

Exhibit P

Fish and Wildlife Habitats and Species

**Bakeoven Solar Project
November 2019**

Prepared for



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Acronyms and Abbreviations

APLIC	Avian Powerline Interaction Committee
Applicant	Bakeoven Solar, LLC
BGEPA	Bald and Golden Eagle Protection Act
Council	Oregon Energy Facility Siting Council
Facility	Bakeoven Solar Project
GIS	Geographic Information System
NOI	Notice of Intent
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ORBIC	Oregon Biodiversity Information Center
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

Bakeoven Solar, LLC (Applicant) proposes to construct and operate a solar energy generation facility and related or supporting facilities in Wasco County, Oregon. This Exhibit P was prepared to meet the submittal requirements in Oregon Administrative Rules (OAR) 345-021-0010(1)(p). Exhibit P provides information about the fish and wildlife habitats and species that could be affected by the Bakeoven Solar Project (Facility), other than the species addressed in Exhibit Q.

2.0 Analysis Area

The analysis area for fish and wildlife habitat is the proposed site boundary plus a 0.5-mile buffer, as defined by OAR 345-001-0010(59)(c). The proposed site boundary is defined in detail in Exhibits B and C. The fish and wildlife habitat analysis area is shown on Figure P-1. A portion of the proposed site boundary is designated as the proposed micro-siting corridor, where solar arrays and all other related and supporting facilities may be located. The Applicant performed field surveys within the proposed micro-siting corridor, while desktop analysis was used to understand the area within the proposed site boundary and the 0.5-mile buffer around the proposed site boundary (Figure P-1; Attachment P-1).

3.0 Agency Consultation

To inform wildlife use of the site boundary, the Applicant consulted with the Oregon Department of Fish and Wildlife (ODFW), and United States Fish and Wildlife Service (USFWS) with respect to the Facility, and received the following comments:

- ODFW provided the following comments during the site visits:
 - Mule deer within the analysis area (and within the Columbia Plateau Ecoregion) are non-migratory, and thus Facility development is not likely to pose a large-scale habitat connectivity issue.
 - Although ODFW-mapped big game winter range encompasses the analysis area, the area is not critical to big game.
 - The solar array should be fenced to exclude big game. Consider installing extra gates to allow big game to exit the solar array if wildlife mistakenly enter the area.
 - It is preferable to leave wildlife/big game corridors through the Facility by fencing each group of solar panels instead of fencing the perimeter of the entire Facility; however, the fence perimeter should be designed so as to not create dead-ends that trap big game and increase predation.

- To mitigate for impacts to big game, ODFW would prefer an in-lieu fee contributed to ongoing programs that benefits big game (such as noxious weed management) rather than having the Applicant identify its own mitigation lands. ODFW recommended the Applicant contact Western Rivers Conservancy regarding a parcel along the Lower John Day River, which is “in proximity” for the big game unit. ODFW requested that mitigation be included for the fenced area, rather than the impact footprint, because big game will be excluded from the fenced area.
- ODFW described the Facility as within an elk de-emphasis area; therefore, there are no management objectives for elk.
- ODFW indicated they will request post-construction fatality monitoring because solar is new in Oregon, and there is a lack of data on how birds interact with solar projects in the Northwest.
- ODFW provided the following comments on the Notice of Intent (NOI; ODFW 2019):
 - The Facility falls wholly within the ODFW-mapped Big Game winter range habitat overlay; ODFW considers all habitats within winter range, with the exception of dryland wheat in the Columbia Plateau Ecoregion, to be Category 2 as per the Oregon Habitat Mitigation Policy. As discussed with the Applicant, ODFW recommends that mitigation be developed to offset the footprint of the fenced area that will provide for “no net loss, net benefit” as outlined in the Mitigation Policy.
 - ODFW requests that the Applicant limit construction activities outside of the microsite corridor during the winter period, December 1 to April 1, to reduce disturbance to wintering deer outside of these areas. In addition, ODFW requests that the placement of project infrastructure, including buildings and roads be sited within the microsite corridor in a manner to reduce the potential for disturbing wildlife outside of these areas both during construction and in the operational phase.
 - ODFW requests that any ground disturbance or vegetation removal be conducted prior to or after the critical period for ground nesting birds, April 15 to September 1. Should ground disturbance occur during this period, ODFW requests that vegetative removal occur prior to the critical nesting period.
 - ODFW recommends that raptor nest surveys be conducted within a 2-mile buffer of the Facility to inform avoidance and minimization measures as described in Section 9.1.3, below.
 - ODFW requests that the Applicant perform post-construction mortality monitoring that follows current best available science, and allows the Applicant to estimate with known statistical confidence the total number of fatalities at the Facility. ODFW also requests that this data be provided by the Applicant as available to assist with recommendations for future projects.

- ODFW recommends that the Applicant work with the county weed department or Oregon State Extension to develop a revegetation and weed control plan that will be successful, given the challenges realized within this ecoregion with revegetation projects.
- ODFW encourages the Applicant to develop a mitigation plan that will effectively offset the impacts to big game winter range and habitat loss. ODFW is willing to assist the Applicant with the development of the plan.
- USFWS provided the following comments from site visit:
 - Suggested the use large gates at more than one location around the solar facility components to expedite removing wildlife from the Facility should they enter the gated area.
 - Requested that the Applicant coordinate with the nearby Imperial Wind Project to share facilities, such as transmission lines.
 - Recommended the Applicant minimize potential perches by following Avian Powerline Interaction Committee (APLIC) best practices for overhead electrical lines. USFWS also recommended the marking of the ground wire on transmission lines in high risk areas (e.g., over valleys and near known raptor nest sites) to minimize collision.
 - Requested that vegetation clearing be done out of the bird breeding season, or that clearance surveys be conducted for bird nests if construction must occur during the breeding season.
- Other outreach included the following:
 - ODFW, the Applicant, and the Western Rivers Conservancy met on February 8, 2019 to further discuss mitigation options for the Facility.

4.0 Description of Biological and Botanical Surveys Performed

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

The applicant shall include:

(A) A description of biological and botanical surveys performed that support the information in this exhibit, including a discussion of the timing and scope of each survey.

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

4.1 Information Review

4.1.1 Desktop Review

Prior to conducting field surveys in 2018, the Applicant conducted a desktop review to identify special-status fish and wildlife species that had the potential to occur in the analysis area, including federal and state endangered, threatened, proposed, and candidate species; species of concern; birds of conservation concern; sensitive and sensitive-critical species; and Oregon Conservation Strategy species (Attachment P-1; OCS 2016; ODFW 2016, 2017; ORBIC 2016, 2018; USFWS 2008, 2016, 2018a). The Applicant reviewed habitat and range information for special-status fish and wildlife species known to occur in Wasco County and the Columbia Plateau to develop the list of species that had the potential to occur within the analysis area. Species were eliminated from consideration if their habitat was absent from the analysis area, or their range did not overlap with the proposed analysis area; but were included if they have the potential for vagrancy at the Facility. The Applicant also reviewed special-status species information recorded during previous surveys for the adjacent Imperial Wind Project (ABR Inc. 2011; NWC 2011; WEST 2013).

The Applicant identified target rare plants species with the potential to occur within the analysis area based on known occurrences recorded by herbaria and other sources (Burke Museum of Natural History and Culture 2018; ODA 2018; OFP 2017a, 2017b, 2017c; ORBIC 2016; USFWS 2015). The Applicant identified all vascular plants listed as endangered or threatened by USFWS under the federal Endangered Species Act, as well as candidates and species proposed for listing, and plants listed as endangered, threatened, or candidates for listing by the Oregon Department of Agriculture under the Oregon Endangered Species Act.

In addition to reviewing publicly available sources, the Applicant submitted a request to the Oregon Biodiversity Information Center (ORBIC) to obtain site-specific records of special-status species occurrences and sensitive habitats within 10 miles of the Facility (ORBIC 2018). The Applicant also reviewed aerial photographs, National Wetlands Inventory data, the National Hydrography Dataset, and big game winter range spatial data to preliminarily identify ODFW habitats within the analysis area (ODFW 2013; USFWS 2018b, 2018c; USGS 2018). The Applicant also reviewed ODFW habitats mapped during previous surveys for a nearby project; the extent of these surveys partially overlapped with the Facility's location (WEST 2013).

4.1.2 Desktop Review Addendums: 2018 and 2019

Following 2018 field surveys, 294 acres were added to the proposed micro-siting corridor. The habitat types in these areas were desktop delineated by comparing field data from nearby areas to aerial imagery (Attachment P-1). In July and August 2019, minor adjustments were made to the transmission corridor. The proposed micro-siting corridor's location was slightly shifted; however, this shifted area occurs within the survey area shown in Figure P-2. This modification shifted the analysis area for this Exhibit. The habitat types in both areas—those added to the proposed

micrositing corridor in 2018 and those added to the analysis area in 2019—were desktop-delineated by comparing field data from nearby areas to aerial imagery (Attachment P-1).

4.2 Field Surveys

The Applicant conducted field surveys within the proposed micrositing corridor in June and July of 2018. A small area (294 acres) was added to the proposed micrositing corridor after 2018 field surveys were completed; these areas received a desktop review in December 2018 and will be field surveyed prior to construction, as appropriate. Field surveys in 2018 also included additional corridors not under consideration in this Application for Site Certificate. Figure P-2 shows the extent of surveys within the proposed micrositing corridor in 2018.

The Applicant’s parent company, Avangrid Renewables, has conducted biological and botanical surveys in the vicinity of the Facility since 2010. Surveys conducted prior to 2018 were primarily focused on a wind energy project (now the Imperial Wind Project), which had been previously proposed for the same general area as the currently proposed solar facility. Methods for all studies were consistent with standards presented in the Oregon Columbia Plateau Ecoregion wind energy siting and permitting guidelines (ODFW et al. 2008). Table P-1 provides a summary of field surveys conducted within the analysis area. Avian use surveys at the Imperial Wind Project are ongoing. One point-count location occurs within the proposed micrositing corridor. This exhibit details field surveys conducted in 2018 for the solar facility, as well as relevant avian point-count results from the ongoing avian use survey.

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

Year	Survey	Reference	Extent
2018-2019	Avian use surveys ^{1/}	WEST 2019	One avian point count location within the proposed micrositing corridor.
2018	Special status wildlife and habitat surveys	Attachment P-1	Solar proposed micrositing corridor (and additional wind corridors), minus 294 acres added after surveys.
2018	Special status plant surveys	Attachment P-1	Solar proposed micrositing corridor (and additional wind corridors), minus 294 acres added after surveys.
2017-2018	Raptor (including eagle) nest surveys	WEST 2018	10-mile (eagle) and 2-mile (other raptor) buffer on previously proposed wind project, including the proposed site boundary.
2011, 2012, 2013	Eagle nest surveys, monitoring, and telemetry	NWC 2011, NWC 2012, NWC 2013	6-mile buffer on previously proposed wind project, including the proposed site boundary.
2011	Avian use surveys	NWC 2011	Previously proposed wind project boundary, including a portion of the proposed site boundary (two point counts located within the proposed site boundary, an additional two located within the analysis area).

Year	Survey	Reference	Extent
2011	Raptor nest surveys	NWC 2011	2-mile buffer on previously proposed wind project, including the proposed site boundary.
2011, 2013	Habitat and special status wildlife and plant surveys	WEST 2013	Previously proposed wind micro-siting corridor, including portions of the proposed site boundary.
2010	Bat acoustic study	ABR Inc. 2011	Previously proposed wind project, including portions of the proposed site boundary (one station located adjacent to the proposed site boundary).
1/ Avian use surveys are associated with the adjacent Imperial Wind Project, and are ongoing.			

4.2.1 Wildlife Habitat Mapping and Categorization Surveys

Prior to conducting field surveys, the Applicant mapped preliminary habitat polygons using aerial photography, previous habitat assessments, and United States Department of Agriculture CropScape Cropland Geographic Information System (GIS) data to identify the range of habitat types within the analysis area (ODFW 2013; USDA-NASS 2018; WEST 2013). The Applicant conducted wildlife habitat surveys within the proposed micro-siting corridor in June and July 2018 to field verify habitat mapping. Surveyors confirmed or recategorized areas of relatively homogenous vegetation, and characterized the composition and structure of habitat types. Each delineated vegetation polygon was assigned a habitat type, sub-type, and habitat quality category guided by the draft habitat categorization table in Attachment P-1. Data characterizing a particular habitat type and quality described representative conditions of all such polygons. A minimum mapping unit of 1 acre was used, except for specialized habitat types, such as cliffs.

Surveyors walked meandering transects within non-cultivated land inside the proposed micro-siting corridor, scanning the landscape and mapping habitats within the proposed micro-siting corridor. Areas of cultivated land that were delineated in the desktop analysis and recently burned¹ areas were verified, primarily for extent. This was done by driving paved roads, gravel roads, and two-tracks, as well as off-road in some burned areas. These low-quality habitat areas were occasionally traversed on foot to verify extent if not fully visible from the vehicle, if areas of potential habitat or nesting opportunities for special-status species were identified, or if areas of adjacent habitat required categorization.

Following field surveys, the digitized boundaries were downloaded and processed in a GIS program, and the field datasheets were incorporated into the spatial data. Data were reviewed for quality control and processed to incorporate wetlands and waters data. Habitat types and categories were

¹ During the field survey season, the Boxcar Fire occurred within the analysis area and portions of the proposed micro-siting corridor. The fire was reported on June 21 and merged with the South Junction Fire on June 23; the fire-fighting effort was demobilized on June 28 (NWCC 2018). The fire occurred in areas characterized by heavy sagebrush and grass, with scattered juniper.

not assigned to wetlands and waters in the field; they were derived from data collected during wetlands and waters surveys where available, following the habitat categorization field effort.

Outside of the proposed micrositeing corridor, but inside the analysis area, habitats were categorized based on desktop analysis, as was the small area added to the proposed micrositeing corridor after 2018 field surveys were completed. Data from National Wetlands Inventory and National Hydrography Dataset were incorporated into desktop-delineated habitat within the analysis area (USFWS 2018c; USGS 2018). The Applicant believes that desktop data for these areas accurately represent habitat types for the purpose of identifying wildlife species that may occur in the analysis area. The extent of field surveys conducted during 2018 are shown in Figure P-2. For the complete survey methods employed, see Attachment P-1. Results of the combined desktop analysis and field surveys are detailed in Section 5.0.

4.2.2 Special Status Wildlife Species Surveys

Special status wildlife species surveys were conducted concurrent to habitat categorization surveys in June and July 2018. Surveyors walked meandering transects within non-cultivated land inside the proposed micrositeing corridor, focusing on areas likely to support special-status wildlife species. Areas unlikely to support special-status species (i.e., cultivated land, developed areas, and recently burned areas) were surveyed primarily from field vehicles, using the same method as described above for habitat mapping. Surveyors alternately scanned the landscape, the sky, and the ground looking for special-status wildlife species and recognizable sign. Surveyors recorded the location of special-status wildlife species (or recognizable sign) and recorded information on the number of individuals and their behavior. Surveyors also kept a running list of all wildlife species observed, and documented special habitats and unique features such as raptor nests, cliffs, rimrock, rock outcrops, and talus slopes, if encountered. Following field surveys, the digitized data were downloaded and processed in a GIS program, and were reviewed for quality control and assurance.

4.2.3 Special Status Plant Species Surveys

The Applicant conducted botanical field surveys within the proposed micrositeing corridor in June and July of 2018. Special status plant species with the potential to occur within the analysis area are discussed in Exhibit Q.

4.2.4 Avian Point Count Survey

The Applicant is conducting avian use surveys within the adjacent Imperial Wind Project. One point-count location occurs within the proposed micrositeing corridor, which was selected to maximize the surrounding viewshed. Two types of surveys are being conducted at the point-count location: a 10-minute small bird point-count survey that is followed by a 60-minute large bird point-count survey. Surveys are ongoing, and are being conducted during daylight hours once a month for up to 2 years. Small and large bird surveys commenced in September and October of 2018, respectively.

The objective of small bird use surveys is to collect data on species occurrence and the spatial and temporal patterns of avian use with a particular focus on passerines and other non-raptors. However, if sensitive species that are classified as large birds or raptors are observed within the 100-meter survey plot, they are recorded and included as incidental observations. All auditory and visual bird observations within the 100-meter circular plot are recorded for a 10-minute sample period. For each observation, data recorded include: species or closest species group (e.g., unidentified passerine), sex, age, number of individuals, distance (in meters), behavior, flight height above ground level (maximum, minimum), flight direction, and habitat.

The objective of large bird use surveys is to collect data on species occurrence and the spatial and temporal patterns of avian use with a particular focus on eagles, other raptors, and large non-raptors such as waterfowl or shorebirds. Large birds are defined as all raptor species and any bird larger than a common raven. Surveys for large birds are conducted at the same point-count location that is used for small bird surveys. All auditory and visual bird observations within an 800-meter circular plot are recorded for a 60-minute sample period. The observer records all eagle observations, the total number of minutes an eagle is observed within the 800-meter survey plot, and whether the bird is flying above or below 200 meters above ground level or is perched. Observations are tallied in full minutes, and rounded to the nearest minute in situations of partial time unless the observation is less than a full minute in total. The large bird observation flight path is delineated on a topographic inset map and is digitized into a GIS program. In addition to the minute data and flight paths, other, similar data are collected during large bird surveys as are collected during the small bird surveys.

5.0 Identification and Description of Habitat

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

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

Table P-2 describes habitat categories and types found within the analysis area. During field surveys, the Applicant identified habitat that met the definitions for Category 3, 4, 5, and 6 habitats (Attachment P-1). Based on consultation with ODFW, the Applicant mapped areas within ODFW-designated Mule Deer Winter Range (ODFW 2013) as Category 2 habitat, except for cultivated cropland and developed land, which is Category 6 habitat. Table P-2 describes the vegetation and other characteristics of each habitat type and category within the analysis area; however, all areas not mapped as Category 6 were ultimately determined to be Category 2, as ODFW-designated Mule Deer Winter Range covers the entirety of the analysis area.

Table P-2. Habitat Types within the Analysis Area

Habitat Type	Habitat Sub-type	Category 2	Category 3	Category 4	Category 5	Category 6
Big Game Winter Range Habitat Overlay applies to all habitat sub-types except for cropland (i.e., Orchards, Vineyards, Wheat Fields, Other Row Crops) and developed areas (i.e., Urban and Mixed Environs)		Mule Deer Winter Range as designated by ODFW (2013).	N/A	N/A	N/A	N/A
Open Water – Lakes, Rivers, Streams	Permanent Ponds/Lakes Open water areas, including natural lakes, reservoirs, stock ponds, beaver ponds	<i>Natural lakes or beaver ponds with high-quality habitat.</i>	Most other open water areas with lower-quality habitat (for example, some habitat requisites missing or bullfrogs abundant).	<i>Highly degraded open water area, dominated by non-native vegetation or no vegetation around margins (for example, highly degraded stock pond).</i>	N/A	N/A
	Seasonal Ponds Open water areas that contain water part of the year	<i>Seasonal ponds with high quality, mostly native vegetation.</i>	Seasonal ponds with lower-quality habitat that is still dominated by native plant species.	Highly degraded, with a higher proportion of non-native vegetation or no vegetation around margins (for example, a seasonal stock pond).	Habitat almost completely dominated by non-native plant species or otherwise highly degraded.	N/A
	Perennial Streams mapped by USGS having permanent (year-round) flow	Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels that drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.	N/A	N/A
	Intermittent or Ephemeral Streams mapped by USGS as intermittent	<i>Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.</i>	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.	<i>Non-fish-bearing ephemeral streams or excavated channels with high restoration potential; not important habitat.</i>	N/A
Wetlands	Emergent Wetlands Emergent wetlands with herbaceous vegetation	<i>High quality habitat, dominated by native species.</i>	Mixture of native and non-native plant species and low to moderate disturbance	N/A	Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	N/A

Habitat Type	Habitat Sub-type	Category 2	Category 3	Category 4	Category 5	Category 6
	Scrub-shrub Wetlands Wetlands with woody vegetation less than 20 feet tall	<i>High quality habitat, dominated by native plant species.</i>	Mixture of native and non-native plant species and low to moderate disturbance.	N/A	Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	N/A
	Forested Wetlands Forests (defined as areas with a minimum of 40% canopy closure > 20 feet tall), dominated by wetland indicator species	<i>Exceptional habitat; well-buffered, with few or no non-native plant species, relatively undisturbed surroundings, or part of a large wetland complex, old-growth, or large sawtimber stage.</i>	Mixture of native and non-native plant species at sapling, pole, sawtimber stage.	N/A	N/A	N/A
Riparian Forest and Natural Shrubland Complexes	Eastside (Interior) Riparian	<i>High quality, diverse riparian areas that are not degraded.</i>	Typical mid-seral riparian, provides wildlife habitat.	Provides marginal habitat; somewhat degraded.	Highly degraded; dominated by non-native plant species.	N/A
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands Grassland areas with few shrubs (not irrigated or cultivated/planted)	<i>Undisturbed habitat dominated by native species (i.e., greater than 75% ground cover is native), or moderately disturbed habitat (i.e., between 50 to 75% ground cover is native) that contains a sagebrush component.</i>	Moderately disturbed habitat with a mix of natives and non-natives (i.e., between 50 to 75% ground cover is native), or highly disturbed habitat (i.e., between 15 to 50% ground cover is native) that contains a sagebrush component.	Highly disturbed habitat with a high percentage of non-native plant species (i.e., between 15 to 50% ground cover is native), or very highly disturbed habitats (i.e., less than 15% ground cover is native) that contain a sagebrush component.	Very highly disturbed habitats with a high percentage of non-native plant species (i.e., less than 15% ground cover is native), but which do not contain a sagebrush component.	N/A
	Shrub-steppe Grassland and shrubland mosaic	<i>High degree of cover; contains native shrubs and native grasses; good structure/forage for wildlife. Understory dominated by native species. More diversity than Category 3 habitat.</i>	Habitat that is limited within the area (e.g., relatively undisturbed habitat); high degree of cover; moderate cover by weeds, moderate structure/forage for wildlife.	Important wildlife habitat that is moderately to heavily degraded and weedy habitat.	Very low quality dominated by non-native species with high restoration potential.	N/A
Upland Forests and Woodlands	Western Juniper and Mountain Mahogany Woodlands Open woodlands dominated by western juniper	<i>Old-growth trees with rounded tops.</i>	Juniper woodland with few old growth junipers.	N/A	Juniper woodland of nearly all young trees that is invading shrub-steppe and grassland habitats due to lack of fire.	N/A
Agriculture, Pasture, and Mixed Environs	Planted Grasslands	N/A	Croplands planted to grassland with characteristics necessary to potentially provide essential habitat for sensitive wildlife due to cover and forage quality.	Croplands planted to grassland that lack later seral stage vegetative communities or are of less importance as wildlife habitat due to management or location.	Croplands planted to grassland that lack later seral stage vegetative communities and are highly disturbed or degraded, and have high restoration potential.	N/A
	Orchards, Vineyards, Wheat Fields, Other Row Crops	N/A	N/A	N/A	N/A	Active agricultural areas with low potential for restoration.
Cliffs, Caves, and Talus		<i>Sites with known bat colonies.</i>	Sites without bat colonies.	N/A	N/A	N/A
Urban and Mixed Environs		N/A	N/A	N/A	N/A	All developed areas.
Note: Italicized text describes habitat types and categories not found within the analysis area but presented for comparative purposes. No Category 1 habitat occurs within the analysis area.						

Table P-3 shows the acreages of each habitat type and habitat category within the analysis area and within the proposed micrositeing corridor, including the habitat categories initially assigned in the field and the final habitat categories following incorporation of the Mule Deer Winter Range overlay. The locations of each habitat category are shown in Figure P-3, both as they were field-surveyed within the proposed micrositeing corridor and as they were desktop-delineated within the analysis area. Figure P-4 shows the location of each habitat type and final habitat category considering the Mule Deer Winter Range overlay.

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

Final Habitat Category	Preliminary Habitat Category	Habitat Type-Subtype	Acres within Micrositeing Corridor	Acres within Analysis Area
2	2	Open Water - Lakes Rivers Streams -Perennial Streams	0.0	2.4
	Category 2 Total		0.0	2.4
2	3	Open Water - Lakes Rivers Streams -Permanent Pond/Lake	0.0	3.0
		Open Water - Lakes Rivers Streams - Seasonal Pond	0.0	8.0
		Open Water - Lakes Rivers Streams -Perennial Streams	0.0	5.1
		Open Water - Lakes Rivers Streams - Intermittent or Ephemeral Streams	0.0	34.9
		Wetlands - Emergent Wetlands	1.8	158.9
		Wetlands - Shrub-scrub Wetlands	0.1	8.5
		Wetlands - Forested Wetlands	0.0	4.2
		Riparian Forest and Natural Shrubland Complexes - Eastside Riparian	19.0	139.2
		Upland Grassland, Shrub-Steppe and Shrubland - Eastside Grassland	722.7	737.3
		Upland Grassland, Shrub-Steppe and Shrubland - Shrub-Steppe	273.0	3,930.50
		Upland Forests and Woodlands - Juniper Woodland	0.0	35.1
		Agriculture, Pasture, Mixed Environs - Planted Grassland	686.7	3,265.0
		Cliffs, Caves, and Talus	5.0	4,200.1
		Category 3 Total		1,708.3

Final Habitat Category	Preliminary Habitat Category	Habitat Type-Subtype	Acres within Micrositing Corridor	Acres within Analysis Area	
2	4	Open Water - Lakes Rivers Streams - Seasonal Pond	2.7	2.7	
		Open Water - Lakes Rivers Streams -Perennial Streams	0.0	1.5	
		Open Water - Lakes Rivers Streams - Intermittent or Ephemeral Streams	0.8	19.6	
		Riparian Forest and Natural Shrubland Complexes - Eastside Riparian	0.0	14.3	
		Upland Grassland, Shrub-Steppe and Shrubland - Eastside Grassland	955.5	975.6	
		Upland Grassland, Shrub-Steppe and Shrubland - Shrub-Steppe	6.6	222.8	
		Agriculture, Pasture, Mixed Environs - Planted Grassland	253.8	555.5	
	Category 4 Total			1,219.4	1,792.0
	5	Open Water - Lakes Rivers Streams - Seasonal Pond	0.0	0.1	
		Wetlands - Emergent Wetlands	3.9	5.3	
		Wetlands - Shrub-scrub Wetlands	0.0	0.0	
		Riparian Forest and Natural Shrubland Complexes - Eastside Riparian	0.0	133.8	
		Upland Grassland, Shrub-Steppe and Shrubland - Eastside Grassland	409.4	419.5	
		Upland Grassland, Shrub-Steppe and Shrubland - Shrub-Steppe	390.6	4930.8	
		Upland Forests and Woodlands - Juniper Woodland	25.9	305.9	
		Agriculture, Pasture, Mixed Environs - Planted Grassland	7.9	1,377.9	
	Category 5 Total			837.7	7,173.3
Category 2 Final Total			3,765.4	21,497.5	
6	Agriculture, Pasture, Mixed Environs - Orchards, Vineyards, Wheat Crops and Other Row Crops	323.7	496.2		
	Urban and Mixed Environs	70.5	218.6		
Category 6 Final Total			394.2	714.8	
Grand Total			4,159.6	22,212.3	
Note: Totals in this table may not be precise due to rounding.					

6.0 Identification of State Sensitive Species and Site-Specific ODFW Issues

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

6.1 Survey Results

Based on the desktop analysis and field surveys (Section 4.0), 21 state sensitive and two eagle species have the potential to occur within the analysis area (Table P-4). State endangered, threatened, and candidate species are addressed in Exhibit Q. Of these 21 species, eight are sensitive-critical species and 13 are sensitive species in the Columbia Plateau Ecoregion (Table P-4). While adverse impacts to bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are not expected due to construction and operation of the Facility, eagles are addressed briefly in this document as a species of concern protected under the Bald and Golden Eagle Protection Act (BGEPA), even though they are not state sensitive species.

Table P-4. State Sensitive Fish and Wildlife Species Potentially Occurring in the Analysis Area

Common Name	Scientific Name	Federal Status ^{1/}	ODFW Status in Columbia Plateau ^{2/}	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Mammals						
hoary bat	<i>Lasiurus cinereus</i>	SOC	S	Roosts in the foliage of trees; late-successional forest habitat.	Occurs in Wasco County (ORBIC 2016). Detected nearby (ABR Inc. 2011).	Limited habitat available. Potential transient during fall.
pallid bat	<i>Antrozous pallidus</i>	SOC	S	Cave/cliff/bridge roosting species.	Occurs in Wasco County (ORBIC 2016). Detected nearby (ABR Inc. 2011).	Potential summer and winter habitat available.
silver-haired bat	<i>Lasionycteris noctivagans</i>	SOC	S	Tree-roosting (primarily in cavities), late-successional forest habitat.	Occurs in Wasco County (ORBIC 2016). Possible detection nearby: Big brown/silver-haired phonic group (ABR Inc. 2011).	Limited habitat available. Potential transient.
spotted bat	<i>Euderma maculatum</i>	SOC	S	Cave/cliff-roosting species. May use trees for night roosts.	Occurs in Wasco County (ORBIC 2016).	Limited habitat available. Potential transient.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	SOC	SC	Caves, mines, isolated buildings, occasionally trees for roosting.	Occurs in Wasco County (ORBIC 2016).	Limited habitat available. Potential transient.
Birds						
bald eagle	<i>Haliaeetus leucocephalus</i>	BCC, BGEPA	-	Nests in forested areas adjacent to large bodies of water. Nests in trees, rarely on cliff faces and ground nests in treeless areas. Known to scavenge opportunistically on carcasses in otherwise unsuitable habitat particularly during migration.	Known occurrence nearby (NWC 2011; WEST 2013, 2018).	Extremely limited nesting habitat. Likely transient.

Common Name	Scientific Name	Federal Status ^{1/}	ODFW Status in Columbia Plateau ^{2/}	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Brewer's sparrow	<i>Spizella breweri</i>	BCC	S	Sagebrush shrubland, generally with a canopy height of more than five feet. Often associated with big sagebrush. Nest in thick crowns or low in brush, or in clumps of grass.	Known occurrence nearby (Tetra Tech 2018; WEST 2013; NWC 2011).	Nesting, foraging, migrating.
burrowing owl	<i>Athene cunicularia hypugaea</i>	SOC	SC	Open, treeless areas with available burrows excavated by other species.	Known burrows within proposed micrositeing corridor (Tetra Tech 2018).	Confirmed breeding.
common nighthawk	<i>Chordeiles minor</i>	-	S	Nests and roosts on gravel or sparsely vegetated grasslands. Forages for insects in all habitats, including urban and developed environments.	Known occurrence nearby (Tetra Tech 2018; NWC 2011).	Nesting, hunting, roosting, migrating.
ferruginous hawk	<i>Buteo regalis</i>	BCC, SOC	SC	Open, grassy areas and shrub-steppe with scattered shrubs or trees for perching and nesting. Can nest in juniper or cottonwood trees near small streams, on rocky sites with an expansive view, on rimrock, or on undisturbed ground.	Known occurrence nearby (Tetra Tech 2018).	Hunting, migrating. Potential nesting habitat available.

Common Name	Scientific Name	Federal Status ^{1/}	ODFW Status in Columbia Plateau ^{2/}	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
golden eagle	<i>Aquila chrysaetos</i>	BCC, BGEPA	-	Usually nests on cliffs but also can nest in trees. Breeds in open and semi-open habitats at a variety of elevations, in tundra, shrublands, grasslands, woodland-brushlands, and coniferous forests, farmland and riparian areas. Typically forages in open habitats like grasslands, areas with steppe-like vegetation.	Known occurrence nearby, including nesting (Table P-5; WEST 2018, WEST 2013, NWC 2011).	Nesting habitat available along cliffs. Migrant occurrence likely.
grasshopper sparrow	<i>Ammodramus savannarum</i>	-	S	Large areas of dry grassland habitat with low to moderate height and low shrub cover.	Known occurrence nearby (Tetra Tech 2018; WEST 2013; NWC 2011).	Nesting, foraging, migrating.
Lewis's woodpecker	<i>Melanerpes lewis</i>	BCC, SOC	SC	Ponderosa pine forests, oak woodlands, oak-pine woodlands, cottonwood riparian forests, and areas burned by wildfires. Specifically requires aerial insects for foraging, large snags for nesting (especially soft or well-decayed snags), and relatively open canopy for flycatching.	Known occurrence nearby (WEST 2013).	Possible migrant.
loggerhead shrike	<i>Lanius ludovicianus</i>	BCC	S	Tall sagebrush, with open grassy areas and bare ground for foraging. Often nest near isolated trees or large shrubs.	Known occurrence nearby (Tetra Tech 2018; WEST 2013; NWC 2011).	Nesting, hunting, migrating.

Common Name	Scientific Name	Federal Status ^{1/}	ODFW Status in Columbia Plateau ^{2/}	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
long-billed curlew	<i>Numenius americanus</i>	BCC	SC	Open habitat, relatively short grass, limited woody vegetation. Dryland wheat areas are also sometimes used as nesting and foraging habitat.	Known occurrence in area (NWC 2011).	Potential to nest and forage in shorter grass areas or dryland wheat. Possible migrant.
sagebrush sparrow	<i>Artemisiospiza nevadensis</i>	BCC	SC	Shrub-steppe with high shrub cover, particularly big sagebrush.	Occurs in Wasco County (ORBIC 2016).	Potential for nesting, migrating.
Swainson's hawk	<i>buteo swainsoni</i>	-	S	Open country grassland habitat with scattered trees and shrubs for nesting.	Known occurrence in micrositeing corridor, nesting nearby (Tetra Tech 2018; WEST 2013; NWC 2011).	Nesting, hunting, migrating.
Reptiles						
California mountain kingsnake	<i>Lampropeltis zonata</i>	SOC	S	Oak and pine woodlands.	Occurs in Wasco County (ORBIC 2016).	Extremely limited habitat available.
northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	SOC	S	Shrub-steppe with sandy soils, sparse grasses and forbs.	Known occurrence nearby (WEST 2013).	Potential to occur.
western painted turtle	<i>Chrysemys picta bellii</i>	-	SC	Primarily aquatic (marshy ponds, small lakes, slow-moving streams, and quiet off-channel portions of rivers). Breeds in terrestrial habitats generally within 165 feet of suitable aquatic habitat. Can disperse across terrestrial habitat.	Occurs in Wasco County (ORBIC 2016).	Limited to no habitat available.

Common Name	Scientific Name	Federal Status ^{1/}	ODFW Status in Columbia Plateau ^{2/}	Expected Habitat	Observed or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Fish						
Pacific lamprey	<i>Entosphenus tridentatus</i>	SOC	S	Fine gravel beds for spawning.	Occurs in Wasco County (ORBIC 2016).	Extremely limited habitat available in perennial streams.
steelhead (Middle Columbia River Species Management Unit/ Evolutionarily Significant Unit, summer run)	<i>Oncorhynchus mykiss</i>	T	SC	The Deschutes River, Buck Hollow Creek and some of its tributaries, and Bakeoven Creek and some of its tributaries.	Per ORBIC (2016) and StreamNet (2018), Buck Hollow Creek and some of its tributaries, and Bakeoven Creek and some of its tributaries are habitat for this run.	Spawning, limited habitat available.
western brook lamprey	<i>Lampetra richardsoni</i>	-	S	Fine gravel beds for spawning.	Occurs in Wasco County (ORBIC 2016).	Extremely limited habitat available.
<p>Sources: ABR Inc. 2011; Bechard et al. 2010; Brigham et al. 2011; Buehler 2000; Dugger and Dugger 2002; Gervais et al. 2009; Guinan et al. 2008; Gutiérrez and Delehanty 1999; Kochert et al. 2002; Martin and Carlson 1998; Ng et al. 2017; NWC 2011; OCS 2016; ODFW 2016, 2017; ORBIC 2016, 2018; OWE 2019; Poulin et al. 2011; Rotenberry et al. 1999; Sedgwick et al. 2000; StreamNet 2018; Sullivan et al. 2009; USFWS 2008, 2016, 2018a, 2018b; Vickery 1996; Vierling et al. 2013; WEST 2013, 2018; White et al. 2002; Yosef 1996.</p> <p>1/ Federal Status: T = Threatened, SOC = Species of Concern, BCC = Bird of Conservation Concern, BGEPA = Bald and Golden Eagle Protection Act.</p> <p>2/ Oregon Department of Fish and Wildlife Status: SC = Sensitive-Critical Species, S = Sensitive Species.</p>						

6.2 Site-Specific Issues Identified by ODFW

During ongoing coordination, ODFW has identified big game as a site-specific issue at the Facility, as ODFW-mapped Mule Deer Winter Range encompasses the entire analysis area. The Applicant has worked with ODFW to avoid, minimize, and mitigate impacts to big game, as described in Section 9.0. For example, the Applicant considered fencing specifications recommended by ODFW to minimize impacts to big game during Facility design, will limit construction and operation activities outside the Facility's fenced area during the winter to reduce disturbance to big game. The Applicant is also working with ODFW to provide mitigation for impacts to big game habitat, which has been mapped as Category 2 habitat per ODFW's recommendation.

Mule deer within the analysis area (and within the Columbia Plateau Ecoregion) are non-migratory, and thus ODFW anticipates that the Facility is not likely to pose a habitat connectivity issue. Similarly, the Facility is located in an elk de-emphasis area; therefore, there are no agency management objectives for elk at the Facility. As a result of these considerations, the Applicant anticipates impacts to big game will be minimized by siting facilities on habitat that is less likely to be used by wintering deer (e.g., dry-land wheat or non-native grassland), and unavoidable impacts will be mitigated consistent with the fish and wildlife habitat mitigation goals, the standards of OAR 635-415-0025, and as described below.

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

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

Table P-4 includes a description of expected habitat for each sensitive species with the potential to occur in the analysis area, whether the species is known to occur within the analysis area or nearby, and the potential for each species' use of the habitats identified within the analysis area. Field surveys were designed to document state sensitive species if present, and targeted areas likely to support these species; however, species not documented during surveys were not necessarily considered absent from the analysis area, as species that are present within the analysis area only seasonally (e.g., during winter) or only during a particular time of day (e.g., nocturnal or crepuscular species) would not have been documented during surveys. Additionally, field surveys may not have documented all habitat use by an observed species. As a result, the Applicant assumed presence of the state sensitive species identified in Table P-4 based on the presence of suitable habitat in the analysis area, and determined habitat use of the analysis area by these species based on known habitat associations in combination with the results of field surveys.

Two state sensitive species were detected within the analysis area during 2018 surveys (Figure P-5). Survey methods are discussed in Section 4.2, and additional details on the results are provided in Attachment P-1. Observed habitat use by each of these species is as follows:

- **Swainson's hawk:** This species was observed in two locations hunting in open grasslands.
- **Burrowing owl:** A family group (two adults, three young) was found in the southwest portion of the proposed micrositeing corridor, in an area of planted grassland. Two burrows were located and documented.

No state sensitive avian species have been observed within the proposed micrositeing corridor during the ongoing avian use surveys (WEST n.d.).

8.0 Description of Potential Adverse Impacts

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

Construction and operation of the Facility would result in both permanent and temporary impacts to wildlife and their habitats. As described in detail in Exhibit B, the Applicant proposes to construct the Facility in phases over several years. The impact analysis presented in this exhibit represents a fully built-out scenario, but takes into consideration a phased construction schedule. Habitat mitigation and vegetation management associated with construction and operation are discussed in this section, and in more detail in the Habitat Mitigation Plan (Attachment P-2), and Revegetation Plan (Attachment P-3). However, as the fenced areas of the Facility are considered permanently impacted for the purposes of habitat mitigation, revegetation efforts described in this application primarily addresses limited areas of temporary impact outside the fenced area that will be restored following construction.

8.1 Potential Impacts to Fish and Wildlife Habitat

Due to the multi-year construction schedule of the Facility, both permanent and temporary impacts to fish and wildlife habitat will occur in phases over this time period. Permanent impact areas are those that would be converted from the existing condition to a different condition for the life of the Facility. Temporary impact areas are those areas that would be disturbed during construction activities, but would not become permanent parts of the Facility. Direct impacts to habitat include permanent loss and temporary disturbance of some specific habitat types; indirect impacts may include increased potential for the invasion of noxious weeds, particularly along fence lines and roads. Before each phase of construction, some areas within the construction footprint will be cleared of vegetation, with permanent and temporary impacts to habitats within the proposed micrositeing corridor. These habitats are identified and described in Section 5.0, and Table P-5 provides the number of acres that will be permanently or temporarily impacted by the Facility, organized by habitat category and type. Exhibit C provides the total, cumulative disturbance impact acreage.

