# Preliminary Application for Site Certificate for the Muddy Creek Energy Park

# Exhibit G. Fish and Wildlife Habitat

**Submitted to the**
**Oregon Energy Facility Siting Council**

**Prepared for**
**Muddy Creek Energy Facility LLC**

**Prepared by**

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# Acronyms and Abbreviations

| Acronym/Abbreviation | Definition |
|---|---|
| Applicant | Muddy Creek Energy Park, LLC |
| ASC | Application for Site Certificate |
| EFSC | Oregon Energy Facility Siting Council |
| Facility | Muddy Creek Energy Park |
| NOI | Notice of Intent |
| O&M | operations and maintenance |
| OAR | Oregon Administrative Rules |
| ODOE | Oregon Department of Energy |
| ODFW | Oregon Department of Fish and Wildlife |
| PGE | Portland General Electric |
| USFWS | U.S. Fish and Wildlife Service |

# 1.0 Introduction

Muddy Creek Energy Park, LLC (Applicant) seeks to develop the Muddy Creek Energy Park (Facility), consisting of a 150-megawatt (MW) solar energy generation facility, a 150-MW battery energy storage system (BESS) project, and related or supporting facilities on approximately 1,590 acres of private land in Linn County, Oregon. This Application for Site Certificate (ASC) demonstrates that the proposed Facility will be designed, constructed, and operated consistent with the relevant Oregon Energy Facility Siting Council (EFSC) siting criteria and standards. In addition to meeting the minimum required EFSC criteria, the Applicant proposes to design, construct, and operate the Facility using agrivoltaics. Agrivoltaics co-locates the Facility with active farm operations to retain agricultural production and minimize agricultural impacts within the Facility Site Boundary.

The information contained herein supports the Facility's demonstration of compliance with the Fish and Wildlife Habitat approval standard for Oregon Administrative Rules (OAR) 345-022-0060.

# 2.0 Analysis Area

The Analysis Area for fish and wildlife habitat is the Site Boundary plus a 5-mile buffer. While the typical Analysis Area for fish and wildlife habitat is a 0.5-mile buffer on the Site Boundary, as defined by OAR 345-001-0010(35)(c), the Proposed Order for the Facility defines the Analysis Area for the Facility as a 5-mile buffer. Specifically, the Project Order defines the Analysis Area for fish and wildlife as the area within and extending 0.5 mile from the Site Boundary, except that the desktop analysis for fish and wildlife habitat shall extend 5 miles from the Site Boundary. The fish and wildlife habitat Analysis Area is shown on Figure G-1. A portion of the Site Boundary is designated as the solar array area, where solar arrays and all other related and supporting facilities may be located. The Applicant performed field surveys within the Site Boundary, while desktop analysis was used to understand the area within the Site Boundary and the 5-mile buffer (Figure G-1, Attachment G-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 U.S. Fish and Wildlife Service (USFWS), as summarized below:

- Met with ODFW and USFWS staff via video call on April 12, 2023, to discuss survey methods. ODFW concurred with the survey methods, including timing and extent of surveys.
- Met with ODFW staff at the Facility on July 31, 2023, to discuss habitat mapping and special status species.

- Met with ODFW and USFWS staff via video call on October 10, 2023, to discuss habitat mapping, mitigation options for Facility habitat impacts, and avoidance and minimization measures for special status species.
- Met with USFWS staff via video call on October 31, 2023 and February 1, 2024 to discuss streaked horned lark habitat impacts and avoidance and minimization measures.
- Met with ODFW staff in person and via video call on February 11, 2026 to provide a project update and habitat categorization.
- Met with USFWS and ODFW staff in person and via video call on March 12, 2026 to provide a project update and discuss streaked horned lark habitat impacts and avoidance and minimization measures.
- Met with ODFW staff via video call on April 30, 2026, to discuss streaked horned lark mitigation, in collaboration with the American Bird Conservancy (ABC).

# 4.0 Description of Biological and Botanical Surveys – OAR 345-022-0060(3)(a)

*(3) To assist the Council in determining whether the standard outlined in (1) through (2) has been met, the Applicant must submit information about the fish and wildlife habitat and the fish and wildlife species, other than the species addressed in OAR-022-0070(3) (the Threatened and Endangered Species Exhibit) that could be affected by the proposed facility, providing evidence to support a finding by the Council as required by this rule. The applicant must 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;*

## 4.1 Information Review

Prior to conducting field surveys in 2023, the Applicant conducted a desktop review to identify special status fish and wildlife species that had the potential to occur in the vicinity of the Facility, 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 G-1; OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2023a, Sullivan et al. 2009, USFWS 2020, USFWS 2021, USFWS 2022, USFWS 2023a, USFWS 2023b, Wildlife Explorer 2023). The Applicant reviewed habitat and range information for special status fish and wildlife species known or predicted to occur within 5 miles of the Facility. Species were eliminated from consideration if their habitat was absent from the Facility vicinity, or their range did not overlap with the Facility; but were included if they have the potential for vagrancy at the Facility.

The Applicant identified special status plants species with the potential to occur at the Facility based on known occurrences recorded by herbaria and other sources (USFWS 2023a, USFWS

2023b, ODA 2023a, ODA 2023b, ORBIC 2019, ORBIC 2023a, ORBIC 2023b, OregonFlora 2023). 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 5 miles of the Facility (ORBIC 2023a). The Applicant also reviewed aerial photographs, National Wetlands Inventory data, the National Hydrography Dataset, and west side big game range spatial data to preliminarily identify ODFW habitats within the Analysis Area (ODFW 2017, StreamNet 2023, USFWS 2022, USFWS 2023c, USGS 2023).

## 4.2 Field Surveys

The Applicant conducted field surveys within the Site Boundary in May, June, July, and August of 2023, March 2024, and December 2025. ODFW and USFWS staff provided concurrence on the scope, timing, and extent of these surveys prior to the field deployments. Table G-1 summarizes surveys conducted and Figure G-2 shows the areas surveyed.

**Table G-1. Summary of Field Surveys Conducted at the Facility**

| Survey | Survey Timing | Reference | Extent |
|---|---|---|---|
| Habitat categorization surveys | March, May, June, August, December | Attachment G-1 | Site Boundary |
| Special status plant species surveys | May-August | | Site Boundary |
| Special status wildlife species surveys | March-August | | Site Boundary |
| Raptor nest surveys | May-June | | Site Boundary and 0.5-mile buffer |
| Wetlands and waters surveys | December, March, April, May, July | Exhibit O, Attachment O-1 | Site Boundary |

### *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 2017; USDA-NASS 2022). The Applicant conducted wildlife habitat surveys within the Site Boundary in May, June, July, and August 2023, March 2024, and December 2025 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, subtype, and habitat quality category guided by the draft habitat categorization table in Attachment G-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, with the exception of wetlands and other waters which do not have a minimum mapping unit.

Surveyors walked meandering transects within non-cultivated land inside the Site Boundary, scanning the landscape and mapping habitats within the Site Boundary. Areas of cultivated land that were delineated in the desktop analysis were field-verified and crops were identified to species. This was primarily done by driving paved roads and gravel roads and walking along field margins. These low-quality habitat areas were also traversed on foot to verify extent and wildlife use if not fully visible from the perimeter, 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 other waters data. Habitat types and categories were not assigned to wetlands and other waters in the field; they were derived from data collected during wetlands and other waters surveys where available, following the habitat categorization field effort.

Outside of the Site Boundary, but inside the Analysis Area, habitats were categorized based on desktop analysis. Data from National Wetlands Inventory and National Hydrography Dataset were incorporated into desktop-delineated habitat within the Analysis Area (USFWS 2023c, USGS 2023). 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 are shown in Figure G-2. For the complete survey methods employed, see Attachment G-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 May, June, July, and August 2023 and March 2024. Surveyors walked meandering transects within non-cultivated land inside the Site Boundary, focusing on areas likely to support special status wildlife species. Cultivated land and developed areas were surveyed primarily from field vehicles and walking along field margins, 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 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 Raptor Nest Survey*

Raptor nest surveys were conducted during two mobilizations in May and June 2023, and incidental observations of raptor nests were collected during general wildlife and wetland surveys. Surveyors systematically searched raptor nest habitat within the Site Boundary and surrounding 0.5-mile by vehicle and on foot. Nesting substrate within the Site Boundary was investigated from public and private roads and on foot. Property outside the Site Boundary but within the 0.5-mile buffer was searched by scanning suitable nesting habitat from public roads and the Oak Grove Rest Area on Interstate 5, or from the edge of the Site Boundary. Periodic stops were made to scan suitable habitat (e.g., trees, utility towers, power poles) and examine nests with the aid of binoculars. To determine the status of a nest, biologists made observations on the behavior of adults, presence of young, signs of nest building, or whitewash. Biologists also documented American crow (*Corvus brachyrhynchos*) and common raven (*Corvus corax*) nests if encountered. Although not raptors, American crow and common raven nests were recorded during the surveys because they are stick nests that could be used by nesting raptors during subsequent breeding seasons. Following field surveys, the digitized data were downloaded and processed in a GIS program and were reviewed for quality control and assurance.

### *4.2.4 Special Status Plant Species Surveys*

The Applicant conducted botanical field surveys within the Site Boundary in May, June, and August, 2023 and May 2024. Special status plant species with the potential to occur within the Analysis Area are discussed in Exhibit H.

# 5.0 Identification of Habitat – OAR 345-022-0060(3)(b)(c)

> *(b) Identification of all fish and wildlife habitat in the analysis area, classified by the general fish and wildlife habitat categories as set forth in OAR 635-415-0025 and the sage-grouse specific habitats described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through 635-140-0025 (core, low density, and general habitats), and a description of the characteristics and condition of that habitat in the analysis area, including a table of the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and subtype;*
>
> *(c) A map showing the locations of the habitat identified in (b);*

The ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0015) provides a framework for assigning one of six category types to habitats based on the relative importance of these habitats to fish and wildlife species. The definition of each category type, as well as example of each category type within the Analysis Area, is shown in Table G-1.

**Table G-2. ODFW Habitat Categorization**

| ODFW Habitat Category | Definition[1] | Examples of ODFW Habitat Categories within Analysis Area |
|---|---|---|
| 1 | Irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population or unique assemblage. | N/A |
| 2 | Essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage. | Emergent Wetlands; Forested Wetlands; Shrub-scrub Wetlands; Westside Riparian; Perennial Steams |
| 3 | Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population. | N/A |
| 4 | Important habitat for fish and wildlife species. | Emergent Wetlands; Westside Lowlands Conifer-Hardwood Forest; Orchards, Vineyards, Grass Seed Fields, Other Row Crops |
| 5 | Habitat for fish and wildlife having high potential to become either essential or important habitat. | N/A |
| 6 | Habitat that has low potential to become essential or important habitat for fish and wildlife. | Urban and Mixed Environs |
| 1. Source: OAR 635-415-0025. | | |

Table G-2 describes habitat categories, types, and subtypes found within the Analysis Area. During field surveys, the Applicant identified habitat that met the definitions for Category 2, 4, and 6 habitats (Attachment G-1). The presence of a particular habitat category within the Analysis Area does not indicate that this habitat will necessarily be impacted by the Facility. Per ODFW's recommendation in their comments on the NOI, the Applicant mapped areas of grass seed cropland as Category 4 habitat due to their importance for grassland-associated birds in the Willamette Valley such as the streaked horned lark. The Applicant also mapped wetlands and waters as Category 2 per ODFW recommendation in their comments on the NOI due to their essential and limited presence in the Willamette Valley ecoregion, except for converted agricultural wetlands, which were considered Category 4 consistent with ODFW's guidance regarding grass seed cropland. Table G-2 describes the vegetation and other characteristics of each habitat type and category field-mapped within the Analysis Area; however, as described above, areas mapped as grass seed cropland were ultimately determined to be Category 4, and delineated wetlands and other waters outside of these fields were determined to be Category 2 per ODFW recommendation.

