale cereale	Cereal rye		X
	Taeniatherum caput-medusae	Medusahead		X
	Triticum aestivum	Wheat		X
	Ventenata dubia	North Africa grass		X
	Vulpia myuros	Annual fescue		X

Table 3. Plant Species Observed During Field Surveys Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
	Vulpia octoflora	Sixweeks fescue	X	
Polemoniaceae	*Collomia grandiflora*	Grand collomia	X	
	Phlox hoodii	Spiny phlox	X	
	Phlox longifolia	Logleaf phlox	X	
	Physara sp.	Bladderpod	X	
Polygonaceae	*Eriogonum* sp.	Buckwheat	X	
Ranunculaceae	*Ceratocephala testiculata*	Curveseed butterwort		X

4.0 Conclusion

The field surveys conducted in May and June of 2017 found no rare or special-status plants within the Montague Phase 1 study area, and the previous rare plants found by NWC during the 2009 survey are not within the current Phase 1 construction footprint. No further plant surveys are recommended.

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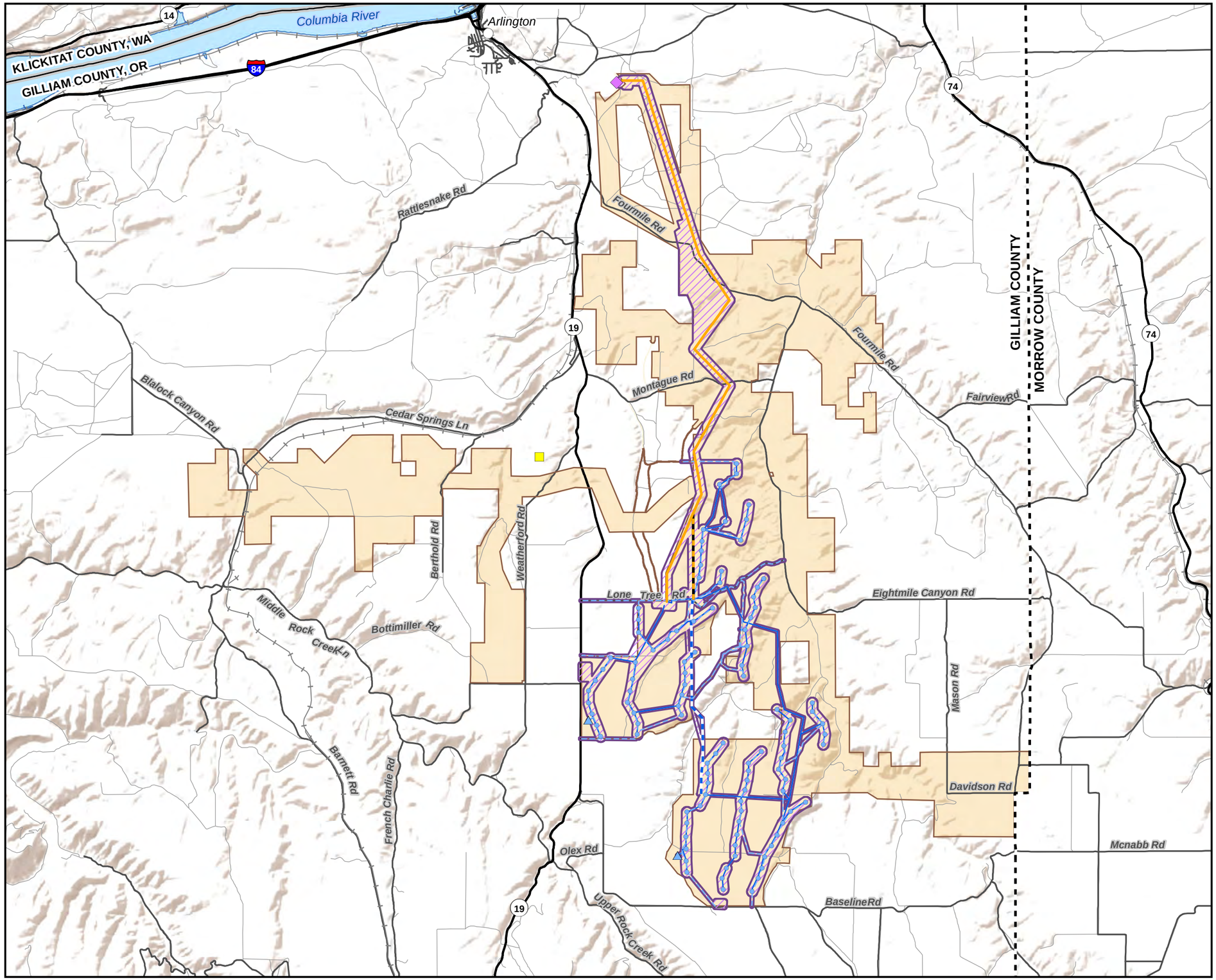
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Figure

Figure 1
2017 Rare Plant Survey Map
Montague Wind Power Facility - Phase 1



Legend

- Survey Corridor
- Approved Site Boundary
- Approved Micrositing Corridor
- Approved 230-kV Transmission Line
- Proposed Alternative 230-kV Transmission Line
- Existing Shared LJIIB O&M Building

Phase 1

- Turbine
- Access Road
- 34.5-kV Collector Line
- Proposed Alternative 34.5-kV Collector Line
- Meteorological Tower

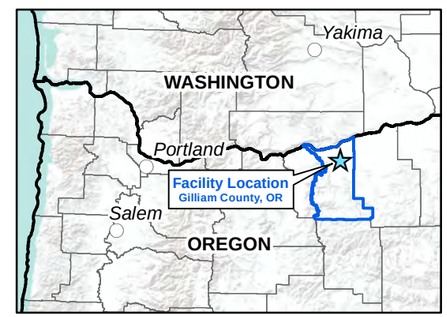
Existing Facilities

- Bonneville Power Administration Slatt Interconnection Substation

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line
- State Boundary
- County Boundary

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AVANGRID RENEWABLES

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Basemap Source: ESRI World Terrain Base

Attachment P-1b
2017 Rare Plant Survey Report—Phase 2

SURVEY REPORT

2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Prepared for

Avangrid Renewables, LLC,
d/b/a Montague Wind Power Facility, LLC

July 2017

CH2M HILL Engineers, Inc.
2020 SW 4th Avenue, Suite 300
Portland, OR 97201

Contents

Section Page

Acronyms and Abbreviations ..... **v**

1.0 Introduction **1**

2.0 Methodology **1**
2.1 Data Search 1
2.2 Field Surveys 1
2.2.1 Survey Protocol 1
2.2.2 Survey Practice 2

3.0 Results **3**
3.1 Data Search 3
3.1.1 Database Search 3
3.1.2 Plant Species Information and Habitat Requirements 5
3.1.3 Adjacent Project Information 9
3.2 Field Surveys 9

4.0 Conclusion **11**

5.0 References **11**

Figure

1 2017 Rare Plant Survey Map

Tables

1 Special-status Plant Species Potentially Found in the Analysis Area for the Montague Facility 4
2 Rare Plant Species Information and Habitat Requirements 6
3 Plant Species Observed During Field Survey Conducted May 23-26 and May 31-June 1, 2017 9

Acronyms and Abbreviations

CH2M	CH2M HILL Engineers, Inc.
d/b/a	doing business as
ESA	Endangered Species Act
Facility	Montague Wind Power Facility
LJIIA	Leaning Juniper IIA
LJIIB	Leaning Juniper IIB
Montague	Montague Wind Power Facility, LLC
NWC	Northwest Wildlife Consultants
ODA	Oregon Department of Agriculture
OESA	Oregon Endangered Species Act of 1987
ORBIC	Oregon Biodiversity Information Center
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

CH2M HILL Engineers, Inc. (CH2M) was retained by Avangrid Renewables, LLC, d/b/a Montague Wind Power Facility, LLC (Montague), to conduct rare plant surveys of all areas to be disturbed by construction of the proposed Montague Wind Power Facility Phase 2 (Facility) site boundary (Phase 2 study area) (Figure 1).

This report summarizes the vegetation data collected within the Phase 2 study area during surveys completed between May 23 and June 1, 2017. The rare plant survey methodology and results are documented in this report.

2.0 Methodology

2.1 Data Search

In advance of the field surveys, CH2M consulted the U.S. Fish and Wildlife Service (USFWS) county lists of *Federally Listed and Proposed Endangered and Threatened Species, Candidate Species and Species of Concern for* (USFWS, 2017) for Gilliam County, Oregon, the Oregon Department of Agriculture (ODA) *Oregon Listed Plants by County* (ODA, 2017), and the Oregon Biodiversity Information Center (ORBIC) database (ORBIC, 2017), to identify special-status species that potentially occur within the Facility site boundary and a 5-mile-radius analysis area.

Information on special-status plants with potential to occur in the analysis area was compiled before the field surveys. The information included habitat requirements, any known associated species, and elevation ranges. Field botanists used this information to focus the level of survey intensity in areas where site conditions indicated species habitat requirements may occur.

In addition to reviewing the above information sources, CH2M reviewed documents from several previously studied wind energy facilities located near the proposed Facility. The documents that summarize the results of rare plant surveys conducted for these projects include the following:

- **Leaning Juniper IIA (LJIIA).** *Final Order for the Leaning Juniper II Wind Power Facility (*ODOE, 2007)
- **Leaning Juniper IIB (LJIIB)**. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Appended to the *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility* (NWC, 2009)
- **Shepherds Flat.** *Final Order for the Shepherds Flat Wind Farm* (ODOE, 2008)
- **Pebble Springs**. *Pebble Springs Wind Project: Application for Conditional Use Permit* (PPM Energy, 2006)

2.2 Field Surveys

2.2.1 Survey Protocol

Surveys were floristic in nature and were conducted according to the U.S. Department of Interior Bureau of Land Management *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants* (Whiteaker et al., 1998). Two survey methods were used. An Intuitive Controlled Survey was conducted throughout the Facility site, and a Complete Survey was conducted in areas of high potential habitat. The protocol for these methods is described in Sections 2.2.1.1 and 2.2.1.2.

2.2.1.1 Intuitive Controlled Survey

An Intuitive Controlled Survey was conducted throughout the Phase 2 study area. The field botanist traversed the Phase 2 study area over representative cross-sections of all the major habitats and topographic features, looking for the target species while en route between different areas. When the field botanist arrived at an area of high potential (defined in the prefield review or encountered during the field visit), a survey for the target species was conducted.

2.2.1.2 Complete Survey

In areas with high probability of detecting sensitive species, the field botanist conducted a Complete Survey in which vascular plant taxa encountered were recorded in the field. Nearly all plant species found were identified to the level needed to determine whether they qualify as special-status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references such as *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955–1969). Plant identification was also aided by current taxonomic guides and other standard references.

2.2.2 Survey Practice

Plant surveys were conducted May 23 to 26 and May 31 to June 1, 2017, by teams led by qualified botanists with experience in vegetation of the Columbia Plateau region. The Phase 2 study area is defined as all areas within the proposed Facility footprint, as shown on Figure 1, not currently in agricultural production, or consisting of residential or farm operation facilities. The survey time was selected to coincide with the optimum bloom time for the target species. Lists of all vascular plant taxa encountered were recorded in the field. Plant species found were identified to the level needed to determine whether they qualify as special-status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references, including the following:

- *Field Guide to the Rare Plants of Washington* (WNHP, 2017)
- *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973)
- *Manual of Grasses of the United States* (Hitchcock, 1971)
- *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955-1969)
- *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness, 1973)
- *Northwest Weeds* (Taylor, 1990)
- *Oregon Flora Project Rare Plant Guide* (OFP, 2017)
- *Oregon Threatened or Endangered Plant Field Guide* (ORBIC, 2009)
- *Rare and Endangered Plants of Oregon* (Eastman, 1990)
- *Threatened and Endangered Vascular Plants of Oregon* (Meinke, 1982)
- *Weeds of the West* (Whitson, 2000)
- *Wetland Plants of Oregon and Washington* (Guard, 1995)

3.0 Results

3.1 Data Search

3.1.1 Database Search

A search of the USFWS county lists (USFWS, 2017), ODA state list (ODA, 2017), and ORBIC database (ORBIC, 2017) identified 27 special-status species as potentially occurring in the analysis area (Table 1). Review of habitat requirements for all species identified nine special-status species with potential to occur within the Phase 2 study area. Target species for the surveys consisted of three species listed as state or federally threatened or endangered or as candidates for such listing. These were the state-listed threatened plant species, Laurent's milk-vetch (*Astragalus collinus* var. *laurentii*), and the state candidate species, sessile mousetail (*Myosurus sessilis*) and dwarf evening primrose (*Camissonia pygmaea*).

Table 1. Special-status Plant Species Potentially Found in the Analysis Area for the Montague Facility
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Scientific Name	Common Name	Federal Status	ODA/ ORBIC Status	Potential Habitat Present
Abronia mellifera	White sand verbena	--	--/3	No
Allium robinsonii	Robinson's onion	SoC	-- / 2-ex	No
Artemesia borealis ssp. *wormskioldi*	Northern wormwood	C	LE / 1-ex	No
Astragalus collinus var. *laurentii*	Laurent's milk-vetch	SoC	LT / 1	Yes
A. conjunctus var. *conjunctus*	Idaho milk-vetch	--	--/3	Yes
A. pulsiferaie var. suksdorfii	Ames' milk-vetch	SoC	-- / --	No
A. scleroscarpus	Stalked-pod milk-vetch	--	-- / 3	Yes
A. succumbens	Columbia milk-vetch	--	-- / 4	Yes
Boechera cusickii	Cusick's rockcress	--	--/3	Yes
Calochortus longebarbatus var. *longebarbatus*	Long-beared sego lily	SoC	-- / 4	No
Camissonia pygmaea	Dwarf evening primrose	SoC	C / 1	Yes
Cryptantha leucophaea	Gray cryptantha	--	-- / 2-ex	No
Cypripedium fasciculatum	Clustered lady's-slipper	SoC	C / 2	No
Lesquerella douglasii	Columbia bladderpod	--	-- / 3	Yes
Lomatium suksdorfii	Suksdorf's desert-parsley	SoC	C / 1	No
L. watsonii	Watson's desert-parsley	--	-- / 2	Yes
Meconella oregano	White meconella	SoC	C / 1	No
Mimulus evanescens	Disappearing monkeyflower	SoC	C / 1	No
Mimulus jungermannioides	Hepatic monkeyflower	SoC	C / 4	No
Myosurus sessilis	Sessile mousetail	SoC	C / 1	Yes
Penstemon barrerttiae	Barrett's beardtongue	SoC	C / 1	No
Pinus albicaulis	Whitebark pine	SoC	-- /	No
Ranunculus reconditus (= *triternatus*)	Obscure buttercup	SoC	LE / 1	No
Rorippa columbiae	Persistent sepal yellowcress	SoC	C / 1	No
Spiranthes diluvialis	Ute ladies'-tresses	LT	-- / --	No
Sysyrhinchium sarmentosum	Pale blue-eyed grass	SoC	C / 1	No
Texosporium sancti-jacobi	Woven spore lichen	SoC	-- / 2	No

Status Definitions

LE Listed Endangered. Taxa listed by the USFWS as endangered under the Endangered Species Act (ESA), or by the Oregon Departments of Agriculture (ODA) under the Oregon Endangered Species Act of 1987 (OESA). Endangered taxa are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

LT Listed Threatened. Taxa listed by the above agencies as threatened; defined as those taxa likely to become endangered within the foreseeable future.

Table 1. Special-status Plant Species Potentially Found in the Analysis Area for the Montague Facility
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Scientific Name	Common Name	Federal Status	ODA/ ORBIC Status	Potential Habitat Present

C Candidate. Candidate taxa for which USFWS have sufficient information to support a proposal to list under the ESA, or which is a candidate for listing by the ODA under the OESA.

SoC Federal species of concern.

ORBIC List 1 – Threatened or endangered throughout range.

ORBIC List 2 – Threatened, endangered, or extirpated from Oregon; secure elsewhere.

ORBIC List 3 – Review.

ORBIC List 4 – Watch.

Ex – Believed extirpated.

3.1.2 Plant Species Information and Habitat Requirements

Information on special-status plants with potential to occur in or near the site boundary was compiled before the field visits. The information included habitat requirements, any known associated species, and elevation ranges (Table 2). This information was used to focus the level of survey intensity in areas where site conditions indicated species habitat requirements may occur.

Table 2. Rare Plant Species Information and Habitat Requirements

2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Abronia mellifera	White sand verbena	Nyctaginaceae	Shrub-steppe. Dunes and sandy soils at low elevations.	Unknown	Endemic to the Pacific northwestern states: Wyoming, Oregon, Washington, and Idaho. Locally common.
Allium robinsonii	Robinson's onion	Liliaceae	Sand and gravel deposits along the Columbia River from near Vantage, Washington, to about the mouth of the John Day River, Oregon, apparently restricted to the bottom and lower benches of the river valley.	60 to 650 feet	Believed extirpated from Oregon.
Artemesia borealis ssp. *wormskioldi*	Northern wormwood	Asteraceae	Arid sites generally supporting shrub-steppe vegetation. Grows on basalt, compacted cobble, and sand in generally flat terrain.	Unknown	Believed extirpated from Oregon.
Astragalus collinus var. *laurentii*	Laurent's milk-vetch	Fabaceae	Occurs on dry slopes, in sandy or rocky substrates. Endemic to the Columbia Plateau, in Gilliam, Morrow, and Umatilla counties, Oregon, and possibly Sherman County as well.	1,800 to 3,300 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
A. conjunctus var. *conjunctus*	Idaho milk-vetch	Fabaceae	Found on dry rocky slopes, scablands, and hilltops throughout the sagebrush desert.	Above 2,000 feet	None
A. pulsiferaie var. *suksdorfii*	Ames' milk-vetch	Fabaceae	Found in generally flat or very gentle terrain in coarse textured substrates; occurs in relatively open ponderosa pine forests with bitterbrush.	1,800 to 1,900 feet	None
A. scleroscarpus	Stalked-pod milk-vetch	Fabaceae--	Dunes and sandy barrens.	200 to 600 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
A. succumbens	Columbia milk-vetch	Fabaceae--	Sandy places and rocky sagebrush desert, from the Columbia River to the lower foothills.	300 to 700 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
Boechera cusickii	Cusick's rockcress	Brassicaceae	Sagebrush flats to open Ponderosa pine forests; often on lithosol.	1,970 to 5,900 feet	None
Calochortus longebarbatus var. *longebarbatus*	Long-beared sego lily	Liliaceae	Clay loams in vernally moist sites in meadows, forest meadow edges, and within semi-open areas within coniferous woods dominated by grasses and forbs.	1,800 to 3,000 feet	None

Table 2. Rare Plant Species Information and Habitat Requirements
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Camissonia pygmaea	Dwarf evening primrose	Onagraceae	Found on unstable soil or gravel in steep talus, dry washes, banks, and roadcuts. Occurs in habitats that are maintained in an open condition by erosion and the generally harsh environment.	500 to 1,800 feet	Flowering period is extended enough so that flowers and fruits have been observed on the same plant. The species is generally recognizable between June and August.
Cryptantha leucophaea	Gray cryptantha	Boraginaceae	Sandy substrate along the Columbia River within the Columbia Basin physiographic province; especially unstable sand dunes.	300 to 2,500 feet	Historical ORBIC record located outside of site boundary.
Cypripedium fasciculatum	Clustered lady's-slipper	Orchidaceae	Mid- to late-seral Douglas-fir forest.	1,200 to 5,000 feet	None
Lesquerella douglasii	Columbia bladderpod	Brassicaceae	Sandy and gravelly soils in sagebrush and into arid juniper or ponderosa pine woodlands.	200 to 800 feet	Documented outside of the site boundary during surveys conducted for Leaning Juniper IIB. Historical ORBIC record located outside of site boundary.
Lomatium suksdorfii	Suksdorf's desert-parsley	Apiaceae	Semi-open to open dry, rocky hillsides on moderate to steep slopes.	350 to 3,500 feet	None
L. watsonii	Watson's desert-parsley	Apiaceae	Arid, open, often rocky hillsides. Often found amongst sagebrush.	Unknown	Historical ORBIC record located outside of site boundary.
Meconella oregano	White meconella	Papaveraceae	Occurs in open grasslands and grassland/woodland mosaic on gentle to steeply sloping sites.	100 to 450 feet	None
Mimulus evanescens	Disappearing monkeyflower	Scrophulariaceae	Occurs within sagebrush-juniper-dominated vegetation zones. Occurs in drying pools, along streambeds, adjacent to pond margins, in wet areas near boulders, etc. Occurs in moist gravelly, rocky areas, and low, wet fields, in sagebrush-juniper zones.	3,900 to 5,600 feet	Only two existing sites: Moll Reservoir in Lassen County, California; and Drews Reservoir in Lake County, Oregon.
Mimulus jungermannioides	Liverwort monkeyflower	Scrophulariaceae	Occurs in basalt crevices in seepage zones of vertical cliff faces and canyon walls.	500 to 3,300 feet	Documented in Wasco County, Oregon. Moist, shaded basaltic cliffs adjacent to the water. Plants are generally under an overhanging area of rock; bottom slope; filtered shade; moist; basalt cliffs. Associated species: *Mimulus guttatus*, *Huechera cylindrica*.

Table 2. Rare Plant Species Information and Habitat Requirements
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Myosurus sessilis	Sessile mousetail	Ranunculaceae	Occurs in vernal pools and alkali flats.	Unknown	Documented within the site boundary during surveys conducted for Pebble Springs and LJIIB projects. Additional areas of potentially suitable habitat identified within site boundary in 2009.
Penstemon barrerttiae	Barrett's beardtongue	Scrophulariaceae	Crevices along basalt cliff faces, on rock outcrop ledges, open talus, and occasionally on well-drained roadsides.	Below 3,200 feet	None
Pinus albicaulis	Whitebark pine	Pinaceae	Grows in exposed subalpine zone near treeline.	Subalpine zone	None
Ranunculus reconditus (= *triternatus*)	Obscure buttercup	Ranunculaceae	Upper elevations of Columbia Hills; meadow-steppe habitat dominated by perennial xerophytic bunchgrass and broad-leaved herbs.	2,240 to 3,220 feet	None
Rorippa columbiae	Persistent sepal yellowcress	Brassicaceae	Observed near all types of bodies of water. Known from a wide variety of soil types, including clay, sand, gravel, sandy silt, cobblestones and rocks. Individuals are usually found in open habitats that have low vegetative cover. A common feature of all of the known sites is inundation for at least part of the year.	3 to 7 feet	None
Spiranthes diluvialis	Ute ladies'-tresses	Orchidaceae	Grows along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers, as well as in wetlands and seeps near freshwater lakes or springs.	720 to 1,830 feet	None
Sysyrhinchium sarmentosum	Pale blue-eyed grass	Iridaceae	The species occurs in meadows and small openings.	1,600 to 4,200 feet	None
Texosporium sancti-jacobi	Woven spore lichen	Caliciaceae	Grows in arid to semi-arid shrub-steppe, grassland or savannah communities.	Up to 3,300 feet	None

3.1.3 Adjacent Project Information

During surveys of LJIIA, four populations of the Oregon candidate species, sessile mousetail, were identified in areas that overlap with the Montague site boundary (ODOE, 2007; ODOE, 2008). In addition, during the information review of Shepherds Flat, sessile mousetail was identified within the analysis area, but outside of the site boundary and outside of the Montague site boundary (Caithness Shepherds Flat, 2007).

In spring 2009, Northwest Wildlife Consultants (NWC) conducted surveys for state- and federally listed and nonlisted special-status plants in areas of the Montague site boundary that overlap with the site boundary for Pebble Springs (PPM, 2006). In spring 2009, NWC conducted similar surveys for LJIIB (NWC, 2009). One state-listed threatened plant species, Laurent's milk-vetch, was documented at LJIIB and within the Montague site boundary during surveys conducted for LJIIB. In addition, one population of the Oregon candidate plant species, sessile mousetail, was identified within the Montague site boundary during surveys conducted for LJIIB (NWC, 2009) and two populations of this species were identified within the site boundary during surveys conducted for Pebble Springs (PPM Energy, 2006).

Two rare plant species with no listed status that are monitored by the ORBIC, stalked-pod milk-vetch (*Astragalus scleroscarpus*) and Columbia milk-vetch (*Astragalus succumbens*), were identified within the Montague site boundary during surveys for LJIIB (NWC, 2009). Three additional rare species monitored by the ORBIC, Columbia bladderpod (*Lesquerella douglasii*) (historical – 1938), gray cryptantha (*Cryptantha leucophaea*) (historical – 1882), and Watson's desert parsley (*Lomatium watsonii*) (historical – 1938), were identified in the vicinity, but outside of the Montague site boundary, during surveys for LJIIB (NWC, 2009). Columbia bladderpod was also identified within the analysis area, but outside of the Montague site boundary during surveys conducted for LJIIB (NWC, 2009).

3.2 Field Surveys

The objective of the rare plant survey was to determine whether special-status plant species occur onsite. Field surveys were conducted May 23 to 26 and May 31 to June 1, 2017. All plant species encountered in the Phase 2 survey areas were identified to at least genus and to the level necessary to ensure that they were not special-status plant species. Table 3 provides a comprehensive list of all plant species encountered during the field surveys. No threatened or endangered plant species were found.

Table 3. Plant Species Observed During Field Survey Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Family	Scientific Name	Common Name	Native	Non-native
Apiaceae	Lomatium macrocarpum	bigseed biscuitroot	X	
Asteraceae	*Achillea millefolium*	common yarrow	X	
	Artemisia tridentata	big sagebrush	X	
	Balsmorhiza caryana	Cary's balsamroot	X	
	Centaurea sp.	knapweed		X
	Chaenactis douglasii	Douglas' dustymaiden	X	
	Cirsium undulatum	wavyleaf thistle	X	
	Ericameria nauseosa	gray rabbitbrush	X	
	Erigeron divergens	spreading fleabane	X	

Table 3. Plant Species Observed During Field Survey Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Family	Scientific Name	Common Name	Native	Non-native
	Erigeron poliospermus	purple cushion fleabane	X	
	Erigeron pumilis	shaggy fleabane	X	
	Gutierrezia sarothrae	broom snakeweed	X	
	Lactuca serriola	prickly lettuce		X
	Lagophylla ramosissima	branched lagophylla	X	
	Matricaria discoidea	disc mayweed		X
	Tragopogon dubius	yellow salsify		X
Boraginaceae	*Amsinckia lypcopsoides*	tarweed fiddleneck	X	
	Amsinckia menziesii	Menzie's fiddleneck	X	
Brassicaceae	*Chorispora tenella*	crossflower		X
	Crepis acuminata	tapertip hawksbeard	X	
	Lepidium perfoliatum	clasping pepperweed		X
	Sisymbrium altissimum	tall tumblemustard		X
Chenopodiaceae	*Salsola tragus*	Russian thistle		X
Cupressaceae	*Juniperus occidentalis*	western juniper	X	
Fabaceae	*Astragalus collinus var. collinus*	Collin's milkvetch	X	
	Astragalus filipes	basalt milkvetch	X	
	Astragalus purshii	woolypod milkvetch	X	
	Lupinus sericeus	silky lupine	X	
	Medicago sativa	alfalfa		X
Geraniaceae	*Erodium cicutarium*	redstem stork's bill		X
Linaceae	*Linum lewisii*	Lewis flax	X	
Plantaginaceae	*Plantago patagonica*	wooly plantain	X	
Poaceae	*Achnatherum thurberianum*	Turber's needlegrass	X	
	Aegilops cylindrica	jointed goatgrass		X
	Agropyron cristatum	crested wheatgrass		X
	Bromus tectorum	cheatgrass	X	
	Festuca idahoensis	Idaho fescue	X	
	Festuca rubra	red fescue	X	
	Hesperostipa comata	needle and thread	X	
	Hordeum murinum	mouse barley		X

Table 3. Plant Species Observed During Field Survey Conducted May 23-26 and May 31-June 1, 2017
2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 2

Family	Scientific Name	Common Name	Native	Non-native
	Poa bulbosa	bulbous bluegrass		X
	Poa secunda	Sandberg's bluegrass	X	
	Pseudoroegneria spicata	bluebunch wheatgrass	X	
	Secale cereale	cereal rye		X
	Taeniatherum caput-medusae	medusahead		X
	Triticum aestivum	wheat		X
	Vulpia myuros	annual fescue		X
	Vulpia octoflora	sixweeks fescue	X	
Polemoniaceae	*Phlox longifolia*	logleaf phlox	X	
	Physaria sp.	bladderpod	X	
Polygonaceae	*Polygonum aviculare*	prostrate knotweed		X
Valerianaceae	*Plectritis* sp.	plectritis	X	

4.0 Conclusion

The field surveys conducted in May and June of 2017 found no rare or special-status plants within the Montague Phase 2 study area, and the previous rare plants found by NWC during the 2009 survey are not within the current Phase 2 construction footprint. No further plant surveys are recommended.

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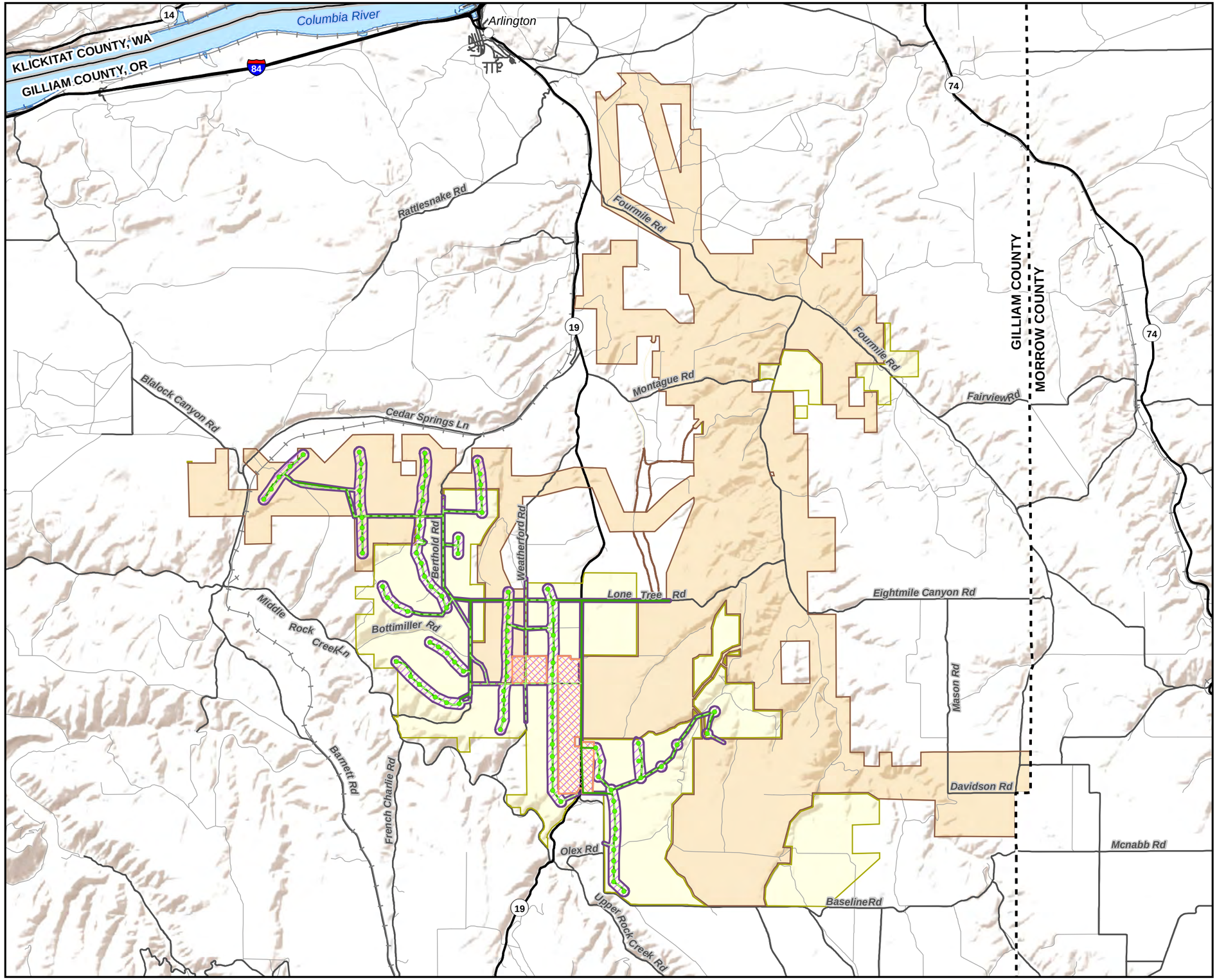
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Figure

Figure 1
2017 Rare Plant Survey Map
Montague Wind Power Facility - Phase 2



Legend

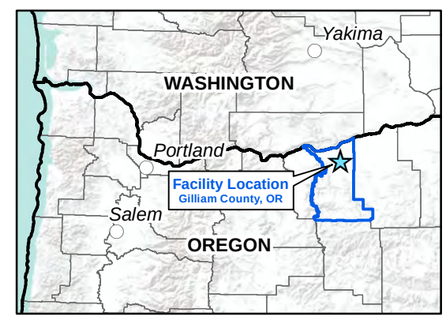
- Survey Corridor
- Approved Site Boundary
- Approved Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor

Phase 2

- Turbine
- Access Road
- 34.5-kV Collector Line
- Proposed Solar and Battery Storage Site Boundary
- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line
- State Boundary
- County Boundary

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Basemap Source: ESRI World Terrain Base

Attachment P-1c
2018 Rare Plant Supplemental Surveys for Montague Wind Power Facility—Phase 1

SURVEY REPORT

2018 Rare Plant Supplemental Surveys for Montague Wind Power Facility—Phase 1

Prepared for

Avangrid Renewables, LLC,
d/b/a Montague Wind Power Facility, LLC

October 2018

CH2M HILL Engineers, Inc.
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Contents

Section Page

Acronyms and Abbreviations ..... **v**

1.0 Introduction **1**
1.1 Purpose 1
1.2 Background 1

2.0 Methodology **1**

3.0 Field Surveys **2**
3.1 Survey Protocol 2
3.1.1 Intuitive Controlled Survey 2
3.1.2 Complete Survey 2
3.2 Survey Practice 2

4.0 Results **3**
4.1 Data Search 3
4.2 Field Surveys 3

5.0 Conclusion **6**

6.0 References **7**

Table

1 Plant Species Observed, May 23-26 and May 31-June 1, 2017, and June 11-15, 2018 3

Figure

1 2018 Rare Plant Survey Map

Acronyms and Abbreviations

CH2M	CH2M HILL Engineers, Inc.
d/b/a	doing business as
EFSC	Energy Facility Siting Council
Facility	Montague Wind Power Facility
LJIIA	Leaning Juniper IIA
LJIIB	Leaning Juniper IIB
Montague	Montague Wind Power Facility, LLC
NWC	Northwest Wildlife Consultants
ODA	Oregon Department of Agriculture
ORBIC	Oregon Biodiversity Information Center
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

CH2M HILL Engineers, Inc. (CH2M) was retained by Montague Wind Power Facility, LLC (Montague) to conduct additional rare plant surveys of areas to be disturbed by construction of the Montague Wind Power Facility Phase 1 (Facility) site boundary (Phase 1 study area) (Figure 1). CH2M conducted the initial surveys in 2017. The results of those surveys are documented in *2017 Rare plant Surveys for Montague Wind Power Facility – Phase 1* (CH2M, 2017a) (2017 Report). The additional survey areas are the result of minor changes to the Facility's final design and layout.

1.1 Purpose

This report is intended to meet Condition 95(b) of the *Site Certificate for the Montague Wind Power Facility* (EFSC, 2010) for potentially occurring threatened and endangered (rare) plant species. A separate report was prepared to address threatened and endangered wildlife in accordance with this condition (CH2M, 2017b). This supplemental rare plant report summarizes the vegetation data collected within the Phase 1 study area during surveys completed between June 11 and 15, 2018. The rare plant survey methodology and results are documented in this report.

1.2 Background

In 2010, Oregon's Energy Facility Siting Council (EFSC) issued a Site Certificate to Montague for the Facility (EFSC, 2010). Phase 1 construction began on September 11, 2017, in compliance with the *Third Amended Site Certificate* (EFSC, 2017). Before construction began, CH2M provided Phase 1 preconstruction support to Montague in compliance with specified site certificate conditions. Preconstruction support included threatened and endangered (rare) plant surveys conducted in compliance with Condition 95(b), which requires that Montague "conduct a survey of all areas to be disturbed by construction for threatened and endangered species" (EFSC, 2017, p. 23)

On August 23, 2017, the Oregon Department of Energy confirmed, in consultation with ODA, that the 2017 Phase 1 rare plant surveys, as documented in the July 17, 2017, submittal of the report titled *2017 Rare Plant Surveys for Montague Wind Power Facility – Phase I* (CH2M, 2017a), appropriately satisfies the requirements of Condition 93(b).

Since 2017, the engineering team has refined its design and layout, and some facilities and construction activities are now planned for implementation in areas outside of cultivated fields that were not identified in the 2017 preconstruction submittals. Approximately 665 acres of land have been identified for supplemental rare plant surveys within Montague's approved micrositing corridor. This report documents the results of the supplemental surveys conducted by CH2M. The 2018 methodology, results, and associated mapping documented in this report are consistent with the methods described in the *2017 Rare Plant Surveys for Montague Wind Power Facility – Phase I* (CH2M, 2017a) and in Exhibit Q (*Threatened and Endangered Plant and Animal Species*) of the *Application for Site Certificate* (Iberdrola, 2010).

2.0 Methodology

In advance of the field surveys, CH2M consulted the U.S. Fish and Wildlife Service (USFWS) county lists of *Federally Listed and Proposed Endangered and Threatened Species, Candidate Species and Species of Concern for* (USFWS, 2017) for Gilliam County, Oregon, the Oregon Department of Agriculture (ODA) *Oregon Listed Plants by County* (ODA, 2018), and the Oregon Biodiversity Information Center (ORBIC)

database (ORBIC, 2017), to identify special-status species that potentially occur within the Facility site boundary and a 5-mile-radius analysis area.

Information on special-status plants with potential to occur in the analysis area was compiled before the field surveys. The information included habitat requirements, any known associated species, and elevation ranges. Field botanists used this information to focus the level of survey intensity in areas where site conditions indicated species habitat requirements may occur.

In addition to reviewing the above information sources, CH2M reviewed the following documents from several previously studied wind energy facilities located near the proposed Facility:

- **Leaning Juniper IIA (LJIIA).** *Final Order for the Leaning Juniper II Wind Power Facility (*ODOE, 2007)
- **Leaning Juniper IIB (LJIIB)**. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Appended to the *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility* (NWC, 2009)
- **Shepherds Flat.** *Final Order for the Shepherds Flat Wind Farm* (ODOE, 2008)
- **Pebble Springs**. *Pebble Springs Wind Project: Application for Conditional Use Permit* (PPM Energy, 2006)

3.0 Field Surveys

3.1 Survey Protocol

Surveys were floristic in nature and were conducted according to the U.S. Department of Interior Bureau of Land Management *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants* (Whiteaker et al., 1998). Two survey methods were used. An Intuitive Controlled Survey was conducted throughout the Facility site, and a Complete Survey was conducted in areas of high potential habitat. The protocol for these methods is described in Sections 3.1.1 and 3.1.2, respectively.

3.1.1 Intuitive Controlled Survey

An Intuitive Controlled Survey was conducted throughout the Phase 1 study area. The field botanist traversed the Phase 1 study area over representative cross-sections of all the major habitats and topographic features, looking for the target species while en route between different areas. When the field botanist arrived at an area of high potential (defined in the prefield review or encountered during the field visit), a survey for the target species was conducted.

3.1.2 Complete Survey

In areas with high probability of detecting sensitive species, the field botanist conducted a Complete Survey in which vascular plant taxa encountered were recorded in the field. Nearly all plant species found were identified to the level needed to determine whether they qualify as special-status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references such as *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955–1969). Plant identification was also aided by current taxonomic guides and other standard references.

3.2 Survey Practice

Plant surveys were conducted between June 11 and 15, 2018, by a qualified CH2M botanist with experience in vegetation of the Columbia Plateau region. The Phase 1 study area is defined as all areas

within the proposed Facility footprint not currently in agricultural production or consisting of residential or farm operation facilities. The 2018 supplemental survey areas are shown in relation to the 2017 survey areas on Figure 1. The survey time was selected to coincide with the optimum bloom time for the target species. Lists of all vascular plant taxa encountered were recorded in the field. Plant species found were identified to the level needed to determine whether they qualify as special-status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references, including the following:

- *Field Guide to the Rare Plants of Washington* (WNHP, 2018)
- *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973)
- *Manual of Grasses of the United States* (Hitchcock, 1971)
- *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955-1969)
- *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness, 1973)
- *Northwest Weeds* (Taylor, 1990)
- *Oregon Flora Project Rare Plant Guide* (OFP, 2018)
- *Rare and Endangered Plants of Oregon* (Eastman, 1990)
- *Threatened and Endangered Vascular Plants of Oregon* (Meinke, 1982)
- *Weeds of the West* (Whitson, 2000)

4.0 Results

4.1 Data Search

A search of the USFWS county lists (USFWS, 2017), ODA state list (ODA, 2018), and ORBIC database (ORBIC, 2017) identified 27 special-status species as potentially occurring in the analysis area. Review of habitat requirements for all species identified nine special-status species with potential to occur within the Phase 1 study area. A complete summary of database search results and plant species information and habitat requirements is provided in the 2017 Report (CH2M, 2017a).

Target species for the surveys consisted of three species listed as state or federally threatened or endangered or as candidates for such listing. These were the state-listed threatened plant species, Laurent's milk-vetch (*Astragalus collinus* var. *laurentii*), and the state candidate species, sessile mousetail (*Myosurus sessilis*) and dwarf evening primrose (*Camissonia pygmaea*).

4.2 Field Surveys

The objective of the rare plant survey was to determine whether special-status plant species occur onsite. The supplemental field surveys were conducted between June 11 and 15, 2018. Plant species encountered in the additional Phase 1 study areas were identified to at least genus and to the level necessary to ensure that they were not special-status plant species. Table 1 provides a comprehensive list of all plant species encountered during the 2017 and 2018 field surveys. No threatened or endangered plant species were found.

Table 1. Plant Species Observed, May 23-26 and May 31-June 1, 2017, and June 11-15, 2018
2018 Rare Plant Supplemental Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
Apiaceae	*Lomatium dissectum*	fernleaf biscuitroot	X	
	Lomatium macrocarpum	bigseed biscuitroot	X	
	Lomatium sp.	biscuitroot	X	

Table 1. Plant Species Observed, May 23-26 and May 31-June 1, 2017, and June 11-15, 2018
2018 Rare Plant Supplemental Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
Asclepidiaceae	*Asclepias fascicularis*	Mexican whorled milkweed	X	
Asteraceae	*Achillea millefolium*	common yarrow	X	X
	Antennaria dimorpha	low pussytoes	X	
	Artemisia tridentata	big sagebrush	X	
	Balsmorhiza caryana	Cary's balsamroot	X	
	Centaurea diffusa	diffuse knapweed		X
	Centaurea solstitialis	yellow starthistle		X
	Centaurea sp.	knapweed		X
	Centaurea virgata	squarrose knapweed		X
	Centromadia pungens	Common tarweed	X	
	Chaenactis douglasii	Douglas' dustymaiden	X	
	Cirsium undulatum	wavyleaf thistle	X	
	Ericameria nauseosa	gray rabbitbrush	X	
	Erigeron divergens	spreading fleabane	X	
	Erigeron poliospermus	purple cushion fleabane	X	
	Erigeron pumilis	shaggy fleabane	X	
	Gutierrezia sarothrae	broom snakeweed	X	
	Lactuca serriola	prickly lettuce		X
	Lagophylla ramosissima	branched lagophylla	X	
	Matricaria discoidea	disc mayweed		X
	Nothocalais troximoides	desert false-dandelion	X	
	Onopordum acanthium	Scotch thistle		X
	Sonchus arvensis	field sowthistle		X
	Tragopogon dubius	yellow salsify		X
	Wyethia amplexicaulis	Mule-ears	X	
Boraginaceae	*Amsinckia lypcopsoides*	tarweed fiddleneck	X	
	Amsinckia menziesii	Menzie's fiddleneck	X	
	Lappula occidentalis	flatspine stickseed	X	
	Lithospermum ruderale	Puccoon	X	
Brassicaceae	*Chorispora tenella*	crossflower		X
	Crepis acuminata	tapertip hawksbeard	X	
	Crepis modocensis	Modoc hawksbeard	X	

Table 1. Plant Species Observed, May 23-26 and May 31-June 1, 2017, and June 11-15, 2018
2018 Rare Plant Supplemental Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
	Descurainia sophia	herb sophis		X
	Lepidium perfoliatum	clasping pepperweed		X
	Sisymbrium altissimum	tall tumblemustard		X
Caryophyllaceae	*Holosteum umbellum*	jagged chickweed		X
Chenopodiaceae	*Salsola tragus*	Russian thistle		X
Convolvulaceae	*Convolvulus arvensis*	field bindweed		X
Cupressaceae	*Juniperus occidentalis*	western juniper	X	
Fabaceae	*Astragalus collinus* var. *collinus*	Collin's milkvetch	X	
	Astragalus filipes	basalt milkvetch	X	
	Astragalus lentiginosus	freckled milkvetch	X	
	Astragalus purshii	woolypod milkvetch	X	
	Astragalus tweedyi	Tweedy's milkvetch	X	
	Lupinus argenteus	silvery lupine	X	
	Lupinus bicolor	miniature lupine	X	
	Lupinus lepidus	Pacific lupine	X	
	Lupinus sericeus	silky lupine	X	
	Medicago sativa	Alflalfa		X
	Oxytropus lagopus	haresfoot locoweed	X	
Geraniaceae	*Erodium cicutarium*	redstem stork's bill		X
Hydrophyllaceae	*Phacelia hastata*	silverleaf phacelia	X	
Liliaceae	*Allium acuminatum*	tapertip onion	X	
	Calochortus macrocarpus	sagebrush mariposa lily	X	
Linaceae	*Linum lewisii*	Lewis flax	X	
Loasaceae	*Mentzelia albicaulis*	whitestem blazingstar	X	
Malvaceae	*Sphaeralcea grossulariifolia*	gooseberryleaf globemallow	X	
Onagraceae	*Epilobium brachycarpum*	tall annual willowherb	X	
	Phlox diffusa	spreading phlox	X	
Plantaginaceae	*Plantago patagonica*	wooly plantain	X	
Poaceae	*Achnatherum hymenoides*	Indian ricegrass	X	
	Aegilops cylindrica	jointed goatgrass		X
	Agropyron cristatum	crested wheatgrass		X
	Agrostis exarata	spike bentgrass	X	

Table 1. Plant Species Observed, May 23-26 and May 31-June 1, 2017, and June 11-15, 2018
2018 Rare Plant Supplemental Surveys for Montague Wind Power Facility—Phase 1

Family	Scientific Name	Common Name	Native	Non-native
	Bromus hordeaceus ssp. *hordeaceus*	soft brome		X
	Bromus tectorum	cheatgrass	X	
	Elymus elymoides	squirreltail	X	
	Elymus lanceolatus	thickspike wheatgrass	X	
	Festuca idahoensis	Idaho fescu	X	
	Hesperostipa comata	needle and thread	X	
	Hordeum murinum	mouse barley		X
	Koeleria macrantha	prairie junegrass	X	
	Poa bulbosa	bulbous bluegrass		X
	Poa secunda	Sandberg's bluegrass	X	
	Pseudoroegneria spicata	bluebunch wheatgrass	X	
	Secale cereale	cereal rye		X
	Taeniatherum caput-medusae	medusahead		X
	Triticum aestivum	wheat		X
	Ventenata dubia	North Africa grass		X
	Vulpia myuros	annual fescue		X
	Vulpia octoflora	sixweeks fescue	X	
Polemoniaceae	*Collomia grandiflora*	grand collomia	X	
	Navarretia tagetina	marigold pincushionplant	X	
	Phlox hoodii	spiny phlox	X	
	Phlox longifolia	logleaf phlox	X	
	Physara sp.	bladderpod	X	
Polygonaceae	*Eriogonum* sp.	buckwheat	X	
Ranunculaceae	*Ceratocephala testiculata*	curveseed butterwort		X

5.0 Conclusion

The field surveys conducted in June 2018 found no rare or special-status plants within the Montague additional Phase 1 study area. No further plant surveys are recommended.

6.0 References

CH2M HILL Engineers, Inc. 2017a. *2017 Rare Plant Surveys for Montague Wind Power Facility—Phase 1*. Prepared for Avangrid Renewables, LLC, d/b/a Montague Wind Power Facility, LLC. July.

CH2M HILL Engineers, Inc. (CH2M). 2017b. *2017 Washington Ground Squirrel Surveys and Habitat Mapping for Montague Wind Power Facility—Phase 1*. Prepared for Avangrid Renewables, LLC, d/b/a Montague Wind Power Facility, LLC. July.

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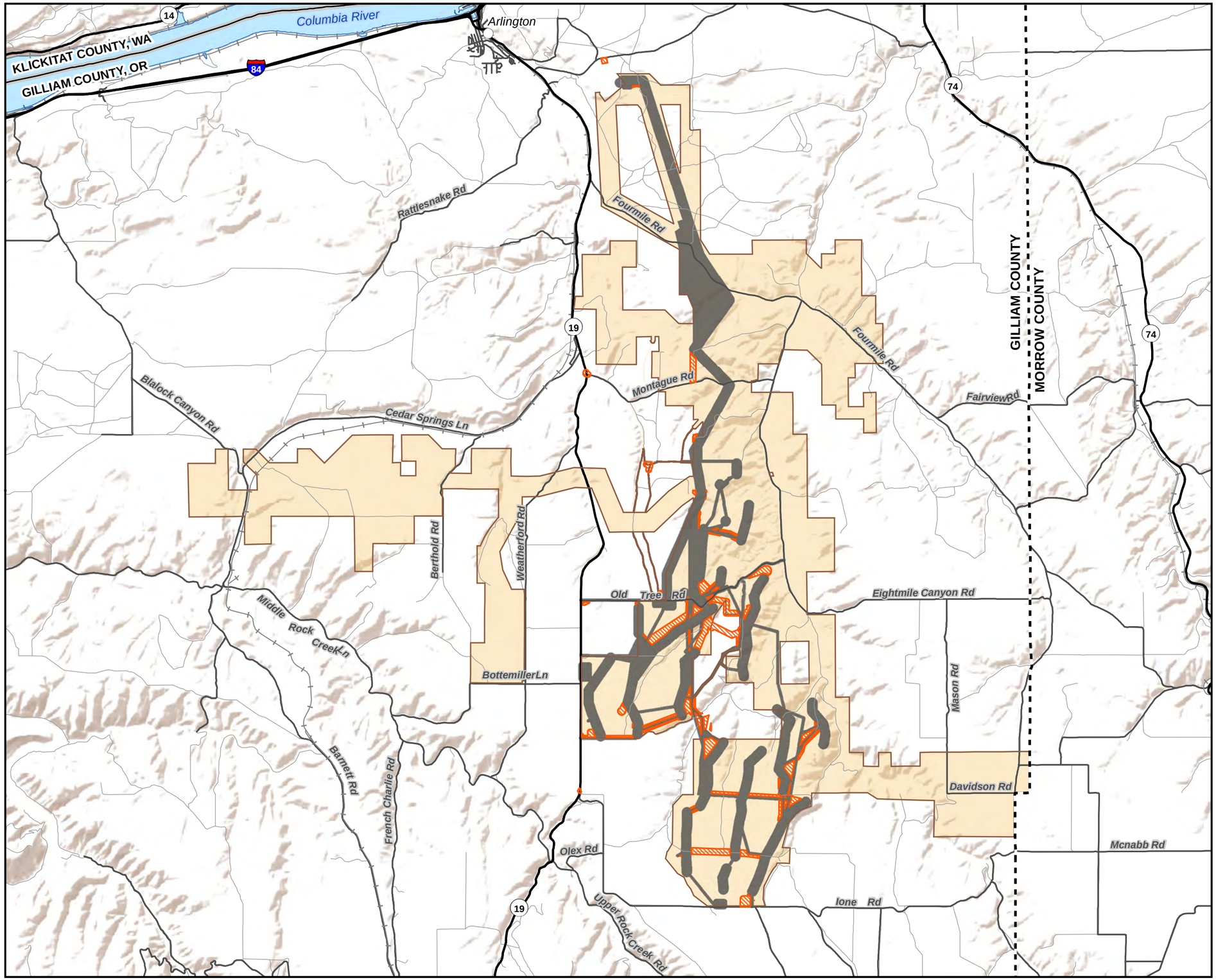
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Figure

Figure 1
2018 Rare Plant Survey Map
Montague Wind Power Facility - Phase 1



Legend

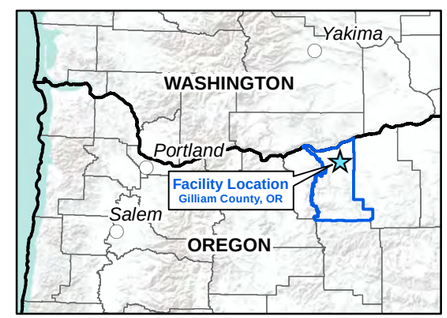
- 2018 Rare Plant Survey Corridor
- 2017 Rare Plant Survey Corridor
- Approved Site Boundary
- Approved Micrositing Corridor

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line
- State Boundary
- County Boundary

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Basemap Source: ESRI World Terrain Base

Attachment P-1d
Addendum to Rare Plant Survey and Washington Ground Squirrel and Habitat Mapping Reports—Phase 2

TECHNICAL MEMORANDUM

Addendum to Rare Plant Survey and Washington Ground Squirrel and Habitat Mapping Reports Montague Wind Power Facility – Phase 2

PREPARED FOR:	Montague Wind Power Facility, LLC
COPY TO:	Linnea Eng/CH2M
PREPARED BY:	Peggy O'Neill/CH2M
DATE:	October 24, 2017

1.0 Introduction

CH2M HILL Engineers, Inc. (CH2M) was retained by Avangrid Renewables, LLC, d/b/a Montague Wind Power Facility, LLC (Montague) to conduct surveys for rare plants and Washington ground squirrel (*Spermophilus washingtoni*) (WGS) within portions of the Montague Wind Power Facility (Facility) site boundary where permanent Facility components are planned or where construction disturbance may occur (Phase 2 study area).

WGS surveys and habitat mapping were originally conducted within the approved site boundary and portions of the proposed expanded site boundary between 2008 and 2010, and were updated within the WGS study area during the spring 2017 surveys. Rare plant surveys were conducted in spring 2017. Two reports were prepared summarizing the results of these surveys: *2017 Rare Plant Surveys, Montague Wind Power Facility, Phase 2*[1] and *2017 Washington Ground Squirrel Surveys and Habitat Mapping for Montague Wind Power Facility, Phase 2.*[2]

Subsequent to these surveys, Montague made further minor modifications to the proposed micrositing corridor that resulted in the addition of several small areas not investigated in previous spring 2017 or other surveys. In October 2017, CH2M conducted a desktop survey of these additional areas to determine the potential presence of special status species, including rare plants and WGS. This report summarizes the results of this desktop survey and provides recommendations for additional field surveys, if needed.

2.0 Methodology

The desktop review consisted of review of existing literature, maps, and other materials. It was conducted to determine whether habitat is present in these areas that could potentially support rare plant species or WGS. Peggy O'Neill, CH2M botanist, and Forrest Parsons, CH2M biologist, conducted the review. Existing documents reviewed included the following:

2.1 Rare Plants

- *2017 Rare Plant Surveys, Montague Wind Power Facility, Phase 2* (CH2M, 2017a).

[1] CH2M HILL Engineers, Inc. (CH2M). 2017a. *2017 Rare Plant Surveys, Montague Wind Power Facility, Phase 2.*

[2] CH2M HILL Engineers, Inc. (CH2M). 2017b. *2017 Washington Ground Squirrel Surveys and Habitat Mapping for Montague Wind Power Facility, Phase 2.*

- *Federally Listed and Proposed Endangered and Threatened Species, Candidate Species and Species of Concern* (U.S. Fish and Wildlife Service [USFWS], 2017) for Gilliam County, Oregon.
- Oregon Biodiversity Information Center (ORBIC) database (ORBIC, 2017).
- *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Appended to the *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility* (Northwest Wildlife Consultants [NWC], 2009).
- Google Earth aerial imagery of the site vicinity (Google Earth, 2017).

2.2 Washington Ground Squirrel

- *2017 Washington Ground Squirrel Surveys and Habitat Mapping for Montague Wind Power Facility, Phase 2* (CH2M, 2017b).
- *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Appended to the *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility* (NWC, 2009).
- Google Earth aerial imagery of the site vicinity (Google Earth, 2017).

3.0 Results

The desktop review identified 10 discrete areas where modifications to Facility components may extend outside of the 2017 rare plant survey corridors (Figure 1 in Attachment). Review of aerial imagery and other resources indicated that eight of these areas are entirely in active agricultural, rural residential, or gravel roads and, therefore, would not provide suitable habitat to support rare plant species. The remaining two areas were identified as non-cropland and may provide suitable habitat for rare plants species.

The desktop review identified two areas where modifications to project facilities may extend outside of the 2017 WGS survey corridors (Figure 2 in Attachment). Review of aerial imagery and other resources indicated that these areas are entirely in active agricultural use.

4.0 Conclusion

The desktop review determined that two areas, identified as non-cropland, may have the potential to support rare plant species. Therefore, protocol-level surveys in these two areas will be conducted for rare plants prior to construction, during the appropriate bloom time in spring 2018.

The desktop review also determined that the two areas where project facilities extend outside the 2017 WGS survey corridors are entirely in active agricultural use. Because they would not provide suitable habitat for WGS, no further surveys are recommended.

5.0 References

CH2M HILL Engineers, Inc. (CH2M). 2017a. *2017 Rare Plant Surveys, Montague Wind Power Facility, Phase 2.*

CH2M HILL Engineers, Inc. (CH2M). 2017b. *2017 Washington Ground Squirrel Surveys and Habitat Mapping for Montague Wind Power Facility, Phase 2.*

Google Earth. 2017. Google Earth aerial imagery of the site vicinity.