Table P-5. Acres of Impact to Habitat Categories and Types within the Proposed Micrositing Corridor

Final Habitat Category	Preliminary Habitat Category	Habitat Type-Subtype ^{1/}	Permanent Impact	Temporary Impact
2	3	Riparian Forest and Natural Shrubland Complexes – Eastside Riparian	0.6	1.3
		Upland Grassland, Shrub-Steppe and Shrubland – Eastside Grassland	579.1	14.4
		Upland Grassland, Shrub-Steppe and Shrubland – Shrub-Steppe	103.4	32.0
		Agriculture, Pasture, Mixed Environs – Planted Grassland	423.4	16.2
		Cliffs, Caves, and Talus	0.0	0.4
	4	Open Water - Lakes Rivers Streams – Seasonal Pond	0.7	0.1
		Open Water - Lakes Rivers Streams – Intermittent or Ephemeral Streams	0.0	<0.1
		Upland Grassland, Shrub-Steppe and Shrubland – Eastside Grassland	792.3	17.0
		Upland Grassland, Shrub-Steppe and Shrubland – Shrub-Steppe	1.8	0.6
		Agriculture, Pasture, Mixed Environs – Planted Grassland	177.1	7.3
	5	Upland Grassland, Shrub-Steppe and Shrubland – Eastside Grassland	303.4	17.4
		Upland Grassland, Shrub-Steppe and Shrubland – Shrub-Steppe	91.1	47.6
		Upland Forests and Woodlands – Juniper Woodland	0.0	2.6
		Agriculture, Pasture, Mixed Environs – Planted Grassland	0.1	0.7
Category 2 Final Total			2,473.0	157.6
6	6	Agriculture, Pasture, Mixed Environs – Orchards, Vineyards, Wheat Crops and Other Row Crops	240.4	4.3
		Urban and Mixed Environs	3.6	14.7
Category 6 Final Total			244.0	19.0
Grand Total			2,717.0	176.6
Note: Totals in this table may not be precise due to rounding.				
1/ Only impacted Habitat Types-Subtypes present within the proposed micrositing corridor are represented.				

Solar array areas will be fenced, and all areas inside the fence are considered permanently disturbed. In addition to the solar array, the collector substation, the operations and maintenance (O&M) building, and the battery storage area will be fenced, as required by electrical code or security needs (see Exhibits B and C). While these areas are considered permanently disturbed, the Applicant intends to manage low-height native plant habitat inside the fenced area. Both the application of gravel and the revegetation of areas within the fenced areas may effectively provide habitat for some wildlife species, as described in Section 8.2.

All temporary disturbance areas are outside the fenced solar arrays. Temporary impact areas are those areas that would be disturbed during construction activities, but would not become permanent parts of the Facility. Temporary disturbances will occur related to the improvement of existing roads, and during the construction of collector and transmission lines, new roads, staging areas, and fences. Some areas of temporary disturbance, such as staging areas, will be graveled during construction, and will be reclaimed by removing the gravel surface, re-grading to match adjacent contours, and reseeding. The specific extent of each component's temporary impact is detailed in Exhibit C, and is described in terms of a total, worst-case scenario impact for the full duration of phased construction.

The duration of this temporal loss varies among habitats, with shrub-steppe habitats generally taking more than 5 years to recover, and grassland around 5 years (Bakker and van Diggelen 2006; McArthur and Stevens 2004; Pyke et al. 2015; Rosentreter 2005; Wambolt et al. 2001; Watts and Wambolt 1996). The Applicant anticipates that the small area of eastside riparian habitat that will be temporarily impacted during construction would recover in less than 5 years, as it is dominated by invasive herbaceous species such as cheatgrass (*Bromus tectorum*), tumbled mustard (*Sisymbrium altissimum*), reed canarygrass (*Phalaris arundinacea*), and thistle species. This riparian habitat is supported by irrigation, and contains young (2-3 years old) willow plantings that will not be removed during construction. Temporary impacts to these habitats are limited, as shown in Table P-5. Restoration of the temporary impact areas will occur following construction phases, as described in the Revegetation Plan (Attachment P-3). Most roads and some staging areas have been sited inside the fenced/permanent impact area, but some temporary impacts due to new roads and staging areas will occur as shown in Exhibit C (Table C-2).

The Applicant has and will continue to minimize or avoid impacts to high-quality habitat through the micro-siting considerations described in Section 9.0, and will mitigate for impacts that cannot be avoided as described in the Habitat Mitigation Plan (Attachment P-2). Impacts to state sensitive species are described in Section 8.2. Impacts by habitat category, and specifically to ODFW-designated Mule Deer Winter Range habitat, are described below.

8.1.1 Category 2 Habitat

ODFW-mapped Mule Deer Winter Range encompasses approximately 17.7 million acres of eastern Oregon and 67 percent of Wasco County. The analysis area is located entirely within the Mule Deer Winter Range, and as such, all habitat field-categorized as Category 3, 4, or 5 has been mapped as Category 2 habitat, per ODFW's recommendation in their comments on the NOI. The Applicant has

minimized impacts to Category 2 habitat to the extent feasible by micrositing facilities on Category 6 habitat where available within the proposed micrositing corridor. Permanent Category 2 habitat impacts are primarily to eastside grassland and planted grassland (approximately 84 percent of permanently impacted areas), followed by shrub-steppe (approximately 7 percent), and small areas of seasonal pond and eastside riparian habitats (Table P-5). Approximately 55 percent of the grassland and shrub-steppe habitat located in the permanent impact areas were determined to be highly or very highly disturbed habitat (Categories 4 and 5), with less than 50 percent native species composition (Table P-2, Table P-5). Approximately 41 percent of all grassland and shrub-steppe habitat within the permanent impact areas were characterized as Category 3, or moderately disturbed habitat.

Areas characterized as Category 3 grasslands in the permanent impact areas are categorized as such due to a dominant bluebunch wheatgrass (*Pseudoroegneria spicata*) component, often in stands of planted grassland with low overall species diversity. Bluebunch is an infrequent component of Categories 4 and 5 grasslands in the permanent impact areas, where potential mule deer forage quality is poor. These areas are composed primarily of non-native species such as intermediate wheatgrass (*Thinopyrum intermedium*), medusahead (*Taeniatherum caput-medusae*) and cheatgrass (*Bromus tectorum*) and are often heavily disturbed by grazing. These non-native species are present and occasionally co-dominant in areas of Category 3 grassland habitat as well. Field-delineated Category 3 shrub-steppe habitat within the permanent impact areas is primarily limited to two contiguous tracts in the southern portion of the fenced area, between areas of planted grassland. Dominant shrub layer species in these areas include stiff/scabland sagebrush (*Artemisia rigida*), big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), and green rabbitbrush (*Chrysothamnus viscidiflorus*). Areas of Categories 4 and 5 shrub-steppe habitat in the permanent impact areas are located primarily within or contiguous to areas burned in the Boxcar Fire.

Temporary impacts to Category 2 habitat are primarily to shrub-steppe and planted and eastside grassland habitats, followed by small areas of juniper woodland, eastside riparian, cliffs, caves and talus, seasonal pond, emergent wetlands, and intermittent or ephemeral streams (Table P-5). Shrub-steppe habitat accounts for approximately 45 percent of all temporary impact areas, primarily along the proposed transmission corridor. Planted and eastside grasslands account for another 41 percent of temporarily impacted habitat, primarily along the perimeter of the fence line, and in staging areas.

Deer require high-quality forage to maintain overall good body condition during the winter (ODFW 2003). Temporary disturbance to the already moderately to very highly disturbed shrub-steppe and grassland habitats at the Project will have a limited impact on mule deer forage, as these temporary impacts will not result in loss of high-quality forage habitat. Deer populations are most productive in early to mid-seral vegetation, which can be adversely impacted by juniper incursion into shrub-steppe habitat, wildfire, seeding with non-native species, and non-native invasive weeds (deVos et al. 2003; ODFW 2014). Approximately 51 percent of the temporarily impacted areas of grassland and shrub-steppe habitat were categorized (field or desktop) as Categories 4 and 5

(highly disturbed and very highly disturbed, respectively; Table P-2). Only 35 percent of the grassland and shrub-steppe habitat that will be temporarily impacted was categorized as Category 3 (moderately disturbed). No grassland or shrub-steppe habitat was categorized as Category 2 (high-quality habitat dominated by native species). The areas temporarily disturbed by construction will be converted to an early seral stage, which could improve overall habitat quality in these areas, and therefore benefit deer if suitable deer forage species are planted following construction.

Areas defined as cliffs, cave, and talus within the temporary impact areas are limited to two locations. One area is a less than 0.01-acre strip of desktop-delineated, potential talus. This thin strip runs along the edge of a small ravine just to the north of the transmission corridor. The second area is a 0.04-acre steep slope located on the north side of a ravine in the transmission corridor. While this area overlaps with the temporary impact area, it will be spanned and avoided during construction and operation of the Facility.

8.1.2 Category 6 Habitat

There are potential temporary and permanent impacts to Category 6 habitat within the proposed micro-siting corridor. Both row crops (i.e., dryland wheat) and urban and mixed environs (i.e., paved roads and other developed areas) could be impacted.

8.2 Potential Impacts to State Sensitive Species

This section addresses potential impacts to state sensitive species identified in Section 6.0. Habitat modification resulting from construction activities will occur in both temporary and permanent impact areas, and the associated impacts will vary by species. In addition to these habitat-related impacts (e.g., habitat loss and modification), potential adverse impacts to sensitive species due to construction and operation may include the introduction of noxious weeds and other non-native invasive species, potential nesting and breeding disturbance, electrocution, powerline collision, structure collision, vehicular collision, disturbance related to artificial lighting, entrapment within open vertical pipes, disturbance to wintering big game, and entrapment within fenced areas.

8.2.1 Mammals

Five state sensitive bat species have the potential to occur within the analysis area: hoary bats, pallid bats, silver-haired bats, spotted bats, and Townsend's big-eared bats. However, the proposed micro-siting corridor is not located within typical maternal or roosting habitat for these species (Table P-4). While areas of caves, cliffs, and talus, and juniper woodlands are located within the analysis area along creek canyons, construction and operation of the Facility may have limited impacts to these roosting habitats. Similarly, impacts to foraging habitats such as wetlands and waters have been avoided and minimized to the extent feasible. Additionally, construction activities will generally occur during daylight hours when bats are generally absent, and thus construction activities are not anticipated to disturb foraging bats.

Any impacts to bats that do occur would likely be limited to late summer and fall, during the migratory period for tree-roosting bats. Post-construction bat mortality data at utility scale photovoltaic solar energy sites are limited; however, three publicly available studies from California sites have reported small numbers of bat carcasses found both during fatality searches and incidentally (WEST 2017). Data from non-photovoltaic solar projects with higher bat fatalities reported (e.g., a power-trough facility in California) suggest that the timing of potential bat fatalities at solar facilities is primarily in late summer and fall. While cause of mortality in these studies is generally inconclusive based on the condition of the carcasses when found, some of these may be due to collision with project infrastructure. Insects may be attracted to lighting around structures, which may in turn attract bats to forage near project infrastructure. Thus, artificial lighting at night may increase the risk of collision fatalities. However, the potential for collision risk due to artificial night lights will be avoided and minimized, as described in Section 9.0. As a result, construction and operation of the Facility are anticipated to have minimal impact on these bat species.

Mule deer are not a state sensitive species; however, potential direct, adverse impacts to mule deer within ODFW-identified Mule Deer Winter Range have been identified in response to consultation with ODFW and USFWS. A recent study investigating habitat use and mule deer survival in eastern Oregon identified that mortality risks varied between male and female populations (Mulligan 2015). For mule deer males, the cumulative risk was highest for legal harvest, with predation the next highest cause of mortality for this sex. For females, the cumulative risk was highest for predation, with anthropogenic causes (vehicles, fences) and illegal harvest also important sources of mortality. Winter survival does not appear to be the primary limiting factor for adult mule deer; however, low coverage and quality of forage in wintering habitat can result in poor deer condition, and thus, survival (ODFW 2003). Agency recommendations have been considered during the design and selection of fence components and layout, as discussed in Section 9.0. The potential for vehicle collisions during all phases of construction and operation of the Facility are also addressed in Section 9.0. Additional potential impacts include displacement from foraging in temporary impact areas due to vegetation removal, and disturbance by construction activities in the winter, when deer are nutritionally stressed (ODFW 2014).

8.2.2 Birds

Ten state sensitive bird species and two eagle species have the potential to occur within the analysis area (Table P-4). Construction and operation of the Facility will result in some temporary and permanent impacts to habitat, which could displace nesting and foraging birds. However, birds using habitat within the proposed micro-siting corridor are expected to relocate to other comparable habitat in the analysis area and the greater vicinity of the Facility. Avian mortality at the Facility due to collision with infrastructure is also possible, although the available data on avian mortality at utility scale solar energy sites suggests mortality at photovoltaic facilities is comparatively low.

A study examining avian fatalities at two power tower solar sites and one photovoltaic facility compared avian mortality rates to other human-caused mortality sources (wind energy, fossil fuel

power plants, communication towers, roadway vehicles, buildings and vehicles; Walston et al. 2016). Avian mortality at these sites collectively fell within a similar range as mortality rates at wind energy facilities, which were found to cause fewer fatalities than any of the other human-caused mortality sources. The mortality rate at the photovoltaic facility in the study was significantly lower than at the two power tower facilities. At the photovoltaic facility, causes of death were described as unknown (86 percent), line collision (3 percent), panel collision (4 percent), predation (less than 1 percent), and electrocution (less than 1 percent; WEST 2014). An additional 6 percent of fatalities were categorized as unknown/preening site, due to observed flocks of mourning doves roosting and preening under the arrays. The data indicate that mortality rates at these three solar facilities are low compared to other anthropogenic sources of avian mortality; however, caution should be taken in the application of this limited data set to other projects. Studies featuring larger facility sample sizes or with a more granular understanding of cause have not yet emerged.

A study focusing on avian use at photovoltaic installations at or near five airports in the United States found that passerine species, including red-winged blackbirds, sometimes use shade provided by panels on summer days, and sometimes perch on panels to sing in the early part of the breeding season (DeVault et al. 2014). This behavior is similar to anecdotal mourning dove use of the photovoltaic facility examined in Walston et al. (2016) and WEST (2014). DeVault et al. (2014) also found that while insectivorous avian species were observed foraging near the arrays, the abundance of foraging birds was similar to the abundance in nearby grasslands. No fatalities were clearly attributable to collision with panels.

The limited avian mortality and usage data for utility scale solar energy sites suggests that mortality at photovoltaic facilities in particular is low; therefore, impacts to sensitive bird species with the potential to occur within the proposed micro-siting corridor are addressed below in terms of habitat removal, structural collision, vehicular collision, artificial lighting, entrapment within open vertical pipes, and nesting disturbance during construction and operation. Measures described in Section 9.0 will be used to minimize or avoid these potential impacts.

- **Bald eagle** (BGEPA). Bald eagles were not observed within the analysis area during 2018 special status species surveys but have been recorded as transients during nearby surveys performed by Avangrid Renewables. No bald eagle nests are located within 10 miles of the proposed micro-siting corridor (WEST 2018). Bald eagles are observed during all months of the year in Wasco County (Sullivan et al. 2009). The Deschutes River provides bald eagle habitat, and a winter roost comprised of several individuals has been documented near where Buckhollow Creek empties into the Deschutes River (NWC 2011). Bald eagles primarily hunt in or near aquatic habitats, but opportunistically forage on carrion particularly in winter (Buehler 2000). Powerline collision and electrocution are the primary potential, adverse impacts to bald eagles, mainly during migration and winter.
- **Brewer's sparrow** (state sensitive). Brewer's sparrows were not observed during 2018 surveys at the Facility. This species uses shrublands, generally with a canopy height of more than 5 feet. Brewer's sparrows are most closely associated with big sagebrush (*Artemisia*

tridentata; OCS 2016, Rotenberry et al. 1999). Sagebrush of this size was not observed during field surveys at the Facility. The predominant sagebrush species observed was *Artemesia rigida*, or stiff sagebrush, which grows to only 12 to 16 inches in height (Rosenreter 2005). Limited stands of the larger *Artemesia tridentata* were observed at a height of up to 3-4 feet. Brewer's sparrows arrive on their breeding grounds as early as mid- to late-March, and are rarely observed in Wasco County after August (Rotenberry et al. 1999; Sullivan et al. 2009). Surveys were conducted during the breeding period for this species, when it is present in Wasco County. Brewer's sparrows were observed during 2018 surveys at the adjacent Imperial Wind Project (Attachment P-1). Surveys at the Imperial Wind Project occurred earlier in the breeding season, when this species vocalizes more frequently and is therefore more likely to be detected; however, this species vocalizes throughout the year. While not recorded during surveys at the Facility, the proximity of observations nearby and the availability of habitat for this species suggests that this species may occur at the Facility. Potential adverse impacts to this species due to the construction and operation of the Facility are habitat loss and potential nesting disturbance in areas where limited stands of larger shrubs may be located.² Additionally, collision with infrastructure during nocturnal migration may be an adverse impact to this species. Several studies have shown that birds can be attracted to artificial lighting on human infrastructure, which can result in collision (Gehring et al. 2009; Kerlinger et al. 2010; Poot et al. 2008). Habitat loss for this species has been minimized by micro-siting outside sagebrush shrub-steppe habitat as feasible, and through the shielding of operational lighting, as described in Section 9.1.1.

- **Burrowing owl** (state sensitive-critical). This species breeds in burrows excavated by other animals in open areas with a high proportion of bare ground (OCS 2016). A family group of two adults and three young was observed during 2018 surveys in the proposed micro-siting corridor, at a site consisting of two burrows (Figure P-5). This species is generally migratory, but a small proportion in neighboring Idaho and Washington have been found to overwinter (Poulin et al. 2011). Arrival in Oregon likely occurs in March; egg-laying begins in April. Dispersal generally occurs during September. Potential adverse impacts to this species during construction are nesting and foraging habitat loss (burrows and grassland, respectively), and vehicle collision. The Applicant will clear and grade the area where burrows were documented in 2018 prior to the breeding season to avoid destroying an occupied nest or causing nesting disturbance. Generally tolerant of human activity, and opportunistic hunters for insects and small mammals, burrowing owls may use the operating Facility to hunt, and may also nest if burrows become available. Potential

² In the field, eastside grassland and shrub-steppe habitat within the proposed micro-siting corridor met the criteria for categories 3, 4, and 5 (Table P-3, Figure P-3). Considering the highly disturbed habitat delineated following the Boxcar Fire (Preliminary Habitat Category 5; Table P-5, Figure P-2), impacts to available habitat for eastside grassland and shrub-steppe associated species are limited to acreages calculated in Table P-5 for Preliminary Habitat Categories 3 and 4.

operational impacts to this species include collision with vehicles during the breeding season.

- **Common nighthawk** (state sensitive). Common nighthawk was not observed in the analysis area during 2018 surveys but has been recorded during nearby surveys performed by Avangrid Renewables (Attachment P-1). A long-distance migrant, this species is only present in Oregon during its breeding season, arriving in mid- to late-May (Brigham et al. 2011). Common nighthawks are rarely observed in Wasco County after August (Sullivan et al. 2009). Surveys were conducted during this species' breeding period in Oregon; however, common nighthawks are most active at dusk and dawn. Surveys at the Facility were conducted during the day only, lowering the potential to observe common nighthawks in flight during their typical crepuscular activity period. During surveys at the adjacent Imperial Wind Project in 2018, nighthawks were infrequently observed in flight during the day and were also flushed from an area of lithosol in scabland habitat. The proximity of these observations and the similarity of habitats at both sites suggests that this species may occur at the Facility. Construction and operation of the Facility could pose a risk to these birds, which nest on a variety of substrates in open areas including bare ground, gravel, and lithosol. Males also tend to roost on gravel roads, and therefore may roost in temporary impact areas in use during construction such as staging areas. During construction and operation, nesting disturbance and collision with vehicles may adversely impact this species.
- **Ferruginous hawk** (state sensitive-critical). This species occurs in open, grassy areas and shrub-steppe with scattered shrubs or trees for perching and nesting. They can nest in juniper or cottonwood trees near small streams, on rocky sites with an expansive view, on rimrock, or on undisturbed ground (OCS 2016). Nesting opportunities for this species are limited within the proposed micrositing corridor, but the available habitat is appropriate for hunting during the breeding season and during migration. Surveys at the Facility occurred during the breeding period, when this species was most likely to be observed. This species was not detected during 2018 surveys within the proposed micrositing corridor, but has been recorded during nearby surveys performed by Avangrid Renewables (Attachment P-1). Ferruginous hawks can be present on breeding territories as early as late February to early March and can be found in Oregon in small numbers year-round (Ng et al. 2017; Sullivan et al. 2009). In addition to potential electrocution and powerline collision, impacts to this species include habitat loss and potential nesting disturbance if ferruginous hawks build new nests adjacent to, but outside the proposed micrositing corridor, although these impacts will be minimized, as described in Section 9.0.
- **Golden eagle** (BGEPA). Golden eagles are known to nest on rocky cliffs along the Deschutes and John Day rivers, outside the analysis area (ORBIC 2018). Avangrid Renewables (NWC 2011; WEST 2018) and the Oregon Eagle Foundation (Isaacs 2018) have observed eagle nests along Buck Hollow and the lower portions of the Bakeoven Creek drainage (Figure P-5; WEST 2018, Sullivan et al. 2009). Habitat within the analysis area is appropriate for

hunting year-round. Vegetation will be removed inside the fenced areas during each phase of construction, resulting in the loss of available hunting areas; however, given the extent of available habitat for hunting within the analysis area, this impact is limited. Golden eagles are opportunistic, but generally prey on medium and small mammals such as rabbits and squirrels. These species occur in habitat abundantly available throughout the analysis area in particular, and in Wasco County in general. The proposed transmission corridor is within 2 miles of the two closest golden eagle nests documented as in-use during 2018 (WEST 2018). Habitat impacts to this portion of the Facility are primarily temporary, as shown in Table C-2. These areas have already been highly disturbed by the Boxcar Fire. Therefore, potential powerline collision and electrocution are more likely potential impacts to golden eagles than habitat disturbance due to the construction and operation of the Facility. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

- **Grasshopper sparrow** (state sensitive). Grasshopper sparrows were not recorded during 2018 surveys at the Facility, but were recorded during surveys at the adjacent Imperial Wind Project (Attachment P-1). This species uses dry grasslands with low shrub cover for breeding (OCS 2016). In Oregon, this species breeds primarily in native bunchgrass. Its breeding period generally begins in May (Vickery 1996). Fall migration timing is poorly understood for this secretive species, but data suggest migration is underway in September. Surveys occurred during the time period when this species is present and breeding in Oregon. This species is generally detected by identifying its song rather than by observing a perched or flying bird. The grasshopper sparrow's singing fluctuates by both season and day, and can vary with changing weather. Seasonal song frequency also varies between populations in different geographic areas. In Oregon, populations breed in different locations from year to year depending on the suitability of habitat (Csuti et al. 2001), further contributing to the difficulties in consistent detection of this species. Construction and operation of the Facility will result in the loss of some suitable breeding and foraging habitat for grasshopper sparrow.³ Generally a nocturnal migrant, this species may be attracted to artificial lights during migration; therefore, collision is an additional potential, adverse impact to this species during construction and operation of the Facility.
- **Lewis's woodpecker** (sensitive-critical). Habitat disturbance due to the 2018 Boxcar Fire has increased the potential for this species to occur within the analysis area. This cavity-nesting species may find increased nesting opportunities in snags in the riparian canyons adjacent to the proposed micro-siting corridor (Vierling et al. 2013). Fire-disturbed woodland habitat was identified in limited areas of the transmission corridor; however, these juniper woodlands are not typical breeding habitat for this species in Oregon (Csuti et al. 2001). Lewis's woodpecker was not observed during 2018 surveys but one individual was observed during surveys performed nearby (Attachment P-1). This species has limited potential to occur at the Facility as a vagrant during migration. Construction of the Facility

³ See previous footnote about habitat disturbance on page 27.

will not result in a loss of habitat for this species. A diurnal migrant, this species will not be adversely impacted by artificial lighting.

- **Loggerhead shrike** (state sensitive). This species uses patches of tall brush or trees in open habitats for nesting and roosting, and forages in open areas with grasses and bare ground (Csuti et al. 2001; OCS 2016). This species was not observed during 2018 surveys but is known to occur nearby (Attachment P-1). Loggerhead shrikes can establish territories as early as mid-February and complete nests as early as mid-March in some states; however, data indicate that early to mid-March is the early arrival period for this species in Wasco County and that nesting is underway by April (Csuti et al. 2001; Sullivan et al. 2009; Yosef 1996). While these birds nest early in the season, they produce two broods per year, and are present Oregon through September. Surveys at the Facility were conducted within the time period that this species is present and breeding in Oregon. Appropriate habitat for this species is present in the proposed micrositeing corridor and in the analysis area. Loggerhead shrikes can defend a territory of 20-40 acres; therefore, the occurrence of this species at the Facility is likely. The primary potential adverse effects to loggerhead shrike are habitat loss and nesting disturbance⁴. Little information exists regarding whether this species is a nocturnal or diurnal migrant; impact to this species during migration due to artificial lighting is unknown. Habitat loss for this species has been minimized by micrositeing outside sagebrush shrub-steppe habitat as feasible, as described in Section 9.1.1.
- **Long-billed curlew** (state sensitive-critical). This grassland-associated species prefers shorter grass, and can occur in dryland wheat (Dugger and Dugger 2002; OCS 2016). Long-billed curlews were not observed during 2018 surveys, but have been observed nearby (Attachment P-1). The timing of this species' migration, whether diurnal or nocturnal, is poorly understood. Long-billed curlews arrive in Oregon late March to early April, initiate nesting through early May, and are rarely observed in Wasco County after June (Sullivan 2009). The Facility is west of their typical breeding range in Oregon; however, long-billed curlews may identify the Facility as stopover habitat during migration, as revegetation with a low-growing seed mix may create their preferred, open, short-grass habitat within the Facility. Therefore, potential adverse impacts due to Facility operation are limited to the migration window for this species during the spring and early summer, and consist only of potential collision with vehicles intermittently operating on site.
- **Sagebrush sparrow** (state sensitive-critical). This often difficult-to-detect species is found in shrub-steppe habitat with high shrub cover, and is closely associated with big sagebrush communities (Martin and Carlson 1998; OCS 2016). This species was not observed during 2018 surveys, but it occurs in Wasco County (ORBIC 2016). Sagebrush sparrows can establish territories as early as late February, and can still be found migrating in Oregon in early November. Potential adverse effects to sagebrush sparrows are habitat loss, nesting disturbance, and possibly lighting-related disturbance during migration, though its migratory behavior is poorly described. Habitat loss for this species has been minimized by

⁴ See previous footnote about habitat disturbance on page 27.

micrositing outside sagebrush shrub-steppe habitat as feasible, as described in Section 9.1.1.

- **Swainson's hawk** (state sensitive). Swainson's hawks are open-country specialists that hunt and forage in grassland, shrub-steppe, and agricultural areas, and often focus on row-crop agriculture. Nests are frequently in lone trees or isolated shrubs in open country. In the non-breeding season, particularly during fall migration in North America, they are often observed hunting in groups behind agricultural equipment, opportunistically preying on rodents and insects (Bechard et al. 2010). This species was observed twice in the proposed micrositing corridor during 2018 surveys (Figure P-5). Nearby surveys performed by the Applicant in 2018 identified three nests near Route 97, approximately 6 miles south of the analysis area (Attachment P-1). Swainson's hawks typically establish breeding territories after arriving from South America in April and are rarely reported in Wasco County in September (Sullivan et al. 2009). Construction will result in permanent and temporary impacts to habitat appropriate for hunting during breeding and migration. Nesting disturbance could also occur if Swainson's hawks build new nests adjacent to the proposed micrositing corridor, although these impacts will be minimized, as described in Section 9.0.

8.2.3 Reptiles

Three state sensitive reptile species have the potential to occur within the analysis area: northern sagebrush lizards, western painted turtles, and California mountain kingsnakes (Table P-4). Targeted surveys for reptiles were not conducted, but special status species surveys occurred after the hibernation periods for each species, and were conducted during the day, when diurnally active reptiles have the potential to be observed in the appropriate habitat. The northern sagebrush lizard may be present and potentially affected by Facility construction, as described below. Habitat for both the California mountain kingsnake (state sensitive) and the western painted turtle (state sensitive-critical) is extremely limited within the analysis area in general, and in the proposed micrositing corridor in particular (Table P-4). Neither species was observed during 2018 surveys, but both occur in Wasco County (ORBIC 2016). No adverse impacts to California mountain kingsnakes or western painted turtles are anticipated.

- **Northern sagebrush lizard** (state sensitive). This species occurs in shrub-steppe and juniper woodland habitat with sandy soils and sparse vegetation in the grass/forb layer (OCS 2016). Northern sagebrush lizards were not observed during 2018 surveys, but have been recorded during nearby surveys. Potential adverse impacts to this species include loss of habitat and disturbance during construction if individuals are present.
- **Western painted turtle** (state sensitive-critical). Potential habitat for this species within the analysis area includes slow-moving wetland areas near perennial streams; however, this habitat does not occur in the proposed micrositing corridor. Predicted habitat for this species within occupied watersheds does not encompass the majority of Wasco County, including the analysis area (OWE 2019). No records of western painted turtles were identified by an ORBIC query submitted by the Applicant (ORBIC 2018); however, this

species occurs within Wasco County and is sensitive-critical in the Columbia Plateau Ecoregion (ORBIC 2016; ODFW 2016). While terrestrial dispersal of western painted turtles (1-2 miles) has been documented, the lack of records for this species in the analysis area and lack of predicted habitat suggests that the occurrence of this species in the proposed micrositeing corridor is extremely unlikely. As a result, no adverse impacts to western painted turtles are anticipated as a result of Facility construction and operation.

- **California Mountain Kingsnake** (state sensitive). This species occurs in oak and pine woodlands, which are limited within the analysis area and in the proposed micrositeing corridor (Table P-3; OCS 2016). No records of California mountain kingsnake were identified by an ORBIC query by the Applicant (ORBIC 2018); however, this species occurs within Wasco County and is sensitive in the Columbia Plateau ecoregion (ORBIC 2016; ODFW 2016). Potential adverse impacts to this species include loss of habitat and disturbance during construction if individuals are present.

8.2.4 Fish

Three state sensitive fish species have the potential to occur within the analysis area: pacific lamprey, western brook lamprey, and Middle Columbia River Evolutionarily Significant Unit summer run steelhead (Table P-4). No suitable habitat for these species will be impacted by the Facility and as a result no adverse impacts are anticipated, as described below.

- **Lamprey** (both species state sensitive). Habitat for both pacific lamprey and western brook lamprey is extremely limited within the analysis area in general, and in the proposed micrositeing corridor in particular (Table P-4). Neither species was observed during 2018 surveys, although fish surveys were not performed. Both lamprey species occur in Wasco County (ORBIC 2016). No lamprey habitat will be impacted by the construction and operation of the Facility. As a result, no adverse impacts to pacific lamprey or western brook lamprey are anticipated.
- **Steelhead, Middle Columbia River Evolutionarily Significant Unit, summer run** (state sensitive-critical). Habitat for steelhead occurs within the analysis area in Buck Hollow Creek and some of its tributaries, as well as in Bakeoven Creek and some of its tributaries (Figure P-1; ORBIC 2016, StreamNet 2018). None of these streams occur within the proposed micrositeing corridor. No other perennial streams and no other fish-bearing streams occur within the proposed micrositeing corridor, and no riparian areas associated with fish bearing streams will be impacted. Therefore, no adverse impacts to steelhead are anticipated.

9.0 Avoidance and Mitigation

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

This section identifies the avoidance, minimization, and mitigation measures that have been and will be implemented to avoid, minimize, and mitigate potential adverse impacts to fish and wildlife habitat and state sensitive species, as well as big game and eagles, and it describes how these measures will meet the ODFW habitat mitigation goals. The analysis area is not within the range of the sage grouse; therefore, the application of the Greater Sage-Grouse Conservation Strategy is not required.

9.1 Avoidance and Minimization

9.1.1 During Project Design and Micrositing

Measures employed during Facility design and micrositing to avoid and minimize impacts to fish and wildlife habitat, state sensitive species, and eagles included the following:

- To the extent feasible, the Facility was sited on previously disturbed habitat, including dryland wheat and planted grassland, and outside sagebrush steppe, which is an ODFW conservation strategy habitat. Minimizing removal of shrub-steppe habitat is expected to minimize impacts to wildlife generally, and to the northern sagebrush lizard, Brewer's sparrow, loggerhead shrike, and sagebrush sparrow in particular.
- The Facility was sited away from identified nests of Swainson's hawks, ferruginous hawks, and golden eagles so that these nests will not be disturbed by the Facility.
- Spiral markers will be installed on the ground wire of the proposed 230-kilovolt transmission line in areas over canyons or within 2 miles of a known eagle nest.
- The Applicant will use Facility-specific measures that follow APLIC guidelines for minimizing avian electrocutions (APLIC 2006). This is expected to minimize the risk of electrocution to raptors generally, and to bald eagles, golden eagles, Swainson's hawks, and ferruginous hawks in particular.
- The Applicant will implement down-shield lighting for permanent lighting at the substation and O&M building. Outdoor lighting will be sited, limited in intensity, shielded, and hooded in a manner that prevents the lighting from projecting onto adjacent properties, roadways,

and waterways. This is expected to minimize the risk of avian collision with Facility infrastructure for all birds and bats in general, but to nocturnal migrant species (including Brewer's sparrows, sagebrush sparrows, grasshopper sparrows) and to the crepuscular, insectivorous common nighthawk in particular. Down-shield lighting will be in place year-round, mitigating impacts to birds and bats both during migration and while foraging for insects at any time of the year.

- The Applicant will cap or otherwise modify vertical pipes and piles to prevent cavity-dwelling and nesting birds from entering. This also prevents any perching bird from inadvertently falling into pipes. These caps are expected to minimize the risk of fatalities to all birds (including the cavity-nesting Lewis's woodpecker), as well as small mammals and lizards.

The Facility is located in ODFW-designated Mule Deer Winter Range. In response to consultation with ODFW and USFWS, the Applicant has undertaken the following design considerations to minimize impacts to big game in general, and to mule deer in particular:

- All solar components will be fenced to exclude big game.
- The Applicant will install extra gates in the fence line to allow escape by big game in the unlikely event they become trapped in the fenced solar area. The fence design between phases will avoid dead-end "hallways" where big game may become trapped and subject to predation.
- To the extent feasible, Facility infrastructure, including buildings and roads, will be sited within the fenced area in a manner to reduce the potential for disturbing wildlife outside of the fenced area both during construction and in the operational phase, as requested by ODFW in their comments on the NOI (ODFW 2019).

9.1.2 Prior to Construction

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

- Burrowing owl burrows identified during 2018 surveys will be covered outside the breeding season, before construction begins, to prevent burrowing owls from reusing this site and being disturbed during construction.
- If construction is scheduled to overlap with the raptor nesting season (February 1 – August 31), the Applicant will conduct a raptor nest survey within 0.5 mile of the defined work area to identify the location of raptor nests that could be affected by construction, as requested by ODFW in its comments on the NOI. The survey protocol will be approved by ODFW, and the surveys will occur no earlier than 2 years prior to construction.

9.1.3 During Construction

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

- The Applicant will apply the buffers and seasonal restrictions in Table P-6 around raptor nests identified during pre-construction surveys to avoid disturbance to nesting raptors as practicable, as requested by ODFW in their comments on the NOI (ODFW 2019). The Applicant will consult with ODFW or USFWS for prior approval for exceptions to nest buffers during construction.

Table P-6. ODFW Raptor Nest Buffers and Seasonal Restrictions

Species	Spatial Buffer	Seasonal Restriction	Release Date if Unoccupied
western burrowing owl	0.25 mile	April 1 to August 15	May 31
golden eagle	0.5 mile	Feb 1- Aug 15	May 15
red-tailed hawk	300-500 feet	Mar 1- Aug 15	May 31
ferruginous hawk	0.25 mile	Mar 15- Aug 15	May 31
Swainson’s hawk	0.25 mile	April 1- Aug 15	May 31
prairie falcon	0.25 mile	Mar 15- Jul 1	May 15
peregrine falcon	0.25 mile	Jan 1- Jul 1	May 15
American kestrel	0.25 mile	Mar 1- Jul 31	May 15

- The Applicant will clear vegetation prior to the critical period for ground-nesting birds (April 15 – September 1) to avoid disturbing active nests, as suggested by ODFW in their comments on the NOI (ODFW 2019). Removal of vegetation outside the breeding season will also eliminate the potential for ferruginous hawks and Swainson’s hawks to establish new nests within the fenced areas. Removal of potential raptor nesting structures will be conducted outside the seasonal restrictions identified in Table P-6.
- If vegetation removal is necessary between April 15 and September 1, a biologist will conduct a clearance survey for nesting birds prior to vegetation removal. Active nests will be flagged for avoidance.
- Prior to construction, streams, wetlands, and other sensitive habitat features (e.g., mature trees, intact sagebrush) that are not proposed to be impacted will be flagged for avoidance during construction. The Applicant will develop a map set showing these sensitive resources that will be kept on site during construction, and updated if additional information on sensitive resources is obtained. These maps will show buffer zones and temporal restrictions of sensitive resources, as applicable. As described below, construction personnel will be instructed to work outside the flagged and mapped sensitive resources.

- The Applicant will limit construction activities outside the fenced area (i.e., at the overhead collection line, transmission line, and roads) between December 1 and April 1 to minimize disturbance to wintering deer, as requested by ODFW in their comments on the NOI (ODFW 2019).
- During vegetation removal, any burrows inside the fenced areas with the potential for use by burrowing owls will be removed to prevent this species from nesting within the fenced areas where disturbance to nesting owls could occur.
- Construction vehicles will be limited to 20 miles per hour on all Facility access roads (excluding public roads). This is expected to limit impacts specifically to burrowing owls, common nighthawks, long-billed curlews, and big game, and to wildlife in general.

9.1.4 During Operation

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

- After Facility construction, areas where habitat was temporarily disturbed outside the fenced area will be restored to their original conditions and monitored as necessary according to provisions in the Revegetation Plan (Attachment P-3). Measures to minimize the spread of noxious weeds are described in the Noxious Weed Control Plan (Attachment P-5). The Noxious Weed Control Plan specifically addresses noxious weeds along solar fence lines. Revegetation and noxious weed control will minimize impact to the quality of available deer forage.
- The Applicant intends to manage low-height native vegetation inside the fenced area, as described in Exhibit B. Weed control measures would follow the Applicant's Noxious Weed Control Plan, developed in coordination with Wasco County Weed Department Supervisor (Attachment P-5).
- The Applicant will identify licensed local wildlife rehabilitators capable of responding to the Facility in the event of injured wildlife.
- The Applicant will perform 1 year of post-construction fatality monitoring for both bird and bat species at the first constructed phase of the Facility. As requested by ODFW, the protocol will follow current best available science, and allow the applicant to estimate with statistical confidence the total number of fatalities at the Facility. This data will be provided to ODFW to assist with recommendations for future projects.
- Operations and maintenance vehicles will be limited to 20 miles per hour on all Facility access roads (excluding public roads). This is expected to limit impacts specifically to burrowing owls, common nighthawks, long-billed curlews, and big game, and to all wildlife in general.

9.2 Mitigation

After avoidance and minimization measures have been implemented, some impacts to wildlife habitat and sensitive species will remain. Temporary⁵ and permanent habitat loss will be mitigated for according to ODFW Habitat Mitigation Policy goals and standards, as described in the Habitat Mitigation Plan (Attachment P-2). Included in this plan are measures for conserving and enhancing sufficient acreages of wildlife habitat to compensate for those acreages temporarily or permanently impacted by the Facility, or for providing commensurate funding to support an in-lieu fee program developed in coordination with ODFW. Mitigation may entail protection and enhancement of one or more of the mitigation sites, described in the Habitat Mitigation Plan (Attachment P-2). This protection will be—at a minimum—for the duration of the Facility. As recommended by ODFW in their comments on the NOI (ODFW 2019), the Applicant is developing mitigation to offset the footprint of the fenced area at the Facility to provide for “no net loss, net benefit” as outlined in the Mitigation Policy. The Habitat Mitigation Plan includes success criteria and provisions for monitoring whether mitigation goals are achieved, and this plan has mitigation provisions for both temporary habitat disturbance associated with construction activities and permanent habitat loss.