**Table G-3. Field-Mapped Habitat Types and Categories within the Analysis Area**

| Habitat Type | Habitat Subtype | Category 1 | Category 2 | Category 3 | Category 4 | Category 5 | Category 6 |
|---|---|---|---|---|---|---|---|
| West Side Big Game Year-Round Peripheral Habitat Overlay applies to all habitat subtypes except for developed areas (i.e., Urban and Mixed Environs) | | N/A | N/A | N/A | **West Side Big Game Year-Round Peripheral Habitat** | N/A | N/A |
| Open Water—Lakes, Rivers, Streams | **Perennial**<br>Streams mapped as having permanent (year-round) flow | N/A | *Fish-bearing natural stream channels that support native 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 stream channels that support native 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;**<br>**OR**<br>**non-fish-bearing stream channels which drain into fish-bearing streams based on StreamNet data.** | **Non-fish-bearing stream channels that do not directly drain into fish-bearing streams.** | N/A | N/A |
| Wetlands | **Emergent Wetlands**<br>Emergent wetlands with herbaceous vegetation | *Any bog, fen, or functional vernal pool.* | *High quality habitat, dominated by native species.* | **Mixture of native and non-native plant species and low to moderate disturbance.** | **Farmed or moderately to highly disturbed wetlands; mixture of native and non-native plant species; provides seasonal wildlife habitat.** | **Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.** | N/A |
| | **Scrub-shrub Wetlands**<br>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 moderately to highly disturbed wetlands; mixture of native and non-native plant species; provides seasonal wildlife habitat.** | *Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species.* | N/A |
| | **Forested Wetlands**<br>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.** | N/A | N/A | N/A |
| Riparian Forest and Natural Shrubland Complexes | **Westside Riparian**<br>Streamside deciduous broadleaf shrubland, woodland or forest | N/A | *High quality, diverse riparian areas that are not degraded and are associated with fish-bearing streams.* | **Typical mid-seral riparian that provides wildlife habitat; mix of native and non-native species.**<br>**OR** | **Standing riparian vegetation associated with non-fish-bearing streams, dominated by non-native species (<50% native). Provides marginal** | *Highly degraded; dominated by non-native plant species (<50% native).* | N/A |

| Habitat Type | Habitat Subtype | Category 1 | Category 2 | Category 3 | Category 4 | Category 5 | Category 6 |
|---|---|---|---|---|---|---|---|
| | | | | **Degraded riparian areas associated with fish-bearing streams.** | **habitat; somewhat degraded.** | | |
| Upland Grassland | **Westside Grasslands**<br>Grassland areas west of the Cascade Range | N/A | *Any size high quality remnant patch that provides potential habitat for uncommon wildlife species dependent on westside grasslands.* | *Any size medium/low quality remnant prairie habitat.* | *Low quality or fencerows with predominance of non-native species.* | **Very low quality dominated by non-native species with high restoration potential.** | N/A |
| Upland Forests and Woodlands | **Westside Lowlands Conifer-Hardwood Forest**<br>Lower elevation forests dominated by mixed conifer and/or hardwood species | N/A | *Large sawtimber or old growth forest stands (as defined in Brown ed. 1985) including complex vertical structure, closed canopy, downed wood (>21" DBH).* | *Mid-seral/closed sawtimber forest (as defined in Brown ed. 1985)*<br>*(e.g., 10"-21" DBH).* | **Regenerating or young closed and open sapling, pole forest (as defined in Brown ed. 1985) (e.g., < 10" DBH).**<br>**OR**<br>**Forested areas consisting of native and non-native horticultural tress that provide wildlife habitat.** | *Shrub and clearcut stage areas that were recently logged.* | N/A |
| Agriculture, Pasture, and Mixed Environs | **Orchards, Vineyards, Grass Seed Fields, Other Row Crops** | N/A | N/A | N/A | **Active agricultural areas with high potential for restoration and seasonal wildlife habitat.** | **Active agricultural areas with high potential for restoration.** | *Active agricultural areas with low potential for restoration.* |
| Urban and Mixed Environs | | N/A | 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 G-4 shows the acreages of each habitat type - subtype and habitat category within the Site Boundary and Table G-5 shows the acreages of each habitat type – subtype and habitat category within the Analysis Area, following incorporation ODFW recommendations. As defined in the Project Order, the desktop analysis for fish and wildlife habitat extends 5 miles from the Site Boundary based on recommendations from Linn County due to the proximity of the Facility to sensitive fish habitat and peripheral and sensitive big game habitat. The locations of each habitat category are shown in Figure G-3, both as they were field-surveyed within the Site Boundary and as they were desktop-delineated within the Analysis Area. Figure G-4 shows the location of each habitat type and final habitat category considering ODFW recommendations.

**Table G-4. Acres of Habitat Categories and Subtypes within the Site Boundary**

| Habitat Type | Habitat Subtype | Habitat Category[1] | | | Total Acres within Site Boundary[2] |
|---|---|---|---|---|---|
| | | 2 | 4 | 6 | |
| Agriculture, Pasture, and Mixed Environs | Orchards, Vineyards, Grass Seed Fields, Other Row Crops | - | 740 | - | **740** |
| Riparian Forest and Natural Shrubland Complexes | Westside Riparian | 4.3 | - | - | **4.3** |
| Upland Forests and Woodlands | Westside Lowlands Conifer-Hardwood Forest | - | 3.5 | - | **3.5** |
| Urban and Mixed Environs | Urban and Mixed Environs | - | - | 4.2 | **4.2** |
| Open Water – Lakes, Rivers, Streams | Perennial | 4.3 | - | - | **4.3** |
| Wetlands | Emergent Wetlands | 21.1 | 803 | - | **824** |
| | Forested Wetlands | 5.2 | - | - | **5.2** |
| | Scrub-shrub Wetlands | 2.9 | - | - | **2.9** |
| **Category Totals (acres)[2]** | | **37.9** | **1,546** | **4.2** | **1,588** |

Note: Survey results presented in this report are used to inform project design, including avoidance of sensitive habitats where practicable. Values listed in this table do not reflect acres of impact. "-" means no acres.

1. There are no Category 3 or Category 5 habitat within the Site Boundary.

2. Totals may not sum exactly due to rounding.

**Table G-5. Acres of Habitat Categories and Subtypes within the Analysis Area**

| Habitat Type | Habitat Subtype | Habitat Category | | | | | Total Acres within Analysis Area[1] |
|---|---|---|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 | |
| Agriculture, Pasture, and Mixed Environs | Irrigated Pastures and Hay Meadows | - | <1 | 19,529 | - | - | **19,529** |
| | Orchards, Vineyards, Grass Seed Fields, Other Row Crops | - | 5 | 23,096 | - | - | **23,102** |
| Riparian Forest and Natural Shrubland Complexes | Westside Riparian | 1,585 | - | - | - | - | **1,585** |
| Upland Forests and Woodlands | Westside Lowlands Conifer-Hardwood Forest | 6,299 | 10,705 | 59 | - | - | **17,064** |
| | Westside Oak and Dry Douglas-fir Forest and Woodlands | 208 | 5,360 | 6,987 | - | - | **12,555** |
| | Westside Oak Woodlands/Savanna | 536 | 1,509 | 1,190 | - | - | **3,235** |
| Upland Grassland | Westside Grasslands | 522 | 118 | 710 | - | - | **1,350** |
| Urban and Mixed Environs | Urban and Mixed Environs | - | - | - | - | 4,504 | **4,504** |
| Open Water – Lakes, Rivers, Streams | Intermittent or Ephemeral | 512 | - | - | - | - | **512** |
| | Perennial | 929 | - | - | - | - | **929** |
| | Permanent Ponds/Lakes | 243 | - | - | - | - | **243** |
| | Seasonal Ponds | 10 | - | - | - | - | **10** |
| Wetlands | Emergent Wetlands | 934 | - | 803 | - | - | **1,737** |
| | Forested Wetlands | 597 | - | - | - | - | **597** |
| | Scrub-shrub Wetlands | 225 | - | - | - | - | **225** |
| **Category Totals (acres)[1]** | | **12,599** | **17,699** | **52,373** | **0** | **4,504** | **87,175** |

Note: Survey results presented in this report are used to inform project design, including avoidance of sensitive habitats where practicable. Values listed in this table do not reflect acres of impact. "-" means no acres while <1 means greater than zero but less than 0.5 acre present within the Analysis Area.

1. Totals may not sum exactly due to rounding.

# 6.0 Identification of State Sensitive Species and ODFW Site-Specific Issues of Concern – OAR 345-022-0060(3)(d)

*(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 State Sensitive Species

Based on the desktop analysis and field surveys (Section 4.0), 17 state sensitive species have the potential to occur within the Analysis Area (Table G-6). State endangered, threatened, and candidate species are addressed in Exhibit H. Of these 17 species, 8 are sensitive-critical species and 9 are sensitive species in the Willamette Valley Ecoregion where the Facility is sited (Table G-6; ODFW 2021a).

In addition to the species above, six species that do not have a state sensitive status are addressed in this document as species of concern. While Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and Roosevelt elk (*Cervus canadensis roosevelti*) are not state sensitive species, the Analysis Area is located within the Western Oregon Big Game Year-Round Peripheral Habitat overlay. Similarly, adverse impacts to bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are not expected due to construction and operation of the Facility, but eagles are addressed briefly in this document as a species of concern protected under the Bald and Golden Eagle Protection Act (BGEPA). Finally, while Fender's blue butterfly (*Icaricia icarioides fenderi*) and monarch butterfly (*Danaus plexippus*) are not state sensitive species and adverse impacts are not expected, these species are addressed in this document as species of concern raised by ODFW and USFWS during consultation.