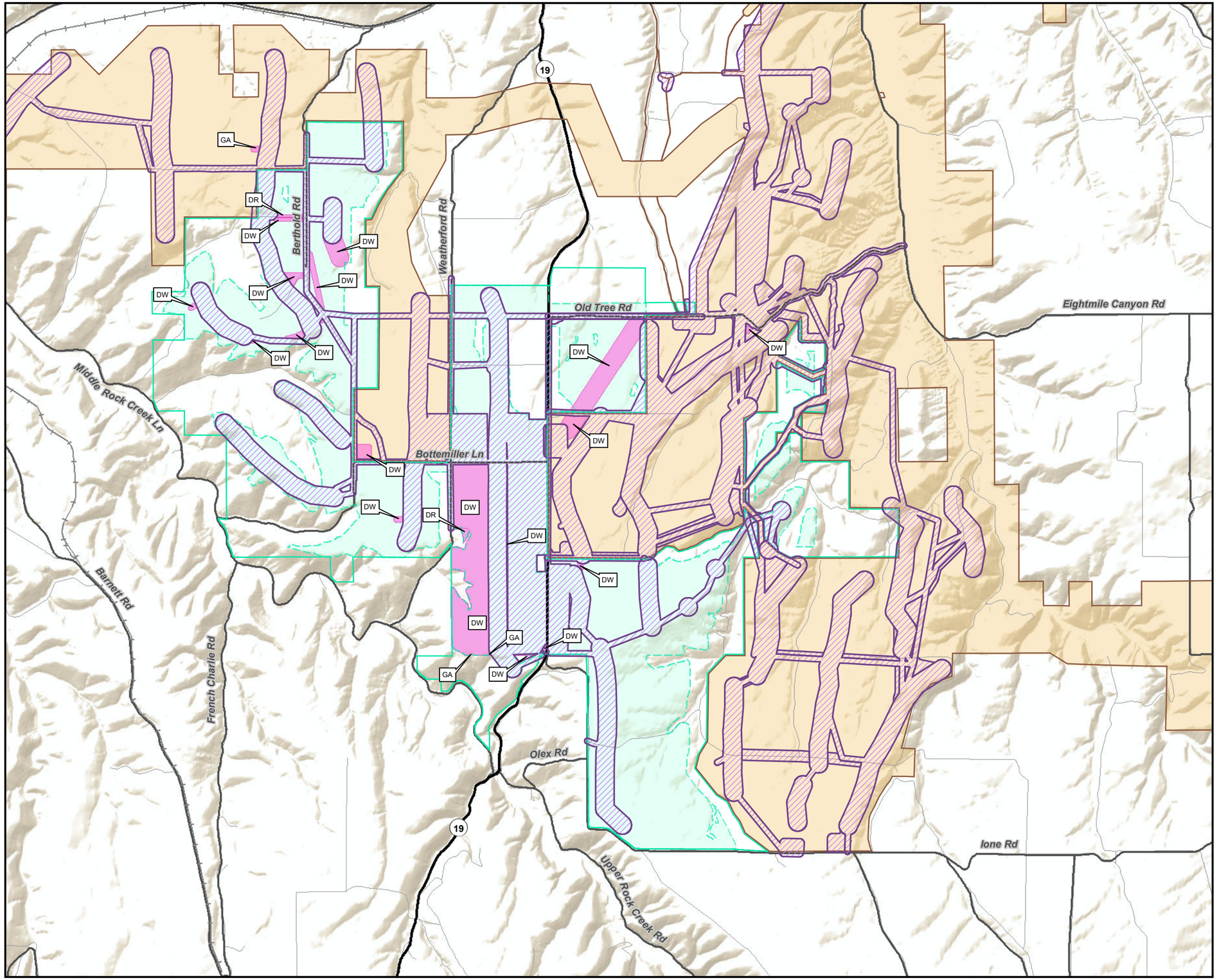
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Oregon Biodiversity Information Center (ORBIC). 2017. *Database Search.*

U.S. Fish and Wildlife Service (USFWS). 2017. *Federally Listed and Proposed Endangered and Threatened Species, Candidate Species and Species of Concern* for Gilliam County, Oregon.

Attachment
Figures

Figure 1
Rare Plant
Supplemental Survey Review
Montague Wind Power Facility



Legend

- Approved Site Boundary
- Approved Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- 2017 Botanical Field Investigation
- Supplemental Survey Review Area

Labeled Habitat Codes

DR: Developed-Revegetated or Other Planted Grassland
DW: Developed-Dryland Wheat
DX: Developed-Other
GA: Exotic Annual Grassland
GB: Native Perennial Grassland
SSA: Basin Big Sagebrush Shrub-steppe

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

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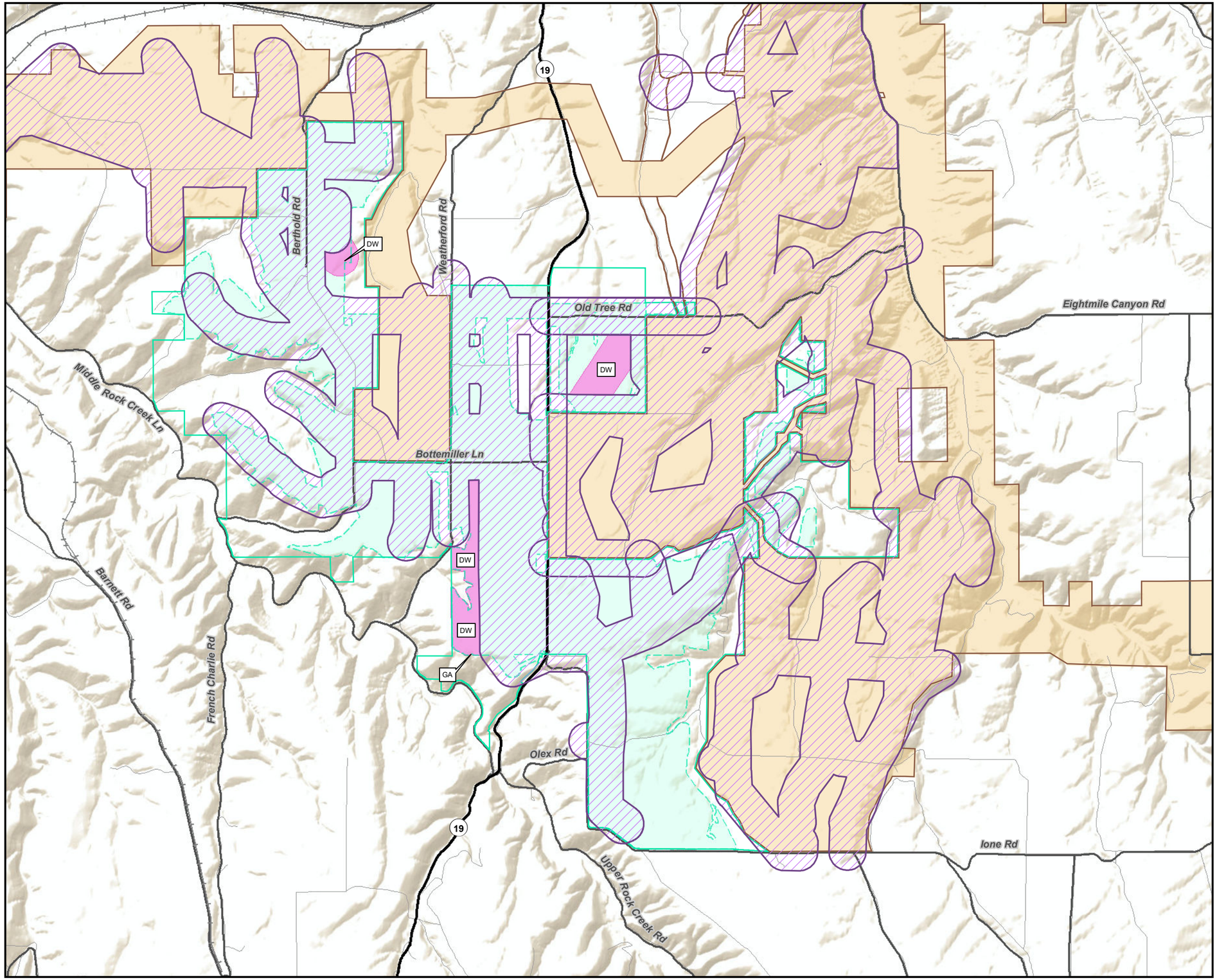
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Basemap Source: ESRI World Terrain Base

Figure 2
Washington Ground Squirrel Supplemental Survey Review
Montague Wind Power Facility



Legend

- Approved Site Boundary
- Approved Micrositing Corridor
- Proposed Expanded Site Boundary
- Proposed Expanded Micrositing Corridor
- 2017 Washington Ground Squirrel Study Area
- Supplemental Survey Review Area

Labeled Habitat Codes

DR: Developed-Revegetated or Other Planted Grassland
DW: Developed-Dryland Wheat
GA: Exotic Annual Grassland
GB: Native Perennial Grassland
SSA: Basin Big Sagebrush Shrub-steppe

Basemap Features

- Interstate/Highway
- Public Road
- Other Road
- Major Railroad Line

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AVANGRID RENEWABLES

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Basemap Source: ESRI World Terrain Base

Attachment P-2a
2017 Washington Ground Squirrel Surveys and Habitat Mapping—Phase 1

Confidential and not for public distribution. Provided under separate cover.

Attachment P-2b
2017 Washington Ground Squirrel Surveys and Habitat Mapping—Phase 2

Confidential and not for public distribution. Provided under separate cover.

Attachment P-2c
2018 Washington Ground Squirrel Supplemental Surveys and Habitat Mapping—Phase 1

Confidential and not for public distribution. Provided under separate cover.

Attachment P-3a
Phase 1 Raptor Nest Survey Report (2017)

Confidential and not for public distribution. Provided under separate cover.

Attachment P-3b
Phase 2 Raptor Nest Survey Report (2017)

Confidential and not for public distribution. Provided under separate cover.

Attachment P-4a
Species Occurrence Data from Oregon Biodiversity Information Center (2017)

Confidential and not for public distribution. Provided under separate cover.

Attachment P-4b
Species Occurrence Data from Oregon Natural Heritage Information Center (2010)

OREGON NATURAL HERITAGE INFORMATION CENTER

OSU Oregon State University
Institute for Natural Resources
1322 SE Morrison Street
Portland, Oregon 97214-2423
503.731.3070
http://oregonstate.edu/ornhic

Wednesday, October 07, 2009

Tamiko Ruhlen
Northwest Wildlife Consultants, Inc.
815 NW 4th St.
Pendleton, OR 97801

Dear Ms. Ruhlen:

Thank you for requesting information from the Oregon Natural Heritage Information Center (ORNHIC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your Motague Wind Project at portions of Morrow and Gilliam Counties.

Forty (40) records total were noted within a five-mile radius of your project site and are included on the enclosed computer printouts.

Please remember that the lack of rare element information from a given area does not mean that there are no significant elements there, only that there is no information known to us from the site. To assure that there are no important elements present, you should inventory the site, at 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 one year from the date it was generated and should not be cited after **October 2010**.

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

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

Sincerely,

Lindsey Koepke

Lindsey Koepke
Assistant Information Manager
lindsey.koepke@oregonstate.edu
503.731.3070 x104

encl.: **invoice (H-100709-LAK1)**
computer printouts and data key

Attachment P-5
U.S. Fish and Wildlife Service Information for Planning and Consultation Resource List (2017)

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

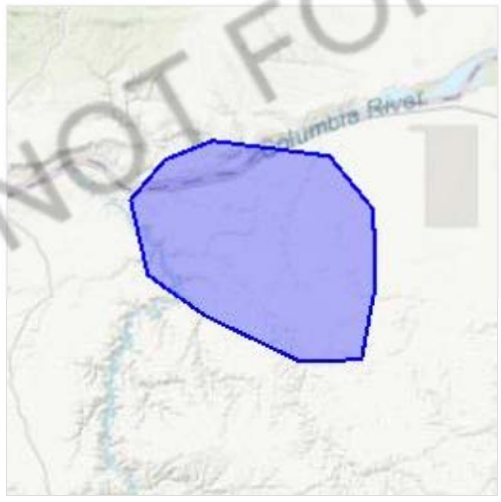
Project information

NAME

Montague Wind Project

LOCATION

Oregon and Washington



DESCRIPTION

Wind energy project.

Local offices

Oregon Fish And Wildlife Office

(503) 231-6179
(503) 231-6195

2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398

https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

Washington Fish And Wildlife Office

(360) 753-9440
(360) 753-9405

510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263

http://www.fws.gov/wafwo/

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

NOT FOR CONSULTATION

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Gray Wolf Canis lupus There is **final designated** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/4488	Endangered

North American Wolverine Gulo gulo luscus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Birds

NAME	STATUS
Yellow-billed Cuckoo Coccyzus americanus There is **proposed** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout Salvelinus confluentus There is **final designated** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Bull Trout Salvelinus confluentus https://ecos.fws.gov/ecp/species/8212#crithab	Final designated
Chinook Salmon Oncorhynchus (=Salmo) tshawytscha Lower Columbia River ESU For information on why this critical habitat appears for your project, even though Chinook Salmon is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/8091#crithab	Final designated

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Chinook Salmon Oncorhynchus (=Salmo) tshawytscha — Final designated
Upper Columbia spring-run ESU

For information on why this critical habitat appears for your project, even though Chinook Salmon is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/8091#crithab

Chinook Salmon Oncorhynchus (=Salmo) tshawytscha — Final designated
Upper Willamette River ESU

For information on why this critical habitat appears for your project, even though Chinook Salmon is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/8091#crithab

Chinook Salmon Oncorhynchus (=Salmo) tshawytscha — Final designated
Puget Sound ESU

For information on why this critical habitat appears for your project, even though Chinook Salmon is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/8091#crithab

Steelhead Oncorhynchus (=Salmo) mykiss — Final designated
Snake River Basin DPS

For information on why this critical habitat appears for your project, even though Steelhead is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/1007#crithab

Steelhead Oncorhynchus (=Salmo) mykiss — Final designated
Upper Columbia River DPS

For information on why this critical habitat appears for your project, even though Steelhead is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/1007#crithab

Steelhead Oncorhynchus (=Salmo) mykiss — Final designated
Upper Willamette River DPS

For information on why this critical habitat appears for your project, even though Steelhead is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/1007#crithab

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Steelhead Oncorhynchus (=Salmo) mykiss — Final designated
Lower Columbia River DPS

For information on why this critical habitat appears for your project, even though Steelhead is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/1007#crithab

Steelhead Oncorhynchus (=Salmo) mykiss — Final designated
Middle Columbia River DPS

For information on why this critical habitat appears for your project, even though Steelhead is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/1007#crithab

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Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are USFWS Birds of Conservation Concern that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better

idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the E-bird data mapping tool (year-round bird sightings by birders and the general public) and Breeding Bird Survey (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the E-bird Explore Data Tool.

NAME	BREEDING SEASON
Black Swift Cypseloides niger https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Brewer's Sparrow Spizella breweri https://ecos.fws.gov/ecp/species/9291	Breeds May 15 to Aug 10
Calliope Hummingbird Stellula calliope https://ecos.fws.gov/ecp/species/9526	Breeds May 1 to Aug 15
Golden Eagle Aquila chrysaetos https://ecos.fws.gov/ecp/species/1680	Breeds Apr 1 to Aug 31
Green-tailed Towhee Pipilo chlorurus https://ecos.fws.gov/ecp/species/9444	Breeds May 1 to Aug 10
Lesser Yellowlegs Tringa flavipes https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Lewis's Woodpecker Melanerpes lewis https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-billed Curlew Numenius americanus https://ecos.fws.gov/ecp/species/5511	Breeds Apr 1 to Jul 31
Marbled Godwit Limosa fedoa https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Olive-sided Flycatcher Contopus cooperi https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Sage Thrasher Oreoscoptes montanus https://ecos.fws.gov/ecp/species/9433	Breeds Apr 15 to Aug 10

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Tricolored Blackbird Agelaius tricolor https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
White Headed Woodpecker Picoides albolarvatus https://ecos.fws.gov/ecp/species/9411	Breeds May 1 to Aug 15
Williamson's Sapsucker Sphyrapicus thyroideus https://ecos.fws.gov/ecp/species/8832	Breeds May 1 to Jul 31
Willow Flycatcher Empidonax traillii https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31

Probability of Presence Summary

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The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project

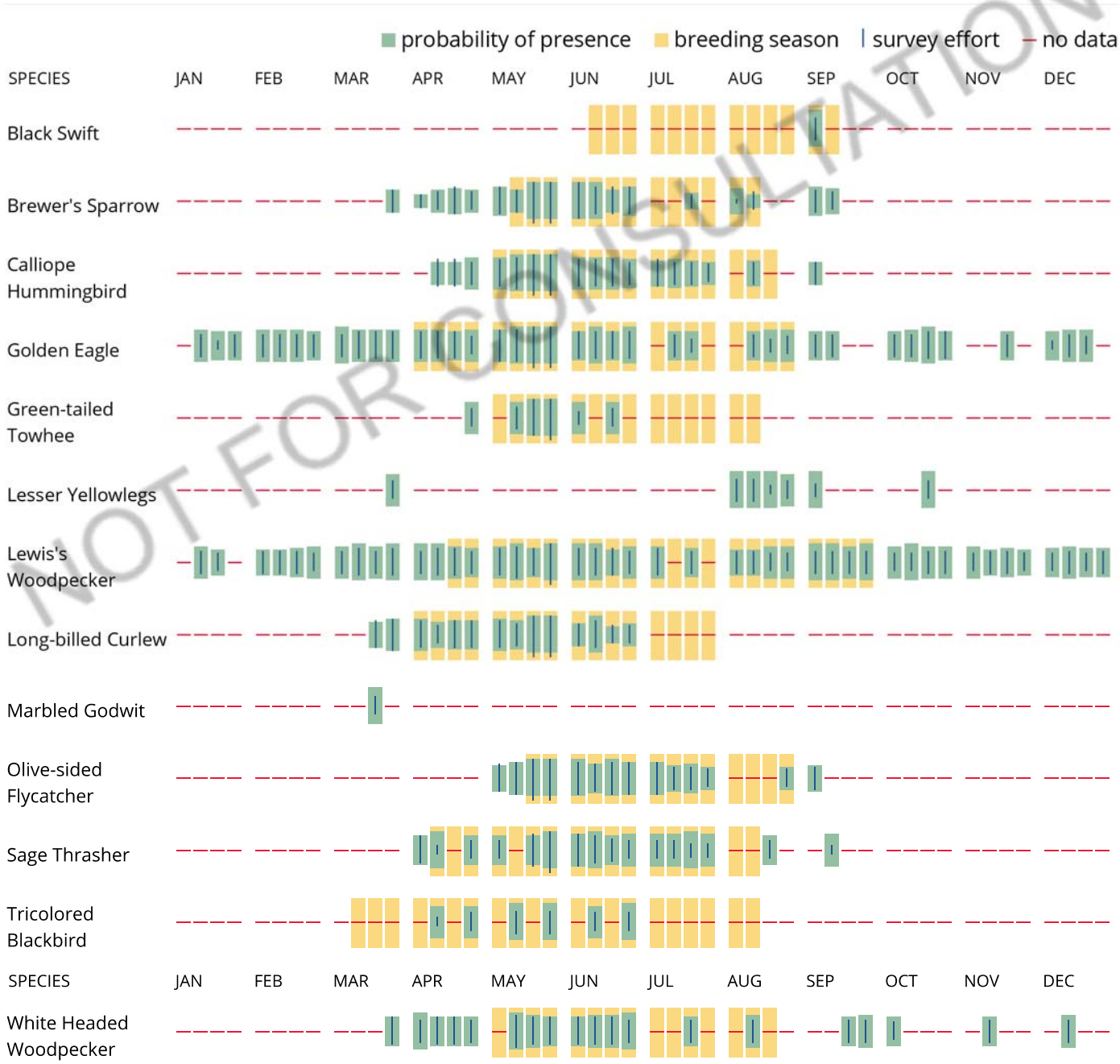
lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

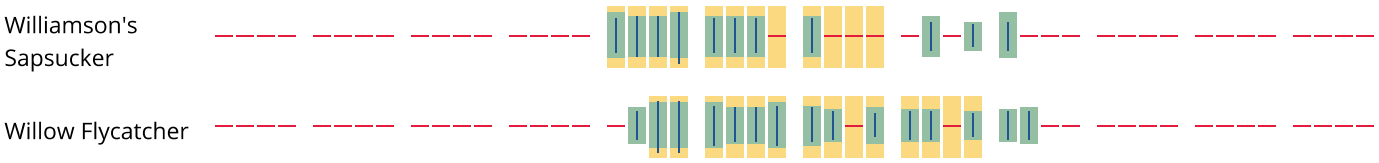
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.



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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the Endangered Species Act (ESA).

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is

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probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

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Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME
This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Attachment P-6
Wildlife and Habitat Studies Report (2010)

Confidential and not for public distribution. Provided under separate cover.

Attachment P-7
Rare Plant Survey Report (2010)

Rare Plant Survey Report
Montague Wind Power Facility
Gilliam County, Oregon

PREPARED FOR: Sara Parsons/Iberdrola Renewables, Inc.

PREPARED BY: Renée Storey/CH2M HILL
Peggy O'Neill /CH2M HILL

COPIES: Linnea Eng/CH2M HILL

DATE: July 20, 2010

Summary

Montague Wind Power Facility LLC (Applicant) proposes to construct the Montague Wind Power Facility (Facility) in Gilliam County, Oregon, with generating capacity of up to 404 megawatts (MW). No more than 269 turbines will be located within the Facility site boundary, depending on the final turbine size and vendor (as further described in Application for Site Certificate [ASC] Exhibit B, Section B.1.3). Please refer to ASC Exhibit C, Figures C-1, C-2, and C-4 through C-7, for maps of the site vicinity, Facility location, and Facility components, respectively.

The proposed Facility is located south of the city of Arlington, in Gilliam County, Oregon. The Facility site boundary encompasses all or portions of the townships, ranges, and sections listed in ASC Exhibit C.

CH2M HILL conducted a reconnaissance-level field investigation during fall 2009, to determine potential presence of suitable habitat for state or federally listed threatened or endangered species as well as other non-listed special-status species within the site boundary. The investigation was limited to areas accessible by secondary roadways throughout the site boundary and areas visited in conjunction with the stream and wetland survey (see ASC Exhibit J).

Comprehensive surveys were conducted in June of 2010 to identify special-status plant species near proposed Facility components; the Facility will be microsited to avoid impacting federal or state threatened or endangered species.

Methods

Data Search

Prior to the field investigation, CH2M HILL checked U.S. Fish and Wildlife Service county lists of *Federally Listed and Proposed Endangered and Threatened Species, Candidate Species and Species of Concern for* (USFWS, 2009) for Gilliam and Morrow counties, Oregon, and Klickitat County, Washington, as well as the Oregon Natural Heritage Information Center (ORNHIC)

database (ORNHIC, 2009), for special-status species that potentially occur within the Facility site boundary and a 5-mile analysis area.

The proposed Facility is located near several previously studied wind energy facilities, as shown in Figure P-1 in ASC Exhibit P. In addition to reviewing the above sources, CH2M HILL reviewed the following documents that summarize the results of rare plant surveys for several of these projects:

- **Leaning Juniper IIA (LJIIA).** *Final Order for the Leaning Juniper II Wind Power Facility (*ODOE, 2007)
- **Leaning Juniper IIB (LJIIB)**. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Appended to the *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility* (NWC, 2009)
- **Shepherds Flat.** *Final Order for the Shepherds Flat Wind Farm* (ODOE, 2008)
- **Pebble Springs**. *Pebble Springs Wind Project: Application for Conditional Use Permit* (PPM Energy, 2006)

Information on special-status plants with potential to occur in the vicinity of the site boundary was compiled before the field visits. The information included habitat requirements, any known associated species, and elevation ranges (Table 2). Field biologists used this information to focus the level of survey intensity in areas where site conditions indicated species habitat requirements may occur. Plant identification was accomplished using current taxonomic guides, including, but not limited to the following sources:

- *Field Guide to Selected Rare Plants of Washington* (WNHP, 2008)
- *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973)
- *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness, 1973)
- *Northwest Weeds* (Taylor, 1990)
- *Oregon Flora Project Rare Plant Guide* (OFP, 2009)
- *Oregon Threatened or Endangered Plant Field Guide* (ORNHIC, 2009)
- *Rare and Endangered Plants of Oregon* (Eastman, 1990)
- *Threatened and Endangered Vascular Plants of Oregon* (Meinke, 1982)
- *Wetland Plants of Oregon and Washington* (Guard, 1995)

Field Investigation

CH2M HILL conducted reconnaissance-level field investigations on October 12 to 15, 20 to 22, 27, and 29; November 3 to 5 and 24; and December 2 to 4, 2009, to determine potential presence of suitable habitat for state or federally listed threatened or endangered species as well as other non-listed special-status species within the site boundary. The investigation was limited to areas accessible by secondary roadways throughout the site boundary and areas visited in conjunction with the stream and wetland survey (see ASC Exhibit J).

CH2M HILL conducted a second set of surveys on June 8 to 10; 15 to 17, and 28, 2010. This second set of investigations were conducted at the protocol-level to determine potential presence of state or federally listed threatened or endangered species as well as other non-listed special-status species within the site boundary. Surveys were conducted in habitats

that were identified as having the potential to support rare plants. All plant species encountered during these surveys were identified and documented.

Results

Data Search

A search of the USFWS County lists and the ORNHIC database and for the site boundary identified 24 special-status species as potentially occurring in the analysis area. Surveys conducted in the site boundary identified habitat for 7 of these special-status species:

TABLE 1
Special-Status Plant Species Potentially Found in the Vicinity of the Montague Facility

Scientific Name	Common Name	Federal Status	ODA/ ORNHIC Status	Potential Habitat Present
Allium robinsonii	Robinson's onion	SoC	-- / 2-ex	No
Artemesia borealis ssp. *wormskioldi*	Northern wormwood	C	LE / 1-ex	No
Astragalus collinus var. laurentii	Laurent's milk-vetch	SoC	LT / 1	Yes
A. pulsiferaie var. suksdorfii	Ames' milk-vetch	SoC	-- / --	No
A. scleroscarpus	Stalked-pod milk-vetch	--	-- / 3	Yes
A. succumbens	Columbia milk-vetch	--	-- / 4	Yes
Calochortus longebarbatus var. *longebarbatus*	Long-beared sego lily	SoC	-- / 4	No
Camissonia pygmaea	Dwarf evening primrose	SoC	C / 1	Yes
Cryptantha leucophaea	Gray cryptantha	--	-- / 2-ex	No
Cypripedium fasciculatum	Clustered lady's-slipper	SoC	C / 2	No
Lesquerella douglasii	Columbia bladderpod	--	-- / 3	Yes
Lomatium suksdorfii	Suksdorf's desert-parsley	SoC	C / 1	No
L. watsonii	Watson's desert-parsley	--	-- / 2	Yes
Meconella oregano	White meconella	SoC	C / 1	No
Mimulus evanescens	Disappearing monkeyflower	SoC	C / 1	No
Mimulus jungermannioides	Hepatic monkeyflower	SoC	C / 4	No
Myosurus sessilis	Sessile mousetail	SoC	C / 1	Yes
Penstemon barrerttiae	Barrett's beardtongue	SoC	C / 1	No
Pinus albicaulis	Whitebark pine	SoC	-- /	No

TABLE 1
Special-Status Plant Species Potentially Found in the Vicinity of the Montague Facility

Scientific Name	Common Name	Federal Status	ODA/ ORNHIC Status	Potential Habitat Present
Ranunculus reconditus (= triternatus)	Obscure buttercup	SoC	LE / 1	No
Rorippa columbiae	Persistent sepal yellowcress	SoC	C / 1	No
Spiranthes diluvialis	Ute ladies'-tresses	LT	-- / --	No
Sysyrhinchium sarmentosum	Pale blue-eyed grass	SoC	C / 1	No
Texosporium sancti-jacobi	Woven spore lichen	SoC	-- / 2	No

Status Definitions

LE Listed Endangered. Taxa listed by the USFWS or National Marine Fisheries Service (NMFS) as Endangered under the Endangered Species Act (ESA), or by the Departments of Agriculture (ODA) and Fish and Wildlife (ODFW) of the state of Oregon under the Oregon Endangered Species Act of 1987 (OESA). Endangered taxa are those which are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

LT Listed Threatened. Taxa listed by the above agencies as Threatened; defined as those taxa likely to become endangered within the foreseeable future.

C Candidate. Candidate taxa for which NMFS or USFWS have sufficient information to support a proposal to list under the ESA, or which is a candidate for listing by the ODA under the OESA.

SoC Federal species of concern.

ORNHIC List 1 – Threatened or endangered throughout range

ORNHIC List 2 – Threatened, endangered, or extirpated from Oregon; secure elsewhere

ORNHIC List 3 – Review

ORNHIC List 4 - Watch

Ex – Believed extirpated.

During surveys of LJIIA, four populations of the Oregon candidate species, sessile mousetail, were identified in areas that overlap with the Montague site boundary (ODOE, 2007; ODOE, 2008). In addition, during the information review of Shepherds Flat, this species was identified within the analysis area, but outside of the site boundary and outside of the Montague site boundary (Caithness Shepherds Flat, 2007).

In spring 2009, Northwest Wildlife Consultants (NWC) conducted surveys for state and federal listed and non-listed special-status plants in areas of the Montague site boundary that overlap with the site boundary for Pebble Springs (PPM, 2006). In spring 2009, NWC conducted similar surveys for LJIIB (NWC, 2009). One state-listed threatened plant species, Laurent's milk-vetch (*Astragalus collinus* var. *laurentii*), was documented at LJIIB and within the Montague site boundary during surveys conducted for LJIIB. In addition, one population of the Oregon candidate plant species, sessile mousetail, was identified within the Montague site boundary during surveys conducted for LJIIB (NWC, 2009) and two populations of this species were identified in the site boundary during surveys conducted for Pebble Springs (PPM Energy, 2006).

Two rare plant species with no status that are monitored by the ORNHIC, stalked-pod milk-vetch and Columbia milk-vetch, were identified within the Montague site boundary during surveys for LJIIB (NWC, 2009). Three additional rare species monitored by the ORNHIC, Columbia bladderpod (historical – 1938), gray cryptantha (historical – 1882), and Watson's desert parsley (historical – 1938), were identified in the vicinity, but outside of the Montague

site boundary, during surveys for LJIIB (NWC, 2009). Columbia bladderpod was also identified within the analysis area, but outside of the Montague site boundary during surveys conducted for LJIIB (NWC, 2009).

Field Investigation –Habitat

The field investigation identified the following habitat types present within the site boundary.

Developed

- **Old Field:** Previously cultivated, currently occupied by a variety of common non-native and native vegetation plants (rabbitbrush shrubs/annual grasses and weeds). Native vegetation is minor component.
- **Conservation Reserve Program (CRP) or Other Planted Grassland:** Planted grassland on previously farmed or other disturbed lands that may be enrolled in the CRP. Residual (not previously plowed) native vegetation patches in a few locations. Old grass stands contain rabbitbrush or other shrubs but are not dominant.
- **Dryland Wheat:** Agricultural fields currently in small grain production or fallow.
- **Irrigated Agriculture:** Agricultural crop or pasture fields that are irrigated for all or a portion of the growing season.
- **Other:** Developed or disturbed areas including farming or ranching home and shop sites, corrals, structures, feedlots, inactive and active gravel quarries, pastures, roads, rights-of-way and waste areas associated with ongoing human activities.

Grassland

Steppe dominated by native or nonnative grasses (less than 20 percent shrub cover):

- **Exotic Annual Grassland:** Dominated by exotic annual grass or weeds.
- **Native Perennial Grassland:** Dominated by native perennial bunchgrass. Shrubs, if present, are an inconspicuous component.

Shrub-Steppe

Steppe dominated by shrubs (greater than 20 percent shrub cover):

- **Sagebrush Shrub-steppe:** Big sage sagebrush/bunchgrass-annual grass.
- **Rabbitbrush-Snakeweed Shrub-steppe:** Rabbitbrush-snakeweed-buckwheat/ bunchgrass-annual grass. Most of these areas are formerly sagebrush-rabbitbrush snakeweed/bunchgrass-annual grass attempting to recover from recent fire or are older Developed/CRP and have significant shrub component.

Woodland

Wooded areas with greater than 10 percent tree cover:

- **Juniper Woodland:** Open canopy woodland consisting of western juniper. Often with significant big sage and grass understory component.

- **Riparian Woodland:** Found in one location along about a half-mile stretch of Eightmile Canyon, downstream from a permanently-flowing spring. Willow is the dominant deciduous tree of the overstory. Provides important roosting habitat for bats; thermal cover for mule deer; and nesting and migration habitat for passerines.

Riparian and Wetland

- **Palustrine Emergent Riverine Wetlands:** Found in one location along the same half-mile stretch of Eightmile Canyon as the riparian woodland community (see above), downstream from the permanently flowing spring. Dominant species are cattail, smartweed, saltgrass, duckweed, rush, and other grasses.
- **Irrigation-Fed/Palustrine Emergent Depressional Wetlands**: Located in a series within the channel of Eightmile Canyon, an ephemeral stream in this reach. The wetlands were artificially created by berms across the channel that collect run-off from the adjacent irrigated fields. Dominant species include prostrate smartweed.
- **Alkali/Isolated Palustrine Depressional Wetland:** Small depressional area with salt crust. This wetland is sparsely vegetated with saltgrass.
- **Vernal Pools/Isolated Palustrine Depressional Wetlands**: Several small depressional seasonal wetlands are present within the site boundary. These are areas that are inundated early in the growing season, drying out by early to mid-summer. Typical species include little mousetail, slender-branched popcorn flower, needleleaf navarretia, and marsh cudweed.

Escarpment

- **Escarpments:** Linear Columbia River Basalt outcroppings approximately 3 to 15 meters (10 to 50 feet) in height, found on steeper slopes that bound canyon edges and shoulders (i.e., Eightmile Canyon). When present, typical species include Sandberg's bluegrass, non-native grasses, and various native and non-native forbs. Soils are absent or very shallow due to rock outcroppings and steep slopes. Pockets of deeper soils are present in swales located in areas with less exposed basalt and fewer cliffs.

Habitat types within the site boundary were evaluated against the habitat requirements for potentially occurring species shown in Table 1. The purpose of the evaluation was to determine whether suitable habitat occurs onsite to support any of the identified species. Table 2 presents the results of this evaluation.

TABLE 2
Rare Plant Species Information and Habitat Requirements

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Allium robinsonii	Robinson's onion	Liliaceae	Sand and gravel deposits along the Columbia River from near Vantage, Washington, to about the mouth of the John Day River, Oregon, apparently restricted to the bottom and lower benches of the river valley.	60 to 650 feet	Believed extirpated from Oregon
Artemesia borealis ssp. *wormskioldi*	Northern wormwood	Asteraceae	Arid sites generally supporting shrub-steppe vegetation. Grows on basalt, compacted cobble, and sand in generally flat terrain.		Believed extirpated from Oregon
Astragalus collinus var. *laurentii*	Laurent's milk-vetch	Fabaceae--	Occurs on dry slopes, in sandy or rocky substrates. Endemic to the Columbia Plateau, in Gilliam, Morrow, and Umatilla counties, Oregon, and possibly Sherman County as well.	1,800 to 3,300 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
A. pulsiferaie var. *suksdorfii*	Ames' milk-vetch	Fabaceae	Found in generally flat or very gentle terrain in coarse textured substrates; occurs in relatively open ponderosa pine forests with bitterbrush.	1,800 to 1,900 feet	
A. scleroscarpus	Stalked-pod milk-vetch	Fabaceae--	Dunes and sandy barrens.	200 to 600 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
A. succumbens	Columbia milk-vetch	Fabaceae--	Sandy places and rocky sagebrush desert, from the Columbia River to the lower foothills.	300 to 700 feet	Documented within the site boundary during surveys conducted for Leaning Juniper IIB.
Calochortus longebarbatus var. *longebarbatus*	Long-beared sego lily	Liliaceae	Clay loams in vernally moist sites in meadows, forest meadow edges, and within semi-open areas within coniferous woods dominated by grasses and forbs.	1,800 to 3,000 feet	
Camissonia pygmaea	Dwarf evening primrose	Onagraceae	Found on unstable soil or gravel in steep talus, dry washes, banks, and roadcuts. Occurs in habitats that are maintained in an open condition by erosion and the generally harsh environment.	500 to 1,800 feet	Flowering period is extended enough so that flowers and fruits have been observed on the same plant. The species is generally recognizable between June and August.
Cryptantha leucophaea	Gray cryptantha	Boraginaceae	Sandy substrate along the Columbia River within the Columbia Basin physiographic province; especially unstable sand dunes.	300 to 2,500 feet	Historical ORNHIC record located outside of site boundary.
Cypripedium fasciculatum	Clustered lady's-slipper	Orchidaceae	Mid- to late seral Douglas fir forest.	1,200 to 5,000 feet	
Lesquerella douglasii	Columbia bladderpod	Brassicaceae	Sandy and gravelly soils in sagebrush and into arid juniper or ponderosa pine woodlands.	200 to 800 feet	Documented outside of the site boundary during surveys conducted for Leaning Juniper IIB. Historical ORNHIC record located outside of site boundary.

TABLE 2
Rare Plant Species Information and Habitat Requirements

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Lomatium suksdorfii	Suksdorf's desert-parsley	Apiaceae	Semi-open to open dry, rocky hillsides on moderate to steep slopes.	350 to 3,500 feet	
L. watsonii	Watson's desert-parsley	Apiaceae	Arid, open, often rocky hillsides. Often found amongst sagebrush.		Historical ORNHIC record located outside of site boundary.
Meconella oregano	White meconella	Papaveraceae	Occurs in open grasslands and grassland/woodland mosaic on gentle to steeply sloping sites.	100 to 450 feet	
Mimulus evanescens	Disappearing monkeyflower	Scrophulariaceae	Occurs within sagebrush-juniper-dominated vegetation zones. Occurs in drying pools, along streambeds, adjacent to pond margins, in wet areas near boulders, etc. Occurs in moist gravelly, rocky areas, and low, wet fields, in sagebrush-juniper zones.	3,900 to 5,600 feet	Only two existing sites: Moll Reservoir in Lassen County, California, and Drews Reservoir in Lake County, Oregon.
Mimulus jungermannioides	Liverwort monkeyflower	Scrophulariaceae	Occurs in basalt crevices in seepage zones of vertical cliff faces and canyon walls.	500 to 3,300 feet	Documented in Wasco County, Oregon. Moist, shaded basaltic cliffs adjacent to the water. Plants are generally under an overhanging area of rock; bottom slope; filtered shade; moist; basalt cliffs. Associated species: *Mimulus guttatus*, *Huechera cylindrica*.
Myosurus sessilis	sessile mousetail	Ranunculaceae	Occurs in vernal pools and alkali flats.		Documented within the site boundary during surveys conducted for Pebble Springs and LJIIB projects. Additional areas of potentially suitable habitat identified within site boundary in 2009.
Penstemon barrerttiae	Barrett's beardtongue	Scrophulariaceae	Crevices along basalt cliff faces, on rock outcrop ledges, open talus, and occasionally on well-drained roadsides.	Below 3,200 feet	
Pinus albicaulis	Whitebark pine	Pinaceae	Grows in exposed subalpine zone near treeline	Subalpine zone	
Ranunculus reconditus (= triternatus)	Obscure buttercup	Ranunculaceae	Upper elevations of Columbia Hills; meadow-steppe habitat dominated by perennial xerophytic bunchgrass and broad-leaved herbs.	2,240 to 3,220 feet	
Rorippa columbiae	Persistent sepal yellowcress	Brassicaceae	Observed near all types of bodies of water. Known from a wide variety of soil types, including clay, sand, gravel, sandy silt, cobblestones and rocks. Individuals are usually found in open habitats that have low vegetative cover. A common feature of all of the known sites is inundation for at least part of the year.	3 to 7 feet	

TABLE 2
Rare Plant Species Information and Habitat Requirements

Scientific Name	Common Name	Family	Habitat	Elevation	Comments
Spiranthes diluvialis	Ute ladies'-tresses	Orchidaceae	Grows along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers, as well as in wetlands and seeps near freshwater lakes or springs.	720 to 1,830 feet	
Sysyrhinchium sarmentosum	Pale blue-eyed grass	Iridaceae	The species occurs in meadows and small openings.	1,600 to 4,200 feet	
Texosporium sancti-jacobi	Woven spore lichen	Caliciaceae	Grows in arid to semi-arid shrub-steppe, grassland or savannah communities.	Up to 3,300 feet	

Field Investigation –Plants

The objective of the rare plant survey was to determine whether special-status plant species occur onsite. The rare plant survey was floristic and followed rare plant guidelines developed by Nelson (1994). The investigation included a complete protocol-level survey for listed plant species. Intuitive controlled surveys were completed throughout identified potential habitats; complete surveys were conducted in areas identified as high potential habitat. These surveys are defined as a 100 percent visual examination of the project area. All plant species encountered in the survey areas were identified to at least genus and to the level necessary to ensure that they were not special-status plant species.

No special-status or rare plants were identified onsite during the protocol level surveys conducted in June 2010. A list of all plant taxa encountered was recorded in the field by plant community type. Collections were made for later determination of species that were not readily identifiable in the field. See Table 3 for a comprehensive list of plant species encountered during surveys.

TABLE 3
Plant Species Observed June 8-10, 15-17, & 28, 2010
Montague Wind Project
Gilliam County, Oregon

Family	Scientific Name	Common Name	Native	Non-native
Amaranthaceae				
	Amaranthus albus	prostrate pigweed		X
Apiaceae				
	Lomatium macrocarpum	gray-leaf desert parsley	X	
Asclepiadaceae				
	Asclepias facicularis	Mexican whorled milkweed	X	
Asteraceae				
	Agoseris heterophylla	annual agoseris	X	
	Artemesia rigida	rigid sagebrush	X	
	Artemesia sp.	sagewort	X	
	Artemesia tridentata	big sagebrush	X	
	Balsamorhiza careyana	Carey's balsamroot	X	
	Blepharipappus scaber	blepharipappus	X	
	Chaenactis douglasii	Douglas' dusty maiden	X	
	Chondrilla juncea	rush skeletonweed		X
	Chrysothamnus nauseosus	gray rabbitbrush	X	
	Chrysothamnus viscidiflorus	green rabbitbrush	X	
	Cirsium undulatum	wavyleaf thistle	X	

TABLE 3
Plant Species Observed June 8-10, 15-17, & 28, 2010
Montague Wind Project
Gilliam County, Oregon

Family	Scientific Name	Common Name	Native	Non-native
	Erigeron divergens	spreading fleabane	X	
	Erigeron pumilus	shaggy daisy	X	
	Grindelia squarrosa	curly-cup gumweed	X	
	Gutierrezia sarothrae	broom snakeweed	X	
	Hymenopappus filifolius	fineleaf hymenopappus	X	
	Lactuca serriola	prickly lettuce		X
	Lagophylla ramosissima	branched rabbitleaf	X	
	Nothocalais troximoides	sagebrush false dandelion	X	
	Onopordum acanthium	Scotch thistle		X
	Solidago sp.	goldenrod	X	
	Sonchus arvensis	field milk thistle		X
	Sonchus oleraceus	common sow-thistle		X
	Tragopogon dubius	yellow salsify		X
Boraginaceae				
	Amsinckia lycopsoides	tarweed fiddleneck	X	
	Amsinckia menzeisii	Menzie's fiddleneck	X	
	Cryptantha flaccida	common cryptantha	X	
Brassicaceae				
	Lepidium latifolium	perennial pepperweed		X
	Lepidium perfoliatum	clasping pepperweed		X
	Sisymbrium officinale	hedge mustard		X
Capparaceae				
	Cleome lutea	yellow bee plant	X	
Chenopodiaceae				
	Salsola kali	Russian thistle		X
Convolvulaceae				
	Convolvulus arvensis	field Morning-glory		X
Cupressaceae				
	Juniperus occidentalis	western juniper	X	
Equisitaceae				
	Equisetum arvense	field horsetail	X	

TABLE 3
Plant Species Observed June 8-10, 15-17, & 28, 2010
Montague Wind Project
Gilliam County, Oregon

Family	Scientific Name	Common Name	Native	Non-native
Fabaceae				
	Astragalus collinus var. collinus	hillside milkvetch	X	
	Astragalus purshii	wooly-pod milk vetch	X	
	Lupinus argenteus	silvery lupine	X	
	Lupinus lepidus var. aridus	prairie lupine	X	
	Lupinus sericeus	silky lupine	X	
	Medicago sativa	alfalfa		X
Geraniaceae				
	Erodium cicutarium	crane's-bill		X
Hydrophyllaceae				
	Phacelia hastata	silver-leaf phacelia	X	
Liliaceae				
	Calochortus macrocarpus	sagebrush mariposa lily	X	
Linaceae				
	Linum lewisii	Lewis' flax	X	
Loasaceae				
	Mentselia laevicaulis	smooth blazingstar	X	
Malvaceae				
	Sphaeralcea munroana	Munro's globemallow	X	
Onagraceae				
	Epilobium brachycarpum	tall annual willowherb	X	
Papaveraceae				
	Eschscholzia californica	California poppy	X	
Plantaginaceae				
	Plantago patagonica	wooly plantain	X	
Poaceae				
	Aegilops cylindrica	jointed goatgrass		X
	Agropyron cristatum	crested wheatgrass		X
	Agropyron spicatum	bluebunch wheatgrass	X	
	Bromus tectorum	cheat grass		X
	Bromus vulgaris	Columbia brome	X	

TABLE 3
Plant Species Observed June 8-10, 15-17, & 28, 2010
Montague Wind Project
Gilliam County, Oregon

Family	Scientific Name	Common Name	Native	Non-native
	Distichlis stricta	saltgrass	X	
	Elymus elymoides	squirreltail	X	
	Erigeron linearis	desert yellow fleabane	X	
	Hordeum murinum	mouse barley		X
	Leymus cinereus	basin wildrye	X	
	Poa bulbosa	bulbous bluegrass		X
	Poa secunda	Sandberg's bluegrass	X	
	Taeniatherum caput-medusa	medusahead		X
	Triticum aestivum	wheat		X
Polemoniaceae				
	Gilia capillaris	miniature gilia	X	
	Phlox longifolia	long-leaf phlox	X	
Polygonaceae				
	Eriogonum strictum	Blue Mountain buckwheat	X	
	Eriogonum thymoides	thyme-leaved buckwheat	X	
Portulacaceae				
	Claytonia	miner's lettuce		
Rosaceae				
	Purshia tridentata	bitterbrush	X	
Salicaceae				
	Salix sp.	willow	X	
Scrophulariaceae				
	Linaria dalmatica	dalmatian toadflax		X
	Verbascum thapsus	wooly mullein		X
Typhaceae				
	Typha latifolia	common cattail	X	

Conclusion

CH2M HILL's field investigation concludes that potential habitat is present within the proposed site boundary to support the state-listed threatened plant species, Laurent's milk-vetch and the state Candidate species, sessile mousetail. Both species were documented within the Facility site boundary during previous studies. CH2M HILL conducted protocol-level surveys during the optimum bloom time for these species (May through June for Laurent's milk-vetch; May through July for sessile mousetail). No additional populations were identified during these surveys, conducted by CH2M HILL in June 2010.

Potential habitat also exists to support one species identified as a Candidate for listing under state regulations, dwarf evening primrose. Should the status of this species be elevated to state threatened or endangered in the course of the project, state Endangered Species Act (ESA) regulations would apply. CH2M HILL conducted protocol-level surveys for this species during the optimum bloom period (June through August) to determine whether the species is present onsite. No populations of dwarf evening primrose were identified onsite during protocol-level surveys.

Potential habitat also was identified for two rare plant species that were identified within the site boundary during a previous study, stalked-pod milk-vetch and Columbia milk-vetch. Suitable habitat may also be present for two other rare species, Columbia bladderpod and Watson's desert-parsley, which were identified in the vicinity, but outside of the site boundary. Neither Columbia bladderpod, or Watson's desert-parsley were identified onsite during the protocol-level rare plant surveys.

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Attachment P-8
Ecological Baseline Report for Baseline Wind Energy Facility (2011)

Ecological Baseline Investigations and Impact Assessment for Baseline Wind Energy Facility

Gilliam County, Oregon

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 METHODS 2

2.1 Information Reviews and Agency Consultation 2

2.1.1 Pre-Field or other Data Reviews 2
2.1.2 Review for Golden Eagle 3
2.1.3 Review of Deer/Elk Winter Range 3
2.1.4 Agency Correspondence and Site Tours 4

2.2 Wildlife Habitat Mapping and Categorization 4

2.2.1 Wildlife Habitat Mapping 4
2.2.2 Habitat Categories 5

2.3 Special Status Vascular Plant Surveys 7

2.4 Avian Use Surveys 8

2.4.1 Field Methods 8
2.4.2 Data Analysis 9

2.5 Raptor Nest Survey 9

2.6 Golden Eagle Telemetry 10

2.7 Special Status Vertebrate Wildlife Species Surveys 10

2.7.1 Washington Ground Squirrel Surveys 11

2.8 Bat Investigation 12

2.9 Future Field Investigations and Other Assessments 13

3.0 RESULTS 13

3.1 Information Reviews and Agency Consultation 13

3.1.1 Pre-Field or other Data Reviews 13
3.1.2 Review for Golden and Bald Eagles 14
3.1.3 Review of Deer/Elk Winter Range 14
3.1.4 Agency Correspondence and Site Tours 14

3.2 Wildlife Habitat Mapping and Categorization 15

3.3 Special Status Vascular Plant Surveys 24

3.4 Avian Use Surveys 25

3.4.1 Special Status Species 26

3.5 Raptor Nest Survey 27

3.6 Golden Eagle Telemetry 28

3.7 Special Status Vertebrate Wildlife Surveys 29

3.7.1 Washington Ground Squirrel Surveys 31

3.8 Bat Investigation 31

4.0 IMPACTS DISCUSSION 32

4.1 Impacts to Wildlife Habitat Types and Categories 32

4.2 Impacts to Threatened and Endangered Plant and Wildlife Species 33

4.3 Impacts to Special Status (non-listed) Plant Species 35

4.4 Impact Assessment for Avian Species 35

4.4.1 Raptors 36
4.4.2 Passerines 38
4.4.3 Waterfowl and other Waterbirds 40
4.4.4 Shorebirds 41
4.4.5 Upland Gamebirds 41

4.5 Displacement Effects 41
4.5.1 Raptors 41
4.5.2 Grassland and Other Nesting Birds 42
4.5.3 Other Wildlife 43
4.6 Impacts to Special Status Vertebrate Wildlife Species 44
4.7 Impacts to Bats 49
5.0 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES 51
6.0 ACKNOWLEDGEMENTS 53
7.0 REFERENCES 54
8.0 TABLES 66
9.0 APPENDICES 84
10.0 FIGURES 103

TABLES

Table 1. General land cover and wildlife habitat types within surveyed areas* of the Baseline Wind Project boundary 66
Table 2. Habitat types and categories within surveyed areas of the Baseline Wind Project boundary with maximum possible area of impact—worst-case layout. 68
Table 3. Avian species observed within 800-meter study plots in the Baseline Wind avian use study during four seasons, 2009–2010. 69
Table 4. Avian species and number of observations recorded on-site while in-transit to avian use surveys for Baseline Wind, 2009–2010. 70
Table 5. Mean use, percent composition, and percent frequency of occurrence for avian groups observed during avian use surveys at Baseline Wind during four seasons, 2009–2010. 71
Table 6. Mean use of avian species observed within 800m by plot at Baseline Wind during four seasons, 2009–2010. 73
Table 7. Estimated raptor nest densities at Baseline Wind and other regional and proposed and existing wind projects located primarily in comparable Columbia Plateau environments*. 76
Table 8. Number of bat passes by call frequency, species, and month recorded during acoustical monitoring at Baseline Wind, 2010. 77
Table 9. Project and turbine characteristics of regional wind energy facilities where fatality monitoring studies have been completed*. 78
Table 10. Reported mean annual fatality estimates on a per MW* and per turbine basis for all birds and raptors in the Columbia Plateau Ecoregion where fatality monitoring studies have been completed. 79
Table 11. Species composition and numbers of bird fatalities found at Columbia Plateau Ecoregion wind projects where fatality monitoring studies* have been completed or are in progress (data obtained from public files). 80
Table 12. Reported mean annual bat mortality estimates at existing wind projects in the Columbia Plateau Ecoregion with completed fatality monitoring studies. 83

APPENDICES

Appendix A1. United State Fish and Wildlife Service Gilliam County species list. 84
Appendix A2. United State Fish and Wildlife Service Morrow County species list. 86
Appendix B. Oregon Biodiversity Information Center response letter 88

Appendix C. Rare vascular plant and lichen species with potential for occurrence within the Baseline Wind area. 89
Appendix D. Special status vertebrate wildlife species of known or potential occurrence in the Baseline Wind area. 91
Appendix E. Species of bats that occur in eastern Oregon and their occurrence or potential for occurrence in the Baseline Wind area. 95
Appendix F. Comprehensive plant species list for Baseline Wind, 2010. 98
Appendix G. Comprehensive species list from site-specific avian use and special status wildlife surveys for Baseline Wind, 2009–2010. 101

FIGURES

Figure 1. Baseline Wind Overview, Threatened and Endangered Species Analysis Area, and ODFW Deer/Elk Winter Ranges
Figure 2a. Baseline Wind Habitat Types
Figure 2b. Baseline Wind Habitat Categories
Figure 3. Baseline Wind Avian Use Study Plots
Figure 4. Baseline Wind Raptor and Other Large Bird Nests (CONFIDENTIAL)
Figure 5a. Baseline Wind Special Status Plants and Wildlife (CONFIDENTIAL)
Figure 5b. Baseline Wind Washington Ground Squirrels (CONFIDENTIAL)
Figure 6. Baseline Wind Bat Monitoring Locations
Figure 7. Bat fatalities by month at existing wind projects in the Columbia Plateau Ecoregion
Figure 8. Number of bat passes by frequency and location at Baseline Wind, 2010.
Figure 9. Number of bat passes by location for species with identified calls at Baseline Wind, 2010.
Figure 10. Number of passes by month for bats with high frequency calls at Baseline Wind, 2010.
Figure 11. Number of passes by month for bats with low frequency calls at Baseline Wind, 2010.
Figure 12. Overall all bird mean use at selected Columbia Plateau Ecoregion wind projects including Baseline Wind
Figure 13. Overall raptor mean use at selected Columbia Plateau Ecoregion wind projects including Baseline Wind

1.0 INTRODUCTION

Baseline Wind, LLC, a development subsidiary of First Wind Energy, LLC is developing the Baseline Wind Energy Facility (Baseline Wind) located in Gilliam County, Oregon. Over 2,000 megawatts (MW) of wind generation are operational in the general vicinity along both sides of the Columbia River. Baseline Wind (the Project) is located within the Columbia Plateau Ecoregion (CPE) and sits geographically on and to the south of Shutler Flat, straddling State Highway 19, all east of Rock Creek, approximately 8 miles (at its closest point) to 20 miles (at its furthest point) south of the Columbia River and the City of Arlington (Figure 1). Baseline Wind occupies approximately 36,351 acres (14,658 hectares; ha) of private land primarily used for small grain production and managed as dryland wheat farms; livestock grazing is a secondary agricultural use. The two nearest permitted wind energy facilities are the adjacent 404-Megawatt (MW) Montague Wind Power Facility (Iberdrola Renewables, Inc., 2010; not constructed yet) and the operating 90.3-MW Leaning Juniper IIB Facility. Other wind projects in the general area to the north of the Project within Gilliam County include the operating Leaning Juniper I and IIA, Rattlesnake Road and Wheat Field Wind Farms, and Pebble Springs Wind Project, which at their closest points, range from approximately 0.5 to 4 miles or 0.8 to 6.4 kilometers (km) away from Baseline Wind. Three other wind projects are located or under construction in both Gilliam and Morrow Counties to the east of Baseline Wind, two of which are within 1.5 miles (2.4 km) of the Project, including Shepherds Flat (under construction, approximately 1.5 miles to the east at its closest point) and Willow Creek Winds (operating, approximately 5.5 miles northeast of the Project).

As currently planned (Project facility layout as of November 23, 2011), Baseline Wind will consist of no more than 219 turbines with an anticipated total generating capacity of up to 500 megawatts. A new overhead 230-kV generator lead line will connect the Project to the proposed Bonneville Power Administration (BPA) Diamond Butte Interconnection Substation (Diamond Butte substation) along the Ash-Marion 500-kV line or the proposed Portland General Electric (PGE) Interconnection Substation at Cedar Spring (Cedar Spring substation). Site control and interconnection queue positions have been secured by Baseline Wind for the development area.

Northwest Wildlife Consultants, Inc. (NWC) was contracted by First Wind in 2009 to study the Baseline Wind site for various biological resources. This ecological baseline study report includes methods and results for the wildlife, rare plant, habitat, and other field investigations as well as information reviews and agency correspondence that have been completed. Specifically it includes methods and results of information reviews and database inquiries, documentation on Federal and State agency consultation, wildlife habitat mapping, habitat quality rating, special status vascular plant surveys, avian use surveys, raptor nest survey and golden eagle telemetry, special status terrestrial vertebrate wildlife surveys, and bat acoustic monitoring. It concludes with assessments of potential impacts of the Project based on the results of these investigations. Methods were consistent with methods employed for nearby operating and permitted proposed wind projects and follow standards set forth for pre-project assessment guidelines in the Oregon Columbia Plateau Ecoregion wind energy siting and permitting guidelines (USFWS, 2008a).

The current Project layout and Project boundary include lands that were not leased by First Wind at the time when NWC was contracted for surveys by First Wind. Most of these additional lands were assessed (in 2008 through 2010) by NWC for the (now permitted) Montague Wind Power Facility (Iberdrola Renewables, Inc., 2010). To provide a complete characterization of the area within the Project boundary as currently proposed, this report

presents survey results from studies conducted for First Wind, other results provided to First Wind by Iberdrola Renewables, Inc. (IRI) specifically for the Montague Wind Power Facility, and additional results obtained from public reports associated with IRI permitted projects. Pertinent information from the other sources was used for assessing potential impacts. For example, data from surveys conducted by IRI (NWC) provided to First Wind were reviewed and used for assessing potential project impacts. Data from IRI's special status plant and wildlife surveys were also used and provided on a figure for this December 2011 report.

All of these studies used similar survey protocols and data analysis methods. In addition, as of this report date a relatively small portion of land inside the current Project boundary remains unsurveyed (except for raptor nests); for these areas, where needed, special status plant and wildlife surveys and habitat mapping and categorization will occur before construction begins. Future surveys recommended or planned are summarized in Section 2.9.

NWC did not conduct fish surveys or map fish species habitats, and therefore, fish are only addressed in the database review sections. Invertebrates and non-vascular plants are not addressed in this report with the exception of database inquiry results.

2.0 METHODS

The following reviews and site-specific studies were conducted for Baseline Wind from 2009–2011. All have been completed.

- Review of existing information and database searches, and agency consultation
- Review of eagle nest records
- Review of deer/elk winter ranges
- Wildlife habitat mapping, and habitat quality rating
- Special status vascular plant surveys
- Avian use surveys
- Raptor nest survey
- Golden eagle telemetry
- Special status vertebrate wildlife species surveys
- Bat information review and bat species inventory

2.1 Information Reviews and Agency Consultation

2.1.1 Pre-Field or other Data Reviews

A review of available literature and other resources was conducted in late 2009 and early 2010 to identify the rare plant and vertebrate wildlife species potentially occurring within the general Baseline Wind area (Appendices A–D). Records of rare, Threatened, and Endangered plant and wildlife species were requested from the Oregon Biodiversity Information Center (ORBIC; formerly Oregon Natural Heritage Information Program) for the 5-mile (8.04 km) search area of the Baseline Wind Project boundary in early January, 2010 (ORBIC, 2010a). A second request was submitted to ORBIC in early May 2010 to cover areas within the 5-mile buffer that were not covered in the original request (ORBIC, 2010b). A third database search request was submitted to ORBIC in mid-September 2010 due to slight boundary changes, and the results of this request (for boundary as of September 1, 2010) are included in this report (ORBIC, 2010c; Appendix B; Figure 1). The current Project boundary extends slightly west and north of the boundaries for which these requests were made; another ORBIC request is being made to encompass the small area not covered by these prior requests.