9.3 Compliance with ODFW Mitigation Goals – OAR 635-415-0025

The Applicant mapped eight habitat types with the proposed micrositing corridor that meet the definition of habitat Categories 2 through 6, per OAR 635-415-0025. However, the entire analysis area is in the Mule Deer Winter Range, which ODFW considers as Category 2 habitat regardless of actual habitat types, except for agricultural lands. Therefore, there are two habitat categories within the analysis area: Category 2 big game winter range, and Category 6 agricultural lands and developed areas. The Applicant will minimize Category 2 habitat impacts by siting facilities on agricultural lands within the proposed micrositing corridor to the extent possible. Because all other land is considered Category 2, there is limited opportunity to avoid impacts through alternatives to the proposed development action. Therefore, the Applicant will provide mitigation to offset unavoidable impacts, as described in its Habitat Mitigation Plan (Attachment P-2). This mitigation is intended to meet the goals of OAR 635-415-0025, as determined by the Oregon Energy Facility Siting Council (Council).

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

10.0 Monitoring Program

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

The Applicant will conduct revegetation monitoring as described in the Revegetation Plan (Attachment P-3). The Applicant will conduct post-construction fatality monitoring as described in the Wildlife Monitoring Plan (Attachment P-4). Monitoring related to mitigation success is described in the Habitat Mitigation Plan (Attachment P-2).

11.0 Conclusion

As part of the Facility siting process, the fish and wildlife habitats within the analysis area were identified and categorized pursuant to OAR 635-415-0025. Based on survey results, facilities were adjusted to avoid all impacts to Category 1 habitat (no Category 1 habitat was identified), and minimize impacts to Category 2, 3, 4, and 5 habitats. Unavoidable habitat impacts will be mitigated consistent with OAR 635-415-0025.

Therefore, based on the information provided in this exhibit, there is sufficient evidence upon which the Council may find that the design, construction, and operation of the Facility, taking into account the proposed mitigation measures, are consistent with the fish and wildlife mitigation goals and standards of OAR 635-415-0025. Accordingly, the Applicant demonstrates compliance with OAR 345-022-0060.

12.0 Submittal Requirements and Approval Standards

12.1 Submittal Requirements

Table P-7. Submittal Requirements Matrix

Requirement	Location
OAR 345-021-0010(1)(p) Information about the fish and wildlife habitat and the fish and wildlife species, other than the species addressed in subsection (q) that could be affected by the proposed facility, providing evidence to support a finding by the Council as required by OAR 345-022-0060. The applicant shall include:	-
(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.	Section 4.0

Requirement	Location
(B) Identification of all fish and wildlife habitat in the analysis area, classified by the general fish and wildlife habitat categories as set forth in OAR 635-415-0025 and the sage-grouse specific habitats described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through -0025 (core, low density, and general habitats), and a description of the characteristics and condition of that habitat in the analysis area, including a table of the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and subtype.	Section 5.0
(C) A map showing the locations of the habitat identified in (B).	Figure P-4
(D) Based on consultation with the Oregon Department of Fish and Wildlife (ODFW) and appropriate field study and literature review, identification of all State Sensitive Species that might be present in the analysis area and a discussion of any site-specific issues of concern to ODFW.	Section 6.0
(E) A baseline survey of the use of habitat in the analysis area by species identified in (D) performed according to a protocol approved by the Department and ODFW.	Section 7.0
(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.	Section 8.0
(G) A description of any measures proposed by the applicant to avoid, reduce, or mitigate the potential adverse impacts described in (F) in accordance with the general fish and wildlife habitat mitigation goals and standards described in OAR 635-415-0025 and a description of any measures proposed by the applicant to avoid, minimize, and provide compensatory mitigation for the potential adverse impacts described in (F) in accordance with the sage-grouse specific habitat mitigation requirements described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through -0025, and a discussion of how the proposed measures would achieve those goals and requirements.	Section 9.0
(H) A description of the applicant's proposed monitoring plans to evaluate the success of the measures described in (G).	Section 10.0

12.2 Approval Standards

Table P-8. Approval Standard

Requirement	Location
OAR 345-022-0060 Fish and Wildlife Habitat	-
To issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are consistent with the general fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025(1) through (6) in effect as of February 24, 2017, and for energy facilities that impact sage-grouse habitat, the sage-grouse specific habitat mitigation requirements of the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-415-0025(7) and OAR 635-140-0000 through -0025 in effect as of February 24, 2017.	Section 9.0

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Figures

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Bakeoven Solar Project

Figure P-1 Fish and Wildlife Analysis Area

WASCO COUNTY, OREGON

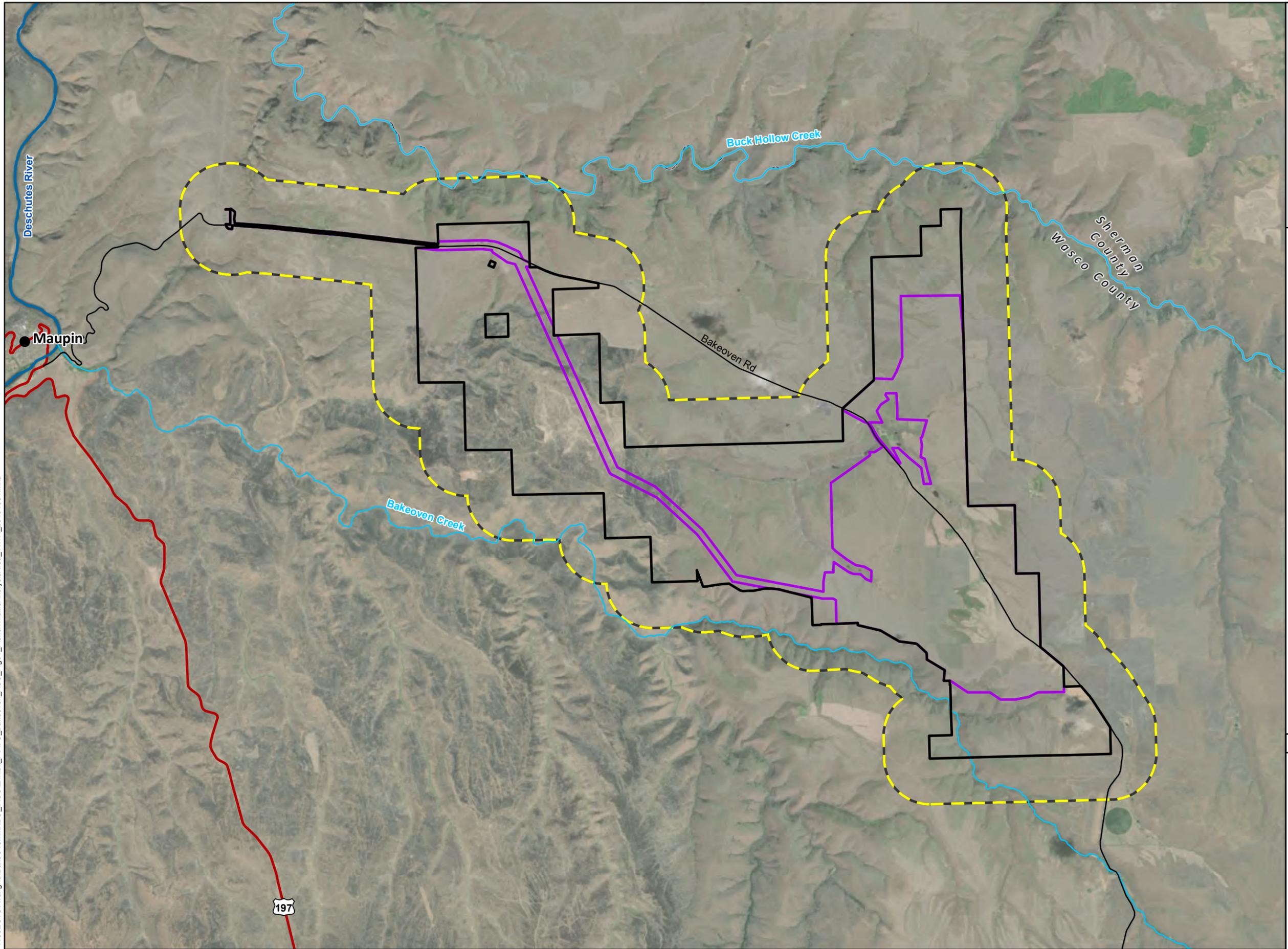
- Proposed Site Boundary
 - Proposed Micrositing Corridor
 - Analysis Area (0.5-mile Buffer)
- Basemap Features**
- City/Town
 - US Highway
 - Local Road
 - Creek
 - River
 - County Boundary



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

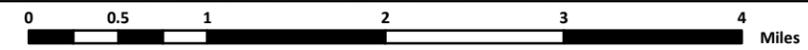
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NOT FOR CONSTRUCTION

Bakeoven Solar Project

Figure P-2 2018 Survey Area

WASCO COUNTY, OREGON

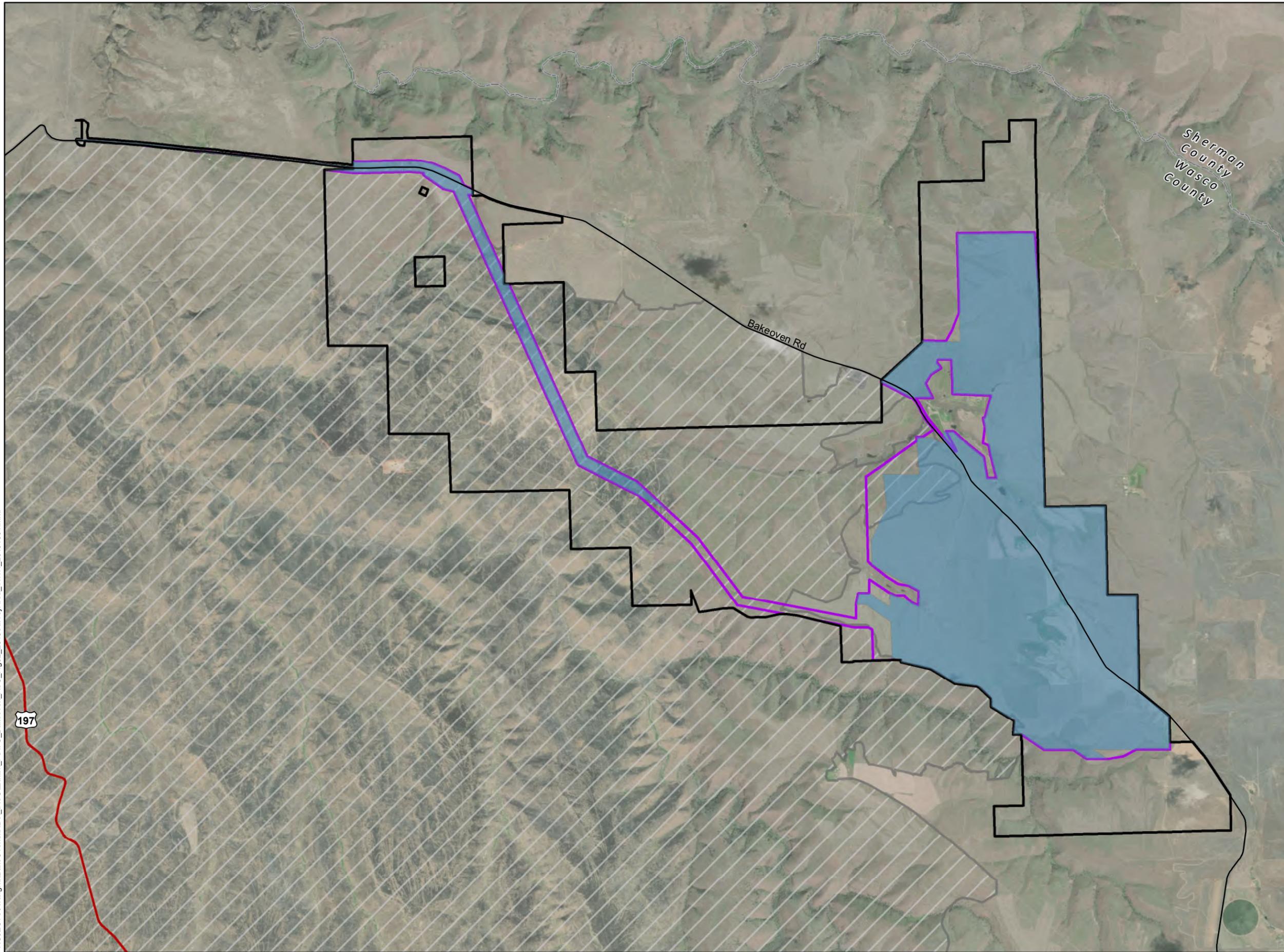
- Proposed Site Boundary
 - Proposed Micrositing Corridor
 - 2018 Survey Area
 - Boxcar Fire Boundary
- Basemap Features**
- US Highway
 - Local Road
 - County Boundary



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads;
Northwest Interagency Coordination Center-Boxcar
Fire Perimeter

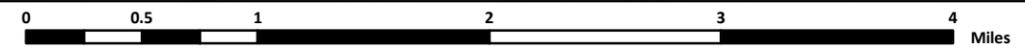
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Bakeoven Solar Project

Figure P-3 Preliminary Habitat Categories within the Analysis Area

WASCO COUNTY, OREGON

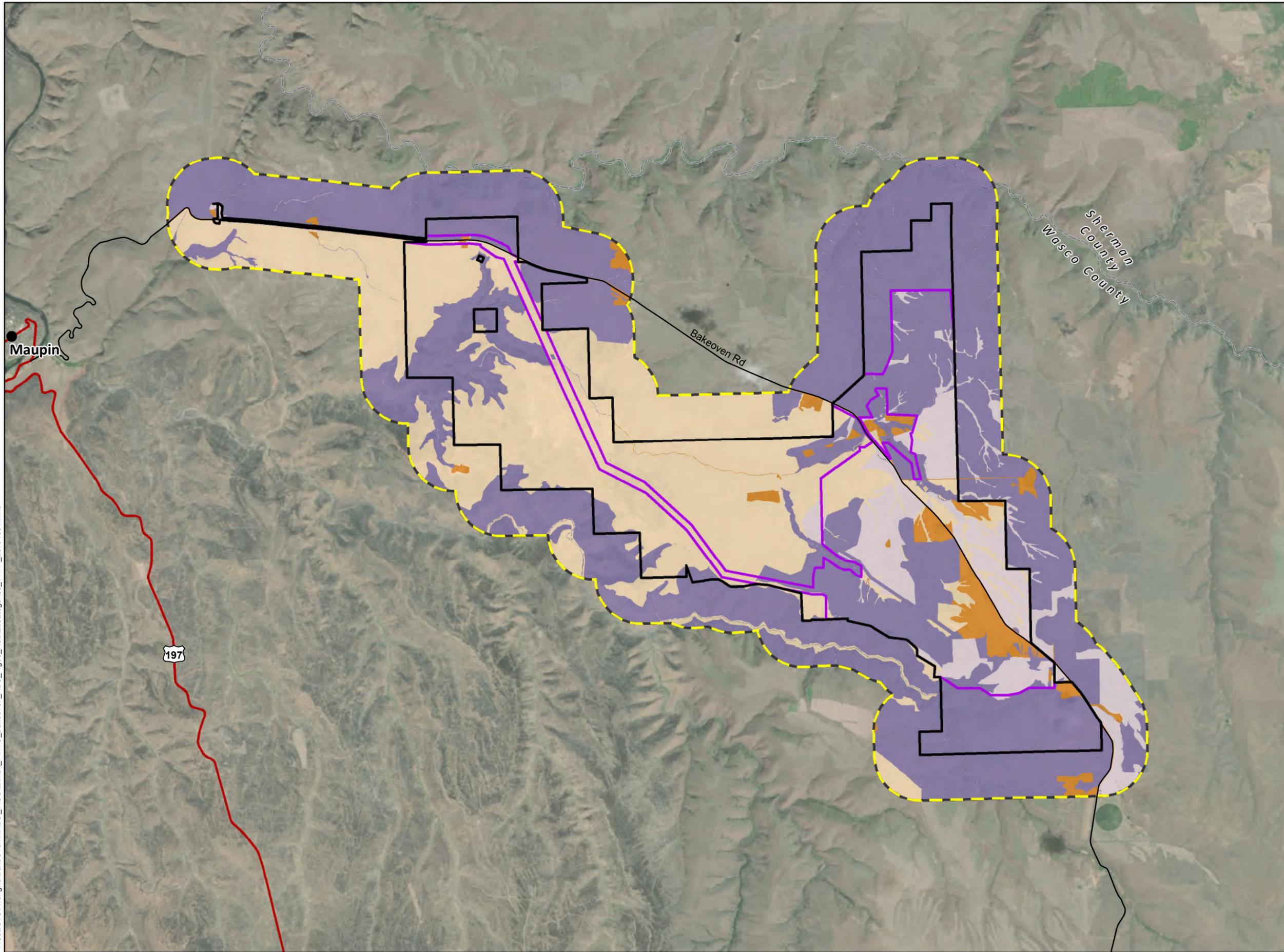
- Proposed Site Boundary
 - Proposed Micrositing Corridor
 - Analysis Area (0.5-mile Buffer)
- Basemap Features**
- US Highway
 - Local Road
 - City/Town
 - County Boundary
- Habitat Category**
- 2
 - 3
 - 4
 - 5
 - 6



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

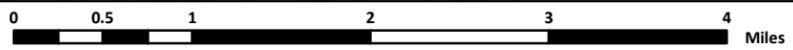
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NOT FOR CONSTRUCTION

Bakeoven Solar Project

**Figure P-4
Habitat Types and
Final Habitat Categories
within the Analysis Area**

WASCO COUNTY, OREGON

- Proposed Site Boundary
 - Proposed Micrositing Corridor
 - Analysis Area (0.5-mile Buffer)
- Basemap Features**
- US Highway
 - Local Road
 - County Boundary
- Habitat Category**
- 2
 - 6

- Habitat Subtype**
- Permanent Pond/Lake
 - Seasonal Pond
 - Perennial Streams
 - Intermittent/Ephemeral Streams
 - Emergent Wetlands
 - Shrub-scrub Wetlands
 - Forested Wetlands
 - Eastside Riparian
 - Eastside Grasslands
 - Shrub-steppe
 - Juniper Woodland
 - Planted Grasslands
 - Orchards, Vineyards, Wheat Fields, Row Crops
 - Urban and Mixed Environs
 - Cliffs, Caves, and Talus



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

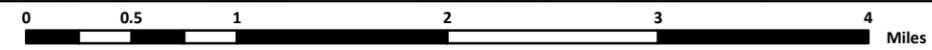
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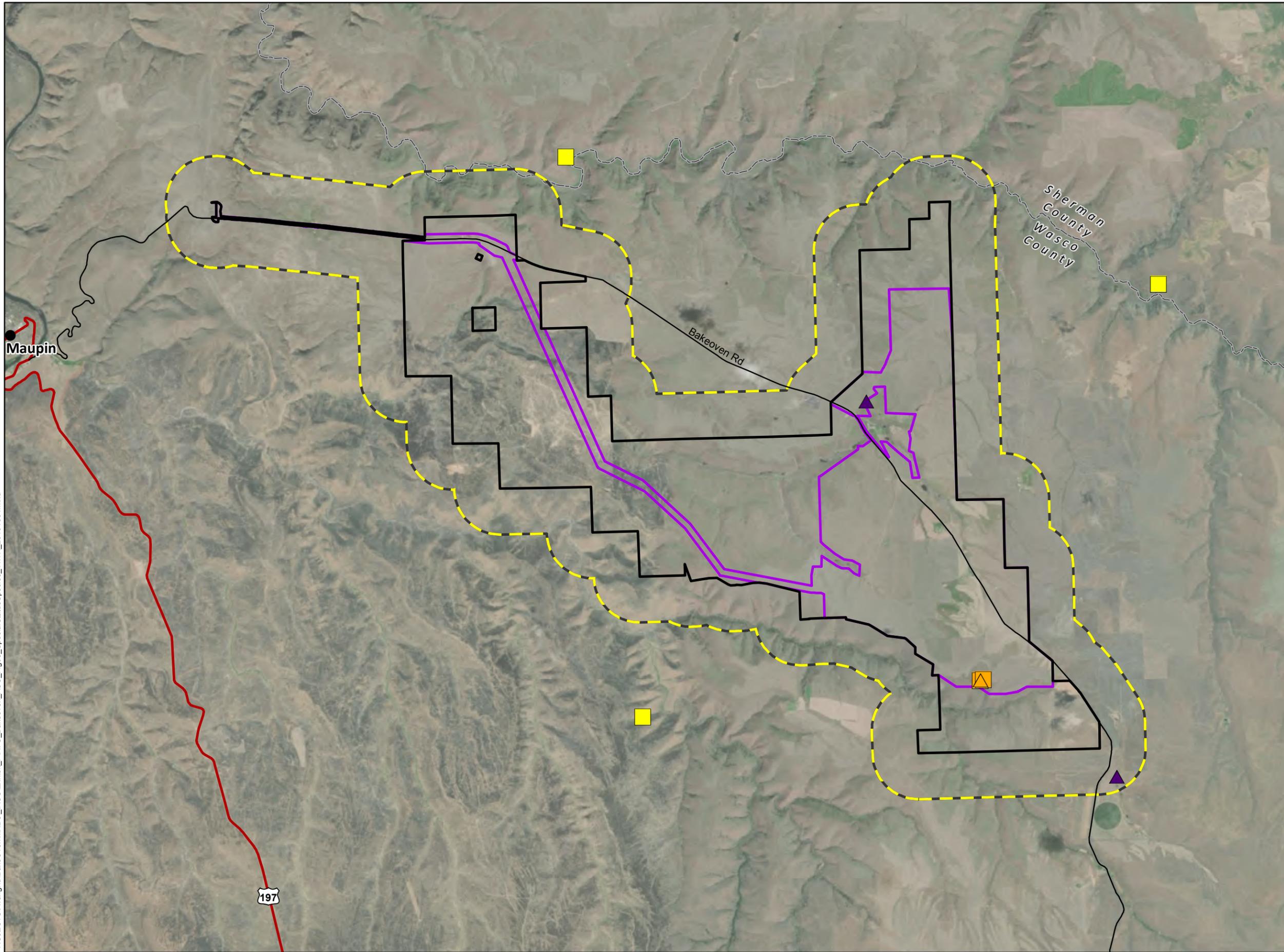
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Bakeoven Solar Project

Figure P-5
Special Status Species within
the Analysis Area

WASCO COUNTY, OREGON

-  Proposed Site Boundary
-  Proposed Micrositing Corridor
-  Analysis Area (0.5-mile Buffer)
- Basemap Features**
-  City/Town
-  US Highway
-  Local Road
-  County Boundary
- Special-Status Species**
-  Burrowing owl
-  Swainson's hawk
- Raptor Nest**
-  Burrowing owl
-  Golden Eagle (Active 2018)



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

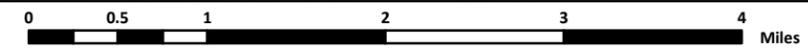
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Attachment P-1. Solar Biological Survey Reports

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May 31, 2019

TTCES-PTLD-2019-057

Sarah Esterson
Oregon Department of Energy
550 Capitol St. NE
Salem, OR 97301

Subject: Bakeoven Solar Project 2018 Biological Survey Reports

Dear Sarah,

Bakeoven Solar, LLC proposes to construct the Bakeoven Solar Project (Facility) in southern Wasco County, near Shaniko, Oregon. Its parent company, Avangrid Renewables, LLC, conducted biological and botanical field surveys in spring and summer of 2018 in support of the Bakeoven Energy Project, which included both the Facility and the nearby Imperial Wind Project. The Facility and the Imperial Wind Project are being developed and permitted separately as two independent projects; the Facility is subject to review by the Oregon Department of Energy, Energy Facility Siting Council, while the Imperial Wind Project is subject to review by Wasco County, and received final land use approval from the Wasco County Planning Commission on March 26, 2019. Both the Facility and the Imperial Wind Project are included in the attached field reports, which were submitted to the Oregon Department of Fish and Wildlife on October 9, 2018:

- *2018 Special-Status Wildlife and Habitat Survey Report for the Bakeoven Energy Project; and*
- *2018 Botanical Survey Report for the Bakeoven Energy Project.*

Following field surveys in 2018, additional areas totaling approximately 294 acres were added to the Facility. Desktop assessments of these areas are attached as supplemental reports to the documents mentioned above, as follows:

- *Supplemental 2018 Wildlife and Habitat Categorization Report for the Bakeoven Solar Project; and*
- *Supplemental 2018 Botanical Report for the Bakeoven Solar Project.*

The two field survey reports, in conjunction with the two desktop assessment reports, provide information on the botanical and other biological resources within the micrositing corridor for the Facility to support Exhibits P and Q of the Application for Site Certificate.

If you have any questions, please contact Matt Hutchinson at matthew.hutchinson@avangrid.com or 503-478-6317.

Sincerely,

Amy Bensted

Biologist, Tetra Tech, Inc.

Cc: Matt Hutchinson, Avangrid Renewables
Brian Walsh, Avangrid Renewables
Jeremy Thompson, Oregon Department of Fish and Wildlife
Sarah Reif, Oregon Department of Fish and Wildlife
Carrie Konkol, Tetra Tech

2018 Special-Status Wildlife and Habitat Survey Report for the Bakeoven Energy Project

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Special-Status Wildlife and Habitat Survey Report Bakeoven Energy Project

Prepared for



Prepared by



September 2018

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1.0 Introduction

Avangrid Renewables contracted Tetra Tech, Inc. (Tetra Tech) to perform special-status wildlife and habitat surveys for the Bakeoven Energy Project (Project), located in Wasco County, Oregon. Tetra Tech mapped and classified habitat according to Oregon Department of Fish and Wildlife (ODFW) guidelines set forth in Oregon Administrative Rule 635-415-0025. Field verification of desktop habitat mapping occurred concurrently with special-status wildlife surveys, and surveyors documented all threatened, endangered, candidate and state sensitive wildlife observed during surveys.

2.0 Methods

2.1 Survey Area

Surveys were conducted within the micrositeing corridor developed by Tetra Tech in coordination with Avangrid (Figure 1). The total area of the corridor is approximately 13,918 acres, which includes the 10,301-acre Conditional Use Permit micrositeing corridor. This survey excluded areas that had been previously included in wildlife and habitat surveys (approximately 4,467 acres; WEST 2013). The total area surveyed for the special-status wildlife and habitat surveys is 9,451 acres.

2.2 Wildlife

Prior to conducting field surveys, Tetra Tech conducted a desktop review to identify special-status wildlife species with the potential to occur at the Project, including federal and state endangered, threatened, proposed, and candidate species; species of concern; birds of conservation concern; sensitive and sensitive-critical species; and Oregon Conservation Strategy species (Attachment 1; OCS 2016, ODFW 2016, ODFW 2017, ORBIC 2016, ORBIC 2018, USFWS 2008, USFWS 2016, USFWS 2018). Tetra Tech reviewed habitat and range information for special-status wildlife species known to occur in Wasco County and the Columbia Plateau/Columbia Basin to develop the list of species that had the potential to occur at the Project. Species were eliminated from consideration if their habitat was absent from the Project Site Boundary, or their range did not overlap with the Project, but were included if they have the potential for vagrancy at the Project. Tetra Tech also reviewed special-status species information recorded during previous surveys at the Project (ABR Inc. 2011, NWC 2011, WEST 2013). Special-status species observed during these previous surveys are included in Attachment 1 even where their status has changed since these surveys were performed and they are no longer considered special-status.

In addition to reviewing publicly available sources, Tetra Tech submitted a formal request to the Oregon Biodiversity Information Center (ORBIC) to obtain site-specific records of special-status species occurrences and sensitive habitats within 10 miles of the micrositeing corridor (ORBIC

2018). Tetra Tech identified 47 special-status wildlife species with the potential to occur at the Project, including 15 mammals, four reptiles, 23 birds, and five fish (Attachment 1).

In the field, surveyors walked meandering transects within non-cultivated land inside the micrositeing corridor, focusing on areas not surveyed in 2011 and 2013 and areas likely to support special-status wildlife species. Areas unlikely to support special-status species—cultivated land, developed areas, and recently burned areas—were surveyed primarily from field vehicles, by driving paved roads, gravel roads, two-tracks, and off-road in some burned areas. These areas were surveyed on foot if the full extent was not visible from the vehicle, if areas of potential habitat or nesting opportunities for special-status species were identified, or if areas of adjacent habitat required categorization. Surveyors alternately scanned the landscape, the sky, and the ground looking for special-status wildlife species and recognizable sign. Surveyors recorded the location of special-status wildlife species (or recognizable sign) on a global positioning system-enabled tablet using ArcGIS Collector software, and recorded information on the number of individuals and their behavior. Surveyors also kept a running list of all wildlife species observed and documented special habitats and unique features such as raptor nests, cliffs, rimrock, rock outcrops, and talus slopes if encountered. Following field surveys, the digitized data were downloaded and processed in a Geographic Information System (GIS), and were reviewed for quality control and assurance.

2.3 Habitat Categorization

Prior to conducting field surveys, Tetra Tech used aerial photography, previous habitat assessments, and United States Department of Agriculture CropScape Cropland GIS Data to identify habitats at the Project (WEST 2013, ODFW 2013, USDA-NASS 2018). Preliminary habitat polygons were identified using these desktop sources within the micrositeing corridor, and were either confirmed or recategorized in the field.

In the field, surveyors used ArcGIS Collector software to confirm or recategorize areas of relatively homogenous vegetation, and characterized the composition and structure on the field datasheets (Attachment 2). Each delineated vegetation polygon was assigned a habitat type, sub-type, and habitat quality category guided by the draft habitat categorization table (Attachment 3). Habitat types and categories were not assigned to wetlands and waters in the field, as they were derived from data collected during wetlands and waters surveys where available, following the habitat categorization field effort. Data characterizing a particular habitat type and quality represented the average condition of all such polygons. A minimum mapping unit of 1 acre was implemented, except for specialized habitat types, such as cliffs.

Habitat categorization surveys were conducted concurrently with special-status wildlife species surveys. Surveyors walked meandering transects within non-cultivated land inside the micrositeing corridor, focusing on areas not surveyed in 2011 and 2013. While walking these transects, surveyors digitized habitats within these focused corridors, scanned the landscape and digitized habitats within the viewshed to map and categorize 100 percent of the micrositeing corridor. Both areas of cultivated land delineated in desktop analysis and recently burned areas were verified, primarily for extent. This was done by driving paved roads, gravel roads, two-tracks, and off-road in

some burned areas. These low-quality habitat areas were occasionally traversed on foot to verify extent if not fully visible from the vehicle, if areas of potential habitat or nesting opportunities for special-status species were identified, or if areas of adjacent habitat required categorization.

Following field surveys, the digitized boundaries were downloaded and processed in GIS, and the field datasheets were incorporated into the spatial data. Data from the 2011 and 2013 habitat surveys and 2018 surveys were merged to produce a complete habitat mapping and categorization dataset for the proposed micrositing corridor. Data were reviewed for quality control, and processed to incorporate wetlands and waters data. Habitat types and categories for wetlands and waters were derived from 2018 field delineation data, where available, and from National Wetlands Inventory (NWI) and National Hydrography Dataset (NHD) data for the remainder of the micrositing corridor.

3.0 Results

The data received from ORBIC showed 78 occurrence records for 20 ORBIC-tracked wildlife species within 10 miles of the micrositing corridor. Tetra Tech conducted special-status species surveys concurrent with habitat categorization surveys in two mobilizations: June 3–10, 2018 and July 13–19, 2018 (ORBIC 2016, ORBIC 2018). Surveyors mapped habitat type and category in 100 percent of the areas within the micrositing corridor that were not surveyed in 2011 and 2013, with special attention in areas to areas likely to support special-status species. These survey dates were planned to coincide with the period of highest biological activity of neotropical migrant and breeding birds, foraging and breeding animal species, and other taxa.

The area inside the micrositing corridor consists of two general landscape types. The southern portion is primarily composed of scabland: a mosaic of sage-steppe and grasslands intermixed with rocky swales and scattered vernal pools, small areas of Conservation Reserve Program (CRP) land, and limited stands of western juniper (*Juniperus occidentalis*). Dominant shrub species include stiff/scabland sagebrush (*Artemisia rigida*), big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), and green rabbitbrush (*Chrysothamnus viscidiflorus*). Dominant grasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), bulbous bluegrass (*Poa bulbosa*), Sandberg bluegrass (*Poa secunda*)—and in CRP areas, intermediate wheatgrass (*Thinopyrum intermedium*).

The understory components are characterized by a mix of native forbs including yarrow (*Achillea millefolium*), various buckwheat species (*Eriogonum sp.*), and non-native annual grasses including medusahead (*Taeniatherum caput-medusae*) and cheatgrass (*Bromus tectorum*). The northern portion is primarily characterized by cropland, eastside grassland, CRP, intermittent drainage ditches, and occasional, small stock-ponds.

Based on post-field processing of the habitat categorization data, and including the previously surveyed areas, the proposed micrositeing corridor includes Category 2 through 6 habitats and fourteen habitat types (Table 1, Figure 1, Figure 2):

1. Permanent ponds/lakes;
2. Seasonal ponds;
3. Perennial streams;
4. Intermittent or ephemeral streams;
5. Emergent wetlands;
6. Scrub-shrub wetlands;
7. Eastside riparian;
8. Eastside grasslands;
9. Shrub-steppe grassland and shrubland mosaic;
10. Juniper woodlands;
11. CRP lands;
12. Orchards, vineyards, wheat fields, other row crops;
13. Cliffs, caves, and talus; and
14. Urban and mixed environs.

Table 1. Habitat Categories and Types Mapped inside the Micrositing Corridor

Habitat Type	Habitat Subtype	Total Acres within Micrositing Corridor ¹	Acres within Micrositing Corridor ¹					
			Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Open Water - Lakes, Rivers, Streams	Permanent Ponds/Lakes	0.2	0.0	0.0	0.2	0.0	0.0	0.0
	Seasonal Ponds	5.4	0.0	0.0	0.4	5.0	0.0	0.0
	Perennial Streams	< 0.05	0.0	0.0	0.0	< 0.05	0.0	0.0
	Intermittent or Ephemeral Streams	5.1	0.0	0.0	0.0	5.1	0.0	0.0
Wetlands	Emergent Wetlands	15.7	0.0	0.0	5.6	0.0	10.0	0.0
	Scrub-shrub Wetlands	< 0.05	0.0	0.0	0.0	0.0	< 0.05	0.0
Riparian Forest and Shrubland Complexes	Eastside (Interior) Riparian	62.2	0.0	0.0	58.6	3.6	0.0	0.0
Upland Grassland, Shrub-steppe, and Shrubland	Eastside Grasslands	3723.5	0.0	0.0	2086.3	1263.1	369.5	4.6
	Shrub-steppe Grassland and shrubland mosaic	7799.4	0.0	25.4	7406.8	0.0	367.1	0.0
Upland Forests and Woodlands	Western Juniper Woodlands	175.4	0.0	0.0	175.4	0.0	0.0	0.0
Agriculture, Pasture, and Mixed Environs	Conservation Reserve Program Lands	1055.7	0.0	0.0	813.9	241.9	0.0	0.0
	Orchards, vineyards, wheat fields, other row crops	884.5	0.0	0.0	0.0	0.0	0.0	884.5
Cliffs, Caves, and Talus	Cliffs, Caves, and Talus	4.1	0.0	0.0	4.1	0.0	0.0	0.0
Urban and Mixed Environs	Urban and Mixed Environs	190.6	0.0	0.0	0.3	0.0	0.0	190.3
Total		13921.9	0.0	25.4	10551.8	1518.7	746.6	1079.4
1. Totals in this table may not be precise due to rounding.								

Areas burned in both the Boxcar Fire in the northwest portion of the Project, and in an unnamed small fire in the southern portion of the Project (approximately 1.75 miles northeast of Shaniko), were designated as Category 5 (highly disturbed) in three habitat types: eastside grassland, grassland/shrub-steppe, and juniper woodlands. Photos of select habitat types and categories are provided in Attachment 4.

A total of 10 special-status wildlife species were observed during surveys (Table 2, Figure 3). No federally threatened or endangered species were observed. No golden or bald eagles were observed. The majority of individual special-status species recorded were Brewer’s sparrows (51) and grasshopper sparrows (46), particularly in sage-steppe/grassland habitat areas. Sixteen Swainson’s hawks were observed, followed by five burrowing owls in a family group (*Athene cunicularia*), five common nighthawks (*Chordeiles minor*), four sage thrashers (*Oreoscoptes montanus*), three loggerhead shrikes (*Lanius ludovicianus*), three ferruginous hawks (*Buteo regalis*), two western rattlesnakes (*Crotalus oreganus*), and one white-tailed jackrabbit (*Lepus townsendii*).

Table 2. Special-Status Wildlife Species Observed During Surveys

Taxa	Common Name	Scientific Name	Federal Status ¹	ODFW Status in Columbia Plateau/Columbia Basin ²
Mammal	white-tailed jackrabbit ³	<i>Lepus townsendii</i>	-	-
Bird	Brewer’s sparrow	<i>Spizella breweri breweri</i>	BCC	S
Bird	burrowing owl	<i>Athene cunicularia hypugaea</i>	SOC	SC
Bird	common nighthawk	<i>Chordeiles minor</i>	-	S
Bird	ferruginous hawk	<i>Buteo regalis</i>	BCC, SOC	SC
Bird	grasshopper sparrow	<i>Ammodramus savannarum</i>	-	S
Bird	loggerhead shrike	<i>Lanius ludovicianus</i>	SOC	S
Bird	sage thrasher	<i>Oreoscoptes montanus</i>	BCC	-
Bird	Swainson’s hawk	<i>Buteo swainsoni</i>	-	S
Reptile	western rattlesnake ³	<i>Crotalus oreganus</i>	-	-

1. Federal Status: SOC = Species of Concern, BCC = Bird of Conservation Concern.
 2. Oregon Department of Fish and Wildlife Status in the Columbia Plateau/Columbia Basin: E = Endangered, SC = Critical Sensitive Species, S = Sensitive Species.
 3. No special-status designation in the Columbia Plateau/Columbia Basin ecoregion as of July 2018. Included for consistent reporting of observed special-status species since biological studies began at the Project.

Tetra Tech observed eight raptor nests inside the Site Boundary. Six of these nests were found inside the micrositeing corridor, including two Swainson’s hawk nests found south of Highway 97, and two burrowing owl burrows. The burrows were found in a CRP field in the north section of the micrositeing corridor, within 190 feet of each other. An apparent family group of one adult, one unknown, and three young were observed in this area, suggestive of a primary burrow and satellite burrow for one family group (Attachment 4, Photos 17 and 18). Young burrowing owls are known

to disperse to non-nest burrows near the nest burrow before migration (Poulin 2011). A third Swainson's hawk nest was found approximately 1 mile northwest of the intersection of Bakeoven Road and Highway 97, just outside the micro-siting corridor. A complete list of wildlife species observed inside the Project during these surveys is included as Attachment 5.

4.0 References

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- NWC (Northwest Wildlife Consultants, Inc.). 2011. Avian Field Studies and Avian Impact Assessment for Bakeoven Wind Facility, Wasco County, Oregon. Prepared for Bakeoven Wind, LLC. July 2011.
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- Poulin, R. G., L. D. Todd, E. A. Haug, B. A. Millsap, and M. S. Martell (2011). Burrowing Owl (*Athene cunicularia*), version 2.0. In *The Birds of North America* (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.61>
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- USFWS. 2016. Federally Listed, Proposed, Candidate, Delisted Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service which May Occur in Oregon. Available online at: <https://www.fws.gov/oregonfwo/Documents/OregonSpeciesStateList.pdf> (Accessed May 2018).
- USFWS. 2018. IPaC (Information for Planning and Consultation). Endangered Species in Sherman and Wasco Counties. Available online at: <https://ecos.fws.gov/ipac/> (Accessed February 2018).
- WEST (Western EcoSystems Technology, Inc.). 2013. Special-Status Species, Habitat, and Impact Report, Bakeoven Wind Facility, Wasco County, Oregon. Prepared for Iberdrola Renewables. August 31, 2011, Revised June 14, 2013.