**Table G-6. State Sensitive Species with the Potential to Occur within the Analysis Area**

| Species | Federal Status[1] | ODFW Status in Willamette Valley[2] | Habitat and Species Information | Sensitive Period(s)[3] | Observed or Expected Occurrence within Analysis Area | Potential Use of Habitat within Analysis Area |
|---|---|---|---|---|---|---|
| **Mammals** | | | | | | |
| Columbian black-tailed deer *Odocoileus virginianus* | - | - | An edge-adapted species that benefits from mix of forest age classes. They use dense forest edges for shelter during the day and forage in open, early successional forests and adjacent grasslands at dawn and dusk. They exhibit both grazing and browsing behaviors, with forbs and browse (consisting of stems and leaves from woody plants) being their preferred forage during the growing season. While they consume grasses during specific seasons, in many regions, the presence of suitable forage is closely tied to logging or fire events, as these create favorable forage conditions. Columbian black-tailed deer populations within ODFW West Side Big Game Year-Round Peripheral Habitat are considered non-migratory.<br><br>The rut, also known as the breeding season, spans from late October to early December. Following a gestation period of about seven months, fawns are typically born in late May to mid-June. | During rutting season from late-October through December and calving season from late May through June. | Observed foraging within Analysis Area. | Known foraging; potential sheltering, calving. |
| Roosevelt elk *Cervus canadensis roosevelti* | - | - | Elk habitat is a mix of open areas and forest cover. Wooded habitats serve as protection and shelter and create travel routes connecting seasonal habitats. Open areas provide herbaceous forage. During summer, elk use meadows and riparian areas while winter survival is primarily dependent on grass forage and fat stores. Some populations are migratory; in the Willamette Valley, Roosevelt elk populations within ODFW West Side Big Game Year-Round Peripheral Habitat are considered non-migratory.<br><br>Elk breeding behavior involves a complex social system, which revolves around mature bulls gathering harems. The rut spans from late August through mid-November. Following a gestation period of about eight months, calves are typically born in late May through June. | During rutting from late August through mid-November and calving season from late May through June. | Scat and tracks observed within Analysis Area. | Likely foraging, sheltering, calving. |
| Fringed myotis *Myotis thysanodes* | - | SS | Primarily occurs at middle elevations of 3,937–7,054 feet (1,200–2,150 meters) in desert, grassland, and woodland habitats; has been recorded at 9,350 feet (2,850 meters) in spruce-fir habitat in New Mexico, and at low elevations along Pacific Coast. Roosts in caves, mines, rock crevices, buildings, and other protected sites. Nursery colonies occur in caves, mines, and sometimes buildings. | During roosting periods, especially spring and early summer maternal roosting and winter hibernation roosting periods | No bat species were observed during surveys for the Facility, although no acoustic surveys targeting bats were performed. There is potential for these species to occur based on presence of suitable habitat, including foraging habitat and potential roost sites, within the Analysis Area. | Roosting, foraging |
| **Birds** | | | | | | |
| bald eagle *Haliaeetus leucocephalus* | BCC, BGEPA | - | Nests in forested areas adjacent to large bodies of water. Forages in open water. Known to scavenge opportunistically on carcasses in otherwise unsuitable habitat particularly during migration. | During the reproductive and nesting periods which occur February through mid-August. | Observed flying and perched within Analysis Area. | Likely hunting, scavenging, migrating; potential nesting. |
| golden eagle *Aquila chrysaetos* | BCC, BGEPA | - | Usually nests on cliffs but also can nest in trees. Breeds in open and semi-open habitats at a variety of elevations, in tundra, shrublands, grasslands, woodland- | During the reproductive and nesting periods which occur February through mid-August. | Known nest within 1 mile (ORBIC 2023a). None observed during surveys. There is potential to occur based on presence of suitable nesting | Likely hunting, migrating; potential nesting. |

| Species | Federal Status[1] | ODFW Status in Willamette Valley[2] | Habitat and Species Information | Sensitive Period(s)[3] | Observed or Expected Occurrence within Analysis Area | Potential Use of Habitat within Analysis Area |
|---|---|---|---|---|---|---|
| | | | brushlands, and coniferous forests, farmland and riparian areas. Typically forages in open habitats like grasslands. | | and hunting habitat within the Analysis Area. | |
| streaked horned lark<br>*Eremophila alpestris strigata* | FT | SS-C | Flat, open areas with sparse vegetation and bare ground for nesting and foraging. Preferred habitats have an average of 17 percent bare ground for foraging and 31 percent bare ground for nesting and contain forbs and grasses less than 13 inches in height with few or no trees or shrubs. In the Willamette Valley, streaked horned larks occupy grasslands, prairies, wetlands, shorelines, and modified or temporarily disturbed habitats such as agricultural or grass seed fields, airports, dredged material placement sites, and gravel roads. Grass seed croplands used by streaked horned larks have bare or sparsely vegetated areas within or adjacent to cropland, and wetland mudflats or "drown outs" (i.e., washed out and poorly performing areas within grass seed or row crop fields).<br><br>Arrive on breeding sites in February; nesting attempts begin in mid-April and ends in late August, with peaks in May and June. May attempt to renest in late June through August if previous attempts were unsuccessful. | During the reproductive and nesting periods which occur mid-April through August. | Known occurrence within 2 miles (ORBIC 2023). None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable foraging habitat within the Analysis Area. | Likely foraging; unlikely breeding. |
| grasshopper sparrow<br>*Ammodramus savannarum* | BCC | SS-C | Medium height grassland and shrub-steppe, typically small vegetative clumps amongst bare ground. Often inhabits native grassland habitat with less than 35 percent shrub cover.<br><br>Ground dwelling species that tends to produce two or more broods per year. Small plant material nest cups are hidden at ground level in grasses. Nests may be in close proximity to each other, and colonies may move nesting locations from year to year due to changing and limited suitable nesting habitat. May attempt to renest if previous attempts were unsuccessful. | During the reproductive and nesting periods which occur April through September. | Known occurrence within 2 miles (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Likely foraging, migrating. |
| Oregon vesper sparrow<br>*Pooecetes gramineus affinis* | FSOC, BCC | SS-C | This subspecies migrates to western Oregon in April. Inhabits open grasslands with a mix of tall and short herbaceous vegetation interspersed with trees and shrubs for nesting and foraging. In the Willamette Valley, associated with Christmas tree farms with trees two to five years post planting and lightly grazed pastures with scattered shrubs and grass less than one to two feet tall. Declines of Oregon vesper sparrow populations have been linked to loss of grassland habitat.<br><br>Ground nests are developed at the base of a tree or shrub where an elevated singing perch and grass dominated understory are present. Defends breeding territories of 1 to 3 acres. Females may produce up to three broods per year. | During the reproductive and nesting periods which occur April through early August. | Known occurrence within 5 miles (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Unlikely breeding; likely foraging, migrating. |
| western meadowlark<br>*Sturnella neglecta* | - | SS-C | Tend to be year-round residents in the Willamette Valley and use open native grasslands, meadows, and pastures. This species may also be found in agricultural cropland borders, roadsides, fencerows, and orchards. They prefer sites with high structural diversity containing a mixture of grasses and forbs less than 10 inches in height. Western meadowlarks have large home ranges and are sensitive to loss, degradation, and fragmentation of grasslands. | During the reproductive and nesting periods which occur April through July. | Occurs in Linn County (ORBIC 2019). None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Potential breeding; likely foraging. |

| Species | Federal Status[1] | ODFW Status in Willamette Valley[2] | Habitat and Species Information | Sensitive Period(s)[3] | Observed or Expected Occurrence within Analysis Area | Potential Use of Habitat within Analysis Area |
|---|---|---|---|---|---|---|
| | | | Nests in a well concealed grass dome placed in a ground depression in grassland habitat. Highly sensitive to human disturbance activities near nesting sites. | | | |
| purple martin (western)<br>*Progne subis arboricola* | - | SS-C | Requires open foraging habitat and often observed over rivers, lakes, marshes, fields, or above tree canopies catching food on the wing. Migrates to Oregon in April.<br><br>Nesting sites are highly associated with burned forest and clear cut logged areas that contain dead standing snags. Opportunistic nester that uses abandoned pileated woodpecker and northern flicker nest cavities, artificial nest boxes, and other human made structures in urban environments.<br><br>Young leave the nest one month after hatching but continue to roost at the nesting site. Purple martins return to the colony to reproduce the following year. May nest in colonies or singly, with one brood per year. | During the reproductive and nesting periods with occur late May through August. | Known occurrence within 4 miles (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Potential breeding, foraging, migrating. |
| olive-sided flycatcher<br>*Contopus cooperi* | BCC | SS | Associated with uneven canopy coniferous forests. Typically nests where dead standing trees are found near water bodies, in burned forest habitat with snags and tall living trees, and in open or semi-open canopy forest stands. | During the reproductive and nesting periods which occur in the spring and summer. | None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Potential breeding, foraging. |
| acorn woodpecker<br>*Melanerpes formicivorus* | FSOC | SS | Associated with oak woodlands with high canopies and relatively open understories. They are dependent upon dead limbs or snags for storing acorns. | During the reproductive and nesting periods which occur in the spring and summer. | None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Potential breeding, foraging. |
| chipping sparrow<br>*Spizella passerina* | - | SS | Associated with open forests and drier woodland edges. They prefer areas with sparse, herbaceous understories for foraging. | During the reproductive and nesting periods which occur in the spring and summer. | None observed during surveys, although no surveys targeting this species were performed. There is potential to occur based on presence of suitable nesting and foraging habitat within the Analysis Area. | Potential breeding, foraging. |
| **Reptiles** | | | | | | |
| northwestern pond turtle<br>*Actinemys marmorata* | FSOC[4] | SS-C | Associated with terrestrial and aquatic habitats year-round. Aquatic habitats include quiet mud or rocky bottom ponds, marshes, slow moving rivers and streams with basking sites for thermoregulation.<br><br>Terrestrial habitat includes hibernation sites (up to 1,600 feet from water) and nesting sites (commonly 600 feet from water) in a variety of vegetation types. | During hibernation and nesting periods which could occur year-round.<br><br>During winter hibernation in upland habitat adjacent to water or within mud substrate of water body. | Known occurrence within 2 miles (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic and terrestrial habitat within the Analysis Area. | Limited to no breeding habitat, potential for transient use of streams and wetlands for foraging and basking. |

| Species | Federal Status[1] | ODFW Status in Willamette Valley[2] | Habitat and Species Information | Sensitive Period(s)[3] | Observed or Expected Occurrence within Analysis Area | Potential Use of Habitat within Analysis Area |
|---|---|---|---|---|---|---|
| | | | | Terrestrial nesting occurs between May and August, but eggs and hatchlings often stay within the nest until the following spring before migrating to water. | | |
| western painted turtle<br>*Chrysemys picta bellii* | – | SS-C | Associated with terrestrial and aquatic habitats year-round. Aquatic habitats include shallow, quiet waters with muddy or sandy substrate such as ponds, marshes, small lakes, ditches, and streams with basking sites for thermoregulation. This species does not hibernate terrestrially like the northwestern pond turtle.<br><br>Terrestrial habitat includes nesting sites in soft ground up to 1,500 feet away from water. | During hibernation nesting periods which could occur year-round.<br><br>During winter hibernation within mud substrate of water body.<br><br>Terrestrial nesting occurs between May and August, but eggs and hatchlings often stay within the nest until the following spring before migrating to water. | Occurs in Linn County (ORBIC 2019). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic and terrestrial habitat within the Analysis Area. | Limited to no breeding habitat, potential for transient use of streams and wetlands for foraging and basking. |
| **Amphibians** | | | | | | |
| northern red-legged frog<br>*Rana aurora aurora* | FSOC | SS | Associated breeding habitats include ponds, bogs, extensive wetlands, marshes or slow-moving streams with dense emergent vegetation and stable water levels through the spring. Breeding sites may be temporary or permanent water bodies.<br><br>Associated terrestrial non-breeding habitats include adjacent meadows, woodlands, and forests with complex understories with dense vegetation cover. Adults may be found as far as 900 feet away from the aquatic breeding site but been documented moving up to 1.5 miles away. Emerge from winter dormancy to breed when temperatures reach 42 to 45°F and suitable breeding ponds become available. Engage in a one to two-week breeding period between January and March. | During terrestrial migration and aquatic breeding periods which occur January through March. | Known occurrence within 4 miles (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic and terrestrial habitat within the Analysis Area. | Potential use of wetlands for breeding, and terrestrial habitat for dispersal and overwintering. |
| **Fish** | | | | | | |
| Pacific lamprey<br>*Entosphenus tridentatus* | FSOC | SS | Spawning habitat includes stream riffles with sand, gravel or rock bottom depressions. Ammocetes (larval lamprey) associated with clear stream eddies with settled mud, silt, and sand.<br>Anadromous species that migrates in the spring from the Pacific Ocean to spawning habitat. | During the extended reproductive and development periods which occur the first four to six years of life prior to migration to the Pacific Ocean and reproductive status is achieved. | Known occurrence in the upper Willamette River and tributaries (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic habitat. | Potential use of perennial streams for spawning, foraging, migrating, and rearing. |
| western brook lamprey<br>*Lampetra richardsoni* | FSOC | SS | Nonparasitic freshwater species that does not migrate to the ocean to feed. After transforming into a 5–6 inch adult, it spawns and dies in its freshwater | During spawning which occurs March – June | Assumed to occur in perennial streams throughout the Analysis | Potential use of perennial streams for spawning, |