Additionally, the United States Fish and Wildlife Service (USFWS) County-level special status species list for Gilliam County was obtained and reviewed prior to surveys (Appendix A1). USFWS special status species lists of neighboring counties (Morrow County and Sherman County) were reviewed for potential species occurrence in the general area. The Morrow County USFWS special status species list is included as Appendix A2. Although newer versions of USFWS County lists now exist, they were recently reviewed and found to contain no relevant changes. Other information (such as 2008 and 2009 bald eagle and peregrine falcon nest information), obtained from the Oregon Dept. of Fish and Wildlife (ODFW) and other sources, have been reviewed and records placed in a confidential nest database file. Information from these database inquiries has been used in conjunction with other information (i.e. results of ongoing surveys of the area, interviews with ODFW biologists regarding potential species occurrence) to develop lists of potential plant and vertebrate wildlife species with potential for occurrence in the Baseline Wind area (Appendices C and D). A review of bat species potentially occurring at Baseline Wind and surrounding area was conducted as part of the bat investigation and included as Appendix E.

Pre-construction wildlife and habitat data in the public files for other wind projects in the area were reviewed; these included Montague Wind Power Facility, Leaning Juniper IIB Facility, Leaning Juniper I and IIA, Rattlesnake Road and Wheat Field Wind Farms, Pebble Springs Wind Project, Willow Creek Winds, Shepherds Flat, and Saddle Butte Wind Park. Pertinent information on wildlife species occurrence for those projects is included in Appendix D (Caithness Shepherds Flat, 2007; Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2008b; Kronner et al., 2010; NWC 2009; NWC, 2010b; PPM, 2006; Saddle Butte Wind, 2009). In addition, completed operations phase wildlife fatality and raptor nest monitoring studies conducted at nearby operating wind projects were reviewed for relevant information, for updated raptor nesting information, and for insight into potential impacts to birds and bats at Baseline Wind (discussed in Section 4.0).

2.1.2 Review for Golden Eagle

The golden eagle and bald eagle are protected under the Federal Bald and Golden Eagle Protection Act. In addition to reviewing records within a 5-mile (8.06 km) search area obtained from ORBIC requests and reviewing USFWS species lists for Gilliam, Morrow, and Sherman Counties, NWC conducted a review specifically for golden and bald eagle nest records within 6 miles (9.6 km) of proposed Baseline Wind turbines (as provided to NWC on March 30, 2010, and also used to create the buffer for the 2010 raptor nest survey). Information on eagles, where available in neighboring wind projects' files (provided by ODFW; Steve Cherry, pers. comm. 2010), State files or other sources including ORBIC (10-mile or 16.09-km buffer of proposed turbines) were reviewed. Although ORBIC tracks bald eagles and their nests, ORBIC does not actively track golden eagles or their nest sites; information on this species is available from their Point of Observation Database (PODS), which is a repository for information on less-rare vertebrates in Oregon started in 2006 (Koepke, pers. comm., 2010). As the species in PODS are common and not tracked by ORBIC, the records have not been through quality checks. The ORBIC PODS is for species that may not warrant the intense monitoring of sensitive species, but whose status it is important to track over time so population declines can be identified early and management actions taken. A summary of golden eagle observations during all field investigations is also included in the Results Section (3.1.2).

2.1.3 Review of Deer/Elk Winter Range

The Oregon Department of Fish and Wildlife's data clearinghouse was reviewed and mapped (within the Project's 5-mile buffer) to obtain and present the general outline of deer and elk winter ranges for eastern Oregon, east of the crest of the Cascades (ODFW, 2009). The

ODFW considers winter range to be that area normally occupied by deer or elk from December through April.

2.1.4 Agency Correspondence and Site Tours

A draft of the Baseline Wind Ecological Baseline Study Plan (NWC, 2010a) was submitted by representatives of Baseline Wind LLC to the ODFW Heppner District Biologist, Steve Cherry, and a meeting and site tour were held for the ODFW on May 20, 2010 to discuss ongoing and planned reviews and studies and to tour the primary turbine development areas. A Notice of Intent (NOI) for Baseline Wind was sent to the Oregon Department of Energy, ODFW and USFWS on June 28, 2010 as part of the State-level permitting process. Biologist Bob Roy of First Wind initiated an informal briefing on the Project with Jerry Cordova of USFWS on August 3, 2010. The overall Project plans were discussed, as were the USFWS interim guidelines for golden eagles (Pagel et al., 2010). Subsequent meetings with ODFW and with USFWS are described in Section 3.1.4.

2.2 Wildlife Habitat Mapping and Categorization

2.2.1 Wildlife Habitat Mapping

Habitat mapping within most of the Project boundary of the proposed Baseline Wind Energy Facility was conducted during the spring and summer seasons of 2010. The majority of habitat types were mapped and categories were assigned as of June 2010, with minor updates due to land alterations noted incidentally during the course of other, later surveys. Habitat mapping of portions of the area within the current Project boundary was conducted by NWC for IRI in 2008-2009 using the same methods, and IRI has provided First Wind with those data for inclusion in this report. Those results are still deemed accurate, as no changes (through fires or land use conversions) were noted during 2010 surveys of the Baseline Project. A portion—3,718.2 acres (1,499.3 ha)—of the area within the current Project boundary remains unmapped; mapping and categorization of this area will be completed, if needed, prior to construction.

Utilizing a combination of historical land cover review, satellite imagery classification review, aerial photograph interpretation, and on-the-ground verification, this mapping effort characterized the range of vegetation types and structural characteristics (vertical height, cover density, etc.) present within the Project area from the perspective of wildlife use, both general (for species assemblages, e.g. Shrub-steppe obligates) and specific (for individual taxa, i.e. special status species). Experienced biologists, familiar with Columbia Plateau habitat types and wildlife, used Gilliam County soil maps (USDA, 1984) and high-quality 2005 and 2009 digital orthophotos during mapping. Habitat types and categories are shown on Figures 2a and 2b. Descriptive classifications were based upon those used in similar mapping efforts conducted in nearby Columbia Basin habitats (Kronner et al., 2005a, Kronner et al., 2007a; NWC, 2009; NWC, 2010b) and followed a native wildlife-use approach to vegetative/wildlife habitat delineation with some practical considerations related to mapping scale.

Prior to field surveys, historical land cover maps from the Oregon Gap Analysis Program (OR-GAP) and the 2001 National Land Cover Database (Homer et al., 2004; Kagan et al., 1999) were reviewed to identify the broad habitat cover types at a coarse scale. While this information is useful for gaining a general overview of vegetation cover, more detailed habitat information, with more specific habitat classifications at a finer spatial scale, were needed to be relevant to wildlife use.

Initial habitat boundaries were delineated at a scale of 1:5,000 in a digital GIS environment using 1-meter resolution orthophotographs (image date June 30, 2009; USDA-FSA 2009). Initial boundaries were delineated based on obvious differences in vegetation, land form, and land use. Overlay of topography, hydrology, and transportation layers aided with these delineations. Experienced biologists subsequently ground-truthed boundaries, mapped habitat types and subtypes and rated habitat quality, using existing knowledge of the extensively studied habitats in the general area and ground-based surveys. Any necessary boundary corrections or habitat classification changes were hand drawn on orthophoto topographic maps in the field and later transferred to the digital boundary layer. Mapping efforts did not include quantitative sampling for species composition and distribution within each habitat type, but dominant, co-dominant, and other common plant species were noted in order to accurately classify and describe habitat types. Conservation Priority Habitat statuses for specific habitat types were attained from the ODFW (2006). Where unclear, NWC assigned the ODFW status to types based on the habitat's potential to support one or more special status wildlife or plant species.

Certain northern portions of the Project were not included in the NWC 2010 studies, and habitat data were not available from prior studies (IRI, 2010). Habitats for these areas were not included in the habitat typing and categorization effort (Figures 2a & 2b), and acreages for habitat in these areas are not included in Tables 1 & 2. The unsurveyed areas amount to 3,718.2 acres (1,499.2 ha) of the 36,351.2 total acres (14,657.7 ha) within the Project boundary.

2.2.2 Habitat Categories

As defined in Oregon Administrative Rule (OAR) 635-415-0025 (Dept. of Fish and Wildlife, Fish and Wildlife Habitat Mitigation Policy, Implementation of Dept. Habitat Mitigation Recommendations), habitat subtypes within the assessed area were further classified into six habitat categories. This rule defines six habitat categories and establishes mitigation goals and implementation standards for each category. Biologists familiar with Columbia Basin habitats and with applying OAR 635-415-0025 used vegetative structure, overall ecological condition and functionality for wildlife, in particular for special status species, and the results of special status wildlife surveys conducted in 2010 to derive habitat categories (Figure 2b). The six habitat categories and corresponding mitigation goals and implementation standards are described below.

(i) ***"Habitat Category 1"*** *is 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.*

(a) The mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality.

(b) The Department (ODFW) shall act to protect Category 1 habitats described in this subsection by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) No authorization of the proposed development action if impacts cannot be avoided.

(ii) ***"Habitat Category 2"*** *is 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.*

(a) The mitigation goal if impacts are unavoidable is no net loss of either habitat quantity or quality and to provide a net benefit of habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 2 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality. In addition, a net benefit of habitat quantity or quality must be provided. Progress towards achieving the mitigation goals and standards shall be reported on a schedule agreed to in the mitigation plan performance measures. The fish and wildlife mitigation measures shall be implemented and completed either prior to or concurrent with the development action.

(c) If neither 635-415-0025(2)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

(iii) ***"Habitat Category 3"*** *is essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.*

(a) The mitigation goal is no net loss of either habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 3 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality. Progress towards achieving the mitigation goals and standards shall be reported on a schedule agreed to in the mitigation plan performance measures. The fish and wildlife mitigation measures shall be implemented and completed either prior to or concurrent with the development action.

(c) If neither 635-415-0025(3)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

(iv) ***"Habitat Category 4"*** *is important habitat for fish and wildlife species.*

(a) The mitigation goal is no net loss in either existing habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 4 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through reliable in-kind or out-of-kind, in-proximity or off-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality. Progress towards achieving the mitigation goals and standards shall be reported on a schedule agreed to in the mitigation plan performance measures. The fish and wildlife mitigation measures shall be implemented and completed either prior to or concurrent with the development action.

(c) If neither 635-415-0025(4)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

(v) ***"Habitat Category 5"*** *is habitat for fish and wildlife having high potential to become either essential or important habitat.*

(a) The mitigation goal, if impacts are unavoidable, is to provide a net benefit in habitat quantity or quality.

(b) The Department shall act to achieve the mitigation goal for Category 5 habitat by recommending or requiring:

(A) Avoidance of impacts through alternatives to the proposed development action; or

(B) Mitigation of impacts, if unavoidable, through actions that contribute to essential or important habitat.

(c) If neither 635-415-0025(5)(b)(A) or (B) can be achieved, the Department shall recommend against or shall not authorize the proposed development action.

(vi) ***"Habitat Category 6"*** *is habitat that has low potential to become essential or important habitat for fish and wildlife.*

(a) The mitigation goal is to minimize impacts.

(b) The Department shall act to achieve the mitigation goal for Category 6 habitat by recommending or requiring actions that minimize direct habitat loss and avoid impacts to off-site habitat.

2.3 Special Status Vascular Plant Surveys

Surveys for special status vascular plants were conducted in 2010 by NWC on May 17–19, 22, 24–27, and June 2. Results of IRI's 2009 Leaning Juniper IIB plant survey (IRI et al., 2009, Attachment 7) and the 2009 late season rare plant habitat evaluation conducted in portions of the Project boundary were provided to First Wind by IRI or obtained from IRI, 2010.

Target species for the purposes of these surveys included all possible Federal and Oregon Department of Agriculture (ODA) Candidate, Threatened and Endangered taxa considered likely to occur in the general region around Baseline Wind (Appendix C). In addition, rare species lacking Federal or State status but which are actively tracked as being rare by the Oregon Biodiversity Information Center (ORBIC, 2010d) were also included in the target list. The timing for these surveys was based on review of the database search results, incorporating NWC's extensive local knowledge of target plant species and their typical phenology.

The technique employed by the experienced investigators was an "intuitively controlled" methodology. This technique allowed the NWC botanist to investigate all areas that may have harbored rare vascular plants. This technique effectively provided full coverage of all habitat types in a given area, and provided a complete species richness baseline "snapshot." This method has been employed with success at other NWC investigations in the area, including Rattlesnake Road (Kronner et al., 2007a), Wheat Field Wind Farms (Kronner et al., 2008b), and Leaning Juniper IIB (NWC, 2009), among others. During the survey, investigators compiled a list of all vascular species encountered. Rare plant species surveys occurred within the Project boundary where suitable habitat was present within and near where development is planned. Due to the limited suitable habitat and extensive active cropland, all suitable habitat areas within survey areas shown on Figure 5a were surveyed. Areas of intensively altered nonnative grasslands and agricultural fields were not surveyed or received muted attention during the surveys due to the extremely low potential for target species occurrence in these areas.

The primary flora reference employed for the field effort was Hitchcock and Cronquist (1973), with supplemental texts from the 5-volume Flora of the Pacific Northwest (1955–1969) used as necessary. Noxious weed populations were noted but not mapped. Currently accepted taxonomic nomenclature was obtained from the PLANTS database (USDA, NRCS, 2010). A comprehensive list of plant species detected during surveys can be found as Appendix F.

2.4 Avian Use Surveys

2.4.1 Field Methods

Experienced biologists conducted avian point counts with a variable circular-plot method to obtain information on species composition and relative abundance of birds (Reynolds et al., 1980) and flight altitudes during diurnal hours. The survey protocol was similar to that used for the nearby Leaning Juniper Phase 1 and Phase II Wind Projects (Kronner et al., 2005a; NWC, 2009), Montague Wind Power Facility (Kronner et al., 2010; NWC, 2010b), Rattlesnake Road Wind Farm (Kronner et al., 2007a), Wheatfield Wind Farm (Kronner et al., 2008b), Klondike I Wind Power Project (Johnson et al., 2002), Klondike III Wind Power Project (Mabee et al., 2005), and several other wind power studies in Oregon and Washington (Kronner et al., 2005b). Studies at these projects involved recording every detection (regardless of distance) although only data from an 800-meter (≈0.5 mile) radius were used for specific analyses. This survey protocol was primarily designed for studying use by large birds (i.e., waterfowl and raptors), but information for all species observed was recorded during each survey.

Eighteen 800-meter (m) radius study plots were established to provide excellent coverage of the habitat types and topographic variation of Baseline Wind, inclusive of the proposed turbine strings (Figure 3). Plots were non-overlapping and were located to provide optimal viewing conditions and thorough coverage of the proposed turbine strings and topographical features within the proposed Project. An experienced avian ecologist positioned at the center of the plot recorded all vertebrate wildlife seen or heard during 20-minute point counts. Species, number, flight height, weather, etc., were collected. Survey starting point locations and times of the day were alternated among surveys to reduce spatial and temporal bias. All survey plots were surveyed every week (weather permitting) during the one-year study.

Survey dates for each season were:

- Winter: November 2, 2009–March 10, 2010; 19 visits to 18 plots, 342 surveys
- Spring: March 16–May 26, 2010; 11 visits to 18 plots, 198 surveys
- Summer: June 4–August 14, 2010; 11 visits to 17 plots, 10 visits to L, 197 surveys
- Fall: August 20–October 26, 2010; 11 visits to 18 plots, 198 surveys.

In all, 935 20-minute avian use surveys were conducted during the period November 2009–October 2010 for Baseline Wind in four seasons. In addition, five plots were established within the current Project boundary on lands then leased by IRI, and avian use studies were conducted at these plots by NWC using the same methods described here. These plots were Plots A, B, and C of the Montague 2008-2009 avian use study, Plot EE of the Montague Fall 2009 avian use study, and Plot D of the 2008-2009 Leaning Juniper IIB avian use study. (Plot EE was surveyed for fall season only, whereas surveys were conducted for four seasons at the other four plots.). Although this report does not include the results of those studies, which can be found in Exhibit P of IRI (2010) or IRI et al. (2009), those results were examined for noteworthy detections or trends during the analysis for this report. In this report, these five plots are referred to as "Montague plots."

Flight paths of special status species or raptors were hand-plotted on topographic maps in the field. These flight paths were reviewed for determining areas of concentrated use near potential turbines. All detected vertebrate wildlife were recorded, whether inside or outside the fixed-point plot. Special status species or species of interest (such as raptors) were also recorded while in-transit near the proposed turbines during the avian surveys. Data were inspected and then entered into a Microsoft Access database.

2.4.2 Data Analysis

Avian-use metrics found in other studies in the region (as mentioned above) were used in conducting analyses for Baseline Wind. In all these analyses, observations within 800 m from the survey point were used. Standardized metrics computed for avian species or species groups were mean use, percent composition, and frequency of occurrence.

- *Mean use* equals the mean number of individuals/20-minute point count for each species or species group, and provides an index of avian relative abundance per survey point. This index does not describe density, however, because individuals (particularly raptors) may have been observed at multiple points and data were not corrected for differences in detectability.
- *Percent composition* is the mean use for a species/total use for all species, multiplied by 100, and provides an estimate of the relative use of a particular species compared with the use of all other species.
- *Frequency of occurrence* is the percentage of 20-minute point counts in which a species is observed; this metric provides an index of how often a species occurs in the Project area.

Mean use and frequency of occurrence reflect different aspects of abundance, in that mean use is based on the number of individuals (i.e., large flocks can produce high estimates), whereas frequency of occurrence is based on the number of flocks (and is not influenced by flock size). Understanding avian use of the Project area involves integrating these metrics.

2.5 Raptor Nest Survey

The objective of the raptor nest survey was to provide information that can be used to predict potential impacts of the Project to nesting raptors and to identify options for avoiding or mitigating impacts. Impacts to nesting raptors can potentially occur during the construction or operations phase of the Project, and may include disturbance during nesting, direct loss of the nest structure, or collision by individual, locally nesting birds with turbines.

An aerial survey of the entire Project area plus a 2-mile (3.2 km) buffer of the proposed turbines (as provided on March 30, 2010) was conducted between May 6–9, 2010 by an experienced helicopter pilot and wildlife biologist to locate active and inactive raptor nests. Species for which this survey is not effective include cavity-nesting raptors (American kestrel and small owl species) and ground-nesting raptors (burrowing and short-eared owls and northern harrier). One survey was conducted; the total survey area was 86,846 acres (136 mi^2, 35,145 ha; Figure 4). Flight paths avoided occupied dwellings, livestock areas, and any areas deemed by the pilot to be unsafe.

All appropriate nesting areas—including trees, rock formations, and transmission line towers—were examined during the aerial survey and during ground-based special status vertebrate wildlife surveys (see Section 2.7). The survey effort was discussed with the local ODFW District Biologist. All potential and confirmed raptor nests were recorded, regardless of activity status. Determination of nest status (active, inactive, unknown) was made using a combination of visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash (excrement), or observational data from the ground-based surveys. Inactive nests (no sign of present usage) were assessed for the type of bird that may have built the nest. Stick nests in trees that appeared to have been constructed and used by common ravens were included in "Inactive" status, as these structures could be used by raptors in the future. All nest locations were recorded using a hand-held Global Positioning System (GPS) unit. All data were inspected and then entered into a GIS database.

2.6 Golden Eagle Telemetry

Telemetry studies enable the acquisition of information regarding the spatial and habitat use of individual animals, information that is in turn useful for micrositing facilities and for assessing risk to the species. With a species as large as golden eagle, solar-powered platform terminal transmitters (PTTs) use satellite technology to provide such information remotely and for up to two or three years. Given the proximity to the Project of a single historical and recently active golden eagle nesting territory, telemetry opportunities were explored as a way of assessing the area of use of the individual eagles associated with that territory. Telemetry of a resident adult eagle is expected to provide year-round spatial and habitat use data. Telemetry of nestling eagles, while also potentially yielding two to three years of location data, is expected to provide spatial data relevant to the Project during the five to six month post-fledging period, when these young are learning to fly and hunt.

ODFW and USFWS were briefed about this study, and all relevant Federal and State permits (for possession and transport of trapping carcasses as well as for capture, handling, banding, telemetry, and blood sampling of eagles) were obtained prior to initiating this research. Attempts were made during January and February 2011 to capture the adult male from the golden eagle territory nearest the Project. Successful breeding attempts within this territory during both 2010 and 2011 provided opportunity for deploying PTTs on a young eagle in each year.

All captured eagles (one juvenile in June 2010, one adult in January, and one juvenile in June 2011) were banded, with a uniquely-numbered United States Geological Survey band affixed with a rivet to the right tarsus. PTTs were attached as backpacks. A blood sample was collected from each eagle (for a separate study of the levels of lead and other contaminants in the golden eagle population of the region). Eagles were weighed and measured, and sexed following standard protocols. Young eagles were placed back on the nest cliff, in or near the nest, as soon as all measurements, banding, and PTT deployment were completed.

PTTs were programmed to transmit hourly location data from approximately one hour before sunrise to one hour after sunset throughout the year. Home ranges will be estimated using the Brownian Bridge Movement Model (Bullard, 1991). This model utilizes movement information from trajectories, incorporating flight corridors and perch locations to define extent of use areas. High-use areas and habitats will be identified using fixed-kernel density estimators.

2.7 Special Status Vertebrate Wildlife Species Surveys

Surveys were conducted during two survey periods, March 31 through April 12, 2010 and May 20 through June 1, 2010. For portions of the Project area, results were provided to First Wind by IRI; surveys of those portions of the Project were conducted in 2008, 2009, and 2010 (IRI, 2010; Kronner, et al., 2010; IRI et al., 2009). Details on methods and survey dates are provided in IRI (2010) and Kronner et al. (2010). Results of all 2010 special status wildlife species surveys are presented together (Figure 5a). Future special status wildlife surveys may be required as detailed in Section 2.9.

Methods to assess presence of special status wildlife species were developed by NWC using the extensive background and experience of the staff, informal consultation with local ODFW biologists, and suggested methods in the Oregon Methodology Manual (ODFW, 1994). Methods selected were similar to those used for the Leaning Juniper IIA and IIB (Kronner et al., 2005a; NWC, 2009) and Montague Wind Power Facilities (Kronner et al., 2010; NWC, 2010b), as well as others in the area (Kronner et al., 2007a; Kronner et al, 2008a).

A list of special status species was compiled to include all Oregon State Listed or Sensitive Species and Federal Endangered, Threatened, Candidate Species and Species of Concern believed to have potential for occurrence on the Project (Appendix D). Of the species on this list, several were expected to occur in suitable habitat in the Baseline Wind area; these include long-billed curlew, grasshopper sparrow, burrowing owl, loggerhead shrike, ferruginous hawk, Swainson's hawk, Washington ground squirrel, white-tailed jackrabbit, and sagebrush lizard. Only the Washington ground squirrel is State Listed (Endangered status); the others have State Sensitive status. Other species of general concern that may use the site for nesting (primarily the above-ground nesting raptors) were surveyed from the air (see Raptor Nest Surveys) or noted incidentally while conducting other ground-based surveys (all raptors).

Experienced biologists and technicians walked meandering transects approximately 50–70 m or 164–230 feet (ft) apart within all habitat suitable for target species within the Project boundary (Figures 5a and 5b). As needed, specific areas along or near the transects were investigated more thoroughly for confirmation of observation, specific reptile habitat, etc. Unsafe areas for walking (steep rocky hillsides/cliffs of the Rock Creek drainage), unsuitable habitat (dryland wheat areas), and residences were not surveyed. All trees were examined for nests, and all nest structures were examined for occupancy by raptors. Cliffs and escarpments were scanned from above and below for nest structures.

Surveys were conducted during diurnal periods from sunrise to early afternoon during those times and weather conditions most suitable for detection of breeding birds and mammals. Surveys continued into the early afternoon to survey for reptile species (of which one lizard species has special status) in suitable habitats during a warmer period of the day. Aquatic habitats were not surveyed for fish and amphibians, as these habitats will be avoided during Project design. All wildlife observed were recorded (Appendix G). Special status species locations were recorded with a handheld GPS unit. Maps were generated in GIS to assist in the micro-siting process.

2.7.1 Washington Ground Squirrel Surveys

Washington ground squirrel (WGS) surveys were conducted concurrently with special status vertebrate wildlife surveys described above (Section 2.7). For the Columbia Plateau, the general consensus from monitoring history is that late-March through mid-May is the optimal time for detecting all age classes of WGS; thus 2010 surveys were conducted during that time period. The first survey period dates, March 31 through April 12, 2010, were specifically chosen to target Washington ground squirrels. Protocols were the same as for special status vertebrate wildlife surveys as described above (Section 2.7); however, if ground squirrels were detected, values were given to different types of detections, following a system implemented during studies conducted on the Boardman Bombing Range (BBR) and the adjoining Boardman Conservation Area (BCA) (Marr, 2004). This value system is known as the "Marr Rating System." This value system has been accepted by State and Federal biologists and is used consistently by NWC elsewhere. The values are as follows:

1 = Holes characteristic of those used by squirrels; droppings, if present are not from current year.

2 = Dropping (WGS scat) of the current year (interior of the dropping is green).

4 = Recognizable calls given by WGS

8 = Visual (actual observation of a WGS)

Values are additive. A positive detection was considered anything of a value equaling "3" or higher, which is at a minimum a hole with droppings positively identified as belonging to Washington ground squirrels from the current year. When a call or visual detection was

obtained, efforts were made to find the nearest hole and look for droppings. If a hole with droppings could not be found, the visual detection of the WGS or the approximate location of an auditory only detection was marked.

Washington ground squirrel survey results provided to First Wind by IRI and included in this report were obtained during 2008-2010 using the same methods described here.

In the year prior to construction, all areas of suitable WGS habitat where construction disturbance could occur will be surveyed for Washington ground squirrels as well as other special status wildlife.

2.8 Bat Investigation

Objectives

The bat investigation was discussed with the ODFW during Study Plan preparation. At the ODFW's request, the primary objective of the 2010 bat field study was to investigate bat species diversity along the Rock Creek bluffs and rocky breaks near proposed turbine strings using acoustic monitoring equipment. Another objective was to prepare a comprehensive list of bat species potentially occurring at the Baseline Wind site using data collected at a few specific locations. The objectives of the field investigation ("inventory") were to: (1) collect baseline information on bat species present during a specific seasonal period in specific areas and (2) examine spatial (landscape) and temporal (seasonal) bat species composition at various habitat areas along the breaks of Rock Creek within or adjacent to the Project boundary. To accomplish these, field investigations and literature/other information reviews occurred.

Bat Species Inventory

The bat species inventory/acoustic monitoring was initiated on July 27, 2010 at the request of the ODFW and continued through the end of October 2010, a late summer and fall period. Six sample locations were spread spatially north to south along the upper breaks of Rock Creek (Figure 6). Because bat activity and wind project related fatalities typically increase by mid-August and decline by mid-October (Figure 7), acoustic monitoring occurred prior to, during, and after peak activity to fully capture the timing and composition of bat species through the area. Three locations were sampled from July 27 through late September (A1, B1, C1), and three locations were sampled from September 24 (A2, B2) and October 1 (C2) through the end of October 2010 (Figure 6). Locations were chosen based on potential bat use—either by the existence of rock cliff faces and/or proximity to Rock Creek or intermittent streams with pools of water present in summer to early fall—and proximity to proposed turbine strings (known as of July 2010).

Pettersson D500X ultrasonic detectors capable of automatically recording the echolocation calls of bats onto compact flash cards (CF cards) were placed into protective cases and located in rock cairns or on fence posts to blend in with the environment. The detectors were programmed to turn on one hour before sunset and turn off one hour after sunrise to coincide with the timing of most bat activity (Hayes, 1997). The CF cards were downloaded on a regular basis every 1–2 weeks. Downloaded calls were analyzed using SonoBat® 3.0 acoustic identification software to identify noise files, which were not utilized, and to identify bat species where possible. Species identifications were manually checked by experienced specialists using call libraries when the automated species identification seemed unlikely or unclear. Common species with significant overlap in call structure with bat species with similar calls were not further analyzed and were instead grouped into high or low frequency calls, a typical strategy in call analysis to conserve effort expended on common species that have no special State or Federal status.

2.9 Future Field Investigations and Other Assessments

NWC biologists did not have permission to access certain portions of the fully anticipated Project extent during the primary 2010 study period, and habitats for these areas were not included in the habitat typing and categorization effort (Figures 2a and 2b) or special status plant and wildlife surveys (Figures 5a and 5b). Wildlife and habitat impacts for these areas will be assessed and reports prepared prior to the beginning of construction. In the year prior to construction, all areas of suitable habitat where construction disturbance could occur will be surveyed for Washington ground squirrels and other special status wildlife as well as for rare plants. Golden eagle telemetry studies are ongoing, and additional survey or monitoring efforts for golden eagle may be implemented (as a component of an Eagle Conservation Plan or Avian and Bat Protection Plan developed in consultation with USFWS as part of compliance with the Bald and Golden Eagle Protection Act and other Federal laws).

3.0 RESULTS

3.1 Information Reviews and Agency Consultation

3.1.1 Pre-Field or other Data Reviews

Oregon Biodiversity Information Center

Records of rare, Threatened, and Endangered plant and wildlife species were requested from the Oregon Biodiversity Information Center for the 5-mile search area of the Baseline Wind boundary and received in January, May, and October of 2010. Results of the database search received on October 5, 2010, which covered the complete 5-mile buffer of the Project boundary known as of September 1, 2010, are included in this report (Appendix B). There were six records of vascular plant or lichen (non-vascular) species, six mammal records, six fish records, one bird record, one amphibian record, and one invertebrate record (all outside the Project boundary); all are listed by species below:

- sessile mousetail (*Myosurus sessilis*), State Candidate; 2 records
- Laurent's milk-vetch (*Astragalus collinus* var. *laurentii*); 1 record
- woven-spore lichen (*Texosporium sancti-jacobi*), Federal species of concern; 2 records
- Washington ground squirrel (*Urocitellus washingtoni*), State Endangered; 6 records
- steelhead (*Oncorhynchus mykiss,* population 28), State Sensitive-Critical; 5 records
- Chinook salmon (*Oncorhynchus tshawtscha,* pop.19), State Sensitive-Vulnerable; 1 record
- ferruginous hawk *(Buteo regalis*), State Sensitive-Critical; 1 record of nesting approximately 5 miles from the Project boundary
- western toad (*Anaxyrus boreas*), State Sensitive-Vulnerable; 1 record
- shortface lanx (giant Columbia River limpet; *Fisherola nuttalli*); no State status, but tracked by ORBIC; 1 record
- Columbia bladderpod (*Lesquerella douglasii*); no State status, but tracked by ORBIC; 1 record

All information, including any records at distances greater than 5 miles from the September 2010 Project boundary previously received, were reviewed to aid in compiling lists of vertebrate wildlife and plant species with potential for occurrence in the general area (Appendices C and D).

United States Fish and Wildlife Service Gilliam and Morrow County Lists

The United States Fish and Wildlife Service Gilliam and Morrow County species lists (Appendix A1 and A2) were also reviewed for plant and vertebrate wildlife species with potential for occurrence in the area and to aid in compiling target lists prior to surveys

(Appendices C and D). Although the planned Project is only located in Gilliam County, with the 5-mile Project boundary review area, Morrow County and a very small portion of Sherman County are included in the analysis area (Figure 1). The updated version of the Gilliam County list (September 11, 2010) was subsequently checked, and the only change was one bird; the greater sage grouse (*Centrocerus urophasianus*) was removed from the list. The Morrow County list remained unchanged and the version used for the information review (as of November 13, 2010) is included as Appendix A2. The USFWS Gilliam and Morrow County species lists encompass a range of habitats within the entire counties; species that have no potential for occurrence within and near Baseline Wind (due to lack of habitat; e.g., mountain quail) are not included in Appendices C and D. The Sherman County USFWS list was reviewed to aid in compiling target lists, but is not included in this report.

3.1.2 Review for Golden and Bald Eagles

NWC conducted a review for eagle nest records within the vicinity of Baseline Wind. The ORBIC Point of Observation Database (PODS) was checked for records of golden eagle nests within 10 miles (16.1 km) of Baseline Wind (included both Gilliam and Morrow County) and one record was found; this was a record of confirmed breeding from 1996 located approximately 4 miles (6.4 km) from the Baseline Project boundary. Such PODS records are not of the actual nest site, however, and this actual nest location may be closer or further from the Project, or could represent one of the other reported nests.

Information on nests where available in neighboring wind project's files (provided by ODFW), State files, or other sources was reviewed within approximately 6 miles (9.6 km) of proposed turbines (as provided on March 30, 2010). Two golden eagle nests were found within approximately 6 miles of the Project boundary, near each other in Eightmile Canyon. One or the other was active in 2005 and 2006, respectively, but not in 2010 (two nests side-by-side, one territory).

Golden eagles were observed at Montague Wind Power Facility during avian use surveys in winter and fall seasons (Kronner et al., 2010; NWC, 2010b; IBR, 2010). Golden eagles were also infrequently detected during pre-construction avian use studies of other nearby wind projects conducted since 2002. These include Rattlesnake Road (aka "Arlington" and "Mar-Lu projects"), Leaning Juniper I, Leaning Juniper IIA, Pebble Springs, Shepherds Flat, Willow Creek Winds Project, and elsewhere in the general vicinity (Caithness Shepherds Flat, 2007; Kronner et al., 2005a; Kronner et al., 2007a and b; PPM, 2006).

3.1.3 Review of Deer/Elk Winter Range

The Oregon Department of Fish and Wildlife's designated big game winter range areas (current through 2009; ODFW, 2009) within the Baseline Wind boundary and within a 5-mile buffer are shown on Figure 1. Only a portion of the winter deer range intersects with the western portion of the Project boundary. The elk range extends into the 5-mile buffer, but at its greatest extent is approximately 4 miles (6.4 km) west of the Project. Mule deer, elk, and pronghorn antelope were observed during spring season special status wildlife surveys in 2010, and were recorded, when observed, during avian use surveys and while in-transit to avian use surveys in (Appendix G).

3.1.4 Agency Correspondence and Site Tours

A draft of the Study Plan (NWC, 2010a) was submitted by representatives of Baseline Wind LLC to the ODFW District Biologist Steve Cherry located in Heppner, Oregon. Draft figures of raptor nest survey and special status wildlife survey extent and results were submitted to Steve Cherry of ODFW in early September, 2010. During a meeting on August 19, 2011,

Steve Cherry was apprised of the final layout proposal and the final results of all wildlife, plant, and habitat investigations.

During an informal briefing between Bob Roy of First Wind and Jerry Cordova of USFWS on August 3, 2010, overall Project plans were discussed, as were the USFWS interim guidelines for golden eagles (Pagel et al., 2010). It was discussed that additional golden eagle surveys might be needed to address suggested recommendations in those guidelines. During the site tour with USFWS, First Wind, and NWC on September 16, 2010, the guidelines for golden eagles (Pagel et al., 2010; USFWS, 2010) were again discussed with Jerry Cordova of USFWS. Other agency concerns discussed included protections provided by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA), presence of nesting golden eagles in the Project area, identifying protective measures for golden eagles, eagle monitoring protocols and potential further study plans, and other topics including the bat field study. During a meeting on August 19, 2011, Jerry Cordova and Jeff Everett of the USFWS were briefed on the final layout, proposed application and construction timelines, and the Project-related golden eagle research that is ongoing. Discussions at that meeting centered around the information needed to adequately assess potential risks the Project might pose to golden eagles and appropriate steps that could be taken to address recent changes in eagle management recommendations (USFWS, 2011). Results of other surveys, including raptor nest survey, habitat mapping, and special status wildlife species surveys, were also shared at this meeting.

3.2 Wildlife Habitat Mapping and Categorization

Habitat types and subtypes found within the assessed area (Figures 2a and 2b) are listed below by Category. Included are descriptions of the habitat types and subtypes and brief discussions of wildlife species typically associated with each. Habitat Categories are defined in Section 2.2.2 and also in IRI, 2010 (as applicable for a small portion of the Baseline Project). Target native wildlife species and their scientific names can be found in Appendix D and scientific names for common wildlife species can be found in Appendix G.

Category 1 Habitat

Washington ground squirrel (WGS) sites are considered Category 1 habitat. In addition, all habitat suitable for WGS within a 785-foot (ft) buffer of WGS sites and within the Project boundary is also defined as Category 1 habitat. Examples of habitat breaks that would cause the 785-ft. buffer to be truncated are tilled field edges or unvegetated, continuous vertical drop rim rock which has no burrowing or food value to Washington ground squirrels choosing to explore a given area. Small linear unvegetated inclusions into otherwise suitable habitat that were determined to not present a barrier to WGS use were not considered habitat breaks.

WGS were observed or sign of their use was confirmed in the Shrub-steppe and Grassland habitat types during the 2010 surveys of the Baseline Wind Energy Facility. Shrub-steppe, Grassland, and Developed habitats were also present as suitable habitat within 785 ft of WGS burrows. As a result, three habitat types were identified as Category 1 within the survey area: Shrub-steppe, Grassland, and Developed.

Developed

WGS were detected in one subtype of Developed within the Project boundary: Revegetated or Other Planted Grassland (subtype DR). This Developed habitat subtype was also present within 785 ft of WGS burrows.

Category 1 Developed – Revegetated or Other Planted Grasslands share the same vegetative cover and ecological condition as immediately adjacent Category 3 Developed – Revegetated or Other Planted Grasslands; they are Category 1 based on their proximity to known (2010) WGS occurrences. White-tailed jackrabbits and grasshopper sparrows may be supported by this Category 1 Revegetated or Other Planted Grasslands habitat. Savannah sparrows and western meadowlarks are commonly found in this habitat subtype.

There are approximately 30.4 acres (12.2 ha) of Category 1 DR habitat within the Baseline Wind Project boundary.

Grassland

WGS were detected in two subtypes of Grassland within the Project boundary, Exotic Annual (subtype GA) and Native Perennial (subtype GB). Grassland habitat was also present within 785 ft of WGS burrows.

Category 1 Exotic Annual Grassland is similar in vegetative cover and ecological condition to the immediately adjacent, respective Category 2, Category 3, or Category 4 Exotic Annual Grassland. Category 1 Exotic Annual Grasslands are categorized as Category 1 where they are within 785 ft of documented WGS burrows. Grasshopper sparrows, loggerhead shrikes, and jackrabbit pellets were detected in this habitat during 2010 special status wildlife surveys. Horned larks occur commonly in this habitat.

Category 1 Native Perennial Grassland is similar in vegetative cover and ecological condition to the immediately adjacent, respective Category 2, Category 3, or Category 4 Native Perennial Grassland. Native Perennial Grasslands are categorized as Category 1 where they are within 785 ft of documented WGS burrows. Category 1 Native Perennial Grasslands provide essential foraging habitat to a variety of common resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl use this habitat. Western meadowlark and horned lark occur commonly in this habitat. Native grasses and forbs provide forage for mule deer during all seasons of the year.

There are approximately 517.2 acres (208.5 ha) of Category 1 GA and 52.4 acres (21.1 ha) of Category 1 GB habitat within the Baseline Wind Project boundary.

Shrub-steppe

WGS were detected in two subtypes of Shrub-steppe within the Project boundary, Basin Big Sagebrush Shrub-steppe (subtype SSA) and Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB). Shrub-steppe habitat was also present within 785 ft of WGS burrows.

Category 1 Basin Big Sagebrush Shrub-steppe is similar in vegetative cover and ecological condition to the immediately adjacent Category 2 and 3 Basin Big Sagebrush Shrub-steppe. Basin Big Sagebrush Shrub-steppe is categorized as Category 1 where it is within 785 ft of documented WGS burrows. In addition to providing essential habitat for Washington ground squirrels, Category 1 Basin Big Sagebrush Shrub-steppe offers high quality breeding habitat for shrub obligate species including loggerhead shrike, and may support white-tailed jackrabbit. Loggerhead shrikes were detected in this habitat during 2010 special status wildlife surveys. Brewer's sparrow and lark sparrow are present in larger blocks of this habitat. Sagebrush lizard and other reptiles are likely to be found in areas where sandy soils are present. Species commonly occurring during the breeding season as well as at other seasons include western meadowlark and mourning dove.

Category 1 Rabbitbrush/Snakeweed Shrub-steppe is similar in vegetative cover and ecological condition to the immediately adjacent Category 3 Rabbitbrush/Snakeweed Shrub-steppe. Rabbitbrush/Snakeweed Shrub-steppe is categorized as Category 1 where it is within 785 ft of documented WGS burrows. In addition to providing essential habitat for Washington ground squirrels, Category 1 Rabbitbrush/Snakeweed Shrub-steppe provides foraging, cover, and/or nesting habitat for common birds and mammals, and may support white-tailed jackrabbit. Loggerhead shrikes, jackrabbit pellets, and long-billed curlew breeding pairs were detected in this habitat subtype during 2010 special status wildlife surveys.

There are approximately 56.5 acres (22.8 ha) of Category 1 SSA and 468.6 acres (189.0 ha) of Category 1 SSB habitat within the Baseline Wind Project boundary.

Category 2 Habitat

Five habitat types were identified as Category 2 within the Project boundary: Developed, Escarpment, Grassland, Woodland, and Shrub-steppe.

Developed

Category 2 Developed habitats occur where former disturbances have ceased and have since attained sufficient ecological condition to become important or essential for wildlife, some having special status. Revegetated or Other Planted Grassland (subtype DR) is the only developed Category 2 subtype within the Project boundary.

Category 2 Revegetated or Other Planted Grasslands are mature planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Many are located near more diverse native habitats that add wildlife value to the less diverse Developed – Revegetated or Other Planted Grasslands. Some Developed – Revegetated or Other Planted Grasslands are the only patch of cover for wildlife in an extensive cropland landscape, increasing their value to wildlife during the breeding season or when wildlife pass through or use the habitat for critical escape cover. This habitat subtype is typically lower in native flora and fauna diversity than the native, less-disturbed grasslands. It is comprised mainly of native-like grass species, with less coverage comprised of just a few native grass species and forbs. The vegetative cover includes intermediate wheatgrass (*Thinopyrum intermedium)*, crested wheatgrass (*Agropyron cristatum*), Sherman big bluegrass (*Poa secunda ampla*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), and Sandberg's bluegrass (*Poa secunda*). Older planted grass stands may contain sparse coverage (always subordinate to grasses) of naturally-established shrubs such as green rabbitbrush (*Chrysothamnus viscidiflorus*), gray rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), or basin big sagebrush (*Artemisia tridentata ssp. tridentata*). Grasshopper sparrows and long-billed curlews were detected in this habitat subtype during 2010 special status wildlife species surveys. Savannah sparrows may be supported by this habitat. Western meadowlarks are commonly found in this habitat subtype when shrubs are present.

There are approximately 201.1 acres (81.3 ha) of Category 2 DR within the Baseline Wind Project boundary.

Exposed Rock

Category 2 Exposed Rock provides important habitat for a variety of vertebrates, including birds, mammals (including bats), and reptiles. There is one Category 2 subtype of Exposed Rock, Escarpment (subtype ESC), within the Project boundary.

Category 2 Escarpment consists of linear basalt outcroppings on the shoulders of steeper canyons or on the edges of canyons. Soils are absent or very shallow, and what vegetative cover is present consists of Sandberg's bluegrass, non-native grasses, and various native and non-native forbs. This habitat provides critical nesting substrate and perching sites for raptors and passerines, and roosting crevices for bats. Escarpment provides shade and thermal cover for mule deer. It also provides home sites for woodrats and marmots and for several snake species, and all of these in turn represent important prey for a variety of raptors.

There are approximately 1.5 acres (0.6 ha) of Category 2 Escarpment within the Baseline Wind Project boundary.

Grassland

Category 2 Grasslands provide essential nesting/denning and foraging habitat for several special status species, including burrowing owl, grasshopper sparrow, and white-tailed jackrabbit. This type also shows fewer signs of impacts resulting from wildfires and domestic livestock grazing pressure, has more native plant diversity, and has fairly intact soil surface crust relative to the Category 3 or 4 habitats. There are two subtypes of Category 2 Grassland within the Project boundary, Exotic Annual Grassland (subtype GA) and Native Perennial Grassland (subtype GB).

Category 2 Exotic Annual Grassland share the vegetation composition and ecological condition of the Category 4 GA described below. Their classification as Category 2 is due to their adjacency to similar habitat that lies within 785 ft of identified WGS burrows (Category 1 Exotic Annual Grassland). Category 2 Exotic Annual Grassland habitat is deemed to be potentially useful to WGS; it may also be used by long-billed curlews for nesting and foraging, and by grasshopper sparrows, and white-tailed jackrabbits; horned larks occur commonly in this habitat.

There are approximately 482.9 acres (194.7 ha) of Category 2 GA habitat within the Baseline Wind Project boundary.

Category 2 Native Perennial Grasslands are composed primarily of perennial bunchgrasses, such as Sandberg's bluegrass. Bluebunch wheatgrass is also present. Soils appear to be generally medium to deep. Other native species, such as Idaho fescue, western needlegrass (*Achnatherum occidentale*) and needle-and-thread grass (*Hesperostipa comata*), are occasionally present in the appropriate soil types for the species. Various native forbs and low shrubs such as gray rabbitbrush and, to a lesser extent, green rabbitbrush are present but are an inconspicuous component. Native vascular plants are diverse and a variety of invertebrates can be found utilizing the plants throughout the growing season. Non-native grasses are present throughout but not dominant, and consist of cheatgrass (*Bromus tectorum*), bulbous bluegrass (*Poa bulbosa*), and annual cereal rye (*Secale cereale*). Broom snakeweed is present but never dominant. The non-native grasses and the broom snakeweed are typical throughout the Columbia Basin, but non-native grasses and forbs are generally less extensive in Category 2 Native Perennial Grasslands than in Category 3 and Category 4 Native Perennial Grasslands. Deep soil native bunchgrass sites in good to excellent condition are limited and becoming more limited in the general area. Category 2 Native Perennial Grassland is found infrequently throughout the Project. Native Perennial Grasslands provide essential foraging habitat to a variety of common resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl have been shown to use this habitat.

Grasshopper sparrows were detected in this habitat subtype during 2010 surveys. Western meadowlark and horned lark occur commonly in this habitat. Native grasses and forbs provide forage for mule deer during all seasons.

There are approximately 78.5 acres (31.7 ha) of Category 2 GB habitat within the Baseline Wind Project boundary.

Woodland

Woodland is classified as Category 2 where it provides essential habitat (in part because of its general rarity) to special status species such as ferruginous hawk, Swainson's hawk, and loggerhead shrike. There is one subtype of woodland, Juniper Woodland (subtype WJ), within the Project boundary.

Category 2 Juniper Woodland habitat consists of mature western juniper (*Juniperus occidentalis*) with an open canopy. Understory components are those of adjacent habitat types, whether Shrub-steppe or Grassland. This habitat subtype provides nesting opportunities for ferruginous hawk and Swainson's hawk (as well as for red-tailed hawk) and foraging and nesting opportunities for loggerhead shrike. Since the more common habitat types do not provide such nesting opportunities, Juniper Woodland is critical to the species that use it for nesting. Loggerhead shrikes and inactive raptor nests were detected in this habitat subtype during 2010 surveys.

There are approximately 14.6 acres (5.9 ha) of Category 2 Juniper Woodland (WJ) habitat within the Baseline Wind Project boundary.

Shrub-steppe

Shrub-steppe is classified as Category 2 where it provides essential habitat to special status species such as loggerhead shrike. There are two subtypes of Category 2 Shrub-steppe, Basin Big Sagebrush Shrub-steppe (subtype SSA) and Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB), within the Project boundary.

The Category 2 Basin Big Sagebrush Shrub-steppe consists of an overstory of mature (large structure) patches of basin big sagebrush. Understory plants consist of a mix of native bunchgrasses and exotic annual grasses depending largely on level of impact from disturbance. Common grasses are Sandberg's bluegrass, bluebunch wheatgrass, cheatgrass, and bulbous bluegrass. Category 2 Basin Big Sagebrush Shrub-steppe has a higher shrub density and greater plant health than similar but lesser quality Category 3 Basin Big Sagebrush Shrub-steppe habitat. This habitat subtype is found on deep soils throughout the Project, usually on slopes or in draws that prevent agricultural use. Category 2 Basin Big Sagebrush Shrub-steppe offers high quality breeding habitat for shrub obligate species including loggerhead shrike, and may support Washington ground squirrel and white-tailed jackrabbit. Brewer's sparrow and lark sparrow are present in larger blocks of this habitat subtype. Sagebrush lizard and other reptiles are likely to be found in areas where more sandy soils are present. White-tailed jackrabbits, loggerhead shrikes, and long-billed curlews were detected in this habitat subtype during 2010 surveys, though long-billed curlews generally are associated with more open habitat types. Commonly occurring species include western meadowlark and mourning dove.

There are approximately 433.4 acres (174.8 ha) of Category 2 SSA habitat within the Baseline Wind Project boundary.

The Category 2 Rabbitbrush/Snakeweed Shrub-steppe has an overstory dominated by low-growing gray rabbitbrush or, to a lesser extent, green rabbitbrush. Snakeweed is

fairly extensive throughout and is the dominant mid height structure. Small patches of basin big sagebrush are intermittent. Understory plants are primarily native and non-native bunchgrass, including Sandberg's bluegrass, western needle-and-thread grass, buckwheat, and annual, non-native grasses such as cheatgrass, and bulbous bluegrass. Annual cereal rye is present in swales and deeper soils where past disturbance has removed most of the native vegetation. Weeds such as Russian thistle (*Salsola kali*) and tumblemustard (*Sisymbrium altissimum*) may be present, but to a lesser extent than in Category 3 Rabbitbrush/Snakeweed Shrub-steppe, which generally has experienced more recent fires or other perturbation. Grasshopper sparrows, loggerhead shrikes, white-tailed jackrabbits, and nesting great horned owls were detected in this habitat subtype during 2010 surveys. Horned lark and western meadowlark are common species in Category 2 Rabbitbrush/Snakeweed Shrub-steppe.

There are approximately 350.0 acres (141.1 ha) of Category 2 SSB habitat within the Baseline Wind boundary.

Category 3 Habitat

Three types of habitats were identified as Category 3 within the Project boundary: Developed, Grassland, and Shrub-steppe.

Developed

Category 3 Developed habitats are areas where former disturbances have ceased and the disturbed areas have attained sufficient ecological condition to become important or essential for wildlife. Revegetated or Other Planted Grassland (subtype DR) is the only developed Category 3 subtype within the Project boundary.

Category 3 Revegetated or Other Planted Grasslands are planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. This habitat subtype is comprised mainly of native or native-like grasses as described for Category 2 Revegetated of Other Planted Grasslands. Native vegetation in Category 3 Revegetated or Other Planted Grasslands is sparser and less well developed than in Category 2 Revegetated or Other Planted Grasslands. Category 3 Revegetated or Other Planted Grasslands have a higher composition of annual grasses and weeds than Category 2 Revegetated or Other Planted Grasslands. White-tailed jackrabbits and savannah sparrows may be supported by this habitat. Burrowing owls, grasshopper sparrows, long-billed curlews, and jackrabbit pellets were detected in this habitat subtype during 2010 surveys. This habitat subtype is important to grasshopper sparrows, and western meadowlarks are commonly found in it as well.

There are approximately 1041.6 acres (420.0 ha) of Category 3 DR within the Baseline Wind boundary.

Grassland

Category 3 Grasslands provide essential or important foraging and nesting habitat for special status birds and mammals as well as for common native and non-native avian species. There are two Category 3 grassland habitat subtypes, Exotic Annual Grassland (subtype GA), and Native Perennial Grassland (subtype GB).

Category 3 Exotic Annual Grassland share the vegetation composition and ecological condition of the Category 4 Exotic Annual Grassland described below except that they occur as a large contiguous area, on a broad open flat, and thereby provide important nesting habitat for long-billed curlews. The Category 3 Exotic Annual Grassland mapped habitat within the Baseline Wind Project boundary is adjacent to an area where long-

billed curlews are known to nest (NWC, 2010b). Category 3 Exotic Annual Grassland differs from Category 1 and Category 2 Exotic Annual Grasslands in that it is neither within 785 ft of identified WGS burrows nor adjacent to such Category 1 habitats. Breeding long-billed curlews were detected in this habitat subtype during 2010 special status wildlife species surveys. Horned larks occur commonly in this habitat. While Exotic Annual Grassland habitats occur throughout the Project boundary and are generally Category 4, grasslands of this large flat nature are limited in the area.

There are approximately 1,214.9 acres (489.9 ha) of Category 3 Exotic Annual Grassland (subtype GA) within the Project boundary.

Category 3 Native Perennial Grasslands are dominated by the same perennial grasses described for Category 2 Native Perennial Grassland. However, these habitats have been altered through land use or wildfires or are more sparsely vegetated. They generally have a higher composition of non-native vegetation (broad-leaf weeds and annual grasses) but are still mostly native vegetation sites. Category 3 Native Perennial Grasslands generally occur on sites with shallower soils and harsher exposures, or in areas that have experienced livestock grazing or frequent fires. Category 3 is the most abundant Category of Native Perennial Grassland. Native Perennial Grasslands provide essential foraging habitat to a variety of common resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl have been shown to use this habitat. Grasshopper sparrows, jackrabbit pellets, long-billed curlews, and loggerhead shrikes were detected in this habitat subtype during 2010 surveys, though it is not considered a preferred habitat type for loggerhead shrike. Western meadowlark and horned lark occur commonly in this habitat. Native grasses and forbs provide forage for mule deer.

There are approximately 1188.9 acres (479.4 ha) of Category 3 Native Perennial Grassland (subtype GB) within the Project boundary.

Shrub-steppe

The primary difference in the Category 2 and Category 3 Shrub-steppe habitats is the overall functionality of the habitat and the breeding season value for special status vertebrate wildlife species such as loggerhead shrike and Washington ground squirrel. In general, Category 3 tends to be more weedy, less biologically diverse, has obvious signs of prior or ongoing impacts, and is a habitat type relatively common in the general area.

Category 3 Shrub-steppe habitats are similar to their respective Category 2 Shrub-steppe habitat subtypes, but have been affected more by wildfires, domestic livestock grazing, or other land use practices resulting in less vascular and nonvascular vegetative diversity. The protective soil surface biotic crust of mosses, lichens, algae, and bacteria (cryptogamic layer) has been impacted from land use, resulting in opportunities for non-native weedy plants to become established. The Shrub-steppe habitat is important to wildlife species but is not as limited in the region as the Category 2; many Shrub-steppe habitats in the local region have experienced wildfires. Two habitat subtypes are present in this category, Basin Big Sagebrush Shrub-steppe (subtype SSA) and Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB).

Category 3 Basin Big Sagebrush Shrub-steppe consists of basin big sagebrush at a mature stage (large structure). Patches of Category 3 Basin Big Sagebrush Shrub-steppe lack the density and plant health of Category 2 Basin Big Sagebrush Shrub-steppe or are in patches of limited size. The overstory sagebrush in this type is often decadent or lacks full foliage. Understory vegetation in Category 3 Basin Big Sagebrush

Shrub-steppe often tends toward annual grasses and low weeds. These areas were historically higher quality habitats but are experiencing degradation due to land use practices or frequent fires. However, the mature shrub cover provides escape and resting cover for common wildlife and is limited in the immediate area and the region. Basin Big Sagebrush Shrub-steppe offers high quality breeding habitat for shrub obligate species including loggerhead shrike, and may support Washington ground squirrel and white-tailed jackrabbit. Loggerhead shrikes, grasshopper sparrows, and long-billed curlews were detected in this habitat subtype during 2010 surveys, though it is not the typical nesting habitat of either of the latter two species. Jackrabbit pellets were also detected during surveys, but black-tailed jackrabbits are more generally associated with this habitat type than are white-tailed jackrabbits. Brewer's sparrow and lark sparrow are present in larger blocks of this habitat subtype. Sagebrush lizard and other reptiles are likely to be found in areas where more sandy soils are present. Commonly occurring species include western meadowlark and mourning dove.

Approximately 374.4 acres (151.6 ha) of Category 3 SSA exist within the Baseline Wind boundary.

Category 3 Rabbitbrush/Snakeweed Shrub-steppe is by far the most abundant Shrub-steppe subtype within the Project boundary. Category 3 Rabbitbrush/Snakeweed Shrub-steppe areas have been more affected by recent fires and are in an earlier seral stage than Category 2 Rabbitbrush/Snakeweed Shrub-steppe. Native rabbitbrush and other low-stature plants such as broom snakeweed and various buckwheat species (*Eriogonum spp.*) are common. The understory is native Sandberg's bluegrass, non-native cheatgrass, bulbous bluegrass, and tumblemustard. Patches of native perennial grasses such as bluebunch wheatgrass and needle-and-thread grass are present. Many of these sites contain small patches of sagebrush that are less than one acre (0.4 ha) in size. Jackrabbit pellets, long-billed curlews, and loggerhead shrikes were detected in this habitat during 2010 surveys. Category 3 Rabbitbrush/Snakeweed Shrub-steppe provides foraging, cover, and/or nesting habitat for grasshopper sparrows and white-tailed jackrabbit, as well as common horned lark and western meadowlark.

Approximately 1664.3 acres (671.1 ha) of Category 3 SSB exist within the Baseline Wind boundary.

Category 4 Habitat

There are three types of Category 4 habitat within the Baseline Wind boundary: Developed, Grassland, and Shrub-steppe.

Developed

There is one subtype of Developed Category 4 habitat within the Project boundary: Revegetated or Other Planted Grasslands (subtype DR).

Category 4 Revegetated or Other Planted Grasslands are planted grasslands on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Category 4 Revegetated or Other Planted Grasslands have sparse vegetative cover and a very sparse native grass component. Category 4 Revegetated or Other Planted Grasslands are dominated by cheatgrass, bulbous bluegrass, annual cereal rye, tumblemustard and Russian thistle. White-tailed jackrabbits and savannah sparrows may be supported by this habitat. Grasshopper sparrows and western meadowlarks are commonly found in this habitat subtype.

There are approximately 113.7 acres (46.0 ha) of Category 4 DR habitat within the Project boundary.

Grassland

There are two subtypes of Category 4 grassland in the Project boundary, Exotic Annual Grassland (subtype GA) and Native Perennial Grassland (subtype GB).

Category 4 Exotic Annual Grassland found within the Project boundary are non-native grasslands with a very high weed component and disturbed or less nutrient-rich soils. The forb component is composed primarily of non-native weeds, such as cheatgrass, bulbous bluegrass, cereal rye, tumblemustard, and Russian thistle, with occasional patches of native bunchgrass, primarily Sandberg's bluegrass. The high weed content is primarily due to past fires, which burned native shrubs and bunchgrasses, and were followed by heavy grazing and/or wind erosion. Some of these sites support long-billed curlew. Horned larks occur commonly in this habitat. Category 4 Exotic Annual Grassland habitat is found throughout the Baseline Wind Energy Facility. Category 4 Exotic Annual Grassland provides important habitat to common species, but the lack of native grasses and the dense weed cover limit the ability of most wildlife species to use these areas for forage or cover. This habitat is commonly found throughout the Columbia Basin. In addition, the weed cover, often dominated by annuals such as cheatgrass, makes the slopes in this area more susceptible to erosion and soil damage from grazing, because of a lack of the robust root structure found in perennial species, such as the native bunchgrasses. With sufficient time and appropriate livestock grazing practices, however, these areas could become suitable habitat for some native wildlife species.

There are approximately 1061.8 acres (428.1 ha) of Category 4 Exotic Annual Grassland (GA) within the Project boundary.

Category 4 Native Perennial Grassland occurs in several small patches within the Project boundary. Category 4 Native Perennial Grassland is ecologically similar to Category 3 Native Perennial Grassland but is classified as Category 4 because its small size and isolated nature limit its value to wildlife. Native Perennial Grasslands provide important foraging habitat to a variety of common resident and migratory birds and common mammals. Grasshopper sparrow, savannah sparrow, vesper sparrow, white-tailed jackrabbit, and burrowing owl are known to use this habitat. Western meadowlark and horned lark occur commonly in this habitat. Native grasses and forbs provide forage for mule deer.