Figures

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Bakeoven Energy Project

Figure 1 Habitat Category

WASCO COUNTY, OREGON

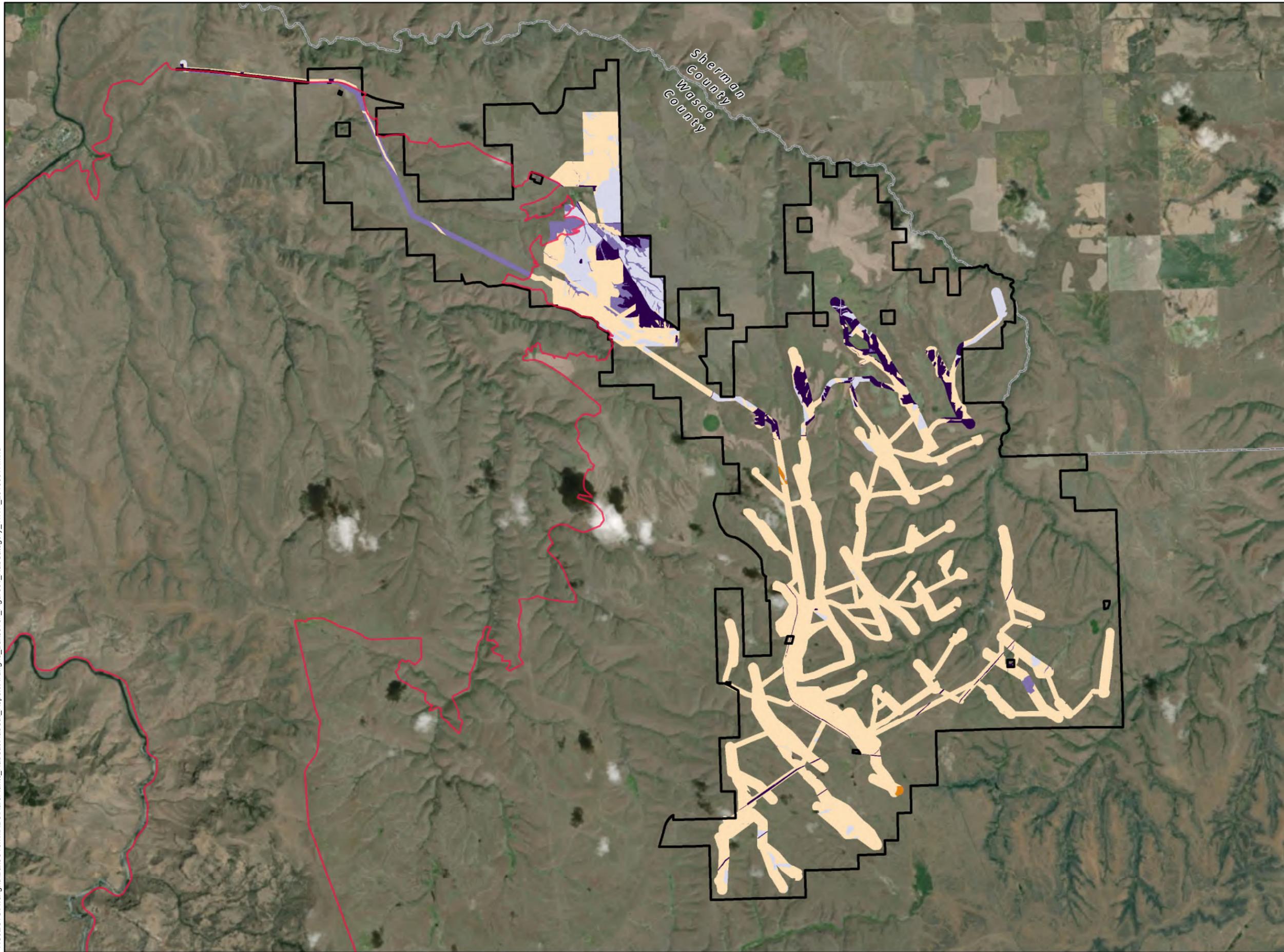
-  Site Boundary
-  County Boundary
-  Boxcar Fire Boundary (NWCC)
- Habitat Category**
-  2
-  3
-  4
-  5
-  6



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; ESRI-Roads

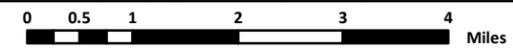
Reference Map



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1:110,000 WGS 1984 UTM Zone 10N



Bakeoven Energy Project

Figure 2 Habitat Type

WASCO COUNTY, OREGON

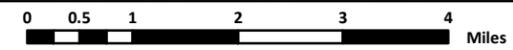
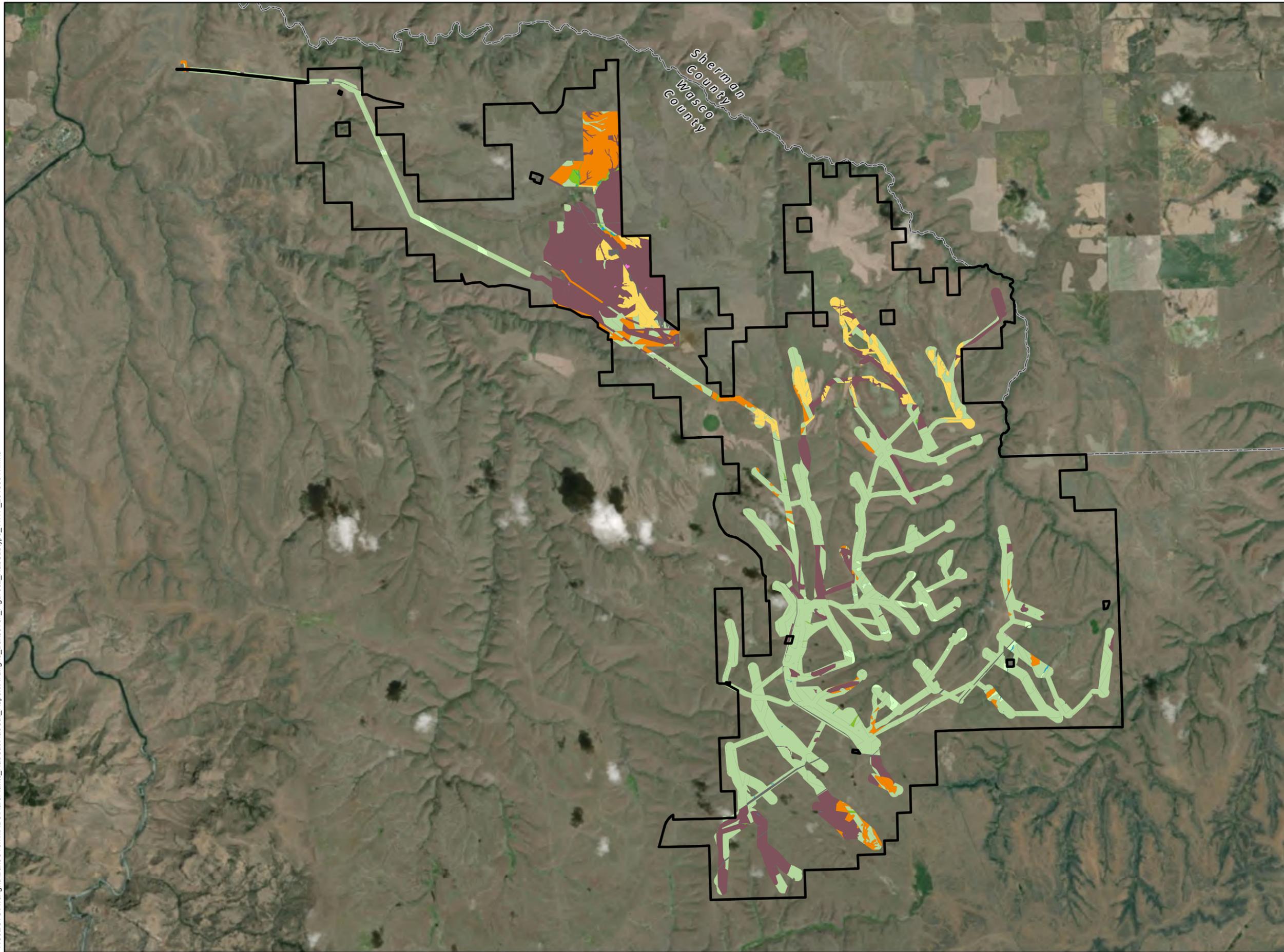
-  Site Boundary
-  County Boundary
- EFSC SubType**
-  Orchards, Vineyards, Wheat Crops, Other Row Crops
-  Cliffs/Caves/Talus
-  Conservation Reserve Program
-  Eastside Grassland
-  Eastside Riparian
-  Shrub-Steppe Grassland and Shrubland Mosaic
-  Juniper Woodland
-  Shrub-Scrub Wetlands
-  Urban and Mixed Environs
-  Perennial Streams
-  Emergent Wetlands
-  Intermittent or Ephemeral Streams
-  Permanent Ponds/Lakes
-  Seasonal Ponds



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; ESRI-Roads

Reference Map



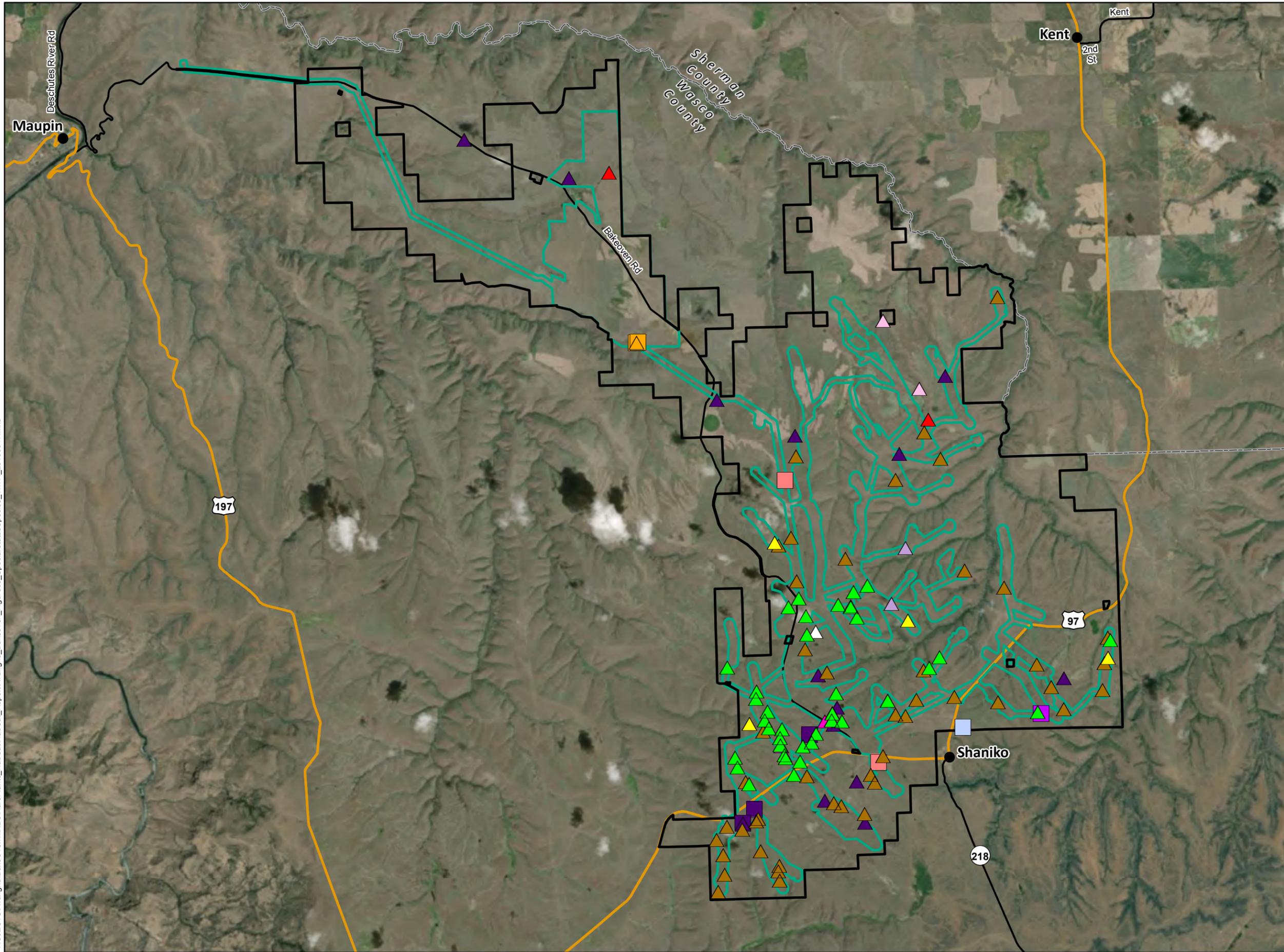
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Bakeoven Energy Project

Figure 3
Raptor Nests and
Special-Status Species

WASCO COUNTY, OREGON



Legend

- Site Boundary
- Micrositing Corridor
- County Boundary
- City/Town
- Secondary Highway
- Secondary Road

Raptor Nest

- American kestrel
- Burrowing owl
- Red-tailed hawk
- Short-eared owl
- Swainson's hawk

Special-Status Species

- Brewer's sparrow
- Burrowing owl
- Common nighthawk
- Ferruginous hawk
- Grasshopper sparrow
- Loggerhead shrike
- Sage thrasher
- Swainson's hawk
- Western rattlesnake
- White-tailed jackrabbit

TETRA TECH AVANGRID RENEWABLES

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

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Attachment 1. Special-Status Wildlife Species Potentially Occurring at Bakeoven

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SPECIAL–STATUS WILDLIFE AND HABITAT SURVEY REPORT
ATTACHMENT 1: SPECIAL-STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING AT BAKEOVEN

Common Name	Scientific Name	Federal Status ¹	ODFW Status in Columbia Plateau ²	Occurs in Wasco County per ORBIC 2016
Birds				
bald eagle	<i>Haliaeetus leucocephalus</i>	BCC, BGEPA	S	Yes
Brewer's sparrow	<i>Spizella breweri breweri</i>	BCC	S	Yes
burrowing owl	<i>Athene cunicularia hypugaea</i>	SOC	SC	Yes
common nighthawk	<i>Chordeiles minor</i>	-	S	Yes
ferruginous hawk	<i>Buteo regalis</i>	BCC, SOC	SC	Yes
greater sandhill crane ³	<i>Antigone canadensis tabida</i>	-	-	Yes
golden eagle	<i>Aquila chrysaetos</i>	BCC, BGEPA	-	Yes
grasshopper sparrow	<i>Ammodramus savannarum</i>	-	S	Yes
Lewis's woodpecker	<i>Melanerpes lewis</i>	BCC, SOC	SC	Yes
loggerhead shrike	<i>Lanius ludovicianus</i>	BCC	S	Yes
long-billed curlew	<i>Numenius americanus</i>	BCC	SC	Yes
mountain quail	<i>Oreortyx pictus</i>	SOC	-	Yes
northern goshawk	<i>Accipiter gentilis</i>	SOC	-	Yes
olive-sided flycatcher	<i>Contopus cooperi</i>	BCC, SOC	-	Yes
peregrine falcon ³	<i>Falco peregrinus anatum</i>	-	-	Yes
sage thrasher	<i>Oreoscoptes montanus</i>	BCC	-	Yes
sagebrush sparrow	<i>Artemisospiza nevadensis</i>	BCC	S	No
Swainson's hawk	<i>buteo swainsoni</i>	-	S	Yes
tricolored blackbird	<i>Agelaius tricolor</i>	BCC, SOC	-	Yes
western bluebird ³	<i>Sialia mexicana</i>	-	-	Yes
white-headed woodpecker	<i>Picooides albolarvatus</i>	BCC, SOC	-	Yes
willow flycatcher	<i>Empidonax traillii adastus</i>	BCC, SOC	S	Yes
yellow-breasted chat ³	<i>Icteria virens</i>	SOC	-	Yes

SPECIAL-STATUS WILDLIFE AND HABITAT SURVEY REPORT
ATTACHMENT 1: SPECIAL-STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING AT BAKEOVEN

Common Name	Scientific Name	Federal Status ¹	ODFW Status in Columbia Plateau ²	Occurs in Wasco County per ORBIC 2016
Fish				
bull trout	<i>Salvelinus confluentus</i>	T	SC	Yes
chinook salmon	<i>Oncorhynchus tshawytscha</i>	T	S	Yes
pacific lamprey	<i>Entosphenus tridentatus</i>	SOC	S	Yes
steelhead trout	<i>Oncorhynchus mykiss</i>	T	SC	Yes
western brook lamprey	<i>Lampetra richardsoni</i>	-	S	Yes
Mammals				
Canada lynx	<i>Lynx canadensis</i>	T	-	Yes
California myotis	<i>Myotis californicus</i>	-	S	Yes
gray wolf	<i>Canis lupus</i>	E	-	Yes
hoary bat	<i>Lasiurus cinereus</i>	SOC	S	Yes
long-eared myotis	<i>Myotis evotis</i>	SOC	-	Yes
long-legged myotis	<i>Myotis volans</i>	SOC	S	Yes
pallid bat	<i>Antrozous pallidus</i>	SOC	S	Yes
pygmy rabbit	<i>Brachylagus idahoensis</i>	SOC	SC	Yes
silver-haired bat	<i>Lasiorycteris noctivagans</i>	SOC	S	Yes
spotted bat	<i>Euderma maculatum</i>	SOC	S	Yes
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	SOC	SC	Yes
western small-footed myotis	<i>Myotis ciliolabrum</i>	SOC	-	Yes
white-tailed jackrabbit ³	<i>Lepus townsendii</i>	-	-	Yes
wolverine	<i>Gulo gulo</i>	T	PT	Yes
Yuma myotis	<i>Myotis yumanensis</i>	SOC	-	Yes
Reptiles				
California mountain kingsnake	<i>Lampropeltis zonata</i>	SOC	S	No

SPECIAL-STATUS WILDLIFE AND HABITAT SURVEY REPORT
ATTACHMENT 1: SPECIAL-STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING AT BAKEOVEN

Common Name	Scientific Name	Federal Status¹	ODFW Status in Columbia Plateau²	Occurs in Wasco County per ORBIC 2016
northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	SOC	S	Yes
western painted turtle	<i>Chrysemys picta bellii</i>	-	SC	Yes
western rattlesnake ³	<i>Crotalus oreganus</i>	-	-	Yes

Sources: ABR Inc, 2011, NWC 2011, OCS 2016, ODFW 2016, ODFW 2017, ORBIC 2016, ORBIC 2018, WEST 2013, USFWS 2008, USFWS 2016, USFWS 2018

1. Federally Listed Species: E = Endangered, T = Threatened, C = Candidate, PT = Proposed Threatened, SOC = Species of Concern, CH = Critical Habitat has been designated for this species, PE = Proposed Endangered, PCH = Critical Habitat has been proposed for this species, BCC = Bird of Conservation Concern
2. Wildlife: Oregon Department of Fish and Wildlife: E = Endangered, T = Threatened, SC = Critical Sensitive Species, S = Sensitive Species, LT = Listed Threatened.
3. This species does not have a special status in the Columbia Plateau/Columbia Basin ecoregion as of July 2018, but is included in this table for consistent reporting of observed special-status species since biological studies began at the Project.

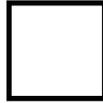
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Attachment 2. Habitat Categorization Field Datasheets

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BAKEOVEN HABITAT CATEGORIZATION

HABITAT CATEGORY



Date _____

Surveyor _____

Site description:

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

Open water-lakes, rivers, streams: Permanent ponds/lakes(PL)/ Seasonal ponds(SP)/ Perennial(PS)/ Intermittent(IS)

Wetlands: Emergent wetlands(EW)/ Scrub-shrub wetlands(SW)/ Forested wetlands(FW)

Riparian forest and shrubland complexes: Eastside (interior) riparian(ER)

Upland grassland, shrub-steppe and shrubland: Eastside grassland(EG)/ Shrub-steppe(SS)

Upland forests and woodlands: Eastside oak and ponderosa pine forest and woodland(EO)/ Western juniper and mountain mahogany woodlands(JW)

Agriculture, pasture, and mixed environs: CRP lands(CR)/ Orchards, vineyards, wheat fields, other row crops, irrigated poplar plantations(AG)/ Irrigated pastures and hay meadows(PA)

Cliffs, caves and talus(CT)

Urban and mixed environs(UR)

Notes if confusion _____

Detailed vegetation measurements:

**Dominant $\geq 20\%$, Subdominant 10-20%

Trees

Dominant species _____

Subdominant species _____

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

Percent native cover _____ Percent bare ground or duff _____

Stumps present? Yes No

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

Forest phase per Brown: GF SHR OSP CSPA LGSAW OGDD

Shrubs

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ___

Percent native cover _____ Percent bare ground _____

Percent cryptobiotic crust (if applicable) _____

Herbs & Grasses

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ___

Percent native cover: _____ Percent bare ground or duff _____

Percent cryptobiotic crust (if applicable) _____

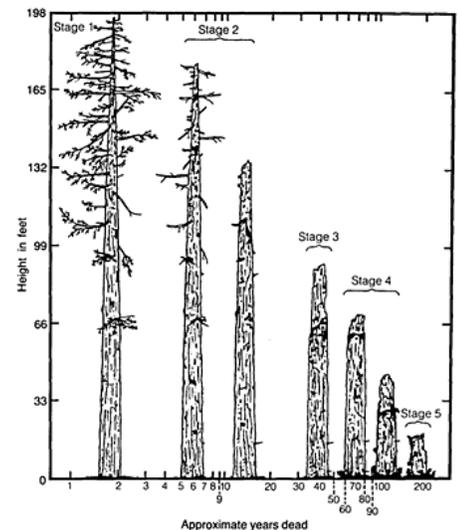


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

Other descriptions:

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

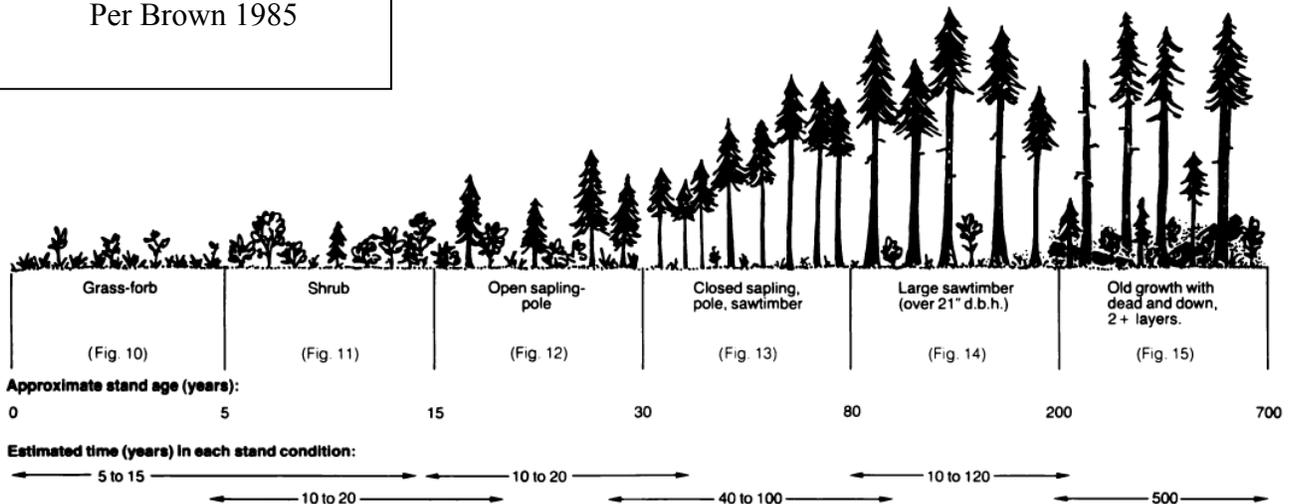
- | | | |
|---|---|---|
| <input type="checkbox"/> Grazing | <input type="checkbox"/> Thinning | <input type="checkbox"/> Wind Farm |
| <input type="checkbox"/> Invasive plants | <input type="checkbox"/> Quarry | <input type="checkbox"/> Fire |
| <input type="checkbox"/> Clearcut Logging | <input type="checkbox"/> Residence or Farm | <input type="checkbox"/> Other Building |
| <input type="checkbox"/> Railroad | <input type="checkbox"/> Communications Tower | <input type="checkbox"/> Campground |
| <input type="checkbox"/> Dirt Road | <input type="checkbox"/> Gravel Road | <input type="checkbox"/> Asphalt road |
| <input type="checkbox"/> Row Crop | <input type="checkbox"/> Urban Area | <input type="checkbox"/> Erosion |
| <input type="checkbox"/> Recreation, if so what kind? _____ | | Other (please specify) _____ |

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

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

Any additional notes:

Per Brown 1985



Attachment 3. Bakeoven Habitat Types and Subtypes Potentially Occurring within the Proposed Site Boundary

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Habitat Type	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Open Water – Lakes, Rivers, Streams	Permanent Ponds/Lakes Open water areas, including natural lakes, reservoirs, stock ponds, beaver ponds		Natural lakes or beaver ponds with high-quality habitat.	Most other open water areas with lower-quality habitat (for example, some habitat requisites missing or bullfrogs abundant).	Highly degraded open water area, dominated by non-native vegetation or no vegetation around margins (for example, highly degraded stock pond).		
	Seasonal Ponds Open water areas that contain water part of the year		Seasonal ponds with high quality, mostly native vegetation.	Seasonal ponds with lower-quality habitat that is still dominated by native plant species.	Highly degraded, with a higher proportion of non-native vegetation or no vegetation around margins (for example, a seasonal stock pond).	Habitat almost completely dominated by non-native plant species or otherwise highly degraded.	
	Perennial Streams mapped by USGS having permanent (year-round) flow		Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.		
	Intermittent or Ephemeral Streams mapped by USGS as intermittent		Fish-bearing natural stream channels that support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provides good spawning (gravel beds present, non-embedded) and/or rearing habitat, with native emergent, shrub, or forested riparian margins.	Fish-bearing natural stream channels that do not support native, migratory fish based on StreamNet data or input from ODFW fish biologists; and provide marginal spawning (gravel present in pockets/30% embedded) and/or rearing habitat; or non-fish-bearing natural stream channels which drain into fish-bearing streams based on StreamNet data.	Non-fish-bearing natural stream channels that do not directly drain into fish-bearing streams.	Non-fish-bearing ephemeral streams or excavated channels with high restoration potential; not important habitat.	
Wetlands	Emergent Wetlands Emergent wetlands with herbaceous vegetation	Any bog or fen.	High quality habitat, dominated by native species	Mixture of native and non-native plant species and low to moderate disturbance		Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	
	Scrub-shrub Wetlands Wetlands with woody vegetation less than 20 feet tall	Any bog or fen.	High quality habitat, dominated by native plant species;	Mixture of native and non-native plant species and low to moderate disturbance		Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.	

Habitat Type	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
	Forested Wetlands Forests (defined as areas with a minimum of 40% canopy closure > 20 feet tall), dominated by wetland indicator species	Any bog or fen.	Exceptional habitat; well-buffered, with few or no non-native plant species, relatively undisturbed surroundings, or part of a large wetland complex, old-growth, or large sawtimber stage	Mixture of native and non-native plant species at sapling, pole, sawtimber stage			
Riparian Forest and Natural Shrubland Complexes	Eastside (Interior) Riparian		High quality, diverse riparian areas that are not degraded	Typical mid-seral riparian, provides wildlife habitat	Provides marginal habitat; somewhat degraded.	Highly degraded; dominated by non-native plant species.	
Upland Grassland, Shrub-steppe and Shrubland	Eastside Grasslands Grassland areas with few shrubs (not irrigated or cultivated/planted)		Undisturbed habitat dominated by native species (i.e., greater than 75% ground cover is native), or moderately disturbed habitat (i.e., between 50 to 75% ground cover is native) that contains a sagebrush component	Moderately disturbed habitat with a mix of natives and non-natives (i.e., between 50 to 75% ground cover is native), or highly disturbed habitat (i.e., between 15 to 50% ground cover is native) that contains a sagebrush component	Highly disturbed habitat with a high percentage of non-native plant species (i.e., between 15 to 50% ground cover is native), or very highly disturbed habitats (i.e., less than 15% ground cover is native) that contain a sagebrush component	Very highly disturbed habitats with a high percentage of non-native plant species (i.e., less than 15% ground cover is native), but which do not contain a sagebrush component	
	Shrub-steppe Grassland and shrubland mosaic		High degree of cover; contains native shrubs and native grasses; good structure/forage for wildlife. Understory dominated by native species. More diversity than Category 3 habitat.	Habitat that is limited within the area (e.g., relatively undisturbed habitat); high degree of cover; moderate cover by weeds, moderate structure/forage for wildlife.	Important wildlife habitat that is moderately to heavily degraded and weedy habitat.	Very low quality dominated by non-native species with high restoration potential.	
Upland Forests and Woodlands	Eastside Oak and Ponderosa Pine Forest and Woodland Eastside oak with Ponderosa pine and/or Douglas-fir		Intact oak stands with little to no signs of encroachment from non-native species or impacts from past disturbance. Stands may be characterized by pure stands or mixed stands where oak component is 25% or greater; or large-diameter oaks, generally >20 inches DBH with open-canopy structure (spreading, rounded, or mushroom crowns; large lateral or broken limbs that contain cavities, crooked branches, and high insect diversity); or younger oak stands with some disturbance and non-native species present.	Essential, oak forests with higher disturbance and non-natives than Category 2.		Shrub and recent clearcut areas or conifers heavily encroaching into historic oak stand.	

Habitat Type	Habitat Sub-type	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
	Western Juniper and Mountain Mahogany Woodlands Open woodlands dominated by western juniper		Old-growth trees with rounded tops.	Juniper woodland with few old growth junipers.		Juniper woodland of nearly all young trees that is invading shrub-steppe and grassland habitats due to lack of fire.	
Agriculture, Pasture, and Mixed Environs	Conservation Reserve Program Lands			Croplands currently enrolled in the Conservation Reserve Program (CRP) with characteristics necessary to potentially provide habitat for sensitive wildlife due to cover and forage quality.	Croplands planted to grassland/shrub steppe in the CRP program that lack later seral stage vegetative communities or are of less importance as wildlife habitat due to management or location.		
	Orchards, Vineyards, Wheat Fields, Other Row Crops						Active agricultural areas with low potential for restoration.
	Irrigated Pastures and Hay Meadows				Potential habitat for wildlife.		
Cliffs, Caves, and Talus		Sites with bat hibernacula.	Sites with known bat colonies.	Sites without bat colonies.			
Urban and Mixed Environs							All developed areas.

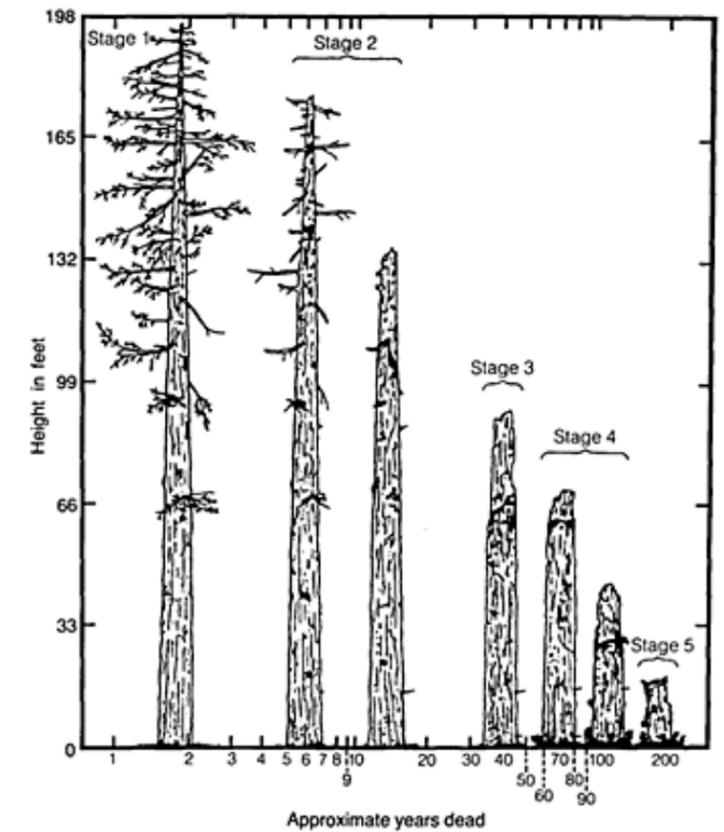
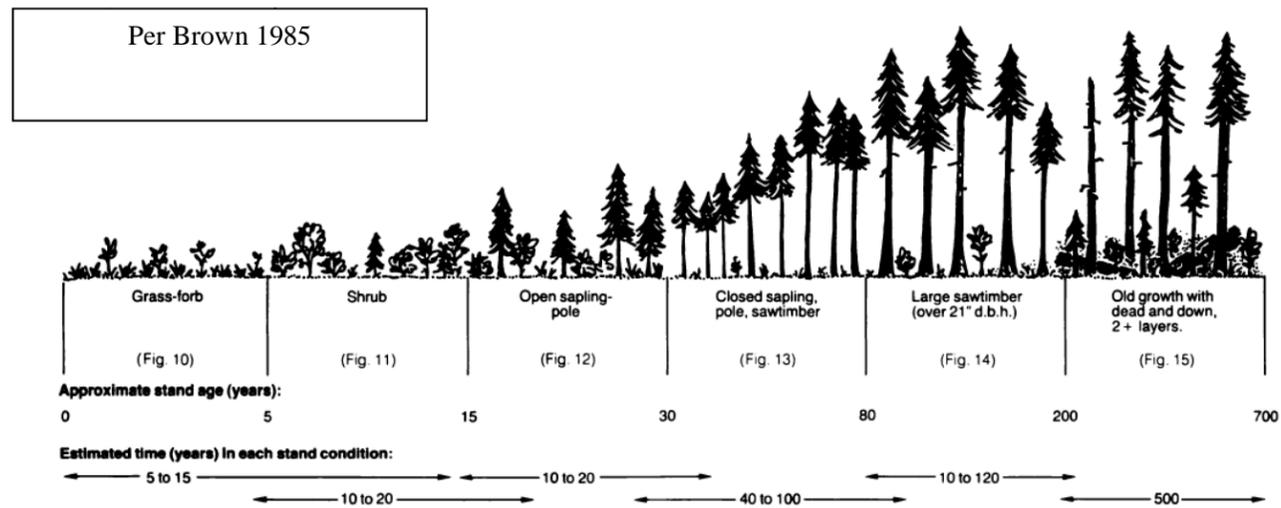
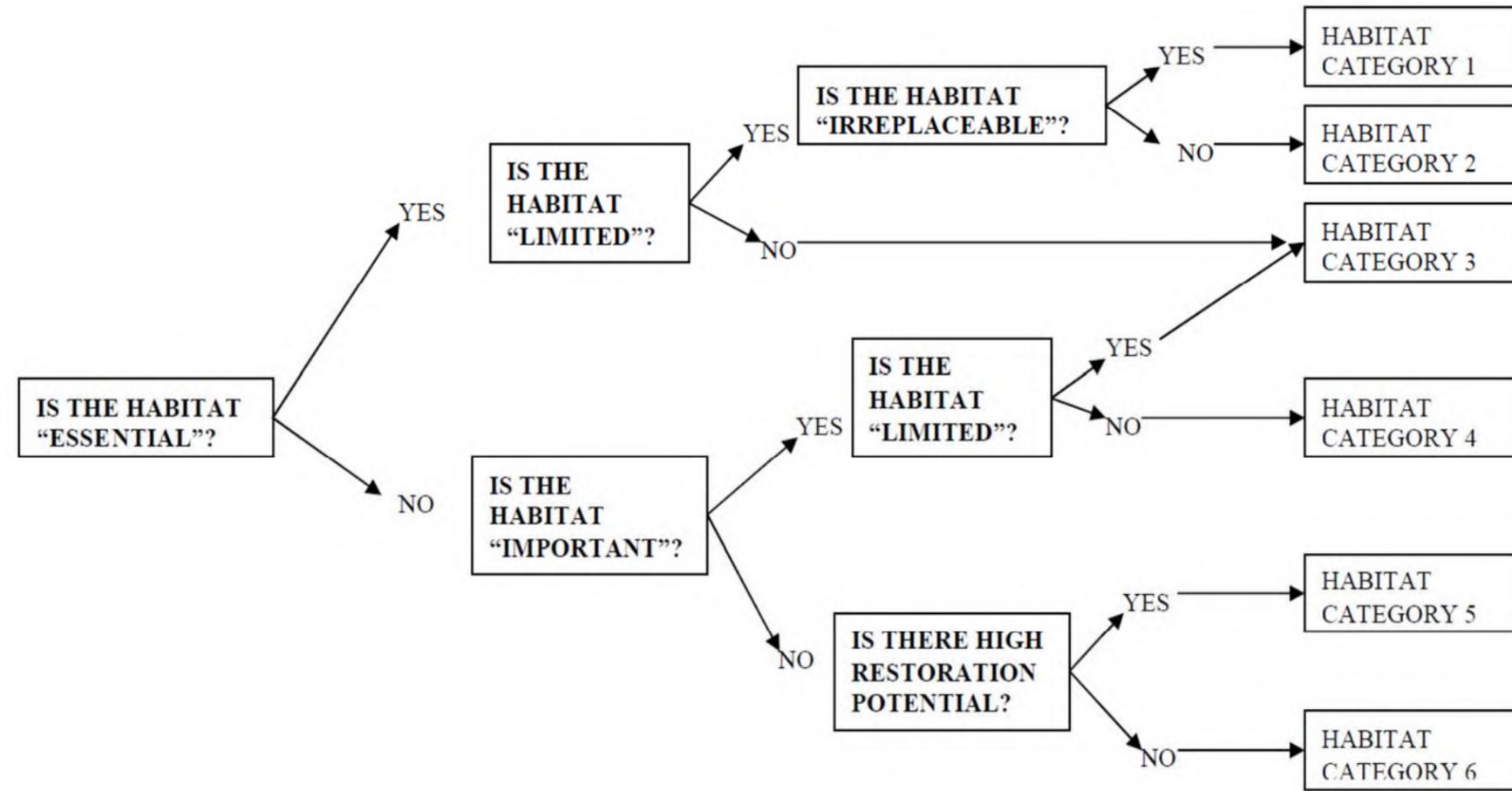


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

Attachment 4. Select Photographs of Habitats and Wildlife Species Taken during 2018 Surveys

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Photo 1. Category 3 Eastside grassland.



Photo 2. Category 4 Eastside grassland, actively grazed.



Photo 3. Category 5 Eastside grassland dominated by non-native annual grasses.



Photo 4. Category 3 CRP.



Photo 5. Category 4 CRP heavily grazed.



Photo 6. Category 3 Shrub-steppe near category 6 (urban and mixed environs) Bakeoven Road.



Photo 7. Category 3 Juniper woodland.



Photo 8. Basalt outcrop.



Photo 9. Wheat cropland.



Photo 10. Lavender cropland.



Photo 11. Eastside grassland burned in Boxcar Fire.



Photo 12. Shrub-steppe burned in Boxcar Fire.



Photo 13. Juniper woodland burned in Boxcar Fire.



Photo 14. Irrigated riparian area.



Photo 15. Shrub-steppe burned east of Shaniko.



Photo 16. Short-eared owl chicks.



Photo 17. Burrowing owls.



Photo 18. Burrowing owl burrow.