| Species | Federal Status[1] | ODFW Status in Willamette Valley[2] | Habitat and Species Information | Sensitive Period(s)[3] | Observed or Expected Occurrence within Analysis Area | Potential Use of Habitat within Analysis Area |
|---|---|---|---|---|---|---|
| | | | stream without feeding. Ammocoetes reside in silt and fine sediment in slow water habitats of creeks and small rivers for up to 6 years. | | Area. None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic habitat. | foraging, migrating, and rearing. |
| steelhead trout (Willamette SMU/Upper Willamette River ESU, winter run)<br>*Onchorynchus mykiss* | FT | SS | Associated with medium to large streams and rivers of low to moderate gradients in Oregon.<br><br>Spawns in low gradient areas of rivers and streams in beds with large gravel. Adults require deep pools within proximity to spawning areas where they hold and mature while migrating to spawning grounds. | During the migration and spawning periods which occur February through June. | Known occurrence in the Willamette River (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic habitat. | Unknown and currently not identified on distribution maps. |
| Chinook salmon (Willamette SMU/Upper Willamette River ESU, spring run)<br>*Onchorynchus tshawytscha* | FT | SS-C | Associated with medium to large streams and rivers of low to moderate gradients in Oregon.<br><br>Requires somewhat deeper, cooler water for spawning than other salmonids. Spawns in low gradient areas of rivers and streams in beds with large gravel. Adults require deep pools within proximity to spawning areas where they hold and mature while migrating to spawning grounds. | During the migration spawning periods which occur year-round. | Known occurrence within Willamette River and tributaries (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic habitat. | Unknown and currently not identified on distribution maps. |
| Oregon chub<br>*Oregonichthys crameri* | DL | SS | Associated with floodplain habitats; inhabit slow-moving, shallow, and well-vegetated bodies of water, such as sloughs, oxbows, and beaver ponds. Often associated with aquatic vegetation (30 to 70 percent cover) and depositional substrates. Feeds opportunistically on water column organisms.<br><br>Spawning occurs in spring and summer over aquatic vegetation in still water. Spawning adults may be carried to pond and slough breeding habitats during winter and spring flooding. | During the spawning period from April through September. | Known occurrence within 1.5 miles (ORBIC 2023a). None observed during surveys, although no surveys targeting this species were performed. It is assumed to occur based on presence of suitable aquatic habitat. | Unknown and currently not identified on distribution maps. |
| **Invertebrates** | | | | | | |
| Fender's blue butterfly<br>*Icaricia icarioides fenderi* | FT | CSS | Associated with grasslands, prairies, and meadows where its three host plants are present: Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), longspur lupine (*L. arbustus*), and sicklekeel lupine (*L. albicaulis*). Nectar plants used by adults occur in upland and wet prairies. Plants most commonly used by adults include: narrowleaf onion (*Allium amplectens*), Tolmie star- tulip (*Calochortus tolmiei*), dwarf checkerbloom (*Sidalcea malviflora* ssp. *virgata*), common wooly sunflower (*Eriophyllum lanatum*), and Oregon geranium (*Geranium oreganum*).<br><br>Life cycle is completed in one year. Adults live approximately two weeks, during which time females will mate, seek a host plant, and lay eggs. Larvae feed on the host plant until it senesces, then enter diapause near the base of the plant until the following spring. Adult butterflies emerge in May and June.<br><br>The species is currently known to occur on fewer than 30 sites in Yamhill, Polk, Benton, and Lane Counties, Oregon. | During egg and larval development which can occur year-round. | Does not occur in Linn County (ORBIC 2019). None observed during surveys, although no surveys targeting this species were performed. Not expected to occur due to absence of larval host plants (Attachment G-1). | Not expected due to absence of host plants (Attachment G-1). |

| Species | Federal Status[1] | ODFW Status in Willamette Valley[2] | Habitat and Species Information | Sensitive Period(s)[3] | Observed or Expected Occurrence within Analysis Area | Potential Use of Habitat within Analysis Area |
|---|---|---|---|---|---|---|
| monarch butterfly<br>*Danaus plexippus* | FPT | CSS | Breeds in a variety of habitats where its larval host plant, milkweed (*Asclepias* sp.), is present. Caterpillars feed almost exclusively on milkweed. Adults require nectar from flowering plants blooming in the spring and fall to fuel migrations. Overwinters in oyamel forests in Mexico and coastal forests in southern California. | Year-round during egg and larval development, overwintering, and migration. | Occurs in Linn County (ORBIC 2023). None observed in flight or on milkweed plants during surveys, although no surveys targeting this species were performed. Potential to occur due to presence of larval host plant, milkweed. | Potential use of milkweed patches for breeding, other flowering plants for foraging. |

Sources: Altman 1999, Anderson and Pearson 2015, Csuti et al., 2001, Gervais et al. 2009, Hayes et al. 2001, Jones et al. 2005, Marshal et al. 2006, Moore 2011, NatureServe 2023, OCS 2016, ODFW and NMFS 2011, ODFW 2015, ODFW 2021a, ORBIC 2019, ORBIC 2023a, Pearson and Hopey 2004, Pearson and Hopey 2005, Pearson et al. 2016, Rosenberg et al. 2009, Schultz and Dlugosch 1999, Schultz et al. 2003, Sharp 1986, St. John 2002, USFWS 2008, USFWS 2023a, USFWS 2023b, USFWS 2023d, USFWS 2023e, Wolf 2011, Wolf and Anderson 2014

1. Federally Listed Species: FT = Federal Threatened, FPT = Federal Proposed Threatened, FSOC = Species of Concern, FC = Federal Candidate, DL = Delisted, BCC = Bird of Conservation Concern, BGEPA = Bald and Golden Eagle Protection Act

2. Oregon Department of Fish and Wildlife: SS-C = State Sensitive Critical, SS = State Sensitive, CSS = Conservation Strategy Species

3. Period in which species is most sensitive to disturbance, such as nesting, mating, migrating, or hibernating.

4. On October 3, 2023 the USFWS announced a proposal to list the northwestern pond turtle as a threatened species under the federal Endangered Species Act.

### 6.2 ODFW Site-Specific Issues of Concern

During ongoing coordination, ODFW has identified the streaked-horned lark, northern red-legged frog, northwestern pond turtle, and western painted turtle as site-specific issues at the Facility. The Applicant has worked with ODFW to avoid, minimize, and mitigate impacts to these species, as described in Section 9.0.

## 7.0 Baseline Survey of Habitat Use by State Sensitive Species – OAR 345-022-0060(3)(e)

> *(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 G-5 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 G-6 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.

The bald eagle is the only special status species detected within the Analysis Area during 2023 and 2024 surveys (Figure G-5). No state sensitive species were observed. Survey methods are discussed in Section 4.2, and additional details on the results are provided in Attachment G-1.

## 8.0 Description of Potential Adverse Impacts – OAR 345-022-0060(3)(f)

> *(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 the Application Background Exhibit, the Applicant proposes to begin on-site construction in December 2027, with commissioning completed and commercial operation targeted for June 2029. Habitat mitigation and vegetation management associated with construction and operation are discussed in this section, and in more

detail in the Draft Habitat Mitigation Plan (Attachment G-2), Draft Noxious Weed Control Plan (Attachment G-3), and Draft Agrivoltaics Plan (Attachment D-1). Fenced areas of the Facility are considered permanently impacted for the purposes of habitat mitigation and temporarily impacted areas outside the fenced area will be returned to cropland following construction.

## 8.1 Potential Impacts to Fish and Wildlife

Permanent impact areas are those that would be converted from the existing condition to a different condition for the life of the Facility for the purposes of wildlife use (e.g., where fencing and structures may change wildlife use of the habitat, even if the underlying grass seed field is returned to cultivation following construction). 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 construction, some areas within the construction footprint will be cleared of vegetation, with permanent and temporary impacts to habitats within the Site Boundary. These habitats are identified and described in Section 5.0, and Table G-7 provides the number of acres that will be permanently or temporarily impacted by the Facility, organized by habitat category and subtype. Section 3.2 in the Application Background Exhibit provides the total disturbance impact acreage by Facility component.

**Table G-7. Potential Impacts by Habitat Category, Type, and Subtype**

| Habitat Category | Habitat Type - Subtype | Acres of Permanent Impact | Acres of Temporary Impact |
|---|---|---|---|
| 2 | Riparian Forest and Natural Shrubland Complexes - Westside Riparian | 0.1 | 0.1 |
| | Wetlands - Emergent Wetlands | 0.1 | <0.1 |
| | Wetlands - Forested Wetlands | <0.1 | <0.1 |
| **Category 2 Total** | | **0.3** | **0.2** |
| 4 | Agriculture, Pasture, and Mixed Environs - Irrigated Pastures and Hay Meadows | 0.2 | 0.2 |
| | Agriculture, Pasture, and Mixed Environs - Orchards, Vineyards, Grass Seed Fields, Other Row Crops | 380 | 21.7 |
| | Upland Forests and Woodlands – Westside Lowlands Conifer-Hardwood | 0.01 | 0.02 |
| | Wetlands - Emergent Wetlands | 454 | 15.7 |
| **Category 4 Total** | | **834** | **37.6** |
| 6 | Urban and Mixed Environs | 1.2 | 0.3 |
| **Category 6 Total** | | 1.2 | 0.3 |
| **Grand Total** | | **835** | **38.1** |
| Note: Totals in this table may not be precise due to rounding. | | | |

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, and the battery storage area will be fenced, as required by electrical code or security needs (see the Application Background Exhibit). While these areas are considered permanently disturbed, the Applicant intends to continue agricultural operations between the solar arrays within the fenced area. Some wildlife species may use fenced areas, 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 returned to cropland. The specific extent of each component's temporary impact is detailed in the Application Background Exhibit, and is described in terms of a total, worst-case scenario impact for the full duration of construction.

Temporary impact areas will be returned to cropland following construction, as described in the Draft Agrivoltaics Plan (Attachment D-1). 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 the Application Background Exhibit.