There are approximately 42.9 acres (17.3 ha) of Category 4 Native Perennial Grassland (GB) within the Project boundary.

Shrub-steppe

There is one subtype of Category 4 Shrub-steppe in the Project boundary: Rabbitbrush/Snakeweed Shrub-steppe (subtype SSB).

Category 4 Rabbitbrush/Snakeweed Shrub-steppe habitat is important to wildlife. Category 4 Rabbitbrush/Snakeweed Shrub-steppe has the same plant species, but differs in composition from Category 3 Rabbitbrush/Snakeweed Shrub-steppe. Category 4 Rabbitbrush/Snakeweed Shrub-steppe has a greater weed and annual grass component than Category 3 Rabbitbrush/Snakeweed Shrub-steppe. While aspect and soils may contribute somewhat to this, disturbances such as livestock grazing and fires have a far greater affect. Category 4 Rabbitbrush/Snakeweed Shrub-steppe provides

foraging and/or nesting habitat for white-tailed jackrabbit as well as for the common species, horned lark and western meadowlark. This habitat, where suitable soils are present, may also support WGS.

There are approximately 7.5 acres (3.0 ha) of Category 4 SSB within the Baseline Wind Project boundary.

Category 5 Habitat

There is no Category 5 habitat identified within the Baseline Wind Project boundary. Fire and grazing-impacted native habitats are likely to become more important for wildlife as the vegetation recovers, but land use practices are likely to influence that process.

Category 6 Habitat

Category 6 habitat is nonessential wildlife habitat with limited potential to become important or essential in the foreseeable future. There is one type of Category 6 habitat within the Project boundary, Developed.

Developed

There are three subtypes of Developed habitat within the Project boundary: Irrigated Agriculture (subtype DI), Dryland Wheat (subtype DW), and Other (subtype DX).

Category 6 Irrigated Agriculture (DI) habitat consists of agricultural crop or pasture fields that are irrigated for all or a portion of the growing season. These areas were recognized by presence of irrigated farm crops and on-site irrigation implements such as pipes, sprinklers, pumps, and motors.

Category 6 Dryland Wheat (DW) habitat is the largest habitat subtype within the Project boundary and is extensive throughout the region. It consists of agricultural fields that are currently in small grain production or fallow. Horned larks and mourning doves are common in winter stubble or when fallow. Wintering and migrating rough-legged hawks occasionally hunt for prey in wheat stubble fields.

Category 6 Other (DX) habitat includes farming/ranching home and shop sites, corrals, structures, feedlots, active and inactive gravel quarries, non-irrigated pastures, graveled and paved roads, right-of-ways, and waste areas associated with on-going human activities. Although some areas have deciduous tree landscaping that attracts some native and non-native passerines, these sites and the other DX areas are not considered to have significant value to wildlife species. Because of the high level of disturbance, no special status/sensitive species are known or expected to occur with regularity in the Category 6 habitats, and these areas are unlikely to become important or essential wildlife habitat in the foreseeable future.

There are approximately 502.1 acres (203.2 ha) of Category 6 DI, 22,522.6 acres (9081.7 ha) of Category 6 DW and 210.9 acres (85.0 ha) of DX habitat within the Baseline Wind Project boundary.

3.3 Special Status Vascular Plant Surveys

One special status plant species was detected during surveys associated with the Project area. This was *Astragalus collinus* var. *laurentii* (Laurent's milkvetch), a State Threatened species and Federal Species of Concern. This species exists as a single population of approximately 300-400 plants encompassing approximately 9.25 acres in the northern part of the Project (Figure 5a). This population was found in 2009 during plant surveys

conducted for IRI, and these data were provided to Baseline Wind for use in this report. No special status plant species were documented during surveys conducted for Baseline Wind. A comprehensive list of all plant species encountered during surveys conducted for Baseline Wind can be found as Appendix F.

3.4 Avian Use Surveys

This section and the associated tables present results of the avian use studies conducted specifically for Baseline Wind. Where appropriate, comparisons are drawn between those results and results of the avian use studies conducted within the current Project boundary for the Montague Wind Power Facility (IRI, 2010).

Thirty-seven avian species were recorded within 800-m of plot centers (Table 3). These included eight species of raptor. Two additional raptor species, burrowing owl and short-eared owl, were observed when in-transit to survey plots (Table 4). A comprehensive list of all avian species observed during surveys, along with their scientific names, can be found in Appendix G. At plots conducted for Montague Wind Power Facility, slightly fewer species were detected, but eight of these were species not detected on the Baseline Wind plots (IRI, 2010). The only notable species (detected at Montague plots but not at Baseline Wind plots) was grasshopper sparrow, a special status species that was also documented at Baseline Wind during special status wildlife surveys (Section 3.7).

Avian Use

Avian 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 Project area. Overall mean use across all seasons was dominated by passerines (Table 5). Passerines had their highest mean use values during summer season (9.058), followed by fall (3.596), and then spring season (2.929). The species of passerine with the highest use in all seasons was horned lark (Table 5).

Raptor mean use values were highest during spring season (0.293), when raptor use was comprised mainly of rough-legged hawk (0.111), Swainson's hawk (0.071), and northern harrier (0.066). Species diversity was variable among seasons for raptors, with only northern harrier, red-tailed hawk, and American kestrel being recorded in all four seasons. Raptor mean use was lowest in summer season (0.132) and fall season (0.136). At the Montague plots, raptor use was highest in summer (0.500), when it was dominated by red-tailed hawk (0.360; IRI, 2010, Table 4)

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 Project area. Passerines dominated over all other species groups throughout the year, with 95.12% of all detections in winter season, 93.44% in fall season, 88.08% in summer season, and 82.39% in spring season (Table 5). Horned lark, in particular, was the passerine species that had the highest percentages in all seasons, with a high of 76.60% in winter season to a low of 39.16% in summer season. Other passerine species that contributed over 5% to overall composition percentages were western meadowlark (22.59% in spring season, 13.31% in summer season, and 8.14% in fall season), common raven (13.78% in fall season, 11.76% in summer season, 10.96% in winter season, and 9.38% in spring season), Brewer's blackbird (7.89% in summer season), barn swallow (5.57 in summer season), and white-crowned sparrow (5.25% in fall season).

Percent composition of raptors varied from a high of 8.24% of all detections in spring season to a low of 1.93% in winter season (Table 5). The species with the highest percentage of the overall composition was rough-legged hawk (3.13% in spring season). This species does not nest in the area. At the Montague plots, raptors represented a smaller percentage of the avian composition in all seasons except summer (7.14% compared to 4.02% at Baseline Wind; IRI, 2010, Table 5).

Frequency of Occurrence

Frequency of occurrence (percentage of 20-min point counts in which a species was detected) provides an index of how often a species occurs in the Project area. In combination with mean use, it allows one to understand the basis of mean-use values. For example, if one large flock of Canada geese is detected one time, the resulting mean use value may be high whereas the frequency of occurrence value will be low. To understand the risks of birds near proposed structures, it is important to understand both how many birds are using the Project area (mean use) and how frequently they are using it (frequency of occurrence).

Passerines were observed at high frequencies throughout the year, including spring (91.92%), summer (85.28%), fall (84.34%), and winter seasons (81.87%; Table 5). Horned larks were frequently observed during all seasons, with the highest percentage in spring season (70.71%) and the lowest in summer (51.78%). Western meadowlark was observed on 49.49% of spring surveys, 28.93% of summer surveys, and 22.73% of fall surveys. Common raven was observed frequently in all seasons, with a high in winter season (41.23%) and a low in spring season (20.20%).

Raptors were observed most frequently in spring (26.26%), followed by winter (16.08%), summer (12.69%), and fall season (11.62%). Rough-legged hawk was observed on 9.60% of spring surveys and 8.19% of winter surveys. Swainson's hawk was observed on 7.07% of spring surveys, and northern harrier was detected on 6.06% of spring surveys. At the Montague plots, raptors were detected during 42.00% of summer surveys, 18.18% of spring surveys, and 13.33% of fall surveys (IRI, 2010, Table 5). Swainson's hawk was observed on 20.00% of summer surveys at Montague plots.

Spatial Use

Mean use was relatively even among plots (Table 6), with horned larks contributing most of the totals at any given plot and at each season. NWC reviewed flight paths and perched locations of raptors. This review did not identify any patterns of interest. The Project area does not appear to be associated with any raptor migration routes, as evidenced by the lack of directed fall flight paths, the relatively low number of raptor detections in the fall season (Table 3), and the lack of detection of the most migratory species (such as sharp-shinned hawk, Cooper's hawk, merlin, and turkey vulture).

3.4.1 Special Status Species

None of the birds identified during avian use surveys were Federal Listed, Candidate, or Proposed species. A single State Sensitive-Critical species, ferruginous hawk, and three State Sensitive-Vulnerable species, loggerhead shrike, long-billed curlew, and Swainson's hawk, were detected during these surveys. A State Sensitive-Critical species, burrowing owl, was detected during spring season surveys while the surveyor was in-transit between avian use study plots. Additionally, golden eagle, which is protected under the (Federal) Bald and Golden Eagle Protection Act, was observed once during surveys. Detections of special status species during other types of surveys, such as ground transect or raptor nest surveys, are detailed in the relevant section of this report and summarized in Appendix D,

as are full statuses for each species and scientific names. Avian use study plots are shown on Figure 3.

Surveys of Montague plots resulted in detections of ferruginous hawk, Swainson's hawk, long-billed curlew, grasshopper sparrow, and loggerhead shrike (IRI, 2010).

Burrowing owl (State Sensitive-Critical*):* Two spring season observations of individuals while the surveyor was in-transit between avian use study plots (plots I to J, Q to P; Table 4). Not found during surveys of Montague plots (IRI, 2010).

Ferruginous hawk (State Sensitive-Critical): Single individuals observed on four occasions (three in spring and one in summer; Table 3) within 800 m of plot centers; three were at plot J and one was at plot R. Another observed at a distance greater than 800 m (summer at plot R), and three more detected (two in summer, one in spring) while the surveyor was in-transit between avian use study plots (plots Q to R, R to O; Table 4). Not found during surveys of Montague plots (IRI, 2010).

Loggerhead shrike (State Sensitive-Vulnerable): Observed once (in spring) within an avian use study survey plot E (Table 3). Also observed on 14 occasions (eight in spring, six in summer) while the surveyor was in-transit between study plots (Table 4). Detected once at Montague Plot C and three times at Montague Plot D (IRI, 2010).

Grasshopper sparrow (State Sensitive-Vulnerable): Not observed during avian use studies of Baseline Wind plots; detected at Montague plots D and C (IRI, 2010).

Long-billed curlew (State Sensitive-Vulnerable): Within avian use study plots, observations of singles and small groups on 23 occasions during spring (43 total birds) and five occasions during summer (seven birds; Table 3). This species was also detected twice in spring while the surveyor was in-transit between plots (Table 4), and seven times in spring and eight times in summer at distances greater than 800 m from the plot center; the latter were primarily at plots I and J, but also at plots A, E, M, and O. Also found at four of five Montague plots (IRI, 2010).

Swainson's hawk (State Sensitive-Vulnerable): Individuals detected 14 times during spring, seven times during summer, and four times during fall within avian use study plots (Table 3). Also detected at distances greater than 800 m from plot centers (four during spring, five during summer, three during fall) and while the surveyor was in-transit between plots (11 during spring, 23 during summer, and four during fall; Table 4). Most detections were at plots J, P, and R; however, there were also detections at plots D, H, I, L, O, and Q. Also detected at four of five Montague plots, especially Plots A and C (IRI, 2010).

Golden eagle (Federal Bald and Golden Eagle Protection Act): Although not a State listed species, this species is protected under the Bald and Golden Eagle Protection Act and is a USFWS Bird of Conservation Concern (Appendix D). A single golden eagle (age and sex undetermined) was detected during these surveys (during spring at plot J); the flight path of this bird was reviewed by NWC and is available upon request. No golden eagles were detected during avian use surveys of the Montague plots (IRI et al., 2009; IRI, 2010).

3.5 Raptor Nest Survey

The aerial raptor nest survey covered an area of approximately 86,846 acres (136 square miles, 35,145 ha; Figure 4). Raptor survey results displayed on Figure 4 (confidential, submitted under separate cover) include results of searches for suitable raptor nests sites in

conjunction with both aerial surveys and the ground-based special status wildlife surveys (methods discussed in Section 2.7).

In all, 54 active raptor nests (and 17 common raven nests) were found, including nests of the following species:

- 22 Swainson's hawk
- 17 red-tailed hawk
- 7 ferruginous hawk
- 5 great horned owl
- 1 prairie falcon
- 1 golden eagle
- 1 unidentified buteo species
- 17 common raven

In addition, 123 inactive stick nests were located. Of these, 35 were large enough to have been built by large *Buteo* species such as ferruginous hawk, and two others were inactive golden eagle nests (in the same territory as the active one). Several other inactive golden eagles nests were located in close proximity to the active nest that is displayed on Figure 4. All of the active and inactive eagle nests are considered to be within the territory of a single pair of golden eagles.

Overall raptor nest density within the 156 mi^2 2010 survey area was 0.35 nests per square mile (Swainson's hawk 0.14/mi^2, red-tailed hawk 0.11/mi^2, ferruginous hawk 0.04/mi^2, great horned owl 0.03/mi^2, prairie falcon 0.01/mi^2,golden eagle 0.01/mi^2, unidentified buteo 0.01/mi^2). In general, nests of burrowing owl, short-eared owl, and American kestrel are difficult to find using the aerial survey method without extensive on-the-ground surveys. Therefore, for comparison with other sites, nest density of those species (American kestrel and burrowing owl found during special status wildlife species surveys, Figure 5a) are not included in the total nest density or in Table 7. Nest density estimates also do not include common raven or inactive nests.

Locations of all nests detected, both active and inactive, are shown in Figure 4. Scientific names of all species are listed in Appendix G. Two burrowing owl nests and two American kestrel nests are shown in Figure 4; these were found not during aerial raptor nest surveys but during special status wildlife surveys.

3.6 Golden Eagle Telemetry

During spring season 2010 site-specific surveys of Baseline Wind, two golden eagle nests, one active (approximately 2,336 ft from the Project boundary; 0.4 miles or 0.7 km) and one inactive (approximately 1,699 ft from the Project boundary; 0.3 miles or 0.5 km), were found outside of the southwest portion of the Baseline Wind Project boundary Figure 4). Both nests, and several others very close to the active golden eagle nest (not displayed on the map), are all considered alternate nests within a single golden eagle breeding territory. A sighting of an adult soaring over the grassland area between this active nest and Ridge Road was recorded on May 31, 2010 during special status wildlife surveys. During avian use surveys for Baseline Wind, one golden eagle (age undetermined) was detected during winter season on January 26, 2010, soaring between 20–50 m (65–164 ft) above the ground at plot J in Shrub-steppe habitat (Figure 3).

Three golden eagles have been telemetered by NWC within the breeding territory nearest to the Project.

The single young produced during the 2010 breeding season was captured on June 11, and a PTT deployed. This deployment yielded 1,911 locations, the majority of them prior to this eagle's dispersing from its natal territory. The PTT suddenly ceased transmitting on January 8, 2011 (with the last locations approximately 25 miles east of the Project). Just prior to this, the bird seemed healthy (based on movements and temperature sensors) and the PTT appeared to be working well. Spatial use by this bird is being analyzed and will be used to inform ongoing impact analyses and Project design decisions in coordination with USFWS.

On January 27, 2011, an adult male golden eagle was captured within 0.5 mile of the nest cliff of the territory nearest the Project, and a PTT was deployed. This eagle soon moved from the area, however, and proved to be a vagrant rather than the resident male. Location data obtained from this eagle nonetheless provided information of interest, particularly on habitat use while in the larger area (the Rock Creek watershed); these data are being analyzed relative to the Project area and turbine micrositing. This adult eagle died on April 7, 2011 and was recovered on April 11, 2011 on the Yakama Indian Reservation of southcentral Washington; the carcass was taken into possession by the USFWS.

Additional attempts were made in February 2011, and attempts may again be made in winter 2011–2012 to capture and telemeter the adult male at the territory nearest the Project.

The single young produced during the 2011 breeding season was captured and telemetered on June 3. As of the date of this report, this bird has successfully dispersed from its natal territory. During the post-fledging period, this male eagle at first stayed in the canyon where its nest was located, but quickly began wandering west and south. At this time, of 1,747 diurnal locations for this bird, a single location was within the Project boundary, corroborating the conclusion from the avian use study that the Project area is little used by golden eagles. Its PTT continues to transmit locations every other hour. Spatial use by this bird is being analyzed and will be used to inform ongoing impact analyses and Project design decisions in coordination with USFWS. The spatial data so far gathered from each of the three eagles telemetered in this area has tended to validate the results of the Project avian use surveys, with eagles avoiding the Project and its agricultural habitat and utilizing instead the canyons and the native habitats therein.

3.7 Special Status Vertebrate Wildlife Surveys

The following describes special status wildlife species that were documented during ground-based surveys conducted during the spring nesting/denning season. As previously described, the target species included State Sensitive species and/or Federal Species of Concern; see Appendix D for target species, full statuses and status definitions, and scientific names. A comprehensive list of all species observed during these ground-based surveys can be found in Appendix G. Observations of State special status species are displayed on Figure 5a, and 785-ft buffers of detections of the single State listed species are displayed on Figure 5b. Raptor species observed flying during the ground-based surveys were assumed to be associated with known nests and were not mapped; active nest locations for raptors can be found on Figure 4.

Special Status Birds

Burrowing owl (State Sensitive-Critical)

Two active burrowing owl dens were found during special status wildlife surveys (Figure 4). One was a confirmed natal den. For the other, subsequent visits could not confirm nesting;

this den may have been used by a single male or as a satellite burrow from an active nest nearby, outside of the surveyed area.

Ferruginous hawk (State Sensitive-Critical)

A ferruginous hawk was seen hunting south of Baseline Road above the Rock Creek breaks. Nests were located in various parts of the raptor nest survey area; most of these were peripheral to the Project, though two (in the northwestern portion) were just inside the Project boundary (see section 3.5 and Figure 4).

Grasshopper sparrow (State Sensitive-Vulnerable)

This ground-nesting grassland bird was located in loose colonies within open low shrub/grassland areas of the Project, including areas of Exotic Annual, Native Perennial, and Revegetated or Other Planted Grassland habitats, and Basin Big Sagebrush Shrub-steppe habitat. Surveyors documented with GPS the locations of territorial singing males and any other individuals, which allowed for identification (through GIS analysis) of the habitat types with which they were associated. Grasshopper sparrows were more frequently heard than seen, and were assumed to be nesting in the area. Areas of concentration included the northeastern portion near Eightmile Canyon, Cow Canyon, and east of Ridge Road near Baseline Road. Grasshopper sparrows were found in lower densities in other areas within the Project, likely due to lack of sufficient grassland structure for nesting cover in those areas (5a).

Loggerhead shrike (State Sensitive-Vulnerable)

Loggerhead shrikes were generally found in areas with mature sagebrush cover (Basin Big Sagebrush and Rabbitbrush/Snakeweed Shrub-steppe), but were also observed in Exotic Annual and Native Perennial Grassland habitats. During the first survey period, a nest was found in the northern portion of the Project, east of Rock Creek in the draw south of Shutler Flat, and a family group with 3 fledglings was found in the same area during the second round of surveys (Figure 5a). A second nest was found in a draw south of Eightmile Canyon. Multiple sightings in Cow Canyon indicate a likely nest in the area. Multiple sightings were also recorded in a draw on the southeastern edge of the Project. Three isolated sightings along the Rock Creek breaks were recorded with no documentation of nesting. Overall density of loggerhead shrikes within the Project is considered low, likely due to lack of sufficient sagebrush/juniper structure for nesting.

Long-billed curlew (State Sensitive-Vulnerable)

This species was frequently seen and/or heard in the south end of the Project, particularly west of Ridge Road, where multiple birds and one nest were found, and in the north on Shutler Flat. There were also a few isolated observations in Cow Canyon and Eightmile Canyon (Figure 5a). Most of the observations were on the open low shrub/grassland (Rabbitbrush/Snakeweed Shrub-steppe as well as some Basin Big Sagebrush Shrub-steppe habitat) with gentle terrain or in fallow fields (Revegetated or Other Planted Grassland and Native Perennial Grassland Habitat).

Swainson's hawk (State Sensitive-Vulnerable)

Swainson's hawks were observed on and near nests throughout the Project (see Section 3.5 and Figure 4). Isolated sightings of birds in flight, hunting, or perched were recorded throughout the Project during special status wildlife surveys.

Golden eagle (Federal Bald and Golden Eagle Protection Act)

Golden eagles were observed on two occasions in the southern end of the Project's wildlife survey area (in close proximity to Rock Creek), summarized as follows. An active golden eagle nest (bird present) was discovered during the ground-based transect surveys in April 2010 (Figure 4). An additional sighting was of an adult soaring between this active nest and Ridge Road in the grassland area to the northeast on May 31, 2010.

Special Status Mammals

White-tailed jackrabbit (State Sensitive-Vulnerable)

White-tailed jackrabbits were observed on four occasions near Rock Creek and one occasion east of Ridge Road near Baseline Road (Figure 5a). Jackrabbit droppings that could have been from either white-tailed or black-tailed jackrabbit (*Lepus californicus*), both of which have been seen in the general area (NWC, 2010b), were observed throughout the Project in suitable habitat (Figure 5a).

3.7.1 Washington Ground Squirrel Surveys

Washington ground squirrels (State Endangered) were observed in the northeast portion of the Project, in the southern portion west of Ridge Road, in Cow Canyon, near Olex, and near Rock Creek in the central portion of the Project (Figure 5b; confidential, submitted under separate cover). The areas of greatest activity were in the northeast part of the Project—where two individuals were seen and numerous holes were discovered—and in the southern portion of the Project between Ridge Road and Rock Creek, where extensive holes and droppings were found; all information indicated the sites were active in 2010.

Twenty-three WGS sites were found during 2010 special status wildlife surveys for Baseline Wind. None of these sites was of single WGS-confirmed holes. One was an auditory-only detection (animal heard, not seen, no sign present). At 22 of the sites, the number of holes recorded ranged from 2–17. Ten distinct Category 1 buffers (785 ft) were created enclosing the 22 WGS sites where confirmed active holes were found (Figure 5b). Including WGS data provided to First Wind by IRI yielded approximately 21 distinct Category 1 areas (785-ft buffers of documented WGS burrows; Figure 5b). General land cover types within these 785-foot buffers included Shrub-steppe (Basin Big Sagebrush and Rabbitbrush/Snakeweed), Grassland (Exotic Annual and Native Perennial), and Developed (Revegetated/Other Planted Grassland) habitat types (Figure 2a; Table 2). The auditory-only WGS detection north of Olex was of a single alarm call and, despite a thorough search around the call area, no holes or other WGS sign were discovered during any of the surveys. Because no sign of site-specific use was found, it is not considered a Category 1 habitat and therefore not on Figure 5b. If this site remains within the Project facility micrositing corridor, it is assumed that it will need to be surveyed again in early spring of the year prior to construction, as will all areas of suitable habitat where construction disturbance could occur.

3.8 Bat Investigation

A review of the literature to identify bats with potential for occurrence at Baseline Wind and surrounding area was conducted and results are presented in Appendix E. Results of the bat acoustic monitoring at Baseline Wind are presented in this section; monitoring locations are shown in Figure 6. There were 103 low frequency passes and 356 high frequency passes for a total of 459 bat passes recorded during the inventory period (Table 8). The most commonly identified species were canyon bat (formerly western pipistrelle), western small-footed myotis, hoary bat, and silver-haired bat. Additional species detected in low numbers were little brown bat, California myotis, Yuma myotis, pallid bat, and big brown bat (Table 8). Scientific names for mentioned bat species can be found in Appendix E.

Location B1 had the highest number of passes with 255 recorded, including 136 high frequency calls in September (Figure 8; Table 8). A factor that may have contributed to the high number of passes at B1 was its proximity to nearby water. Location C1 was second highest with 94 recorded passes, and location A2 had the third highest with 55. The number of calls at location A2 may have been due to the presence of water at a stock pond just below the detector location and the close proximity of a large juniper tree that may have been used for roosting or hosting insect prey. Location A1 had 42 recorded passes and C2 had 11 recorded passes. The low number at C2 is partially due to the location being established later in the season than either A2 or B2. Location B2 had the lowest recorded number of passes with two, likely due to the relatively poor habitat in the northernmost portion of the Project.

Of identified calls, canyon bat was most frequently recorded at location C1, where this species comprised the majority of high frequency passes during August (Table 8; Figure 9). This location was in close proximity to Rock Creek and rock cliff faces suitable for roosting and hunting by this species. Hoary bat and silver-haired bat were also more frequently identified at location C1 than other locations, and these species had low detection rates at location A1. All October records of hoary bat were recorded at location A2, which represented the only location with both a tree and standing water nearby. Western small-footed myotis was the most commonly identified species at location B1, which accounted for 86% of this species' passes.

The timing of passes corresponded with the timing of bat fatalities at existing wind farms in the Columbia Plateau Ecoregion (Figure 7, Figure 10, and Figure 11). There were five passes in July, 176 in August, 238 in September, and 40 in October (mostly during the first week; Table 8). Canyon bat numbers peaked in August in contrast to other species detected at Baseline in sufficient numbers to determine timing (Figure 10). Western small-footed myotis, hoary bat, and silver-haired bat numbers peaked in September, which relates to the timing of fatalities found and identified in other nearby Columbia Plateau Ecoregion projects (Figures 7, 10, and 11).

4.0 IMPACTS DISCUSSION

4.1 Impacts to Wildlife Habitat Types and Categories

Three land cover/wildlife habitat types that include eight habitat subtypes were delineated within the (32,633.0 acres, 13,158.5 ha) mapped area for Baseline Wind (Table 1; Figure 2a). The predominant habitat type present within the Project boundary was Dryland Wheat or Other Small Grain (22,522.6 acres, 9081.7 ha) which together with the other Category 6 habitats, Irrigated Agriculture and Other Developed Habitats, represented approximately 64% of the habitat mapped. ODFW Conservation Strategy habitats (ODFW, 2006), including Revegetated or Other Planted Grassland (1,386.8 acres, 540.8 ha), Exotic Annual Grassland (3,276.8 acres, 1,321.3 ha), Native Perennial Grassland (1,362.7 acres, 549.5 ha), Basin Big Sagebrush Shrub-steppe (864.3 acres, 348.5 ha), and Rabbitbrush/Snakeweed Shrub-steppe habitat (2,490.4 acres, 1,004.2 ha), together comprised most of the remaining 36% of the mapped habitat, with very small amounts of Juniper Woodland (14.6 acres, 5.9 ha) and Escarpment (1.5 acres, 0.6 ha) present as well (Table 1, Figure 2a).

Impacts to wildlife habitat are typically described as temporary and permanent. Habitat loss and various levels of habitat alteration and disturbance occur mainly during construction. Periodically during operations, additional temporary impacts may occur for facility repairs or upgrades. These will be restored as required in the Permit Conditions. Permanent impacts

are those where Project facilities are located for the life of the Project or where complete restoration of temporarily impacted habitats may not be attainable. Mature sagebrush shrubs in Shrub-steppe habitat may not be restored to the pre-construction structural stage for an extensive time-period (20–30 years or more).

Based on the maximum possible area of Project impact ("worst-case layout"), most temporary and permanent impacts will occur in the Category 6 habitats (active agricultural lands), followed by Category 3 habitats (Table 2). Although this assessment reflects 2.3 acres of permanent impacts and 11.3 acres of temporary impacts to Category 1 habitat, no impacts will occur to Category 1 habitat in the final facility layout design. There was no Category 5 habitat identified within the surveyed portions of the Project boundary (Table 2). Further details of impacts to each habitat Category can be found in Table 2.

Certain northern portions within the Project boundary were not included in the NWC 2010 studies, therefore, habitats for these areas were not included in the habitat typing and categorization effort (Figures 2a and 2b).

4.2 Impacts to Threatened and Endangered Plant and Wildlife Species

Plants

There were no Federal Listed, Proposed, or Candidate plant species documented. A single population of *Astragalus collinus* var. *laurentii* (a State Threatened species) was identified in the northern part of the Project (Figure 5a). No Project facilities are planned for the area in which this population occurs, and no impacts to Threatened or Endangered plant species are expected at Baseline Wind within surveyed areas shown on Figure 5a.

NWC biologists did not have permission to access certain portions of the Project, within the northern portion of the Project boundary. If construction is planned for any areas not surveyed for special status plants, potential impacts to Threatened and Endangered plants would need to be assessed prior to the beginning of construction, or surveys may be needed for those areas if no public information is available and suitable for reporting use and predicting impacts.

Mammals

One listed mammal was documented at Baseline Wind, the State Endangered and Federal Candidate Washington ground squirrel. As previously described, during 2010 special status wildlife surveys, WGS were detected in 23 sites, and at 22 of these the number of holes ranged from 2–17. One WGS detection was of a single alarm call, and despite a thorough search, no holes were found; therefore, no Category habitat was delineated at that site. If it remains within the micrositing corridor, however, it will be surveyed again prior to construction. Ten Category 1 buffers of suitable habitat were created around these sites (Figure 5b; for habitat definitions, see Section 2.2.2). Adding WGS data provided to First Wind by IRI yielded approximately 21 distinct Category 1 areas buffering WGS burrows in the surveyed portions of the Project (Figure 5b).

Washington ground squirrels and their holes have also been observed in the surrounding area. The Oregon Biodiversity Information Center reported six historical (from 1977–1988) records of WGS within 5 miles of the Baseline Wind boundary; three of these were partially located within the Baseline Wind boundary (ORBIC, 2010c). WGS were also observed during surveys of Leaning Juniper IIA and IIB, and of the Montague Wind Power Facility as well as the general area (IRI, 2010; IRI et al., 2009; Kronner et al., 2005a; Kronner et al., 2010; NWC, 2009; NWC, 2010b; PPM, 2006; Caithness Shepherds Flat, 2007; ORBIC, 2010c). At Leaning Juniper IIA and IIB, most sites were in Shrub-steppe habitats (Sagebrush and some

Rabbitbrush/Snakeweed), and a few were in Juniper Woodland habitat, Annual Grassland, or near the edge of a disturbed field (NWC, 2009; Kronner et al., 2005a). At Montague Wind Power Facility, WGS were found in native Shrub-steppe (including Sagebrush and Rabbitbrush/Snakeweed), Exotic Annual Grassland, and Native Perennial Grassland, as well as Revegetated or Other Planted Grassland and at the edge of Juniper Woodland habitats (IRI, 2010). At Baseline Wind, WGS were detected in three Category 1 habitats, Shrub-steppe, Grassland, and Developed Habitats including the following subtypes: Basin Big Sagebrush Shrub-steppe, Rabbitbrush/Snakeweed Shrub-steppe, Exotic Annual Grassland, Native Perennial Grassland, and Revegetated/Other Planted Grassland (Table 2).

WGS persistence in areas currently occupied may be affected by disturbance through construction or operation of the Project and loss or degradation of habitat. Project construction or disturbance from operations can potentially disturb estivating squirrels or interrupt the WGS daily habits during their above-ground activity period (late January through early June), resulting in increased energy consumption and underweight immergence, respectively, followed by greater over-winter mortality. Degradation of habitat and loss of foraging opportunities is critical because ground squirrels may lose as much as half their body weight during estivation and hibernation (Carlson et al., 1980; Yensen and Sherman, 2003; Barrett, 2005). Limited forage in spring and early summer likely affects juvenile survival to independence, survival through estivation, and subsequent reproductive performance (Carlson et al., 1980; Murie and Boag, 1984; Rieger, 1996; Greene, 1999; ODFW, 1999). Loss and degradation of occupied habitat (temporary or permanent) would likely result in loss of animals, whereas loss or degradation of suitable, unoccupied areas may reduce the ability of subpopulations to communicate and of the population as a whole to expand as conditions allow.

It is not known how the WGS near Baseline Wind construction zones and permanent facilities will respond to changes and human activities. Project facilities will be designed and microsited to avoid all identified WGS sites and the associated Category 1 habitat, including those previously documented and those discovered during year-of-construction surveys or other required surveys specified in the Project permit. No temporary or permanent impacts will occur to Category 1 habitat (though the current layout entails 2.3 acres of permanent and 11.3 acres of temporary impacts; Table 2, Figure 2b).

If individual Washington ground squirrels travel outside of identified colonies on the Project into construction zones, they could potentially be struck by vehicles. While some incidental injuries or kills might occur as a result of construction and operation traffic, these impacts would not reduce the likelihood of the survival or recovery of the species. A reporting procedure will be in place to document WGS vehicle strikes.

Based on a maximum possible area of impact (worst-case layout), up to 313.4 acres of SSA, SSB, GA, GB, WJ, ESC, and DR habitats (combined) consisting of variable quality and potential suitability for the WGS could be impacted temporarily during construction, and approximately 34.2 acres could be permanently impacted (Table 2). Revegetation of the temporary construction zones with native vegetation species, along with weed and fire management and appropriate grazing practices during the vegetation recovery period, all have the potential to improve the habitat in construction zones to some degree. Post-construction monitoring of WGS use near Baseline Wind turbines could help to understand persistence of WGS in the presence of wind projects.

Certain northern portions within the Project boundary were not included in NWC 2010 studies. In the year prior to construction, all areas of suitable habitat at Baseline Wind

where construction disturbance could occur will be surveyed for Washington ground squirrels.

Birds

No birds classified as Threatened or Endangered by the U.S. Fish and Wildlife Service were detected. One State Threatened species, bald eagle, while it has the potential to occur occasionally during winter season, was not documented during surveys. This species winters along the Columbia River and is known to hunt upland for carrion and small mammals. They also can be expected to pass through the Project area infrequently during spring and/or fall migration, but are not expected to nest on the Project or near the turbine development area. The ORBIC database search and bald eagle reports did not identify any bald eagle nests or roosting areas within the 5-mile search area (ORBIC, 2010c; Isaacs and Anthony, 2011). There have been two documented instances of bald eagle fatalities at wind farms in Canada, and three reported instances of bald eagle fatalities at wind farms in the western United States (Pagel et al., 2011), but none within the Columbia Plateau Ecoregion (Table 11). One bald eagle fatality was recently found, however, at a wind farm in Ontario, Canada (M. Anderson, 2010; NWC has not been able to confirm whether or not that fatality has been attributed to a turbine strike). Wind turbine collisions for this species have likely been low in part because roosting and breeding areas have not substantially overlapped with turbine sites to date. However, a study in Alaska where bald eagle use was high showed that eagles altered their flight behavior to avoid turbines (Sharp et al., 2010). Neither breeding habitat nor important wintering habitat are associated with the Baseline Wind Energy Facility, and no bald eagles were detected during surveys; thus, construction and operation of the Project are not expected to have a negative effect on bald eagles.

4.3 Impacts to Special Status (non-listed) Plant Species

No special status (non-listed) plants or other rare plants listed in Appendix C were detected during spring 2010 site-specific surveys for Baseline Wind. Therefore, no impacts to special status plants are expected at Baseline Wind within areas surveyed as shown on Figure 5a. NWC biologists did not have permission to access certain portions of the Project, within the northern portion of the Project boundary. If construction is planned for any areas not surveyed for special status plants, potential impacts to rare plants would need to be assessed prior to the beginning of construction, or surveys may be needed for those areas if no public information is available and suitable for reporting use and predicting impacts.

4.4 Impact Assessment for Avian Species

This section focuses primarily on impacts to birds from the operating turbines. The most probable direct impact to birds resulting from the proposed Project is direct mortality or injury due to collisions with the Project turbines. Collisions may occur with resident birds foraging and flying within the area, or with birds migrating through the area. Other potential, but infrequent, direct impacts could occur such as bird strikes with Project maintenance vehicles traveling roads throughout the Project site, but they are often difficult to confirm and are assumed to be less frequent than the documented bird-wind turbine direct impacts.

Baseline Wind is located within the Columbia Plateau Ecoregion of the Pacific Northwest, a region where many wind projects have been developed and studied. Pre-construction studies and fatality monitoring have been conducted for 19 wind projects of 25 MW or greater in the CPE (Tables 9 and 10). These projects include Leaning Juniper I, Vansycle, Klondike I, II, III, and IIIa, Biglow Canyon Phase I and II (year two is still ongoing), Hay Canyon, Pebble Springs, Combine Hills, Rattlesnake Road, and Wheat Field in Oregon, and Big Horn, Nine Canyon, Hopkins Ridge, Wild Horse, Marengo I and II, and Tuolumne in

Washington, and Stateline in both Oregon and Washington (Tables 9 and 10). Extensive pre-construction avian studies have been also been conducted at other nearby sites in Oregon including Montague Wind Power Facility, Leaning Juniper IIB Facility, Willow Creek Winds, Shepherds Flat, and Saddle Butte Wind Park (Caithness Shepherds Flat, 2007; Kronner et al., 2007a; Kronner et al., 2008b; Kronner et al., 2010; NWC 2009; NWC, 2010b; PPM, 2006; Saddle Butte Wind, 2009). In addition, results of wildlife fatality monitoring studies at CPE wind projects that are ongoing, but not yet complete, were also reviewed for pertinent information (Table 11; Gritski, 2010). Reports from these nearby proposed or operating wind projects were reviewed for pertinent public information on species use and/or documented direct impacts and for insight into potential direct impacts to birds and bats at Baseline Wind.

Project and turbine characteristics of the 19 CPE wind projects where standardized fatality monitoring has been conducted are described in Table 9. A consistent assumption amongst studies is that all fatalities or injured wildlife are attributed to the operating projects unless confirmed otherwise. All bird average fatality estimates from these projects (22 studies) have ranged from 0.3 to 12.7 fatalities/turbine/year or 0.2 to 7.7 fatalities/MW/year (Table 10). It is recognized that not all fatalities are detected ("observed fatalities" are the ones detected) but the lists of the species and groups found were reviewed and used for insight on direct impacts at Baseline Wind. The only species represented by more than 10% of the observed fatalities was horned lark (Table 11), one of the most commonly observed species at most CPE wind projects during pre-construction daytime use surveys, and also one of the most frequently observed and abundant at Baseline Wind avian survey plots (Table 5). Overall bird use within the Baseline Wind area was lower than many other CPE wind projects. Specifically, all bird use for four seasons combined was lower at Baseline Wind than at 10 other CPE wind projects located in Oregon as shown in Figure 12. This suggests that fatality estimates observed at the 19 CPE wind projects that have similar habitats as described above and in Table 10, could provide a fair basis for predicting fatality impacts from Baseline Wind.

Further discussions of potential impacts to bird groups including passerines, raptors, and waterbirds (waterfowl, shorebirds, others) as well as a discussion of indirect impacts (displacement) are described in detail below.

4.4.1 Raptors

Factors such as mean use, raptor nest density, and existing information (pre- and post-construction avian use and recorded avian fatalities) at regional wind projects were reviewed to assess potential raptor risk and species at risk for Baseline Wind. Although the numbers of raptors that collide with turbine rotors at newer wind projects is far less than at poorly-sited, older-generation wind projects (NAS, 2007), numerous species remain at risk of collision. Fatality rates have been found to vary widely in different regions (NWCC, 2010), and, at least for some species, abundance of raptors at a wind project is correlated with frequency of collision fatality (NAS, 2007; Kingsley and Whittam, 2007). Mean raptor fatality estimate from fourteen new generation wind projects in the Midwest and west (Stateline, OR/WA; Vansycle, OR; Klondike, OR; Nine Canyon, WA; Foote Creek, WY; Buffalo Ridge, MN; Wisconsin; Buffalo Mountain, TN; Top of Iowa, IA) was 0.04 raptor fatalities/MW/yr compared to up to approximately one raptor fatality/MW/yr (i.e., 25 times greater) at older generation wind projects (NAS, 2007). Of 36 studies included in a recent review (Strickland et al., 2011), raptor fatalities ranged from zero to approximately 0.87/MW/study period (the high end of the range comes from a site in California, Diablo Winds). Raptor fatality rates in California in general were reported as higher than at other facilities around the country (Strickland et al., 2011). Even where raptor fatality rates are

relatively low, the number of raptor fatalities is still higher relative to the number of individuals exposed to turbine collisions than for passerines (Strickland et al., 2011).

Comparing raptor nest densities across projects is confounded by annual variation, particularly in the number of Swainson's hawks and ferruginous hawks present. Each of these is highly migratory, leaving the breeding area for much of the year. Whether they return in a given year, and the length of their stay, are affected by spring numbers of their prey, which includes cyclical species like Washington ground squirrels and (for Swainson's hawk) a native invertebrate, Mormon cricket (*Anabrus simplex*), which can be very numerous in some uplands during some summers. The 2010 survey season (for both raptor nest survey and spring avian use surveys) seemed to be a year of relatively high numbers of squirrels, of voles, and of both of these hawk species in the larger area surrounding Baseline Wind (based on the extensive experience in the region of NWC field personnel). Thus, the nest density of these species—and therefore of raptors as a whole—may have been higher in the year of survey than in most years. This has implications for drawing comparisons between Baseline Wind and other projects for which pre-construction surveys were completed during seasons of lower regional abundance of these hawk species. Nonetheless, other years of relatively high densities would be expected during the 30-year operation of the Project, and the 2010 results may provide a good basis for predicting levels of impacts during such years.

Overall raptor nest density within the 2010 survey area for Baseline Wind (Figure 4) was 0.35/mi^2, within the range and slightly above the average of 14 other wind projects in the region (0.30/mi^2; Table 7). Swainson's hawk nest density at Baseline Wind (0.13/mi^2) was slightly lower than other wind projects in the area, such as Willow Creek Winds (0.44/mi^2), Leaning Juniper IIA and IIB, Pebble Springs, and Rattlesnake Road (0.18–0.19/mi^2), but higher than others in the region (0.00–0.07/mi^2 at nine other wind projects; Table 7). Swainson's hawk nests were also the most common raptor nest found during the 2009 raptor nest survey for Montague Wind Power Facility; at both projects, Swainson's hawk nests were followed in abundance by red-tailed hawk nests and ferruginous hawk nests (IRI, 2010; NWC, 2010b). This similarity is not surprising, as portions of the aerial raptor survey area for the two projects overlapped. Number of breeding attempts by these hawks exhibits annual variation, with the 2010 survey season likely having a relatively high nesting density of Swainson's hawks in the CPE.

Average annual fatality estimates for raptors (including owls) at the 19 CPE wind projects mentioned above range from 0 to 0.29 per MW/year (Table 10). The upper end of the range comes from Leaning Juniper I where a high nest density and high mean use of raptors was observed (Gritski et al., 2008) and Tuolumne Wind Project in Washington (Enz and Bay, 2010). Figure 13 displays overall pre-construction mean use estimates (four seasons combined) for raptors at CPE wind projects, particularly permitted projects in Oregon and nearest Baseline Wind where data were available for this format. Raptor mean use overall at Baseline Wind was lower than at the ten other wind projects shown in Figure 13. Because overall raptor use was at the low end of the range compared to many CPE wind projects (Figure 13), and there are similarities in habitat types at Baseline Wind compared to other CPE wind projects, it would be expected that the estimated range of raptor fatalities from completed avian fatality monitoring studies in the CPE (Table 10) may provide a fair basis for predicting fatality impacts at Baseline Wind.

Because raptor mean use, raptor nest density, and species composition of raptor nests found at Baseline Wind were similar to, but lower than, those at Leaning Juniper I (Table 7, Figure 13), it would be expected that estimates of raptor mortality would also be similar or lower at Baseline Wind. Pebble Springs is the other operating wind project in the general

vicinity where fatality monitoring has been completed and final fatality estimates are available. Raptor mean use for spring season at Baseline Wind (0.293 birds/20 min) was lower than at Pebble Springs (0.42/20 min.; spring was the only season of avian use surveys; PPM, 2006). Baseline has considerably less native habitat for raptors than Pebble Springs. Moreover, although raptor nest density was slightly higher overall at Baseline Wind, this result was likely confounded by relatively higher regional density of Swainson's hawk during the year of surveys at this Project (as discussed above). Raptor fatality rates at Pebble Springs (0.04 birds/MW) were low relative to Leaning Juniper I (Table 10). Raptor fatality rates at Baseline Wind are expected to fall within the range found at CPE projects (Table 10); given the average raptor nest density (even in a year of regional abundance) and below-average mean use, fatalities of raptors at Baseline Wind is expected to be slightly lower than the CPE average.

Rough-legged hawk, northern harrier, Swainson's hawk, red-tailed hawk, and American kestrel are the raptor species that exhibited the highest mean use at Baseline Wind (Table 5). Of these, Swainson's hawk has been found as a fatality at CPE wind project with higher frequency than rough-legged hawk (present only in winter and early spring) and the relatively low-flying northern harrier. Exposure indices for these three species which were calculated for Leaning Juniper IIA, were highest for Swainson's hawk (0.078) followed by rough-legged hawk (0.020), and northern harrier (0.008; Kronner et al., 2005a). Swainson's hawks have been found as fatalities at Pebble Springs and Leaning Juniper I, as well as at other studied CPE wind projects (Table 11) and at projects currently being studied (Leaning Juniper II). American kestrel and red-tailed hawk exhibited relatively high mean use and have a history of collision in the CPE, and specifically have been found as fatalities at Leaning Juniper I, Rattlesnake Road, and Wheat Field Wind Farm (Gritski et al. 2011; Gritski and Downes, 2011; Gritski et al. 2008).

Other locally nesting diurnal raptor species that were observed during surveys—prairie falcon and ferruginous hawk—are also at some risk of collision. Cooper's hawk and merlin, found during special status wildlife species surveys but not breeding on the Project, could also be found infrequently as fatalities. Risk to special status raptors is discussed in further detail in Section 4.6.

Short-eared owl, a ground-nesting owl, was observed once during special status wildlife species surveys of Baseline Wind and may be found as a wind turbine-related fatality based on avian fatality monitoring results recorded at other nearby CPE wind projects (Gritski et al., 2010a, Gritski et al., 2008; Erickson, et al., 2004; NWC and WEST, 2007; Table 11). Influencing factors that could affect potential mortality of short-eared owls include the species' year-to-year wintering population fluctuation that may be influenced by prey abundance and/or winter weather patterns (snow depth and duration of snow cover).

Other species of owl that have been found as fatalities at regional wind projects include barn owl, great horned owl, and long-eared owl (Table 11). The western screech owl may be at risk when it occasionally departs its typical riparian and other tree habitats and travel upland within turbine zones. All of these species could be expected to occur at various times of the year in suitable habitats within (though not throughout) the Project. Great horned and long-eared owls were observed during special status wildlife surveys in spring 2010 and four great horned owl nests were found during raptor nest surveys (Figure 4).

4.4.2 Passerines

Passerines have been the most abundant avian fatality at wind projects in the CPE, comprising >65% of the fatalities overall (Table 11). Passerines include many dozens of

species, which generally outnumber other groups (such as raptors), thus their collision rate may not be out of proportion to their overall relative abundance in the landscape. Similar to the trend nationally, horned larks have dominated the passerine fatality composition throughout the CPE with an average of 31% of all observed CPE fatalities (Table 11). Horned lark has been the most numerous fatality found at CPE sites studied to date with the exception of Klondike II (NWC and WEST, 2007) where golden-crowned kinglet outnumbered horned lark in observed composition (21.05% to 15.79%).

Passerines were the most abundant avian group observed during studies of Baseline Wind, and passerines accounted for the majority of overall bird use on other Oregon wind projects as shown in Figure 12. Passerine use, including corvid use (common raven), ranged from 2.929–9.058 birds/20 minute survey at Baseline Wind. This is lower in all seasons than the nearest operating wind project where fatality monitoring has been completed, Leaning Juniper I; there, passerine use for pre-construction surveys range from 5.517–42.833 birds/20 min. (Kronner et al., 2005a). Large groups of horned larks (this species varies in number between years) were detected during pre-construction surveys for Leaning Juniper I, and common ravens also occurred in large groups near the active landfill during those surveys (Kronner et al., 2005a). At Leaning Juniper I, passerines comprised the largest percentage of observed as well as estimated fatalities (78% and 91%, respectively; Gritski et al., 2008). The annual fatality estimate for passerines at Leaning Juniper I ranged from 3.61–9.67 per MW per year, and is higher than that at other regional projects (Erickson et al., 2003a; Erickson et al., 2004; Johnson et al., 2003a; NWC and WEST, 2007). Because overall bird use was lower at Baseline Wind than found in studies for Leaning Juniper I, a conservative prediction of passerine fatalities for Baseline Wind would be 1 to 4.6 passerine fatalities/MW/year; this is less than or similar to nearby operating wind projects, Leaning Juniper I and Pebble Springs. Some of these fatalities are expected to be non-native species (European starling, rock pigeon), as found at Leaning Juniper I (approximately 5%). Assuming that mean use as recorded during the diurnally-conducted point counts is a reliable predictor of avian fatalities (as suggested by Downes et al., 2008), then passerine fatalities at Baseline Wind are expected to be at the low end of the CPE range (Figure 12; Table 10).

The species most at risk for turbine collision at Baseline Wind is horned lark (based on daytime avian use estimates), which showed the highest use in all seasons of survey and history of collisions in the CPE (Table 5; Table 11). Common raven, western meadowlark, and Brewer's blackbird were the species with highest mean use overall after horned lark (Table 5). Common ravens, could have lower levels of fatalities because they appear far less susceptible to collision than would be expected based on their level of use. While common ravens are usually within the top five most abundant birds observed at projects and are known to have flight heights in the turbine rotor swept area, very few have been reported as fatalities at CPE wind projects relative to their higher abundance (Table 11). Common ravens are known for their ability to quickly learn skills of a spatial nature (Boarman and Heinrich, 1999), which likely helps explain some avoidance of turbine rotors.

Smaller numbers of migrant species will likely also be found as fatalities at Baseline Wind. Forest-dwelling species (such as golden-crowned kinglet and dark-eyed junco) are typically unrecorded during the year-round avian use surveys and spring season special status species surveys, since they do not frequent the habitat types found in the arid uplands of the CPE generally (or Baseline Wind particularly), except for resting during migration, typically along watercourses and riparian habitat or other deciduous tree and shrub habitats (Hudson, 2000). Nonetheless, based on trends from regional wind projects such as the Klondike II, Stateline I and II, and Big Horn wind projects (NWC and WEST, 2007; Erickson et al., 2004; Kronner et al., 2008a), some may pass through the CPE during migration and

may collide with turbines. At Baseline Wind, the risk for nocturnal migrant passerines could be highest at turbines near the breaks of Rock Creek, since riparian habitat types present in that drainage provide stopover sites for these birds (Kronner and Gritski, 2010).

Actual number of fatalities (passerines or other avian groups) may vary among years during the life of the Project as fluctuations in weather patterns, migration patterns, and environmental events and land use patterns may influence avian activity levels and distribution patterns.

4.4.3 Waterfowl and other Waterbirds

Nationally, waterfowl fatalities at land-based wind facilities have been low compared to overall use (Kingsley and Whittam, 2007; NWCC, 2010). Wind projects with year-round waterfowl use have shown the highest waterfowl fatalities, although levels of waterfowl/waterbird fatalities appear insignificant compared to use of the sites by these groups.

In the CPE, several fatalities of geese and waterfowl have been reported, but waterfowl have not comprised large numbers of observed fatalities during fatality monitoring studies (Table 7). Two Canada goose fatalities were documented at the Klondike I (OR) wind project (Johnson et al., 2003a), although several Canada goose flocks were observed during pre-construction surveys (Johnson et al., 2002). They are known to forage on sprouting wheat in the extensive dryland wheat fields of the Columbia River area. One Canada goose was found as a fatality at Hay Canyon Wind Project (Gritski and Kronner, 2010b) and one was found at Rattlesnake Road Wind Farm (Gritski et al., 2011). One unidentified duck was found as a fatality at Leaning Juniper I Wind Power Facility during the two-year monitoring study (Gritski et al., 2008). Fatality monitoring at Klondike III recorded no waterfowl fatalities, despite numerous groups of Canada geese recorded on the project area during avian use studies conducted concurrently with fatality monitoring (Gritski et al., 2010a). One bufflehead was found at the Klondike II Wind Project (NWC and WEST, 2007). Three great-blue herons have been found as fatalities at regional wind projects (Klondike III, Gritski et al., 2010a; Stateline and Nine Canyon; Erickson et al., 2003a; Erickson et al., 2004). Other waterbird species that have been found at regional wind projects include American coot, mallard, western grebe, horned grebe, northern pintail, and Virginia rail (Table 11).

The Top of Iowa Wind Project is located in cropland between three Wildlife Management Areas (WMAs) with historically high bird use, including migrant and resident waterfowl, shorebirds, raptors, and songbirds. During one study, approximately 1 million total goose-use days and 120,000 total duck-use days were recorded in the WMAs during the fall and early winter, and no waterfowl fatalities were documented during concurrent and standardized wind project fatality studies (Koford et al., 2004). Similar results were obtained at the Buffalo Ridge Wind Project in southwestern Minnesota, which is located in an area with relatively high waterfowl/waterbird use and some shorebird use. Snow geese, Canada geese and mallards were the most common waterfowl observed. In all, 55 fatalities were observed during the fatality monitoring studies and these included three species of waterfowl: two mallards, two American coots, and one blue-winged teal (Johnson et al., 2002b). One sandhill crane was found as a fatality at a wind project consisting of modern high-capacity wind turbines at the Altamont Pass Wind Resource Area, California (Altamont Pass Avian Monitoring Team, 2008).

The only waterfowl observed at Baseline Wind were Canada goose (7 detections) during winter season (Table 3). It is unlikely that the proposed Project will have any significant impact on waterfowl.

4.4.4 Shorebirds

The only shorebirds observed during the 2009–2010 site-specific surveys were the State Sensitive-Vulnerable species long-billed curlew and killdeer *(*Table 3).

Shorebirds as a group are rarely killed at wind projects; based on data available several years ago, of 1,036 avian fatalities collected at U.S. wind projects, only one was a shorebird (a killdeer found at Buffalo Ridge, Minnesota; Erickson et al., 2001), even though shorebirds have been recorded at nearly every wind project during pre-construction surveys. A long-billed curlew collision fatality found at Pebble Springs Wind Project was the first known fatality of this species (Gritski and Kronner, 2010a) during a monitoring study. One long-billed curlew was found in April 2010 incidentally to fatality monitoring at Wheat Field Wind Farm (Gritski and Downes, 2011). Although some fatalities may occur, based on local and national trends described above shorebird fatalities are expected to be infrequent and isolated occurrences.

4.4.5 Upland Gamebirds

Some upland game bird mortality has been documented at wind projects (Enk et al., 2010; Enk et al., 2011; Erickson et al., 2001; Erickson et al., 2004; Erickson et al., 2007; Gritski and Kronner, 2010; Gritski et al., 2010a; Jeffrey et al., 2009a; Kronner et al., 2008a). The two gamebird species recorded at Baseline Wind—ring-necked pheasant and chukar—are among the gamebird species most frequently observed as fatalities at CPE wind projects. It is not clear if such mortalities were caused by striking turbine towers or blades, but there are also likely some strikes with vehicles traveling through the wind projects. Based on habitat present, results from other regional wind projects, and the presence of a few chukar and ring-necked pheasant within the Baseline Wind area, there is potential for mortality of some upland gamebirds to occur.

4.5 Displacement Effects

This section primarily addresses breeding season impacts during operations; however, some temporary displacement could occur during construction if the Project were constructed during the nesting season for species discussed, and if active nests were nearby to construction activities. Some temporary displacement of grassland and shrub-steppe birds could occur during construction, but if the areas were revegetated following construction, the species may reoccupy suitable habitat in these disturbed areas. It is assumed, however, that construction activities and the disturbance extent will be designed to avoid and minimize likely construction-related impacts.

4.5.1 Raptors

Development of wind turbines near raptor nests may result in indirect impacts to nesting birds such as resulting in the nest site being less attractive for nesting, or displacement of birds during nesting; however, few studies have shown avoidance of wind turbine areas by nesting raptors. One report of avoidance of wind turbines by nesting raptors in the U.S. occurred at Buffalo Ridge (MN). During this study raptor nest density on 101 mi^2 (261 km^2) of land surrounding a wind project was 5.94/39 mi^2 (5.94/100 km^2). No nests were present in the 12 mi^2 (32 km^2) wind project facility itself, even though habitat was similar (Usgaard et al., 1997). A pair of golden eagles successfully nested 0.8 km from the Foote Creek Rim, Wyoming wind plant for three different years after it became operational (Young et al., 2003b), and a Swainson's hawk nested within 0.8 km of Klondike Wind Project (Johnson et al., 2003a). Studies at the Stateline Wind Project in Oregon and Washington have not shown any short-term effects on nesting raptors (Erickson et al., 2004). In 2006 at Stateline II Wind Project (supplemental surveys of a subset of the full Stateline Project), there were fewer active target raptor species (ferruginous hawk and Swainson's hawk)

nests within two miles of the Project than during the previous years; although some changes may be attributed to various factors such as nest structure degradation and competition with other species (great horned owl) for the limited nest sites (Erickson et al., 2007) and landowner activities. Ferruginous hawks appear to continue to nest in the Stateline Oregon/Washington area, given some intermittent competition with great horned owl over the monitored years (2001–2006). One nest within 1,122 ft and approximately 42 ft lower in elevation of the nearest turbine persisted as an active and successful nest site from 2001 (pre-construction) through 2006, the year last studied and presented in public reports.

Displacement of raptor use was studied at a Wisconsin wind project in predominately agricultural habitats with small patches of deciduous woodland (Drake et al., 2010). The study concluded that there was evidence of displacement from the wind farm area of *Accipiter* species, American kestrels, and northern harrier. Flight behavior data and mortality estimates indicated that most raptors were not directly affected by the presence of turbines. Turkey vultures and red-tailed hawks both displayed high-risk flight behaviors relative to other species, which exhibited 100% avoidance and of which most individuals stayed more than 100 m (328 ft) from turbines and above the rotor-swept area. Five red-tailed hawks were the only raptors found as fatalities during monitoring (including incidentals).

4.5.2 Grassland and Other Nesting Birds

A grassland bird study at Stateline Wind Project (Erickson et al., 2007) showed a relatively small-scale impact of the wind facility on grassland nesting passerines. A gradient analysis (Morrison et al., 2001) was used to determine the relationship between density of grassland/steppe avian species and distance from the Vestas 0.660 MW turbines. A "gradient analysis" assesses whether a significant or a biologically substantial relationship exists between distance from Project structures and abundance or use of the area. The initial impacts observed during the early years of the study were mostly due to direct loss of habitat due to placement of turbine pads, construction of roads, and some temporary habitat disturbance (Erickson et al., 2004). During the 2006 post-construction study, grasshopper sparrows showed a significant decrease in use when compared to pre-construction use within the first 50-m (164-foot, horizontal) sub-segment of the turbines, although sample sizes were very low for grasshopper sparrows. Horned lark, savannah sparrow, and western meadowlark displacement was not apparent. In summary, the data suggest there was a relatively small-scale impact of the wind facility on the grassland passerine species of that project site for the period studied. Grassland species as a whole appear not to have been impacted. Grassland bird displacement studies at the Combine Hills Wind Project also suggest a relatively small-scale impact from the operating wind facility on grassland nesting passerines (Young et al., 2006). Passerine use at survey points offset from the turbines showed a significant increase from pre-construction to post-construction surveys, but there was no change at the turbine points suggesting other factors that could also be involved (Young et al., 2006).