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Attachment 5. Complete List of Wildlife Species Observed

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**Special-Status Wildlife and Habitat Survey Report
Attachment 5: Complete List of Wildlife Species Observed**

Complete List of Wildlife Species Observed

Common Name	Scientific Name
BIRDS	
American coot	<i>Fulica americana</i>
American goldfinch	<i>Spinus tristis</i>
American kestrel	<i>Falco sparverius</i>
American robin	<i>Turdus migratorius</i>
barn swallow	<i>Hirundo rustica</i>
black-billed magpie	<i>Pica hudsonia</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Brewer's sparrow	<i>Spizella breweri</i>
brown-headed cowbird	<i>Molothrus ater</i>
bufflehead	<i>Bucephala albeola</i>
burrowing owl	<i>Athene cunicularia</i>
California scrub jay	<i>Aphelocoma californica</i>
Cassin's vireo	<i>Vireo cassinii</i>
chickadee, sp.	<i>Poecile, sp.</i>
chipping sparrow	<i>Spizella passerina</i>
common grackle	<i>Quiscalus quiscula</i>
common nighthawk	<i>Chordeiles minor</i>
common raven	<i>Corvus corax</i>
downy or hairy woodpecker	<i>Dryobates pubescens/villosus</i>
Eurasian collared dove	<i>Streptopelia decaocto</i>
European starling	<i>Sturnus vulgaris</i>
ferruginous hawk	<i>Buteo regalis</i>
flycatcher, sp.	<i>Empidonax, sp.</i>
gadwall	<i>Mareca strepera</i>
grasshopper sparrow	<i>Ammodramus savannarum</i>

**Special-Status Wildlife and Habitat Survey Report
Attachment 5: Complete List of Wildlife Species Observed**

Common Name	Scientific Name
gray flycatcher	<i>Empidonax wrightii</i>
gray partridge	<i>Perdix perdix</i>
green-winged teal	<i>Anas crecca</i>
gull, sp.	<i>Larus, sp.</i>
Hammond's flycatcher	<i>Empidonax hammondii</i>
horned lark	<i>Eremophila alpestris</i>
house finch	<i>Haemorhous mexicanus</i>
house sparrow	<i>Passer domesticus</i>
house wren	<i>Troglodytes aedon</i>
killdeer	<i>Charadrius vociferus</i>
lark sparrow	<i>Chondestes grammacus</i>
lazuli bunting	<i>Passerina amoena</i>
Lincoln's sparrow	<i>Melospiza lincolnii</i>
loggerhead shrike	<i>Lanius ludovicianus</i>
long-eared owl	<i>Asio otus</i>
mountain bluebird	<i>Sialia currucoides</i>
mourning dove	<i>Zenaida macroura</i>
norther flicker	<i>Colaptes auratus</i>
northern harrier	<i>Circus hudsonius</i>
osprey	<i>Pandion haliaetus</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
rock wren	<i>Salpinctes obsoletus</i>
sage thrasher	<i>Oreoscoptes montanus</i>
savannah sparrow	<i>Passerculus sandwichensis</i>
Say's phoebe	<i>Sayornis saya</i>
sharp-shinned hawk	<i>Accipiter striatus</i>

**Special-Status Wildlife and Habitat Survey Report
Attachment 5: Complete List of Wildlife Species Observed**

Common Name	Scientific Name
short-eared owl	<i>Asio flammeus</i>
Swainson's hawk	<i>Buteo swainsoni</i>
turkey vulture	<i>Cathartes auraoni</i>
vesper sparrow	<i>Pooecetes gramineus</i>
violet-green swallow	<i>Tachycineta thalassina</i>
warbler, sp.	<i>Parulidae, sp.</i>
western kingbird	<i>Tyrannus verticalis</i>
western meadowlark	<i>Sturnella neglecta</i>
western tanager	<i>Piranga ludoviciana</i>
yellow warbler	<i>Setophaga petechia</i>
yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
MAMMALS	
coyote	<i>Canus latrans</i>
elk – scat only	<i>Cervus canadensis</i>
ground squirrel, sp.	Unknown ground squirrel species
Merriam's ground squirrel	<i>Urocitellus canus</i>
mule deer	<i>Odocoileus hemionus</i>
pronghorn antelope	<i>Antilocapra americana</i>
cottontail rabbit, sp.	<i>sylvilagus sp.</i>
white-tailed jackrabbit	<i>Lepus townsendii</i>
REPTILES	
gopher snake – carcass only	<i>Pituophis catenifer</i>
racer – carcass only	<i>Coluber constrictor</i>
western fence lizard	<i>Sceloporus occidentalis</i>
western rattlesnake	<i>Crotalus viridus</i>

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2018 Botanical Survey Report for the Bakeoven Energy Project

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Botanical Survey Report Bakeoven Energy Project

Prepared for



Prepared by



July 2018

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Attachment 1. Vascular Plants Observed During Surveys

Attachment 2. ORBIC Correspondence

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1.0 Introduction

This summary report presents the methods and results for the 2018 botanical surveys conducted by Tetra Tech, Inc. (Tetra Tech) for the Bakeoven Energy Project (Project). The purpose of this survey was to document the presence of federal or state-listed endangered, threatened, or candidate vascular plant species and noxious weeds within un-surveyed areas in the Micrositing Corridor developed by Tetra Tech in coordination with Avangrid (Figure 1).

2.0 Methods

2.1 Survey Area

The total area of the Micrositing Corridor is approximately 13,922 acres. This survey excluded coverage of areas included in previous botanical surveys (approximately 4,467 acres) (WEST 2013). It was assumed and confirmed that the additional approximately 999 acres previously identified as cropland within the Micrositing Corridors was accurately mapped and would not need to be traversed during surveys. The Survey Area, consisting of the remainder of the Micrositing Corridor (8456 acres), was completely surveyed for target species and noxious weeds.

The Project is entirely within the Columbia Plateau level III ecoregion (Thorson et. al. 2003). The Site Boundary is primarily within the Umatilla level IV ecoregion and consists of two general landscape types with additional areas of wheat and alfalfa cropland, as well as Conservation Reserve Program-designated land. The southern portion of the Survey Area is primarily composed of scabland and sage-steppe grasslands, with scattered vernal pools. The northern portion is primarily characterized by agricultural and Conservation Reserve Program land, intermittent drainage ditches and stock-ponds, and a few basalt canyons.

2.2 Target Species

The initial list of potential target species included all of the vascular plants listed as endangered or threatened by the US Fish and Wildlife Service under the federal Endangered Species Act (ESA), as well as the candidates for listing. Potential target species also included all plants listed as endangered, threatened, or candidates for listing by the Oregon Department of Agriculture (ODA) under the Oregon ESA. Tetra Tech reviewed this initial list to produce a final list of target species that included all federal and state-listed and candidate plant species that have the potential to occur near the Project, based on known occurrences recorded by herbaria and other sources (Table 1).

Table 1. Target Species with the Potential to Occur in the Site Boundary

Scientific Name	Common Name	Federal Status ¹	State Status ²	Flowering Period ³
<i>Astragalus tyghensis</i>	Tygh Valley milk-vetch	-	T	Late May to mid-June. Flowering from May to early June and Fruiting in July.
<i>Achnatherum hendersonii</i>	Henderson’s ricegrass	SOC	C	May-June
<i>Erythranthe jungermannioides</i>	Hepatic monkeyflower	-	C	(May) June – August (as long as water is present)
<i>Myosurus sessilis</i>	Sessile mousetail	SOC	C	April – June (depending on hydrology)
<i>Eremothera (Camissonia) pygmaea</i>	Dwarf suncup	SOC	C	June-August
<p>Sources: Burke Museum of Natural History and Culture 2018; ODA 2018; OFA 2011; ORBIC 2010; ORBIC 2013; USFWS 2015.</p> <p>1. T = Threatened; C = Candidate for listing; SOC = Species of Concern.</p> <p>2. E = Endangered; T = Threatened; C = Candidate for listing.</p> <p>3. Species may bloom anytime within the range presented; peak blooming periods (i.e., prime survey periods), are included where applicable.</p>				

2.3 Background Review

Prior to conducting field surveys, Tetra Tech identified suitable habitats in the vicinity of the Project, and generated fact sheets for each target species. This included review of the following sources:

- GoogleEarth aerial imagery (GoogleEarth 2018);
- Previous rare plant and habitat assessments (WEST 2013);
- Oregon Biodiversity Information Center (ORBIC) rare, threatened, and endangered plant species records (ORBIC 2018);
- US Department of Agriculture CropScape Cropland GIS Data (USDA-NASS 2017); and
- Other online databases (ODA n.d., ODA 2018, OFA 2011, OFA 2017a, OFA 2017b, OFA 2017c, WNHP 1997).

The fact sheets were used by surveyors in the field and included:

- Photos of the species and its habitat;
- Information detailing habitat associations;

- Species range and characteristics distinguishing the target species from similar species within its range;
- Flowering period; and
- Identifying features.

Tetra Tech conducted wetland/waters surveys prior to the botanical field surveys in May 2018. During these surveys, concurrent surveys were conducted for the target species associated with wetland habitats and vernal pools (*Myosurus sessilis*). During wetland and habitat categorization surveys, landscape features with the potential to support target species, such as streams, wetlands, vernal pools, and riparian areas, were noted and revisited during botanical field surveys.

2.4 Field Survey Methods

Botanical surveys were conducted using the Intuitive Controlled survey method, a standard and commonly accepted survey protocol (USFS and BLM 1999, California Native Plant Society 2001, CDFG 2000, Nelson 1987, Nelson 1994). This method incorporates survey lines that traverse the Survey Area and that target the full array of major vegetation types, aspects, topographical features, habitats, and substrate types. While en route, the surveyors search for target species, and when the surveyors arrive at an area of high potential habitat (that was defined in the background review or encountered during the field visit), they conduct a complete survey for the target species.

When surveyors encountered a target plant species, they recorded the location with GPS-enabled tablets via the ArcGIS Collector application. For individual plants or small patches of individuals, surveyors took a single GPS point. For numerous plants over a larger area, a polygon was mapped that encompassed all individuals. Tetra Tech only mapped the portion of the population within the Survey Area, but any extension of the population beyond the Survey Area was noted. ORBIC siting forms were completed as appropriate. Surveyors took photos to serve as digital specimen vouchers, with the aim of illustrating identifying plant habit, characteristics, and habitat.

Data for each site included the following:

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

During surveys, Tetra Tech maintained a running list of plant species encountered, and made informal collections of unknown species for later identification. Identification was verified by the use of appropriate plant keys; including *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973), among others (Jaster et. al. 2017, ODA 2017, Whittemore 1997, Wilson 2014). For quality control, species identifications were compared against location records of known observations and vouchered specimens (OFA 2017a). Nomenclature follows the Angiosperm Phylogeny Group III

system, as used by the Oregon Flora Project (OFA 2017c). The final vascular plant species list for the Survey Area is included as Attachment 1 in this report.

Surveyors also incidentally recorded ODA-listed noxious weeds, which included A and B-listed species, as well as T-designated species (ODA 2017). Surveyors documented all discrete populations of noxious weeds that were uncommon within the Survey Area. For common noxious weeds, large infestations were documented, and occasional points were taken noting the number of individuals in the area.

2.5 Survey Schedule

The survey schedule was designed to target each species' expected flowering period. This included surveys for *Myosurus sessilis* in early to mid-June 2018, in conjunction with wetland surveys conducted in late May 2018. Surveys for all other target species occurred in mid to late June 2018. *Myosurus sessilis* surveys continued during the June surveys.

3.0 Results

Tetra Tech completed botanical surveys in the portions of the Survey Area where access was granted between June 6 and June 25, 2018. Limited surveys were also conducted simultaneously with wetland surveys from May 21 to May 25, 2018 to target the early-blooming species *Myosurus sessilis*. Surveys for target species were comprehensive, meaning that all areas of potential suitable habitat for each species were surveyed within that species' expected flowering period. During surveys in late-June 2018, the Boxcar Fire burned a portion of the Project (NWCC 2018; Figure 1). Surveys were conducted in areas with potential rare plant habitat along the boundary of the burned area, but recently burned and actively burning areas are not habitat for the targeted rare plants. Subsequent habitat and wetland surveys inside the burned areas confirmed the paucity of available habitat for the target species.

3.1 Target Species

No federal or state-listed endangered, threatened, or candidate plant species were observed within the Survey Area. A hybrid species of the target species *Myosurus sessilis* and *Myosurus minimus* was found in vernal pools within the Survey Area, but this plant does not have a special status in Oregon.

3.2 Noxious Weeds

Tetra Tech recorded ten ODA-listed (ODA 2017) noxious weed species within the Survey Area, and documented the location, and the estimated number of plants or extent of the populations observed (Table 2). Five noxious weed species were abundant throughout the Survey Area: bull thistle, Canada thistle, diffuse knapweed, jointed goatgrass, and medusahead rye.

Table 2. Noxious Weeds Located within the Survey Area

Scientific Name	Common Name	Status ¹	Frequency
<i>Aegilops cylindrica</i>	Jointed goatgrass	B	Abundant - 11 observations scattered throughout NE.
<i>Centaurea diffusa</i>	Diffuse knapweed	B	Abundant - 5 observations, scattered throughout NW.
<i>Chondrilla juncea</i>	Rush skeletonweed	B, T	5 observations, scattered throughout NE.
<i>Cirsium arvense</i>	Canada thistle	B	Abundant - 5 observations, mostly along Bakeoven Rd.
<i>Cirsium vulgare</i>	Bull thistle	B	Abundant - 8 observations, scattered throughout north, half along Bakeoven Rd.
<i>Lepidium draba</i>	Heart podded hoarycress	B	1 observation, center Project.
<i>Lepidium latifolium</i>	Perennial pepperweed	B, T	2 observations, close to each other to north of Project on Bakeoven Rd.
<i>Phragmites australis</i>	Common reed	B	1 observation, north in Project on Bakeoven Rd.
<i>Rubus bifrons (armeniacus)</i>	Himalayan blackberry	B	2 observations, north in Project on Bakeoven Rd.
<i>Taeniatherum caput-medusae</i>	Medusahead rye	B	Abundant - wide-spread throughout Project.
<p>1. "A" designated weeds: Weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent. "B" designated weeds: Weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties. "T" Designated Weed: A priority noxious weed designated by the Oregon State Weed Board as a target for which the ODA will develop and implement a statewide management plan. "T" designated noxious weeds are species selected from either the "A" or "B" list (ODA 2017).</p>			

Three species were observed in small patches at a few sites within the Survey Area: rush skeletonweed, perennial pepperweed, and Himalayan blackberry. Two species were observed as a single infestation: heart podded hoarycress and common reed.

All of the noxious weed species observed were "B" designated weeds, meaning that they are weeds of economic importance that are regionally abundant, but which may have limited distribution in some counties (ODA 2017). Two species, rush skeletonweed and perennial pepperweed, are also a "T"-designated weed, meaning that ODA has targeted the species for prevention and control (ODA 2017).

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Figure

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Bakeoven Energy Project

Figure 1 Botanical Survey

WASCO COUNTY, OREGON

- Site Boundary
- 2011/2013 WEST Survey Corridor
- Micrositing Corridor
- Cropland
- Boxcar Fire Boundary (NWCC)
- County Boundary
- City/Town
- Secondary Highway
- Secondary Road



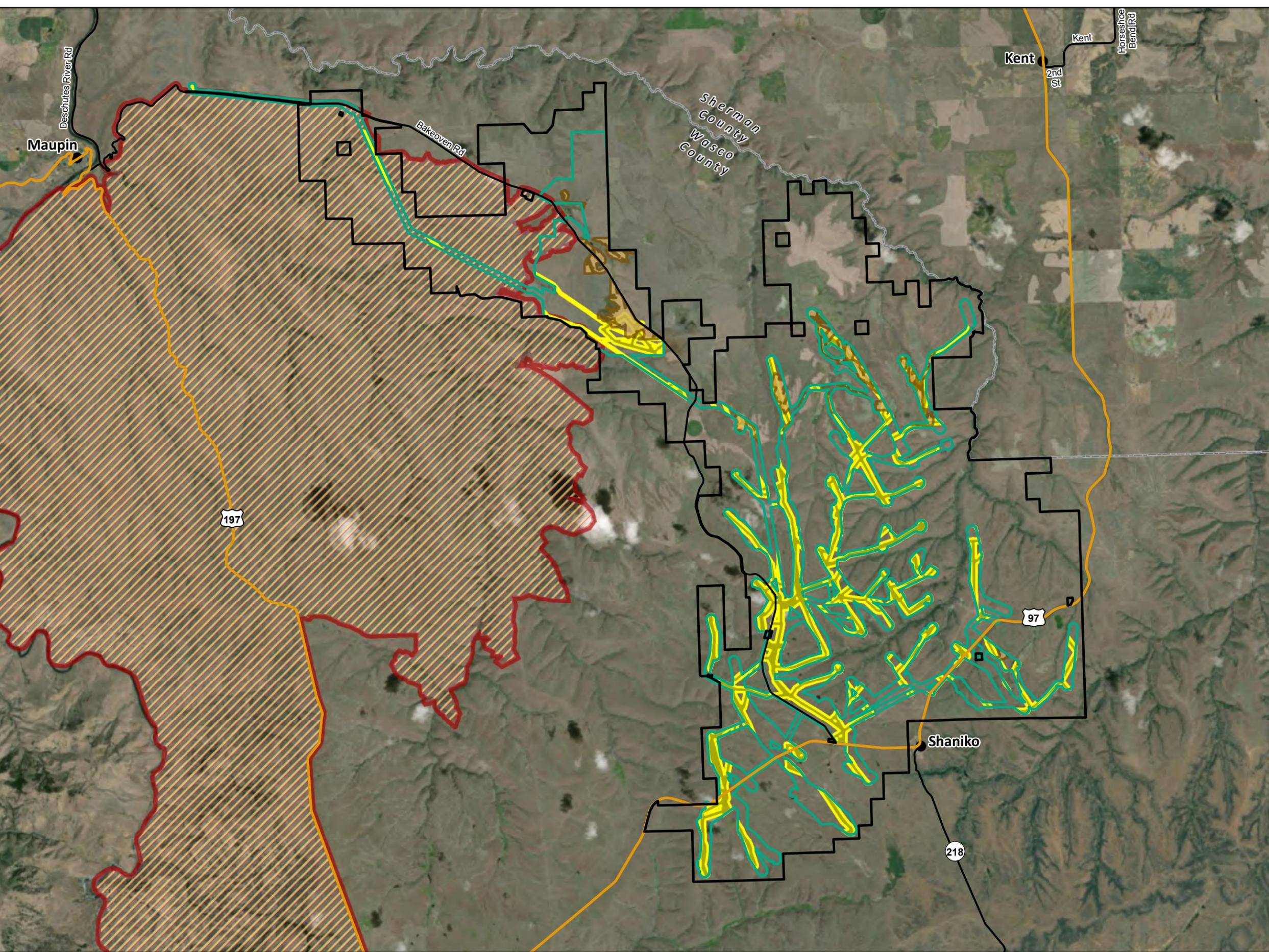
Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; ESRI-Roads

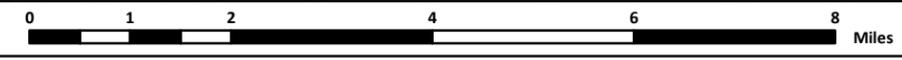
Reference Map



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1:115,000 WGS 1984 UTM Zone 10N



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Attachment 1. Vascular Plants Observed During Surveys

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Attachment 1. Vascular Plants Observed During Surveys

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Achillea millefolium</i>	common yarrow	N		
<i>Achnatherum occidentale</i>	western needlegrass	N	<i>Stipa occidentalis</i>	
<i>Acmispon denticulatus</i>	meadow lotus	N	<i>Lotus denticulatus</i>	
<i>Aegilops cylindrica</i>	jointed goatgrass	I		ODA Noxious Weed, B List
<i>Agastache sp.</i>	hyssop	N		
<i>Agoseris glauca</i>	pale agoseris	N		
<i>Agoseris grandiflora</i>	bigflower agoseris	N		
<i>Agoseris heterophylla</i>	annual mountain dandelion	N		
<i>Agrostis sp.</i>	bentgrass	I		
<i>Allium acuminatum</i>	tapertip onion, Hooker's onion	N		
<i>Allium sp.</i>	wild onion	N		
<i>Allium tolmiei</i> var. <i>tolmiei</i>	Tolmie's onion	N		
<i>Alopecurus pratensis</i>	meadow foxtail	I		
<i>Alopecurus saccatus</i>	Pacific meadow foxtail	I		
<i>Alopecurus sp.</i>	foxtail	N		
<i>Alyssum alyssoides</i>	yellow alyssum	I		
<i>Amaranthus blitoides</i>	prostrate pigweed, tumbleweed amaranth	I		
<i>Amaranthus powellii</i>	Powell's amaranth	N		
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	N		
<i>Amsinckia lycopsoides</i>	tarweed fiddleneck, bugloss fiddleneck	N		
<i>Amsinckia retrorsa</i>	Menzie's fiddleneck	N		
<i>Amsinckia tessellata</i>	bristly fiddleneck	N		
<i>Antennaria dimorpha</i>	low pussytoes	N		
<i>Antennaria luzuloides</i>	woodrush pussytoes, small flowered everlasting	N		
<i>Antennaria sp.</i>	pussytoes	N		
<i>Anthriscus caucalis</i>	bull chervil	I	<i>Anthriscus scandicina</i>	
<i>Apera interrupta</i>	interrupted windgrass	I	<i>Agrostis interrupta</i>	
<i>Artemisia ludoviciana</i>	white sagebrush	N		
<i>Artemisia rigida</i>	stiff sagebrush, scabland sagebrush	N		
<i>Artemisia tridentata</i>	big sagebrush	N		
<i>Artemisia tripartita</i>	threetip sagebrush	N		
<i>Astragalus conjunctus</i> var. <i>conjunctus</i>	stiff milkvetch, basalt milkvetch	N		
<i>Astragalus filipes</i>	threadstalk milkvetch	N		
<i>Astragalus howellii</i>	Howell's milkvetch	N		

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Astragalus purshii</i>	woollypod milkvetch	N		
<i>Astragalus curvicaupus</i> var. <i>subglaber</i>	glabrous sickle milkvetch	N		
<i>Atriplex</i> sp.	orache, saltbush	N		
<i>Avena fatua</i>	wild oats	I		
<i>Balsamorhiza careyana</i>	Carey's balsamroot	N		
<i>Balsamorhiza sagittata</i>	arrowleaf balsamroot	N		
<i>Balsamorhiza serrata</i>	serrate balsamroot, toothed balsamroot	N		
<i>Blepharipappus scaber</i>	blepharipappus	N		
<i>Boechera</i> sp.	rockcress	N	<i>Arabis</i> sp.	
<i>Bromus commutatus</i>	meadow brome, hairy chess	I		
<i>Bromus hordeaceus</i>	soft chess	I	<i>Bromus mollis</i>	
<i>Bromus inermis</i>	smooth brome	I		
<i>Bromus japonicus</i>	Japanese brome	I		
<i>Bromus sitchensis</i> var. <i>marginatus</i>	Sitka brome, Alaska brome	N		
<i>Bromus</i> sp.	brome	N		
<i>Bromus tectorum</i>	cheatgrass, downy chess, downy brome	I		
<i>Calochorus macrocarpus</i> var. <i>macrocarpus</i>	sagebrush mariposa lily	N		
<i>Camassia quamash</i>	common camas	N		
<i>Carex douglasii</i>	Douglas' sedge	N		
<i>Carex pachystachya</i>	thick-headed sedge, Chamisso sedge	N		
<i>Castilleja hispida</i>	harsh Indian paintbrush	N		
<i>Castilleja</i> sp.	paintbrush	N		
<i>Castilleja tenuis</i>	annual white paintbrush, hairy owl clover	N	<i>Orthocarpus hispidus</i>	
<i>Centaurea cyanus</i>	Bachelor's button, cornflower	I		
<i>Centaurea diffusa</i>	diffuse knapweed, tumble knapweed	I		ODA Noxious Weed, B List
<i>Centaureum umbellatum</i>	common centaury, European centaury	N		
<i>Cerastium</i> sp.	chickweed	I		
<i>Ceratocephala testiculata</i>	hornseed buttercup	I	<i>Ranunculus testiculatus</i>	
<i>Chaenactis douglasii</i>	hoary false yarrow	N		
<i>Chamaesyce serpyllifolia</i>	thyme-leaved spurge, thymeleaf sandmat	N	<i>Euphorbia serpyllifolia</i>	
<i>Chenopodium fremontii</i>	Fremont's goosefoot	N		
<i>Chenopodium rubrum</i>	low goosefoot	N		
<i>Chondrilla juncea</i>	gum succory, rush skeletonweed	I		ODA Noxious Weed, B List
<i>Chorispora tenella</i>	chorispora, purple field mustard	I		
<i>Chrysothamnus viscidiflorus</i>	green rabbitbrush	N		

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Cichorium intybus</i>	wild succory, common chicory	I		
<i>Cirsium arvense</i>	Canada thistle, creeping thistle	I		ODA Noxious Weed, B List
<i>Cirsium undulatum</i>	wavy leaf thistle	N		
<i>Cirsium vulgare</i>	bull thistle, common thistle	I		ODA Noxious Weed, B List
<i>Clarkia pulchella</i>	ragged robin, elkhorns clarkia	N		
<i>Collinsia parviflora</i>	small flowered blue eyed Mary	N		
<i>Collomia grandiflora</i>	large flowered collomia	N		
<i>Conyza canadensis</i>	Canadian fleabane, horseweed	N		
<i>Crataegus douglasii</i>	Douglas' hawthorn, black hawthorn	N		
<i>Crepis atrabarba</i>	long leaved hawksbeard, tapertip hawksbeard	N		
<i>Crepis barbigera</i>	bearded hawksbeard	N		
<i>Crepis intermedia</i>	gray hawksbeard, intermediate hawksbeard	N		
<i>Cystopteris fragilis</i>	fragile fern, brittle fern	N		
<i>Danthonia unispicata</i>	one-spike oatgrass	N		
<i>Delphinium nuttallianum</i>	upland larkspur	N		
<i>Deschampsia danthonioides</i>	annual hairgrass	N		
<i>Deschampsia elongata</i>	slender hairgrass	N		
<i>Descurainia sophia</i>	flixweed, tansy mustard	I		
<i>Descurainia sp.</i>	flixweed	N		
<i>Dipsacus fullonum</i>	wild teasel, Fuller's teasel	I	<i>Dipsacus sylvester</i>	
<i>Dodecatheon sp.</i>	shooting star	N		
<i>Draba verna</i>	spring whitlow grass	N		
<i>Drymocallis glandulosa</i>	sticky cinquefoil	N	<i>Potentilla glandulosa</i>	
<i>Elatine chilensis</i>	chilean waterwort	N		
<i>Eleocharis palustris</i>	common spikerush, marsh spikerush, creeping spikerush	N		
<i>Eleocharis sp.</i>	spikerush	N		
<i>Elymus elymoides</i>	squirreltail	N	<i>Sitanium hystrix</i>	
<i>Elymus repens</i>	quackgrass	N	<i>Agropyron repens, Elytrigia repens</i>	
<i>Epilobium brachycarpum</i>	tall annual willowherb, autumn willowherb	N	<i>Epilobium paniculatum</i>	
<i>Epilobium campestre</i>	smooth spikeprimrose	N	<i>Boisduvalia glabella</i>	
<i>Epilobium minutum</i>	small flowered willowherb	N		
<i>Epilobium torreyi</i>	brook spike-primrose, Torrey's epilobium	N	<i>Boisduvalia stricta</i>	
<i>Epilobium watsonii</i>	fringed willowherb, American willowherb, slender willowherb, northern willowherb	N		
<i>Eremophila franklinii</i>	Franklin's sandwort	N	<i>Arenaria franklinii</i>	
<i>Ericameria nauseosa</i>	rubber rabbitbrush	N	<i>Chrysothamnus nauseosus</i>	

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Erigeron bloomeri</i>	Bloomer's daisy	N		
<i>Erigeron filifolius</i>	threadleaf fleabane	N		
<i>Erigeron linearis</i>	desert yellow daisy, lineleaf fleabane	N		
<i>Erigeron poliospermus</i>	gray-seeded fleabane, purple cushion fleabane	N		
<i>Eriogonum compositum</i>	arrowleaf buckwheat	N		
<i>Eriogonum douglasii</i>	Douglas' buckwheat	N		
<i>Eriogonum heracleoides</i>	parsnipflower buckwheat	N		
<i>Eriogonum sphaerocephalum</i>	rock buckwheat	N		
<i>Eriogonum strictum</i> var. <i>proliferum</i>	Blue Mountain buckwheat	N		
<i>Eriogonum vimineum</i> var. <i>vimineum</i>	wickerstem buckwheat, broom buckwheat	N		
<i>Eriophyllum lanatum</i> var. <i>integrifolium</i>	Oregon sunshine	N		
<i>Erodium cicutarium</i>	african filaree, red-stemmed filaree	I		
<i>Erythranthe nasuta</i>	large nose monkeyflower	N	<i>Mimulus guttatus</i>	
<i>Euthamia occidentalis</i>	western goldenrod	N	<i>Solidago occidentalis</i>	
<i>Festuca idahoensis</i>	Idaho fescue	N		
<i>Fritillaria pudica</i>	yellow bells, yellow fritillary	N		
<i>Gaillardia aristata</i>	common blanketflower	N		
<i>Galium aparine</i>	stickywilly, cleavers	N		
<i>Galium boreale</i>	northern bedstraw	N		
<i>Gayophytum decipiens</i>	deceptive groundsmoke	N		
<i>Gayophytum</i> sp.	groundsmoke	N		
<i>Geum triflorum</i>	old man's whiskers	N		
<i>Gnaphalium palustre</i>	lowland cudweed	N		
<i>Grindelia hirsutula</i>	hairy gumweed	N		
<i>Grindelia squarrosa</i>	curlycup gumweed, resinweed	N		
<i>Gutierrezia sarothrae</i>	broom snakeweed, matchweed	N		
<i>Hieracium cynoglossoides</i>	houndstongue hawkweed	N		
<i>Holosteum umbellatum</i>	jagged chickweed	I		
<i>Hordeum brachyantherum</i>	meadow barley	N		
<i>Hordeum jubatum</i>	foxtail barley	N		
<i>Hordeum marinum</i> ssp. <i>Gussoneanum</i>	seaside barley	I		
<i>Hordeum</i> sp.	barley	N		
<i>Hydrophyllum capitatum</i>	ballhead waterleaf	N		
<i>Idahoia scapigera</i>	scalepod, flatpod	N		
<i>Iva axillaris</i>	poverty weed, deeproot	N		

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Juncus balticus</i>	baltic rush	N	<i>Juncus arcticus</i> ssp. <i>balticus</i>	
<i>Juncus bufonius</i> var. <i>bufonius</i>	western toad rush	N		
<i>Juncus effusus</i>	pasture rush, soft rush	N		
<i>Juncus nevadensis</i>	Sierra rush	N		
<i>Juncus tenuis</i>	path rush, slender rush, poverty rush	N		
<i>Juniperus occidentalis</i>	western juniper	N		
<i>Koeleria macrantha</i>	junegrass	N	<i>Koeleria cristata</i>	
<i>Lactuca serriola</i>	prickly lettuce	I		
<i>Lagophylla ramosissima</i>	slender hareleaf, common rabbitleaf	N		
<i>Lappula redowskii</i>	western stickseed	N		
<i>Lemna</i> sp.	duckweed	N		
<i>Lepidium draba</i>	heart podded hoarycress	I	<i>Cardaria draba</i>	ODA Noxious Weed, B List
<i>Lepidium latifolium</i>	perennial pepperwort, perennial pepperweed, broad leaved pepperwort	I		ODA Noxious Weed, B List
<i>Lepidium perfoliatum</i>	clasping pepperweed	I		
<i>Lewisia rediviva</i>	bitterroot, resurrection flower	N		
<i>Leymus cinereus</i>	Great Basin wildrye	N	<i>Elymus cinereus</i>	
<i>Limosella acaulis</i>	southern mudwort	N		
<i>Lithophragma glabrum</i>	bulbous woodland star	N		
<i>Lithophragma parviflorum</i>	small-flower woodland star	N		
<i>Lithospermum ruderale</i>	western gromwell, Columbia puccoon	N		
<i>Lomatium canbyi</i>	Canby's lomatium	N		
<i>Lomatium donnellii</i>	Donnell's lomatium	N		
<i>Lomatium grayi</i>	Gorman's lomatium	N		
<i>Lomatium leptocarpum</i>	slender fruited lomatium, gumbo lomatium	N		
<i>Lomatium macrocarpum</i>	large fruited lomatium	N		
<i>Lomatium minus</i>	John Day Valley desert parsley	N		
<i>Lomatium nudicaule</i>	barestem lomatium	N		
<i>Lomatium piperi</i>	Indian biscuitroot	N		
<i>Lomatium</i> sp.	lomatium, bisuitroot	N		
<i>Lomatium triternatum</i>	nineleaf biscuitroot, broad nineleaf lomatium, broad fruit lomatium	N		
<i>Lupinus arbustus</i>	longspur lupine, spur lupine	N	<i>Lupinus laxiflorus</i>	
<i>Lupinus lepidus</i> var. <i>aridus</i>	dwarf lupine	N		
<i>Lupinus leucophyllus</i>	velvet lupine, woolly leaved lupine	N		
<i>Madia exigua</i>	little tarweed, threadstem madia	N		
<i>Madia gracilis</i>	slender tarweed, common tarweed	N		

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Marrubium vulgare</i>	white horehound	I		
<i>Matricaria discoidea</i>	pineapple weed	I		
<i>Matricaria matricarioides</i>	pineapple mayweed, wild chamomile, disc mayweed	I		
<i>Medicago lupulina</i>	black medic, hop clover	I		
<i>Medicago sativa</i>	alfalfa, lucerne	I		
<i>Melilotus officinalis</i>	common yellow sweetclover	I		
<i>Microseris nutans</i>	nodding microseris, nodding scorzonella	N		
<i>Microsteris gracilis</i>	slender phlox	N	<i>Phlox gracilis</i>	
<i>Montia linearis</i>	narrowleaf montia, lineleaf Indian lettuce	N	<i>Claytonia linearis</i>	
<i>Montia perfoliata</i>	Miner's lettuce	N	<i>Claytonia perfoliata</i>	
<i>Myosotis stricta</i>	strict forget-me-not, blue scorpion grass	I	<i>Myosotis micrantha</i>	
<i>Myosurus apetalus</i> var. <i>montanus</i>	bristly mousetail	N	<i>Myosurus aristatus</i>	
<i>Myosurus minimus</i>	least mousetail, tiny mousetail	N		
<i>Nasturtium officinale</i>	watercress	I	<i>Rorippa nasturtium-aquaticum</i>	
<i>Navarretia leucocephala</i> var. <i>minimus</i>	white-flowered navarretia	N		
<i>Nothocalais troximoides</i>	false agoseris	N	<i>Microseris troximoides</i>	
<i>Orobanche</i> sp.	broomrape	N		
<i>Penstemon gairdneri</i>	Gairdner's beardtongue	N		
<i>Penstemon rydbergii</i>	Rydberg's penstemon	N		
<i>Perideridia gairdneri</i>	Gairdner's yampah, western false caraway	N		
<i>Phacelia hastata</i>	lance leaf phacelia, cordilleran phacelia	N		
<i>Philadelphus lewisii</i>	Lewis' mockorange, wild mockorange	N		
<i>Phlox hoodii</i>	woolly phlox	N		
<i>Phlox longifolia</i>	timothy	N		
<i>Phoenicaulis cheiranthoides</i>	daggerpod, phoenicaulis	N		
<i>Phragmites australis</i>	common reed	I		ODA Noxious Weed, B List
<i>Pinus</i> sp.	pine	N		
<i>Plagiobothrys scouleri</i>	Scouler's popcornflower	N		
<i>Plantago lanceolata</i>	English plantain, buckhorn plantain	I		
<i>Plantago major</i>	common plantain	N		
<i>Plectritis macrocera</i>	longspur white plectritis	N		
<i>Poa bulbosa</i>	bulbous bluegrass	I		
<i>Poa compressa</i>	Canada bluegrass	I		
<i>Poa pratensis</i>	Kentucky bluegrass	I		
<i>Poa secunda</i>	secund bluegrass	N		

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Polemonium micranthum</i>	annual polemonium	N		
<i>Polygonum aviculare</i>	prostrate knotweed	I		
<i>Polygonum polygaloides ssp. Confertiflorum</i>	white margined knotweed	N		
<i>Polygonum polygaloides ssp. esotericum</i>	water knotweed	N	<i>Polygonum esotericum</i>	
<i>Polypogon monspeliensis</i>	rabbitsfoot grass, annual beardgrass	I		
<i>Populus nigra</i>	black poplar	I		
<i>Potentilla biennis</i>	biennial cinquefoil	N		
<i>Potentilla gracilis</i>	graceful cinquefoil	N		
<i>Poteridium occidentale</i>	annual burnet	N	<i>Sanguisorba annua</i>	
<i>Pseudognaphalium stramineum</i>	cotton batting plant	N	<i>Gnaphalium chilense</i>	
<i>Pseudoroegneria spicata</i>	bluebunch wheatgrass	N	<i>Agropyron spicatum</i>	
<i>Psilocarphus oregonus</i>	Oregon woolyheads	N		
<i>Ranunculus aquatilis</i>	water buttercup	N		
<i>Ranunculus sceleratus</i>	blister buttercup	N		
<i>Ribes aureum</i>	golden currant	N		
<i>Ribes cereum</i>	wax currant	N		
<i>Rigiopappus leptocladus</i>	bristlehead	N		
<i>Robinia pseudo-acacia</i>	black locust	I		
<i>Rosa woodsii</i>	Wood's rose	N		
<i>Rubus bifrons</i>	Himalayan blackberry	I	<i>Rubus discolor</i>	ODA Noxious Weed, B List
<i>Rumex crispus</i>	curly dock	I		
<i>Rumex salicifolius</i>	willow dock, fleshy willow dock	N		
<i>Salix amygdaloides</i>	peach leaf willow	N		
<i>Salix sp.</i>	willow	N		
<i>Salsola tragus</i>	prickly Russian thistle, tumbleweed	I	<i>Salsola kali</i>	
<i>Sambucus cerulea</i>	rock willow	N		
<i>Schoenoplectus tabernaemontani</i>	tule, soft-stem bulrush	N	<i>Scirpus validus</i>	
<i>Sclerochloa dura</i>	fairgrounds grass, hardgrass	I		
<i>Scrophularia sp.</i>	figwort	N		
<i>Scutellaria angustifolia</i>	narrowleaf skullcap	N		
<i>Sedum leibergii</i>	Leiberg's stonecrop	N		
<i>Sidalcea oregana</i>	Oregon checkermallow	N		
<i>Silene menziesii</i>	Menzies' catchfly	N		
<i>Sisymbrium altissimum</i>	Jim Hill mustard, tumble mustard	I		
<i>Sisymbrium loeselii</i>	Loesel tumbledustard, small tumbleweed mustard	I		

Scientific Name	Common Name	Native or Introduced? ¹	Synonym	Notes
<i>Sonchus sp.</i>	sow thistle	I		
<i>Stachys sp.</i>	betony, hedgenettle	N		
<i>Stellaria sp.</i>	starwort	I		
<i>Symphoricarpos rotundifolius var. oreophilis</i>	roundleaf snowberry	N		
<i>Symphotrichum sp.</i>	aster	N	<i>Aster sp.</i>	
<i>Taeniatherum caput-medusae</i>	medusahead	I		ODA Noxious Weed, B List
<i>Taraxacum officinale</i>	common dandelion	I		
<i>Tetradymia canescens</i>	gray horsebrush, spineless horsebrush	N		
<i>Thelypodium sp.</i>	thelypody	N		
<i>Thinopyrum intermedium</i>	intermediate wheatgrass	I	<i>Agropyron intermedium</i>	
<i>Thysanocarpus curvipes</i>	sand fringe pod, hairy fringe pod	N		
<i>Tragopogon dubius</i>	yellow salsify	I		
<i>Trifolium cyathiferum</i>	cup clover, wide collared clover	N		
<i>Trifolium macrocephalum</i>	big headed clover	N		
<i>Trifolium repens</i>	white clover, Dutch clover	I		
<i>Trifolium willdenovii</i>	tomcat clover	N		
<i>Triteleia grandiflora</i>	large flowered triteleia	N	<i>Brodiaea douglasii</i>	
<i>Triteleia hyacinthina</i>	hyacinth triteleia, white triteleia, hyacinth cluster-lily, fool's-onion	N	<i>Brodiaea hyacinthina</i>	
<i>Typha angustifolia</i>	lesser cattail, narrow-leaf cattail	N		
<i>Ulmus pumila</i>	dwarf elm, Siberian elm	I		
<i>Urtica dioica</i>	stinging nettle	N		
<i>Valenianella locusta</i>	European corn salad	I		
<i>Ventenata dubia</i>	ventenata, North Africa grass	I		
<i>Verbascum thapsus</i>	flannel mullein, cowboy toilet paper	I		
<i>Verbena bracteata</i>	bracted verbena	N		
<i>Veronica americana</i>	American brooklime	N		
<i>Veronica peregrina var. xalapensis</i>	purslane speedwell	N		
<i>Viola sp.</i>	violet	N		
<i>Vulpia bromoides</i>	brome fescue, rattail fescue	I	<i>Festuca bromoides</i>	
<i>Vulpia microstachys</i>	small fescue, desert fescue	N	<i>Festuca microstachys</i>	
<i>Vulpia myuros</i>	rattail fescue, rat-tail six-weeks grass	I	<i>Festuca myuros</i>	
<i>Wyethia amplexicaulis</i>	northern mule's ears, smooth dwarf sunflower	N		
<i>Xanthium strumarium</i>	rough cocklebur	I		
Nomenclature follows Hitchcock 1973, OFA 2017a, OFA 2017b, OFA 2017c. 1. N=Native, I=Introduced.				

Attachment 2. ORBIC Correspondence

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Archived: Thursday, July 5, 2018 2:53:12 PM

From: Atkins, Kate

Sent: Monday, May 14, 2018 1:30:00 PM

To: inrdata@pdx.edu

Cc: Konkol, Carrie; Bensted, Amy

Subject: Wasco County data request

Sensitivity: Normal

Attachments:

[Bakeoven_ORBIC_Request.zip](#) 

Dear Ms. Wise,

Avangrid Renewables has hired Tetra Tech, Inc. (Tetra Tech) to assist in assessing biological issues of a potential project in Wasco County, Oregon.

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

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

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

Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at (503) 721-7215 or email at Kate.Atkins@tetrattech.com.

Sincerely,



Kate Atkins
Project Biologist
Tetra Tech, Inc.