The Applicant has and will continue to minimize or avoid impacts to high-quality habitat through the micrositing considerations described in Section 9.0 and will mitigate for impacts that cannot be avoided as described in the Draft Habitat Mitigation Plan (Attachment G-2). Impacts to state sensitive species are described in Section 8.2. Impacts by habitat category, and specifically to ODFW-designated West Side Big Game Year-Round Peripheral Habitat, are described below.

### *8.1.1 Category 2 Habitat*

Based on consultation with ODFW and ODFW's comments on the Facility NOI, all field-delineated wetlands and other waters were recategorized as Category 2 habitats, except for converted wetlands within grass seed fields. ODFW expressed that wetlands and other waters are essential and limited habitats in the Willamette Valley ecoregion regardless of habitat quality. Westside Riparian habitat, located along the margins of streams and wetlands throughout the Facility, was also classified as Category 2. Overall, less than 1 acre of Westside Riparian, Emergent Wetlands, or Forested Wetlands habitat will be permanently or temporarily impacted by the Facility.

### *8.1.2 Category 4 Habitat*

The majority of both temporary and permanent habitat impacts associated with the Facility are within Category 4 Emergent Wetlands and Agriculture, Pasture and Mixed Environs. Based on consultation with ODFW and ODFW's comments on the Facility NOI, all areas that were field mapped as Category 5 Agriculture, Pasture and Mixed Environs (i.e., grass seed fields) were

recategorized as Category 4 due to their importance for grassland bird species. ODFW indicated that although grass seed fields are not essential or limited habitats, they play an important role by offering nesting and foraging opportunities for various grassland bird species.

### *8.1.3 Category 6 Habitat*

There are potential temporary and permanent impacts to Category 6 habitat. 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 big game, and entrapment within fenced areas.

### *8.2.1 Mammals*

Columbian black-tailed deer and Roosevelt elk are not state sensitive species; however, potential direct, adverse impacts to these species within ODFW-identified Western Oregon Big Game Year-Round Peripheral Habitat have been identified in response to consultation with ODFW. Year-Round Peripheral Habitat provides important functions and values such as shelter and forage to support non-migratory deer and elk populations through all seasons. ODFW maps Year-Round Peripheral Habitat in areas that contain patches of important deer and elk habitat within a broader landscape that is primarily managed for intensive timber production, agriculture, grazing, or other human land uses. Because these areas are primarily managed for human use, they are also subject to actions to discourage deer and elk use but are not identified as deer or elk de-emphasis areas.

The areas where solar arrays are sited within the Facility will be fenced to exclude big game. Therefore, the primary impact to big game from Facility construction and operation in these areas are permanent loss of foraging habitat. However, these permanent habitat impacts are primarily concentrated in areas of existing grass seed cropland. While grasses are readily consumed when available they are not the seasonally preferred foods for Columbian black-tailed deer (Crouch 1981), and big game grazing is generally discouraged in croplands. Year-Round Peripheral Habitat is not considered essential or limited habitat, therefore impacts to this habitat are not expected to result in significant impacts to deer or elk populations (ODFW 2017). 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 to big game include displacement from foraging in temporary impact areas due to vegetation removal.

While fringed myotis has potential to occur within the Analysis Area, suitable roosting and foraging habitat within the Facility is limited. Fringed myotis is primarily found in dry habitats where open areas are interspersed with mature forests (usually ponderosa pine, pinyon-juniper, or oak), creating complex mosaics with ample edges and abundant snags (Keinath 2004). These features are not present within the Facility and direct impacts to this species as a result of construction and operation of the Facility are not expected. However, insect prey availability for bats that potentially occur within the Analysis Area may be impacted due to vegetation removal.

### *8.2.2 Birds*

Eight state sensitive bird species and two eagle species have the potential to occur within the Analysis Area (Table G-6). Construction and operation of the Facility will result in some temporary and permanent impacts to habitat, which could displace nesting and foraging birds, and grassland birds in particular. The conversion of native grasslands to agriculture, urban development, and the invasion of non-native plant species has adversely affected native grassland ecosystems in the Willamette Valley. In this context, farmed grass fields such as those present at the Facility may serve as surrogate grasslands for nesting and foraging grassland bird species. However, birds using habitat within the Site Boundary are expected to relocate to other comparable habitat in the Analysis Area and the greater vicinity of the Facility, as farmed grass fields are abundant and widespread throughout the Willamette Valley. If construction is conducted during the breeding season, some direct mortality of eggs or chicks could occur through vegetation clearing or ground disturbance. Thus, ground disturbance and removal of nest trees or nesting habitat (e.g., destruction of ground nesting bird nests) are the Facility impacts most likely to impact state sensitive bird species. BMPs will be used to minimize the potential impacts on nesting state sensitive bird species (see Section 9.0).

**Streaked horned lark** (state sensitive-critical). No streaked-horned larks were observed during 2023 or 2024 surveys (Attachment G-1). The survey window for this species extends from mid-April to mid-July; surveys occurred during the time when this species is present and breeding in Oregon.

Streaked horned larks are small ground-nesting birds closely associated with expansive open habitats containing low vegetation and a high percentage of bare ground (Robinson and Moore 2005). Nesting typically begins in mid-April and may continue into late August (U.S. Fish and Wildlife Service 2019). Streaked horned larks establish their nests in areas contiguous areas at least 90 - 300 acres in size with at least 16 percent bare ground and grasses and forbs less than 13 inches high, and nests are placed adjacent to clumps of vegetation (Pearson and Hopey 2004). Studies from occupied sites in Washington have found that streaked horned larks have strong natal fidelity to nesting sites, returning each year to the place they were born (Pearson et al. 2008). Eggs hatch after 11 days; young leave the nest 8–10 days after hatching and are cared for by the parents until they are about 4 weeks old, when they become independent (Beason 1995).

In the Willamette Valley one of the largest areas of potential habitat for streaked horned larks is agricultural land, particularly grass seed fields. Currently, there are approximately 360,000 acres of

grass seed fields in the Willamette Valley, which is roughly 25 percent of the region by acreage (Oregon Seed Council 2023). Within these agricultural areas, fallow fields provide preferred habitat structure and the highest nest success potential, as active agricultural fields are subjected to soil and vegetation management practices during the nesting season, resulting in the destruction of eggs, killing of young larks, and/or the abandonment of nests by adult females (Moore 2009).

Larks arrive on breeding sites in February (Pearson et al. 2016). Nesting attempts begin in mid-April and end in late August, with peaks in May and June (Pearson and Hopey 2004, Moore 2011, Wolf 2011, Wolf and Anderson 2014). As documented during 2023 surveys for the Facility (Attachment G-1), most of the Facility is densely vegetated with ryegrass and fescue crops from May through late June or early July, which grow two to three feet tall on average, precluding nesting activity. Harvest at the Facility creates suitable nesting habitat (i.e., sparse vegetation with high percent of bare ground) in late June, which is after the typical first nest attempt. Streaked horned larks have also been documented nesting in mudflats created by dried seasonal wetlands such as those within the Site Boundary (Moore 2010). However, the wetlands at the site were inundated during field surveys in early May (Attachment G-1), indicating the wetlands within the Site Boundary are unlikely to provide early-season nesting habitat for streaked horned larks when inundated. However, suitable nesting habitat may be present within the Site Boundary during the primary nesting season from May through late June when precipitation levels are below normal or after grass seed harvest.

While peak breeding occurs early in the summer, streaked horned larks can nest until August, and can re-nest throughout the summer (Moore 2009). Second and third breeding attempts typically occur from late June through August. As documented in Attachment G-1, suitable nesting conditions may be created by harvest activities (e.g., swathing and combing, tilling), which continue at the Facility from late June through August. However, these activities would likely destroy any ground nests established by streaked horned larks or other ground-nesting birds during this time.

Although the Facility is unlikely to support nesting streaked horned larks, the sparse vegetation and mudflats present during winter months are suitable foraging habitat for overwintering streaked horned larks. During consultation, ODFW and USFWS staff indicated streaked horned larks would be expected to avoid the Facility after construction due to their aversion to tall structures which act as predator perches. Therefore, construction and operation of the Facility will result in the permanent loss of foraging and overwintering habitat for streaked horned larks. These impacts would be mitigated as described in Section 9.2 and Attachment G-2. Direct impacts to individuals could occur if streaked horned larks move into the site after construction begins. Ground disturbance (e.g., clearing, grading) will create the open, bare ground habitat preferred by this species. If nesting during construction occurs, construction equipment could harm or kill individual birds or destroy their nests. The Applicant has worked with ODFW and USFWS to develop avoidance and minimization measures to limit these potential impacts, as described in Section 9.0.

**Grasshopper sparrow** (state sensitive-critical). Grasshopper sparrows were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). This species uses dry grasslands with low shrub cover for breeding (OCS 2016). In Oregon, this species breeds primarily in native bunchgrass

habitats. 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. Potential impacts to this species include habitat loss and modification, including permanent loss of potential foraging and breeding habitat, and displacement and/or disturbance as a result of construction activities. Collision with construction equipment and vehicles is unlikely as birds are expected to fly out of the way of construction equipment, and speed limits would by followed by construction vehicles. If construction occurs during the nesting period, construction equipment could harm or kill individual birds or destroy their nests. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

**Oregon vesper sparrow** (state sensitive-critical). Oregon vesper sparrows were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is present and breeding in Oregon. This species is a ground-nesting and ground-foraging bird who uses dry grassland, agricultural land, and shrub steppe habitats in Oregon (OCS 2016). Nests are usually located next to a clump of vegetation, crop residue, dirt clod, or at the base of a shrub or tree. The breeding period generally begins in mid-May and continues through mid-July. Surveys occurred during the time when this species is present and breeding in Oregon. Potential impacts to this species include habitat loss and modification, including permanent loss of potential foraging and breeding habitat, and displacement and/or disturbance as a result of construction activities. Collision with construction equipment and vehicles is unlikely as birds are expected to fly out of the way of construction equipment, and speed limits would by followed by construction vehicles. If construction occurs during the nesting period, construction equipment could harm or kill individual birds or destroy their nests. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

**Western meadowlark** (state sensitive-critical). Western meadowlarks were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is present and breeding in Oregon. Western Meadowlarks use expansive grassland, pastures, or other open habitats with low-lying vegetation for both foraging and nesting. They are also known to use hedgerows and field margins such as those present at the Facility. Male western meadowlarks are highly detectable and frequently use shrubs, trees, or fence posts as elevated singing perches. The breeding period generally begins in mid-April and continues through mid-July. Human disturbance during the nesting season can cause nest abandonment. Potential impacts to this species include habitat loss and modification, including permanent loss of potential foraging and breeding habitat, and displacement and/or disturbance as a result of construction activities. Collision with construction equipment and vehicles is unlikely as birds are expected to fly out of the way of construction equipment, and speed limits would by followed by construction

vehicles. If construction occurs during the nesting period, construction equipment could harm or kill individual birds or destroy their nests. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

**Purple martin** (state sensitive-critical). Purple martins were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is present and breeding in Oregon. Purple martins exhibit colonial nesting behavior and opportunistically use cavities such as woodpecker holes in snags, nest boxes, and human made structures in urban environments to build nests (OCS 2016). Preferred nest sites are near water sources and open areas suitable for foraging insects in flight. Nesting sites are highly associated with burned forest and clear cut logged areas that contain dead standing snags. Potential impacts to this species could include removal of nest trees or nesting habitat (e.g., trees or snags with cavities if present) and temporary loss of foraging habitat.