A grassland bird study initiated in 2003 at the South Dakota Wind Energy Center was also conducted to determine if wind turbines constructed in grazed, mixed grass prairie affect the density or species composition of breeding grassland birds. Preliminary results did not demonstrate avoidance patterns for the western meadowlark, and no evidence currently exists to show that this species avoids wind turbines. However, for grasshopper sparrow, the mean difference between the observed and expected numbers tended to be negative out to about 200m, indicating that this species avoided wind turbines to some degree. Studies at this and other nearby sites are continuing to determine if this pattern persists throughout the study (Johnson and Shaffer, 2008).

Nesting burrowing owls were monitored during construction at Stateline (FPLE, 2002) and although most active nests were not within turbine construction zones, one nest site located 367 ft from a turbine was active through the construction period and successfully produced young (although the nest was not in a direct line of sight to the construction zone). In addition to persistence during construction, burrowing owl nest site monitoring conducted post-construction for two to three years indicated persistence in the presence of an operating wind turbine facility (Erickson et al., 2004; Kronner Field Notes, 2004, 2005). An active den of this species was found within the Baseline Wind boundary (Figure 4). This species also has been found to nest at Leaning Juniper IIA, Leaning Juniper IIB, and at Pebble Springs and the surrounding area (NWC, 2009; PPM, 2006; Kronner et al., 2005a; Kronner et al., 2007a). If construction occurs during the nesting season, it is not known to what degree, if any, construction activity will affect the burrowing owls or other nesting grassland birds. During construction, closed areas will be posted and monitored during the sensitive nesting burrowing owl period. No adverse impacts to the regional populations are expected.

Long-billed curlews are also known to be susceptible to human disturbance during the breeding season that can result in nest abandonment or disruption of important parental behaviors (such as brooding chicks; Dugger and Dugger, 2002). Loss of suitable habitat may also reduce social behaviors or reduce nesting opportunities. During operations, grassland birds may avoid areas of continual human activity and also along a perimeter around new roads and turbines. NWC is unaware of any displacement studies specific to long-billed curlews, but individuals and groups have been observed near operating turbines during post-construction surveys at nearby wind farms Pebble Springs (Gritski and Kronner, 2010a) and Rattlesnake Road (Gritski et al., 2011).

Loggerhead shrike is a shrub-steppe bird species documented at Baseline Wind during its breeding season (two nests were confirmed and others suspected). This species has been documented as nesting in nearby areas (NWC, 2009). Due to lack of wind-power displacement studies targeting this species, indirect impacts are unknown. Response to vehicular traffic will likely depend on the level of use and size of equipment (noise, width, etc.). Intermittent travel through the nesting habitat during Facility operations is not likely to alter this species' ability to nest and fledge young within the Facility area, but some avoidance of concentrated human activity areas may result.

4.5.3 Other Wildlife

No substantial impacts are anticipated to big game. Results from the review of deer and elk winter range show that only a portion of the ODFW designated winter deer range intersects with the western portion of the Project boundary (Figure 1). Small numbers of mule deer, elk, and pronghorn were observed during spring special status wildlife surveys and during winter avian use surveys on the Project. Some of these game species may be temporarily displaced during construction, as has been noted at other wind projects, but such displacement is not expected to be permanent. A single study in Union County, Oregon, suggested that more deer and elk congregated at greater distances from turbines after construction than they had from those same areas during pre-construction surveys (WEST, 2010). However, confounding evidence—including greater density estimates on the study area of both deer and elk post-construction—led the researchers to admit that their results were inconclusive with regard to impacts to big game (WEST, 2010). Apart from this study, abundant anecdotal evidence indicates that big game are not displaced by wind farms. As an example, at the Big Horn Wind Project in Washington, very young mule deer fawns (only a few days to a week old) were observed on eight occasions in May and June during post-construction wildlife fatality monitoring conducted on turbine search plots, indicating that

mule deer birthing activities occurred near turbines (NWC, 2007). At the Foote Creek Rim Wind Project in Wyoming, pronghorn use within 800 m of the site did not change significantly after construction (Johnson et al., 2000).

Permanent facilities and the construction of them may also result in loss of foraging and breeding habitat for nonlisted small mammals, such as northern pocket gopher, (*Thomomys talpoides)*, Ord's kangaroo rat (*Dipodymys ordi)*, and badger (*Taxidea taxus*). Ground-dwelling mammals may lose the use of permanently affected areas, but are expected to repopulate temporarily impacted areas. No impacts to amphibians are anticipated; no aquatic habitat impacts are anticipated. Impacts to reptiles during operation are likely to be limited to direct mortality as a result of vehicle strikes and are expected to be low, provided that recommended speed limits are followed.

4.6 Impacts to Special Status Vertebrate Wildlife Species

This section discusses potential direct and indirect impacts of the construction and operation of the Project to special status avian species and other species of vertebrate wildlife. Bats are discussed in Section 4.7. For all avian species, risk could vary year-to-year for the life of the operating Project, depending on the level of nesting in the general area, proximity of active nests to operating turbines, prey availability, and regional and migrant population trends. Areas of suitable habitat where construction disturbance could occur may need to be surveyed for special status wildlife species in the year prior to construction (by the ground transect method outlined in Section 2.7).

Special Status Raptors

The *golden eagle* (protected by the Bald and Golden Eagle Protection Act) is considered at *low risk* of collision. Golden eagles are known to collide with turbines at wind projects (Erickson et al., 2001). In the Pacific Northwest, one was found as a fatality in 2010 at the Goodnoe Hills project in Washington (URS, 2010), and another was found in 2010 at Pebble Springs Wind Project, Gilliam County, Oregon although the cause of death of the latter was deemed unrelated to the presence of turbines (Gritski and Kronner, 2010a). One golden eagle fatality was discovered in 2011 at Juniper Canyon I Wind Project in Klickitat County, Washington (cause of death under review), and there was also one golden eagle fatality in 2011 at the Combine Hills Wind Project, Umatilla Co., Oregon (M. Kirsch, pers. comm.). Four golden eagle fatalities were recorded at the Elkhorn Valley Wind Farm located in Union County in northeastern Oregon (Rautenstrauch, 2010; Calabrese, pers. comm. 2011). The Elkhorn Valley Wind Farm is not considered to be within the CPE physiographical area, but is located within the Blue Mountain Ecoregion (Jeffrey et al., 2009b). Moreover, use of Elkhorn Valley Wind Farm by golden eagles was significantly higher than that of CPE project areas, with 136 detections during three seasons of preconstruction avian use studies (WEST, 2005). By contrast, a full year of avian use studies at Baseline Wind resulted in one golden eagle detection (Table 3).

Golden eagle nest records found as a result of the information review for Baseline Wind (Section 3.1.2) include two historical nests located in Eightmile Canyon, both within the same territory, approximately 6 miles (9.6 km) from the Baseline Wind Project boundary. There was one record of confirmed golden eagle breeding in 1996 approximately 4 miles (6.4 km) from the Project received from the Oregon Biodiversity Information Center PODS database, but the available location is not of the actual nest site. This species was observed infrequently during other avian use studies in the general vicinity (see Section 3.1.2. for further details; Caithness Shepherds Flat; Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2010; PPM, 2006).

At Baseline Wind, one active golden eagle nest (which had several inactive, alternate nests nearby within the same territory) was located during 2010 surveys; the active nest was 2,336 ft (0.4 miles or 0.7 km) from the Project boundary and 1.3 miles (2.1 km) from the nearest proposed turbine. The 2010 breeding attempt resulted in the fledging of one young. Nonetheless, neither the adult pair nor the fledgling were observed over the actual Project area during the year of avian use surveys that spanned this successful nest attempt, unless the single winter-season detection (at Point J, approximately 10 miles from the nest territory) was a bird from this territory. In southwest Idaho, resident golden eagles use a smaller home range in winter (Dunstan et al., 1978), which would suggest that this detection was of a wintering, rather than resident, eagle.

The lack of use of the Project despite the proximity of an active (and successful) nest is explainable with reference to the lack of habitat on the Project for the species upon which golden eagles prey. In foraging, this species avoids agriculture and grassland in favor of shrub-steppe (Marzluff et al., 1997, USGS unpubl.; cited in Kochert et al., 2002), since these habitat types do not support the medium-to-large avian and mammal species that constitute the primary prey for this species. Agriculture and grasslands comprise 80.4% and 12.7% of the Project area, respectively, or 93.1% of the Project together. Jackrabbits were infrequently encountered on the Project, and the species of ground squirrel present, the Washington ground squirrel, is more secretive (spends more of the diurnal cycle underground) and exists in smaller colonies than other ground squirrel species, which elsewhere can constitute an important component of eagles' diets. Except for Canada goose, waterfowl were not documented on the Project, and no fish habitat is found there. By contrast, Rock Creek Canyon and surrounding steeper-grade breaks in which the eagles nest and have been observed foraging contains riparian habitat, which supports fish, mallards, and muskrats, and draws pheasants, chukar, and partridge, the main birds taken (Olendorff, 1976), as well as black-billed magpie, an important part of the nestling diet (Gerhardt, 2000) and other prey important to eagles. The canyon in which the eagles nest (Figure 4) also provides habitat for yellow-bellied marmots, the primary prey of golden eagles in parts of the region (Marr and Knight, 1983). From spring to fall, snakes are also expected to be much more plentiful within the canyon habitats and more-complex land cover than in the more arid, less diverse Project facility zones.

Based on the low eagle mortality at CPE operating wind projects (three known fatalities, all assumed at this time to be related to operating wind turbines), the extremely low use of the Project area by golden or bald eagles, and the lack of concentrations on the Project of eagle prey species, the proposed Baseline Wind is deemed to entail a low risk of mortality either to the nearest breeding eagles or to migrant or wintering eagles. It is unlikely that the proposed Project will have a significant impact on the golden eagle population in the region. In addition, no nesting habitat will be directly impacted because nesting habitat is not present within the Project boundary.

Ferruginous hawk (State Sensitive-Critical) is considered at *moderate risk* of collision at Baseline Wind. Five active nests were found within the raptor survey area in 2010, though, none were found within the Project boundary (Figure 4). Individuals were observed during spring (3 detections) and summer (one detection) avian use surveys, and this species was also observed while in-transit to surveys and during ground transect surveys. This species is known to nest in the general vicinity (Kronner et al., 2005a; Gritski et al., 2008; NWC, 2009; NWC, 2010b; Kronner et al., 2007a and b; Kronner et al., 2010; Caithness Shepherds Flat, 2007; ORBIC, 2010c).

Ferruginous hawk has a history of collision at other wind projects in the CPE (Table 11). From 2003 through 2011, there were six known fatalities of this species at wind projects in

the CPE (five where formal monitoring reports are final and public; Table 11; ODFW pers. comm., October 2011). One was found as a fatality at Willow Creek Winds Project during July 2009 (Gritski, 2010). Ferruginous hawk had the third highest turbine exposure index at the Willow Creek Wind Project according to avian use study analysis, and nest density for this species was higher there than at other CPE projects (0.25/mi^2; Kronner et al., 2007b). Several ferruginous hawk nests were present in the Leaning Juniper I project area and one individual was observed colliding with an operating turbine by a maintenance worker at Leaning Juniper I in April 2008 (Gritski et al., 2008). The 2004–2005 pre-construction avian use study analysis showed this species to have relatively high exposure for the site (Kronner et al., 2005a). At the Big Horn Wind Project in Washington, one ferruginous hawk fatality was found in early July 2007, though this species is not known to nest within the leased area for that wind project (Kronner et al., 2008a). At the Stateline Wind Project, one ferruginous hawk fatality was detected during the fatality monitoring period from July 2001 through December 2003. The nearest nest was 0.5 miles (0.8 km from the turbine), but it was not known whether or not the fatality was an adult from that nest (Erickson et al., 2004). A one-year fatality monitoring study was conducted for part of the full Stateline project in 2006; one ferruginous hawk fatality was found in that year as well (Erickson et al., 2007). NWC is aware of an additional fatality of this species that has been found within the CPE (making up the total of six fatalities reported above), the reports of which are not yet published (ODFW, pers. comm.).

Whereas the other special status avian species discussed below are considered State Sensitive-Vulnerable, ferruginous hawk are considered State Sensitive-Critical. This designation reflects the species' low regional population size, concerns about continuing declines in nests and successful breeding attempts, and concerns about historical and continuing loss of breeding habitat. Due to these factors and the tendency of ferruginous hawks to use the same nest sites from one year to the next, minimizing impacts in and near identified nests of this species is deemed essential. Turbine layout and construction activities and timing will factor in the cautious approach towards avoiding and minimizing impacts to ferruginous hawks, particularly during the sensitive nesting period, March 15 through August 15 (ODFW, 1994). In the current layout (as of November 23, 2011), the nearest turbines are proposed approximately 2.052 ft (625 m) from one ferruginous hawk nest active in 2010 and 2,749 ft (838 m) from another nest active in 2010 (Turbines 4 and 201, respectively). The turbines nearest known nests are deemed likely to pose the greatest risk to ferruginous hawks.

Baseline Wind, LLC is also participating in a collaborative local telemetry study of ferruginous hawks aimed at better understanding the impacts of wind energy development on this species (Kolar and Bechard, 2010). Opportunities for future raptor telemetry are being discussed with agency personnel by Baseline Wind for the general Project area.

Swainson's hawk (State Sensitive-Vulnerable) is considered at *moderate to high risk* of collision. Eighteen active Swainson's hawk nests were found within the raptor survey area in 2010; five of these were within the Project boundary (Figure 4). This species was also detected during spring avian use surveys (14 detections) and summer season surveys (7 detections). Swainson's hawk nest density at Baseline Wind (0.13/mi^2) was slightly lower than other wind projects in the area, such as Willow Creek Winds (0.44/mi^2), Leaning Juniper IIA and IIB, Pebble Springs, and Rattlesnake Road (0.18–0.19/mi^2), but higher than others in the region (0.00–0.07/mi^2 at nine other wind projects; Table 7). Swainson's hawk nests were also the most common raptor nest found during the raptor nest survey for Montague Wind Power Facility (Kronner et al., 2010; NWC, 2010b). The number of breeding attempts by this species exhibits annual variation, with the 2010 survey season likely having a relatively high nesting density of Swainson's hawks in the CPE.

Swainson's hawks are known to nest in the general vicinity of Baseline Wind (ORBIC, 2010a; Kronner et al., 2005a; Kronner et al., 2010; Gritski et al., 2008; Gritski et al., 2011; NWC, 2009; NWC, 201b; Kronner et al., 2007a and b ; Kronner et al., 2008b; PPM, 2006; Caithness Shepherds Flat, 2007; Saddle Butte Wind, 2009). In all, 19 Swainson's hawks have been found as casualties (includes seven incidental findings) at wind projects in the CPE (as reported in final or public monitoring reports in Table 11 and ODFW, pers. comm., 2011; WDFW, pers. comm., 2011). Two Swainson's hawks were found as fatalities at Leaning Juniper I in 2007 (Gritski et al., 2008). The pre-construction avian use study analysis conducted at that site showed that this species had relatively high risk exposure (Kronner et al., 2005a). Three were found as fatalities at the Klondike III wind project (two as incidentals; Gritski et al., 2010a), one at Willow Creek Wind Project (Gritski, 2010), one at Pebble Springs Wind Project (Gritski and Kronner, 2010a), and one at Hopkins Ridge (Young et al., 2009). At Stateline, one Swainson's hawk fatality was detected; the nearest nest to the fatality was more than two miles (3.2 km) distant. It is not known whether this fatality was a locally nesting bird or a migrant from farther away. Also at Stateline, an injured Swainson's hawk was found at the base of a turbine. It was assumed to have collided with the turbine. It was captured, treated, and successfully released (Kronner and Gritski, pers. comm., 2004). At Klondike I, a Swainson's hawk was found as a fatality after the formal monitoring study was complete. At Harvest Wind, one Swainson's hawk was found during the first monitoring year (Downes et al., 2011a). One Swainson's hawk was found incidentally at Rattlesnake Road Wind Farm in spring season of 2010 (Gritski et al., 2011). NWC is aware of additional fatalities of this species that have been found within the CPE, the details of which are not published yet (making up the total of 19 fatalities as reported above).

After the final turbine layout and construction schedules are known, data and construction plans will be reviewed to attempt to minimize any potential impacts, particularly during the sensitive nesting period, April 1 through August 15 (ODFW, 1994). In addition, in an effort to better understand the impacts of wind energy development on Swainson's hawks, Baseline Wind, LLC is a participant in a local collaborative telemetry study that includes this species (Kolar and Bechard, 2010).

The *burrowing owl* (State Sensitive-Critical) is considered at *very low risk* of collision. Two active dens were documented during special status wildlife surveys in spring season 2010, although nesting could not be confirmed at one of these dens. There were two detections in-transit to avian use surveys in spring season. Nesting and observations have been confirmed in the general vicinity (ORBIC, 2010a; Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2010; NWC, 2009; PPM, 2006; Caithness Shepherds Flat, 2007). Although there was one confirmed burrowing owl nest observed at Leaning Juniper I (Kronner et al., 2005a), no burrowing owls were observed as fatalities at Leaning Juniper I (Gritski et al., 2008). Burrowing owl fatalities have been found during fatality monitoring studies at Altamont Pass Wind Resource Area in California (Orloff and Flannery, 1992; Smallwood and Thelander, 2004). One dead burrowing owl was found at the Stateline Wind Project, not near turbines; it collided with an operations maintenance truck (Dominick, pers. comm., 2009). Due to the low-flying habits of this species, impacts at wind projects could be turbine strikes or vehicle strikes when they are flying or perched on the ground. One burrowing owl was found as a fatality at the White Creek Wind I Project in Klickitat County, Washington (Downes and Kronner, 2011). It was an adult owl banded in Canada and determined to be a migrating or wintering bird (not a local breeder) due to band information and timing of the fatality. Information about nest persistence amidst construction and operation of turbines can be found in Section 4.5 (displacement effects). After the final turbine layout and construction schedules are known, survey data and construction plans

will be reviewed to attempt to minimize any potential impacts, particularly during the sensitive nesting period, April 1 through August 15 (ODFW, 1994).

Peregrine falcon (State Sensitive-Vulnerable) is considered at *very low risk* of collision. This species was not observed during surveys of Baseline Wind or nearby wind projects (NWC, 2009; NWC, 2010b; Caithness Shepherds Flat, 2007; Kronner et al., 2005a; Kronner et al., 2007a and b), but has been seen in the Arlington area (Morgan, pers. comm., 2004). Basalt cliffs along the Columbia River are potentially suitable for nesting but are less suitable than habitat along the Columbia River further to the northwest, which is the traditional nesting area for peregrine falcons. Historical nest sites are located approximately 10 to 50 miles (16 to 80 km) from the Facility (ODFW, pers. comm., 2011). One peregrine falcon was found as a fatality on September 22, 2010 at the Wheat Field Wind Farm (Gritski and Downes, 2011).

Special Status Passerines

Grasshopper sparrow (State Sensitive-Vulnerable) is considered to be at *low risk* of collision with turbines due to low-level flight characteristics of this species. Grasshopper sparrows were observed singing in multiple locations during spring 2010 special status wildlife surveys and are presumed to breed onsite. This species occurs throughout much of the CPE on and near wind project sites, but only one has been documented as a fatality at a wind project in the CPE (Table 11). The main concern to grasshopper sparrows is the impact of habitat loss and potential displacement. Stateline Wind Project (Oregon and Washington) and South Dakota Wind Energy Center displacement study data suggest that grasshopper sparrows are displaced during their season of use (nesting season) near turbines, though it may be a temporary effect due to construction impact to habitat (NWC and WEST, 2007; Johnson and Shaffer, 2008).

Loggerhead shrike (State Sensitive-Vulnerable) is considered to be at *low risk* of collision with turbines, primarily because of its apparent low susceptibility to such collision. This species occurs throughout the U.S. where wind projects have been built, yet only two loggerhead shrikes (both in California) have been reported as fatalities at wind power facilities (Erickson et al., 2001). This species was detected in multiple locations during special status wildlife surveys at Baseline Wind, and two nests were confirmed on-site. It was also documented during spring avian surveys as well as in-transit to study plots. Nesting was confirmed in one location at Leaning Juniper IIB and nesting was also confirmed at Leaning Juniper IIA (Kronner et al., 2005a; NWC, 2009). Loggerhead shrikes can be found in the general area (Kronner et al., 2007a and b; Kronner et al., 2008b; PPM, 2006; Caithness Shepherds Flat, 2007; Saddle Butte Wind, 2009). This species may be more affected by habitat loss and displacement than by turbine collision; however, the effects of indirect impacts such as these are largely unknown, as studies of displacement have not been conducted for this species. After the final turbine layout and construction schedules are known, survey data and construction plans will be reviewed to attempt to minimize any potential impacts, particularly during the sensitive nesting and brood-rearing period.

Special Status Shorebirds

Long-billed curlew (State Sensitive-Vulnerable) appears to be at *low to moderate risk* of collision with turbines. Long-billed curlews were observed on-site during spring 2010 avian use surveys (43 detections) and summer season (7 detections). They were detected in multiple locations during special status wildlife surveys in 2010; nesting was confirmed within the Project boundary. Long-billed curlews have also been observed frequently (and some nesting) at Olex and elsewhere in the general vicinity (ORBIC, 2010a; Kronner pers. field notes , 2010, Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2010;

NWC, 2009; NWC, 2010b; PPM, 2006; Caithness Shepherds Flat, 2007; Saddle Butte Wind, 2009). One long-billed curlew fatality was found at Pebble Springs on April 9, 2009 (Gritski et al, 2009b), and one was found at Wheat Field Wind Farm (reported as an incidental on July 28, 2009; Gritski and Downes, 2011). The estimated exposure risk conducted for Leaning Juniper I and Leaning Juniper IIA for this species of shorebird was relatively high; however, none have been reported as fatalities at Leaning Juniper I during the fatality study (Kronner et al., 2005a; Gritski et al., 2008) but one was found incidentally after the study by maintenance workers.

Curlews defend a nesting territory (15–35 acres or 6–14 ha) and typically forage outside the nesting territory (Dugger and Dugger, 2002). Unpaired males establish territories and begin aerial displays (often 30–50 m or 98–164 ft above ground level) to attract females. Curlews are most visible during this arrival and pre-incubation period (mid-March to mid-April; Kronner, pers. field notes 1986–2010). While long-billed curlews may be at risk for collision with turbines whenever they occur, they may be at increased risk during pair formation, when they are performing their aerial displays. Construction of the Project could result in some temporary and permanent habitat loss and the presence of turbines and human activity during and after construction may displace curlews from some areas. However, other portions of the leased area are suitable for curlew nesting and staging and curlew use is expected to occur there. Localized impacts to nesting and staging curlews would not likely impact entire breeding populations in the general area. After the final turbine layout and construction schedules are known, data and construction plans will be reviewed to attempt to minimize any potential impacts, particularly during the sensitive nesting and brood-rearing period.

Special Status Mammals

White-tailed jackrabbit (State Sensitive-Vulnerable) appears to be at *low risk* of impacts from the proposed Project. This species was observed in several locations during special status wildlife surveys in 2010 and pellets of jackrabbit species were detected in numerous locations (Figure 5a). A small amount of temporary and permanent loss of open shrub cover and grassland is expected; proposed habitat conservation and enhancement is expected to adequately mitigate for such loss.

Other Special Status Wildlife

Sagebrush lizard (State Sensitive-Vulnerable). Sagebrush lizard was not observed during site-specific surveys, although a minor amount of suitable habitat is present within the Project boundary. It has been observed within the general vicinity (Kronner et al., 2005a; Kronner et al., 2010; NWC, 2009; NWC, 2010b; PPM, 2006). If present, individuals are expected to be impacted during construction; however, no adverse impacts are expected to the regional population.

Western toad (State Sensitive-Vulnerable). There was one Oregon Biodiversity Information Center (ORBIC, 2010c) record of this species within 5 miles of the Project boundary. It has been confirmed to be relatively common along Rock Creek (Kronner and Gritski, 2010). However, this species was not observed within the Baseline Wind surveys, and there is no aquatic habitat and limited potential for upland movements during wet periods due to extensive large agricultural crop fields. Impacts are not expected for this species.

4.7 Impacts to Bats

The primary impact to bats will be direct mortality through turbine collision or barotrauma (i.e., rapid pressure changes that cause severe internal organ damage; Baerwald et al., 2008). Available local and regional evidence indicates that this will be confined primarily to

the migratory species. Throughout the CPE, fatalities at operating wind projects have been comprised primarily of silver-haired and hoary bats, with fall being the main season of fatalities and spring and summer seasons contributing only small numbers of fatalities (Figure 7). Data from 19 CPE wind projects show that 630 total bat fatalities have been found and most have been identified to species. Of the 630 bat fatalities, 85% have been found during the period of August–October (the peak in September), and 97% of all of these bat fatalities were hoary (311) and silver-haired bats (303).

Although 46 species of bats occur in the United States, 11 species comprise all known bat fatalities at U.S. wind plants (Johnson, 2005), despite the fact that wind projects occur in several regions of the country in a variety of habitats. The three most common species of migratory bats in the U.S. (hoary, eastern red, and silver-haired bats) comprised roughly 77% of all bat fatalities at 70 wind energy facilities in North America (Strickland et al., 2011). At a wind farm in Wisconsin, veterinary analysis of bat carcasses found during monitoring (to further understand the cause of death in bats killed by wind turbines) found that bats were killed by both blunt force trauma and barotraumas, and some fatalities were a combination of the two (Grodsky et al., 2010). This is consistent with other studies on the cause of mortality of bats at operating wind projects (Baerwald et al., 2008).

Although only a few species are consistently found as fatalities, other species also occur in the CPE and may occasionally occur in the Project area. Because the Townsend's big-eared bat is a State Sensitive-Critical species with known occurrence in the general area, other literature was reviewed to more thoroughly understand the biology of this bat species and potential use of habitat near wind turbines. A Biological Assessment was prepared to address the potential for a wind project in West Virginia to impact the federally endangered Virginia big-eared bat, a subspecies of Townsend's big-eared bat (Johnson and Strickland, 2003). The Biological Assessment concluded that the collision risk to the Virginia big-eared bat is very low because the species is nonmigratory and forages well below the space occupied by turbine blades. Not much is known about the species' daily and seasonal activity patterns in Gilliam County. Of 630 bat fatalities found and identified at 19 CPE wind projects (Figure 7), Townsend's big-eared bat has not been found as a fatality. There is little or no suitable roosting habitat within the Project boundary or close to anticipated turbine locations.

As with other CPE projects, most bat mortality would be expected to occur from July through early fall (NWCC, 2010), coinciding with the late summer dispersal/fall migration period for hoary and silver-haired bats, with the exception of a few fatalities found from March through June and a small number could occur during the early winter season (Figure 7). At Leaning Juniper I, four silver-haired bats were found as fatalities during May despite there being no suitable (forested) breeding habitat nearby; these may have been individuals temporarily residing in lower warmer elevation zones or along Rock Creek (perennial stream with deciduous tree habitat) before going to mountainous forest areas for the summer. In December, one hoary bat was found as a fatality at Leaning Juniper I as an incidental (Gritski et al., 2008). At Pebble Springs, one silver-haired bat was found as a fatality (incidental) in late April, one in late May, two bats were found in mid-June, a hoary bat and an unidentified bat and two were found incidentally in November, a hoary bat and a silver-haired bat (Gritski and Kronner, 2010a). At Rattlesnake Road Wind Farm, one hoary bat was found in November and three silver-haired bats were found in May; the other six bat fatalities (four silver-haired and two hoary bats) were found in September and October (Gritski et al., 2011).

Bat Impact Predictions for Baseline Wind

Bat mortality patterns at wind projects in Washington and Oregon have followed patterns similar to the rest of the country, but the average rate of fatality on a per turbine basis is slightly lower (NWCC, 2010; Arnett et al., 2008; Strickland et al., 2011). Bat mortality at Baseline Wind could be expected to be similar to fatalities found at existing CPE wind projects, ranging from 0.00 to 3.78 bats/MW/year with a mean of 1.15 (Table 12). Actual fatality numbers may be higher or lower for each year for the life of the Project. Bat fatality rates for Baseline Wind are expected to be lower than fatalities at many other wind projects in the United States, particularly lower than projects in the eastern U.S. where bat mortality at some projects has ranged from 28 to over 40 per turbine per year (Kerns and Kerlinger, 2004; Nicholson, 2003; Arnett et al., 2008).

Bat species composition of fatalities at Baseline Wind is likely to be similar to fatalities found within the CPE (Figure 7) consisting primarily of silver-haired and hoary bats (both State Sensitive-Vulnerable status). Small numbers of other bat species, such as big brown bat (Kronner et al., 2008b), little brown bat (Erickson, et al., 2004), and other *Myotis* species (Appendix E) have been found at wind projects in the CPE and may also be found as fatalities at Baseline Wind.

If the species and level of calls documented during the 2010 ground-level acoustic monitoring near likely turbine locations is indicative of turbine-collision risk, then hoary bats may be at greater risk of mortality at turbine strings near location C1 (Figure 6) due to the higher number of identified calls at this location (Figure 9). *Myotis* species (species in the "high frequency calls" category) may be at increased risk of mortality at turbine strings near location B1 due to the very high numbers of high frequency bat passes recorded at this location (Figure 8). As location B1 is in the bottom of a draw it is possible that the increased activity level recorded there will not translate into increased mortality at turbines. In addition, turbine rotor heights (the zone of collision risk) will be higher above ground than were bat detectors during pre-construction surveys.

5.0 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Comprehensive measures for avoidance, minimization and mitigation of impacts to wildlife and their habitats are described in the application for site certificate, with full details described in the Wildlife Monitoring and Mitigation Plan, the Habitat Mitigation Plan, and the Revegetation Plan. This section contains a summary of these avoidance, minimization, and mitigation measures, which include pre-construction, during construction, and operational phase components.

Prior to construction, Baseline facilities will be designed to avoid impacts to special status plant and animal species, riparian areas, and native habitats to the extent practicable.

- Pre-project assessment surveys have been conducted (as described in Sections 2 and 3 of this report) and are planned for the year of construction. Those planned for the year of construction (prior to construction) are rare plant surveys (in areas not yet surveyed), Washington ground squirrel surveys, and a raptor nest survey.
- Turbine locations, laydown areas, and roads will be microsited to avoid WGS colonies; no components will be located in Category 1 habitat associated with known WGS colonies, and there will be no temporary or permanent impacts to Category 1 habitat.
- Facility design will also take into account the locations of nests of special status raptors, particularly ferruginous hawks and also Swainson's hawks.

- Baseline facilities will be microsited to avoid and minimize impacts (both temporary and permanent) to high-quality native habitat where practicable, with the goal of retaining these habitats in the general landscape.
- Though not found to date within areas planned for development, special status plants may be found during supplemental surveys of newly-added areas. If found, populations of listed species will be avoided, and no permanent or temporary impacts will occur.
- Underground collector lines will be installed in agricultural or other disturbed habitats where feasible, and overhead lines will be constructed according to Avian Power Line Interaction Committee (APLIC) recommendations.

During construction, measures implemented to minimize impacts will include:

- Construction compliance monitoring in sensitive areas and unique habitats
- Where needed close to construction zones, exclusion flagging around special status species locations and high quality native habitats
- Breeding-season no-disturbance buffer (1300 ft) around active raptor nests
- Breeding-season no-disturbance buffer (1/2 mile) around active Swainson's and ferruginous hawk nests
- Environmental sensitivity and reporting training
- Lower speed limits in zones close to areas that may have higher wildlife activity
- Fire control
- Erosion control

After construction, and during the operational phase of the Project, numerous measures will be undertaken to monitor and to mitigate for the impacts of the Project to wildlife and their habitats. These measures include both short- and long-term aspects. A brief list of the components for post-construction monitoring and mitigation are listed here, and full methods and timelines will be provided in three plans: Wildlife Monitoring and Mitigation Plan, Habitat Mitigation Plan, and Revegetation Plan. These are scheduled to be prepared during the permit application period.

Operations phase monitoring and mitigation components:

- Raptor nest surveys and monitoring, short term and long-term schedule
- Washington ground squirrel surveys
- Wildlife fatality monitoring, including fatality searches, removal trials, searcher efficiency trials, and statistical analysis
- A wildlife reporting and handling system
- Habitat mitigation that results in no net loss of Category 3 and 4 habitats and a net benefit for category 2 habitats
- Habitat enhancement in a habitat conservation easement area may include modification of livestock grazing practices, shrub/tree/grass plantings, weed control, fire control, and erection of an artificial raptor nest platform
- Monitoring of the effectiveness of habitat protection and enhancement measures
- Revegetation of and weed control in habitats temporarily disturbed during construction, with associated monitoring (excludes previously disturbed lands such as cropland)

First Wind will determine the location and boundaries of the mitigation area in consultation with ODFW and the affected landowners and subject to the approval of the Department of Energy. The final mitigation area will contain suitable habitat to achieve the ODFW goals of no net loss of habitat in Categories 2, 3 and 4 and a net benefit in habitat quantity or quality for impacts to Category 2 habitat through appropriate enhancement actions. Before beginning construction of the facility, First Wind will acquire the legal right to create, maintain, and protect the habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and will provide a copy of the documentation to the Department of Energy. Sites have been explored and suitability has been determined. Descriptions and detailed draft and final plans will be provided. A habitat mitigation site tour will be arranged with the ODFW.

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8.0 TABLES

Table 1. General land cover and wildlife habitat types within surveyed areas* of the Baseline Wind Project boundary.

General Land Cover Type and Codes	Specific Habitat Type ("subtype") and Mapping Codes	Specific Habitat Type Description**	Acres in Site Boundary
Developed (D)	**Irrigated Agriculture (DI)**	Agricultural crop or livestock pasture fields that are irrigated for all or a portion of the growing season. Irrigated status was determined by presence of farm crop and onsite irrigation implements such as pipes, sprinklers, pumps, and motors.	502.1
	Revegetated or Other Planted Grassland (DR)	Planted grassland on previously farmed or other disturbed lands that may be enrolled in the Conservation Reserve Program. Residual (not previously plowed) native vegetation patches in a few locations. Old grass stands contain rabbitbrush or other shrubs but are not dominant (see SSB below). May support white-tailed jackrabbits (WTJ). Common species include western meadowlark (WEME) and grasshopper sparrow (GRSP) where grassland is mature. This is an *Oregon Conservation Strategy Habitat*.	1,386.8
	Dryland Wheat or Other Small Grain (DW)	Agricultural fields currently in small grain production or fallow. Common species include horned lark (HOLA) and mourning dove (MODO) in winter stubble or when fallow.	22,522.6
	Other (DX)	Developed or disturbed areas including farming/ranching home and shop sites, corrals, structures, feedlots, inactive and active gravel quarries, pastures, roads, right-of-ways and waste areas associated with on-going human activities. Not considered of significant value to native wildlife species.	210.9
Grassland (G) Steppe dominated by native and/or non-native grasses (<20% shrub cover)	**Exotic Annual Grassland (GA)**	Dominated by exotic annual grass and/or weeds. Open, low shrubs such as snakeweed are present in larger blocks. Some GA sites supports long-billed curlew (LBCU), Washington ground squirrel (WGS). Common bird species include HOLA. This is an *Oregon Conservation Strategy Habitat*.	3,276.8
	Native Perennial Grassland (GB)	Dominated by native perennial bunchgrass. Shrubs, if present, are an inconspicuous component. May support WGS, WTJ, burrowing owl, depending on soil type and depth. Important nesting habitat for ground-nesting birds such as GRSP, savannah sparrow (SVSP), and vesper sparrow. Common bird species include WEME and HOLA. This is an *Oregon Conservation Strategy Habitat*.	1,362.7

General Land Cover Type and Codes	Specific Habitat Type ("subtype") and Mapping Codes	Specific Habitat Type Description**	Acres in Site Boundary
Exposed Rock (ER)	**Escarpment (ESC)**	Linear Columbia River Basalt outcroppings approximately 3 to 15 meters (10–50 feet) in height, found on steeper slopes which bound canyon edges and shoulders. Plant diversity and cover is very low on escarpments. Provides critical nesting substrate and perching sites for raptors and crevices for bats. May support WGS burrowing or foraging at the base of Escarpments where adjacent to typical WGS habitat. Provides shade and thermal cover for deer in summer and also serve as windbreaks. May provide home sites for small mammals such as woodrats and marmots and for snakes, which in turn constitute prey for raptors.	1.5
Woodland (W) With >10% tree cover	**Juniper Woodland (WJ)**	Open canopy woodland consisting of western juniper trees in more concentrated distribution (vs. scattered individual trees in other habitat types). Often with significant sagebrush or grass understory component. Potential habitat for nesting ferruginous hawk and Swainson's hawk; foraging and nesting loggerhead shrike; foraging and breeding short-horned and sagebrush lizards. May support WGS burrowing or foraging. Migrating and wintering habitat for American robin, Townsend's solitaire, and mountain bluebird. Mourning dove nesting habitat.	14.6
Shrub-steppe (SS) Steppe dominated by shrubs (>20% shrub cover)	**Basin Big Sagebrush Shrub-steppe (SSA)**	Dominated by >20% cover of basin big sagebrush. Offers high quality breeding habitat for shrub obligate species including loggerhead shrike (LOSH). May also support WGS and WTJ. Common species include WEME and MODO. Sage sparrow, Brewer's sparrow, and lark sparrow are present in larger blocks. In the more-sandy soils, sagebrush lizard and other reptiles are likely to be found. A few sites have been impacted in varying degrees by recent fires. Sagebrush Shrub-steppe is an *Oregon Conservation Strategy Habitat*.	864.3
	Rabbitbrush/Snakeweed Shrub-steppe (SSB)	Dominated by >20% cover of green and gray rabbitbrush and broom snakeweed. Most of these areas are formerly SSA that have experienced recent fire. Some sites contain mature big sagebrush cover in patches approx. 2 acres and less in size. Can support LBCU, WTJ, and WGS. Common species include HOLA and WEME. Lark sparrow occasional found nesting.	2,490.4
		Total Acres	**32,633.0**

* a portion (3,718.2 acres) of the area within the current Project boundary remains unmapped, and is not included in this table or in Table 2.

** refer to Section 3.2 of this report for more detailed descriptions and wildlife use

Table 2. Habitat types and categories within surveyed areas of the Baseline Wind Project boundary with maximum possible area of impact—worst-case layout.

Category and Habitat Description	Habitat Subtype Code	Impacts (Worst Case)		
		Total Acres Within Baseline Boundary	Temporary Baseline[1] Components (acres disturbed)	Permanent Baseline[2] Components (acres disturbed)
Category 1				
Developed – Revegetated/Other Planted Grassland	DR	30.4	0.1	0.0
Grassland – Exotic Annual	GA	517.2	5.5	1.1
Grassland – Native Perennial	GB	52.4	0.0	0.0
Shrub-steppe – Basin Big Sagebrush	SSA	56.5	0.0	0.0
Shrub-steppe – Rabbitbrush/Snakeweed	SSB	468.6	5.8	1.1
Total		**1125.2**	**11.3**	**2.3**
Category 2				
Developed – Revegetated/Other Planted Grassland	DR	201.1	10.9	0.7
Escarpment	ESC	1.5	0.1	0.0
Grassland – Exotic Annual	GA	482.9	42.1	5.8
Grassland – Native Perennial	GB	78.5	0.0	0.0
Woodland – Juniper	WJ	14.6	0.0	0.0
Shrub-steppe – Basin Big Sagebrush	SSA	433.4	2.8	0.2
Shrub-steppe – Rabbitbrush/Snakeweed	SSB	350.0	40.7	3.5
Total		**1,562.2**	**96.5**	**10.2**
Category 3				
Developed – Revegetated/Other Planted Grassland	DR	1,041.6	29.1	3.0
Grassland – Exotic Annual	GA	1,214.9	78.9	8.7
Grassland – Native Perennial	GB	1,188.9	7.3	0.6
Shrub-steppe – Basin Big Sagebrush	SSA	374.4	4.8	0.0
Shrub-steppe – Rabbitbrush/Snakeweed	SSB	1,664.3	45.6	3.0
Total		**5,484.0**	**165.7**	**15.4**
Category 4				
Developed – Revegetated/Other Planted Grassland	DR	113.7	1.4	0.1
Grassland – Exotic Annual	GA	1,061.8	36.8	6.1
Grassland – Native Perennial	GB	42.9	1.7	0.1
Shrub-steppe – Rabbitbrush/Snakeweed	SSB	7.5	0.0	0.0
Total		**1,225.9**	**39.9**	**6.3**
Category 5				
none				
Subtotal for Cat. 1, 2, 3, 4		**9,397.3**	**313.4**	**34.2**
Category 6				
Developed – Irrigated Agriculture	DI	502.1	10.3	0.9
Developed – Dryland Wheat	DW	22,522.6	1,319.0	123.3
Developed – Other	DX	210.9	18.6	0.3
Total		**23,235.7**	**1,347.9**	**124.5**
Total for all Categories		**32,633.0**	**1,661.3**	**158.7**

[1] Temporary facilities include access roads, construction areas, access for overhead line construction, installation sites for underground collector cables, and equipment laydown areas for individual turbines, entire strings of turbines, and laydown areas for in-transit towers, cranes, and miscellaneous construction equipment.

[2] Permanent facilities include turbine pads and towers, substation, meteorological towers, Operations and Maintenance facility or facilities, and permanent access roads.

Table 3. Avian species observed within 800-meter study plots in the Baseline Wind avian use study during four seasons, 2009–2010.

Species	Winter[1]		Spring[2]		Summer[3]		Fall[4]	
	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind
Waterfowl		**7**		**0**		**0**		**0**
Canada goose	6	7	0	0	0	0	0	0
Raptors		**63**		**58**		**26**		**27**
Harriers		*12*		*13*		*6*		*3*
northern harrier	12	12	12	13	5	6	3	3
Buteos		*37*		*42*		*16*		*8*
ferruginous hawk	0	0	3	3	1	1	0	0
red-tailed hawk	6	6	3	3	8	8	4	4
rough-legged hawk	30	31	22	22	0	0	0	0
Swainson's hawk	0	0	14	14	7	7	4	4
Eagles		*1*		*0*		*0*		*0*
golden eagle	1	1	0	0	0	0	0	0
Falcons		*12*		*3*		*3*		*14*
American kestrel	6	6	3	3	3	3	9	13
prairie falcon	6	6	0	0	0	0	1	1
Other Raptors		*1*		*0*		*1*		*2*
unidentified hawk	1	1	0	0	1	1	2	2
Gamebirds		**12**		**18**		**18**		**0**
chukar	4	9	3	6	3	4	0	0
ring-necked pheasant	3	3	11	12	9	14	0	0
Goatsucker		**0**		**0**		**7**		**0**
common nighthawk	0	0	0	0	4	7	0	0
Shorebirds		**1**		**43**		**9**		**0**
killdeer	1	1	0	0	2	2	0	0
long-billed curlew	0	0	23	43	5	7	0	0
Doves		**4**		**5**		**17**		**23**
mourning dove	1	2	1	2	10	17	3	4
rock pigeon	1	2	3	3	0	0	4	19
Passerines		**3098**		**580**		**569**		**712**
Songbirds		*2741*		*514*		*493*		*607*
American pipit	0	0	0	0	1	1	1	15
American robin	3	25	0	0	0	0	0	0
barn swallow	0	0	1	1	23	36	2	5
Brewer's blackbird	1	15	1	5	9	51	0	0
Bullock's oriole	0	0	1	1	1	1	0	0
cliff swallow	0	0	0	0	1	4	0	0
dark-eyed junco	0	0	1	1	0	0	0	0
European starling	2	28	3	6	2	3	0	0
horned lark	363	2495	160	280	102	253	107	384
lark sparrow	0	0	0	0	1	2	0	0
loggerhead shrike	0	0	1	1	0	0	0	0
northern shrike	1	1	0	0	0	0	0	0
red-winged blackbird	1	1	3	14	2	8	0	0

Species	Winter[1]		Spring[2]		Summer[3]		Fall[4]	
	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind
savannah sparrow	0	0	7	10	2	2	8	30
Say's phoebe	0	0	1	1	2	2	0	0
spotted towhee	0	0	1	1	0	0	0	0
unidentified blackbird	0	0	1	6	3	11	1	12
unidentified passerine	14	142	3	10	7	17	12	47
unidentified sparrow	0	0	2	3	2	2	2	12
unidentified swallow	0	0	0	0	1	2	0	0
violet-green swallow	0	0	0	0	2	5	0	0
western kingbird	0	0	10	11	7	7	0	0
western meadowlark	34	34	99	159	57	86	45	62
white-crowned sparrow	0	0	1	4	0	0	7	40
Corvids		*357*		*66*		*76*		*105*
common raven	187	357	40	66	51	76	60	105
Totals	**684**	**3257**	**434**	**704**	**334**	**646**	**275**	**762**

Survey dates:
[1] Winter: November 2, 2009 through March 10, 2010; 19 visits to 18 sites = 342 surveys
[2] Spring: March 16 through May 26, 2010; 11 visits to 18 sites = 198 surveys
[3] Summer: June 4 through August 14, 2010; 11 visits to 17 sites, 10 visits to L = 197 surveys
[4] Fall: August 20 through October 26, 2010; 11 visits to 18 sites = 198 surveys

Table 4. Avian species and number of observations recorded on-site while in-transit to avian use surveys for Baseline Wind, 2009–2010.

Species*	Observed only in-transit	Winter	Spring	Summer	Fall	Total
American kestrel		0	3	2	12	**17**
burrowing owl	X	0	2	0	0	**2**
ferruginous hawk		0	1	2	0	**3**
loggerhead shrike		0	8	6	0	**14**
long-billed curlew		0	2	0	0	**2**
northern harrier		0	7	1	1	**9**
prairie falcon		5	2	0	1	**8**
red-tailed hawk		0	7	5	11	**23**
rough-legged hawk		4	8	0	0	**12**
short-eared owl	X	1	0	0	0	**1**
Swainson's hawk		0	11	23	4	**38**
unidentified shrike		0	0	0	6	**6**
Total		**10**	**51**	**39**	**35**	**135**

*Species in bold have special status. See Appendix D for statuses.

Table 5. Mean use, percent composition, and percent frequency of occurrence for avian groups observed during avian use surveys at Baseline Wind during four seasons, 2009–2010.

Species	**Winter** (342 surveys)			**Spring** (198 surveys)			**Summer** (197 surveys)			**Fall** (198 surveys)		
	Mean Use[1]	**% Comp**[2]	**% Freq**[3]	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Waterfowl	**0.231**	**2.43**	**1.46**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
Canada goose	0.231	2.43	1.46	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
Raptors	**0.184**	**1.93**	**16.08**	**0.293**	**8.24**	**26.26**	**0.132**	**4.02**	**12.69**	**0.136**	**3.54**	**11.62**
Harriers	*0.035*	*0.37*	*3.22*	*0.066*	*1.85*	*6.06*	*0.030*	*0.93*	*2.54*	*0.015*	*0.39*	*1.52*
northern harrier	0.035	0.37	3.22	0.066	1.85	6.06	0.030	0.93	2.54	0.015	0.39	1.52
Buteos	*0.108*	*1.14*	*9.65*	*0.212*	*5.97*	*19.70*	*0.081*	*2.48*	*8.12*	*0.040*	*1.05*	*4.04*
ferruginous hawk	0.000	0.00	0.00	0.015	0.43	1.52	0.005	0.15	0.51	0.000	0.00	0.00
red-tailed hawk	0.018	0.18	1.75	0.015	0.43	1.52	0.041	1.24	4.06	0.020	0.52	2.02
rough-legged hawk	0.091	0.95	8.19	0.111	3.13	9.60	0.000	0.00	0.00	0.000	0.00	0.00
Swainson's hawk	0.000	0.00	0.00	0.071	1.99	7.07	0.036	1.08	3.55	0.020	0.52	2.02
Eagles	*0.003*	*0.03*	*0.29*	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*	*0.000*	*0.00*	*0.00*
golden eagle	0.003	0.03	0.29	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
Falcons	*0.035*	*0.37*	*3.51*	*0.015*	*0.43*	*1.52*	*0.015*	*0.46*	*1.52*	*0.071*	*1.84*	*5.05*
American kestrel	0.018	0.18	1.75	0.015	0.43	1.52	0.015	0.46	1.52	0.066	1.71	4.55
prairie falcon	0.018	0.18	1.75	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.13	0.51
Other Raptors	*0.003*	*0.03*	*0.29*	*0.000*	*0.00*	*0.00*	*0.005*	*0.15*	*0.51*	*0.010*	*0.26*	*1.01*
unidentified hawk	0.003	0.03	0.29	0.000	0.00	0.00	0.005	0.15	0.51	0.010	0.26	1.01
Gamebirds	**0.035**	**0.37**	**2.05**	**0.091**	**2.56**	**7.07**	**0.091**	**2.79**	**5.58**	**0.000**	**0.00**	**0.00**
chukar	0.026	0.28	1.17	0.030	0.85	1.52	0.020	0.62	1.52	0.000	0.00	0.00
ring-necked pheasant	0.009	0.09	0.88	0.061	1.70	5.56	0.071	2.17	4.57	0.000	0.00	0.00
Goatsucker	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.036**	**1.08**	**2.03**	**0.000**	**0.00**	**0.00**
common nighthawk	0.000	0.00	0.00	0.000	0.00	0.00	0.036	1.08	2.03	0.000	0.00	0.00
Shorebirds	**0.003**	**0.03**	**0.29**	**0.217**	**6.11**	**11.62**	**0.046**	**1.39**	**3.55**	**0.000**	**0.00**	**0.00**
killdeer	0.003	0.03	0.29	0.000	0.00	0.00	0.010	0.31	1.02	0.000	0.00	0.00
long-billed curlew	0.000	0.00	0.00	0.217	6.11	11.62	0.036	1.08	2.54	0.000	0.00	0.00
Doves	**0.012**	**0.12**	**0.58**	**0.025**	**0.71**	**2.02**	**0.086**	**2.63**	**5.08**	**0.116**	**3.02**	**3.54**
mourning dove	0.006	0.06	0.29	0.010	0.28	0.51	0.086	2.63	5.08	0.020	0.52	1.52
rock pigeon	0.006	0.06	0.29	0.015	0.43	1.52	0.000	0.00	0.00	0.096	2.49	2.02
Passerines	**9.058**	**95.12**	**81.87**	**2.929**	**82.39**	**91.92**	**2.888**	**88.08**	**85.28**	**3.596**	**93.44**	**84.34**
Songbirds	*8.015*	*84.16*	*69.88*	*2.596*	*73.01*	*90.91*	*2.503*	*76.32*	*80.71*	*3.066*	*79.66*	*76.77*
American pipit	0.000	0.00	0.00	0.000	0.00	0.00	0.005	0.15	0.51	0.076	1.97	0.51

Species	**Winter** (342 surveys)			**Spring** (198 surveys)			**Summer** (197 surveys)			**Fall** (198 surveys)		
	Mean Use[1]	**% Comp**[2]	**% Freq**[3]	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
American robin	0.073	0.77	0.88	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
barn swallow	0.000	0.00	0.00	0.005	0.14	0.51	0.083	5.57	11.68	0.025	0.66	1.01
Brewer's blackbird	0.044	0.46	0.29	0.025	0.71	0.51	0.259	7.89	4.57	0.000	0.00	0.00
Bullock's oriole	0.000	0.00	0.00	0.005	0.14	0.51	0.005	0.15	0.51	0.000	0.00	0.00
cliff swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.020	0.62	0.51	0.000	0.00	0.00
dark-eyed junco	0.000	0.00	0.00	0.005	0.14	0.51	0.000	0.00	0.00	0.000	0.00	0.00
European starling	0.082	0.86	0.58	0.030	0.85	1.52	0.015	0.46	1.02	0.000	0.00	0.00
horned lark	7.295	76.60	69.01	1.414	39.77	70.71	1.284	39.16	51.78	1.939	50.39	54.04
lark sparrow	0.000	0.00	0.00	0.000	0.00	0.00	0.010	0.31	0.51	0.000	0.00	0.00
loggerhead shrike	0.000	0.00	0.00	0.005	0.14	0.51	0.000	0.00	0.00	0.000	0.00	0.00
northern shrike	0.003	0.03	0.29	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
red-winged blackbird	0.003	0.03	0.29	0.071	1.99	1.52	0.041	1.24	1.02	0.000	0.00	0.00
savannah sparrow	0.000	0.00	0.00	0.051	1.42	3.54	0.010	0.31	0.51	0.152	3.94	4.04
Say's phoebe	0.000	0.00	0.00	0.005	0.14	0.51	0.010	0.31	1.02	0.000	0.00	0.00
spotted towhee	0.000	0.00	0.00	0.005	0.14	0.51	0.000	0.00	0.00	0.000	0.00	0.00
unidentified blackbird	0.000	0.00	0.00	0.030	0.85	0.51	0.056	1.70	1.52	0.061	1.57	0.51
unidentified passerine	0.415	4.36	4.09	0.051	1.42	1.52	0.086	2.63	3.55	0.237	6.17	6.06
unidentified sparrow	0.000	0.00	0.00	0.015	0.43	1.01	0.010	0.31	1.02	0.061	1.57	1.01
unidentified swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.010	0.31	0.51	0.000	0.00	0.00
violet-green swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.025	0.77	1.02	0.000	0.00	0.00
western kingbird	0.000	0.00	0.00	0.056	1.56	5.05	0.036	1.08	3.55	0.000	0.00	0.00
western meadowlark	0.099	1.04	9.36	0.803	22.59	49.49	0.437	13.31	28.93	0.313	8.14	22.73
white-crowned sparrow	0.000	0.00	0.00	0.020	0.57	0.51	0.000	0.00	0.00	0.202	5.25	3.54
Corvids	*1.044*	*10.96*	*41.23*	*0.333*	*9.38*	*20.20*	*0.386*	*11.76*	*25.89*	*0.530*	*13.78*	*30.30*
common raven	1.044	10.96	41.23	0.333	9.38	20.20	0.386	11.76	25.89	0.530	13.78	30.30
Totals	**9.523**		**86.26**	**3.556**		**95.96**	**3.279**		**91.37**	**3.848**		**86.36**

[1] Mean Use: mean number of individuals within 800m plot/20-minute point count for each species or group provides an index of the magnitude of avian use, but it does not describe density.
[2] Percent Composition: mean use for a species/total use across all species, multiplied by 100, providing an estimate of the relative use of any particular species, compared to the use by all other species combined.
[3] Frequency of Occurrence: percentage of surveys in which a species was observed with the survey plot providing an index of how often a species occurs in the project area.

Table 6. Mean use of avian species observed within 800m by plot at Baseline Wind during four seasons, 2009–2010.

Groups	Plots																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Waterfowl	**0.442**	**0.481**	**0.000**	**0.269**	**0.192**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.135**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Winter	1.211	1.316	0.000	0.737	0.526	0.000	0.000	0.000	0.000	0.000	0.368	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Spring	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Summer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fall	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Raptors	**0.058**	**0.096**	**0.115**	**0.135**	**0.173**	**0.423**	**0.423**	**0.308**	**0.077**	**0.385**	**0.096**	**0.216**	**0.019**	**0.173**	**0.135**	**0.077**	**0.154**	**0.288**
Winter	0.105	0.211	0.053	0.053	0.211	0.316	0.474	0.368	0.211	0.316	0.158	0.105	0.053	0.211	0.000	0.105	0.158	0.211
Spring	0.091	0.091	0.091	0.455	0.182	0.545	0.636	0.545	0.000	0.636	0.182	0.182	0.000	0.091	0.273	0.182	0.273	0.818
Summer	0.000	0.000	0.182	0.091	0.091	0.545	0.273	0.182	0.000	0.364	0.000	0.100	0.000	0.000	0.273	0.000	0.091	0.182
Fall	0.000	0.000	0.182	0.000	0.182	0.364	0.273	0.091	0.000	0.273	0.000	0.545	0.000	0.364	0.091	0.000	0.091	0.000
Harriers	*0.038*	*0.038*	*0.019*	*0.038*	*0.038*	*0.231*	*0.038*	*0.077*	*0.000*	*0.019*	*0.000*	*0.000*	*0.019*	*0.000*	*0.000*	*0.019*	*0.000*	*0.077*
Winter	0.053	0.053	0.000	0.053	0.053	0.000	0.053	0.053	0.000	0.053	0.000	0.000	0.053	0.000	0.000	0.053	0.000	0.158
Spring	0.091	0.091	0.091	0.091	0.000	0.455	0.091	0.182	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091
Summer	0.000	0.000	0.000	0.000	0.091	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fall	0.000	0.000	0.000	0.000	0.000	0.182	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Buteos	*0.019*	*0.038*	*0.038*	*0.096*	*0.096*	*0.135*	*0.346*	*0.231*	*0.038*	*0.327*	*0.077*	*0.059*	*0.000*	*0.077*	*0.038*	*0.058*	*0.096*	*0.212*
Winter	0.053	0.105	0.053	0.000	0.158	0.211	0.368	0.316	0.105	0.158	0.105	0.000	0.000	0.105	0.000	0.053	0.105	0.053
Spring	0.000	0.000	0.000	0.364	0.182	0.091	0.545	0.364	0.000	0.636	0.182	0.182	0.000	0.091	0.091	0.182	0.182	0.727
Summer	0.000	0.000	0.091	0.091	0.000	0.091	0.273	0.182	0.000	0.364	0.000	0.100	0.000	0.000	0.000	0.000	0.091	0.182
Fall	0.000	0.000	0.000	0.000	0.000	0.091	0.182	0.000	0.000	0.273	0.000	0.000	0.000	0.091	0.091	0.000	0.000	0.000
Falcons	*0.000*	*0.019*	*0.019*	*0.000*	*0.038*	*0.038*	*0.038*	*0.000*	*0.038*	*0.019*	*0.019*	*0.157*	*0.000*	*0.096*	*0.096*	*0.000*	*0.038*	*0.000*
Winter	0.000	0.053	0.000	0.000	0.000	0.105	0.053	0.000	0.105	0.053	0.053	0.105	0.000	0.105	0.000	0.000	0.000	0.000
Spring	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.000	0.091	0.000
Summer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0.000	0.000	0.273	0.000	0.000	0.000
Fall	0.000	0.000	0.091	0.000	0.182	0.000	0.091	0.000	0.000	0.000	0.000	0.545	0.000	0.273	0.000	0.000	0.091	0.000
Eagles	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.019*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Winter	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Spring	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Summer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fall	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Groups	Plots																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Other Raptors	*0.000*	*0.000*	*0.038*	*0.000*	*0.000*	*0.019*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.019*	*0.000*
Winter	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.000
Spring	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Summer	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fall	0.000	0.000	0.091	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gamebirds	**0.000**	**0.000**	**0.154**	**0.288**	**0.154**	**0.019**	**0.000**	**0.096**	**0.000**	**0.096**	**0.019**	**0.000**	**0.019**	**0.000**	**0.077**	**0.000**	**0.000**	**0.000**
Winter	0.000	0.000	0.000	0.211	0.053	0.053	0.000	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.211	0.000	0.000	0.000
Spring	0.000	0.000	0.364	0.455	0.364	0.000	0.000	0.273	0.000	0.000	0.091	0.000	0.091	0.000	0.000	0.000	0.000	0.000
Summer	0.000	0.000	0.364	0.545	0.273	0.000	0.000	0.000	0.000	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fall	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Goatsuckers	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.038**	**0.058**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.038**	**0.000**
Winter	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Spring	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Summer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.273	0.000	0.000	0.000	0.000	0.000	0.182	0.000
Fall	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Shorebirds	**0.346**	**0.173**	**0.038**	**0.000**	**0.077**	**0.019**	**0.000**	**0.000**	**0.019**	**0.019**	**0.000**	**0.000**	**0.154**	**0.000**	**0.019**	**0.096**	**0.058**	**0.000**
Winter	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Spring	1.636	0.636	0.182	0.000	0.364	0.000	0.000	0.000	0.000	0.091	0.000	0.000	0.727	0.000	0.000	0.273	0.000	0.000
Summer	0.000	0.182	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091	0.182	0.273	0.000
Fall	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Doves	**0.000**	**0.000**	**0.115**	**0.000**	**0.077**	**0.192**	**0.000**	**0.000**	**0.038**	**0.000**	**0.038**	**0.059**	**0.000**	**0.019**	**0.135**	**0.000**	**0.269**	**0.000**
Winter	0.000	0.000	0.000	0.000	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.105	0.000
Spring	0.000	0.000	0.000	0.000	0.000	0.182	0.000	0.000	0.000	0.000	0.000	0.273	0.000	0.000	0.000	0.000	0.000	0.000
Summer	0.000	0.000	0.000	0.000	0.182	0.364	0.000	0.000	0.182	0.000	0.182	0.000	0.000	0.091	0.455	0.000	0.091	0.000
Fall	0.000	0.000	0.545	0.000	0.000	0.364	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.000	1.000	0.000
Passerines	**5.942**	**9.058**	**2.154**	**6.692**	**2.827**	**9.442**	**4.519**	**7.846**	**2.615**	**4.673**	**4.115**	**5.020**	**5.308**	**3.673**	**3.962**	**8.096**	**4.096**	**5.423**
Winter	10.158	19.158	2.579	9.632	4.895	13.947	7.158	17.842	4.368	6.526	6.053	8.895	7.474	7.105	5.421	16.632	5.737	9.474
Spring	2.909	2.909	2.182	4.909	2.455	4.636	1.818	2.000	2.091	4.727	2.727	2.273	2.545	2.091	3.727	2.818	2.909	3.000
Summer	3.364	2.182	0.545	4.455	1.364	7.909	3.000	1.727	1.273	3.091	2.818	2.800	3.364	1.364	3.091	2.636	3.909	3.091
Fall	4.273	4.636	3.000	5.636	1.091	8.000	4.182	2.545	1.455	3.000	3.455	3.091	6.273	1.636	2.545	4.091	2.636	3.182

Groups	Plots																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Songbirds	*4.962*	*8.346*	*1.827*	*5.481*	*2.538*	*8.346*	*3.788*	*7.154*	*2.212*	*3.750*	*3.769*	*4.725*	*4.596*	*3.346*	*3.365*	*7.308*	*3.481*	*4.846*
Winter	8.263	17.368	2.526	8.105	4.421	12.579	5.789	16.421	3.316	5.053	5.211	8.526	6.579	6.526	4.789	15.526	4.632	8.632
Spring	2.909	2.727	1.909	3.545	2.182	3.909	1.818	1.818	2.000	4.182	2.636	2.182	2.182	2.091	3.364	2.182	2.545	2.545
Summer	2.909	2.182	0.091	3.364	1.273	7.182	2.273	1.636	1.273	2.727	2.727	2.700	2.545	1.091	2.364	2.364	3.545	2.818
Fall	3.364	4.545	2.273	5.000	0.909	6.636	3.818	2.000	1.455	2.091	3.455	2.545	5.636	1.364	1.909	3.182	2.364	2.636
Corvids	*0.981*	*0.712*	*0.327*	*1.212*	*0.288*	*1.096*	*0.731*	*0.692*	*0.404*	*0.923*	*0.346*	*0.294*	*0.712*	*0.327*	*0.596*	*0.788*	*0.615*	*0.577*
Winter	1.895	1.789	0.053	1.526	0.474	1.368	1.368	1.421	1.053	1.474	0.842	0.368	0.895	0.579	0.632	1.105	1.105	0.842
Spring	0.000	0.182	0.273	1.364	0.273	0.727	0.000	0.182	0.091	0.545	0.091	0.091	0.364	0.000	0.364	0.636	0.364	0.455
Summer	0.455	0.000	0.455	1.091	0.091	0.727	0.727	0.091	0.000	0.364	0.091	0.100	0.818	0.273	0.727	0.273	0.364	0.273
Fall	0.909	0.091	0.727	0.636	0.182	1.364	0.364	0.545	0.000	0.909	0.000	0.545	0.636	0.273	0.636	0.909	0.273	0.545

Survey dates:
Winter: November 2, 2009 through March 10, 2010; 19 visits to 18 sites = 342 surveys
Spring: March 16 through May 26, 2010; 11 visits to 18 sites = 198 surveys
Summer: June 4 through August 14, 2010; 11 visits to 17 sites, 10 visits to L = 197 surveys
Fall: August 20 through October 26, 2010; 11 visits to 18 sites = 198 surveys

Table 7. Estimated raptor nest densities at Baseline Wind and other regional and proposed and existing wind projects located primarily in comparable Columbia Plateau environments*.