Attachments (1)

-WinZip file containing ArcGIS Shapefile of research buffer

Kate Atkins | Senior Associate Biologist
External (503) 721-7215 | Internal 721-2240 | Cell (215) 601-4330 | kate.atkins@tetrattech.com

Tetra Tech | Complex World, Clear Solutions™ | Sciences
[1750 SW Harbor Way, Suite 400 | Portland, OR 97201](#) | tetrattech.com

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OREGON BIODIVERSITY INFORMATION CENTER

Institute for Natural Resources



Mail Stop: INR
Post Office Box 751
Portland, Oregon 97207
503.725.9950
<http://inr.oregonstate.edu/orbic>

May 17, 2018

Kate Atkins
Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, OR 97701

Dear Ms. Atkins:

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 Bakeoven Area Project in Wasco County.

One-hundred fifty-six (156) element occurrence records were noted within a ten-mile radius of your project and are included on the enclosed computer printout and GIS export.

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

1. No warranty is made by US Fish & Wildlife Service as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. The information may not meet National Map Accuracy Standards. This project was developed through digital means and may be updated without notification.
2. Golden eagle nest location data presented here is not intended for land use planning and analysis purposes and should be considered draft. Location data is provided solely for use in developing an inventory strategy intended to determine precise nest locations and develop a breeding population estimate for Oregon.
3. The data were based on reports from others, often second or third-hand interpretations from files, rather than original field work.
4. This data reflects only those nest sites that were reported through 2016.
5. The locations were described inconsistently, often covered large areas such as a square mile, and were not field-verified for accuracy.
6. Statewide coverage was unknown. There was no systematic survey of the landscape. Locations were gathered opportunistically or as part of local projects. Consequently, the absence of a location on the map does not mean that there was not a golden eagle nest in the area.
7. Current nest locations within breeding areas may be different from those portrayed on the maps, especially tree nests which are more ephemeral than cliff nests.
8. The nest use data were not collected annually or following an accepted protocol. Consequently, summaries or comparisons have little value.

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

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,

A handwritten signature in cursive script that reads "Lindsey Wise".

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

encl.: **invoice (H-051718-LKW5)**
computer printout and data key
GIS export

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Supplemental 2018 Wildlife and Habitat Categorization Report for the Bakeoven Solar Project

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Supplemental 2018 Wildlife and Habitat Categorization Report Bakeoven Solar Project

Prepared for



Prepared by



April 2019

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1.0 Introduction

This report presents the methods and results of a desktop assessment performed by Tetra Tech, Inc. (Tetra Tech) for the Bakeoven Solar Project (Facility) to identify wildlife habitat and special status wildlife species that have the potential to occur in areas that did not receive field surveys in 2018, but which may be impacted by the Facility. Specifically, the purpose of this report is to identify the habitat categories and types as set forth in Oregon Administrative Rules (OAR) 635-415-0025 and to determine the potential for special status species to occur within areas added to the Facility following the 2018 surveys.

2.0 Methods

2.1 Analysis Area

The *2018 Special-Status Wildlife and Habitat Survey Report* for the Facility details the locations of field surveys performed for the Facility in 2018 (Tetra Tech 2018). This report describes an analysis area that only includes areas added to the micrositing corridor following 2018 surveys, as shown in Figure 1. The analysis area is approximately 294 acres.

2.2 Habitat Categorization and Wildlife

Tetra Tech performed a desktop assessment of the analysis area in December 2018. Habitats were identified using aerial photography and the results of the 2018 field surveys (NAIP 2018, Tetra Tech 2018). Habitat types and categories for wetlands and waters were derived from 2018 field delineation data, which included the analysis area. Tetra Tech delineated polygons in a Geographic Information System based on aerial photography (Figure 2, Figure 3). This classification was primarily based on the type and condition of contiguous habitat polygons in the field-surveyed areas that were adjacent to the additional areas.

Prior to conducting field surveys in 2018, Tetra Tech conducted a desktop review to identify special-status wildlife species with the potential to occur at the Facility (Tetra Tech 2018). The analysis area under consideration in this report is located within the broader general area reviewed during the original desktop review for the 2018 surveys; therefore, no additional special status species have been identified for analysis in this report.

3.0 Results

During the desktop assessment, Tetra Tech assigned new habitat polygons within the analysis area that were the same types and categories as the adjacent, field-verified habitat that appeared similar to it, based on aerial photography. The analysis area includes habitat preliminarily designated as

Categories 3, 4, 5, and 6 (Table 1). More than half of the analysis area was identified as Upland Grassland, Shrub-steppe, and Shrubland — Shrub-steppe habitat, most of which was burned in the Boxcar Fire, as described in the 2018 survey report (Tetra Tech 2018). Most of the remaining habitat identified in the analysis area is composed of Planted and Eastside Grasslands. Category 5 habitat accounts for approximately 171 acres, followed by Category 3, Category 4, and Category 6 habitat. A description of this habitat within the analysis area from north to south is provided below, along with a description of special status wildlife species, if any, observed in the vicinity of these areas during 2018 field surveys.

North of Bakeoven Road

The analysis area north of Bakeoven Road consists of habitat polygons similar in appearance to adjacent areas of grassland habitat. These polygons were assigned the following habitat types and categories:

- Upland Grassland, Shrub-steppe, and Shrubland — Eastside Grasslands (Category 4); and
- Agriculture, Pasture, and Mixed Environs — Planted Grassland (Categories 3 and 4)¹.

A Swainson's hawk (*Buteo swainsoni*) was observed during surveys north of Bakeoven Road (Tetra Tech 2018). Swainson's hawk is state sensitive in the Columbia Plateau Ecoregion and has no federal status (ODFW 2016, ODFW 2017, USFWS 2008, USFWS 2016, USFWS 2018). No other special status species were observed north of Bakeoven Road during surveys ².

¹ Areas referred to as Agriculture, Pasture, and Mixed Environs (Conservation Reserve Program lands) in Tetra Tech 2018 have been redefined as Planted Grasslands in this report for greater accuracy.

² Western rattlesnake has no special federal or state status, and was recorded only for consistency across surveys per Tetra Tech 2018.

Table 1. Habitat Categories and Types Mapped inside the Analysis Area

Habitat Type	Habitat Subtype	Total Acres within Micrositing Corridor ¹	Acres within Micrositing Corridor ¹					
			Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Open Water - Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Wetlands	Emergent Wetlands	0.1	0.0	0.0	0.0	0.0	0.1	0.0
	Scrub-shrub Wetlands	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Riparian Forest and Shrubland Complexes	Eastside (Interior) Riparian	<0.1	0.0	0.0	0.0	0.0	<0.1	0.0
Upland Grassland, Shrub-steppe, and Shrubland	Eastside Grasslands	15.7	0.0	0.0	3.9	4.0	7.8	0.0
	Shrub-steppe	172.4	0.0	0.0	8.4	6.6	157.3	0.0
Upland Forests and Woodlands	Western Juniper Woodlands	<0.1	0.0	0.0	0.0	0.0	<0.1	0.0
Agriculture, Pasture, and Mixed Environs	Planted Grasslands	97.3	0.0	0.0	79.2	12.3	5.8	0.0
Cliffs, Caves, and Talus	Cliffs, Caves, and Talus	3.6	0.0	0.0	3.6	0.0	0.0	0.0
Urban and Mixed Environs	Urban and Mixed Environs	4.3	0.0	0.0	0.0	0.0	0.0	4.3
Total		293.6	0.0	0.0	95.2	23.0	171.1	4.3

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

Along Bakeoven Road

The analysis area along Bakeoven Road is primarily composed of Bakeoven Road (Urban and Mixed Environs [Category 6]), and some areas of highly disturbed, burned habitat (Category 5). Narrow roadside areas of the following habitat types and categories were identified:

- Upland Grassland, Shrub-steppe, and Shrubland — Shrub-steppe (Categories 4 and 5);
- Upland Grassland, Shrub-steppe, and Shrubland — Eastside Grasslands (Categories 4 and 5);
- Open Water - Lakes Rivers Streams — Intermittent or Ephemeral Streams (Category 4);
- Wetlands — Shrub-scrub Wetlands (Category 3); and
- Eastside (Interior) Riparian — Riparian Forest and Natural Shrubland Complexes (Category 5).

No special status species were observed in areas contiguous to this portion of the analysis area during surveys.

South of Bakeoven Road

The portion of the analysis area along the western edge of the previously surveyed areas primarily includes areas of highly disturbed, burned habitat, as follows:

- Upland Grassland, Shrub-steppe, and Shrubland — Shrub-steppe (Categories 3, 4 and 5);
- Upland Grassland, Shrub-steppe, and Shrubland — Eastside Grasslands (Categories 3 and 5);
- Agriculture, Pasture, and Mixed Environs — Planted Grassland (Categories 3 and 5); and
- Cliffs, Caves, Talus (Category 3).

No special status species were observed in areas contiguous to this portion of the analysis area during surveys.

Transmission Corridor

Most of the analysis area within the transmission corridor (i.e., the narrow, linear corridor in Figures 1, 2, and 3) was burned in the Boxcar Fire. Tetra Tech identified the following habitat types and categories within this portion of the analysis area:

- Upland Grassland, Shrub-steppe, and Shrubland — Shrub-steppe (Category 5 primarily, small areas of Category 3);
- Agriculture, Pasture, and Mixed Environs — Planted Grassland (Categories 3 and 5); and
- Wetlands — Emergent Wetlands (Category 5).

No special status species were observed in areas contiguous to this portion of the analysis area during surveys.

South Edge of the Facility

This portion of the analysis area includes the following:

- Agriculture, Pasture, and Mixed Environs — Planted Grassland (Categories 3 and 4);
- Upland Grassland, Shrub-steppe, and Shrubland — Shrub-steppe (Category 3); and
- Cliffs, Caves, Talus (Category 3).

A family group of burrowing owls (*Athene cunicularia hypugaea*) were found near two active burrows in an area of Planted Grassland that was contiguous to these polygons during the 2018 surveys (Tetra Tech 2018). Burrowing owls are a federal Species of Concern, and state sensitive-critical in the Columbia Plateau Ecoregion (ODFW 2016, ODFW 2017, USFWS 2008, USFWS 2016, USFWS 2018). Data received from ORBIC prior to 2018 surveys showed no occurrence records for any ORBIC-tracked wildlife species within the analysis area (ORBIC 2018).

4.0 Conclusion

Based on a review of information from desktop sources, as well as the results of nearby field surveys, eight habitat types ranging from Category 3 through 6 occur within the analysis area. The desktop assessment did not identify any localized conditions within the analysis area that would indicate these unsurveyed areas are substantially different from the areas surveyed in 2018. As a result, these habitats have potential to support the same special status wildlife species identified in the previous survey efforts (Tetra Tech 2018).

5.0 References

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- USFWS. 2016. Federally Listed, Proposed, Candidate, Delisted Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service which May Occur in Oregon. Available online at: <https://www.fws.gov/oregonfwo/Documents/OregonSpeciesStateList.pdf> (Accessed March 2019).
- USFWS. 2018. IPaC (Information for Planning and Consultation). Endangered Species in Sherman and Wasco Counties. Available online at: <https://ecos.fws.gov/ipac/> (Accessed February 2018).

Figures

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Bakeoven Solar Project

Figure 1 2018 Survey Area

WASCO COUNTY, OREGON

- Proposed Site Boundary
- Proposed Micrositing Corridor
- 2018 Survey Area
- Analysis Area
- Boxcar Fire Boundary
- US Highway
- Local Road
- County Boundary



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads;
Northwest Interagency Coordination Center-Boxcar
Fire Perimeter

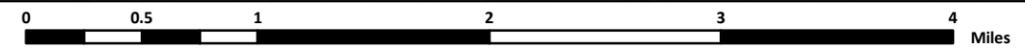
Reference Map



P:\GIS_PROJECTS\Avangrid\BakeOven\MXD\Habitat_Assessment\AVG_Bakeoven_ASC_Fig01_11171_20190328.mxd



1:50,000 WGS 1984 UTM Zone 10N



Bakeoven Solar Project

Figure 2 Habitat Categories within the Proposed Micrositing Corridor

WASCO COUNTY, OREGON

-  Proposed Site Boundary
-  Proposed Micrositing Corridor
-  2018 Survey Area
-  US Highway
-  Local Road
-  County Boundary
- Habitat Category**
-  3
-  4
-  5
-  6



Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

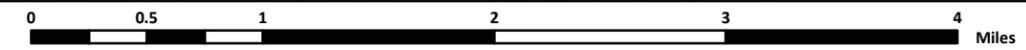
Reference Map



P:\GIS_PROJECTS\Avangrid\BakeOven\MXDs\Habitat_Assessment\AVG_Bakeoven_ASC_Fig02_HabitatCategoriesInMicrositingCorridor_11171_20190403.mxd



1:50,000 WGS 1984 UTM Zone 10N



Bakeoven Solar Project

Figure 3
Habitat Types within the
Proposed Micrositing Corridor

WASCO COUNTY, OREGON

-  Proposed Site Boundary
-  Proposed Micrositing Corridor
-  2018 Survey Area
-  US Highway
-  Local Road
-  County Boundary
- Habitat Subtype**
-  Seasonal Pond
-  Intermittent or Ephemeral Streams
-  Emergent Wetlands
-  Shrub-scrub Wetlands
-  Eastside (Interior) Riparian
-  Eastside Grasslands
-  Shrub-steppe
-  Juniper Woodland
-  Planted Grasslands
-  Orchards, Vineyards, Wheat Fields, Row Crops
-  Urban and Mixed Environs
-  Cliffs, Caves, and Talus



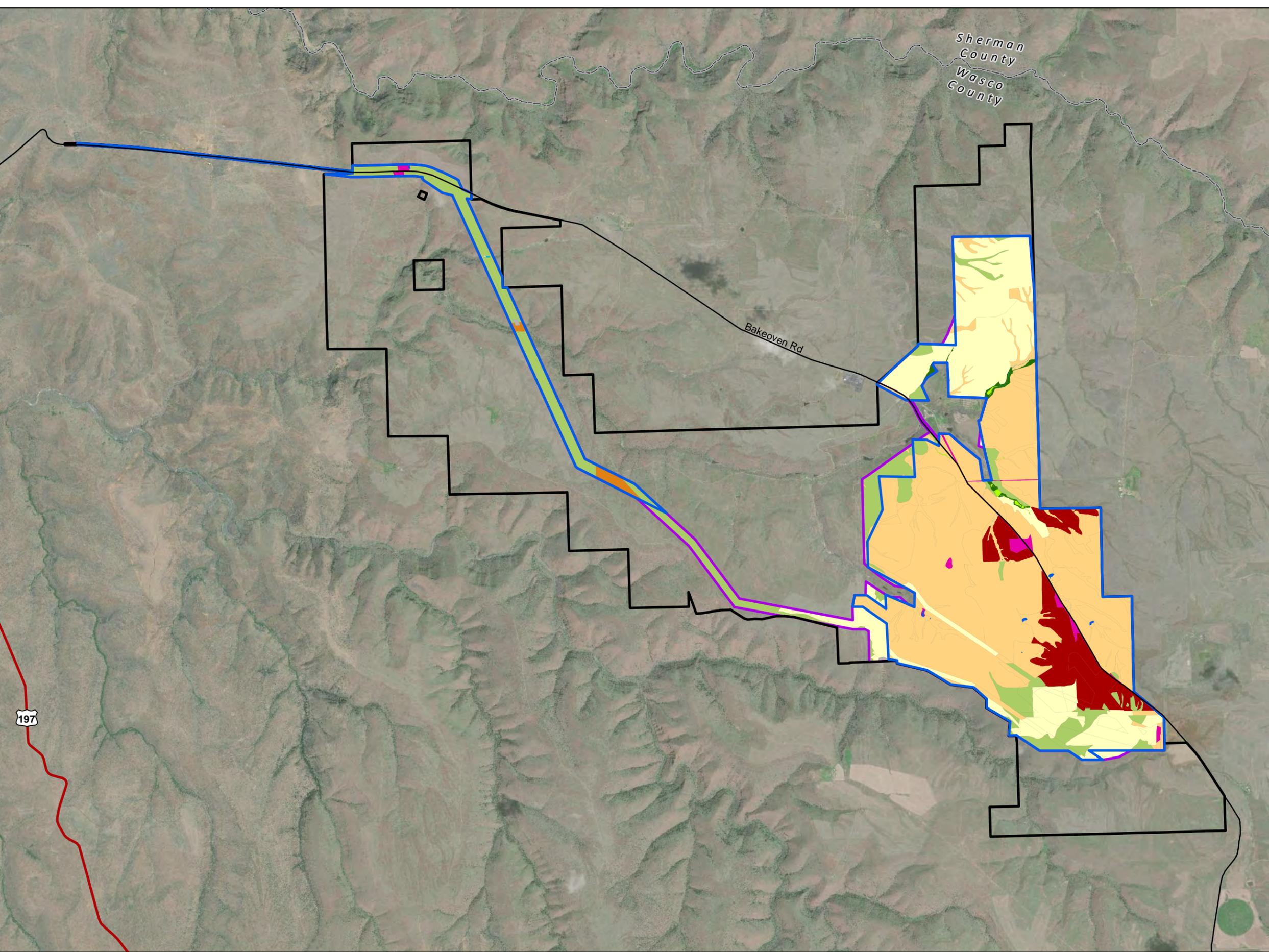
Data Sources

Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

Reference Map



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Supplemental 2018 Botanical Report for the Bakeoven Solar Project

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Supplemental 2018 Botanical Report

Bakeoven Solar Project

Prepared for



Prepared by



April 2019

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1.0 Introduction

This report presents the methods and results of a desktop assessment performed by Tetra Tech, Inc. (Tetra Tech) for the Bakeoven Solar Project (Facility) to determine the potential for target rare plants to occur in areas that did not receive field surveys in 2018, but which may be impacted by the Facility. Specifically, the purpose of this report is to document the likelihood for target rare plant species to occur within areas added to the Facility subsequent to the 2018 surveys. These target species include Henderson's ricegrass (*Achnatherum hendersonii*), Tygh Valley milk-vetch (*Astragalus tyghensis*), dwarf suncup (*Eremothera* [*Camissonia*] *pygmaea*), hepatic monkeyflower (*Erythranthe* [*Mimulus*] *jungermanniioides*), and sessile mousetail (*Myosurus sessilis*). The assessment in this report is based on Tetra Tech's desktop review, knowledge of the area, and previous rare plant surveys conducted at the Facility in 2011 and 2018 (Tetra Tech 2018, WEST 2013).

2.0 Methods

2.1 Analysis Area

The 2018 Botanical Survey Report details the locations of field surveys performed for the Facility in 2018 (Tetra Tech 2018). The analysis area for this supplemental report includes only areas added to the Facility following 2018 surveys, as shown in Figure 1 of the Supplemental 2018 Wildlife and Habitat Categorization Report (Tetra Tech 2019a). The analysis area is approximately 294 acres.

2.2 Information Review

To determine the potential occurrence of target species, Tetra Tech reviewed the habitats and habitat condition within the analysis area, as detailed in the Supplemental 2018 Wildlife and Habitat Categorization Report (Tetra Tech 2019a). Tetra Tech delineated polygons within the analysis area based on aerial photography, then assigned habitat type, sub-type, and quality categories from Oregon Administrative Rules (OAR) 635-415-0025 to these polygons. This classification was primarily based on the type and condition of contiguous habitat polygons in the field-surveyed areas that were adjacent to the additional areas.

Habitat types delineated in the analysis area include the following:

- Upland Grassland, Shrub-steppe, and Shrubland — Eastside Grasslands;
- Agriculture, Pasture, and Mixed Environs — Planted Grassland;
- Upland Grassland, Shrub-steppe and Shrubland — Shrub-steppe; and
- Limited areas of:
 - Open Water - Lakes Rivers Streams — Intermittent or Ephemeral Streams;

- Wetlands — Shrub-scrub Wetlands;
- Wetlands — Emergent Wetlands;
- Eastside (Interior) Riparian — Riparian Forest and Natural Shrubland Complexes; and
- Cliffs, Caves, Talus.

The habitat was of low quality in some areas surveyed for the Facility in 2018 due to high levels of disturbance from the 2018 Boxcar Fire. The extent of this fire is shown in Figure 1 of the Botanical Survey Report (Tetra Tech 2018), and in Figure 1 of the Supplemental 2018 Wildlife and Habitat Categorization Report (Tetra Tech 2019a). Burned parts of the analysis area were characterized as Category 5 (i.e., habitat that is not essential or important, but that has high potential to become either essential or important habitat). Areas unaffected by the Boxcar Fire within the analysis area were designated as Category 3 (essential habitat, or important and limited habitat) and Category 4 (important habitat) based on the condition of adjacent habitat that was field-verified and that appeared similar in quality based on aerial photographs. For the previously field-verified portions of the Facility near the burned areas, the primary disturbance types were grazing and invasive weeds, indicating that these were also the likely sources of disturbance in the burned portions of the analysis area for this desktop assessment as well.

3.0 Results

During surveys conducted in 2018, surveyors did not observe any rare plants, and only limited suitable habitat for these species was identified. Additionally, no Oregon Biodiversity Information Center (ORBIC) records for these species occur within the area surveyed in 2018, nor within the analysis area for this desktop assessment (ORBIC 2018). Tetra Tech evaluated the likelihood for each target species to occur in the habitats within the analysis area, as well as knowledge of the general area from having conducted the previous surveys in 2018. The potential impact that fire disturbance may have on each species is also addressed here, where information was available.

3.1 Tygh Valley Milk-Vetch

Tygh Valley milk-vetch is a state listed threatened species and has no federal status. This species is found in dry, rocky soils with thin, sandy surface soil, in bunchgrass grasslands, mounded prairies, or open juniper habitat (ODA n.d., OCS 2016). Potentially suitable habitat for this species may be located in the transmission corridor portion of the analysis area (i.e., the narrow, linear corridor shown in Figure 1 of the Supplemental 2018 Wildlife and Habitat Categorization Report [Tetra Tech 2019a]). This area of potential habitat was mapped as shrub steppe habitat during Tetra Tech's desktop assessment (Tetra Tech 2019a), and was disturbed in 2018 by the Boxcar Fire.

Tygh Valley milk-vetch is a perennial plant with a thick, woody taproot; it reproduces from seed. The effects of fire on Tygh Valley milk-vetch depend on the timing of the fire. Fires during the

plant's reproductive period may interrupt reproduction, and thus negatively affect those individuals (Quigley et al. 1997). If an undocumented population of this species were located in the transmission corridor before the fire, they may have been prevented from producing seeds, as the Boxcar Fire occurred in early to mid-summer, which is prior to this species' fruiting period. However, this species is a hard-seeded legume that it has the potential to maintain a seedbank (Ellis et al. 2012). Therefore, if Tygh Valley milk-vetch was present prior to the fire, it may have persisted in the seedbank.

Fire may benefit Tygh Valley milk-vetch by decreasing the cover of noxious weeds that compete with this species; conversely, individuals that survive fire may experience increased competition from invasive weeds if weeds are not controlled following the fire. Most research on the effects of Tygh Valley milk-vetch's competition with invasive weeds have focused on grazing rather than fire as a disturbance factor. A 2008 study found that immediately following intensive grazing, the plant population is negatively impacted; however, recovery can be rapid if invasive weeds are controlled (Thorpe and Kaye 2008).

Records of this species in the ORBIC dataset (ORBIC 2018) are limited to the west side of the Deschutes River; none are east of the river, where the Facility is located. This species was not observed during surveys conducted in 2018 in either unburned areas or in burned areas. Therefore, the potential for this species to occur in the analysis area is extremely low.

3.2 Henderson's Ricegrass

The Oregon Department of Agriculture (ODA) lists Henderson's ricegrass as a candidate species, and it is also a federal species of concern. Found in lithosol areas of scabland habitats, this species' range may include the analysis area (Dewey 2013). Limited scabland lithosol was located in shrub-steppe habitat within the transmission corridor (see Figure 1 of the Supplemental 2018 Wildlife and Habitat Categorization Report [Tetra Tech 2019a]) during surveys conducted in 2018. As noted above, this area was disturbed by the 2018 Boxcar Fire; however, fire is generally not cited as a disturbance to this species, as lithosol can act as a fire break (USFS 2004).

The primary disturbance factors associated with this plant are grazing and invasive species (Dewey 2013). Particular emphasis is placed on competition from non-native, invasive plant species *ventenata* (*Ventenata dubia*) and medusahead rye (*Taeniatherum caput-medusae*), which are omnipresent at the Facility (Tetra Tech 2018, Farris-Lopez 2013). Grazing and invasive species were the primary sources of disturbance in the areas that were field surveyed, and are likely disturbance factors in the analysis area as well.

No records of Henderson's ricegrass occur within 5 miles of the Facility (ORBIC 2018). Additionally, this species was not observed during surveys conducted in 2018; therefore, the potential for this species to occur in the analysis area is low.

3.3 Hepatic Monkeyflower

Hepatic monkeyflower is listed by ODA as a candidate species, and it has no federal status. This species is found in moist crevices and seeps in basalt cliff faces; this species' range may include the analysis area (WNHP n.d.). However, no suitable habitat for this species is present in the analysis area. No records of this species occur within 5 miles of the Facility (ORBIC 2018), and it was not observed during surveys conducted in 2018. Therefore, the potential for this species to occur in the analysis area is extremely low.

3.4 Sessile Mousetail

Sessile mousetail is listed by ODA as a candidate species, and it is a federal species of concern. Found in moist areas associated with drying vernal pools and alkali flats, this species' range includes the analysis area (Hitchcock 1973, WNHP n.d.). Tetra Tech conducted wetland surveys within the analysis area in December 2018 and did not identify any vernal pools (Tetra Tech 2019b). As a result, no suitable habitat for this species is present in the analysis area. Two records of this species occur within 5 miles of the Facility, both west of the Deschutes River (ORBIC 2018). This species was not observed during surveys conducted in 2018, and the potential for this species to occur in the analysis area is extremely low.

3.5 Dwarf Evening-Primrose

Dwarf evening-primrose is listed by ODA as a candidate species, and it is a federal species of concern. Found on dry plains, rocky slopes, sandy banks, roadcuts, gravel areas of steep talus, and in dry, gravelly washes, this species' range may include the analysis area (Oregon Flora Project 2017). Habitat for this species was determined to be limited within the areas surveyed in 2018. Potential habitat also appears limited in the analysis area, including the limited area of cliffs, caves and talus mapped along the southern edge of the analysis area. No records of this species occur within 5 miles of the Facility (ORBIC 2018). This species was not observed during surveys conducted in 2018, and the potential for this species to occur in the analysis area is extremely low.

4.0 Conclusion

Based on a review of information from desktop sources, as well as the results of field surveys within the vicinity of the Facility, there is low to extremely low potential for the target rare plant species to occur within the analysis area. Although there is some potential for suitable habitat to be present, the majority of the analysis area was recently disturbed by the 2018 Boxcar Fire, which is likely to have negatively impacted any individuals of the target species, if they were present. Furthermore, the analysis area is interspersed within a much larger area where field surveys were conducted in 2018, and where the target rare plant species were not documented. The desktop assessment did not identify any localized conditions within the analysis area that would indicate these unsurveyed areas would be more likely to support rare plants than the areas surveyed in 2018.

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Attachment P-2. Draft Habitat Mitigation Plan

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Attachment P-2.

Draft Habitat Mitigation Plan

**Bakeoven Solar Project
November 2019**

Prepared for



Avangrid Renewables, LLC

Prepared by



Tetra Tech, Inc.

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1.0 Introduction

This Habitat Mitigation Plan (HMP) describes how Bakeoven Solar, LLC (Applicant) will mitigate for the unavoidable wildlife habitat impacts of the Bakeoven Solar Project (Facility). Specifically, this HMP¹ outlines how the Applicant will construct and operate the Facility consistent with the Oregon Department of Fish and Wildlife (ODFW) Habitat Mitigation Policy. This plan addresses mitigation for both the permanent impacts of Facility components (permanent impacts) and the temporal impacts associated with the Facility construction (temporary impacts). The Applicant proposes to protect and enhance a mitigation area and/or provide commensurate funding. This HMP specifies habitat enhancement actions and monitoring procedures to evaluate the success of those actions, as applicable. Because the Applicant anticipates that the Facility will be built in phases, the mitigation discussion has been described by phase.

2.0 Description of the Impacts Addressed by the HMP

The Facility is located entirely within the ODFW Designated Mule Deer Winter Range. ODFW (2013) describes winter range in eastern Oregon as limited and essential habitat for big game; therefore, should be considered as Category 2 under ODFW's Habitat Mitigation Policy. It is not possible to site the Facility outside of the designated winter range because the Facility is location-dependent on its interconnection point at Maupin Substation, which is also in the winter range. Therefore, impacts to Category 2 are unavoidable due to the Facility's interconnection location and the overlapping mule deer winter range.

Notwithstanding the overarching habitat categorization, the area within the micrositing corridor is primarily composed of eastside grassland (habitat types Upland Grassland, Shrub-Steppe and Shrubland; subtype Eastside Grassland) and planted grasslands, with smaller areas of shrub-steppe habitat (habitat types Upland Grassland, Shrub-Steppe and Shrubland; subtype Shrub-Steppe) that may be used by various species (Exhibit P, Tables P-2 and P-3). Essential habitat values for quality big game winter range, such as thermal cover, security from predation and harassment, quality forage, and limited disturbance are generally lacking from the micrositing corridor because it is mostly composed of planted grassland and highly disturbed native grassland (Exhibit P, Section 8.1.1). No areas of native eastside grassland or shrub-steppe habitat were field-characterized as Category 2 habitat. Planted grasslands ranging from Categories 3-5 account for 948.4 acres (22.8 percent) of the micrositing corridor. Areas of eastside grassland and shrub-steppe habitat dominated by non-native plant species (Categories 4 and 5) comprise 1762.1 acres (42.3 percent) of the micrositing corridor (see Exhibit P, Tables P-3 and P-4). The remaining areas of eastside grassland and shrub-steppe have a higher native species composition (Category 3), and comprise 997.2 (23.9 percent) acres of the micrositing corridor.

¹ This HMP will be incorporated by reference in the site certificate for the Bakeoven Solar Project and must be understood in that context. It is not a "stand-alone" document.

Permanent impact areas are those that would be converted from the existing condition to a different condition for the life of the Facility. Solar array areas will be fenced, and all areas inside the fence are considered permanently disturbed. In addition to the solar array, fencing will occur at the collector substation, the operations and maintenance (O&M) building, and the battery storage area, as required by electrical code or security needs (see Exhibits B and C). Temporary impacts will be fully mitigated for through successful implementation of the Revegetation Plan (Attachment P-3 to Exhibit P). However, some areas of shrub-steppe that will be temporarily impacted include sagebrush stands that could take longer than 5 years to be restored. Even where restoration of this habitat subtype is successful, there is a loss of habitat function during the restoration period. Therefore, this HMP includes mitigation for both permanently impacted habitat (2,473.0 acres) and select areas of temporarily impacted shrub-steppe habitat (shrubs-steppe subtype: 32.0 acres) that results in a temporal loss of habitat quality (Table 1).

The Facility will not have any impacts on Category 1 habitat. No mitigation is required for impacts to Category 6 areas. All remaining Category 3, 4, and 5 habitat has been re-categorized as Category 2 habitat because the Facility is within ODFW’s Designated Mule Deer Winter Range, which overlaps the areas of temporary and permanent impact (ODFW 2013). Based on this definition, Table 1 presents anticipated acres of impact for Category 2 habitat present at the Facility, in addition to the preliminary habitat categorization of these areas before the application of this overlay.

Table 1. Acres of Impact to Habitat Categories and Types within the Proposed Micrositing Corridor

Final Habitat Category ¹	Preliminary Habitat Category	Habitat Type-Subtype ²	Permanent Impact	Temporary Impact
2	3	Riparian Forest and Natural Shrubland Complexes – Eastside Riparian	0.6	1.3
		Upland Grassland, Shrub-Steppe and Shrubland – Eastside Grassland	579.1	14.4
		Upland Grassland, Shrub-Steppe and Shrubland – Shrub-Steppe	103.4	32.0 ³
		Agriculture, Pasture, Mixed Environs – Planted Grassland	423.4	16.2
		Cliffs, Caves, and Talus	0.0	0.4
	4	Open Water - Lakes Rivers Streams – Seasonal Pond	0.7	0.1
		Open Water - Lakes Rivers Streams – Intermittent or Ephemeral Streams	0.0	<0.1
		Upland Grassland, Shrub-Steppe and Shrubland – Eastside Grassland	792.3	17.0
		Upland Grassland, Shrub-Steppe and Shrubland – Shrub-Steppe	1.8	0.6

Final Habitat Category ¹	Preliminary Habitat Category	Habitat Type-Subtype ²	Permanent Impact	Temporary Impact
		Agriculture, Pasture, Mixed Environs – Planted Grassland	177.1	7.3
	5	Upland Grassland, Shrub-Steppe and Shrubland – Eastside Grassland	303.4	17.4
		Upland Grassland, Shrub-Steppe and Shrubland – Shrub-Steppe	91.1	47.6
		Upland Forests and Woodlands – Juniper Woodland	0.0	2.6
		Agriculture, Pasture, Mixed Environs – Planted Grassland	0.1	0.7
Category 2 Final Total			2,473.0	157.6
6	6	Agriculture, Pasture, Mixed Environs – Orchards, Vineyards, Wheat Crops and Other Row Crops	240.4	4.3
		Urban and Mixed Environs	3.6	14.7
Category 6 Final Total			244.0	19.0
Grand Total			2,717.0	176.6
<p>Note: Totals in this table may not be precise due to rounding.</p> <p>1. Final Category following application of ODFW Designated Mule Deer Winter Range overlay.</p> <p>2. Only impacted Habitat Types-Subtypes present within the proposed micrositing corridor are represented.</p> <p>3. Temporarily impacted shrub-steppe habitat.</p>				

The Applicant proposes to begin construction as soon as June 2020, and to construct the Facility in phases. The size and construction schedule for each phase will be based on market demand, but the entire Facility, including all phases, will be completed by 2025 unless the Applicant seeks an amendment to extend the construction deadline. Table 2 provides an example phased construction schedule. The impact analysis presented in the Application for Site Certificate and mitigation outlined in this HMP represents the fully built-out scenario of 303 megawatts. Mitigation will be determined prior to the construction of each phase. If phases are transferred to a new Certificate Holder, then any mitigation obligations will also be transferred.

Table 2. Example Construction Schedule

Year	Activity
2019	Issuance of Bakeoven Solar Project site certificate.
2020	Final engineering and begin construction.
2021	Phase 1 construction and operation.
2022	Phase 2 construction and operation.

Year	Activity
2023/2024	Phase 3 construction and operation.
2025	Construction completion deadline for all phases.

3.0 Methods for Calculating the Size of the Mitigation Area

The mitigation area will be determined for each phase of the Facility based on the final design for that phase and actual habitat impacts (i.e., Category 2 vs. Category 6 habitat). Before beginning construction of each phase of the Facility, the Applicant will provide the Oregon Department of Energy (ODOE) with a map showing the final design configuration for that phase of the Facility, and a table showing the estimated acres of permanent and temporary impacts by habitat category (Table 1). A mitigation ratio between 1.1 and 1.5 acres for every 1 acre of Category 2 habitat affected will be used to ensure that the mitigation area is large enough to achieve “no net loss” of habitat quantity or quality. A “net benefit” in habitat quantity or quality for impacts to habitat in Categories 2 may be achieved through habitat enhancement actions, increased mitigation ratios, or by other means approved by ODFW. The Applicant will determine the final mitigation ratio in consultation with ODFW prior to construction based on the mitigation option selected (see Section 4.0), the type of mitigation, duration of mitigation (i.e., term vs. perpetuity), and the likelihood of mitigation success. No mitigation will be implemented for impacts on Category 6 habitat.

For temporary impacts that require mitigation, the mitigation area will include up to 0.5 acres for every 1 acre of select eastside grassland and shrub-steppe habitat affected. The size of this portion of the mitigation area assumes that restoration of disturbed eastside grassland and shrub-steppe habitat is successful, as determined under the Revegetation Plan (Attachment P-3 to Exhibit P).

4.0 Mitigation Options

The Applicant has identified three options for addressing the mitigation obligation where habitat protection and enhancement and/or commensurate funding are feasible and consistent with this HMP. Each option is on the Columbia Plateau and “in proximity” to the Facility. The Applicant may use one option or a combination of options to mitigate for habitat impacts, and will determine the combination of the mitigation options that best correlate to the impacted areas in consultation with ODFW and the affected landowners, subject to ODOE’s approval. The final mitigation approach will offer enough suitable habitat to achieve the ODFW goal of no net loss of habitat quantity or quality. A net benefit in habitat quantity could be achieved through an increased ratio and a net benefit in quality could be achieved through appropriate enhancement actions. As the potential mitigation locations are within ODFW-mapped Mule Deer Winter Range, acquisition of these areas constitutes acquisition of Category 2 habitat regardless of the habitat condition (excluding Category 6 habitat), and thus meets the ODFW goal of no net loss of habitat quantity; any enhancement actions successfully performed (including on a subset of the acquired area or at other in-proximity locations) would result in a net benefit in habitat quality. Prior to operation of the Facility, or a

particular phase of the Facility, the Applicant will acquire the legal right to create, maintain, and protect the habitat mitigation area for the life of the Facility² by means of an outright purchase, conservation easement, or similar conveyance, and will provide a copy of the documentation to ODOE.

4.1 Option 1: ODFW Payment-to-Provide

The Applicant understands that ODFW is considering a payment-to-provide program that could be used to mitigate habitat impacts related to energy facilities. However, at this time, this program is not yet available. Should such a program become available in the future, the Applicant could use a payment-to-provide mitigation option with the approval of ODOE and ODFW.

4.2 Option 2: Western Rivers Conservancy, In-lieu Fee

Under this option, the Applicant would partner with Western Rivers Conservancy in land acquisition for the purpose of habitat protection and restoration. The Applicant would contribute funds to Western Rivers Conservancy that would be used to support the purchase of lands that would eventually be transferred to a government agency such as the Bureau of Land Management (BLM), or to a qualified non-governmental organization (NGO).

The subject parcel is a former ranch located along the Lower John Day River. The ranch is about 30,000 acres and is at risk of being subdivided into smaller parcels because the landowner plans to sell the property. The Applicant's contributions would support Western River Conservancy's purchase for the entire property and maintain this large continuous area as a single tract. The land would be eventually transferred to a government agency or a qualified NGO. Western Rivers Conservancy will hold the lands until this transfer occurs. During this interim period, Western River Conservancy would implement an interim management plan that precludes cattle grazing, limits public access to foot access only, and potentially includes removing structures.

This land acquisition deal is structured to preclude future mineral development. There are no executed mineral leases on the property, but Western Rivers Conservancy is aware of three outstanding mineral reservations. At part of its due diligence, Western River Conservancy will complete a third-party evaluation of mineral resources potential to assess the actual resources and feasibility for future mineral development. If this evaluation indicates a possibility of mineral development, then Western Rivers Conservancy will offer to purchase the mineral reservations or rights, and work with the government agency or NGO to expressly preclude mineral development in documents prepared for the land transfer. Based on this approach, the Applicant believes there is little chance of future mineral development that could affect the mitigation lands associated with the Facility.

The Western Rivers Conservancy mitigation option would benefit wintering deer, as robust riparian vegetation with a high diversity of woody shrub species along streams is an important component

² As used in this Plan, "life of the facility" means continuously until the Facility site is restored and the site certificate is terminated in accordance with Oregon Administrative Rules 345-027-0110.

of winter deer habitat (ODFW 2011). During severe winters, snow can cover annual grasses and native bunch grasses, so access to nutritious woody vegetation (i.e., shrubs) is essential to over-winter survival (ODFW 2011).

4.3 Option 3: Conservation Easement Lands Adjacent to the Facility

Under this option, the Applicant has identified parcels available for establishing conservation easements adjacent to the Facility and owned by participating landowners. The identified parcels include an area along Buck Hollow Creek that would allow for enhancement of riparian areas beneficial to fish and big game, and a larger area (the Maupin Opportunity Area) with grassland protection and enhancement opportunities beneficial to big game and grassland birds. If sufficient land is not available within these adjacent parcels, the Applicant will select other land that is suitable for meeting the mitigation area requirement consistent with this HMP.

As of May 2019, up to 1,000 acres of land along Buck Hollow Creek have been identified as available for conservation easement and enhancement. These parcels are contiguous with land managed by the Bureau of Land Management, providing an opportunity for integrated enhancement over a larger area. As described above under Option 2, robust riparian vegetation with a high diversity of woody shrub species along streams is an important component of deer winter habitat. The Oregon Mule Deer Initiative (ODFW 2011) identified these types of habitats as highly impacted compared to historical conditions, noting that riparian areas have been degraded and often lack quantity and diversity of shrub species. Therefore, enhancement of riparian habitat along Buck Hollow Creek would benefit wintering mule deer. Under this option, the Applicant may partner with a third-party for long-term enhancement and monitoring of the mitigation parcels.