**Olive-sided flycatcher** (state sensitive). Olive-sided flycatchers were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is present and breeding in Oregon. This species is associated with uneven canopy coniferous forests. They typically nest where dead standing trees are found near water bodies, in burned forest habitat with snags and tall living trees, and in open or semi-open canopy forest stands. Within the Facility, these habitats primarily occur along hedgerows and at riparian buffers around streams and wetlands. Potential impacts to this species include habitat loss and modification, including permanent loss of potential foraging and breeding habitat, and displacement and/or disturbance as a result of construction activities. Collision with construction equipment and vehicles is unlikely as birds are expected to fly out of the way of construction equipment, and speed limits would by followed by construction vehicles. Potential loss of nests as a result of habitat removal during construction could occur if vegetation clearing occurs during the bird breeding season. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

**Acorn woodpecker** (state sensitive). Acorn woodpeckers were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is present and breeding in Oregon. Acorn woodpeckers are obligates to oak woodland habitat characterized by with high oak canopies and relatively open understories. While no oak woodland habitat is present at the Facility, oak trees are present in hedgerows at the Facility and oak woodland habitat is present in the broader Analysis Area. Potential impacts to this species include habitat loss and modification, including permanent loss of potential foraging and breeding habitat, and displacement and/or disturbance as a result of construction activities. Collision with construction equipment and vehicles is unlikely as birds are expected to fly out of the way of construction equipment, and speed limits would by followed by construction vehicles. Potential loss of nests as a result of habitat removal during construction could occur if vegetation clearing occurs during the bird breeding season.

**Chipping sparrow** (state sensitive). Chipping sparrows were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species

is present and breeding in Oregon. Chipping Sparrows are typically found in open forests and drier woodland edges. Within the Facility, these habitats are primarily found along hedgerows of ryegrass fields. Potential impacts to this species include habitat loss and modification, including permanent loss of potential foraging and breeding habitat, and displacement and/or disturbance as a result of construction activities. Collision with construction equipment and vehicles is unlikely as birds are expected to fly out of the way of construction equipment, and speed limits would by followed by construction vehicles. Potential loss of nests as a result of habitat removal during construction could occur if vegetation clearing occurs during the bird breeding season. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

**Bald eagle** (BGEPA). Bald eagles were observed within the Analysis Area during 2023 and 2024 special status wildlife species surveys (Attachment G-1). Two bald eagle nests are located within 5 miles of the Site Boundary (ORBIC 2023a). The nearby Willamette River and surrounding forests provide suitable bald eagle nesting habitat. While no bald eagle nests were found within 0.5-miles of the Facility, bald eagle use of the area is high. Bald eagles were observed congregating in early spring at the wetlands within the Facility and were seen perched on power poles and flying through the area in summer. Migratory bald eagles likely use the Facility as stopover habitat, and resident bald eagles likely use the area for hunting and socializing. Vegetation will be removed inside the fenced areas during construction, resulting in the loss of available habitat; however, given the extent of similar available habitat for within the Analysis Area, this impact is limited. Powerline collision and electrocution and loss of habitat are the primary potential, adverse impacts to bald eagles. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

**Golden eagle** (BGEPA). One known golden eagle nest is located within 5 miles of the Analysis Area (ORBIC 2023a). No golden eagles were observed within the Analysis Area during 2023 or 2024 surveys (Attachment G-1). Surveys occurred during the time period when this species is present and breeding in Oregon. Habitat within the Analysis Area is appropriate for hunting year-round. Vegetation will be removed inside the fenced areas during 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 Linn County in general. Powerline collision and electrocution are the primary potential, adverse impacts to golden eagles. However, these impacts will be limited by avoidance and minimization measures, as described in Section 9.0.

### *8.2.3 Amphibians and Reptiles*

Two state sensitive reptiles, the northwestern pond turtle and western painted turtle, and one state sensitive amphibian, the northern red-legged frog, have the potential to occur within the Analysis Area. Because amphibians and reptiles are relatively slow moving, they may be unable to avoid construction equipment or vehicles and thus could be directly impacted by the Facility. Burrows, nests, or eggs within impact areas could be destroyed by equipment. The removal of downed

woody debris that some state sensitive amphibians require for survival could directly or indirectly impact some species. Facility impacts to state sensitive amphibians and reptiles associated with the removal of woody debris are expected to be minor; most riparian habitat will be avoided during construction and upland forest habitat is minimal within the Facility footprint and surrounded by active croplands. Direct impacts of woody debris removal would include removal of decaying logs that provide cover for individuals; indirect impacts would include the removal of decaying logs that have the potential to provide habitat for individuals, but that are not being utilized at the time of construction.

All of the state sensitive amphibian and reptile species with potential to occur in the Analysis Area are aquatic or semi-aquatic. However, impacts to streams and non-converted agricultural wetlands will be avoided as described in Section 9.0, and impacts to riparian vegetation will be minimized, these impacts are expected to be minor.

**Northwestern pond turtle** (state sensitive-critical). Northwestern pond turtles were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is active. This species is assumed to be present within the Analysis Area due to presence of suitable habitat and nearby records of occurrence (ORBIC 2023a). Northwestern pond turtles are associated with terrestrial and aquatic habitats year-round. Impacts to streams will be avoided by Facility design; however, construction within converted wetlands and adjacent to streams could cause direct mortality to adults migrating between nesting areas and overwintering areas, locally aestivating adults, and eggs and young overwintering in terrestrial nests.

**Western painted turtle** (state sensitive-critical). Western painted turtles were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is active. This species is assumed to be present within the Analysis Area due to presence of suitable habitat. Western painted turtles are associated with terrestrial and aquatic habitats year-round. Impacts to streams will be avoided to the extent possible by Facility design; however, construction within converted wetlands and adjacent to streams could cause direct mortality to adults migrating between nesting areas and overwintering areas, locally aestivating adults, and eggs and young overwintering in terrestrial nests.

**Northern red-legged frog** (state sensitive). Northern red-legged frogs were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the time period when this species is active. This species is assumed to be present within the Analysis Area due to presence of suitable habitat and nearby records of occurrence (ORBIC 2023a). Associated with terrestrial and aquatic habitats year-round. Impacts to streams will be avoided by Facility design and impacts to riparian habitat will be avoided where practicable; however, construction will result in temporary and permanent terrestrial habitat modification.

### *8.2.4 Fish*

Five state sensitive fish species have the potential to occur within the Analysis Area: Pacific lamprey, western brook lamprey, steelhead trout, Chinook salmon, and Oregon chub. Streams will be avoided in the Facility design and during construction, as described in Section 9.0. Therefore, construction and operational activities are not expected to impact state sensitive fish or their habitats.

**Pacific lamprey and western brook lamprey** (state sensitive). Pacific lamprey and western brook lamprey were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1) but are assumed to be present due to presence of suitable fish-bearing streams within the Analysis Area which connect with waterbodies that contain ORBIC records of occurrence (ORBIC 2023a). Impacts to streams will be avoided by Facility design, therefore, construction and operational activities are not expected to impact Pacific lamprey.

**Steelhead trout** (state sensitive). Steelhead trout were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1) but are assumed to be present due to presence of suitable fish-bearing streams within the Analysis Area which connect with waterbodies that contain ORBIC records of occurrence (ORBIC 2023a). Impacts to streams will be avoided by Facility design, therefore, construction and operational activities are not expected to impact steelhead trout.

**Chinook salmon** (state sensitive-critical). Chinook salmon were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1) but are assumed to be present due to presence of suitable fish-bearing streams within the Analysis Area which connect with waterbodies that contain ORBIC records of occurrence (ORBIC 2023a). Impacts to streams will be avoided by Facility design, therefore, construction and operational activities are not expected to impact Chinook salmon.

**Oregon chub** (state sensitive). Oregon chub were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1) but are assumed to be present due to presence of suitable fish-bearing streams within the Analysis Area which connect with waterbodies that contain ORBIC records of occurrence (ORBIC 2023a). Impacts to streams will be avoided by Facility design, therefore, construction and operational activities are not expected to impact Oregon chub.

### *8.2.5 Invertebrates*

While not state sensitive, the Fender's blue butterfly and monarch butterfly were identified by ODFW as species of concern at the Facility. The life history of these species depends on the presence of their larval host plants. Given the majority of the Facility is currently used for active agriculture, minimal habitat is available for their host plants and agricultural pesticide use could preclude their presence. The Fender's blue butterfly was determined to be unlikely to occur at the Facility, and the monarch butterfly has potential to occur. Due to the presence of the monarch butterfly host plant, milkweed (*Asclepias* sp.), construction impacts would involve removal of breeding habitat, and could include mortality of caterpillars if the plants are removed when they are present. Adult butterflies are highly mobile and would be expected to avoid construction equipment.

**Fender's blue butterfly** (Oregon Conservation Strategy Species). Fender's blue butterflies were not recorded during 2023 or 2024 surveys at the Facility (Attachment G-1). Surveys occurred during the flight period when this species is in its adult form. Additionally, ORBIC (2019) does not include Linn County in this species' distribution. Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*) is the primary host plant (plants used for oviposition and food for larvae) for the Fender's blue butterfly. Two other species of lupine are known to be used in the absence of the primary host plant: longspur lupine (*L. arbustus*), and sicklekeel lupine (*L. albicaulis*; USFWS 2008). None of the host plant species were observed during surveys (Attachment G-1). Because Fender's blue butterfly has a limited dispersal range, they require host plants to be near nectar plants (within approximately 1.2 miles and within contiguous habitat; Schultz and Dlugosch 1999). The absence of this species' host plants indicates they are unlikely to occur at the Facility. Therefore, impacts to Fender's blue butterfly from construction and operation of the Facility are not anticipated.

**Monarch butterfly** (Oregon Conservation Strategy Species). Monarch butterflies were not recorded during 2023 or 2024 surveys at the Facility. However, few small patches of the monarch's host plant, milkweed, were observed at the Facility. Due to the presence of this species' host plant, there is potential for monarchs to breed at the Facility. Vegetation clearing in milkweed patches would permanently remove breeding habitat. If vegetation clearing is conducted when caterpillars are present, mortality of monarch butterflies could occur. Given the limited amount of milkweed at the Facility and avoidance and minimization measures described in Section 9.0, these impacts are expected to be minor.

# 9.0 Avoidance and Mitigation Measures – OAR 345-022-0060(3)(g)

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

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 with the range of sage grouse; therefore, the application of the Greater Sage-Grouse Conservation Strategy is not required.