Project Site**	Raptor Nest Density (# / mi^2), rounded							
	All Raptor Species Combined	Buteos				Eagle	Falcon	Owl
		SWHA	RTHA	FEHA	UNBU	GOEA	PRFA	GHOW
Baseline Wind, OR	0.35	0.14	0.11	0.04	0.01	0.01	0.01	0.03
Willow Creek Winds, OR	0.80	0.44	0.07	0.25	0.00	0.00	0.00	0.04
Rattlesnake Road, OR	0.45	0.19	0.13	0.05	0.00	0.00	0.08	0.00
Hopkins Ridge, WA	0.42	0.01	0.27	0.01	0.05	0.00	0.00	0.08
Leaning Juniper I, OR	0.41	0.18	0.16	0.03	0.00	0.00	0.02	0.02
Leaning Juniper IIB, OR	0.40	0.19	0.13	0.06	0.00	0.00	0.02	0.00
Wheat Field, OR	0.26	0.06	0.12	0.03	0.00	0.00	0.06	0.00
Golden Hills, OR	0.25	0.04	0.16	0.00	0.00	0.00	0.00	0.05
Pebble Springs, OR (2009 Project area only***)	0.24	0.18	0.06	0.00	0.00	0.00	0.00	0.00
Klondike I and II, OR (5 mile radius survey area)	0.23	0.07	0.11	0.00	0.00	0.01	0.00	0.04
Stateline OR/WA	0.21	0.03	0.08	0.03	0.00	0.00	0.00	0.07
Klondike III, OR	0.20	0.04	0.11	0.00	0.01	0.00	0.00	0.03
Wild Horse, WA	0.16	0.00	0.12	0.00	0.00	0.00	0.02	0.02
Klickitat County, WA	0.12	0.00	0.09	0.00	0.00	0.00	0.01	0.03
Big Horn, WA	0.11	0.00	0.06	0.00	0.00	0.00	0.01	0.04
AVERAGE (not including Baseline Wind)	0.30							

Note: American kestrel, short-eared owl, and burrowing owl are omitted due to difficulty in locating and confirming nesting of these species with the raptor nest survey method (helicopter survey) employed in this and other studies

Codes: SWHA = Swainson's hawk
RTHA = red-tailed hawk
FEHA = ferruginous hawk
GOEA = golden eagle
PRFA = prairie falcon
GHOW = great horned owl
UNBU = unknown species of the genus *Buteo*

* Studies with similar study methods. Arid grassland and Shrub-steppe environments with extensive dryland wheat, non-native grassland (CRP), and narrow riparian corridors in some drainages.

** References for projects: Big Horn (Johnson and Erickson, 2004), Leaning Juniper I (Kronner et al., 2005a), Leaning Juniper II (NWC, 2009); Klondike I and II (Johnson et al., 2002), Klondike III (Mabee et al., 2005), Golden Hills (Jeffrey et al., 2008), Stateline (Erickson et al., 2004; NWC and WEST, 2001), Klickitat County (Johnson et al., 2003b), Hopkins Ridge (Young et al., 2003a), Wild Horse (Erickson et al., 2003b), Rattlesnake Road (Kronner et al., 2007a), Wheat Field (Kronner et al., 2008b); Pebble Springs (Gritski and Kronner, 2010a); Willow Creek Winds (Kronner et al., 2007b).

*** Post-construction study of operating project

Table 8. Number of bat passes by call frequency, species, and month recorded during acoustical monitoring at Baseline Wind, 2010.

Location	Month	Total Number of Passes		# of Passes for Identified Bats with High Frequency Calls						# of Passes for Identified Bats with Low Frequency Calls			
		# High Freq. Passes	# Low Freq. Passes	canyon bat	little brown bat	California myotis	w. small-footed myotis	yuma myotis	myotis species	big brown bat	hoary bat	pallid bat	silver-haired bat
A1	July	1	0	0	0	0	0	0	0	0	0	0	0
A1	August	17	5	3	1	0	0	0	2	0	0	0	0
A1	September	11	8	2	0	0	0	1	2	0	1	0	1
A2	September	24	3	1	0	0	3	0	4	0	0	0	1
A2	October	14	14	2	6	0	0	0	4	0	5	0	1
B1	July	0	0	0	0	0	0	0	0	0	0	0	0
B1	August	94	13	1	0	2	11	1	0	0	1	0	3
B1	September	136	12	7	1	0	26	1	0	1	3	1	2
B2	September	0	1	0	0	0	0	0	0	0	0	0	0
B2	October	0	1	0	0	0	0	0	0	0	0	0	0
C1	July	4	0	2	0	0	0	0	0	0	0	0	0
C1	August	37	10	27	0	0	1	0	7	0	1	2	1
C1	September	14	29	7	0	0	2	0	0	0	10	0	5
C2	September	0	0	0	0	0	0	0	0	0	0	0	0
C2	October	4	7	2	0	0	0	0	1	1	0	0	1
Totals		**356**	**103**	**54**	**8**	**2**	**43**	**3**	**20**	**2**	**21**	**3**	**15**

Total number of passes includes both identified species passes and unidentified passes.

Table 9. Project and turbine characteristics of regional wind energy facilities where fatality monitoring studies have been completed*.

Columbia Plateau Ecoregion Wind Project**	Project Size		Turbine Characteristics		
	# Turbines	MW	RD*** (meters)	Tip Height (max. meters)	MW
Big Horn, WA	133	199.5	77	118.5	1.5
Biglow Canyon I, OR	76	125.4	90	121	1.65
Biglow Canyon II, OR	65	150	93	126.5	2.3
Combine Hills I, OR	41	41	61	84	1.0
Goodnoe Hills, WA	47	94	92.5	135	2.0
Hay Canyon, OR	48	100.8	97	124	2.1
Hopkins Ridge I, WA	83	150	80	107	1.8
Klondike I, OR	16	24	65	100	1.5
Klondike II, OR	50	75	77	118.5	1.5
Klondike III, OR (Phase 1) (3 types of turbines)	80/44/1	120/101.2/2.4	77/93/100	118.5/126.5/127.5	1.5/2.3/2.4
Klondike IIIa, OR (Phase 2)	51	77	77	118.5	1.5
Leaning Juniper I, OR	67	100.5	77	118.5	1.5
Marengo I, WA	78	140.4	80	110	1.8
Marengo II, WA	39	70.2	80	110	1.8
Nine Canyon I, WA	37	48	62	91	1.3
Pebble Springs, OR	47	98.7	97	124	2.1
Rattlesnake Road, OR	49	102.9	88	123	2.1
Stateline I and II, OR/WA	454	300	47	74/89 (20 turbines)	0.66
Tuolumne, WA (2 turbine types)	42/20	136.6	93/92.5	126.5/135	2.3/2.0
Vansycle, OR	38	25	47	74	0.66
Wheat Field, OR	46	96.6	88	123	2.1
Wild Horse, WA	127	229	80	107	1.8

* Similar study methods. Condon Wind Project Carcass Study omitted due to differences in study methods. Nine Canyon II was studied partial year so was omitted.

** Projects are sorted alphabetically.

*** RD = rotor diameter

Table 10. Reported mean annual fatality estimates on a per MW* and per turbine basis for all birds and raptors in the Columbia Plateau Ecoregion where fatality monitoring studies have been completed.

Columbia Plateau Ecoregion Wind Project[1]	All Bird Fatality Rates		Raptor Fatality Rates[2]	
Listed in order of highest to lowest All Bird Fatality Rate per MW/Year	# / MW	# / Turbine	# / MW	# / Turbine
Biglow Canyon, OR (Phase II, Year 1)	7.7	12.7	0.20	0.33
Leaning Juniper I, OR[3]	6.7	10.0	0.21	0.32
Tuolumne, WA	3.2	7.1	0.29	0.63
Klondike III, OR (Phase 1)[3]	3.2	5.7	0.15	0.27
Klondike II, OR	3.1	4.7	0.11	0.17
Hopkins Ridge I, WA (Phase 1, Year 2)	3.0	5.4	0.07	0.12
Stateline I and II, OR/WA	2.9	1.9	0.09	0.06
Nine Canyon I, WA	2.8	3.6	0.05	0.07
Klondike IIIa, OR (Phase 2)[3]	2.8	4.2	0.06	0.09
Combine Hills, OR	2.6	2.6	0.00	0.00
Big Horn, WA[3]	2.5	3.8	0.15	0.23
Biglow Canyon, OR (Phase I, Year 2)	2.5	4.1	0.04	0.06
Hay Canyon, OR[3]	2.2	4.7	0.00	0.00
Rattlesnake Road, OR[3]	2.2	4.5	0.06	0.13
Pebble Springs, OR[3]	1.9	4.1	0.04	0.08
Biglow Canyon, OR (Phase I, Year 1)	1.8	2.9	0.03	0.06
Wild Horse, WA (Year 1)	1.6	2.8	0.09	0.17
Wheat Field, OR[3]	1.4	3.0	0.28	0.60
Goodnoe Hills, WA	1.4	2.8	0.17	0.34
Hopkins Ridge I, WA (Phase 1, Year 1)	1.2	2.2	0.14	0.25
Vansycle, OR	1.0	0.6	0.00	0.00
Klondike I, OR	0.9	1.4	0.00	0.00
Marengo I, WA (Year 1)	0.3	0.5	0.00	0.00
Marengo I, WA (Year 2)	0.2	0.4	0.03	0.05
Marengo II, WA (Year 1)	0.2	0.3	0.05	0.09
Marengo II, WA (Year 2)	0.2	0.3	0.00	0.00
Mean	**2.29**	**3.70**	**0.09**	**0.16**

* MW – turbine nameplate MW

[1] References for wind project studies: Big Horn (Kronner et al., 2008a), Biglow Canyon Phase I (Jeffrey et al., 2009a; Enk et al., 2010), Biglow Canyon Phase II (Enk et al., 2011), Combine Hills (Young et al., 2006), Goodnoe Hills (URS, 2010); Hay Canyon (Gritski and Kronner, 2010b); Hopkins Ridge I (Young et al., 2007, 2009), Klondike I (Johnson et al., 2003a), Klondike II (NWC and West, 2007), Klondike IIIa (Gritski et al., 2010b); Klondike III (Gritski et al., 2010a), Leaning Juniper I (Gritski et al., 2008), Marengo I and II (URS, 2011a and b), Nine Canyon (Erickson et al., 2003a), Pebble Springs (Gritski and Kronner, 2010a), Rattlesnake Road (Gritski et al., 2011), Stateline I and II-partial (Erickson et al., 2004), Tuolumne (Enz and Bay, 2010), Vansycle (Erickson et al., 2000), Wheat Field (Gritski and Downes, 2011), Wild Horse (Erickson et al., 2008).

[2] Raptor estimates include diurnal raptors and owls.

[3] Huso estimator was used to determine estimated fatality rates for these 8 projects: Leaning Juniper I, Big Horn, Hay Canyon, Rattlesnake Road, Pebble Springs, Wheat Field, and Klondike III, and Klondike IIIa wind projects.

Table 11. Species composition and numbers of bird fatalities found at Columbia Plateau Ecoregion wind projects where fatality monitoring studies* have been completed or are in progress (data obtained from public files).

Species (in descending order of % Composition)	**% Composition** (Only Standardized Searches)	**Number of Fatalities Found on Standardized Searches**	**Number of Fatalities Found as Incidentals**
horned lark	31.0	382	47
golden-crowned kinglet	5.6	69	2
ring-necked pheasant (n)	5.1	63	15
gray partridge (n)	4.6	57	3
western meadowlark	3.0	37	2
chukar (n)	2.7	33	4
European starling (n)	2.7	33	4
unidentified bird	2.7	33	2
American kestrel	2.6	32	12
dark-eyed junco	2.4	30	5
mourning dove	2.1	26	1
Townsend's warbler	2.1	26	0
unidentified passerine	2.0	25	4
white-crowned sparrow	1.9	24	3
red-tailed hawk	1.9	23	11
yellow-rumped warbler	1.6	20	2
ruby-crowned kinglet	1.5	18	2
rock pigeon (n)	1.4	17	1
Pacific wren	1.1	14	1
northern flicker	1.1	13	1
savannah sparrow	0.9	11	0
American robin	0.8	10	1
short-eared owl	0.8	10	1
unidentified kinglet	0.8	10	0
red-breasted nuthatch	0.6	8	0
unidentified sparrow	0.6	7	1
warbling vireo	0.6	7	0
black-billed magpie	0.5	6	0
common nighthawk	0.5	6	6
great horned owl	0.5	6	1
house wren	0.5	6	1
Swainson's hawk	0.5	6	7
Brewer's sparrow	0.4	5	4
Canada goose	0.4	5	2
golden-crowned sparrow	0.4	5	0
house sparrow (n)	0.4	5	1
barn owl	0.3	4	1
Cassin's vireo	0.3	4	0
chipping sparrow	0.3	4	0
common raven	0.3	4	1
western tanager	0.3	4	0
American coot	0.2	3	0
great blue heron	0.2	3	0
house finch	0.2	3	1
Lincoln's sparrow	0.2	3	0
mallard	0.2	3	0
mountain bluebird	0.2	3	1
northern harrier	0.2	3	1
orange-crowned warbler	0.2	3	0
rough-legged hawk	0.2	3	3
song sparrow	0.2	3	1
spotted towhee	0.2	3	2
unidentified *Buteo*	0.2	3	0
unidentified duck	0.2	3	0
unidentified vireo	0.2	3	0

Species (in descending order of % Composition)	**% Composition** (Only Standardized Searches)	**Number of Fatalities Found on Standardized Searches**	**Number of Fatalities Found as Incidentals**
unidentified warbler	0.2	3	0
Vaux's swift	0.2	3	2
vesper sparrow	0.2	3	1
Wilson's warbler	0.2	3	0
American goldfinch	0.2	2	0
California quail	0.2	2	0
common yellowthroat	0.2	2	0
downy woodpecker	0.2	2	0
ferruginous hawk	0.2	2	3
Hammond's flycatcher	0.2	2	0
long-eared owl	0.2	2	0
MacGillivray's warbler	0.2	2	1
northern rough-winged swallow	0.2	2	0
pine siskin	0.2	2	0
red-winged blackbird	0.2	2	0
sage thrasher	0.2	2	0
sharp-shinned hawk	0.2	2	0
Virginia rail	0.2	2	0
white-throated swift	0.2	2	2
American pipit	0.1	1	0
ash-throated flycatcher	0.1	1	0
black-throated gray warbler	0.1	1	0
black-throated sparrow	0.1	1	0
Brewer's blackbird	0.1	1	0
brown creeper	0.1	1	0
brown-headed cowbird	0.1	1	0
common poorwill	0.1	1	0
Cooper's hawk	0.1	1	0
eastern kingbird	0.1	1	0
golden eagle	0.1	1	0
grasshopper sparrow	0.1	1	0
gray flycatcher	0.1	1	0
hairy woodpecker	0.1	1	0
hermit thrush	0.1	1	1
horned grebe	0.1	1	0
killdeer	0.1	1	0
Lewis's woodpecker	0.1	1	0
long-billed curlew	0.1	1	1
merlin	0.1	1	0
northern pintail	0.1	1	0
pacific-slope flycatcher	0.1	1	0
peregrine falcon	0.1	1	0
prairie falcon	0.1	1	2
purple finch	0.1	1	0
rock wren	0.1	1	0
Swainson's thrush	0.1	1	1
Townsend's solitaire	0.1	1	0
tree swallow	0.1	1	0
unidentified accipiter	0.1	1	0
unidentified flycatcher	0.1	1	0
unidentified swallow	0.1	1	0
unidentified thrush	0.1	1	0
varied thrush	0.1	1	0
western grebe	0.1	1	1
western kingbird	0.1	1	0
western screech-owl	0.1	1	0
western wood-pewee	0.1	1	0
white-breasted nuthatch	0.1	1	0
yellow warbler	0.1	1	0

Species (in descending order of % Composition)	**% Composition** (Only Standardized Searches)	**Number of Fatalities Found on Standardized Searches**	**Number of Fatalities Found as Incidentals**
American crow	0.0	0	1
bufflehead	0.0	0	1
cackling goose	0.0	0	1
gray catbird	0.0	0	1
sage sparrow	0.0	0	1
turkey vulture	0.0	0	1
Total (108 species identified) (102 native identified, 6 non-native)	**100**	**1,232**	**180**

* with similar study protocols n = non-native species

[1] Data from the following formal monitoring studies. These are observed fatalities and not final estimates of fatalities, which are higher. Big Horn (Kronner et al., 2008), Biglow Canyon Phase I (Jeffrey et al., 2009a; Enk et al., 2010), Biglow Canyon Phase II (Enk et al., 2011), Combine Hills (Young et al., 2006), Goodnoe Hills (URS, 2010); Harvest Wind (Downes et al., 2011b), Hay Canyon (Gritski and Kronner, 2010b); Hopkins Ridge I (Young et al., 2007, 2009), Klondike I (Johnson et al., 2003a), Klondike II (NWC and West, 2007), Klondike IIIa (Gritski et al., 2010b); Klondike III (Gritski et al., 2010a), Leaning Juniper I (Gritski et al., 2008), Marengo I and II (URS, 2010a and b; URS 2011a and b), Nine Canyon (Erickson et al., 2003a), Pebble Springs (Gritski and Kronner, 2010a), Rattlesnake Road (Gritski et al., 2011), Stateline I and II-partial (Erickson et al., 2004; Erickson et al., 2007), Stateline II-partial (Erickson et al., 2007), Tuolumne (Enz and Bay, 2010), Vansycle (Erickson et al., 2000), Wheat Field (Gritski and Downes, 2011), Wild Horse (Erickson et al., 2008), White Creek I (Downes et al., 2011a), Willow Creek (Gritski 2010).

Table 12. Reported mean annual bat mortality estimates at existing wind projects in the Columbia Plateau Ecoregion with completed fatality monitoring studies.

Wind Project[1] Listed in order of highest to lowest bat fatality rate per MW/year (last column)	**Number of Bat Fatalities Found**	**Annual Fatality Estimate** (number of bats rounded to whole number)	**Number of Bat Fatalities per Turbine per Year** (mean)	**Number of Bat Fatalities per MW per Year** (mean)
Biglow Canyon, OR (Phase II, Year 1)	17	406	6.24	3.78
Rattlesnake Road, OR[2]	10	295	6.03	2.87
Nine Canyon I, WA	27	119	3.21	2.47
Biglow Canyon, OR (Phase I, Year 1)	39	250	3.29	1.99
Leaning Juniper I, OR [2]	20	199	2.97	1.98
Big Horn, WA[2]	59	380	2.86	1.90
Combine Hills, OR	21	77	1.88	1.88
Stateline I and II, OR/WA	128	500	1.12	1.70
Pebble Springs, OR[2]	10	153	3.25	1.55
Hopkins Ridge I, WA (Phase 1, Year 2)	23	208	2.50	1.39
Klondike III, OR (Phase 1)[2]	37	254	2.07	1.17
Vansycle, OR	10	28	0.74	1.12
Tuolumne, WA	15	128	2.07	0.94
Klondike I, OR	6	19	1.16	0.77
Wheat Field, OR[2]	6	67	1.46	0.69
Hopkins Ridge I, WA (Phase 1, Year 1)	19	94	1.13	0.63
Biglow Canyon, OR (Phase I, Year 2)	17	73	0.96	0.58
Hay Canyon, OR[2]	2	54	1.12	0.53
Klondike II, OR	5	31	0.63	0.41
Wild Horse, WA (Year 1)	17	89	0.70	0.39
Goodnoe Hills, WA	8	32	0.68	0.34
Marengo II, WA (Year 1)	4	19	0.49	0.27
Marengo I, WA (Year 1)	6	24	0.31	0.17
Klondike IIIa, OR (Phase 2)[2]	3	12	0.24	0.16
Marengo I, WA (Year 2)	5	21	0.27	0.15
Marengo II, WA (Year 2)	0	0	0.00	0.00
Mean			**1.82**	**1.15**

[1] References for wind project studies: Big Horn (Kronner et al., 2008a), Biglow Canyon Phase I (Jeffrey et al., 2009a; Enk et al., 2010), Biglow Canyon Phase II (Enk et al., 2011), Combine Hills (Young et al., 2006), Goodnoe Hills (URS, 2010); Hay Canyon (Gritski and Kronner, 2010b); Hopkins Ridge I (Young et al., 2007, 2009), Klondike I (Johnson et al., 2003a), Klondike II (NWC and West, 2007), Klondike IIIa (Gritski et al., 2010b); Klondike III (Gritski et al., 2010a), Leaning Juniper I (Gritski et al., 2008), Marengo I and II (URS, 2011a and b), Nine Canyon (Erickson et al., 2003a), Pebble Springs (Gritski and Kronner, 2010a), Rattlesnake Road (Gritski et al., 2011), Stateline I and II-partial (Erickson et al., 2004), Tuolumne (Enz and Bay, 2010), Vansycle (Erickson et al., 2000), Wheat Field (Gritski and Downes, 2011), Wild Horse (Erickson et al., 2008).

[2] Huso estimator was used to determine estimated fatality rates for these 8 projects: Leaning Juniper I, Big Horn, Hay Canyon, Rattlesnake Road, Pebble Springs, Wheat Field, and Klondike III, and Klondike IIIa wind projects.

9.0 APPENDICES

Appendix A1. United State Fish and Wildlife Service Gilliam County species list.

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN GILLIAM COUNTY, OREGON

LISTED SPECIES

Fish
Inland:

Bull trout	*Salvelinus confluentus*	CH T

PROPOSED SPECIES

None

No Proposed Endangered Species		PE
No Proposed Threatened Species		PT

CANDIDATE SPECIES

Mammals
Terrestrial:

Washington ground squirrel	*Spermophilus washingtoni*

SPECIES OF CONCERN

Mammals

Pallid bat	*Antrozous pallidus pacificus*
Spotted bat	*Euderma maculatum*
Silver-haired bat	*Lasionycteris noctivagans*
Small-footed myotis bat	*Myotis ciliolabrum*
Yuma myotis bat	*Myotis yumanensis*

Birds

Western burrowing owl	*Athene cunicularia hypugaea*
Ferruginous hawk	*Buteo regalis*
Greater sage-grouse	*Centrocercus urophasianus*
Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*

Reptiles and Amphibians

Northern sagebrush lizard	*Sceloporus graciosus graciosus*

Fish

Pacific lamprey	*Lampetra tridentata*

Invertebrates
Insects:

Lynn's clubtail dragonfly	*Gomphus lynnae*

Last Updated December 26, 2009 (1:39:37 PM)
U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office
Page 1 of 2

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE WHICH MAY OCCUR WITHIN GILLIAM COUNTY, OREGON

Plants

Robinson's onion	*Allium robinsonii*
Laurence's milk-vetch	*Astragalus collinus var. laurentii*
Dwarf evening-primrose	*Camissonia pygmaea*
disappearing monkeyflower	*Mimulus evanescens*
Sessile mousetail	*Myosurus sessilis*

DELISTED SPECIES

Birds

American Peregrine falcon	*Falco peregrinus anatum*
Bald eagle	*Haliaeetus leucocephalus*

Definitions:

Listed Species: An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

Proposed Species: Taxa for which the Fish and Wildlife Service or National Marine Fisheries Service has published a proposal to list as endangered or threatened in the Federal Register.

Candidate Species: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

Species of Concern: Taxa whose conservation status is of concern to the U.S. Fish and Wildlife Service (many previously known as Category 2 candidates), but for which further information is still needed. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing.

Delisted Species: A species that has been removed from the Federal list of endangered and threatened wildlife and plants.

Key:

E	Endangered
T	Threatened
CH	Critical Habitat has been designated for this species
PE	Proposed Endangered
PT	Proposed Threatened
PCH	Critical Habitat has been proposed for this species

Notes:

Marine & Anadromous Species: Please consult the National Marine Fisheries Service (NMFS) (http://www.nmfs.noaa.gov/pr/species/) for marine and anadromous species. The National Marine Fisheries Service (NMFS) manages mostly marine and anadromous species, while the U.S. Fish and Wildlife Service manages the remainder of the listed species, mostly terrestrial and freshwater species.

Last Updated December 26, 2009 (1:39:37 PM)
U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office
Page 2 of 2

Appendix A2. United State Fish and Wildlife Service Morrow County species list.

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN MORROW COUNTY, OREGON

PROPOSED SPECIES

None

No Proposed Endangered Species	PE
No Proposed Threatened Species	PT

CANDIDATE SPECIES

Mammals
Terrestrial:

Washington ground squirrel	*Urocitellus washingtoni*

SPECIES OF CONCERN

Mammals

Silver-haired bat	*Lasionycteris noctivagans*
Small-footed myotis bat	*Myotis ciliolabrum*
Long-eared myotis bat	*Myotis evotis*
Yuma myotis bat	*Myotis yumanensis*

Birds

Northern goshawk	*Accipiter gentilis*
Western burrowing owl	*Athene cunicularia hypugaea*
Ferruginous hawk	*Buteo regalis*
Olive-sided flycatcher	*Contopus cooperi*
Willow flycatcher	*Empidonax traillii adastus*
Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*
White-headed woodpecker	*Picoides albolarvatus*

Reptiles and Amphibians

Northern sagebrush lizard	*Sceloporus graciosus graciosus*

Fish

Margined sculpin	*Cottus marginatus*
Pacific lamprey	*Lampetra tridentata*

Plants

Robinson's onion	*Allium robinsonii*
Laurence's milk-vetch	*Astragalus collinus var. laurentii*

DELISTED SPECIES

Birds

Last Updated November 13, 2010 (2:07:01 PM)
U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office
Page 1 of 3

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN MORROW COUNTY, OREGON

American Peregrine falcon	*Falco peregrinus anatum*
Bald eagle	*Haliaeetus leucocephalus*

Definitions:

Listed Species: An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

Proposed Species: Taxa for which the Fish and Wildlife Service or National Marine Fisheries Service has published a proposal to list as endangered or threatened in the Federal Register.

Candidate Species: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

Species of Concern: Taxa whose conservation status is of concern to the U.S. Fish and Wildlife Service (many previously known as Category 2 candidates), but for which further information is still needed. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing.

Delisted Species: A species that has been removed from the Federal list of endangered and threatened wildlife and plants.

Key:

E	Endangered
T	Threatened
CH	Critical Habitat has been designated for this species
PE	Proposed Endangered
PT	Proposed Threatened
PCH	Critical Habitat has been proposed for this species

Notes:

Marine & Anadromous Species: Please consult the National Marine Fisheries Service (NMFS) (http://www.nmfs.noaa.gov/pr/species/) for marine and anadromous species. The National Marine Fisheries Service (NMFS) manages mostly marine and anadromous species, while the U.S. Fish and Wildlife Service manages the remainder of the listed species, mostly terrestrial and freshwater species.

Marine Turtle Conservation and Management: All six species of sea turtles occurring in the U.S. are protected under the Endangered Species Act of 1973. In 1977, NOAA Fisheries and the U.S. Fish and Wildlife Service signed a Memorandum of Understanding to jointly administer the Endangered Species Act with respect to marine turtles. NOAA Fisheries has the lead responsibility for the conservation and recovery of sea turtles in the marine environment and the U.S. Fish and Wildlife Service has the lead for the conservation and recovery of sea turtles on nesting beaches. For more information, see the NOAA Fisheries webpage on sea turtles http://www.nmfs.noaa.gov/pr/species/turtles/.

Gray Wolf: On February 27, 2008, the Service published a final rule that established a distinct population segment of the gray wolf (*Canis lupis*) in the northern Rocky Mountains (which includes a portion of Eastern Oregon, east of the centerline of Highway 395 and Highway 78 north of Burns Junction and that portion of Oregon east of the centerline of Highway 95 south of Burns Junction). Any wolves found west of this line in

Appendix B. Oregon Biodiversity Information Center response letter.

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://inr.pdx.edu

October 5, 2010

Tamiko Ruhlen
Northwest Wildlife Consultants, Inc.
815 NW 4th Street
Pendleton, OR 97801

Dear Ms. Ruhlen:

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 Baseline Wind Project in Gilliam County.

Twenty-one (21) element occurrence records were noted within the intersection of the five-mile buffer around your project and are included on the enclosed computer printout. A GIS shapefile is also included.

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,

Cliff Alton
Conservation Information Assistant
cliff.alton@pdx.edu
503.725.9952

encl.: **invoice (H-100510-CWA02)**
computer printout and data key
shapefile

Appendix C. Rare vascular plant and lichen species with potential for occurrence within the Baseline Wind area.

Name	Status	Typical Habitat	Likelihood of Occurrence	Identification Period
Allium robinsonii **Robinson's onion**	USFWS: SC OR Rank: G3SH ORBIC List: 2-EX	Harsh, scabby areas. Sand and gravel deposits along bottom and lower benches of Columbia River. Elevation: 60 - 650 ft.	Low	April - May
Astragalus collinus var. *laurentii* **Laurent's milkvetch**	USFWS: SC ODA: LT OR Rank: G5T1S1 ORBIC List: 1	Basaltic grassland and sagebrush desert.	Moderate	May - June
Astragalus sclerocarpus **stalked-pod milkvetch**	OR Rank: G5SNR ORBIC List: 3	Open xeric locations with sandy soils	Moderate	April - June
Astragalus succumbens **Columbia milkvetch**	OR Rank: G4G5S4 ORBIC List: 4	Sandy places and rocky sagebrush desert, from the Columbia River to the lower foothills. Elevation: 300-700 ft.	Moderate	April - June
Camissonia pygmaea **dwarf evening-primrose**	USFWS: SC ODA: C OR Rank: G3S1 ORBIC List: 1	Rocky slopes, sandy banks, and dry gravelly washes	Low	Late April - June
Carex hystericina **porcupine sedge**	OR Rank: G5S3 ORBIC List: 4	Wet ground near creeks, seeps, and springs. Elevation: 500-2600 ft.	Low	May - June
Cryptantha leucophaea **gray cryptantha**	OR Rank: G2G3H ORBIC List:2-EX	Sandy dunes and open xeric sandy areas.	Low	May - June
Hackelia diffusa var. *cottonii* **creamy stickseed**	OR Rank: G4T4S3 ORBIC List: 4	On steep talus slopes or on cliffs. Elevation: 100-3000 ft.	Low	May - June
Lesquerella douglasii **Columbia bladderpod**	OR Rank: G4?SNR ORBIC List: 3	Open xeric locations – usually well-drained sandy/rocky soils Elevation: 200-800 ft.	Moderate	April - May
Lomatium watsonii **Watson's desert-parsley**	OR Rank: G4S1 ORBIC List: 2	Open, rocky hillsides often within sagebrush.	Low	May
Mimulus evanescens **disappearing monkeyflower**	USFWS: SC ODA: C OR Rank: G2S2 ORBIC List: 1	Moist, heavy gravel which has been inundated earlier in the spring	Low	Late April – Mid May
Mimulus jungermannioides **hepatic monkeyflower**	ODA: C OR Rank:G3S3 ORBIC List: 4	Basalt crevices in seepage zones in vertical cliff faces and canyon walls. Elevation: 500-3300 ft.	Low	May - Late August
Myosurus sessilis **sessile mousetail**	USFWS: SC ODA: C OR Rank:G2S1 ORBIC List: 1	Moist areas and drying vernal pools and alkali flats. Elevation: 50-5200 ft.	High	May - July

Name	Status	Typical Habitat	Likelihood of Occurrence	Identification Period
Texosporium sancti-jacobi **woven-spore lichen**	USFWS: SC OR Rank: G3S1 ORBIC List: 2	Deep soil, high ecological quality habitats on gentle aspects	Low	Can be identified throughout the year

USFWS (US Fish and Wildlife Service) Ranking Key:
LE = Listed Endangered. Taxa in danger of Extinction throughout all or a significant portion of their range.
LT = Listed Threatened. Taxa likely to be classified as Endangered within the foreseeable future throughout all or a significant portion of their range.
PE = Proposed Endangered. Taxa proposed to be listed as Endangered (formal rulemaking in progress).
PT = Proposed Threatened. Taxa proposed to be listed as Threatened (formal rulemaking in progress).
C = Candidate Species. Taxa for which sufficient threats exist to warrant a proposal to list the species/subtaxon as Threatened or Endangered
SC = Species of Concern. Available information supports tracking the status and threats to species/subtaxon.

ODA (Oregon Department of Agriculture) Ranking Key:
LE = Listed Endangered.
LT = Listed Threatened.
C = Candidate for listing as Threatened or Endangered.

OR Rank (Oregon Biodiversity Information Center) Categories Key:
G = Global rank indicator; denotes rank based on range wide status.
T = Trinomial rank indicator; denotes range wide status of infraspecific taxa.
S = State rank indicator; denotes rank based on status within Oregon.
1 = Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences).
2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6 to 20 occurrences).
3 = Rare or uncommon but not imperiled (typically 21 to100 occurrences).
4 = Not rare and apparently secure, but with cause for long-term concern (usually more than 100 occurrences).
5 = Demonstrably widespread, abundant, and secure.
E = Exotic or introduced.
U = Unknown.
H = Historical occurrence (i.e., formerly part of the native biota with the implied expectation that it might be rediscovered).
X = Presumed extinct or extirpated.
Q = Indicates uncertainty about taxonomic status.
? = Not yet ranked.

ORBIC (Oregon Biodiversity Information Center) Rare Plant Lists Key:
1 = List 1 taxa are Endangered or Threatened throughout their range or are presumed extinct.
2 = List 2 taxa are Threatened, Endangered, or possibly extirpated from Oregon, but are more stable elsewhere.
3 = List 3 contains taxa for which more information is needed before status can be determined, but which may be Threatened or Endangered in Oregon or throughout their range.
4 = List 4 contains taxa of concern which are not currently Threatened or Endangered
EX = Thought to be extirpated from Oregon

Source for Status: ORBIC (2010d)

Appendix D. Special status vertebrate wildlife species of known or potential occurrence in the Baseline Wind area.

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near Baseline Wind D = Documented N = Not Documented
Mammals (See Appendix E for Bats)			
Washington ground squirrel *Urocitellus washingtoni (*formerly *Spermophilus washingtoni)*	C Priority List 2	E	**D**—Observed during special status wildlife surveys in multiple locations in 2008-2010 (Figure 5b). ORBIC records (6) of individuals and holes within 5-miles of proposed turbines (ORBIC, 2010c). Active WGS colonies in the general area including Leaning Juniper IIA and IIB, Montague, Pebble Springs, and Shepherds Flat Wind Projects (NWC, 2009; NWC, 2010b; Kronner et al., 2005a; Kronner et al., 2010; PPM, 2006; Caithness Shepherds Flat, 2007). Usually found in open big sagebrush/grassland habitat, but also occurs in pastures and abandoned fields.
white-tailed jackrabbit *Lepus townsendii*	–	SV	**D**—One documented incidentally during winter avian use surveys on-site. Detected during specials status wildlife surveys on-site. (Figure 5a). Observed in the general area (ORBIC, 2010a; Kronner et al., 2005a; Kronner et al., 2007a; Kronner et al., 2007b; Kronner et al., 2010; NWC, 2009; NWC, 2010b; PPM, 2006; Caithness Shepherds Flat, 2007. Prefers open, bunchgrass steppe and frequents Conservation Reserve Program (CRP) grasslands.
Birds			
greater sandhill crane *Grus canadensis tabida*	–	SV	**N**— Not documented. May fly over as migrant during migration seasons (fall and spring); usually flies higher than turbine rotor swept area during migration. Project does not include typical habitat for resting
long-billed curlew *Numenius americanus*	BoCC	SV	**D**—Observed on-site during spring 2010 avian use surveys (43 detections) and summer season (7 detections). Also detected during avian use surveys at Montague plots (IRI, 2010). Detected in multiple locations during special status wildlife surveys; nesting confirmed within the Project boundary (Figure 5a). Also observed frequently (and some nesting) at Olex and elsewhere in the general vicinity (ORBIC, 2010a; Kronner, 2010, Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2010; NWC, 2009; NWC, 2010b; PPM, 2006; Caithness Shepherds Flat, 2007; Saddle Butte Wind, 2009). Nests in grassland flats and plateaus. Considered "Highly Imperiled" (U.S. and Canadian shorebird conservation plans) due to declines throughout its geographic range. BLM's Horn Butte Area of Critical Environmental Concern (ACEC) established for nesting long-billed curlew is approx. 6,000 acres, contains curlew nests and nesting habitat (some of it is being restored or enhanced), and is located approximately 6.5 miles north east of the Project (BLM, 2008).

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near Baseline Wind D = Documented N = Not Documented
bald eagle *Haliaeetus leucocephalus*	NW EPA BoCC	T	**N**—May occasionally occur during winter months, but not documented during surveys. Wintering population in the Columbia Basin, primarily along watercourses. Known to hunt uplands for carrion and small mammals. Nearest known nest is ~25 miles from the Project (C. Flick, pers. comm., 2009). One recorded in winter during avian use study at Rattlesnake Road Wind Power Facility and at Willow Creek Winds in winter (Kronner et al., 2007a and b). One observed in the northern portion of Shepherds Flat Wind Farm area during winter (Caithness Shepherds Flat, 2007).
golden eagle *Aquila chrysaetos*	EPA BoCC	–	**D—**One active and several inactive nests (within the same breeding territory) found outside the southeast portion of the Project boundary approximately 2,336 and 1,699 ft from the Project boundary (Figure 4). One observed during winter season avian use surveys on-site. Also observed on one occasion during special status wildlife surveys. Observed infrequently and some nests in the general vicinity (Caithness Shepherds Flat; Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2010; PPM, 2006). Nests in large rocky cliffs.
American peregrine falcon *Falco peregrinus anatum*	NW BoCC	SV	**N**— Not documented on-site. Continental subspecies breeds in a few places along the Columbia Gorge and may roam a few miles from breeding habitat for foraging. May pass through the Project in foraging or migration. Has been seen in Arlington area (Morgan, pers. comm., 2004). Basalt cliffs along Columbia River are potentially suitable for nesting but lesser quality than further west along the Columbia River. Historic nest sites are present within approximately 10 to 50 miles of the Project (S. Cherry, pers. comm., 2010; Isaacs, 2008; ODFW, pers. comm., 2011).
ferruginous hawk *Buteo regalis*	SoC BoCC	SC FS	**D**—Seven active nests found within the raptor survey area in 2010 (Figure 4). One ORBIC record of nesting approximately 5 miles from the Project boundary (ORBIC, 2010c). Individuals observed during spring 2010 avian use surveys (3 detections), and one observed during summer season. Also observed in-transit to plots. Nests in the general vicinity (Kronner et al., 2005a; Kronner et al., 2010; Gritski et al., 2008; NWC, 2009; NWC, 2010b; Kronner et al., 2007a and b; Caithness Shepherds Flat, 2007). Nests in juniper trees.
Swainson's hawk *Buteo swainsoni*	-	SV	**D**—Twenty-two active nests found within the raptor survey area in 2010 (Figure 4). Detected during spring avian use surveys (14 detections), summer season surveys (7 detections), and fall season surveys (4 detections). Also detected in-transit to plots. Detected during avian use surveys at Montague plots (IRI, 2010). Nests in the general vicinity in junipers or isolated deciduous trees (ORBIC, 2010a; Kronner et al., 2005a; Gritski et al., 2008; NWC, 2009; NWC, 201b; Kronner et al., 2007a and b ; Kronner et al., 2008b; Kronner et al., 2010; PPM, 2006; Caithness Shepherds Flat, 2007; Saddle Butte Wind, 2009). Found in open grassland steppe areas and agricultural settings, but typically requires scattered trees for nesting.

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near Baseline Wind D = Documented N = Not Documented
western burrowing owl *Athene cunicularia*	SoC	SC	**D**—Two burrowing owl dens located during special status wildlife surveys in 2010 (Figure 5a). Two detections in-transit to avian use surveys in spring season. Nesting and observations in the general vicinity (ORBIC, 2010a; Kronner et al., 2005a; Kronner et al., 2007a and b; Kronner et al., 2010; NWC, 2009; PPM, 2006; Caithness Shepherds Flat, 2007). Found in Shrub-steppe and grassland areas, uses existing burrows of coyotes, small mammals, and badgers for nesting.
loggerhead shrike *Lanius ludovicianus*	BoCC	SV	**D**—Detected in multiple locations during special status wildlife surveys (Figure 5a). Two nests confirmed on-site. One individual documented during spring season avian use surveys, and 14 detections in-transit to plots during spring and summer seasons. Detected during avian use surveys at Montague plots (IRI, 2010). Individuals and nests found in the general vicinity in areas with mature sagebrush cover or in juniper woodlands or isolated juniper trees (Kronner et al., 2005a; Kronner et al.,2 2010; NWC, 2009; NWC, 2010b; Kronner et al., 2007a and b; Kronner et al., 2008b; PPM, 2006; Caithness Shepherds Flat, 2007; Saddle Butte Wind, 2009).
sage sparrow *Amphispiza belli*	BoCC	SC FS	**N**—Needs extensive sagebrush shrub habitat to support breeding populations. Known to nest in the general area in larger patches of sagebrush and are seen occasionally in smaller patches during migration (Kronner 2001 and 2009). Observed in one location during March 2008 at Montague Wind Facility (NWC, 2010b). Breeds at Boardman Conservation Area to the east of the Project. Observed (1) in northern portion of Shepherds Flat Project in Eightmile Canyon in June 2003 (Caithness Shepherds Flat, 2007).
grasshopper sparrow *Ammodramus savannarum*	–	SV FS	**D**—Documented singing in multiple locations during the breeding season during special status wildlife surveys (Figure 5a). Detected during avian use surveys at Montague plots (IRI, 2010). Observed during the nesting season in the general vicinity (Kronner et al., 2005a; Kronner et al., 2010; NWC, 2009; NWC, 2010b; Caithness Shepherds Flat, 2007; Kronner et al., 2007a and b; Kronner et al., 2008; PPM, 2006). Requires sufficient grassland with good vertical structure for nesting cover and perching.
Lewis's woodpecker *Melanerpes lewis*	SoC BoCC	SC	**N**—Not documented during surveys. May fly through during migration. Two detections of this species at the Shepherds Flat Wind Farm in May 2003 (Caithness Shepherds Flat, 2007). Known to occasionally occur along Rock creek riparian habitat (Kronner and Gritski, field notes 2009–2010).
willow flycatcher *Empidonax traillii brewsteri*	SoC BoCC	SV	**N**—Not documented during surveys. May fly through during migration. Observed during surveys for Shepherds Flat Wind Farm (Caithness Shepherds Flat, 2007). Utilizes riparian habitat.
yellow-breasted chat *Iceria virens*	SoC	-	**N**—Not documented during surveys. Observed along Rock Creek near Olex (Kronner and Gritski field notes, 2009) in riparian habitat. May fly through the Project during local dispersal and migration.

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near Baseline Wind D = Documented N = Not Documented
Reptiles and Amphibians			
northern sagebrush lizard *Sceloparus graciosus graciosus*	SoC	SV	**N**—Not documented during surveys. Prefers Shrub-steppe habitat. Some habitat present on-site. Observed within the general vicinity (Kronner et al., 2005a; Kronner et al., 2010; NWC, 2009; NWC, 2010b; PPM, 2006).
western toad *Bufo boreus*	–	SV	**D**—Not documented during surveys; however, one record documented by ORBIC approximately 4 miles from the Project boundary. Known to occur along perennial streams such as Rock Creek, abundant at Olex (Kronner and Gritski, field notes 2006–2009).
Fish			
bull trout *Salvelinus confluentus*	T	SC	**N–**No potential for occurrence in the portion of Rock Creek that flows near the Project (J. Neil, pers. comm., 2010).
Pacific lamprey *Lampetra tridentata*	SoC	SV	**N–**Not documented within the Project; however, low potential to occur within the portion of Rock Creek that flows near the Project (J. Neil, pers. comm., 2010).
chinook salmon *Oncorhyncus tshawytscha*	-	SV	**D**–One record documented by ORBIC approximately 4 miles from the Project boundary. Documented as potentially present in the general area, but no records in the portion of Rock Creek that flows near the Project (J. Neil, pers. comm., 2010).
steelhead (Middle Columbia River ESU, summer run) *Oncorhynchus mykiss population 28*	T	SC	**D–**ORBIC records list this species as potentially occurring in streams within the 5-mile search area. Documented within Rock Creek (K. Kronner and J. Neil, pers. comm., 2010).

Status Key:

Federal:

T	Threatened	SoC	Species of Concern
E	Endangered	NW	Not Warranted; delisted
C	Candidate		

EPA Eagle Protection Act (16 U.S.C. 668-668d, June 8, 1940, as amended 1959, 1962, 1972, 1978)
BoCC USFWS Birds of Conservation Concern (Table 7 BCR 9, Great Basin Region).
Note: All migratory birds are protected by the Migratory Bird Treaty Act (MBTA).

Oregon:

T Threatened E Endangered

SC "Critical" sensitive species are those for which listing as Threatened or Endangered would be appropriate if immediate conservation actions were not taken. Some peripheral species which are at risk throughout their range and some disjunct populations (those that are geographically isolated from other populations) area also considered "Critical."

SV "Vulnerable" sensitive species are not in imminent danger of being listed as Threatened or Endangered, but could become sensitive-critical, Threatened, or Endangered with changes in populations, habitats or threats.

FS Focal Species highlighted in the Draft John Day Subbasin Plan (CBMRCD/NWPPC, 2004)

Sources for Status: CBMRCD/NWPPC, 2004; ODFW, 2008; ORBIC, 2010d, USFWS, 2008b; USFWS, 2009

Appendix E. Species of bats that occur in eastern Oregon and their occurrence or potential for occurrence in the Baseline Wind area.

Common Name and Scientific Name	Federal Status[1]	State of Oregon Status[2]	Documented during 2010 at Baseline Wind?	Documented in Gilliam County?[3]	Documented in Adjacent Oregon[3] and Washington[4] Counties?	Primary Roost Sites[4]	Foraging Habitat[4]	Likelihood of Occurrence in Project Area[5]	Comments
pallid bat *Antrozous pallidis*	SoC	SV	Yes	Yes	Wheeler (OR), Klickitat (WA)	Rock crevices, tree hollows, mines, caves, buildings	Rocky deserts, grasslands; takes large insects, often from the ground	Low to moderate	Recorded twice in August at location C and once in September at location B. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
Townsend's big-eared bat *Corynorhinus townsendii* [the local subspecies is also called pale western big-eared bat]	SoC	SC	No	Yes	Wheeler (OR), Klickitat (WA)	Mines, caves, buildings	Edges along streams, areas adjacent to and within pinyon-juniper and pine forests, desert scrub, agricultural areas; probably a moth specialist	Low	Appropriate roost and maternity sites are mostly lacking with the exception of farm buildings, suitability unknown. Known to occur along Rock Creek throughout the warm season (Kronner and Gritski, personal field notes); maternity colony suspected to be present. Closest known breeding population in Klickitat County, WA.
big brown bat *Eptesicus fuscus*	None	None	Yes	Yes	Morrow (OR), Wheeler (OR), Klickitat (WA)	Rock crevices, tree hollows, mines, caves, buildings	Wide variety including desert scrub, grasslands, forests, urban areas; perhaps a beetle specialist	Low to moderate	Recorded once at location B in September and once at location C in October. Found at several CPE wind projects as a fatality (Figure 7). Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
spotted bat *Euderma maculatum*	SoC	SV	No	Yes	Wheeler (OR)	Rock crevices in cliff faces	Riparian areas, meadows, old agricultural fields, forest openings	Low	This species has a very patchy distribution; it is hard to capture and many "sightings" are based on its audible echolocation signal. Nearest record is Cottonwood Creek at the John Day River (Rodhouse et al., 2005).

Common Name and Scientific Name	Federal Status[1]	State of Oregon Status[2]	Documented during 2010 at Baseline Wind?	Documented in Gilliam County?[3]	Documented in Adjacent Oregon[3] and Washington[4] Counties?	Primary Roost Sites[4]	Foraging Habitat[4]	Likelihood of Occurrence in Project Area[5]	Comments
hoary bat *Lasiurus cinereus*	None	SV	Yes	Yes	Wheeler (OR), Klickitat (WA)	Foliage of coniferous and deciduous trees	Riparian areas, grasslands, Shrub-steppe, forest edges and openings, urban areas	Low in summer; moderate to high in fall during migration	Locations B and C had a few passes in August, while A and C had passes in September and C had a few passes in October. Found at several CPE wind projects as a fatality (Figure 7). Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
silver-haired bat *Lasionycteris noctivagans*	SoC	SV	Yes	Yes	Morrow (OR), Wheeler (OR) Klickitat (WA)	Tree cavities, under loose bark	Forested areas, riparian areas near forest	Low in summer; moderate to high in fall during migration	Recorded at all locations in low numbers. Found at several CPE wind projects as a fatality (Figure 7). Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
California myotis *Myotis californicus*	None	SV	Yes	Yes	Wheeler (OR), Klickitat (WA)	Rock crevices, under loose bark, tree cavities, buildings	Shrub-steppe, desert, arid grasslands, coniferous forest edges	Moderate to high	Two confirmed bat passes at location B in August. Habitat is correct for both foraging and roosting. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
western small-footed myotis *Myotis ciliolabrum*	SoC	None	Yes	Yes	Morrow (OR), Sherman (OR), Wheeler (OR), Klickitat (WA)	Rock crevices, caves, mines, talus slopes, buildings	Desert, semiarid shrubland, riparian areas, coniferous forest	Moderate to high	Recorded at all locations though most common at location B. Known to occur in Rock Creek area and along Willow Creek (Kronner and Gritski, personal field notes).
long-eared myotis *Myotis evotis*	SoC	None	No	Yes	Morrow (OR), Wheeler (OR), Klickitat (WA)	Rock crevices, tree cavities, under loose bark, tree stumps, caves, mines, buildings	Coniferous forest, semiarid shrubland, sage; often gleans insects from plant and rock surfaces	Low	More common in forests than arid scrubland. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).

Common Name and Scientific Name	Federal Status[1]	State of Oregon Status[2]	Documented during 2010 at Baseline Wind?	Documented in Gilliam County?[3]	Documented in Adjacent Oregon[3] and Washington[4] Counties?	Primary Roost Sites[4]	Foraging Habitat[4]	Likelihood of Occurrence in Project Area[5]	Comments
little brown bat *Myotis lucifugus*	None	None	Yes	Yes	Morrow (OR), Wheeler (OR), Klickitat (WA)	Tree cavities, under loose bark, buildings, rock crevices, caves	Open forest, forest edges, over water in arid habitats	Low	One confirmed and six additional likely passes at location A. One likely pass at location B in September. Found at several CPE wind projects as a fatality (Figure 7). Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
fringed myotis *Myotis thysanodes*	SoC	SV	No	Yes	No	Caves, mines, buildings, rock crevices, tree cavities	Dry woodlands, desert scrubland, grasslands, coniferous forest	Low	Most common roosts are in caves, mines, and snags. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
long-legged myotis *Myotis volans*	SoC	SV	Yes	Yes	Morrow OR), Wheeler (OR), Klickitat (WA)	Tree cavities, under loose bark, rock crevices, buildings	Montane coniferous forest, desert, riparian areas	Low	There were two passes at location A. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
Yuma myotis *Myotis yumanensis*	SoC	None	Yes	Yes	Morrow (OR), Sherman (OR), Wheeler (OR), Klickitat (WA)	Caves, mines, rock crevices, buildings	Near or over water in desert, scrubland, and forest	Low	There were two confirmed passes at site B. Might roost in rock crevices or old abandoned buildings. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).
canyon bat *Parastrellus hesperus*	None	None	Yes	Yes	Sherman (OR), Wheeler (OR)	Rock crevices, caves, mines	Desert, rocky canyons, Shrub-steppe	High	Recorded at all locations and all months during the survey. Known to occur along Rock Creek (Kronner and Gritski, personal field notes).

[1]SoC = Federal Species of Concern (USFWS, 2010a and b).

[2]Current status according to Oregon Department of Fish and Wildlife; SC = Sensitive Critical, SV = Sensitive Vulnerable (ODFW, 2008; ORBIC, 2010a-d).

[3]Sources of information: Oregon Biodiversity Database (ORBIC 2010a-d), U.S. Fish and Wildlife lists (USFWS, 2010a and b), Verts and Carraway (1998); personal communication from Mark Perkins, Bats-R-Us Northwest, Portland, OR (Perkins, 1994, 1995); personal knowledge and inventories conducted by Karen Kronner and Bob Gritski, Northwest Wildlife Consultants, Inc. through 2011; Condon, Oregon Wind Project BPA EIS, and personal knowledge of Dr. Burr Betts, LaGrande, OR (under contract to Northwest Wildlife Consultants, Inc.; Betts, 1998, 2004), Kronner and Betts, 2004

[4]Based on Fleckenstein (2001).

[5]Based on: Nagorsen and Brigham (1993), Verts and Carraway (1998), Western States Bat Working Group (1998), various Mammalian Species accounts, and personal knowledge.

Appendix F. Comprehensive plant species list for Baseline Wind, 2010.