An additional parcel option identified by ODFW for consideration by the Applicant in August 2019, the Maupin Opportunity Area, presents another potential mitigation opportunity (Figure 1). The property is proximate to the site boundary, provides ample potential acreage, and is composed of similar habitat types suitable for in-kind mitigation. A portion of the property is located immediately south of Bakeoven Road, near the westernmost section of the proposed transmission line. Habitat in this area was desktop delineated (as shown in Exhibit P Figure P-4) as primarily shrub-steppe and planted grassland habitat, with intermittent riparian, wetland, and developed areas. Much of the area shown in the figure was within the boundary of the 2018 Boxcar Fire. Areas to the north of Bakeoven Road were not impacted by this disturbance. Per ODFW (pers. comm., Jeremy Thompson, August 19, 2019), before the fire, the habitat with the Maupin Opportunity Area was similar to habitat within the site boundary; however, its condition following fire disturbance and a year of recovery time is unknown. Per ODFW, this area likely offers opportunities for upland and grassland habitat restoration, to mitigate for permanent and temporary impacts to grassland habitats due to the construction and operation of the Facility (Table 1). Enhancement of grassland habitat in this area would potentially improve forage quality for wintering mule deer and offer improved conditions for grassland bird species as well.

Per ODFW request (pers. comm., Jeremy Thompson, August 19, 2019), the Applicant has performed a desktop analysis of the remainder of the approximately 40,322-acre area. Using pre-fire imagery

via Google Earth, the Applicant confirmed that the property appears to be primarily a mix of upland grasslands (some appear to be planted), and a mosaic of shrublands and grasslands. Pre-fire, junipers were encroaching on these shrub-steppe habitats from lower-elevation draws and possible riparian areas, but the condition of these trees post-fire is unknown. If this option is pursued, the Applicant will continue to work with ODFW to identify opportunities to protect and enhance habitats in this area, and to define the appropriate monitoring of mitigation parcels.

4.3.1 Habitat Enhancement Actions

The Applicant or a third party will address habitat enhancement as described in this section. The objectives of habitat enhancement are to protect habitat within the mitigation area from degradation and to improve the habitat quality of the mitigation area. By achieving these objectives, the Applicant can address the permanent and temporary habitat impacts of the Facility and meet the ODFW goals of no net loss of habitat quantity or quality and a net benefit in habitat quantity or quality for impacts to Category 2 habitat. The Applicant may choose one or more of the following enhancement actions based on the needs of the selected habitat mitigation area to improved habitat conditions, as appropriate and feasible:

1. **Shrub Planting**. The Applicant would plant sagebrush shrubs in locations within the habitat mitigation area where existing sagebrush is stressed, or where recent wildfires have occurred. The Applicant would determine the size of the shrub-planting areas based on the professional judgment of a qualified biologist after a ground survey of actual conditions. The size of the shrub-planting areas will depend on the size of the available mitigation area and opportunity for survival of planted shrubs. The shrub survival rate at 4 years after planting is an indicator of successful enhancement of habitat quality to Category 2. The Applicant would complete the initial sagebrush planting within 1 year after the beginning of construction of the Facility, or a particular phase of the Facility. Supplementing existing, but disturbed, sagebrush areas with sagebrush seedlings would assist the restoration of this valuable shrub-steppe component. The Applicant would obtain shrubs from a qualified nursery, and would identify the area to be planted with sagebrush shrubs after consultation with ODFW, subject to final approval by ODOE. The Applicant would mark the planted sagebrush clusters at the time of planting for later monitoring purposes, and would keep a record of the number of shrubs planted.
2. **Weed Control**. The Applicant would implement a weed control program. Under the weed control program, the Applicant would monitor the mitigation area to locate weed infestations. The Applicant would continue weed control monitoring, as needed, for the life of the facility. As needed, the Applicant would use appropriate methods to control weeds. Weed control on the mitigation site will reduce the spread of noxious weeds within the habitat mitigation area and on any nearby grassland, Conservation Reserve Program or cultivated agricultural land. Weed control will promote the growth of desirable native vegetation and planted sagebrush. The Applicant may consider weeds to be successfully controlled when weed clusters have been eradicated or reduced to a non-competing level.

Weeds may be controlled with herbicides or hand-pulling. The Applicant would notify the landowner of the specific chemicals to be used on the site and when spraying will occur. To protect locations where young desirable forbs may be growing, spot-spraying may be used instead of total area spraying.

3. Seeding. The Applicant would plant an ODFW-approved seed mix within the habitat mitigation area in areas that have been recently disturbed (e.g., recent wildlife or weed treatment). The method for seed application would be determined primarily based on the size of the area to be seeded. The size of the seeded area will depend on the amount of recently disturbed area within the mitigation area. The Applicant would complete the initial seeding within 1 year after the beginning of construction of the Facility, or a particular phase of the Facility. The Applicant would record and mark the seeded areas at the time of seeding for later monitoring purposes.
4. Fire Control. The Applicant would implement a fire control plan for wildfire minimization when Facility staff are working within the mitigation area. The Applicant would provide a copy of the fire control plan to ODOE before starting habitat enhancement actions. The Applicant would include in the plan appropriate fire prevention measures, methods to detect fires that may occur and a protocol for fire response if a fire were to occur when Project staff were present. If any part of the mitigation area is damaged by future wildfire, the Applicant would assess the extent of the damage and implement appropriate actions to restore habitat quality in the damaged area.
5. Riparian Planting. The Applicant would plant appropriate riparian species along streams to enhance these riparian areas, if present, for the benefit of fish and big game. Riparian plantings will improve access to nutritious woody vegetation for wintering deer, which is essential to over-winter survival during severe winters when annual grasses and native bunchgrasses are covered in snow. Riparian plantings will improve shading of streams, which will improve temperature conditions for fish at the location of plantings, as well as downstream. Riparian plantings will also provide cover for big game and help stabilize soil.
6. Fence Building. The Applicant would build fencing around the riparian plantings to reduce grazing pressure and allow riparian vegetation to grow. Fencing would be designed to exclude cattle but not deer. Woody vegetation is used by deer for foraging in the winter and provides cover for insulation and hiding.
7. Juniper Removal. Where appropriate, the Applicant would remove encroaching juniper to increase the amount of sunlight, moisture, and nutrients available for shrubs and forbs used by mule deer.
8. Habitat Protection. The Applicant would restrict uses of the mitigation area that are inconsistent with the goals of no net loss of habitat quantity or quality and a net benefit in Category 2 habitat quantity or quality.

Table 3 outlines the anticipated costs and benefits of various enhancement actions, as well as the anticipated cost of operations and maintenance.

Table 3. Estimated Restoration Cost Per Unit and Benefit to Mule Deer Winter Range

Type	Action	Cost per Unit	Units	Benefit
Enhancement	Shrub Planting	\$136.95 ¹	Per acre	Provide access to nutritious woody vegetation during winter, especially severe winters when snow covers grass forage, in order to improve over-winter survival. Deer on winter ranges without a shrub component often have high rates of over-winter mortality (ODFW 2011).
	Biological, Chemical, or Mechanical Weed treatment	\$8.81 – \$257.73 ¹	Per acre	Reduce competition with desirable forage species to improve or maintain mule deer forage quality and quantity ⁴ . Impacts of invasive species on Oregon’s fish and wildlife resources are one of the seven most pressing conservation issues identified in the Oregon Conservation Strategy (ODFW 2016).
	Riparian Planting	\$1,220.60 ¹	Per acre	Provide access to nutritious woody vegetation during winter, especially severe winters when snow covers grass forage, in order to improve over-winter survival. Robust riparian vegetation with a high diversity of woody shrub species along streams are an important component of deer winter habitat (ODFW 2011).
	Juniper Removal	\$100 ²	Per acre	Increase the amount of sunlight, moisture, and nutrients available for shrubs and forbs used by mule deer (ODFW 2014). Shrubs are important where snow is deep during winter (ODFW 2016).
	Rangeland Broadcast/Drill Seeding	\$198.53 – \$293.48 ¹	Per acre	Establish desirable forage species in areas that have been disturbed (e.g., following high intensity fire, juniper treatments, or repeated weed treatments) and provide competition for weeds ⁴ . Perennial grasslands and sagebrush steppe are important habitat features of key deer winter range areas (ODFW 2016).
	Hydroseeding (of Critical Areas)	\$1,092.93 ¹	Per acre	
	Wildlife Exclusion Fence Building	\$5.03 ¹	Per foot	Reduce grazing pressure on important shrubs by improving cattle distribution, and enhance riparian areas which could then be used by mule deer as fawning habitat ⁴ . Woody vegetation (e.g., bitterbrush, aspen, alder, willow, oak) are used by deer for foraging in the winter, and provide cover for insulation and for hiding (ODFW 2016).

Type	Action	Cost per Unit	Units	Benefit
Operations	Annual Operation and Maintenance	\$33 ³	Per acre	N/A
<p>1. Based on the Fiscal Year 2019 Oregon Natural Resources Conservation Service Environmental Quality Incentives Program Practice Payment Rate Schedule (NRCS 2019).</p> <p>2. Based on Memorandum from ODFW to Avangrid Renewables dated December 14, 2016 describing ODFW Solar Development Mitigation Recommendations in Crook County (pers. comm. Greg Jackie, ODFW, December 14, 2016).</p> <p>3. This O&M cost is an estimate of the cost per acre per year (not including acquisition/easement costs) based on the research presented in the Independent Economic Analysis Board's 2007 Investigation of Wildlife O&M Costs. The average cost per acre presented in that document was \$24 in 2004 dollars, this has been adjusted to reflect 2019 dollars (IEAB 2007).</p>				

5.0 Monitoring

The monitoring needs for the mitigation area would vary depending on the mitigation option selected. For Option 1 (ODFW Payment-to-Provide) and Option 2 (Western River Conservancy), the third-party mitigation provider would be responsible for monitoring as needed, and the Applicant would have no obligations other than the upfront payment. For Option 3 (Conservation Easement), the Applicant will hire a qualified investigator (botanist, wildlife biologist, or revegetation specialist) to conduct a comprehensive monitoring program for the mitigation area, as appropriate. The purpose of this monitoring is to evaluate on an ongoing basis the protection of the habitat quality and the results of enhancement actions, especially during the winter and wildlife breeding seasons.

The investigator will monitor the habitat mitigation area for the life of the Facility beginning in the year following the initial planting. Monitoring will occur annually during the first 10 years following initial planting, then will occur every 3 years thereafter. The Applicant will identify appropriate monitoring actions for the Conservation Easement and the habitat enhancement actions that are implemented in consultation with ODOE and ODFW. Depending upon specific habitat enhancement actions implemented, the investigator may carry out the following monitoring procedures:

1. Assess vegetation cover (species, structural stage, etc.) and progress toward meeting the success criteria;
2. Record environmental factors (such as precipitation at the time of surveys and precipitation levels for the year);
3. Record any wildfire that occurs within the mitigation area and any remedial actions taken to restore habitat quality in the damaged area;
4. Assess the success of the weed control program and recommend remedial action, if needed; and
5. Assess the survival rate and growth of planted species.

The investigator will visit identified monitoring points within planted areas. Plantings will generally be considered successful if a 20 percent survival rate is achieved after 5 years. The investigator will report on the timing and extent of any livestock grazing that has occurred within the mitigation area since the previous monitoring visit.

6.0 Success Criteria

Mitigation of the permanent and temporal habitat impacts of the Facility may be considered successful if the Applicant protects and enhances sufficient habitat to meet the ODFW goals of no net loss of habitat quantity or quality and a net benefit in habitat quantity or quality for impacts to Category 2 habitat, or provides commensurate funding. The Applicant must ensure the protection of the required quantity and quality of habitat within the mitigation area for the life of the Facility, including providing commensurate funding for ODFW or a third party to do so.

The Applicant must protect a sufficient quantity of habitat to meet the mitigation area requirements based on the final design configuration of the Facility, or provide commensurate funding. The Applicant will determine the actual mitigation area requirements for the Facility, subject to ODOE approval, before beginning construction of each phase of the Facility. The Applicant, ODFW, or a third party may demonstrate improvement of habitat quality based on evidence of indicators such as survival of planted shrubs, natural recruitment of sagebrush, and successful weed control. However, much of the Category 2 habitat impacted by the Project was preliminarily identified as Category 3, 4, and 5 habitat based on vegetative characteristics such as presence of non-native species and was only designated as Category 2 habitat based on its value to wintering mule deer. As a result, habitat within the mitigation area will only need to be enhanced to the extent that it provides net benefit over the quality of habitat impacted by the Facility as it falls within ODFW-designated Mule Deer Winter Range. If the Applicant cannot demonstrate that the habitat mitigation area is trending toward the habitat quality goals described above within 5 years after the initial sagebrush planting, the Applicant would propose remedial action. ODOE may require supplemental planting or other corrective measures.

After the Applicant has demonstrated that the habitat quantity goals have been achieved, the investigator will verify, during subsequent monitoring visits, that the mitigation area continues to meet the ODFW “no net loss” and “net benefit” goals described above. The investigator will recommend remedial action if the habitat quality within the mitigation area falls below the habitat quantity goals listed above. ODOE may require supplemental planting, other corrective measures, and additional monitoring as necessary to ensure that the habitat quantity goals are achieved and maintained.

7.0 Amendment of the HMP

This HMP may be amended from time to time by agreement of the Applicant and the Oregon Energy Facility Siting Council (Council). Such amendments may be made without amendment of the site certificate. The Council authorizes ODOE to agree to amendments to this HMP. ODOE shall notify

the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of this HMP agreed to by ODOE.

8.0 References

- IEAB (Independent Economic Analysis Board). 2007. Investigation of Wildlife O&M Costs. Task Number 116. October 30, 2007. IEAB 2007-4.
- NRCS (Natural Resources Conservation Service). 2019. Environmental Quality Incentives Program (EQIP) payment schedule for Oregon.
<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/?cid=nrceprd1328259> Accessed January 2019.
- ODFW. 2011. Oregon Mule Deer Initiative. January 7, 2011. Available online at:
https://www.dfw.state.or.us/resources/hunting/big_game/mule_deer/docs/Mule_Deer_Mgmt_Plan_Final.pdf. Accessed February 2019.
- ODFW. 2013. ODFW Winter Range for Eastern Oregon. GIS dataset available online at: <https://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=885.xml>
- ODFW. 2014. Oregon Mule Deer Initiative 5 Year Summary 2010 – 2014. Available at:
https://www.dfw.state.or.us/resources/hunting/big_game/mule_deer/docs/Mule_Deer_Initiative_5_Year_Summary.pdf.
- ODFW. 2016. Oregon Conservation Strategy. Oregon Department of Fish and Wildlife, Salem, Oregon.

Figure

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Bakeoven Solar Project

Figure 1
Potential Mitigation Areas

WASCO COUNTY, OREGON

-  Proposed Site Boundary
-  Proposed Micrositing Corridor
-  Maupin Opportunity Area
-  Conservation Easement Lands*
-  Western Rivers Conservancy (John Day)*
-  River
-  Creek
- Basemap Features**
-  City/Town
-  US Highway
-  State Highway
-  Local Road
-  County Boundary

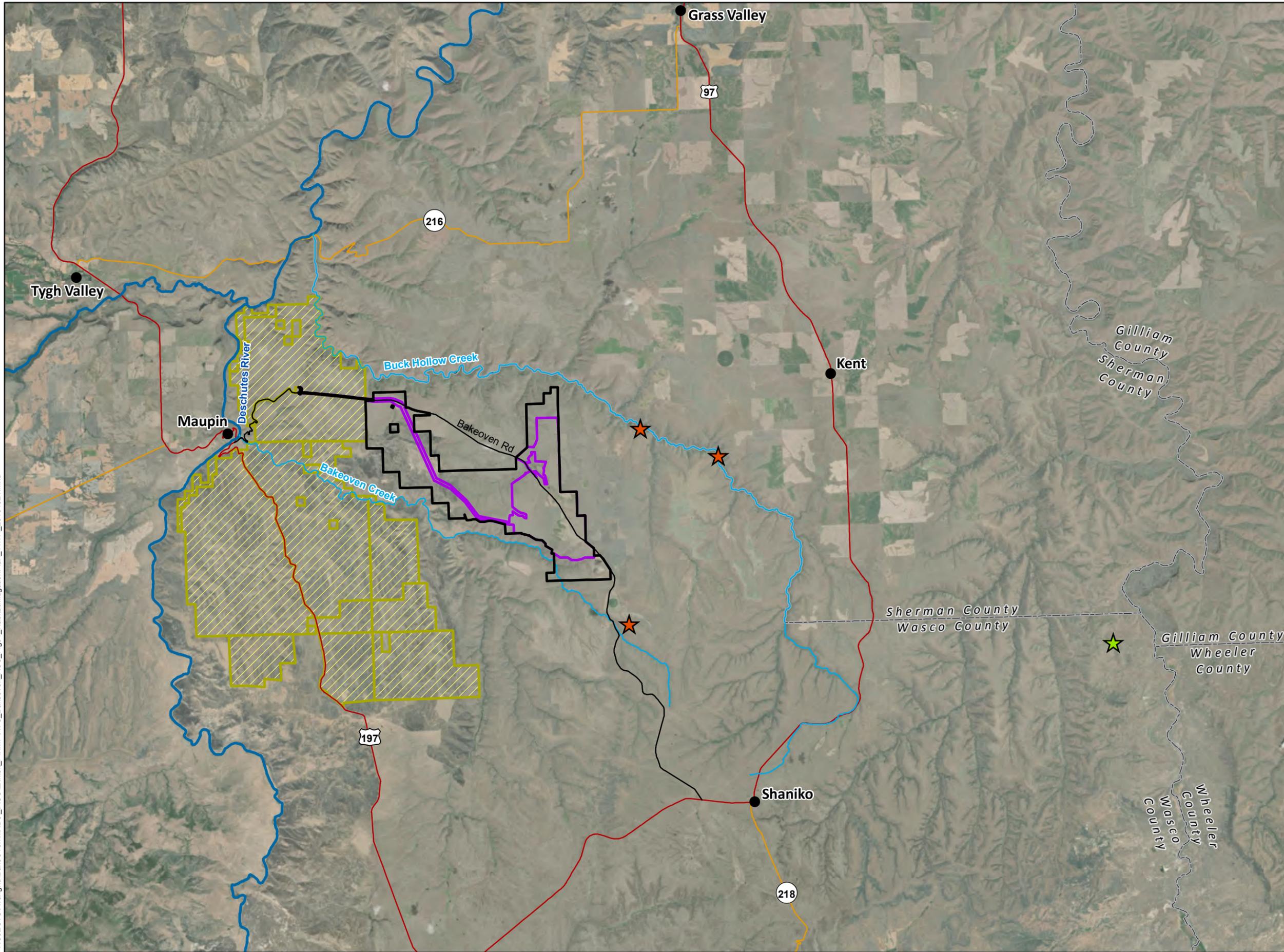
*Approximate locations. Exact locations to be determined.



Data Sources

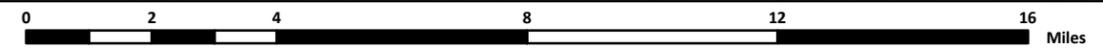
Avangrid-Project Infrastructure;
USDA-Aerial Imagery; Census Bureau-Tiger Roads

Reference Map



P:\GIS_PROJECTS\Avangrid\BakeOven\MXDs\ASC\Exhibit_P\HMP\AVG_Bakeoven_ASC_Fig01_HabitatMitigationPlan_111171_20191021.mxd

1:185,000 WGS 1984 UTM Zone 10N



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Attachment P-3. Draft Revegetation Plan

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Attachment P-3.

Revegetation Plan

**Bakeoven Solar Project
November 2019**

Prepared for



Avangrid Renewables, LLC

Prepared by



Tetra Tech, Inc.

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1.0 Introduction

This Revegetation Plan (Plan) describes methods, success criteria, and monitoring and reporting requirements for the restoration and revegetation of areas temporarily disturbed during the construction of the Bakeoven Solar Project (Facility). This Plan does not include areas occupied by permanent Facility components (i.e., the “footprint,” including the fenced solar arrays).¹ The objective of revegetation is to restore temporarily disturbed areas to pre-disturbance conditions. This Plan was developed in consultation with the Oregon Department of Fish and Wildlife (ODFW), the Oregon Department of Energy (ODOE), and the Wasco County Weed and Pest Division.

The Facility is in Wasco County, Oregon and is located on private land, the vast majority of which is primarily used for rangeland/grazing, with some limited areas used for cultivation of agricultural crops. Habitat mapping and categorization of the site were conducted for the Facility between 2011 and 2019. Details on habitat types, subtypes, and categories can be found in Exhibit P of the Facility’s Application for Site Certificate (ASC), especially Attachment P-1. Details on potential impacts to habitat and special-status species from construction and operation of the Facility, as well as avoidance and minimization measures, can be found in the ASC Exhibits P and Q.

2.0 Description of Temporary Facility Impacts

Construction of the Facility would result in approximately 178.4 acres of temporary impacts. Temporary impact areas are those areas that will be disturbed during construction activities, but which will not become permanent parts of the Facility. Temporary disturbance will occur in association with the improvement of existing roads, as well as during the construction of collector and transmission lines, new roads, staging areas, and fences. The intensity of the construction impact will vary: in some areas, the impact will be relatively light; but in other areas, heavy construction activity will remove all vegetation, remove topsoil, and compact the remaining subsoil. Some areas of temporary disturbance, such as staging areas, will be graveled during construction, and will be reclaimed by removing the gravel surface, regrading to match adjacent contours, and reseeding. The specific extent of each component’s temporary impact is detailed in ASC Exhibit C, and is described in terms of a total, worst-case scenario impact for the full duration of phased construction.

All temporary impact areas are outside the fenced solar arrays. This Plan addresses revegetation of these areas of temporary impact outside the fenced area that will be restored following construction. Within the fenced area, the Applicant intends to manage low-height native vegetation, as described in ASC Exhibit B.

¹ This Plan will be incorporated by reference in the site certificate for the Facility and must be understood in that context. It is not a “stand-alone” document.

3.0 Agency Consultation

The Applicant will consult with ODFW, ODOE, and the Wasco County Weed and Pest Division prior to construction to discuss the areas to be revegetated, habitat category and habitat subtype conditions, reference site location and conditions, topsoil restoration and revegetation methods, erosion and sediment control measures, and implementation schedule. Three months prior to commercial operation of each Facility phase², the Applicant will meet with ODFW, ODOE, and the Wasco County Weed and Pest Division to review the actual extent and conditions of temporarily impacted areas, to confirm the revegetation methods agreed to during pre-construction review are still appropriate, and to identify reference sites.

4.0 Revegetation Methods

Revegetation will begin as soon as feasible following completion of construction. The Applicant will restore temporarily disturbed areas by preparing the soil, followed by seeding using common application methods. The Applicant will seed all temporarily impacted grassland, shrub-steppe, and other Category 3, 4, and 5 wildlife habitat type-subtype areas (as detailed in Exhibit P of the ASC) that are not cropland or other developed lands. Agricultural lands will be restored at the landowner's direction.

4.1 Soil Preparation

Soil preparation will involve standard, commonly-used methods, and will take into account relevant site-specific factors, including slope, size of area, and erosion potential. In areas where soil is removed during construction, the topsoil will be stockpiled separately from the subsurface soils, where possible. The stockpiled topsoil will be put back in place prior to revegetation activities. The Applicant will use mulching and other appropriate practices to control erosion and sediment during revegetation work.

4.2 Seeding Methods

Following preparation of the soil, a seed mix will be applied. The Applicant will select the seed mix to apply to each area based on the pre-construction land use and in coordination with ODFW, ODOE, and Wasco County, as appropriate. Seed mixes will be obtained from a reputable supplier in compliance with the Oregon Department of Agriculture's Oregon Seed Laws. Seeding will be conducted based on ODFW and the Wasco County Weed and Pest Division recommendations, and in consultation with the seeding contractor. It will be implemented at the appropriate time of year to

² The Applicant proposes to begin construction as soon as June 2020, and to construct the Facility in phases. The size and construction schedule for each phase will be based on market demand, but the entire Facility, including all phases, will be completed by 2025 unless the Applicant seeks an amendment to extend the construction deadline.

facilitate seed germination. The Applicant will choose seeding methods based on site-specific factors such as slope, erosion potential, and the size of the area in need of revegetation. Two common seed application methods that may be used are described below.

4.2.1 Broadcasting

Broadcast seeding is the application of seed directly on the ground surface. This method may be chosen for areas with shallow and rocky soils, and the type of broadcast spreader would depend on the size of the area to be seeded and the terrain.

In this method, the seed mix would be applied at the specified application rates. Where feasible, half of the total mix would be applied in one direction and the second half of the mix would be applied in the direction perpendicular to the first half. A tracking dye may be added to facilitate uniform seed application. Immediately following seed application, certified weed-free straw would be applied at a rate of 2 tons per acre. Straw would be crimped into the ground to a depth of 2 inches using a crimping disc or similar device. As an alternative to crimping, a tackifier may be applied using hydroseed equipment at a rate of 100 pounds per acre. Prior to mixing the tackifier, the tank would be visually inspected for cleanliness. If remnants from previous applications exist, the tank would be washed. Broadcasting should not be used if winds exceed 5 miles per hour.

4.2.2 Drilling

Drill seeding would be used on areas of sufficient size with moderate or favorable terrain to accommodate mechanical equipment. This method, which is more successful in areas with deeper soils, provides the advantage of planting the seed at a uniform depth and may provide better soil to seed contact.

Using an agricultural or range seed drill, seeds would be sown at 70 percent of the recommended application rate to a depth of 0.25 inches; or as recommended by the seed supplier. Where feasible, half of the total mix would be applied in one direction and the second half of mix in the direction perpendicular to first half. If mulch has been previously applied, seed may be drilled through the mulch provided the drill can penetrate the straw resulting in seed-to-soil contact conducive for germination.

5.0 Noxious Weed Prevention and Control

The Applicant will implement weed prevention and control measure during construction and revegetation efforts, as described in the Noxious Weed Control Plan developed in coordination with the Wasco County Weed Department Supervisor (Avangrid 2019).

6.0 Revegetation Documentation

The Applicant will maintain documentation of significant revegetation work conducted at the Facility. Documentation will include the date that construction was completed in the area to be revegetated, a description of the affected area, the date revegetation work began, a description of the work implemented within the revegetation area, and supporting figures representing the location, acres affected, and pre-disturbance condition of the revegetation area. The Applicant will report revegetation activities to ODOE for the first 5 years after the completion of Facility construction. After 5 years, any revegetation actions will be described in the annual report, per Oregon Administrative Rules 345-026-0080(e).

7.0 Monitoring

7.1 Reference Sites

Nearby reference sites, approximating preconstruction conditions of the revegetation areas, will be selected as targets toward which revegetation will aim. Reference sites will be chosen to represent each of the ODFW Category 3, 4, and 5 habitat types (excluding cliffs, talus, and caves and open water). Land use patterns, soil types, terrain, and presence of noxious weeds will also be considered in selection of reference sites. Once reference sites are selected by the Applicant and approved by the ODOE and ODFW, the reference site shall remain in the same location unless approval for use of a different reference site is obtained by the ODOE and ODFW.

Once the reference sites are approved by the ODOE and ODFW, the Applicant will employ a qualified investigator (botanist or revegetation specialist) to monitor those sites to establish baseline conditions as they relate to the success criteria for revegetation efforts. Documentation of baseline conditions at reference sites shall occur prior to commencement of revegetation efforts. If land use changes, wildfires, or other disturbances occur between the time of selection and monitoring of baseline conditions such that a chosen reference site is no longer representative of target conditions, new reference sites may be chosen. Following the selection of a new reference site, an updated table and latitude/longitudinal data will be provided to ODOE within a 6-month revegetation record report or the annual compliance report, whichever report is submitted first.

7.2 Monitoring Procedures

Following implementation of revegetation efforts, the Applicant will monitor the revegetation areas as described in this section, unless the landowner has converted the area to a use inconsistent with the success criteria. The Applicant will submit its vegetation monitoring methodology to ODFW and ODOE for approval prior to assessing baseline conditions within reference sites and prior to the first annual monitoring of revegetation areas.

Revegetation areas will be monitored by a qualified investigator annually for 5 years, with the first monitoring period to occur the first growing season following initial seeding. Revegetation areas will be inspected to determine if the area is meeting and/or on track to meeting the success criteria as described in Section 7.3. The investigator will evaluate the following site conditions during annual monitoring:

- Extent of bare soil;
- Degree of erosion;
- Presence and abundance of noxious weeds;
- Vegetation density;
- Relative proportion of desirable vegetation (desirable vegetation includes those species included in the seed mix or native or native-like species, excluding noxious weeds); and
- Species diversity and structural stage of desirable vegetation.

Following annual monitoring, a monitoring report will be prepared and will include:

- The investigator's assessment of whether the revegetated areas are trending toward meeting the success criteria;
- Assessments of factors impacting the ability of the revegetated area to trend towards meeting the success criteria;
- Descriptions of appropriate weed control measures as recommended by ODOE, ODFW and the Wasco County Weed and Pest Division; and
- Recommendations of remedial actions, if any.

The Applicant will report the investigator's findings and recommendations regarding wildlife habitat recovery and revegetation success within 60 days of the inspector's investigation to ODOE and to ODFW.

7.3 Success Criteria

In each monitoring report, the Applicant will provide an assessment of revegetation success for revegetation areas. An area will be deemed successfully revegetated when its habitat quality is equal to or better than the habitat quality of the reference site as follows:

- Vegetation density is equal to or greater than that of the reference site;
- Relative proportion of desirable vegetation is equal to or greater than that of the reference site;
- Species diversity of desirable vegetation is equal to or greater than that of the reference site; and
- The presence and density of noxious weeds is equal to or less than that of the reference site.

When ODOE and ODFW finds that the condition of a revegetation area satisfies the criteria for revegetation success, ODOE and ODFW will conclude that the Applicant has met its restoration obligations for that area. If ODOE or ODFW finds that the landowner has converted a wildlife habitat area to a use that is inconsistent with these success criteria, ODOE and ODFW will conclude that the Applicant has no further obligation to restore the area.

7.4 Remedial Action

After each monitoring visit, the Applicant's qualified investigator will report to the Applicant regarding the revegetation progress of each revegetation area. The investigator, in consultation with ODOE, ODFW, the Wasco County Weed and Pest Division, and the revegetation contractor, will make recommendations to the Applicant for reseeding, weed control, or other remedial measures for areas that are not showing progress toward achieving revegetation success. The investigator will provide a description of factors that may be contributing to the lack of revegetation success. The ODOE may require reseeding, weed control, or other remedial measures in those areas that are not trending towards meeting the success criteria by Year 5.

If a revegetation area is damaged by wildfire during the first 5 years following initial seeding, the Applicant will work to restore the damaged area. The Applicant will continue to report on revegetation progress during the remainder of the 5-year period. The Applicant will report to ODOE and ODFW the area impacted by the fire (with a map or figure).

8.0 Amendment of the Plan

This Revegetation Plan may be amended from time to time by agreement of the Applicant and the Energy Facility Siting Council (Council). Such amendments may be made without amendment of the site certificate. The Council authorizes ODOE to agree to amendments to this plan. ODOE shall notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of this plan agreed to by ODOE.

9.0 References

Avangrid (Avangrid Renewables, LLC). 2019. Draft Noxious Weed Control Plan. Attachment P-5 to the final Application for Site Certificate. Submitted to the Oregon Department of Energy. November 2019.

Attachment P-4. Draft Wildlife Monitoring Plan

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Attachment P-4.

Draft Wildlife Monitoring Plan

**Bakeoven Solar Project
November 2019**

Prepared for



Avangrid Renewables, LLC

Prepared by



Tetra Tech, Inc.

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1.0 Introduction

Bakeoven Solar, LLC (Applicant) has prepared this Wildlife Monitoring Plan (WMP) for the Bakeoven Solar Project's (Facility) Application for Site Certificate (ASC). This WMP describes the post-construction fatality monitoring (PCFM) at the Facility, as recommended by the Oregon Department of Fish and Wildlife (ODFW) and in compliance with the Wasco County Land Use & Development Ordinance, Chapter 19.

Specifically, the goals of this WMP are as follows:

1. Describe the PCFM protocol that was designed to determine the estimated bird fatality rates at Phase 1 of the Facility during the first year of operation (and account for bat fatalities should detections occur); and
2. Describe how these data will be provided to ODFW to fill data gaps on solar facility-related wildlife fatalities in Oregon, to assist with recommendations for future projects.

2.0 Post-construction Fatality Monitoring

2.1 Purpose and Overview

This WMP has been developed to estimate Facility-related impacts to birds through direct mortality. The fundamental components of a PCFM study for a solar facility include standardized carcass searches to determine a raw carcass count, measurement of detection bias, and an estimation of project-specific annual fatality rates for target species groups. The WMP utilizes current, scientifically validated methods to estimate the number of bird fatalities adjusted for searcher efficiency, carcass persistence, and spatial and temporal sampling intensity, and has been informed by study design guidance from the U.S. Geological Survey and U.S. Fish and Wildlife Service (Huso et al. 2016a). The methods presented herein are focused on understanding the Facility's impacts to birds; however, the study protocol will be adaptively managed to include a bat fatality estimate if bat fatalities meet the minimum sample size criteria for fatality modelling (see Section 2.1.4).

2.1.1 Technical Approach

Solar facility-related fatality estimation derives from the number of carcasses found during searches conducted around the infrastructure of an operational solar facility. Because not all bird fatalities at a facility are found during carcass searches, the number of carcasses found is corrected by factors that account for carcasses that may have been missed during searches (sources of bias). Sources of bias include the imperfect ability of field technicians (searchers) to detect carcasses (searcher efficiency), the less than 100 percent probability that a carcass persists on site long

enough to be detected by field technicians (carcass persistence), and carcasses falling in areas that are unsearchable due to access, terrain, thick vegetation, or other factors (carcass distribution).

The WMP has been adapted to the specific characteristics of the Facility, as proposed in the ASC. The approach to PCFM presented here will be applied to Phase 1 of the Facility during the first year of operation. In order to maximize the effectiveness and efficiency of the WMP, this approach may be modified in response to the refinement of Phase 1's final design.

2.1.2 Standardized Carcass Searches

This section outlines the methods for conducting standardized carcass searches, which constitute the initial step in generating the fatality estimate. These data will be adjusted to account for detection bias (Section 2.1.4). Key metrics for standardized carcass searches are sampling duration, frequency, and spatial sampling.

2.1.2.1 Sampling Duration and Frequency

PCFM will be conducted at Phase 1 for 1 year starting at the beginning of the first season after the date of the Facility coming commercially online. Data will be collected on a seasonal basis to allow for assessment of potential seasonal patterns in bird fatality rates, scavenging activity, vegetation and light conditions, and other factors that may influence carcass persistence and searcher efficiency during the study. The monitoring period will be divided into the following seasons:

- Fall migration period (September 1 – October 31);
- Winter (November 1 – February 28/29);
- Spring migration period (March 1 – May 31); and
- Summer (June 1 – August 31).

Standardized carcass searches will be conducted biweekly (approximately once every 14 days) during the spring, summer, and fall to maximize, to the extent practicable, the likelihood that a carcass will be available to be found by field technicians. The frequency of carcass searches will decrease to once per month during winter.

2.1.2.2 Spatial Sampling and Approach

The percent coverage of the Facility and a representative random sample of the Facility's solar arrays (i.e., solar trackers) will influence the precision of the fatality estimate. To achieve a level of precision consistent with the goal of this study, which is generally consistent with the standard Tier 4 study described in the *Land-Based Wind Energy Guidelines* (USFWS 2012) and similar studies conducted at wind farms, the Applicant will randomly sample a percentage of Phase 1 according to the final MW output for Phase 1.

- 100 percent sampled if between 20 MW and 40 MW;
- 50 percent sampled if between 41 and 100 MW; and

- 35 percent sampled if greater than 100 MW.

Viewshed complexity (the ease or difficulty of locating a carcass based on the ground cover distribution and vegetation height) informs the sampling method used to locate carcasses around a facility. Based on the design of the solar arrays and the anticipated moderate complexity of the viewshed at the Facility, within-array transect sampling will be utilized for standardized carcass searches (Table 1). Examples of transect sampling methods are presented in Figure 1. Within-array sampling (Figure 1b) will be conducted within sample units. Sampling units are comprised of a group of four solar arrays for this study (Figure 2). The number and distribution of sample units included in the study will be determined by the finalized MWs of Phase 1 (see bullets above). Figure 2 represents an example sample unit only; neither the number nor distribution of sample units for the facility are depicted. The sample unit size will be modified as needed should solar array spacing, viewshed complexity, or other applicable factors change (Table 1). Because both the layout of the solar arrays and the landscape at a typical photovoltaic solar facility tend to be relatively homogenous, a simple random or systematic sampling design will be utilized.

Table 1. Viewshed Complexity and Approximate Visible Distances of Fatalities

Viewshed Complexity	Habitat Characteristics	Visible Distance (Meters)	Sampling Method
Low	Bare or nearly bare ground, fine gravel cover. Greater than 90% bare ground with vegetation heights below 30 cm.	Small birds: 50-100	Along-array ¹
		Large birds: up to 140	
Moderate	Moderate vegetation cover, moderate rock and cobble cover. Greater than 90% bare ground with vegetation heights 31 to over 46 cm, or 0 to 25% bare ground with vegetation height less than 15 cm.	Small birds: 15-50	Within-array ²
		Large birds: 50-120	
High	Dense vegetation cover, heavy rock and cobble cover. Less than 90% bare ground with vegetation heights greater than 16 cm.	Small birds: 5-15	Within-array ²
		Large birds: 20-50	
1. See Figure 1a. Not applicable to this Facility based on anticipated viewshed complexity, but presented for comparison. 2. See Figure 1b.			

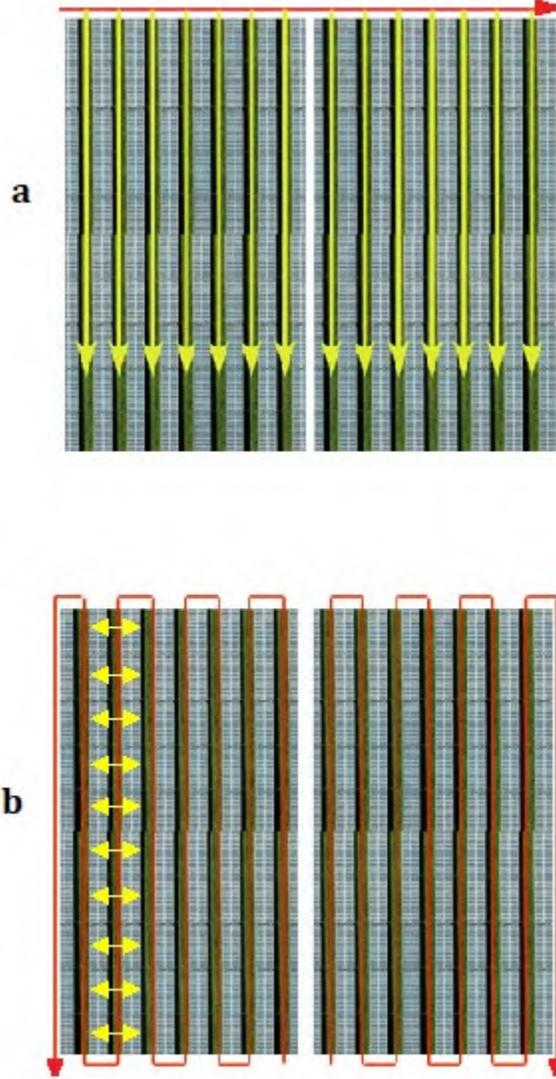


Figure 1. Example of Transect Sampling

(a) along array distance sampling; (b) within-array sampling. Red lines represent walking transect, yellow lines represent distance sampling viewshed. Not to scale for Facility.