## 9.1 Avoidance and Minimization

### *9.1.1 During Facility Design and Micrositing*

In 2023, Facility design proposed solar panels on every parcel within the Site Boundary, as depicted in Figure G-6.1. However, in 2025, based on evaluation of survey information and coordination with ODFW and USFWS, the Applicant significantly reduced the Facility footprint to minimize impacts to fish and wildlife habitat and wetlands (Figure G-6.2). Those avoidance and minimization measures included the following:

- To the extent feasible, the Facility was sited on previously disturbed habitat, land that has been converted to agriculture for the purpose of growing grass seed. No removal of aquatic habitat is expected to minimize impacts to wildlife generally, and to the northern red-legged frog, northwestern pond turtle, and western painted turtle in particular. The only impacts proposed to wetlands are to converted wetlands within grass seed fields.
- The Applicant will use Facility-specific measures that follow Avian Powerline Interaction Committee (APLIC) guidelines for minimizing avian electrocutions (APLIC 2006). This is expected to minimize the risk of electrocution to raptors generally, and to bald and golden eagles in particular.
- The Applicant will implement down-shield lighting for permanent lighting at the substation. 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 grasshopper sparrows, 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 as well as small mammals, amphibians (such as the northern red-legged frog), and reptiles (such as the northwestern pond turtle and western painted turtle).

The Facility is located in ODFW-designated West Side Big Game Year-Round Peripheral Habitat. In response to consultation with ODFW and USFWS, the Applicant has undertaken the following design considerations to minimize impacts to big game:

- All solar components will be fenced to exclude big game.
- Gates will be installed in the fence line to allow escape by big game in the unlikely event they become trapped in the fenced solar area.

### *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:

- If construction is scheduled to overlap with the raptor nesting season (February 1 – August 31), the Applicant will conduct a raptor nest survey within 0.25 mile of the defined work area the nesting season prior to the construction start date, to identify the location of raptor nests that could be affected by construction.
- The Applicant will develop a Streaked Horned Lark Avoidance Plan based on input from the USFWS to avoid take of streaked horned lark during 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:

- If vegetation removal is necessary between April 1 and August 31, a biologist will conduct a clearance survey for nesting birds prior to vegetation removal and vegetation will be cleared in phases, just ahead of other construction activity, to avoid leaving areas of the site open for streaked horned lark to move in. Any active bird nests will be flagged for avoidance.
- Prior to construction, streams, avoided wetlands, and other sensitive habitat features (e.g., mature trees) 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.
- Streams classified as having fish presence will be provided at minimum a 50-foot riparian setback from the ordinary high-water mark. The Applicant will work with ODFW to identify priority areas to provide larger buffers where feasible to reduce potential impacts to amphibians and turtles.
- The Applicant will consult with ODFW to determine if monitoring during construction activities is needed to assess presence of specific species.
- 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 northern red-legged frogs, northwestern pond turtles, western painted turtles, 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, soils that were temporarily disturbed will be decompacted and reseeded according to provisions in the Draft Agrivoltaics Plan (Attachment D-1) and will return to agricultural use outside of the fenced Solar Array Areas and an agrivoltaic use (i.e., dual-use) within the fenced Solar Array Areas to continue the cultivation of grass seed crops.
- The Applicant will implement weed control measures to minimize the spread of noxious weeds as described in the Draft Noxious Weed Control Plan (Attachment G-3). The Draft 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 wildlife forage and the production of grass seed crops.
- The Applicant will identify licensed local wildlife rehabilitators capable of responding to the Facility in the event of injured wildlife, such as Cascades Raptor Center in Eugene.
- 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 northern red-legged frogs, northwestern pond turtles, western painted turtles, and big game, and to wildlife in general.

## 9.2 Mitigation

After avoidance and minimization measures have been implemented, some impacts to wildlife habitat and sensitive species will remain. Permanent habitat loss will be mitigated according to ODFW Habitat Mitigation Policy goals and standards, as described in the Draft Habitat Mitigation Plan (Attachment G-2). Included in this plan are measures for conserving and enhancing sufficient acreages of wildlife habitat to compensate for those acreages permanently impacted by the Facility, or for providing commensurate funding to support a payment-to-provide program developed in coordination with ODFW. This protection will be—at a minimum—for the duration of the Facility. The Habitat Mitigation Plan includes success criteria and provisions for monitoring whether mitigation goals are achieved, and this plan has mitigation provisions for habitat disturbance associated with construction activities and permanent habitat loss.

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

The Applicant mapped seven habitat types within the Site Boundary that meet the definition of habitat Categories 3 through 6, per OAR 635-415-0025. However, habitat categories were adjusted based on ODFW input. All wetlands and waters and riparian forest were recategorized as Category 2 and all grass seed fields were recategorized as Category 4 habitats per ODFW recommendation. Additionally, the entire Analysis Area is in West Side Big Game Year-Round Peripheral Habitat, which ODFW considers as Category 4 habitat regardless of actual habitat types, except for

agricultural and developed areas. Therefore, there are three habitat categories within the Site Boundary: Category 2 wetlands, streams, and westside riparian forest, Category 4 big game winter range, grass seed cropland, and converted wetlands in the grass seed fields, and Category 6 developed areas. The Applicant will minimize Category 2 habitat impacts by siting facilities on agricultural lands within the Site Boundary to the extent possible. Because all other land is considered Category 4, 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 the Draft Habitat Mitigation Plan (Attachment G-2). Mitigation is intended to meet the goals of OAR 635-415-0025, as determined by the Council.

# 10.0 Monitoring Program – OAR 345-022-0060(3)(h)

> *(h) A description of the applicant's proposed monitoring plans to evaluate the success of the measures described in (g).*

The Applicant will conduct noxious weed and revegetation monitoring as described in the Draft Noxious Weed Control Plan (Attachment G-3) and Draft Agrivoltaics Plan (Attachment D-3), respectively. Monitoring related to mitigation success is described in the Draft Habitat Mitigation Plan (Attachment G-2).

# 11.0 Conclusion

As part of the Facility siting process, 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 minimize impacts to Category 2 habitat (no Category 1 habitat was identified) to the extent possible. Unavoidable habitat impacts will be mitigated consistent with OAR 635-415-0025.

Therefore, based on 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 References

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# 13.0 Approval Standards and Submittal Requirements

**Table G-8. Approval Standards and Submittal Requirements Matrix**

| Requirements | Location |
|---|---|
| OAR 345-022-0060 Fish and Wildlife Habitat | – |
| **Approval Standards** | |
| 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: | |
| (1) 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 | |
| (2) 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. | N/A |
| **Submittal Requirements** | |
| (3) To assist the Council in determining whether the standard outlined in (1) through (2) has been met, the Applicant must submit information about the fish and wildlife habitat and the fish and wildlife species, other than the species addressed in OAR-345-022-0070(3) (the Threatened and Endangered Species Exhibit) that could be affected by the proposed facility, providing evidence to support a finding by the Council as required by this rule. The applicant must 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 |
| (b) Identification of all fish and wildlife habitat in the analysis area, classified by the general fish and wildlife habitat categories as set forth in OAR 635-415-0025 and the sage-grouse specific habitats described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through 635-140-0025 (core, low density, and general habitats), and a description of the characteristics and condition of that habitat in the analysis area, including a table of the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and subtype; | Section 5.0 |
| (c) A map showing the locations of the habitat identified in (b); | Figure 3 |
| (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 |

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

# Figures

# Muddy Creek Energy Park

## Figure G-1
## Fish and Wildlife Analysis Areas

**LINN COUNTY, OR**

- Facility Site Boundary
- Analysis Area (0.5-mile Buffer)
- Desktop Analysis Area (5-mile Buffer)
- City/Town
- County Boundary
- Interstate Highway
- State Highway
- Local Roads

TETRA TECH

Hanwha Renewables

Reference Map


Linn County
Benton County
Benton County
Lane County
Linn County
Lane County
Harrisburg
Junction City
Coburg
Marcola
99E
99W
99
36
5

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# Muddy Creek Energy Park

## Figure G-2
## Survey Areas

**LINN COUNTY, OR**

- Facility Site Boundary
- Interstate Highway
- Local Roads

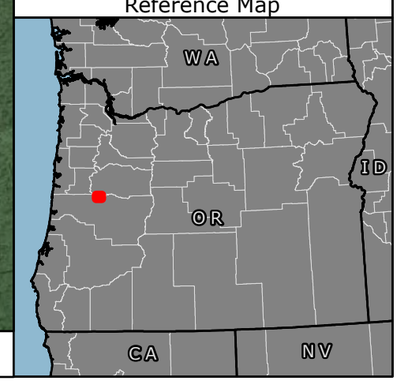
Survey Areas

- Wildlife and Habitat Survey Area
- Raptor Nest Survey Area (0.5-mile Buffer)

TETRA TECH

Hanwha Renewables

Reference Map

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# Muddy Creek Energy Park

## Figure G-3
## Habitat Categories in the Analysis Area

**LINN COUNTY, OR**

- Facility Site Boundary
- Desktop Analysis Area (5-mile Buffer)
- City/Town
- County Boundary
- Interstate Highway
- State Highway

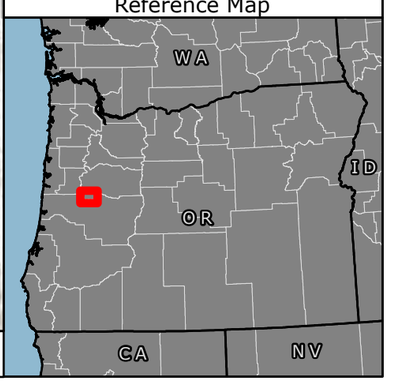
Habitat Category

- 2
- 3
- 4
- 6

TETRA TECH

Hanwha Renewables

Reference Map




Linn County
Benton County
Benton County
Lane County
Linn County
Lane County
Harrisburg
Junction City
Coburg
Marcola
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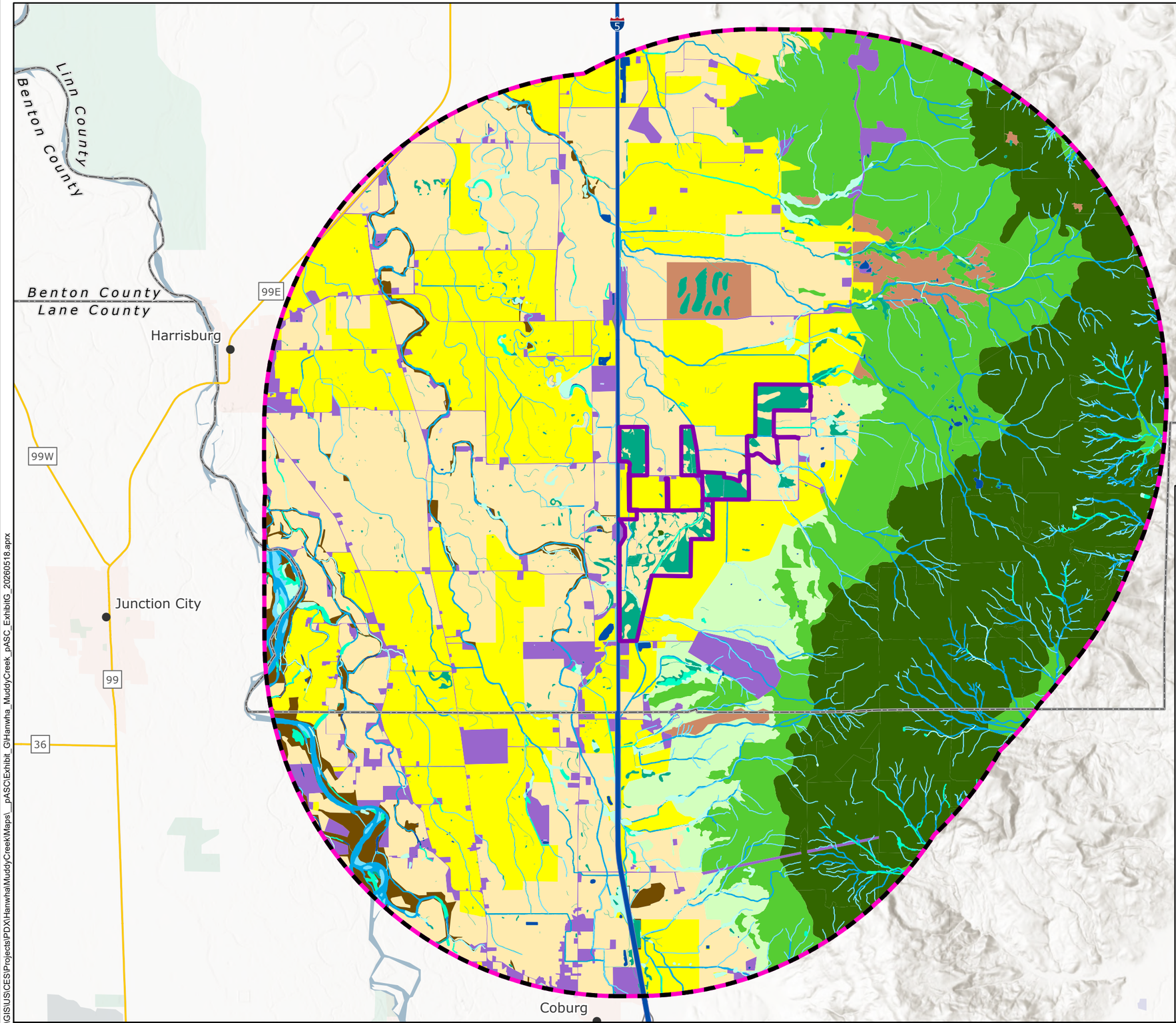
# Muddy Creek Energy Park