Listed alphabetically by Family name

Ab	Accepted Scientific Name	Common Name	Family	Nat.	Hitchcock & Cronquist Synonym	Notes
7	*Angelica arguta*	Lyall's angelica	*Apiaceae*	N		
2	*Lomatium grayi*	Gray's desert parsley	*Apiaceae*	N		
2	*Lomatium macrocarpum*	bigseed biscuitroot	*Apiaceae*	N		
3	*Lomatium nudicaule*	barestem biscuitroot	*Apiaceae*	N		
3	*Lomatium simplex* var. *simplex*	Great Basin desert parsley	*Apiaceae*	N	*Lomatium triternatum* ssp. *platycarpum*	
2	*Achillea millefolium*	Common yarrow	*Asteraceae*	N		
2	*Agoseris heterophylla*	annual agoseris	*Asteraceae*	N		
5	*Antennaria dimorpha*	low pussytoes	*Asteraceae*	N		
2	*Artemisia tridentata* ssp. *tridentata*	basin big sagebrush	*Asteraceae*	N		
6	*Artemisia arbuscula*	little sagebrush	*Asteraceae*	N		
2	*Balsamorhiza careyana*	Carey's balsamroot	*Asteraceae*	N		
4	*Centaurea diffusa*	diffuse knapweed	*Asteraceae*	I		
2	*Chaenactis douglasii*	Douglas's dusty maiden	*Asteraceae*	N		
2	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	*Asteraceae*	N		
3	*Cirsium arvense*	Canada thistle	*Asteraceae*	I		
3	*Conyza Canadensis*	Canadian horseweed	*Asteraceae*	I		
2	*Crepis atribarba*	slender hawksbeard	*Asteraceae*	N		
2	*Ericameria nauseosa*	rubber rabbitbrush	*Asteraceae*	N	*Chrysothamnus nauseosus*	
2	*Erigeron linearis*	desert yellow fleabane	*Asteraceae*	N		
2	*Erigeron pumilus*	shaggy fleabane	*Asteraceae*	N		
6	*Eriophyllum lanatum*	common woolly sunflower	*Asteraceae*	N		
1	*Gutierrezia sarothrae*	broom snakeweed	*Asteraceae*	N		
2	*Lactuca serriola*	prickly lettuce	*Asteraceae*	I		invasive
3	*Lagophylla ramosissima*	branched lagophylla	*Asteraceae*	N		
3	*Nothocalais troximoides*	sagebrush false dandelion	*Asteraceae*	N	*Microseris troximoides*	
2	*Taraxacum officinale*	common dandelion	*Asteraceae*	I		
2	*Tragopogon dubius*	yellow salsify	*Asteraceae*	I		
1	*Amsinckia lycopsoides*	tarweed fiddleneck	*Boraginaceae*	N		
1	*Amsinckia menziesii*	Menzie's fiddleneck	*Boraginaceae*	N	*Amsinckia retrorsa*	
2	*Buglossoides arvensis*	corn gromwell	*Boraginaceae*	I	*Lithospermum arvense*	
6	*Lithospermum ruderale*	western stoneseed	*Boraginaceae*	N		
2	*Plagiobothrys tenellus*	Pacific popcorn flower	*Boraginaceae*	N		
1	*Chorispora tenella*	crossflower	*Brassicaceae*	I		invasive
1	*Descurainia pinnata*	western tansymustard	*Brassicaceae*	N		
1	*Descurainia sophia*	herb sophia	*Brassicaceae*	I		Disturbed sites, homesteads
1	*Draba verna*	spring draba	*Brassicaceae*	N		
6	*Erysimum asperum*	western wallflower	*Brassicaceae*	N		
1	*Idahoa scapigera*	oldstem idahoa	*Brassicaceae*	N		
1	*Lepidium perfoliatum*	clasping pepperweed	*Brassicaceae*	I		
1	*Sisymbrium altissimum*	tall tumblemustard	*Brassicaceae*	I		invasive
3	*Thysanocarpus curvipes*	sand fringepod	*Brassicaceae*	N		

Ab	Accepted Scientific Name	Common Name	Family	Nat.	Hitchcock & Cronquist Synonym	Notes
5	*Holosteum umbellatum*	jagged chickweed	*Caryophyllaceae*	I		
5	*Atriplex spinosa*	spiny hopsage	*Chenopodiaceae*	N		
2	*Chenopodium album*	lambsquarters	*Chenopodiaceae*	I		
2	*Convolvulus arvensis*	field bindweed	*Convolvulaceae*	I		
4	*Juniperus occidentalis*	western juniper	*Cupressaceae*	N		
7	*Dipsacus sylvestris*	teasel	*Dipsaceae*	I		
7	*Astragalus collinus* var. *laurentii*	Laurent's milkvetch	*Fabaceae*	N		
2	*Astragalus purshii*	woollypod milkvetch	*Fabaceae*	N		
5	*Astragalus tweedyi*	Tweedy's milkvetch	*Fabaceae*	N		
2	*Lupinus argenteus* ssp. *argenteus* var. *laxiflorus*	silvery lupine	*Fabaceae*	N	*Lupinus laxiflorus* var. *laxiflorus*	
2	*Lupinus aridus* ssp. *aridus*	desert lupine	*Fabaceae*	N		
4	*Medicago sativa*	alfalfa	*Fabaceae*	I		in reveg. fields
7	*Trifolium* sp.	clover	*Fabaceae*	I		
1	*Erodium cicutarium*	redstem stork's bill	*Geraniaceae*	I		
2	*Phacelia hastata*	silverleaf phacelia	*Hydrophyllaceae*	N		
3	*Phacelia linearis*	threadleaf phacelia	*Hydrophyllaceae*	N		
6	*Allium acuminatum*	tapertip onion	*Lilaceae*	N		
4	*Calochortus macrocarpus*	sagebrush mariposa lily	*Lilaceae*	N		
5	*Fritillaria pudica*	yellow fritillary	*Lilaceae*	N		
5	*Triteleia grandiflora* var. *howellii*	Howell's triteleia	*Lilaceae*	N	*Brodiaea howellii*	
6	*Linum perenne*	blue flax	*Linaceae*	N		
6	*Mentzelia laevicaulis* var. *laevicaulis*	smoothstem blazingstar	*Loasaceae*	N		
2	*Malva neglecta*	common mallow	*Malvaceae*	I		
7	*Sphaeralcea grossulariifolia*	gooseberryleaf globemallow	*Malvaceae*	N		
2	*Epilobium brachycarpum*	tall annual willowherb	*Onagraceae*	N	*Epilobium paniculatum*	
7	*Orobanche uniflora*	oneflowered broomrape	*Orobanchaceae*	N	*Orobanchaceae uniflora* var. *purpurea*	
1	*Plantago patagonica*	woolly plantain	*Plantaginaceae*	N		
2	*Achnatherum occidentale*	western needlegrass	*Poaceae*	M		
4	*Agropyron cristatum*	crested wheatgrass	*Poaceae*	I	*Agropyron cristatum*	planted on reveg. sites
4	*Bromus arvensis*	field brome	*Poaceae*	I	*Bromus japonicus*	invasive
1	*Bromus tectorum*	cheatgrass	*Poaceae*	I		invasive
5	*Elymus elymoides*	squirreltail	*Poaceae*	N	*Sitanion hystrix*	
5	*Festuca idahoensis*	Idaho fescue	*Poaceae*	N		
2	*Hesperostipa comate*	needle and thread grass	*Poaceae*	N		
5	*Leymus cinereus*	basin wildrye	*Poaceae*	N	*Elymus cinereus*	
1	*Poa bulbosa*	bulbous bluegrass	*Poaceae*	I	*Poa bulbosa*	
1	*Poa secunda*	Sandberg's bluegrass	*Poaceae*	N	*Poa sandbergii*	
4	*Poa secunda (ampla)*	Sherman big bluegrass	*Poaceae*	I	*Poa ampla*	Non-native variety of *P. secunda* (CRP)
1	*Pseudoroegneria spicata*	bluebunch wheatgrass	*Poaceae*	N	*Agropyron spicatum*	deep soils / revegetated fields
2	*Secale cereal L.*	cereal rye	*Poaceae*	I		
4	*Thinopyrum intermedium*	intermediate wheatgrass	*Poaceae*	N	*Agropyron intermedium*	planted

Ab	Accepted Scientific Name	Common Name	Family	Nat.	Hitchcock & Cronquist Synonym	Notes
2	*Vulpia bromoides*	brome fescue	*Poaceae*	I	*Festuca bromoides*	
5	*Collomia grandiflora*	grand colomia	*Polemoniaceae*	N		
6	*Collomia linearis*	tiny trumpet	*Polemoniaceae*	N		
6	*Leptodactylon pungens*	granite prickly phlox	*Polemoniaceae*	N		
4	*Microsteris gracilis* var. *humilior*	slender phlox	*Polemoniaceae*	N		
2	*Phlox longifolia*	longleaf phlox	*Polemoniaceae*	N		
5	*Eriogonum douglasii* var. *douglasii*	Douglas' buckwheat	*Polemoniaceae*	N		
4	*Eriogonum heracleoides*	parsnipflower buckwheat	*Polygonaceae*	N		
4	*Eriogonum strictum* ssp. *proliferum* var. *proliferum*	Blue Mountain buckwheat	*Polygonaceae*	N		
6	*Polygonum aviculare*	prostate knotweed	*Polygonaceae*	I		
4	*Polygonum douglasii*	Douglas' knotweed	*Polygonaceae*	N		
7	*Rumex acetosella*	common sheep sorrel	*Polygonaceae*	I		
7	*Rumex crispus*	curly dock	*Polygonaceae*	I		
4	*Claytonia perfoliata*	miner's lettuce	*Portulacaceae*	N	*Montia perfoliata*	
5	*Dodecatheon pulchellum*	darkthroat shooting star	*Primulaceae*	N		
2	*Ceratocephala testiculata*	curveseed butterwort	*Ranunculaceae*	I		
3	*Delphinium nuttallianum*	twolobe larkspur	*Ranunculaceae*	N		
7	*Potentilla* sp.	cinquefoil	*Rosaceae*	N		
4	*Purshia tridentata*	antelope bitterbrush	*Rosaceae*	N		
5	*Galium aparine*	stickywilly	*Rubiaceae*	N		
3	*Lithophragma parviflorum*	smallflower woodland star	*Saxifragaceae*	N		
2	*Collinsia parviflora*	maiden blue eyed Mary	*Scrophulariaceae*	N		
7	*Mimulus guttatus*	seep monkeyflower	*Scrophulariaceae*	N		
3	*Verbascum thapsus*	common mullein	*Scrophulariaceae*	I		
7	*Veronica Americana*	American speedwell	*Scrophulariaceae*	N		
7	*Typha latifolia*	broadleaf cattail	*Typhaceae*	N		
7	*Urtica dioica*	stinging nettle	*Urticaceae*	I		
4	*Plectritis macrocera*	longhorn plectritis	*Valerinaceae*	N		

Ab = Abundance Codes:
1 = abundant in multiple plant communities
2 = common in multiple plant communities
3 = uncommon in multiple plant communities
4 = abundant in specific plant communities
5 = common in specific plant communities
6 = uncommon in specific plant communities
7 = rare with 3 or fewer separate occurrences on the project area surveyed

Nat. = Nativity Codes: N = Native I = Introduced

Appendix G. Comprehensive species list from site-specific avian use and special status wildlife surveys for Baseline Wind, 2009–2010.

Common Name *(in alphabetical order)*	***Scientific Name***	**Avian Use Surveys**	**Special Status Wildlife Surveys**
	Birds		
American crow	*Corvus brachyrhynchos*		X
American goldfinch	*Carduelis tristis*		X
American kestrel	*Falco sparverius*	X	X
American pipit	*Anthus rubescens*	X	
American robin	*Turdus migratorius*	X	X
ash-throated flycatcher	*Myiarchus cinerascens*		X
barn swallow	*Hirundo rustica*	X	
black-billed magpie	*Pica hudsonia*		X
Brewer's blackbird	*Euphagus cyanocephalus*	X	
Bullock's oriole	*Icterus bullockii*	X	X
burrowing owl*	*Athene cunicularia*	X	X
California quail	*Callipepla californica*		X
Canada goose	*Branta canadensis*	X	X
chipping sparrow	*Spizella passerine*		X
chukar	*Alectoris chukar*	X	X
cliff swallow	*Petrochelidon pyrrhonota*	X	X
common nighthawk	*Chordeiles minor*	X	X
common raven	*Corvus corax*	X	X
Cooper's hawk	*Accipiter cooperii*		X
dark-eyed junco	*Junco hyemalis*	X	X
Eurasian collared-dove	*Streptopelia decaocto*		X
European starling	*Sturnus vulgaris*	X	X
ferruginous hawk*	*Buteo regalis*	X	X
golden eagle*	*Aquila chrysaetos*	X	X
grasshopper sparrow*	*Ammodramus savannarum*		X
gray partridge	*Perdix perdix*		X
great egret	*Ardea alba*		X
great horned owl	*Bubo virginianus*		X
horned lark	*Eremophila alpestris*		X
killdeer	*Charadrius vociferus*	X	X
lark sparrow	*Chondestes grammacus*	X	X
lazuli bunting	*Passerina amoena*		X
Lincoln’s sparrow	*Melospiza lincolnii*		X
loggerhead shrike*	*Lanius ludovicianus*	X	X
long-billed curlew*	*Numenius americanus*	X	X
long-eared owl	*Asio otus*		X
merlin	*Falco columbarius*		X
mourning dove	*Zenaida macroura*	X	X
Nashville warbler	*Vermivora ruficapilla*		
northern flicker	*Colaptes auratus*		X
northern harrier	*Circus cyaneus*	X	X
olive-sided flycatcher	*Contopus cooperi*		X
orange-crowned warbler	*Vermivora celata*		X
prairie falcon	*Falco mexicanus*	X	
red-tailed hawk	*Buteo jamaicensis*	X	X

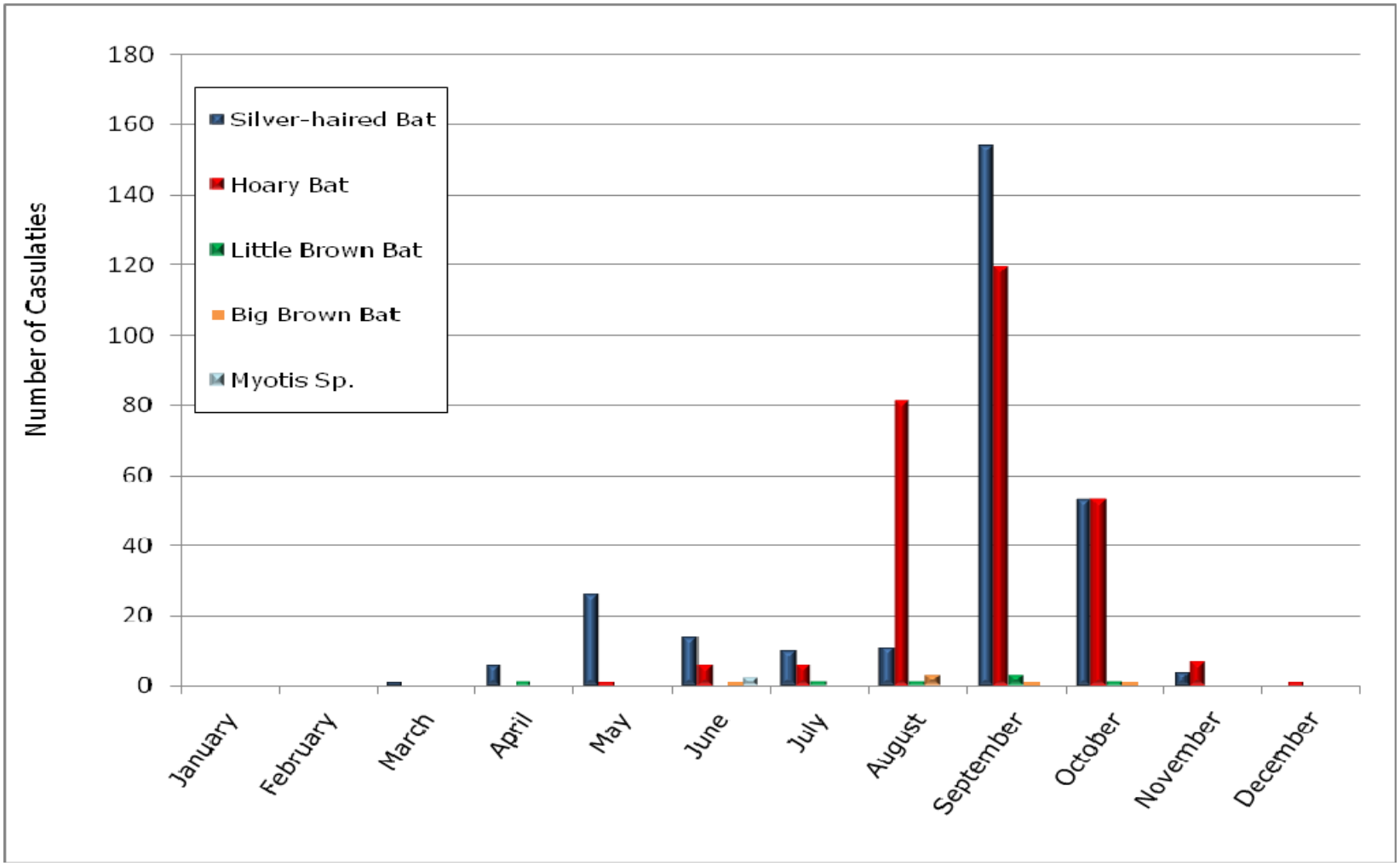
Common Name *(in alphabetical order)*	***Scientific Name***	**Avian Use Surveys**	**Special Status Wildlife Surveys**
ring-necked pheasant	*Phasianus colchicus*	X	X
red-winged blackbird	*Agelaius phoeniceus*	X	X
rock pigeon	*Columba livia*	X	X
rock wren	*Salpinctes obsoletus*		X
rough-legged hawk	*Buteo lagopus*	X	X
sage thrasher	*Oreoscoptes montanus*		X
savannah sparrow	*Passerculus sandwichensis*	X	X
Say's phoebe	*Sayornis saya*	X	X
short-eared owl	*Asio flammeus*		X
spotted towhee	*Pipilo maculates*	X	
Swainson's hawk*	*Buteo swainsoni*	X	X
tree swallow	*Tachycineta bicolor*		X
vesper sparrow	*Pooecetes gramineus*		X
violet-green swallow	*Tachycineta thalassina*	X	
western kingbird	*Tyrannus verticalis*	X	X
western meadowlark	*Sturnella neglecta*	X	X
western tanager	*Piranga ludoviciana*		X
western wood-pewee	*Contopus sordidulus*		X
white-crowned sparrow	*Zonotrichia leucophrys*	X	X
yellow-rumped warbler	*Dendroica coronata*		X
Mammals			
American badger	*Taxidea taxus*		X
cottontail rabbit	*Sylvilagus nuttalli*	X	X
coyote	*Canis latrans*	X	X
yellow-bellied marmot	*Marmota flaviventris*		X
mule deer	*Odocoileus hemionus*	X	X
Ord's kangaroo rat	*Dipodomys ordi*		X
pocket gopher	*Thomomys talpoides*		X
pronghorn	*Antilocapra americana*	X	X
Rocky Mountain elk	*Cervus elaphus*		X
Washington ground squirrel	*Urocitellus washingtoni*		X
white-tailed jackrabbit	*Lepus townsendii*	X	X
Reptiles and Amphibians			
gopher snake	*Pituophis catenifer*		X
western rattlesnake	*Crotalis viridus*		X
side-blotch lizard	*Uta stansburiana*		X

* denotes species is of state or federal special status.

10.0 FIGURES

Figures 1 through 6 provided under separate cover

Figure 7. Bat fatalities by month at existing wind projects in the Columbia Plateau Ecoregion.*



* Data used are dates when bat fatality was discovered with no adjustment for age of carcass when found. Includes incidentals.

Figure 8. Number of bat passes by frequency and location at Baseline Wind, 2010.

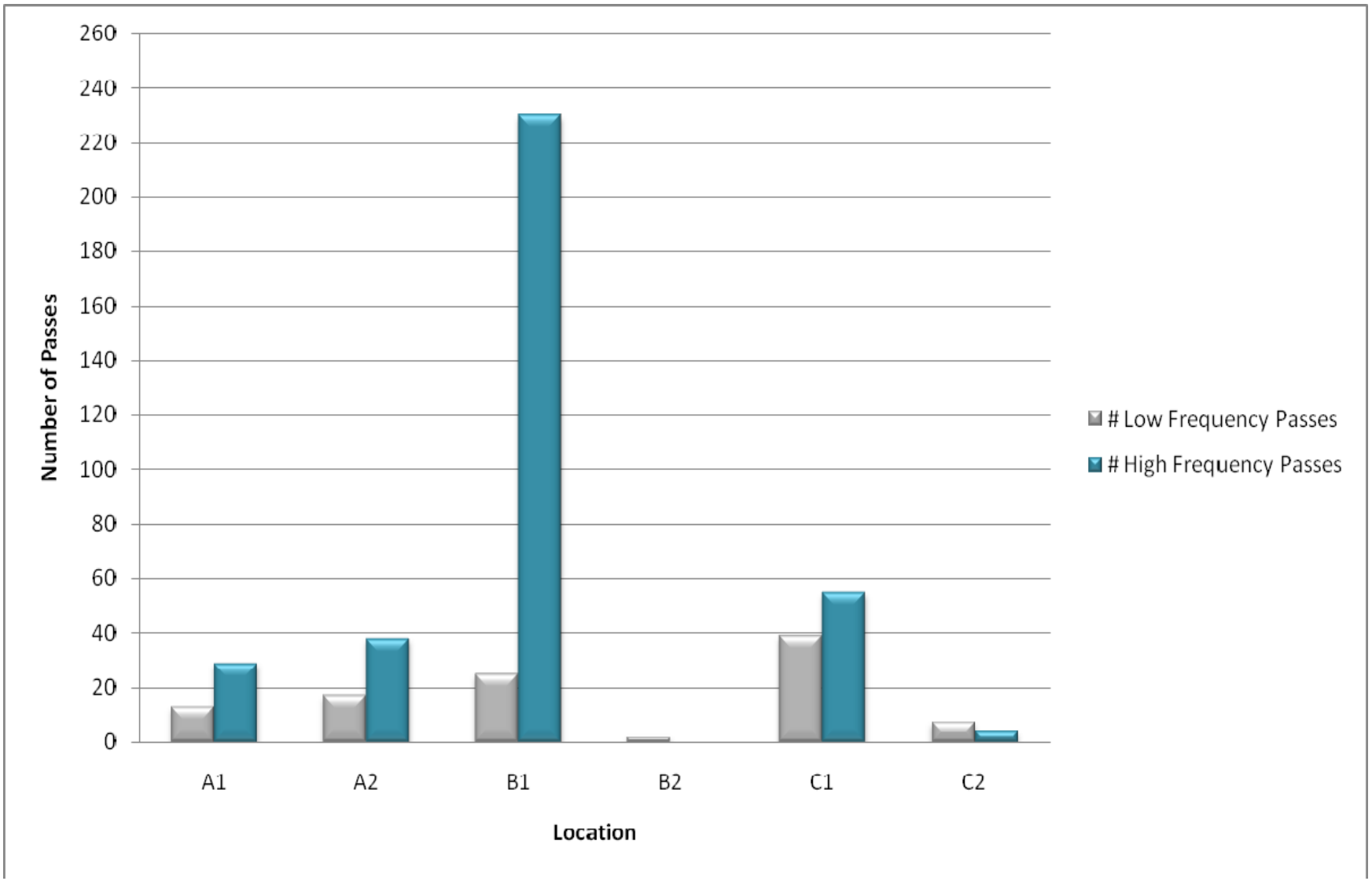


Figure 9. Number of bat passes by location for species with identified calls at Baseline Wind, 2010.

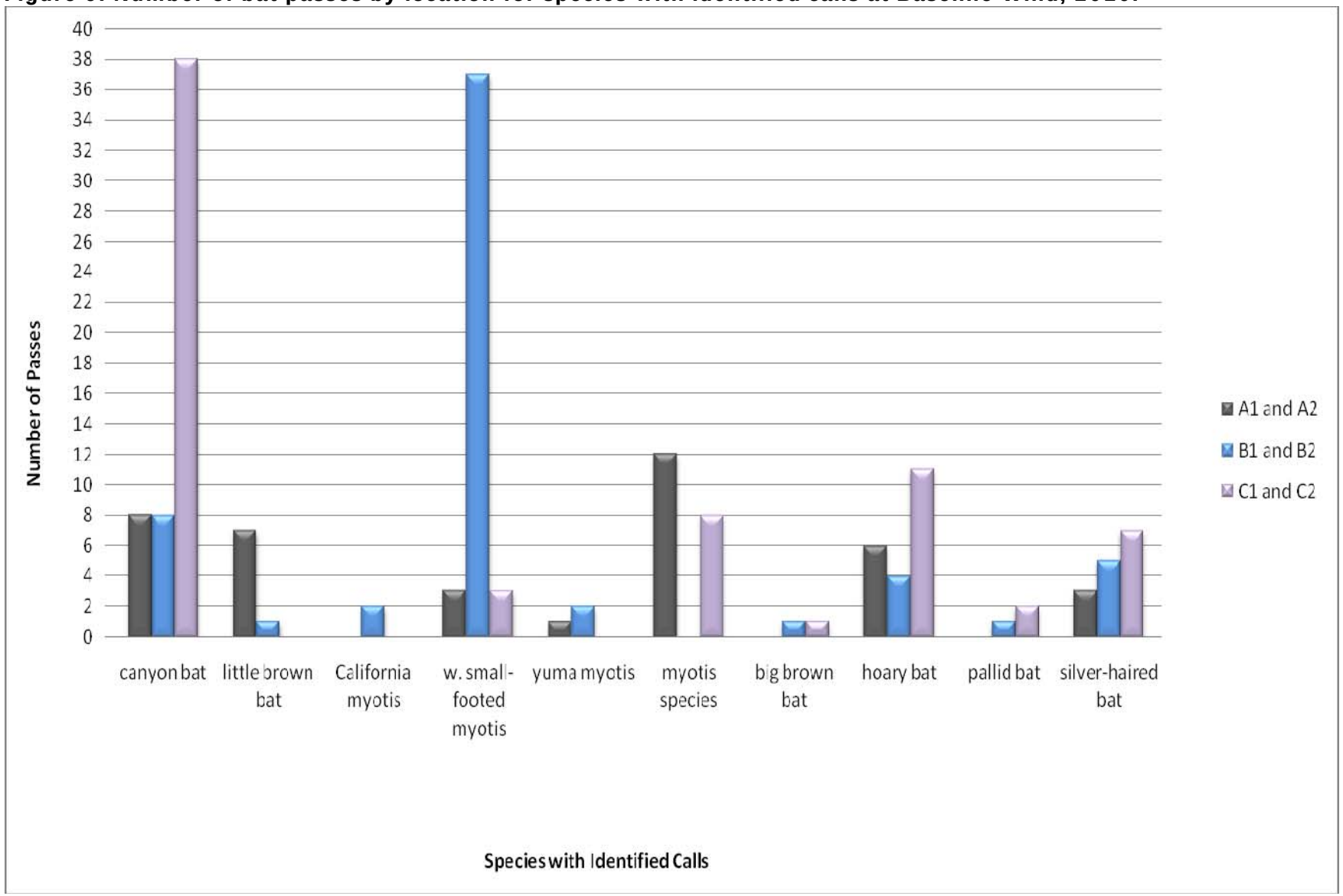


Figure 10. Number of passes by month for bats with high frequency calls at Baseline Wind, 2010.

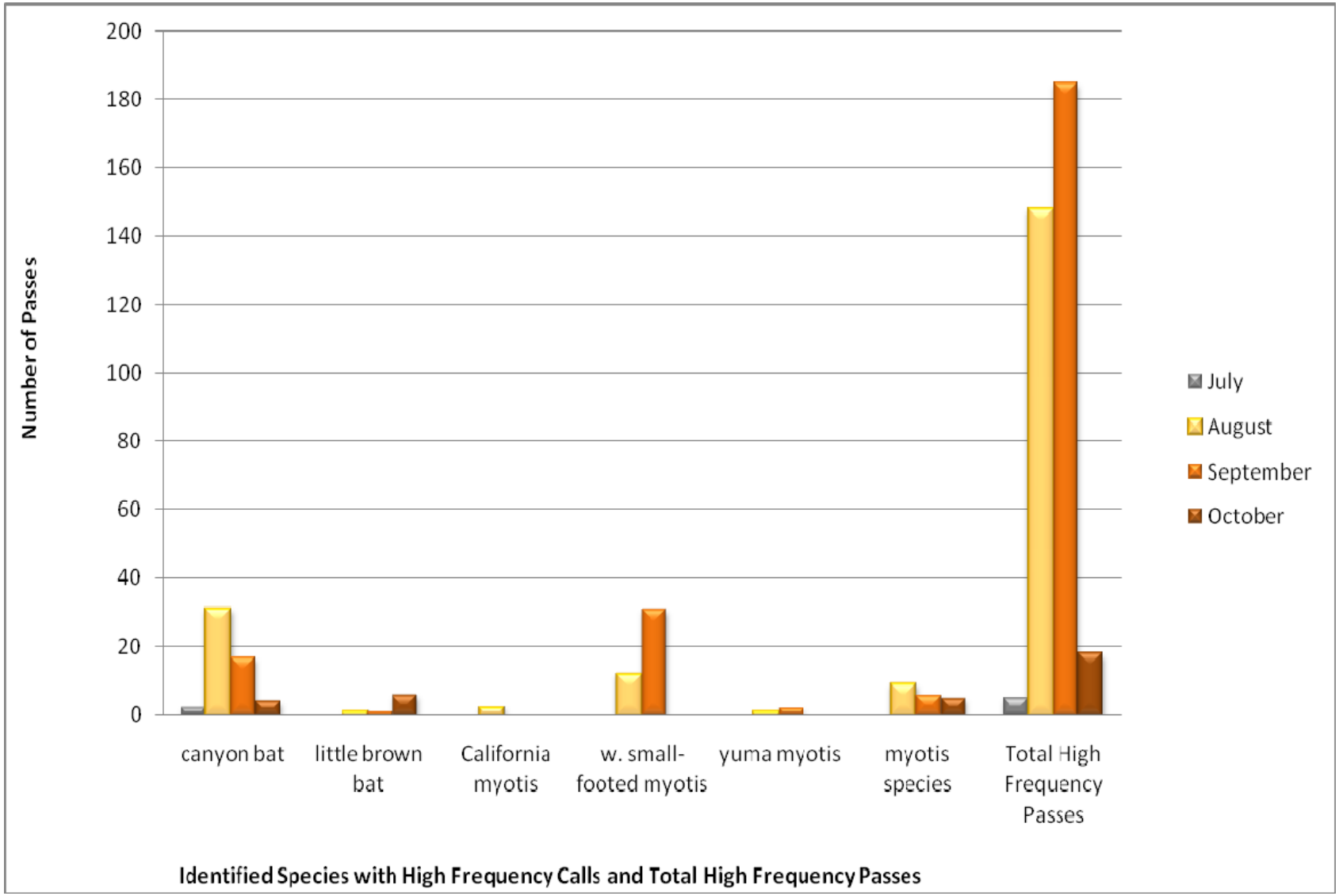


Figure 11. Number of passes by month for bats with low frequency calls at Baseline Wind, 2010.

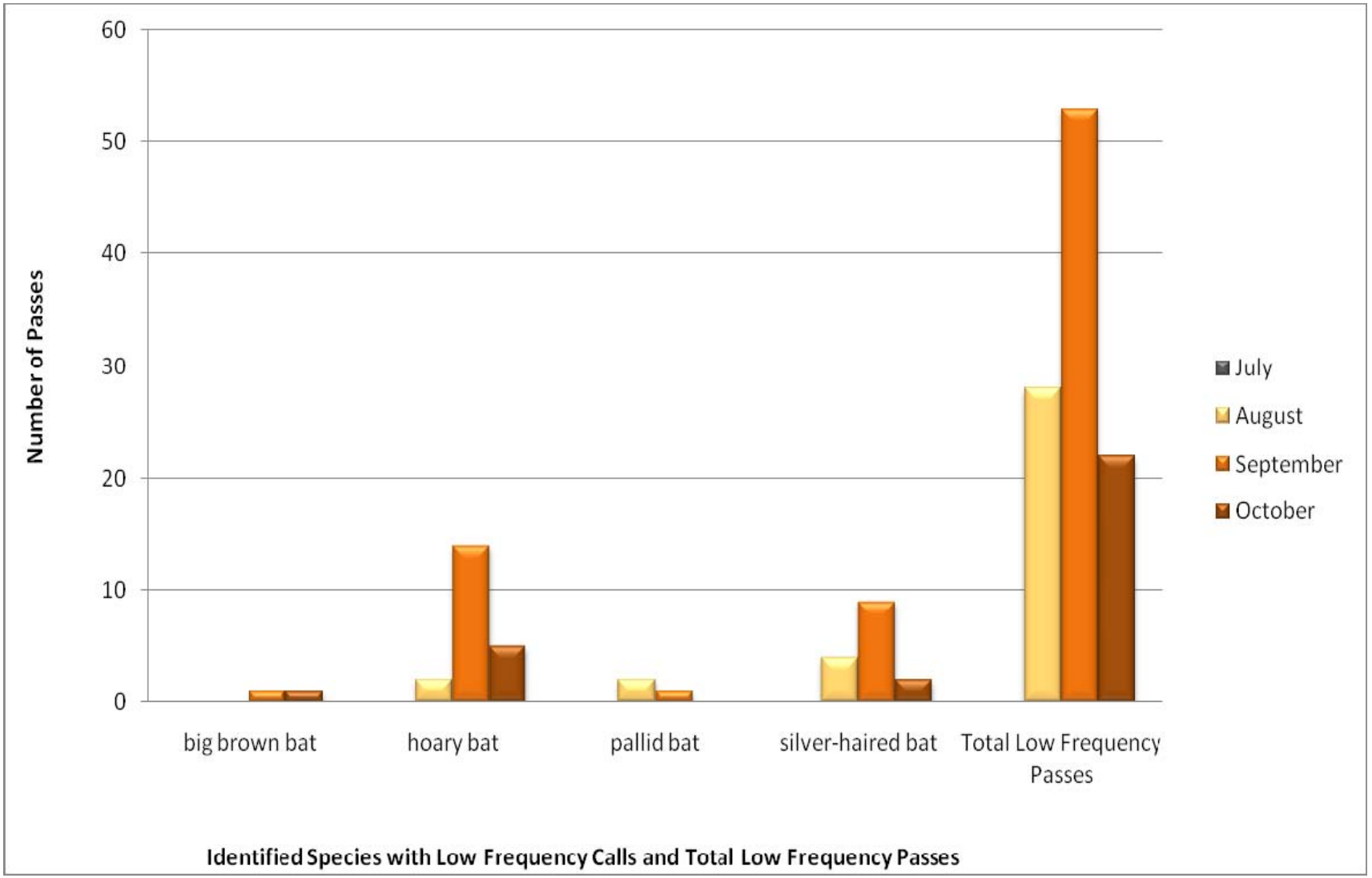


Figure 12. Overall all bird mean use at selected Columbia Plateau Ecoregion wind projects including Baseline Wind.

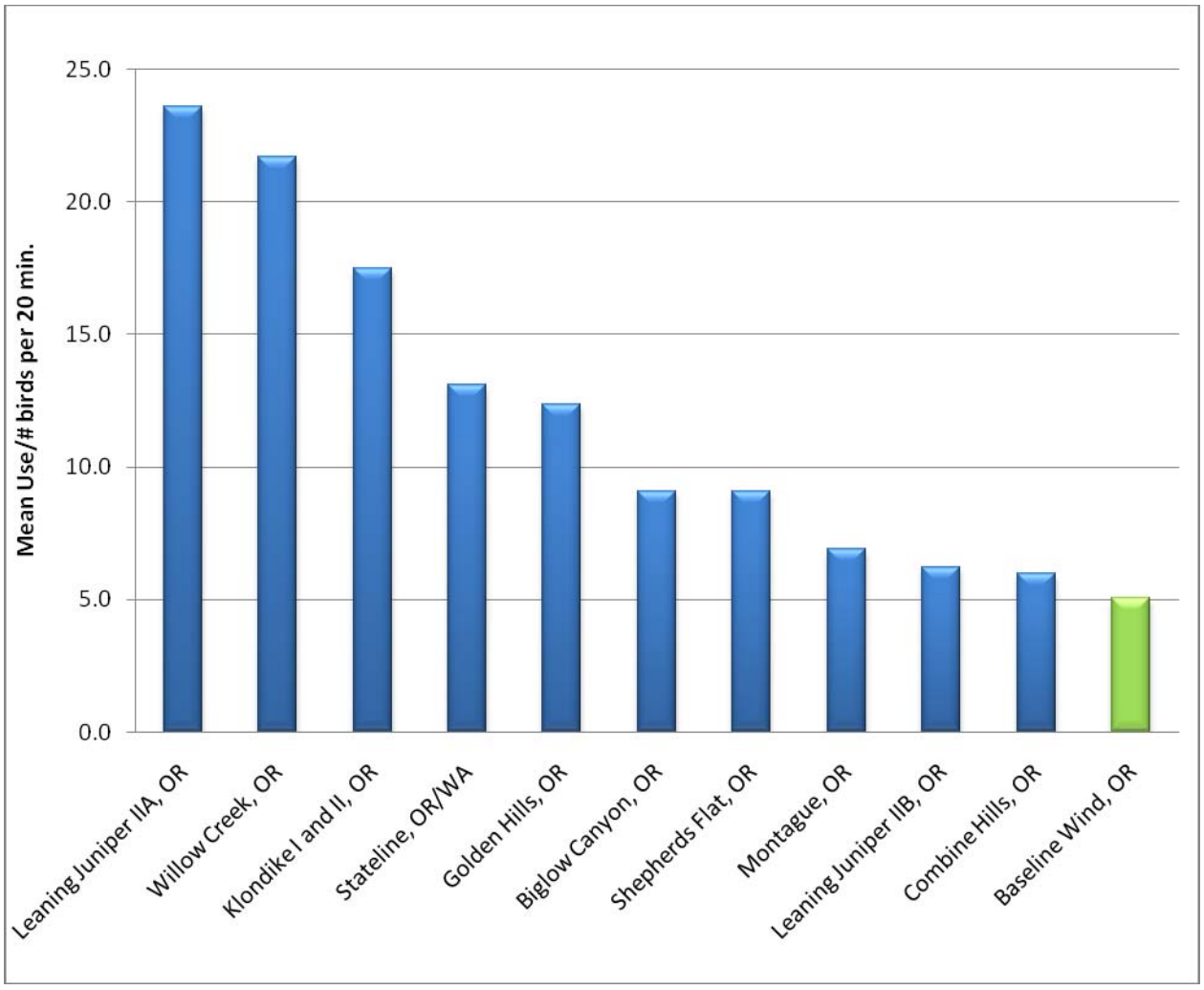
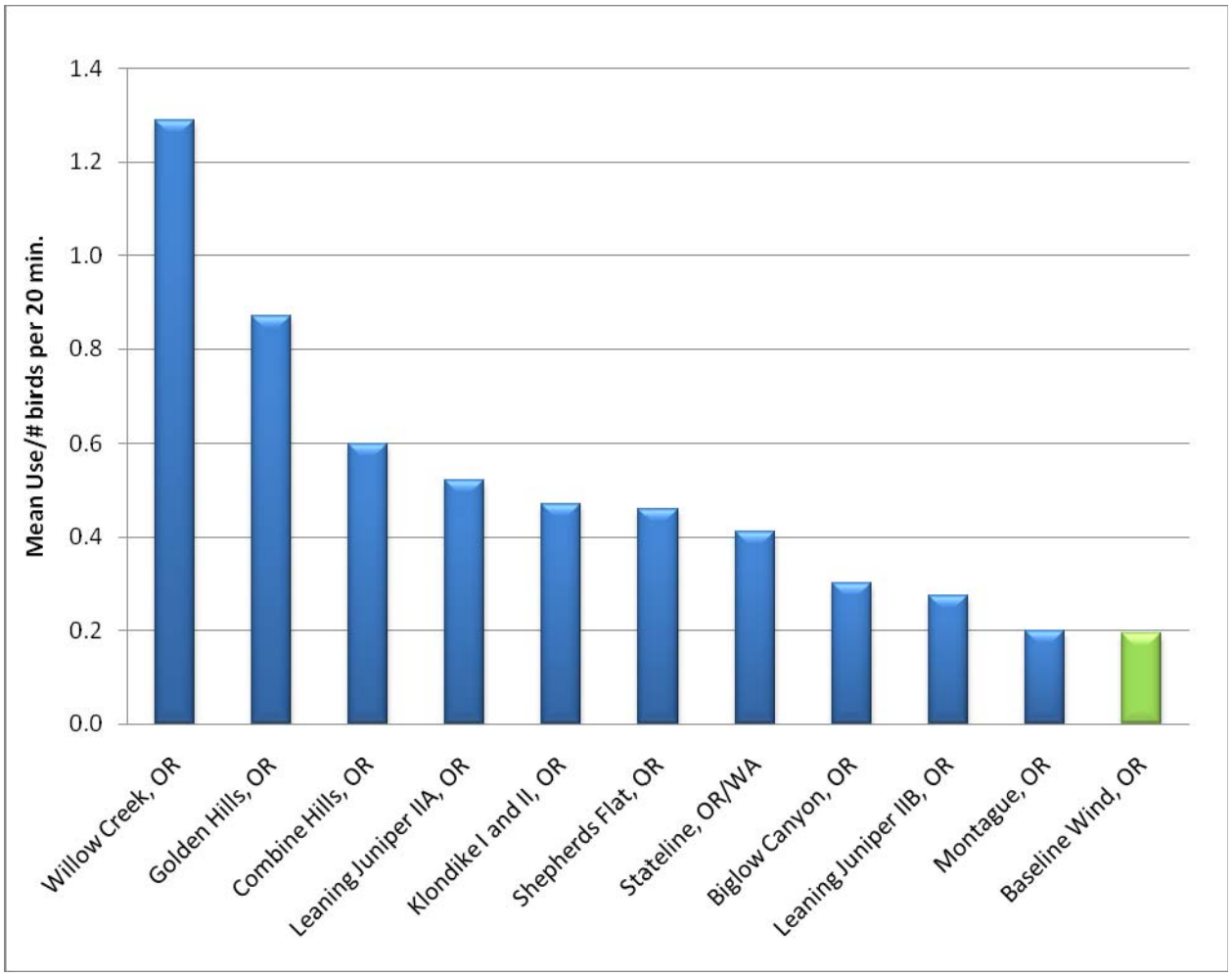


Figure 13. Overall raptor mean use at selected Columbia Plateau Ecoregion wind projects including Baseline Wind.



Attachment P-9
Supplemental Wildlife and Habitat Studies (2010)

Confidential and not for public distribution. Provided under separate cover.

Attachment P-10
Summary of 2010 Avian Use Surveys (2017)

TECHNICAL MEMORANDUM

Summary of 2010 Avian Use Surveys for the Montague Wind Power Facility

PREPARED FOR:	Avangrid Renewables, LLC
COPY TO:	Carrie Konkol/Tetra Tech Irina Makarow/HDR
PREPARED BY:	CH2M HILL Engineers, Inc.
DATE:	July 19, 2017

1.0 Introduction

CH2M HILL Engineers, Inc. (CH2M) was retained by Avangrid Renewables, LLC (Avangrid), to summarize the results of Northwest Wildlife Consultants, Inc. (NWC) 2010 avian use surveys for the Montague Wind Power Facility (Facility). This technical memorandum reports the results of the summer 2010 surveys conducted by NWC, which were completed after two previous reports (NWC, 2010a and 2010b) were prepared and provided to Avangrid. Further, this memorandum is prepared to address site certificate Condition 95. Condition 95(d) reads as follows:

> "(d) Before beginning construction, certificate holder's qualified professional biologist shall complete the avian use studies that began in September 2009 at six plots within or near the facility site as described in the Final Order on the Application. The certificate holder shall provide a written report on the avian use studies to the Department and to ODFW."

2.0 Methods

Three rounds of avian use surveys were conducted in 2009-2010 and described in a report provided to the Oregon Department of Energy and the Oregon Department of Fish and Wildlife in September 2010. A fourth round of surveys was in progress as the 2010 report was being prepared for submittal; data collection methods were the same as those described and approved for the earlier three rounds (NWC, 2010b). The protocol followed for avian use surveys at the Facility was consistent with similar baseline studies conducted at other wind power projects in the Columbia Basin and more broadly, throughout the United States. The protocol for the study follows that described by Reynolds et al. (1980) and is effective for describing habitat use by large birds. Five 800-meter (m; approximately 0.5 mile [mi]) radius survey plots (AA, BB, EE, FF, GG; see the attachment to this memorandum, titled Montague Wind Power Facility Avian Use Study Overview, for plot locations) were located to provide good coverage of the proposed Facility as well as relatively unobstructed viewing conditions. A sixth plot (HH) was surveyed during the initial three rounds as reported in NWC (2010b), but was not included in the fourth round due to its location outside of the Facility site boundary. Ten surveys were conducted at each point from June 8 to August 9, 2010, for a total of 50 surveys.

During avian use surveys, experienced avian observers positioned at the center of the plot recorded all wildlife seen or heard over a 20-minute period, noting species, number of individuals, and distance from plot center, flight height, and habitats utilized for each observation. Flight paths of special-status species and raptors were hand-plotted on topographic maps in the field to later aid in determination of spatial use of these species in relation to proposed turbine sites. Efforts were made to avoid double counting of

individuals; however, given the difficulty in tracking multiple individual birds simultaneously, some double counting was likely (NWC, 2010a).

Average weather conditions (wind speed/direction, temperature, cloud cover and level of precipitation) were noted for each survey plot visit. Efforts were made to vary the survey times for individual plots throughout each survey season to provide a full spectrum of avian activity during all daylight hours. While all avian detections were recorded, it should be noted that the survey protocol and plot placements used here emphasize the accurate detection of large, uncommon birds over a large area (i.e., raptors) while still providing a useful, though less precise measure of smaller, more abundant bird species (Reynolds et al., 1980).

Methods implemented for this investigation follow the methods used in the biological surveys for the previous layout of the Facility (2008-2009) as presented in Exhibit P of the Application for Site Certificate (IBR, 2010). Methods are also the same as used for the amended site boundary for Leaning Juniper IIB in 2008–2009 (LJWP, 2009; NWC, 2009), and for the *Wildlife Baseline Study for the Leaning Juniper Wind Power Facility* and supplemental studies conducted over the period 2004–2006 (Kronner et al., 2005; Attachment P-2 in LJWP, 2006); these sites are adjacent to the Facility. Methods follow standards set forth for preproject assessment in the Oregon Columbia Plateau Ecoregion wind energy siting and permitting guidelines (USFWS, 2008).

3.0 Results

3.1 Avian (Raptor) Use

Sixteen species of birds were identified during point count surveys within the five study plots during the summer 2010 effort (June 8 to August 9, 2010; Table 1). Two additional species were observed in-transit to surveys that were not observed during avian use surveys within or outside of 800-meter plots: ferruginous hawk and prairie falcon (Table 2). No federal or state threatened or endangered species were observed during or incidental to surveys. A total of 107 groups (flocks) comprising a total of 263 individual birds were observed during the summer 2010 surveys (some individuals may have been counted more than once; Table 1). Summer season mean use (5.260 birds/20-minute [min.] survey) was significantly lower than fall season mean use (12.727 birds/20 min.) and was slightly higher than both winter (4.238 birds/20 min.) and spring (2.917 birds/20 min.) season use overall (Table 3).

As raptors are the primary focus of this memorandum, further survey results on the other avian groups (e.g., passerines) are not discussed. Raptor use during summer (mean use 0.880/20 min.) was higher than in winter (mean use 0.404 birds/20 min.), fall (mean use 0.273 birds/20 min.), or spring (0.167 birds/20 min.; Table 3). Raptors overall, had the second highest (second to passerines) frequency of occurrence as a group in fall, winter, and spring surveys and this pattern held true for summer surveys (Table 4). Rough-legged hawk was the most abundant species of raptor at the six plots surveyed during two of the four seasons with the highest use in winter season (0.298 birds/20 min.) and spring season (0.056 birds/20 min.). In fall, red-tailed hawk was the raptor species with highest use (0.091) followed by rough-legged hawk and northern harrier (both 0.068 birds/20 min.) In spring, ferruginous hawk had the second highest mean use of 0.042 birds/20 min. Other raptor species observed during these surveys include Swainson's hawk, American kestrel, prairie falcon, and golden eagle. Two additional raptor species, Cooper's hawk and great-horned owl, were observed while in-transit to surveys.

During summer surveys, Swainson's hawk had significantly higher use than other raptors (0.760 birds/ 20 min.) and this accounted for the high mean use exhibited by raptors in general (0.880 birds/20 min.) during summer. A total of 29 groups of Swainson's hawks, including 38 individuals, were observed during the summer surveys. Among raptors, Swainson's hawk were the most numerous species observed during any one season, followed by rough-legged hawk (34 individuals during winter). No rough-legged hawks were observed during the summer surveys as they breed north of the Facility.

Conversely, no Swainson's hawks were observed during winter surveys as they spend the winter months in southern South America.

3.2 Spatial Use by Raptors

At the five summer 2010 study plots, overall avian mean use ranged from 0.300 birds/20 min. at plot EE to 1.600 birds/20 min. at plot BB (Table 4). The range of all three seasons and all groups combined was fairly similar between plots ranging from 4.359 birds/20 min. at plot BB to 7.243 birds/20 min. at plot GG (Table 7). No one single plot showed consistently higher use than others in all seasons surveyed.

All six study plots surveyed during fall, winter, and spring as well as the five plots surveyed during the summer had some raptor use, with the lone exception of plot EE, which had no raptor use in winter season. Plots BB and FF exhibited the highest number of raptors observed (32 and 25 individuals, respectively) throughout all four seasons and plot EE exhibited the lowest number of raptor observations (8 individuals).

3.3 Special-status Raptor Species

No federal- or state-listed threatened or endangered species were observed during the avian use surveys at the five study plots during summer 2010.

Swainson's hawk (State Sensitive-Vulnerable) was detected 29 times (38 individuals) during summer surveys.

Ferruginous hawk (State Sensitive-Critical) was observed eight times while surveyors were in transit between survey locations; however, no observations occurred during summer surveys.

4.0 Impacts Discussion

4.1 Raptors

In previous reports prepared for the Facility (NWC, 2010a and 2010b), the potential impacts to raptor species posed by the construction and operation of the Facility were discussed extensively. In general, locally nesting raptor species (e.g., Swainson's hawk, ferruginous hawk, red-tailed hawk, and American kestrel) are most at risk of colliding with turbines due to their frequent presence in the survey area, and the fact that they have been found as fatalities at other wind projects in the Oregon Columbia Plateau Ecoregion, including nearby Leaning Juniper I (Gritski et al., 2008). Data gathered during the summer 2010 surveys were consistent with the information provided in the prior three seasons of avian use surveys and therefore there is no change to the previous analysis (NWC, 2010a and 2010b).

4.2 Special-status Raptors

Consistent with findings reported during 2009 summer surveys, Swainson's hawk (State Sensitive-Vulnerable) is at some risk of collision due to the number of individuals observed using the Facility during the summer 2010 avian use surveys (see Attachment P-7 in IBR, 2010). Data gathered during the summer 2010 surveys were consistent with the information provided in the prior three seasons of avian use surveys and therefore there is no change to the previous analysis (NWC, 2010a and 2010b).

Ferruginous hawk (State Sensitive-Critical) is at some risk of collision due to the number of individuals observed using the Facility during the summer 2010 (see Attachment P-7 in IBR, 2010). This finding also is consistent with the 2009 summer surveys. Data gathered during the summer 2010 surveys were consistent with the information provided in the prior three seasons of avian use surveys and therefore there is no change to the previous analysis (NWC, 2010a and 2010b).

5.0 References

Gritski, B. K. Kronner, and S. Downes. 2008. *Leaning Juniper Wind Power Project, 2006–2008. Wildlife Monitoring Final Report*. Prepared for PacifiCorp Energy, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

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Tables

Table 1. Species Observed during Summer 2010 Avian Use Surveys

Species/Groups	Summer 2010	
	# Grps	# Ind
Raptors		**44**
Harriers		*2*
northern harrier	1	2
Buteos		*41*
red-tailed hawk	3	3
Swainson's hawk	29	38
Falcons		*1*
American kestrel	1	1
Doves		**42**
mourning dove	3	4
rock pigeon	4	38
Gamebirds		**1**
ring-necked pheasant	1	1
Shorebirds		**3**
long-billed curlew	3	3
Passerines		**173**
Songbirds		*155*
Brewer's blackbird	1	1
cliff swallow	1	10
European starling	3	4
loggerhead shrike	1	1
horned lark	33	106
unidentified passerine	1	7
unidentified swallow	1	2
western kingbird	3	3
western meadowlark	11	21
Corvids		*18*
common raven	7	18
Totals	**107**	**263**

Table 2. In-transit Avian Observations Recorded at Montague Wind Power Facility during Summer 2010

Common Name[a]	Observed Only In-Transit	Summer 2010
American kestrel		1
ferruginous hawk	8	0
loggerhead shrike		15
long-billed curlew		1
prairie falcon	1	0
red-tailed hawk		1
Swainson's hawk		12
Total	**9**	**30**

[a] Table includes species of interest (such as 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 recorded, individuals may have been counted more than once.

Summer: June 8 through August 9, 2010

Table 3. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Species and Groups at the Montague Wind Power Facility, 2009–2010

	Fall 2009[a]			Winter 2009 - 2010			Spring 2010			Summer 2010		
Species/Groups	Mean Use[b]	% Comp[c]	% Freq[d]	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq
Raptors	**0.273**	**2.14**	**25.00**	**0.404**	**9.24**	**38.60**	**0.167**	**5.71**	**15.28**	**0.880**	**16.73**	**54.00**
Harriers	*0.068*	*0.54*	*6.82*	*0.026*	*0.60*	*2.63*	*0.000*	*0.00*	*0.00*	*0.040*	*0.76*	*2.00*
northern harrier	0.068	0.54	6.82	0.026	0.60	2.63	0.000	0.00	0.00	0.040	0.76	2.00
Buteos	*0.182*	*1.43*	*15.91*	*0.316*	*2.73*	*29.82*	*0.139*	*4.76*	*12.50*	*0.820*	*15.59*	*50.00*
ferruginous hawk	0.000	0.00	0.00	0.000	0.00	0.00	0.042	1.43	2.78	0.000	0.00	0.00
red-tailed hawk	0.091	0.71	6.82	0.018	0.40	1.75	0.028	0.95	2.78	0.060	1.14	6.00
rough-legged hawk	0.068	0.54	6.82	0.298	6.83	28.07	0.056	1.90	5.56	0.000	0.00	0.00
Swainson's hawk	0.023	0.18	2.27	0.000	0.00	0.00	0.014	0.48	1.39	0.760	14.45	50.00
Falcons	*0.023*	*0.18*	*2.27*	*0.035*	*0.80*	*3.51*	*0.000*	*0.00*	*0.00*	*0.020*	*0.38*	*2.00*
American kestrel	0.023	0.18	2.27	0.009	0.20	0.88	0.000	0.00	0.00	0.020	0.38	2.00
prairie falcon	0.000	0.00	0.00	0.026	0.60	2.63	0.000	0.00	0.00	0.000	0.00	0.00
Eagles	*0.000*	*0.00*	*0.00*	*0.018*	*0.40*	*1.75*	*0.000*	*0.00*	*0.00*	0.000	0.00	0.00
golden eagle	0.000	0.00	0.00	0.018	0.40	1.75	0.000	0.00	0.00	0.000	0.00	0.00
Other raptors	*0.000*	*0.00*	*0.00*	*0.009*	*0.20*	*0.88*	*0.028*	*0.95*	*2.78*	0.000	0.00	0.00
unidentified hawk	0.000	0.00	0.00	0.009	0.20	0.88	0.028	0.95	2.78	0.000	0.00	0.00
Doves	**0.000**	**0.00**	**0.00**	**0.351**	**8.03**	**9.65**	**0.028**	**0.95**	**2.78**	**0.840**	**15.97**	**14.00**
mourning dove	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.080	1.52	6.00
rock pigeon	0.000	0.00	0.00	0.351	8.03	9.65	0.014	0.48	1.39	0.760	14.45	8.00
Gamebirds	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.014**	**0.48**	**1.39**	**0.020**	**0.38**	**2.00**
ring-necked pheasant	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.020	0.38	2.00
Shorebirds	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.278**	**9.52**	**11.11**	**0.060**	**1.14**	**6.00**
long-billed curlew	0.000	0.00	0.00	0.000	0.00	0.00	0.278	9.52	11.11	0.060	1.14	6.00
Wading birds	**0.023**	**0.18**	**2.27**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**	**0.000**	**0.00**	**0.00**
great blue heron	0.023	0.18	2.27	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
Passerines	**12.432**	**97.68**	**95.45**	**3.614**	**82.73**	**69.30**	**2.431**	**83.33**	**87.50**	**3.460**	**65.78**	**74.00**
Songbirds	*11.614*	*91.25*	*90.91*	*3.140*	*71.89*	*56.14*	*2.167*	*74.29*	*84.72*	*3.100*	*58.94*	*72.00*
American pipit	0.523	4.11	9.09	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
bank swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.000	0.00	0.00
barn swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.056	1.90	2.78	0.000	0.00	0.00
Brewer's blackbird	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.020	0.38	2.00
brown-headed cowbird	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.000	0.00	0.00
cliff swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.028	0.95	1.39	0.200	3.80	2.00

Table 3. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Species and Groups at the Montague Wind Power Facility, 2009–2010

European starling	0.545	4.29	6.82	0.430	9.84	10.53	0.111	3.81	6.94	0.080	1.52	6.00
loggerhead shrike	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.020	0.38	2.00
horned lark	4.431	34.11	79.55	2.246	51.41	44.74	1.403	48.40	77.78	2.120	40.30	66.00
mountain bluebird	0.068	0.54	2.27	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
savannah sparrow	0.000	0.00	0.00	0.000	0.00	0.00	0.028	0.95	2.78	0.000	0.00	0.00
Say's phoebe	0.000	0.00	0.00	0.000	0.00	0.00	0.042	1.43	4.17	0.000	0.00	0.00
Townsend's solitaire	0.023	0.18	2.27	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
tree swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.069	2.38	1.39	0.000	0.00	0.00
unidentified blackbird	0.000	0.00	0.00	0.167	3.82	0.88	0.000	0.00	0.00	0.000	0.00	0.00
unidentified passerine	5.795	45.54	36.36	0.254	5.82	2.63	0.000	0.00	0.00	0.140	2.66	2.00
unidentified sparrow	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.000	0.00	0.00
unidentified swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.040	0.76	2.00
violet-green swallow	0.000	0.00	0.00	0.000	0.00	0.00	0.056	1.90	1.39	0.000	0.00	0.00
western flycatcher	0.000	0.00	0.00	0.000	0.00	0.00	0.014	0.48	1.39	0.000	0.00	0.00
western kingbird	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.060	1.14	6.00
western meadowlark	0.227	1.79	9.09	0.044	1.00	3.51	0.306	10.48	20.83	0.420	7.98	18.00
white-crowned sparrow	0.068	0.54	2.27	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
yellow-rumped warbler	0.023	0.18	2.27	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00
Corvids	**0.818**	**6.43**	**52.27**	**0.474**	**10.84**	**28.07**	**0.264**	**9.05**	**18.06**	***0.360***	***6.84***	***14.00***
black-billed magpie	0.000	0.00	0.00	0.018	0.40	0.88	0.000	0.00	0.00	0.000	0.00	0.00
common raven	0.818	6.43	52.27	0.456	10.44	29.19	0.264	9.05	18.06	*0.360*	*6.84*	*14.00*
Totals	**12.727**	**100.00**	**95.45**	**4.368**	**100.00**	**88.60**	**2.917**	**100.00**	**93.06**	**5.260**	**100.00**	**90.00**

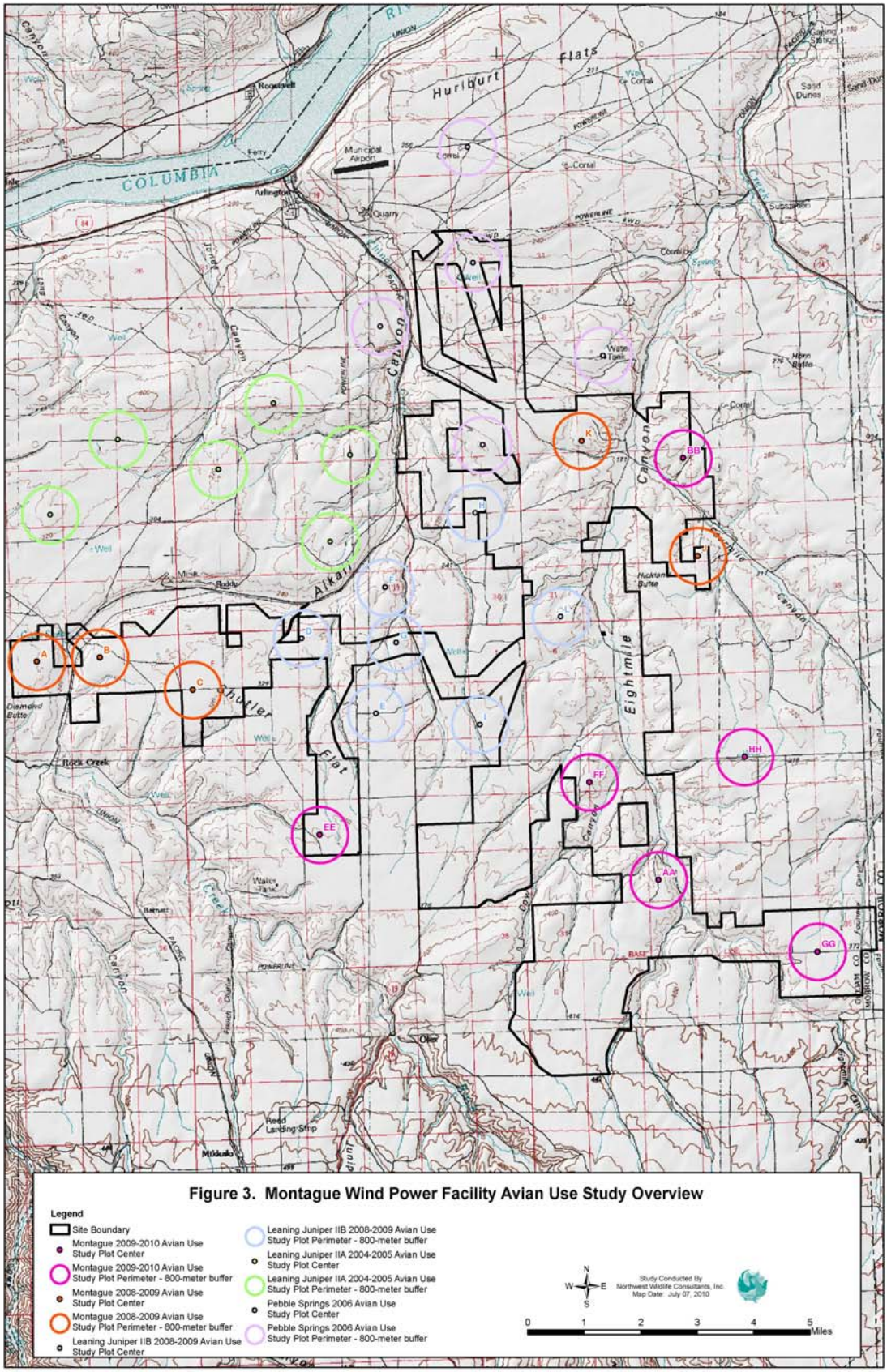
Table 4. Number of Individuals and Mean Use by Plot for Avian Groups at the Montague Wind Power Facility during Summer 2010

Avian Group	Study Plots									
	AA		BB		EE		FF		GG	
	# Ind	Mean Use	# Ind	Mean Use	# Ind	Mean Use	# Ind	Mean Use	# Ind	Mean Use
Raptors	5	0.500	16	1.600	3	0.300	14	1.400	6	0.600
Doves/Pigeons	0	0.000	0	0.000	13	1.300	0	0.000	29	2.900
Gamebirds	0	0.000	0	0.000	1	0.100	0	0.000	0	0.000
Shorebirds	0	0.000	3	0.300	0	0.000	0	0.000	0	0.000
Passerines	18	1.800	41	4.100	42	4.200	36	3.600	36	3.600
Songbirds	*16*	*1.600*	*36*	*3.600*	*38*	*3.800*	*35*	*3.500*	*30*	*3.000*
Corvids	*2*	*0.200*	*5*	*0.500*	*4*	*0.400*	*1*	*0.100*	*6*	*0.600*
Total All Groups	**23**	**2.300**	**60**	**6.000**	**59**	**5.900**	**50**	**5.000**	**71**	**7.100**

Summer: June 8 through August 9, 2010; 10 visits to AA, BB, EE, FF, GG= 50 surveys.