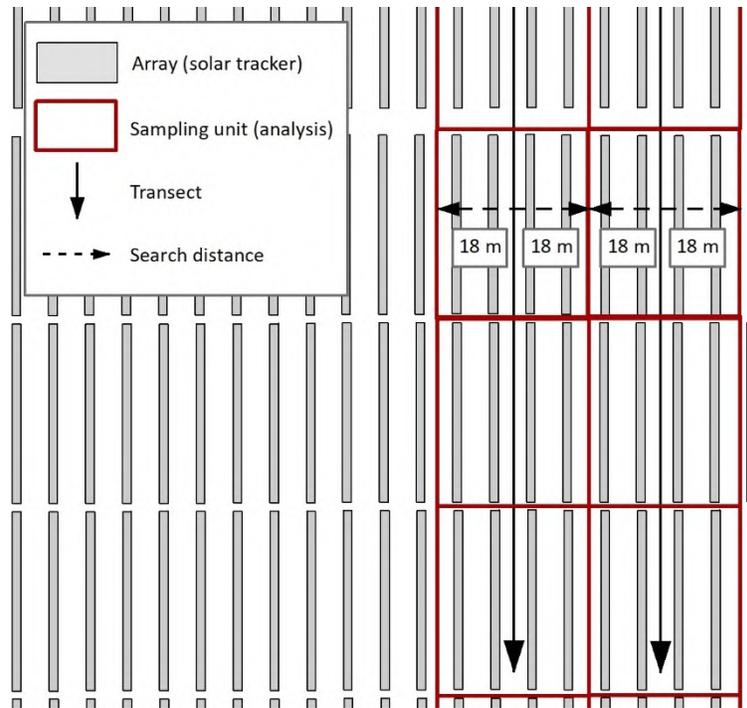


Figure 2. Example of Within-Array Transect Sampling

(Sample units, travel route, and search distance at the Facility)

The Applicant anticipates that the viewshed complexity at the Facility is moderate, and will conduct transect sampling within the solar array based on this assumption. Transects will be utilized for fatality monitoring within each sample unit, with the total distance of transects dependent upon the total MW of the Facility and the percent of solar arrays sampled. Searchers will walk down designated rows between tracker racks (arrays), scanning the area for fatalities directly ahead and underneath the panels to the immediate right and left of the searcher (Figure 1). While the actual number and final specification of arrays are subject to change during final design, the Applicant presents this example of transect travel routes, search distances, and sampling units according to the sample specifications presented in Exhibits B and C. Per these specifications, the distance from the transect line to the edge of the sampling unit, encompassing two tracker racks (arrays) and the space between these racks, is approximately 18 meters to the left and 18 meters to the right. In an area of moderate viewshed complexity, this visibility distance should allow for the location of small birds, per Table 1. Searchers will travel down each sampled row a single time during a survey to provide a uniform search effort throughout the sampled arrays. Final transect travel routes will be determined on final arrangement of solar array.

Standardized carcass searches will be performed by field technicians trained in the field methods and data collection protocols outlined in this WMP. A one-time clearance search will be conducted prior to the first scheduled search of sampled arrays. The purpose of the clearance search is to clear the survey area of any carcasses that may be present. The clearance survey is necessary to ensure that any carcasses detected after the clearance search represent fatalities that occurred during a

preceding interval of known length. The clearance survey will be scheduled to ensure that the interval between the clearance survey and the first standardized carcass search is the same for all sampling units. Carcasses detected during the clearance search will be documented (see Section 2.1.2.3); but will be considered incidental to the study and not included in the fatality estimate because the time interval in which they occurred will be unknown.

2.1.2.3 Fatality Detection Criteria

To develop a site-specific fatality estimate, the applicant will make the conservative assumption that all fatalities detected within the Facility were a result of the Facility unless the fatality was clearly attributable to a non-facility cause.

Standard Fatality Detections

Detections from standardized carcass searches will inform the fatality estimate for the Facility, thus it is important that they are recorded and evaluated properly (See Section 2.1.2.4). Any injured bird, bird carcass, partial bird carcass, or feather spot that is discovered during the course of standardized carcass searches is considered a detection. Thus, detections represent evidence of an avian fatality.

Feather Spots

In order for a feather spot to be considered a detection, it must consist of three or more primary flight feathers, five or more tail feathers, or 10 or more feathers of any type concentrated together in an area 3 meters square or smaller (Smallwood 2007), without any bone, beak, or significant amounts of flesh or skin. A feather spot meeting these criteria is considered a detection, and assumed likely evidence of an avian fatality. A feather spot detection found during standardized carcass searches will be included in the fatality estimation process, assuming the detection meets all other criteria for inclusion in fatality estimation.

Incidental Fatality Detections

Once PCFM begins, all subsequent detections that occur incidentally to the standardized post-construction monitoring program will be classified as “incidental detections.” Incidental detections will be documented using procedures similar to the ones used for specimens discovered during the standardized carcass searches, and the records will be integrated for summary reporting and evaluation purposes.

Incidental detections fall into two categories, which determine how they are treated in fatality estimation. Both are based on where they are found and the timing in which they are found:

- **Within Searched Areas:** Incidental detections that occur in areas sampled during standardized carcass searches, but found at a time when searches are not occurring (e.g., found during carcass persistence setup), can conservatively be included in analysis.

- **Outside of Searched Areas:** Incidental detections that occur in areas not sampled during standardized carcass searches are processed as other detections, but always excluded from analysis.

Because bat detections are expected to be rare at the Facility, should a bat fatality be detected, it will be recorded as an incidental detection regardless of timing or location. The Applicant anticipates that detections over the course of 1 year are unlikely to meet minimum sample size for a reliable fatality estimate (Section 2.1.4).

2.1.2.4 Fatality Documentation

Digital photographs will be taken to document all detections in situ. When possible, likely cause of death will be indicated on data sheets based on evidence from the carcass and proximity to Facility infrastructure. Detections in the form of feather spots will be classified as a “F”; searchers will make their best attempt to classify feather spots by bird size according to the sizes or identifying features of the feathers.

All detections will be assigned to a size class, a taxonomic family and an ecological guild, to the extent possible. Detections not identifiable to species (e.g., unidentified sparrow) will be recorded to the lowest taxonomic group possible. When possible, a detection will be identified to size even if it cannot be identified to a species or group (e.g., unidentified small bird).

To ensure accurate documentation of the detection locations, the searcher will record the unique identifier of the sample unit, GPS coordinates (in latitude/longitude) of the carcass location, and a measurement of the distance from the detection location to the end of the solar array where the carcass was detected.

2.1.3 Bias Correction

The objective of the bias correction trials is to develop seasonal, Facility-specific measures of searcher efficiency and carcass persistence. Searcher efficiency trials estimate the probability that a searcher will detect a carcass, assuming it is available to be found. The ability of searchers to detect carcasses is influenced by several factors, including vegetation within the search area, characteristics of individual carcasses (e.g., body size, color, condition), and the skill of an individual searcher in finding the carcasses. Carcass persistence trials document the length of time carcasses persist in the search area, and thus are available to be found by field technicians. Carcasses may be removed from the search area due to scavenging or other means (e.g., due to forces such as wind and rain, agricultural activity, or decomposition beyond recognition), thereby rendering carcasses undetectable. To reduce the number of carcasses introduced on site, minimizing the risk of attracting potential scavengers, searcher efficiency and carcass persistence trials may be combined by utilizing the same carcass to measure both sources of bias in any given season.

2.1.3.1 Searcher Efficiency

Searcher efficiency trials will be conducted each season to help assess and adjust for potential temporal bias in the detection of fatalities among arrays (e.g., searcher experience, environmental conditions, etc.). If variable ground conditions exist, resulting in multiple viewshed complexity classes, trial carcasses will be placed in each viewshed complexity class to account for potential bias based on vegetation height. Searcher efficiency trials will be repeated seasonally (winter, spring, summer, and fall) and trials will be organized so that all search personnel are tested. Based on preliminary guidance for solar monitoring (Huso et. al 2016a), a minimum of 25 carcass samples per small size class, and 10 for large, will be used at the Facility per season. A bias trial coordinator will place the trial specimens in randomly generated locations within the sampling units. With direction from the bias coordinator, searchers will recover any specimens missed within the sampling unit upon completion of the search.

The carcasses that will be used for trials will be representative of the species likely to be encountered as fatalities in the area of the Facility to the extent possible. Trial species may include the house sparrow (*Passer domesticus*) and juvenile coturnix quail (*Coturnix coturnix*) for small birds; the hen mallard (*Anas platyrhynchos*), and ring-necked pheasant (*Phasianus colchicus*) to represent large birds; or other species obtainable from commercial sources that meet carcass requirements.

All trial specimens will be inconspicuously marked (e.g., with a piece of black electrical tape wrapped around one leg), in a manner that allows the surveyor to readily distinguish trial specimens from new fatalities, but without rendering the specimen unnaturally conspicuous (Smallwood 2007, USFWS 2012). To ensure a degree of “natural” placement, carcasses need to be represented by placing them between rows of panels, under panels, near I-beams supporting the panels, or in the open. Therefore, carcasses will be tossed towards the designated, randomly chosen placement spot from a distance of 2 to 4 meters. Documentation of each location will include GPS coordinates, notes about the substrate and carcass placement, and a digital photo of the placement location.

Searchers will have one opportunity to discover placed specimens. Once documentation of discovered/missed carcasses occurs, trial carcasses may be kept in place and used for carcass persistence trials (see below).

Data from the searcher efficiency trials will be used to derive estimates of searcher efficiency for each size class. Data will be modelled as the probability that a carcass is found during the first search after its arrival, adjusted by the opportunity for searcher efficiency change over time (Dalthorp et al. 2018). To determine the predictor variables (s) that may influence searcher efficiency (e.g., season), corrected Akaike Information Criterion (AICc) values will be used to determine model selection. Generally, the model with the lowest AICc value will be used to best explain the variance in searcher efficiency; searcher efficiency estimates generated from this model will be used in the calculation of fatality rates.

2.1.3.2 *Carcass Persistence*

Carcass persistence trials will be conducted each season to help assess and adjust for potential temporal bias in the degree that carcasses persist on the landscape. To quantify carcass persistence, a minimum of 15 small and 10 large carcasses will be placed each season (25 trials per season, 100 total per year). Carcasses will be randomly placed within the solar arrays, and monitored for 30 days, or until the carcass has deteriorated to a point where it would no longer qualify as a detection (i.e., the carcass is absent or has deteriorated into a feather spot that does not meet the detection criteria). A minimum of 25 percent of the carcasses in the solar arrays will be monitored using motion-triggered, digital game cameras, and carcasses without game cameras will be visited on days 1, 2, 3, 4, 5, 7, 14, 21, and 30. Periodic ground-based checking of carcasses with game cameras will occur to guard against misleading indicators of carcass removal, such as wind blowing the carcass out of the camera's field of view, or scavengers moving (but not removing) carcasses; trials with game cameras will be checked on a 7 to 10 day basis. Carcass-persistence specimens will be distributed across the entire Phase 1 Facility, not just in areas subject to standard surveys.

Trial specimens will be comprised legally obtained species such as house sparrows, rock pigeons, European starlings, ring-necked pheasants and/or chukars. To the extent possible, trial specimens will be selected to best represent the size and coloration of the range of species expected to be found based on available regional data. Trial specimens will include only intact, fresh (i.e., estimated to be no more than 1 or 2 days old and not noticeably desiccated) bird carcasses frozen immediately following death. Species composition of trial specimens will be similar to those used for searcher efficiency.

All trial carcasses will be handled with latex gloves, and handling time will be minimized. All trial specimens will be inconspicuously marked (e.g., with fingernail polish on the bill and legs) to distinguish them from both unmarked fatalities and searcher efficiency trial specimens. Trial placements will be spaced throughout each season so that trials are dropped on at least two distinct dates, separate by at least 2 weeks. Random trial locations will be selected prior to placements, each season. To simulate the random positioning of carcasses, trials will be tossed towards the designated, randomly chosen placement spot from approximately 2 to 4 meters. Documentation of each location will include GPS coordinates, notes about the substrate and carcass placement, and a digital photo of the placement location (if not a game camera trial).

For each on-foot trial check, it is necessary to record the date, time, disposition of the carcass, and any potential scavengers, if known. The carcass disposition will be classified into one of the following categories:

- **Intact:** Whole and un-scavenged other than by insects;
- **Scavenged/Depredated:** Carcass present, but incomplete, dismembered, or flesh removed;
- **Feather Spot:** Carcass scavenged and removed, but sufficient feathers remain to qualify as a fatality, as defined above; or

- **Removed:** Not enough remains to be considered a fatality during standard surveys, as defined above.

Trials using a game camera will have their photos examined at the end of the trial. Photo review will focus on identifying the date of scavenging events, the date at which the carcass was last available, and the date at which the carcass was first observed to be removed. Data from on foot checks and game camera photos will be used to estimate carcass persistence.

Data from the carcass persistence trials will be used to derive estimates of the probability that a carcass remains in the interval between searches (probability of persistence), and therefore available to be re-located by field technicians. Data will be modelled by size class using a survival analysis which will utilize censored exponential, Weibull, lognormal, or loglogistic survival models fit by maximum likelihood estimation. Model selection will be based on the corrected AICc. Carcass persistence results will be used to adjust carcasses detected for persistence bias, and a median point estimate of the length of time a carcass persists on site will be estimated for each size class.

2.1.3.3 Carcass Distribution

Because mortality at a PV facility is unlikely to be caused by a centralized feature in a particular location, and solar collectors and reflectors at PV facilities are typically uniform, the distribution of the carcasses is anticipated to be an isotropic random process (Huso et al. 2016a). Therefore, systematic sampling by transect is expected to adequately sample the anticipated carcass distribution. Carcasses may fall in areas that are unsearchable due to access, terrain, thick vegetation, or other factors. Any areas within the sampled arrays that qualify as unsearchable will be mapped and excluded from the proportion of the area sampled.

2.1.4 Data Analysis and Fatality Estimation

The data collected during the monitoring period will be used to estimate annual fatality rates for birds. Fatality rate estimates will consider:

- The search interval;
- The number of carcasses detected during standardized carcass searches within the monitoring period where the cause of death is assumed to be the operation of the Facility;
- Carcass persistence expressed as the probability that a carcass remains in the study area (persists) and is available for detection by the field technicians during persistence trials;
- Searcher efficiency expressed as the probability that a trial carcass is found by field technicians during searcher efficiency trials; and
- The proportion of the carcass distribution searched at the Facility.

There are a variety of statistical estimators that take into account these factors, each relying on different underlying assumptions. Both the study design and resulting data can affect whether the study adheres to these underlying assumptions, and fatality estimators become inherently unstable

if the number of detections in a stratum (e.g., avian size class, bats) are small (Korner-Nievergelt et al. 2011, Huso et al. 2016b). When few detections are found in a particular stratum, the estimate can suffer from bias, which makes results difficult to interpret. Thus, it is recommended that no estimate, regardless of estimator used, is provided for any stratum with fewer than five detections.

Publicly available data from facilities California (WEST 2014) suggest that bat fatalities are uncommonly detected during PCFM at PV solar facilities. Based on the relatively low use of the Facility by bats as documented in ABR (2011), and anticipated minimal impacts to bat species as discussed in Exhibit P of the ASC, bat fatalities at the Facility are also anticipated to be rare. However, should five or more detections of bat fatalities occur during the monitoring year, thereby meeting the minimum sample size criteria for fatality modelling, the estimation of fatality rates for the Facility will be adaptively managed for the inclusion of bats.

Adjusted annual fatality rates will be estimated and will be expressed as the fatality per unit area (i.e., acres and MW) per year, and overall per year with a 90 percent confidence interval calculated using a bootstrap method.

2.2 Reporting

The Applicant will document the results of PCFM in a summary report following the completion of the monitoring year. The summary report will include the following:

- Tabular and/or graphical summaries of fatalities by size class, season, and habitat/viewshed complexity class (if needed);
- A map showing the location of all fatalities encountered during the study;
- Summaries of searcher efficiency trials;
- Summaries of carcass persistence trials;
- A summary of the fatalities included in the analysis;
- Estimates of total fatalities annually and by season for each size class, all birds, and any taxa/species groups of interest and that meet minimum sample size criteria for fatality modelling; and
- Estimates of annual fatality rates per acre and per MW.

The Applicant will submit this report to ODFW and the Oregon Department of Energy to assist with recommendations for future projects.

3.0 Amendment of the WMP

This WMP may be amended from time to time by agreement of the Applicant and the Oregon Energy Facility Siting Council (Council). Such amendments may be made without amendment of the site certificate. The Council authorizes ODOE to agree to amendments to this WMP. ODOE shall

notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of this WMP agreed to by ODOE.

4.0 References

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Attachment P-5. Draft Noxious Weed Control Plan

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Attachment P-5.

Draft Noxious Weed Control Plan

**Bakeoven Solar Project
November 2019**

Prepared for



Avangrid Renewables, LLC

Prepared by



Tetra Tech, Inc.

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Appendix A. 2008 Wasco County Noxious Weed List

Appendix B. 2019 Oregon Department of Agriculture Noxious Weed List

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1.0 Introduction

Bakeoven Solar, LLC (Applicant), a subsidiary of Avangrid Renewables, LLC, is seeking to construct and operate the Bakeoven Solar Project (Facility) in southern Wasco County, near Maupin, Oregon. Oregon Administrative Rule (OAR) 660-033-0130 (38)(h)(D) states, in regard to photovoltaic solar power generation facilities, that:

“Construction or maintenance activities will not result in the unabated introduction or spread of noxious weeds and other undesirable weed species. This provision may be satisfied by the submittal and county approval of a weed control plan prepared by an adequately qualified individual that includes a long-term maintenance agreement. The approved plan shall be attached to the decision as a condition of approval.”

This Draft Noxious Weed Control Plan (Plan) was prepared to comply with OAR 660-033-0130 (38)(h)(D) and describes the noxious weed control measures that will be implemented during construction and operation of the Facility. Noxious weed control practices for the Facility described in this plan have been developed in coordination with the Wasco County Weed Department Supervisor.

1.1 Background

The measures described in this Plan are designed to minimize the introduction of new noxious weed species and to control existing populations of target noxious weeds (as defined below). Treatment of target noxious weeds will specifically focus on areas within and adjacent to the Facility fence line, along new Facility roads, and along the transmission line (cumulatively referred to as treatment areas hereafter). If it is determined that noxious weeds have invaded areas adjacent to the treatment areas as a result of construction, the Applicant will contact the landowner and seek approval to treat those noxious weed populations. In addition, new noxious weeds detected during post-construction restoration will be considered a result of construction activities and shall be controlled and treated accordingly.

Designated noxious weeds are those invasive weed species that are of elevated economic or environmental concern to the State of Oregon or local jurisdictions, and receive priority during management planning and operations. In Wasco County (County), control of noxious weeds is overseen by the Wasco County Weed and Pest Department. Currently, the County lists 45 species of noxious weeds, which are designated as “A,” “B,” “C,” or “Q” Pests (Wasco County Weed Department 2008; Appendix A). “A” listed noxious weeds occur in the County in small enough infestations to “make eradication practical”; “B” listed pests are “subject to intensive control or eradication, where feasible”; “C” listed pests are those that are more widely spread and “control of these weeds will be limited by conditions that warrant special attention”; and “Q” listed pests are weeds that “are to be monitored and subject to control if they begin to appear threatening” (Wasco County Weed Department 2008).

In addition to the County noxious weed list, the Wasco County Weed and Pest Department also defers to the state noxious weed list developed by the Oregon Department of Agriculture (ODA) (Wasco County Weed Department 2019). The ODA lists 45 Class A noxious weed species and 92 Class B noxious weed species (ODA 2019; Appendix B). “A” listed weeds are those which occur in the state in small enough infestations to make eradication or containment possible and eradication or intensive control of these species is recommended wherever they are found. “B” listed weeds are weeds of economic importance that are regionally abundant, but which may have limited distribution in some counties and intensive control at the state, county, or regional level as determined on a site-specific, case-by-case basis. The ODA also designates select weeds from either the “A” or “B” list as “T” designated weeds. “T” designated weeds are priority noxious weeds that the ODA has targeted for prevention and control.

1.2 Target Noxious Weed Species

For the purposes of this Plan, target noxious weeds include County-listed “A” and “B” noxious weed species and ODA-listed “A” and “T” noxious weed species (see Appendices A and B). Based on botanical surveys conducted in 2018 (Tetra Tech 2018), three target noxious weed species were observed within the Facility micro-siting corridor¹ (Table 1). Although these three species will specifically be targeted for control, if other ODA-listed “A” or “T” noxious weeds or County-listed “A” and “B” noxious weeds are observed in the treatment areas, they will also be treated.

Table 1. Target Noxious Weeds Located within the Facility Micro-siting Corridor

Scientific Name	Common Name	ODA Status	County Status
<i>Centaurea diffusa</i>	Diffuse knapweed	B	B ^{1/}
<i>Cirsium arvense</i>	Canada thistle	B	B/C ^{2/}
<i>Lepidium latifolium</i>	Perennial pepperweed	B, T	C

1/ Per the County Weed List, the Bakeoven/Maupin area is a knapweed control zone and control efforts are mandatory under ORS 569.355 and 569.360. The entire Facility lies within the knapweed control zone.

2/ Canada thistle is listed as “B” pest outside Forest and a “C” pest inside Forest. The Facility lies outside the forest; therefore, this species is considered a “B” listed weed within the Facility.

2.0 Noxious Weed Control

The Applicant’s primary objective is to prevent the introduction of new noxious weed populations and the spread of existing target noxious weed populations. Early detection and management of small populations of noxious weeds before they can expand into larger populations is extremely important for successful control efforts. If within the treatment areas, existing populations of diffuse knapweed (*Centaurea diffusa*), Canada thistle (*Cirsium arvense*), and perennial pepperweed (*Lepidium latifolium*;) will be prevented from growing in size and density at the one to two

¹ The micro-siting corridor is where solar arrays and all other related and supporting facilities may be located; see Exhibit P of the Facility’s Application for Site Certificate.

locations they were documented during surveys, and will be prevented from spreading to new sites.

Long-term weed control will be accomplished through the seeding of perennial grasses known to compete well with noxious weeds, such as thickspike wheatgrass (*Elymus lanceolatus*) and Sherman big bluegrass (*Poa secunda*). The Applicant intends to manage low-height native vegetation inside the fenced area. Seeding will occur between October 1 and February 1 (the preferred seeding dates specified by the Oregon Department of Transportation for construction east of the Cascades²).

Short-term weed control will be through herbicide use (as discussed in Section 2.2.1) or mechanical methods (as discussed in Section 2.2.2). However, it will be important to ensure that short-term herbicide use does not affect establishment of the perennial grass cover that will provide the long-term control. Supplemental seeding may be needed on a case-by-case basis. Subsequent fertilizer application will be limited in areas treated for target noxious weeds, and the timing of the seeding will need to be coordinated with any herbicide applications.

2.1 Preventative Methods

The Applicant will implement best management practices during Facility construction and operation to help prevent the invasion and spread of noxious weeds onsite. These may include the following:

- Monitoring areas of temporary and permanent disturbance for noxious weeds after construction, during the normal course of revegetation maintenance of temporary work spaces, and implementing control measures appropriately (as described below);
- Providing information regarding target noxious weed species at the operations and maintenance building;
- Including noxious weed prevention and control measures, such as Facility inspection and documentation, in operations plans;
- Inspecting and documenting all temporary ground-disturbing operations in noxious weed-infested areas per the Facility Revegetation Plan (Attachment P-3 to Exhibit P);
- Cleaning vehicles and equipment before entry into revegetation areas to help minimize introduction of noxious weed seeds;
- Preventing conditions that favor noxious weed establishment by revegetating temporarily disturbed areas as soon as possible and appropriate following construction (as described above);

² Oregon Department of Transportation. Oregon Standard Specification for Construction 2018. Section 01030.43(b)

- Revegetating the site with appropriate, locally collected native seed or native plants; when these are not available, non-invasive and non-persistent non-native species may be used (as described above); and
- Inspecting and certifying that the seed and straw mulch used for site rehabilitation are free of weed seed and propagules.

2.2 Treatment Methods

Treatment of target noxious weeds will differ, depending on the disturbed area, the proximity to biologically sensitive areas, size of infestation, and the specific noxious weed being controlled. Control of noxious weeds will be either through the use of herbicides or mechanical methods.

2.2.1 Herbicide Treatment

The specific herbicide used and the timing of application will be chosen based on the specific noxious weed being treated, as appropriate herbicides differ between species and types of plants (i.e., dicots versus monocots). Recommended treatment methods, as well as the recommended timing of treatments for the three target noxious weeds identified within the Facility micro-siting corridor, are summarized in Table 2.

Table 2. Recommended Treatment for Target Noxious Weed Species

Scientific Name	Common Name	Recommended Treatment	Treatment Timing
<i>Centaurea diffusa</i>	Diffuse knapweed	Spot application of post-emergent, species-specific herbicide.	Once per year in the spring.
<i>Cirsium arvense</i>	Canada thistle	Spot application of post-emergent, species-specific herbicide.	Once per year in the spring.
<i>Lepidium latifolium</i>	Perennial pepperweed	Spot application of post-emergent, species-specific herbicide.	Once in the fall in first year of treatment; then once per year in the spring.

Only herbicides approved by the U.S. Environmental Protection Agency and ODA will be applied and appropriate best management practices will be implemented during application. Herbicides will be applied with a spreader sticker surfactant (e.g., Dynamic Green Concepts, Phase).

2.2.2 Mechanical Treatment

Mechanical control methods rely on removal of plants, seed heads, and/or cutting roots with a shovel or other hand tools or equipment that can be used to remove, mow, or disc noxious weed populations. Hand removal of plants is also included under this treatment method. Mechanical methods are useful for smaller, isolated populations of noxious weeds or in areas of sensitive habitats. Additionally, hand removal of small infestations can minimize soil disturbance, allowing desirable species to remain and limiting conditions favorable for noxious weeds. Some rhizomatous plants can spread by discing or tillage; therefore, implementation of discing will be species specific.

If such a method is used in areas to be revegetated, subsequent seeding will be conducted to re-establish desirable vegetative cover that will stabilize the soils and slow the potential re-invasion of noxious weeds.

3.0 Monitoring

During the construction phases of the Facility, construction staff will conduct periodic monitoring of target noxious weeds within and adjacent to the treatment areas. Any signs of new target noxious weed growth, or of re-growth in treated areas, will be addressed promptly with further herbicide or mechanical treatments or other best management practices.

Following construction, monitoring for target noxious weeds will be conducted annually for the first 3 years to assess weed growth and to inform noxious weed control measures. Noxious weed monitoring will consist of a site survey, conducted during the growing season, to identify noxious weed species that have established within and adjacent to the treatment areas, as well as inspections of treated areas to assess the success of previous noxious weed treatments.

The initial monitoring survey will be scheduled slightly before herbicide application, as applicable, to identify any noxious weed species within the areas to be treated, with a focus on target noxious weed species observed prior to construction (Table 1), or other populations of target noxious weeds not previously observed in these areas.

The results of the site survey will be summarized in a monitoring report that details all noxious weed species observed, identifies treatment protocols for target noxious weed species, and describes the location of target noxious weed species identified. Subsequent monitoring will assess the success of noxious weed treatments and will document any new target noxious weed infestations observed. These results will be summarized in short memorandums that describe the treatment success or failure, make recommendations to improve treatment success (if necessary), and note any new target noxious weed species or emergence. If the Applicant contracts with the County Weed Department Supervisor to perform weed control at the Facility, then no monitoring report will be provided except for a statement that the County performed the work.

The Applicant will maintain ongoing communication with individual landowners and the County regarding noxious weeds within the Facility micro-siting corridor. Landowners may also contact the Applicant to report the presence of noxious weeds. The Applicant will control the reported noxious weeds on a case-by-case basis, and will include a summary of actions taken for that incident in the memorandum.

4.0 Weed Department Supervisor Review

Merle Keys, Weed Department Supervisor, provided input during the development of this Plan. Mr. Keys will be provided with a copy of this Plan for review in November 2019. This Plan will be updated, as necessary, based on comments from Mr. Keys.

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5.0 References

- ODA (Oregon Department of Agriculture). 2019. Noxious Weed Policy and Classification System. Noxious Weed Control Program. Salem, OR. Accessed October 2019:
<https://www.oregon.gov/ODA/shared/Documents/Publications/Weeds/NoxiousWeedPolicyClassification.pdf>.
- Tetra Tech (Tetra Tech, Inc.). 2018. Botanical Survey Report Bakeoven Energy Project. Prepared for Avangrid Renewables. July 2018.
- Wasco County Weed Department. 2008. Weed List and Classifications. Available online at:
https://www.co.wasco.or.us/document_center/Public%20Works/wdlist08.pdf. Accessed October 2019.
- Wasco County Weed Department. 2019. Personal communication between Tetra Tech, Inc. (on behalf of Avangrid Renewables, LLC) and Merle Keys, Wasco County Weed Department Supervisor. Via phone October 30, 2019.

Appendix A. 2008 Wasco County Noxious Weed List

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MERLE A. KEYS, Superintendent

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WEED LIST AND CLASSIFICATIONS

A PESTS

Dyers Woad
Houndstongue
Kudzu
Leafy Spurge
Meadow Knapweed
Mediterranean Sage
Musk Thistle
Purple Loosestrife
Spotted Knapweed
Tansy Ragwort
Western Water
Hemlock
Yellow Flag Iris

B PESTS

Canada Thistle (outside Forest)
Dalmation Toadflax
Diffuse Knapweed*
Kochia
Russian Knapweed
Rush Skeletonweed
Scotch Broom
Whitetop
Yellow Starthistle
(outside lower 15-Mile)

C PESTS

Buffalobur
California Spikeweed
Canada Thistle (inside Forest)
Dogbane
Field Bindweed
Goatgrass
Horned-head Buttercup
Horsetail Rush
Jimsonweed
Knapweed Complex
Perennial Pepperweed
Perennial Sowthistle
Poison Hemlock
Puncturevine
Quackgrass
Russian Thistle
St. Johnswort
Sandbur
Showy Milkweed
Spiney Cocklebur
Wild Oats
Yellow Starthistle
(Inside 15-Mile)

Q PESTS

Common Mullein
Horseweed

* Within Bakoeven / Maupin area is a knapweed control zone. Control efforts are mandatory under ORS 570.510 and 570.515.

A Pests:

A weed of known economic importance known to occur in the county in small enough infestations to make eradication practical.

B Pests:

A weed of known economic importance and of limited distribution within the county and is subject to intensive control or eradication, where feasible, at the county level.

C Pests:

A weed that also has economic importance but is more widely spread. Control of these weeds will be limited by conditions that warrant special attention.

Q Pests:

A weed that exists in the county, but is of little, no, or undetermined economic importance. However, they are to be monitored and subject to control if they begin to appear threatening.

**Appendix B. 2019 Oregon Department of Agriculture Noxious
Weed List**

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Noxious Weed Control Classification Definitions

Noxious weeds, for the purpose of this system, shall be listed as either A or B, and may also be designated as T, which are priority targets for control, as directed by the Oregon State Weed Board.

- **A Listed Weed:**

A weed of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent (Table I).

Recommended action: Infestations are subject to eradication or intensive control when and where found.

- **B Listed Weed:**

A weed of economic importance which is regionally abundant, but which may have limited distribution in some counties (Table II).

Recommended action: Limited to intensive control at the state, county or regional level as determined on a site specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.

- **T-Designated Weed (T):**

A designated group of weed species that are selected and will be the focus for prevention and control by the Noxious Weed Control Program. Action against these weeds will receive priority. T-designated noxious weeds are determined by the Oregon State Weed Board and directs ODA to develop and implement a statewide management plan. T-designated noxious weeds are species selected from either the A or B list.

Weed Biological Control

Oregon implements biological control, or “biocontrol” as part of its integrated pest management approach to managing noxious weeds. This is the practice of using host-specific natural enemies such as insects or pathogens to control noxious weeds. The Oregon Department of Agriculture Noxious Weed Program has adopted the International Code of Best Practices for biological control of weeds. Only safe, effective, and federally- approved natural enemies will be used for biocontrol.

Table I: A Listed Weeds

Common Name	Scientific Name
African rue (T)	<i>Peganum harmala</i>
Camelthorn	<i>Alhagi pseudalhagi</i>
Cape-ivy (T)	<i>Delairea odorata</i>
Coltsfoot	<i>Tussilago farfara</i>
Common frogbit	<i>Hydrocharis morsus-ranae</i>
Cordgrass	
Common	<i>Spartina anglica</i>
Dense-flowered (T)	<i>Spartina densiflora</i>
Saltmeadow (T)	<i>Spartina patens</i>
Smooth (T)	<i>Spartina alterniflora</i>
Delta arrowhead (T)	<i>Sagittaria platyphyla</i>
European water chestnut	<i>Trapa natans</i>
Flowering rush (T)	<i>Butomus umbellatus</i>
Garden yellow loosestrife (T)	<i>Lysimachia vulgaris</i>
Giant hogweed (T)	<i>Heracleum mantegazzianum</i>
Goatgrass	
Barbed (T)	<i>Aegilops triuncialis</i>
Ovate	<i>Aegilops ovata</i>
Goatsrue (T)	<i>Galega officinalis</i>
Hawkweed	
King-devil	<i>Hieracium piloselloides</i>
Mouse-ear (T)	<i>Hieracium pilosella</i>
Orange (T)	<i>Hieracium aurantiacum</i>
Yellow (T)	<i>Hieracium floribundum</i>
Hoary alyssum (T)	<i>Berteroa incana</i>
Hydrilla	<i>Hydrilla verticillata</i>
Japanese dodder	<i>Cuscuta japonica</i>
Kudzu (T)	<i>Pueraria lobata</i>
Matgrass (T)	<i>Nardus stricta</i>
Oblong spurge (T)	<i>Euphorbia oblongata</i>
Paterson's curse (T)	<i>Echium plantagineum</i>
Purple nutsedge	<i>Cyperus rotundus</i>
Ravennagrass (T)	<i>Saccharum ravennae</i>
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Squarrose knapweed (T)	<i>Centaurea virgata</i>

(T) T-Designated Weed (See page 4)

(Continued)

Table I: A Listed Weeds

Common Name	Scientific Name
Starthistle Iberian (T) Purple (T)	<i>Centaurea iberica</i> <i>Centaurea calcitrapa</i>
Syrian bean-caper	<i>Zygophyllum fabago</i>
Thistle Plumeless (T) Smooth distaff Taurian (T) Wetted (curly plumeless) (T) Woolly distaff (T)	<i>Carduus acanthoides</i> <i>Carthamus baeticus</i> <i>Onopordum tauricum</i> <i>Carduus crispus</i> <i>Carthamus lanatus</i>
Water soldiers	<i>Stratiotes aloides</i>
West Indian spongeplant	<i>Limnobium laevigatum</i>
White bryonia	<i>Bryonia alba</i>
Yellow floating heart (T)	<i>Nymphoides peltata</i>
Yellowtuft (T)	<i>Alyssum murale, A. corsicum</i>

(T) T-Designated Weed (See page 4)

Table II: B Listed Weeds

Common Name	Scientific Name
Armenian (Himalayan) blackberry	<i>Rubus armeniacus</i> (<i>R. procerus</i> , <i>R. discolor</i>)
Biddy-biddy	<i>Acaena novae-zelandiae</i>
Broom French* Portuguese (T) Scotch* Spanish	<i>Genista monspessulana</i> <i>Cytisus striatus</i> <i>Cytisus scoparius</i> <i>Spartium junceum</i>
Buffalobur	<i>Solanum rostratum</i>
Butterfly bush	<i>Buddleja davidii</i> (<i>B. variabilis</i>)
Common bugloss (T)	<i>Anchusa officinalis</i>
Common crupina	<i>Crupina vulgaris</i>
Common reed	<i>Phragmites australis</i> ssp. <i>australis</i>
Creeping yellow cress	<i>Rorippa sylvestris</i>
Cutleaf teasel	<i>Dipsacus laciniatus</i>
Dodder Smoothseed alfalfa Five-angled Bigseed	<i>Cuscuta approximata</i> <i>Cuscuta pentagona</i> <i>Cuscuta indecora</i>
Dyer's woad	<i>Isatis tinctoria</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
False brome	<i>Brachypodium sylvaticum</i>
Field bindweed*	<i>Convolvulus arvensis</i>
Garlic mustard (T)	<i>Alliaria petiolata</i>
Geranium Herb Robert Shiny leaf	<i>Geranium robertianum</i> <i>Geranium lucidum</i>
Gorse* (T)	<i>Ulex europaeus</i>
Halogeton	<i>Halogeton glomeratus</i>
Houndstongue	<i>Cynoglossum officinale</i>
Indigo bush	<i>Amorpha fruticosa</i>
Ivy Atlantic English	<i>Hedera hibernica</i> <i>Hedera helix</i>
Johnsongrass	<i>Sorghum halepense</i>

* Biocontrol (See page 4)

(T) T-Designated Weed (See page 4)

(Continued)

Table II: B Listed Weeds

Common Name	Scientific Name
Jointed goatgrass	<i>Aegilops cylindrica</i>
Jubata grass	<i>Cortaderia jubata</i>
Knapweed Diffuse* Meadow* Russian* Spotted* (T)	<i>Centaurea diffusa</i> <i>Centaurea pratensis</i> <i>Acroptilon repens</i> <i>Centaurea stoebe (C. maculosa)</i>
Knotweed Bohemian Giant Himalayan Japanese	<i>Fallopia x bohemica</i> <i>Fallopia sachalinensis (Polygonum)</i> <i>Polygonum polystachyum</i> <i>Fallopia japonica (Polygonum)</i>
Kochia	<i>Kochia scoparia</i>
Lesser celandine	<i>Ranunculus ficaria</i>
Meadow hawkweed (T)	<i>Pilosella caespitosum (Hieracium)</i>
Mediterranean sage*	<i>Salvia aethiopsis</i>
Medusahead rye	<i>Taeniatherum caput-medusae</i>
Old man's beard	<i>Clematis vitalba</i>
Parrot feather	<i>Myriophyllum aquaticum</i>
Perennial peavine	<i>Lathyrus latifolius</i>
Perennial pepperweed (T)	<i>Lepidium latifolium</i>
Pheasant's eye	<i>Adonis aestivalis</i>
Poison hemlock*	<i>Conium maculatum</i>
Policeman's helmet	<i>Impatiens glandulifera</i>
Puncturevine*	<i>Tribulus terrestris</i>
Purple loosestrife*	<i>Lythrum salicaria</i>
Ragweed	<i>Ambrosia artemisiifolia</i>
Ribbongrass (T)	<i>Phalaris arundinacea var. Picta</i>
Rush skeletonweed* (T)	<i>Chondrilla juncea</i>
Saltcedar* (T)	<i>Tamarix ramosissima</i>
Small broomrape	<i>Orbanche minor</i>
South American waterweed	<i>Egeria densa (Elodea)</i>
Spanish heath	<i>Erica lusitanica</i>
Spikeweed	<i>Hemizonia pungens</i>

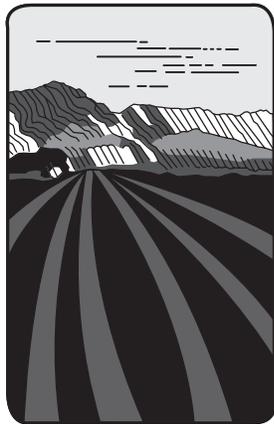
*Biocontrol (See page 4)

(T) T-Designated Weed (See page 4)

(Continued)

Table II: B Listed Weeds

Common Name	Scientific Name
Spiny cocklebur	<i>Xanthium spinosum</i>
Spurge laurel	<i>Daphne laureola</i>
Spurge Leafy* (T) Myrtle	<i>Euphorbia esula</i> <i>Euphorbia myrsinites</i>
St. Johnswort*	<i>Hypericum perforatum</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Swainsonpea	<i>Sphaerophysa salsula</i>
Tansy ragwort* (T)	<i>Senecio jacobaea (Jacobaea vulgaris)</i>
Thistle Bull* Canada* Italian Milk* Musk* Scotch Slender-flowered*	<i>Cirsium vulgare</i> <i>Cirsium arvense</i> <i>Carduus pycnocephalus</i> <i>Silybum marianum</i> <i>Carduus nutans</i> <i>Onopordum acanthium</i> <i>Carduus tenuiflorus</i>
Toadflax Dalmatian* (T) Yellow*	<i>Linaria dalmatica</i> <i>Linaria vulgaris</i>
Tree of heaven	<i>Ailanthus altissima</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Ventenata grass	<i>Ventenata dubia</i>
Primrose Willow Large-flower (T) Water primrose (T) Floating (T)	<i>Ludwigia grandiflora</i> <i>Ludwigia hexapetala</i> <i>Ludwigia peploides</i>
Whitetop	
Hairy	<i>Lepidium pubescens</i>
Lens-podded	<i>Lepidium chalepensis</i>
Whitetop (hoary cress)	<i>Lepidium draba</i>
Yellow archangel	<i>Lamiastrum galeobdolon</i>
Yellow flag iris	<i>Iris pseudacorus</i>
Yellow nutsedge	<i>Cyperus esculentus</i>
Yellow starthistle*	<i>Centaurea solstitialis</i>
*Biocontrol (See page 4)	(T) T-Designated Weed (See page 4)



Oregon

Department
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2/2019

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