Attachment
Overview Map Showing Plot Locations

Figure 3. Montague Wind Power Facility Avian Use Study Overview



Attachment P-11
Avian Use and Habitat Disturbance Supporting Data

Attachment P-11. Avian Use and Habitat Disturbance Supporting Data

List of Tables

1 Species Observed within 800 Meters at Avian Use Study Plots in Three Four-Season Studies (2008–2010) 1
2 Special-status Avian Species Observed During Avian Use Surveys (including incidental observations and in-transit) from Three Four-Season Studies (2008–2010) 4
3 Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons 5
4 Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons 8
5 Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed 18 Avian Study Plots in 2009-2010 for the Baseline Wind Project 11
6 Species Observed and Mean Use Within 800 Meters by Plot at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons 14
7 Species Groups Observed and Mean Use within 800 Meters by Plot at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons 16
8 Species Groups Observed and Mean Use within 800 Meters at 18 Plots During 2009-2010 Avian Use Study Conducted for the Baseline Wind Project 18
9 Temporary and Permanent Disturbance by Habitat Category and Subtype – Phase 2 Design Scenario A (Maximum Wind Layout) 21
10 Temporary and Permanent Disturbance by Habitat Category and Subtype – Phase 2 Design Scenario B (Minimum Wind Layout) 22
11 Temporary and Permanent Disturbance by Habitat Category and Subtype – Phase 2 Design Scenario C (Solar Layout) 23

Attachment P-11. Avian Use and Habitat Disturbance Supporting Data

Table 1. Species Observed within 800 Meters at Avian Use Study Plots in Three Four-Season Studies (2008–2010)

	Montague 2008-2009 (5 plots)		Montague 2009-2010 (6 plots)		Baseline 2009-2010 (18 plots)	
Species/Groups	**# Grps**	**# Ind**	**# Grps**	**# Ind**	**# Grps**	**# Ind**
Waterfowl		5		0		7
Canada goose	1	5	0	0	7	6
Raptors		46		114		174
Harriers		10		8		88
Northern harrier	10	10	7	8	77	88
Buteos		29		95		103
Red-tailed hawk	5	5	11	11	21	21
Rough-legged hawk	1	1	39	41	52	53
Ferruginous hawk	3	3	2	3	4	4
Swainson's hawk	18	18	31	40	25	25
Unidentified buteo	22	2	3	3	4	4
Falcons		6		6		32
American kestrel	2	2	3	3	21	25
Prairie falcon	3	3	3	3	7	7
Unidentified falcon	1	1	0	0	0	0
Eagles		0		2		1
Golden eagle	0	0	2	2	1	1
Vultures		1		0		0
Turkey vulture	1	1	0	0	0	0
Shorebirds		74		23		52
Killdeer	0	0	0	0	3	3
Long-billed curlew	54	74	11	23	28	52
Wading birds		0		1		0
Great blue heron	0	0	1	1	0	0
Game birds		1		2		0
California quail	1	1	0	0	0	0
Ring-necked pheasant	0	0	2	2		
Doves		1		84		49
Mourning dove	1	1	4	5	15	25
Rock pigeon	0	0	16	79	8	24
Passerines		1,428		1.307		4,959
Songbirds		1,181		1,180		4,355

Table 1. Species Observed within 800 Meters at Avian Use Study Plots in Three Four-Season Studies (2008–2010)

	Montague 2008-2009 (5 plots)		Montague 2009-2010 (6 plots)		Baseline 2009-2010 (18 plots)	
Species/Groups	**# Grps**	**# Ind**	**# Grps**	**# Ind**	**# Grps**	**# Ind**
American pipit	0	0	4	23	2	16
American robin	2	6	0	0	3	25
Bank swallow	0	0	1	1	0	0
Barn swallow	1	2	2	4	26	42
Brewer's blackbird	1	1	1	1	11	71
Brown-headed cowbird	0	0	1	1	0	0
Cliff swallow	0	0	2	12	1	4
Dark-eyed junco	1	6	0	0	1	1
European starling	1	15	23	157	7	37
Grasshopper sparrow	2	2	0	0	2	2
House finch	7	8	0	0	0	0
Horned lark	584	746	189	654	732	3,412
Lark sparrow	3	4	0	0	1	2
Loggerhead shrike	1	1	2	2	1	1
Mountain bluebird	1	3	1	3	0	0
Red-winged blackbird	1	2	1	2	6	23
Savannah sparrow	4	4	2	2	17	42
Say's phoebe	0	0	3	3	3	3
Spotted towhee	0	0	0	0	1	1
Townsend's solitaire	0	0	1	1	0	0
Tree swallow	0	0	1	5	0	0
Unidentified blackbird	2	26	1	19	5	29
Unidentified finch	1	4	0	0	0	0
Unidentified passerine	24	75	22	291	36	216
Unidentified sparrow	8	21	1	1	6	17
Unidentified swallow	0	0	1	2	1	2
Vesper sparrow	8	8	4	4	0	0
Violet-green swallow	0	0	2	6	2	5
Western flycatcher	0	0	1	1	0	0
Western kingbird	2	4	3	3	17	18
Western meadowlark	221	243	34	58	235	341
White-crowned sparrow	0	0	1	3	8	44
Yellow-rumped warbler	0	0	1	1	0	0
Corvids		247		39		604
American crow	1	1	0	0	0	0

Table 1. Species Observed within 800 Meters at Avian Use Study Plots in Three Four-Season Studies (2008–2010)

Species/Groups	Montague 2008-2009 (5 plots)		Montague 2009-2010 (6 plots)		Baseline 2009-2010 (18 plots)	
	# Grps	# Ind	# Grps	# Ind	# Grps	# Ind
Black-billed magpie	8	9	1	2	0	0
Common raven	114	237	76	125	338	604
Totals	1,101	1,555	511	1,531	1,727	5,369

Ind = Number of individuals.

Grps = Number of groups.

Sources:

Northwest Wildlife Consultants, Inc. (NWC). 2009. *Wildlife and Habitat Studies for Montague Wind Power Facility*. Prepared for Iberdrola Renewables, Inc., Portland, Oregon. December 22.

Northwest Wildlife Consultants, Inc. (NWC). 2009. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Conducted for *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility*. Prepared for Iberdrola Renewables, Inc. June.

Northwest Wildlife Consultants, Inc. (NWC). 2010. *Supplemental Wildlife and Habitat Studies for Montague Wind Power Facility*. Prepared for Montague Wind Power Facility. September 22.

Table 2. Special-status Avian Species Observed During Avian Use Surveys (including incidental observations and in-transit) from Three Four-Season Studies (2008–2010)

Species	Status	Montague 2008-2009	Montague 2009-2010	Baseline 2009-2010
Burrowing owl[a]	SC, BoCC			
Ferruginous hawk	SC, BoCC	X	X	X
Golden eagle	BGEPA, BoCC	X	X	X
Grasshopper sparrow	SV	X		X
Loggerhead shrike	SV, BoCC	X	X	X
Long-billed curlew	SV, BoCC	X	X	X
Swainson's hawk	SV, BoCC	X	X	X

Notes:

[a] Phase 2 surveys included one area, Shutler Flat, where burrowing owl had previously been identified (NWC, 2010). This location was no longer active during 2017 surveys.

This table does not include sightings of special-status wildlife observed during ground transect surveys.

Status Key:

Oregon (ORBIC, 2017):

SC = "Critical" sensitive species are those for which listing as Threatened or Endangered would be appropriate if immediate conservation actions were not taken. Some peripheral species which are at risk throughout their range and some disjunct populations (those that are geographically isolated from other populations) area also considered Critical.

SV = "Vulnerable" sensitive species are not in imminent danger of being listed as Threatened or Endangered, but could become sensitive-critical, Threatened, or Endangered with changes in populations, habitats or threats.

Federal:

BoCC = U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern (USFWS, 2002; Table BCR 9, Great Basin Region).

BGEPA -Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d), June 8, 1940, as amended 1959, 1962, 1972, 1978.

Sources:

Northwest Wildlife Consultants, Inc. (NWC). 2009. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Conducted for *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility*. Prepared for Iberdrola Renewables, Inc. June.

Northwest Wildlife Consultants, Inc. (NWC). 2010. *Supplemental Wildlife and Habitat Studies for Montague Wind Power Facility*. Prepared for Montague Wind Power Facility. September 22.

Northwest Wildlife Consultants, Inc. (NWC). 2011. *Ecological Baseline Investigations and Impact Assessment for Baseline Wind Energy Facility, Gilliam County, Oregon*. Prepared for Baseline Wind. December 16.

Table 3. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Fall			Winter			Spring			Summer		
Species/Groups	**Mean Use[a]**	**% Comp[b]**	**% Freq[c]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Waterfowl	**0**	**0**	**0**	**0.064**	**1.11**	**1.28**	**0**	**0**	**0**	**0**	**0**	**0**
Canada goose	0	0	0	0.064	1.11	1.28	0	0	0	0	0	0
Raptors	**0.133**	**0.17**	**13.33**	**0.051**	**0.89**	**5.13**	**0.2**	**2.74**	**18.18**	**0.5**	**7.14**	**42**
Harriers	*0.044*	*0.57*	*4.44*	*0*	*0*	*0*	*0.091*	*1.24*	*9.09*	*0.06*	*0.86*	*6*
northern harrier	0.044	0.57	4.44	0	0	0	0.091	1.24	9.09	0.06	0.86	6
Buteos	*0.044*	*0.57*	*4.44*	*0.038*	*0.67*	*3.85*	*0.109*	*1.49*	*10.91*	*0.36*	*5.14*	*28*
red-tailed hawk	0.022	0.28	2.22	0	0	0	0.018	0.25	1.82	0.06	0.86	6
rough-legged hawk	0	0	0	0.013	0.22	1.28	0	0	0	0	0	0
ferruginous hawk	0	0	0	0.013	0.22	1.28	0	0	0	0.04	0.57	4
Swainson's hawk	0	0	0	0.013	0.22	1.28	0.091	1.24	9.09	0.24	3.43	20
unidentified buteo	0.022	0.28	2.22	0	0	0	0	0	0	0.02	0.29	2
Falcons	*0.022*	*0.28*	*2.22*	*0.013*	*0.22*	*1.28*	*0*	*0*	*0*	*0.08*	*1.14*	*8*
American kestrel	0	0	0	0	0	0	0	0	0	0.04	0.57	4
prairie falcon	0	0	0	0.013	0.22	1.28	0	0	0	0.04	0.57	4
unidentified falcon	0.022	0.28	2.22	0	0	0	0	0	0	0	0	0
Vultures	*0.022*	*0.28*	*2.22*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
turkey vulture	0.022	0.28	2.22	0	0	0	0	0	0	0	0	0
Shorebirds	**0**	**0**	**0**	**0**	**0**	**0**	**0.709**	**9.7**	**45.45**	**0.7**	**10**	**30**
long-billed curlew	0	0	0	0	0	0	0.709	9.7	45.45	0.7	10	30
Game birds	**0.022**	**0.28**	**2.22**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
California quail	0.022	0.28	2.22	0	0	0	0	0	0	0	0	0
Doves	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.02**	**0.29**	**2**
mourning dove	0	0	0	0	0	0	0	0	0	0.02	0.29	2

Table 3. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Fall			Winter			Spring			Summer		
Species/Groups	**Mean Use[a]**	**% Comp[b]**	**% Freq[c]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Passerines	**7.689**	**98.02**	**97.78**	**5.654**	**98**	**89.74**	**6.4**	**87.56**	**92.73**	**5.78**	**82.57**	**100**
Songbirds	*6.356*	*81.02*	*95.56*	*4.038*	*70*	*87.18*	*5.691*	*77.86*	*92.73*	*5.34*	*76.29*	*100*
American robin	0	0	0	0.077	1.33	2.56	0	0	0	0	0	0
barn swallow	0	0	0	0	0	0	0.036	0.5	1.82	0	0	0
Brewer's blackbird	0	0	0	0	0	0	0	0	0	0.02	0.29	2
dark-eyed junco	0.133	1.7	2.22	0	0	0	0	0	0	0	0	0
European starling	0.333	4.25	2.22	0	0	0	0	0	0	0	0	0
grasshopper sparrow	0	0	0	0	0	0	0	0	0	0.04	0.57	4
house finch	0.044	0.57	4.44	0.038	0.67	3.85	0.018	0.25	1.82	0.04	0.57	2
horned lark	3.467	44.19	95.56	3.128	54.22	83.33	3.236	44.28	87.27	3.36	48	92
lark sparrow	0	0	0	0	0	0	0.018	0.25	1.82	0.06	0.86	2
loggerhead shrike	0	0	0	0	0	0	0.018	0.25	1.82	0	0	0
mountain bluebird	0.067	0.85	2.22	0	0	0	0	0	0	0	0	0
red-winged blackbird	0	0	0	0	0	0	0.036	0.5	1.82	0	0	0
savannah sparrow	0	0	0	0	0	0	0.036	0.5	3.64	0.04	0.57	4
unidentified blackbird	0.578	7.37	4.44	0	0	0	0	0	0	0	0	0
unidentified finch	0	0	0	0.051	0.89	1.28	0	0	0	0	0	0
unidentified passerine	0.867	11.05	20	0.385	6.67	11.54	0.109	1.49	9.09	0	0	0
unidentified sparrow	0.378	4.82	11.11	0	0	0	0	0	0	0.08	1.14	6
vesper sparrow	0	0	0	0	0	0	0.073	1	5.45	0.08	1.14	6
western kingbird	0	0	0	0	0	0	0.055	0.75	1.82	0.02	0.29	2
western meadowlark	0.489	6.23	26.67	0.359	6.22	17.95	2.055	28.11	72.73	1.6	22.86	70

Table 3. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Fall			Winter			Spring			Summer		
Species/Groups	**Mean Use[a]**	**% Comp[b]**	**% Freq[c]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Corvids	*1.333*	*17*	*37.78*	*1.615*	*28*	*42.31*	*0.709*	*9.7*	*38.18*	*0.44*	*6.29*	*32*
American crow	0	0	0	0	0	0	0.018	0.25	1.82	0	0	0
black-billed magpie	0.022	0.28	2.22	0.064	1.11	5.13	0.036	0.5	3.64	0.02	0.29	2
common raven	1.311	16.71	35.56	1.551	26.89	39.74	0.655	8.96	34.55	0.42	6	30
Totals	**7.844**		**97.78**	**5.769**		**92.31**	**7.309**		**94.55**	**7**		**100**

a – mean use = number individuals/20-min/800-m plot.

b – percent composition = the percent out of all birds observed during surveys that were of the species.

c – percent frequency = percent of surveys in which a species occurred.

Source:

Northwest Wildlife Consultants, Inc. (NWC). 2009. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Conducted for *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility*. Prepared for Iberdrola Renewables, Inc. June.

Table 4. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Fall 2009[a]			Winter 2009 - 2010			Spring 2010			Summer 2010		
Species/Groups	**Mean Use[b]**	**% Comp[c]**	**% Freq[d]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Raptors	**0.273**	**2.14**	**25**	**0.404**	**9.24**	**38.6**	**0.167**	**5.71**	**15.28**	**0.88**	**16.73**	**54**
Harriers	*0.068*	*0.54*	*6.82*	*0.026*	*0.6*	*2.63*	*0*	*0*	*0*	*0.04*	*0.76*	*2*
northern harrier	0.068	0.54	6.82	0.026	0.6	2.63	0	0	0	0.04	0.76	2
Buteos	*0.182*	*1.43*	*15.91*	*0.316*	*2.73*	*29.82*	*0.139*	*4.76*	*12.5*	*0.82*	*15.59*	*50*
ferruginous hawk	0	0	0	0	0	0	0.042	1.43	2.78	0	0	0
red-tailed hawk	0.091	0.71	6.82	0.018	0.4	1.75	0.028	0.95	2.78	0.06	1.14	6
rough-legged hawk	0.068	0.54	6.82	0.298	6.83	28.07	0.056	1.9	5.56	0	0	0
Swainson's hawk	0.023	0.18	2.27	0	0	0	0.014	0.48	1.39	0.76	14.45	50
Falcons	*0.023*	*0.18*	*2.27*	*0.035*	*0.8*	*3.51*	*0*	*0*	*0*	*0.02*	*0.38*	*2*
American kestrel	0.023	0.18	2.27	0.009	0.2	0.88	0	0	0	0.02	0.38	2
prairie falcon	0	0	0	0.026	0.6	2.63	0	0	0	0	0	0
Eagles	*0*	*0*	*0*	*0.018*	*0.4*	*1.75*	*0*	*0*	*0*	0	0	0
golden eagle	0	0	0	0.018	0.4	1.75	0	0	0	0	0	0
Other raptors	*0*	*0*	*0*	*0.009*	*0.2*	*0.88*	*0.028*	*0.95*	*2.78*	0	0	0
unidentified hawk	0	0	0	0.009	0.2	0.88	0.028	0.95	2.78	0	0	0
Doves	**0**	**0**	**0**	**0.351**	**8.03**	**9.65**	**0.028**	**0.95**	**2.78**	**0.84**	**15.97**	**14**
mourning dove	0	0	0	0	0	0	0.014	0.48	1.39	0.08	1.52	6
rock pigeon	0	0	0	0.351	8.03	9.65	0.014	0.48	1.39	0.76	14.45	8
Gamebirds	**0**	**0**	**0**	**0**	**0**	**0**	**0.014**	**0.48**	**1.39**	**0.02**	**0.38**	**2**
ring-necked pheasant	0	0	0	0	0	0	0.014	0.48	1.39	0.02	0.38	2
Shorebirds	**0**	**0**	**0**	**0**	**0**	**0**	**0.278**	**9.52**	**11.11**	**0.06**	**1.14**	**6**
long-billed curlew	0	0	0	0	0	0	0.278	9.52	11.11	0.06	1.14	6

Table 4. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Fall 2009[a]			Winter 2009 - 2010			Spring 2010			Summer 2010		
Species/Groups	**Mean Use[b]**	**% Comp[c]**	**% Freq[d]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Wading birds	**0.023**	**0.18**	**2.27**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
great blue heron	0.023	0.18	2.27	0	0	0	0	0	0	0	0	0
Passerines	**12.432**	**97.68**	**95.45**	**3.614**	**82.73**	**69.3**	**2.431**	**83.33**	**87.5**	**3.46**	**65.78**	**74**
Songbirds	*11.614*	*91.25*	*90.91*	*3.14*	*71.89*	*56.14*	*2.167*	*74.29*	*84.72*	*3.1*	*58.94*	*72*
American pipit	0.523	4.11	9.09	0	0	0	0	0	0	0	0	0
bank swallow	0	0	0	0	0	0	0.014	0.48	1.39	0	0	0
barn swallow	0	0	0	0	0	0	0.056	1.9	2.78	0	0	0
Brewer's blackbird	0	0	0	0	0	0	0	0	0	0.02	0.38	2
brown-headed cowbird	0	0	0	0	0	0	0.014	0.48	1.39	0	0	0
cliff swallow	0	0	0	0	0	0	0.028	0.95	1.39	0.2	3.8	2
European starling	0.545	4.29	6.82	0.43	9.84	10.53	0.111	3.81	6.94	0.08	1.52	6
loggerhead shrike	0	0	0	0	0	0	0.014	0.48	1.39	0.02	0.38	2
horned lark	4.431	34.11	79.55	2.246	51.41	44.74	1.403	48.4	77.78	2.12	40.3	66
mountain bluebird	0.068	0.54	2.27	0	0	0	0	0	0	0	0	0
savannah sparrow	0	0	0	0	0	0	0.028	0.95	2.78	0	0	0
Say's phoebe	0	0	0	0	0	0	0.042	1.43	4.17	0	0	0
Townsend's solitaire	0.023	0.18	2.27	0	0	0	0	0	0	0	0	0
tree swallow	0	0	0	0	0	0	0.069	2.38	1.39	0	0	0
unidentified blackbird	0	0	0	0.167	3.82	0.88	0	0	0	0	0	0
unidentified passerine	5.795	45.54	36.36	0.254	5.82	2.63	0	0	0	0.14	2.66	2
unidentified sparrow	0	0	0	0	0	0	0.014	0.48	1.39	0	0	0
unidentified swallow	0	0	0	0	0	0	0	0	0	0.04	0.76	2

Table 4. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Fall 2009[a]			Winter 2009 - 2010			Spring 2010			Summer 2010		
Species/Groups	**Mean Use[b]**	**% Comp[c]**	**% Freq[d]**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
violet-green swallow	0	0	0	0	0	0	0.056	1.9	1.39	0	0	0
western flycatcher	0	0	0	0	0	0	0.014	0.48	1.39	0	0	0
western kingbird	0	0	0	0	0	0	0	0	0	0.06	1.14	6
western meadowlark	0.227	1.79	9.09	0.044	1	3.51	0.306	10.48	20.83	0.42	7.98	18
white-crowned sparrow	0.068	0.54	2.27	0	0	0	0	0	0	0	0	0
yellow-rumped warbler	0.023	0.18	2.27	0	0	0	0	0	0	0	0	0
Corvids	**0.818**	**6.43**	**52.27**	**0.474**	**10.84**	**28.07**	**0.264**	**9.05**	**18.06**	***0.36***	***6.84***	***14***
black-billed magpie	0	0	0	0.018	0.4	0.88	0	0	0	0	0	0
common raven	0.818	6.43	52.27	0.456	10.44	29.19	0.264	9.05	18.06	*0.36*	*6.84*	*14*
Totals	**12.727**	**100**	**95.45**	**4.368**	**100**	**88.6**	**2.917**	**100**	**93.06**	**5.26**	**100**	**90**

a – mean use = number individuals/20-min/800-m plot.

b – percent composition = the percent out of all birds observed during surveys that were of the species.

c – percent frequency = percent of surveys in which a species occurred.

Sources:

CH2M HILL Engineers, Inc. (CH2M). 2017. *2017 Washington Ground Squirrel Surveys and Habitat Mapping for Montague Wind Power Facility—Phase 2*. Prepared for Avangrid Renewables. August.

Northwest Wildlife Consultants, Inc. (NWC). 2010. *Supplemental Wildlife and Habitat Studies for Montague Wind Power Facility*. Prepared for Montague Wind Power Facility. September 22.

Table 5. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed 18 Avian Study Plots in 2009-2010 for the Baseline Wind Project

	Winter (342 surveys)			Spring (198 surveys)			Summer (197 surveys)			Fall (198 surveys)		
Species	Mean Use[a]	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq	Mean Use	% Comp	% Freq
Waterfowl	**0.231**	**2.43**	**1.46**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Canada goose	0.231	2.43	1.46	0	0	0	0	0	0	0	0	0
Raptors	**0.184**	**1.93**	**16.08**	**0.293**	**8.24**	**26.26**	**0.132**	**4.02**	**12.69**	**0.136**	**3.54**	**11.62**
Harriers	*0.035*	*0.37*	*3.22*	*0.066*	*1.85*	*6.06*	*0.03*	*0.93*	*2.54*	*0.015*	*0.39*	*1.52*
northern harrier	0.035	0.37	3.22	0.066	1.85	6.06	0.03	0.93	2.54	0.015	0.39	1.52
Buteos	*0.108*	*1.14*	*9.65*	*0.212*	*5.97*	*19.7*	*0.081*	*2.48*	*8.12*	*0.04*	*1.05*	*4.04*
ferruginous hawk	0	0	0	0.015	0.43	1.52	0.005	0.15	0.51	0	0	0
red-tailed hawk	0.018	0.18	1.75	0.015	0.43	1.52	0.041	1.24	4.06	0.02	0.52	2.02
rough-legged hawk	0.091	0.95	8.19	0.111	3.13	9.6	0	0	0	0	0	0
Swainson's hawk	0	0	0	0.071	1.99	7.07	0.036	1.08	3.55	0.02	0.52	2.02
Eagles	*0.003*	*0.03*	*0.29*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
golden eagle	0.003	0.03	0.29	0	0	0	0	0	0	0	0	0
Falcons	*0.035*	*0.37*	*3.51*	*0.015*	*0.43*	*1.52*	*0.015*	*0.46*	*1.52*	*0.071*	*1.84*	*5.05*
American kestrel	0.018	0.18	1.75	0.015	0.43	1.52	0.015	0.46	1.52	0.066	1.71	4.55
prairie falcon	0.018	0.18	1.75	0	0	0	0	0	0	0.005	0.13	0.51
Other Raptors	*0.003*	*0.03*	*0.29*	*0*	*0*	*0*	*0.005*	*0.15*	*0.51*	*0.01*	*0.26*	*1.01*
unidentified hawk	0.003	0.03	0.29	0	0	0	0.005	0.15	0.51	0.01	0.26	1.01
Gamebirds	**0.035**	**0.37**	**2.05**	**0.091**	**2.56**	**7.07**	**0.091**	**2.79**	**5.58**	**0**	**0**	**0**
chukar	0.026	0.28	1.17	0.03	0.85	1.52	0.02	0.62	1.52	0	0	0
ring-necked pheasant	0.009	0.09	0.88	0.061	1.7	5.56	0.071	2.17	4.57	0	0	0
Goatsucker	**0**	**0**	**0**	**0**	**0**	**0**	**0.036**	**1.08**	**2.03**	**0**	**0**	**0**
common nighthawk	0	0	0	0	0	0	0.036	1.08	2.03	0	0	0
Shorebirds	**0.003**	**0.03**	**0.29**	**0.217**	**6.11**	**11.62**	**0.046**	**1.39**	**3.55**	**0**	**0**	**0**
killdeer	0.003	0.03	0.29	0	0.00	0	0.01	0.31	1.02	0	0	0
long-billed curlew	0	0	0	0.217	6.11	11.62	0.036	1.08	2.54	0	0	0

Table 5. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed 18 Avian Study Plots in 2009-2010 for the Baseline Wind Project

	Winter (342 surveys)			Spring (198 surveys)			Summer (197 surveys)			Fall (198 surveys)		
Species	**Mean Use[a]**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
Doves	**0.012**	**0.12**	**0.58**	**0.025**	**0.71**	**2.02**	**0.086**	**2.63**	**5.08**	**0.116**	**3.02**	**3.54**
mourning dove	0.006	0.06	0.29	0.01	0.28	051	0.086	2.63	5.08	0.02	0.52	1.52
rock pigeon	0.006	0.06	0.29	0.015	0.43	1.52	0	0	0	0.096	2.49	2.02
Passerines	**9.058**	**95.12**	**81.87**	**2.929**	**82.39**	**91.92**	**2.888**	**88.08**	**85.28**	**3.596**	**93.44**	**84.34**
Songbirds	*8.015*	*84.16*	*69.88*	*2.596*	73.01	90.91	*2.503*	*76.32*	*80.71*	*3.066*	*79.66*	*76.77*
American pipit	0	0	0	0	0	0	0.005	0.15	0.51	0.076	1.97	0.51
American robin	0.073	0.77	0.88	0	0	0	0	0	0	0.000	0	0
barn swallow	0	0	0	0.005	0.14	0.51	0.083	5.57	11.68	0.025	0.66	1.01
Brewer's blackbird	0.044	0.46	0.29	0.025	0.71	0.51	0.259	7.89	4.57	0.000	0	0
Bullock's oriole	0	0	0	0.005	0.14	0.51	0.005	0.15	0.51	0.000	0	0
cliff swallow	0	0	0	0	0	0	0.02	0.62	0.51	0.000	0	0
dark-eyed junco	0	0	0	0.005	0.14	0.51	0	0	0	0.000	0	0
European starling	0.082	0.86	0.58	0.03	0.85	1.52	0.015	0.46	1.02	0.000	0	0
horned lark	7.295	76.6	69.01	1.414	39.77	70.71	1.284	39.16	51.78	1.939	50.39	54.04
lark sparrow	0	0	0	0	0	0	0.01	0.31	0.51	0	0	0
loggerhead shrike	0	0	0	0.005	0.14	0.51	0	0	0	0	0	0
northern shrike	0.003	0.03	0.29	0	0	0	0	0	0	0	0	0
red-winged blackbird	0.003	0.03	0.29	0.071	1.99	1.52	0.041	1.24	1.02	0	0	0
savannah sparrow	0	0	0	0.051	1.42	3.54	0.01	0.31	0.51	0.152	3.94	4.04
Say's phoebe	0	0	0	0.005	0.14	0.51	0.01	0.31	1.02	0	0	0
spotted towhee	0	0	0	0.005	0.14	0.51	0	0	0	0	0	0
unidentified blackbird	0	0	0	0.03	0.85	0.51	0.056	1.7	1.52	0.061	1.57	0.51
unidentified passerine	0.415	4.36	4.09	0.051	1.42	1.52	0.086	2.63	3.55	0.237	6.17	6.06
unidentified sparrow	0	0	0	0.015	0.43	1.01	0.01	0.31	1.02	0.061	1.57	1.01
unidentified swallow	0	0	0	0	0	0	0.01	0.31	0.51	0	0	0
violet-green swallow	0	0	0	0	0	0	0.025	0.77	1.02	0	0	0

Table 5. Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups Observed 18 Avian Study Plots in 2009-2010 for the Baseline Wind Project

	Winter (342 surveys)			**Spring (198 surveys)**			**Summer (197 surveys)**			**Fall (198 surveys)**		
Species	**Mean Use[a]**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**	**Mean Use**	**% Comp**	**% Freq**
western kingbird	0	0	0	0.056	1.56	5.05	0.036	1.08	3.55	0	0	0
western meadowlark	0.099	1.04	9.36	0.803	22.59	49.49	0.437	13.31	28.93	0.313	8.14	22.73
white-crowned sparrow	0	0	0	0.02	0.57	0.51	0	0	0	0.202	5.25	3.54
Corvids	*1.044*	*10.96*	*41.23*	*0.333*	*9.38*	*20.2*	*0.386*	*11.76*	*25.89*	*0.53*	*13.78*	*30.3*
common raven	1.044	10.96	41.23	0.333	9.38	20.2	0.386	11.76	25.89	*0.53*	*13.78*	30.3
Totals	**9.523**		**86.26**	**3.556**		**95.96**	**3.279**		**91.37**	**3.848**		**86.36**

a – mean use = number individuals/20-min/800-m plot.

Source:

Northwest Wildlife Consultants, Inc. (NWC). 2010. *Supplemental Wildlife and Habitat Studies for Montague Wind Power Facility*. Prepared for Montague Wind Power Facility. September 22.

Table 6. Species Observed and Mean Use Within 800 Meters by Plot at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Study Plot									
	A		B		C		J		K	
Avian Group	# Ind	Mean Use	# Ind	Mean Use	# Ind	Mean Use	# Ind	Mean Use	# Ind	Mean Use
Waterfowl	0	0.000	5	0.109	0	0.000	0	0.000	0	0.000
Fall	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Winter	0	0.000	5	0.313	0	0.000	0	0.000	0	0.000
Spring	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Summer	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Raptors	7	0.152	9	0.196	12	0.261	7	0.156	11	0.244
Fall	1	0.111	2	0.222	1	0.111	0	0.000	2	0.222
Winter	1	0.063	0	0.000	1	0.063	1	0.067	1	0.067
Spring	3	0.273	2	0.182	2	0.182	2	0.182	2	0.182
Summer	2	0.200	5	0.500	8	0.800	4	0.400	6	0.600
Shorebirds	9	0.196	23	0.500	22	0.478	16	0.356	4	0.089
Fall	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Winter	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Spring	7	0.636	11	1.000	14	1.273	4	0.364	3	0.273
Summer	2	0.200	12	1.200	8	0.800	12	1.200	1	0.100
Gamebirds	1	0.022	0	0.000	0	0.000	0	0.000	0	0.000
Fall	1	0.111	0	0.000	0	0.000	0	0.000	0	0.000
Winter	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Spring	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Summer	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Passerines	271	5.891	318	6.913	302	6.565	264	5.867	273	6.067
Songbirds	233	5.065	230	5.000	242	5.261	239	5.311	237	5.267
Fall	48	5.333	50	5.556	67	7.444	69	7.667	52	5.778
Winter	62	3.875	73	4.563	70	4.375	46	3.067	64	4.267
Spring	73	6.636	64	5.818	43	3.909	70	6.364	63	5.727
Summer	50	5.000	43	4.300	62	6.200	54	5.400	58	5.800
Corvids	38	0.826	88	1.913	60	1.304	25	0.556	36	0.800
Fall	19	2.111	23	2.556	16	1.778	0	0.000	2	0.222
Winter	14	0.857	51	3.188	33	2.063	16	1.067	12	0.800
Spring	2	0.182	8	0.727	9	0.818	3	0.273	17	1.545
Summer	3	0.300	6	0.600	2	0.200	6	0.600	5	0.500
Doves	0	0.000	0	0.000	1	0.022	0	0.000	0	0.000
Fall	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Winter	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Spring	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
Summer	0	0.000	0	0.000	1	0.100	0	0.000	0	0.000

Table 6. Species Observed and Mean Use Within 800 Meters by Plot at Five 2008–2009 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	Study Plot									
	A		B		C		J		K	
Avian Group	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**
Total Fall All Groups	69	7.667	75	8.333	84	9.333	69	7.667	54	6.000
Total Winter All Groups	77	4.813	129	8.063	104	6.500	63	4.200	77	5.133
Total Spring All Groups	85	7.727	85	7.727	68	6.182	79	7.182	85	7.727
Total Summer All Groups	57	5.700	66	6.600	81	8.100	76	7.600	70	7.000
Overall All Groups (All Seasons)	288	6.261	355	7.717	337	7.326	287	6.378	288	6.400

Ind = Number of individual birds.

Seasons

Fall: September 4, 2008, through October 31, 2008; 9 visits to 5 sites = 45 surveys.

Winter: November. 3, 2008, through March 11, 2009; 16 visits to A, B, C, 15 visits to J, K = 78 surveys.

Spring: March 17, 2009, through May 25, 2009; 11 visits to 5 sites = 55 surveys.

Summer: May 31, 2009, through August 7, 2009; 10 visits to 5 sites = 50 surveys.

Overall (all seasons) visits to Plots: A – 46 surveys; B – 46 surveys; C – 46 surveys; J – 45 surveys; K – 45 surveys.

Source:

Northwest Wildlife Consultants, Inc. (NWC). 2009. *Supplemental 2008–2009 Study to the 2005 Leaning Juniper Wildlife Baseline Study*. Conducted for *Request for Amendment No. 1 to the Site Certificate for the Leaning Juniper II Wind Power Facility*. Prepared for Iberdrola Renewables, Inc. June.

Table 7. Species Groups Observed and Mean Use within 800 Meters by Plot at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	AA		BB		EE		FF		GG		HH	
Avian Group	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**
Raptors	**19**	**0.388**	**32**	**0.6531**	**8**	**0.1633**	**25**	**0.5102**	**20**	**0.4255**	**10**	**0.27027**
Fall	4	0.5	1	0.125	0	0	2	0.25	3	0.5	2	0.333
Winter	6	0.316	12	0.632	4	0.211	8	0.421	10	0.526	6	0.316
Spring	4	0.333	3	0.25	1	0.083	1	0.083	1	0.083	2	0.167
Summer	5	0.5	16	1.6	3	0.3	14	1.4	6	0.6	N/A	N/A
Doves	**0**	**0**	**0**	**0**	**15**	**0.3061**	**0**	**0**	**40**	**0.8511**	**29**	**0.78378**
Fall	0	0	0	0	0	0	0	0	0	0	0	0
Winter	0	0	0	0	2	0.105	0	0	9	0.474	29	1.526
Spring	0	0	0	0	0	0	0	0	2	0.167	0	0
Summer	0	0	0	0	13	1.3	0	0	29	2.9	N/A	N/A
Gamebirds	**0**	**0**	**0**	**0**	**2**	**0.0408**	**0**	**0**	**0**	**0**	**0**	**0**
Fall	0	0	0	0	0	0	0	0	0	0	0	0
Winter	0	0	0	0	0	0	0	0	0	0	0	0
Spring	0	0	0	0	1	0.083	0	0	0	0	0	0
Summer	0	0	0	0	1	0.1	0	0	0	0	N/A	N/A
Shorebirds	**5**	**0.102**	**18**	**0.3673**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Fall	0	0	0	0	0	0	0	0	0	0	0	0
Winter	0	0	0	0	0	0	0	0	0	0	0	0
Spring	5	0.417	15	2.15	0	0	0	0	0	0	0	0
Summer	0	0	3	0.3	0	0	0	0	0	0	N/A	N/A
Wading birds	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0.0213**	**0**	**0**
Fall	0	0	0	0	0	0	0	0	1	0.167	0	0
Winter	0	0	0	0	0	0	0	0	0	0	0	0
Spring	0	0	0	0	0	0	0	0	0	0	0	0
Summer	0	0	0	0	0	0	0	0	0	0	N/A	N/A

Table 7. Species Groups Observed and Mean Use within 800 Meters by Plot at Six 2009-2010 Montague Wind Power Facility Avian Use Study Plots in Four Seasons

	AA		BB		EE		FF		GG		HH	
Avian Group	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**	**# Ind**	**Mean Use**
Passerines	**193**	**3.939**	**185**	**3.7755**	**268**	**5.4694**	**255**	**5.20408**	**284**	**6.0426**	**140**	**3.78378**
Songbirds	*174*	*3.551*	*165*	3.3673	*238*	4.8571	*239*	4.87755	*262*	5.5745	*120*	3.24324
Fall	62	7.75	84	10.5	108	13.5	68	8.5	127	21.167	62	10.333
Winter	68	3.579	18	0.947	62	3.263	108	5.684	69	3.632	33	1.737
Spring	26	2.167	22	1.833	26	2.167	27	2.25	30	2.5	25	2.083
Summer	18	1.8	41	4.1	42	4.2	36	3.6	36	3.6	N/A	N/A
Corvids	*19*	*0.388*	*20*	*0.4082*	*30*	*0.6122*	*16*	*0.32653*	*22*	*0.4681*	*20*	*0.5405*
Fall	10	1.25	2	0.25	4	0.5	7	0.875	7	1.167	6	1
Winter	6	0.316	9	0.474	19	1	6	0.316	6	0.316	8	0.421
Spring	1	0.083	4	0.333	3	0.25	2	0.167	3	0.25	6	0.5
Summer	*2*	*0.2*	*5*	*0.5*	*4*	*0.4*	*1*	*0.1*	*6*	*0.6*	N/A	N/A
Total All Groups	**217**	**4.429**	**235**	**4.7959**	**293**	**5.9796**	**280**	**5.71429**	**345**	**7.3404**	**179**	**4.83784**

Ind = Number of individual birds.

Fall: September 10, 2009–October 30, 2009; 8 visits to AA, BB, EE, FF; 6 visits to GG, HH = 44 surveys

Winter: November 5, 2009 through March 13, 2010; 19 visits to AA, BB, EE, FF, GG, HH = 114 surveys

Spring: March 20 through June 1, 2010; 12 visits to AA, BB, EE, FF, GG, HH = 72 surveys

Summer: June 8 through August 9, 2010; 10 visits to AA, BB, EE, FF, GG= 50 surveys.

Sources:

CH2M HILL Engineers, Inc. (CH2M). 2017. *Summary of 2010 Avian Use Surveys for the Montague Wind Power Facility*. Prepared for Avangrid Renewables. July 19.

Northwest Wildlife Consultants, Inc. (NWC). 2010. *Supplemental Wildlife and Habitat Studies for Montague Wind Power Facility*. Prepared for Montague Wind Power Facility. September 22.

Table 8. Species Groups Observed and Mean Use within 800 Meters at 18 Plots During 2009-2010 Avian Use Study Conducted for the Baseline Wind Project

	Plots																	
Avian Group	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
Waterfowl	**0.442**	**0.481**	**0**	**0.269**	**0.192**	**0**	**0**	**0**	**0**	**0**	**0.135**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Winter	1.211	1.316	0	0.737	0.526	**0**	**0**	**0**	**0**	**0**	0.368	0	**0**	**0**	**0**	**0**	0	0
Spring	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	**0**	**0**	**0**	**0**	0	0
Summer	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	**0**	**0**	**0**	**0**	0	0
Fall	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	**0**	**0**	**0**	**0**	0	0
Raptors	**0.058**	**0.096**	**0.115**	**0.135**	**0.173**	**0.423**	**0.423**	**0.308**	**0.077**	**0.385**	**0.096**	**0.216**	**0.019**	**0.173**	**0.135**	**0.077**	**0.154**	**0.288**
Winter	0.105	0.211	0.053	0.053	0.211	0.316	0.474	0.368	0.211	0.316	0.158	0.105	0.053	0.211	0	0.105	0.158	0.211
Spring	0.091	0.091	0.091	0.455	0.182	0.545	0.636	0.545	0	0.636	0.182	0.182	0	0.091	0.273	0.182	0.273	0.818
Summer	0	0	0.182	0.091	0.091	0.545	0.273	0.182	0	0.364	0	0.1	0	0	0.273	0	0.091	0.182
Fall	0	0	0.182	0	0.182	0.364	0.273	0.091	0	0.273	0	0.545	0	0.364	0.091	0	0.091	0
Harriers	*0.038*	*0.038*	*0.019*	*0.038*	*0.038*	*0.231*	*0.038*	*0.077*	*0*	*0.019*	*0*	*0*	*0.019*	*0*	*0*	*0.019*	*0*	*0.077*
Winter	0.053	0.053	0	0.053	0.053	0	0.053	0.053	0	0.053	0	0	0.053	0	0	0.053	0	0.158
Spring	0.091	0.091	0.091	0.091	0	0.455	0.091	0.182	0	0	0	0	0	0	0	0	0	0.091
Summer	0	0	0	0	0.091	0.455	0	0	0	0	0	0	0	0	0	0	0	0
Fall	0	0	0	0	0	0.182	0	0.091	0	0	0	0	0	0	0	0	0	0
Buteos	*0.019*	*0.038*	*0.038*	*0.096*	*0.096*	*0.135*	*0.346*	*0.231*	*0.038*	*0.327*	*0.077*	*0.059*	*0*	*0.077*	*0.038*	*0.058*	*0.096*	*0.212*
Winter	0.053	0.105	0.053	0	0.158	0.211	0.368	0.316	0.105	0.158	0.105	0	0	0.105	0	0.053	0.105	0.053
Spring	0	0	0	0.364	0.182	0.091	0.545	0.364	0	0.636	0.182	0.182	0	0.091	0.091	0.182	0.182	0.727
Summer	0	0	0.091	0.091	0	0.091	0.273	0.182	0	0.364	0	0.1	0	0	0	0	0.091	0.182
Fall	0	0	0	0	0	0.091	0.182	0	0	0.273	0	0	0	0.091	0.091	0	0	0
Falcons	*0*	*0.019*	*0.019*	*0*	*0.038*	*0.038*	*0.038*	*0*	*0.038*	*0.019*	*0.019*	*0.157*	*0*	*0.096*	*0.096*	*0*	*0.038*	*0*
Winter	0	0.053	0	0	0	0.105	0.053	0	0.105	0.053	0.053	0.105	0	0.105	0	0	0	0
Spring	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.182	0	0.091	0
Summer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.273	0	0	0

Table 8. Species Groups Observed and Mean Use within 800 Meters at 18 Plots During 2009-2010 Avian Use Study Conducted for the Baseline Wind Project

	Plots																	
Avian Group	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
Fall	0	0	0.091	0	0.182	0	0.091	0	0	0	0	0.545	0	0.273	0	0	0.091	0
Eagles	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.019*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Winter	0	0	0	0	0	0	0	0	0	0.053	0	0	0	0	0	0	0	0
Spring	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Summer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Raptors	*0*	*0*	*0.038*	*0*	*0*	*0.019*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.019*	*0*
Winter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.053	0
Spring	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Summer	0	0	0.091	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fall	0	0	0.091	0	0	0.091	0	0	0	0	0	0	0	0	0	0	0	0
Gamebirds	**0**	**0**	**0.154**	**0.288**	**0.154**	**0.019**	**0**	**0.096**	**0**	**0.096**	**0.019**	**0**	**0.019**	**0**	**0.077**	**0**	**0**	**0**
Winter	0	0	0	0.211	0.053	0.053	0	0.105	0	0	0	0	0	0	0.211	0	0	0
Spring	0	0	0.364	0.455	0.364	0	0	0.273	0	0	0.091	0	0.091	0	0	0	0	0
Summer	0	0	0.364	0.545	0.273	0	0	0	0	0.455	0	0	0	0	0	0	0	0
Fall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goatsuckers	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.038**	**0.058**	**0**	**0**	**0**	**0**	**0**	**0.038**	**0**
Winter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spring	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Summer	0	0	0	0	0	0	0	0	0	0.182	0.273	0	0	0	0	0	0.182	0
Fall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shorebirds	**0.346**	**0.173**	**0.038**	**0**	**0.077**	**0.019**	**0**	**0**	**0.019**	**0.019**	**0**	**0**	**0.154**	**0**	**0.019**	**0.096**	**0.058**	**0**
Winter	0	0	0	0	0	0	0	0	0.053	0	0	0	0	0	0	0	0	0
Spring	1.636	0.636	0.182	0	0.364	0	0	0	0	0.091	0	0	0.727	0	0	0.273	0	0
Summer	0	0.182	0	0	0	0.091	0	0	0	0	0	0	0	0	0.091	0.182	0.273	0

Table 8. Species Groups Observed and Mean Use within 800 Meters at 18 Plots During 2009-2010 Avian Use Study Conducted for the Baseline Wind Project

	Plots																	
Avian Group	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
Fall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Doves	**0**	**0**	**0.115**	**0**	**0.077**	**0.192**	**0**	**0**	**0.038**	**0**	**0.038**	**0.059**	**0**	**0.019**	**0.135**	**0**	**0.269**	**0**
Winter	0	0	0	0	0.105	0	0	0	0	0	0	0	0	0	0	0	0.105	0
Spring	0	0	0	0	0	0.182	0	0	0	0	0	0.273	0	0	0	0	0	0
Summer	0	0	0	0	0.182	0.364	0	0	0.182	0	0.182	0	0	0.091	0.455	0	0.091	0
Fall	0	0	0.545	0	0	0.364	0	0	0	0	0	0	0	0	0.182	0	1	0
Passerines	**5.942**	**9.058**	**2.154**	**6.692**	**2.827**	**9.442**	**4.519**	**7.846**	**2.615**	**4.673**	**4.115**	**5.02**	**5.308**	**3.673**	**3.962**	**8.096**	**4.096**	**5.423**
Winter	10.158	19.158	2.579	9.632	4.895	13.947	7.158	17.842	4.368	6.526	6.053	8.895	7.474	7.105	5.421	16.632	5.737	9.474
Spring	2.909	2.909	2.182	4.909	2.455	4.636	1.818	2	2.091	4.727	2.727	2.273	2.545	2.091	3.727	2.818	2.909	3
Summer	3.364	2.182	0.545	4.455	1.364	7.909	3	1.727	1.273	3.091	2.818	2.8	3.364	1.364	3.091	2.636	3.909	3.091
Fall	4.273	4.636	3	5.636	1.091	8	4.182	2.545	1.455	3	3.455	3.091	6.273	1.636	2.545	4.091	2.636	3.182
Songbirds	*4.962*	*8.346*	*1.827*	*5.481*	*2.538*	*8.346*	*3.788*	*7.154*	*2.212*	*3.75*	*3.769*	*4.725*	*4.596*	*3.346*	*3.365*	*7.308*	*3.481*	*4.846*
Winter	8.263	17.368	2.526	8.105	4.421	12.579	5.789	16.421	3.316	5.053	5.211	8.526	6.579	6.526	4.789	15.526	4.632	8.632
Spring	2.909	2.727	1.909	3.545	2.182	3.909	1.818	1.818	2	4.182	2.636	2.182	2.182	2.091	3.364	2.182	2.545	2.545
Summer	2.909	2.182	0.091	3.364	1.273	7.182	2.273	1.636	1.273	2.727	2.727	2.7	2.545	1.091	2.364	2.364	3.545	2.818
Fall	3.364	4.545	2.273	5	0.909	6.636	3.818	2	1.455	2.091	3.455	2.545	5.636	1.364	1.909	3.182	2.364	2.636
Corvids	*0.981*	*0.712*	*0.327*	*1.212*	*0.288*	*1.096*	*0.731*	*0.692*	*0.404*	*0.923*	*0.346*	*0.294*	*0.712*	*0.327*	*0.596*	*0.788*	*0.615*	*0.577*
Winter	1.895	1.789	0.053	1.526	0.474	1.368	1.368	1.421	1.053	1.474	0.842	0.368	0.895	0.579	0.632	1.105	1.105	0.842
Spring	0	0.182	0.273	1.364	0.273	0.727	0	0.182	0.091	0.545	0.091	0.091	0.364	0	0.364	0.636	0.364	0.455
Summer	0.455	0	0.455	1.091	0.091	0.727	0.727	0.091	0	0.364	0.091	0.1	0.818	0.273	0.727	0.273	0.364	0.273
Fall	0.909	0.091	0.727	0.636	0.182	1.364	0.364	0.545	0	0.909	0	0.545	0.636	0.273	0.636	0.909	0.273	0.545
Total All Seasons	**6.788**	**9.808**	**2.576**	**7.384**	**3.5**	**10.095**	**4.942**	**8.25**	**2.749**	**5.211**	**4.461**	**5.295**	**5.5**	**3.865**	**4.328**	**8.269**	**4.615**	**5.711**

Source:

Northwest Wildlife Consultants, Inc. (NWC). 2011. *Ecological Baseline Investigations and Impact Assessment for Baseline Wind Energy Facility, Gilliam County, Oregon*. Prepared for Baseline Wind. December 16.

Table 9. Temporary and Permanent Disturbance by Habitat Category and Subtype – Phase 2 Design Scenario A (Maximum Wind Layout)

Habitat Category and Subtype	Permanent Disturbed	Temporary Disturbed	Total Disturbed
Habitat Category 2			
DR - Revegetated or Other Planted Grassland	1.00	11.03	12.03
GA - Exotic Annual Grassland	1.10	10.22	11.32
GB - Native Perennial Grassland	0.00	0.00	0.00
SSA - Basin Big Sagebrush Shrub-steppe	0.00	0.20	0.20
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 2 Total	**2.10**	**21.45**	**23.55**
Habitat Category 3			
DC - Developed-CRP or Other Planted Grassland	0.00	0.14	0.14
DR - Developed-Revegetated or Other Planted Grassland	0.44	7.82	8.26
GB - Native Perennial Grassland	0.00	0.01	0.01
SSA - Basin Big Sagebrush Shrub-steppe	0.00	0.09	0.09
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 3 Total	**0.44**	**8.06**	**8.50**
Habitat Category 4			
DR - Developed-Revegetated or Other Planted Grassland	0.00	0.00	0.00
GA - Exotic Annual Grassland	0.09	0.76	0.85
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 4 Total	**0.09**	**0.76**	**0.85**
Habitat Category 6			
DW - Developed-Dryland Wheat	64.28	460.41	524.69
DI - Developed Irrigated Agriculture	0.85	5.98	6.83
DX - Developed-Other	0.13	2.58	2.71
Habitat Category 6 Total	**65.26**	**468.97**	**534.23**
Grand Total	**67.89**	**499.24**	**567.13**

Note: Because some Facility impact areas overlap or are shown on existing county and noncounty roads, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as represented in Exhibit C. The total areas in Exhibit C are not exact estimates of the Facility's total impact to land and habitat, as they do not account for overlapping impact areas and include existing road areas. Consequently, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables using geographic information systems (GIS), overlapping impact areas were not double-counted and existing county and noncounty road areas were removed. As a result, the tables in Exhibit P provide a more accurate total calculation of impacts to habitat.

Table 10. Temporary and Permanent Disturbance by Habitat Category and Subtype – Phase 2 Design Scenario B (Minimum Wind Layout)

Habitat Category and Subtype	Permanent Disturbed	Temporary Disturbed	Total Disturbed
Habitat Category 2			
DR - Revegetated or Other Planted Grassland	1.00	11.11	12.11
GA - Exotic Annual Grassland	1.10	10.24	11.34
GB - Native Perennial Grassland	0.00	0.00	0.00
SSA - Basin Big Sagebrush Shrub-steppe	0.00	0.20	0.20
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 2 Total	**2.10**	**21.55**	**23.65**
Habitat Category 3			
DC - Developed-CRP or Other Planted Grassland	0.00	0.14	0.14
DR - Developed-Revegetated or Other Planted Grassland	0.44	8.01	8.45
GB - Native Perennial Grassland	0.00	0.01	0.01
SSA - Basin Big Sagebrush Shrub-steppe	0.00	0.09	0.09
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 3 Total	**0.44**	**8.25**	**8.69**
Habitat Category 4			
DR - Developed-Revegetated or Other Planted Grassland	0.00	0.00	0.00
GA - Exotic Annual Grassland	0.09	0.46	0.55
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 4 Total	**0.09**	**0.46**	**0.55**
Habitat Category 6			
DW - Developed-Dryland Wheat	59.66	351.07	410.73
DI - Developed Irrigation Agriculture	0.85	4.85	5.70
DX - Developed-Other	0.14	2.58	2.72
Habitat Category 6 Total	**60.65**	**358.50**	**419.15**
Grand Total	**63.28**	**388.76**	**452.04**

Note: Because some Facility impact areas overlap or are shown on existing county and noncounty roads, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as represented in Exhibit C. The total areas in Exhibit C are not exact estimates of the Facility's total impact to land and habitat, as they do not account for overlapping impact areas and include existing road areas. Consequently, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables using geographic information systems (GIS), overlapping impact areas were not double-counted and existing county and noncounty road areas were removed. As a result, the tables in Exhibit P provide a more accurate total calculation of impacts to habitat.

Table 11. Temporary and Permanent Disturbance by Habitat Category and Subtype – Phase 2 Design Scenario C (Solar Layout)

Habitat Category and Subtype	Permanent Disturbed	Temporary Disturbed	Total Disturbed
Habitat Category 2			
DR - Revegetated or Other Planted Grassland	5.44	0.00	5.44
GA - Exotic Annual Grassland	1.38	0.00	1.38
GB - Native Perennial Grassland	0.07	0.00	0.07
SSA - Basin Big Sagebrush Shrub-steppe	0.89	0.00	0.89
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 2 Total	**7.78**	**0.00**	**7.78**
Habitat Category 3			
DC - Developed-CRP or Other Planted Grassland	0.00	0.14	0.14
DR - Developed-Revegetated or Other Planted Grassland	0.00	0.00	0.00
GB - Native Perennial Grassland	0.00	0.00	0.00
SSA - Basin Big Sagebrush Shrub-steppe	0.00	0.00	0.00
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 3 Total	**0.00**	**0.14**	**0.14**
Habitat Category 4			
DR - Developed-Revegetated or Other Planted Grassland	0.00	0.00	0.00
GA - Exotic Annual Grassland	0.00	0.00	0.00
SSB - Rabbitbrush/Snakeweed Shrub-steppe	0.00	0.00	0.00
Habitat Category 4 Total	**0.00**	**0.00**	**0.00**
Habitat Category 6			
DW - Developed-Dryland Wheat	1,194.52	24.75	1,219.27
DI - Developed Irrigation Agriculture	0.00	0.00	0.00
DX - Developed-Other	0.10	0.04	0.14
Habitat Category 6 Total	**1,194.62**	**24.79**	**1,219.41**
Grand Total	**1,202.40**	**24.93**	**1,227.33**

Note: Because some Facility impact areas overlap or are shown on existing county and noncounty roads, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as represented in Exhibit C. The total areas in Exhibit C are not exact estimates of the Facility's total impact to land and habitat, as they do not account for overlapping impact areas and include existing road areas. Consequently, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables using geographic information systems (GIS), overlapping impact areas were not double-counted and existing county and noncounty road areas were removed. As a result, the tables in Exhibit P provide a more accurate total calculation of impacts to habitat.

Attachment P-12a
Phase 2 Wildlife Monitoring and Mitigation Plan

Submitted under separate cover.

Attachment P-12b
Phase 2 Revegetation Plan

Submitted under separate cover.

Attachment P-12c
Phase 2 Habitat Mitigation Plan

Submitted under separate cover.