## Figure G-4
## Habitat Subtypes in the Analysis Area

**LINN COUNTY, OR**

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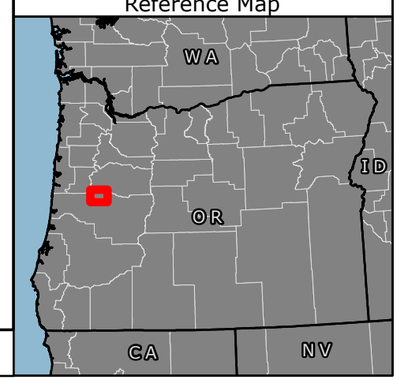
Hanwha Renewables

Reference Map

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# Muddy Creek Energy Park

## Figure G-5
## Special Status Species within the Analysis Area

**LINN COUNTY, OR**

- Facility Site Boundary
- Analysis Area (0.5-mile Buffer)
- City/Town
- Interstate Highway
- Local Roads

Special Status Species

- Bald Eagle (Number of Individuals Observed)

Raptor Nest (Species, Status)

- Great horned owl, In-use
- Red-tailed hawk, In-use
- Unknown, Inactive
- Unknown, Unknown

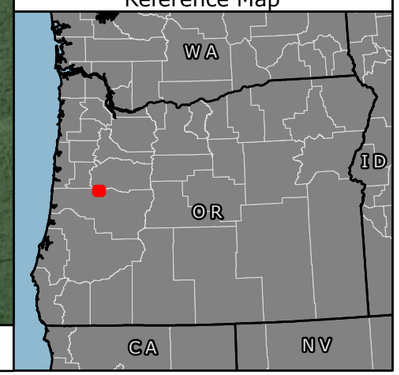
Other Incidental Observations

- Monarch Butterfly Host Plant, No Butterflies Observed

TETRA TECH

Hanwha Renewables

Reference Map

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# Muddy Creek Energy Park

## Figure G-6.1
## 2023 Facility Layout

**LINN COUNTY, OR**

- Facility Site Boundary
- Interstate Highway
- Local Roads
- Existing Transmission Line
- Existing Substation

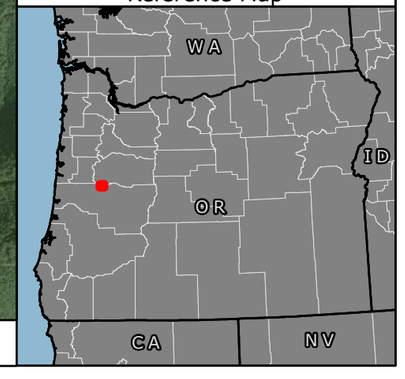
2023 Proposed Facility Components

- Fenceline
- Solar Array
- Inverters
- BESS Area
- Collector Substation
- Access Roads
- Underground Collector Lines
- Overhead Transmission Line

TETRA TECH

Hanwha Renewables

Reference Map



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# Muddy Creek Energy Park

## Figure G-6.2
## 2026 Facility Layout

**LINN COUNTY, OR**

- Facility Site Boundary
- Interstate Highway
- Local Roads
- Existing Transmission Line
- Existing Substation

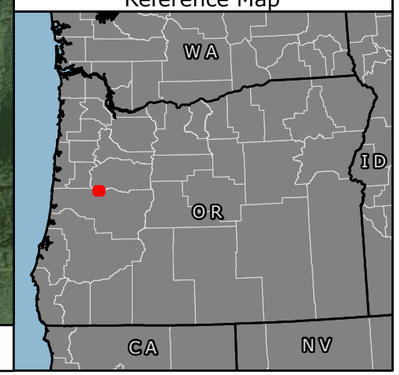
Proposed Facility Components

- Fenceline
- Solar Array
- Inverters
- Laydown Areas
- BESS Area
- Collector Substation
- Permanent Road
- Permanent Substation Road
- Temporary Road
- Underground Collector Lines
- Overhead Transmission Line
- Transmission Line Poles

TETRA TECH

Hanwha Renewables

Reference Map




Priceboro Dr
Brownsville Coburg Rd
Alice Ln 3502
Gap Rd
Priceboro Rd
Bowers Rd
Bowers Dr
N Coburg Rd
Miller Dr
Mt Tom Dr
Mount Tom Dr

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WGS 1984 UTM Zone 10N

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# Attachment G-1. Biological Survey Reports

# Habitat Categorization Survey Report
# Muddy Creek Energy Park

**Prepared for**
**Muddy Creek Energy Park LLC**

**Prepared by**

TETRA TECH

**February 2026**

**GENERAL DISCLAIMER FOR SCIENTIFIC WORK PRODUCTS**

This deliverable was prepared in accordance with generally accepted professional practices that are typically utilized for scientific work products. The work was performed within the limitations and assumptions of our approved scope of work, and the descriptive documentation associated with this deliverable. Unless explicitly included in our approved scope of work, information provided in this deliverable has not been prepared to meet industry standards for engineering and should not be used for construction.

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# 1.0 Introduction

Muddy Creek Energy Park LLC (Muddy Creek) plans to develop the Muddy Creek Energy Park (Facility). As part of its environmental due diligence, Muddy Creek contracted Tetra Tech to conduct biological surveys for the Facility in support of an Application for Site Certificate through the Oregon Department of Energy's Energy Facility Siting Council. This summary report presents the methods and results for the habitat categorization surveys conducted in 2023, 2024, and 2025. The purpose of these surveys was to map and classify habitat at the Facility according to Oregon Department of Fish and Wildlife (ODFW) guidelines set forth in Oregon Administrative Rules (OAR) 635-415-0025.

Surveyors also documented rare plants and noxious weeds and collected data on raptor nests and other wildlife species, if observed. Botanical, wildlife, and raptor nest surveys are addressed in separate reports (Tetra Tech 2023, Tetra Tech 2024, Tetra Tech 2026).

# 2.0 Agency Coordination

Prior to the surveys, Muddy Creek and Tetra Tech met with ODFW and U.S. Fish and Wildlife Service (USFWS) staff via video meetings on April 12 and 27, 2023, to introduce the Facility and discuss survey methods, survey extent, and wildlife of interest at the Facility. ODFW and USFWS staff provided concurrence on the scope, timing, and extent of the habitat categorization surveys prior to Tetra Tech's field deployments (ODFW 2023, USFWS 2023a). Consultation with ODFW on habitat categorization is ongoing.

# 3.0 Survey Area

Surveys were conducted by Tetra Tech and Muddy Creek throughout the entire Facility site boundary as proposed at the time of surveys (Survey Area). The Survey Area encompasses approximately 1,588 acres (Figure 1).

# 4.0 Methods

The objective of habitat surveys was to categorize habitats within the Survey Area per habitat categories set forth in OAR 635-415-0025 and ODFW's Fish and Wildlife Habitat Mitigation Policy. Habitat subtypes were adapted from habitat descriptions in Wildlife-Habitat Relationships in Oregon and Washington (Johnson and O'Neil 2001). ODFW's Fish and Wildlife Habitat Mitigation Policy defines six habitat quality categories ranging from Category 1 to Category 6, as defined in Table 1.

**Table 1. ODFW Habitat Category Definitions and Mitigation Goals (OAR 635-415-0025)**

| ODFW Habitat Category | Definition | Goals for Mitigation |
|---|---|---|
| 1 | Essential, limited, and irreplaceable habitat | No loss of habitat quantity or quality |
| 2 | Essential and Limited Habitat | No net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality |
| 3 | Essential habitat, or Important and Limited Habitat | No net loss of habitat quantity or quality |
| 4 | Important Habitat | No net loss of existing habitat quantity or quality |
| 5 | Habitat having high potential to become either essential or important habitat | Net benefit in habitat quantity or quality |
| 6 | Habitat that has low potential to become essential or important habitat | Minimize impacts |

Prior to field surveys, Tetra Tech reviewed National Wetlands Inventory (USFWS 2023b), National Hydrography Dataset (USGS 2023), and National Land Cover Database (Dewitz 2019). Tetra Tech also reviewed data from the Oregon Biodiversity Information Center (ORBIC 2023) on locations of rare species and habitats in the Project vicinity that were requested in preparation for field surveys. Using this information, Tetra Tech conducted a desktop-delineation of preliminary habitat transitions based on aerial imagery to assist the field habitat delineation effort. Preliminary habitat polygons desktop-delineated within the Survey Area were either confirmed or recategorized in the field.

Tetra Tech conducted field habitat categorization surveys during the growing season to aid in identification of vegetative species. Surveyors walked meandering transects within the Survey Area to categorize the composition and structure of habitat by noting the dominant vegetation; existing disturbance; or other habitat features such as shrub, forb, and grass composition and density. While walking these transects, surveyors also scanned the landscape to digitize habitats within the viewshed. Additional mapping was conducted by driving Facility roads and digitizing habitat from vantage points. In the field, surveyors digitized and updated polygons of relatively homogenous vegetation over aerial photos on GPS-enabled tablets using the FieldMaps application and characterized the composition and structure of habitat types on field datasheets (Attachment 1). Based on characteristics observed in the field, each delineated vegetation polygon was assigned a habitat type, subtype, and habitat quality category guided by the habitat categorization table, which was developed based on Johnson and O'Neil (2001) and OAR 635-415-0025 (Attachment 2).

Habitat types and categories were initially assigned to wetlands and waters in the field. These initial habitat categorizations were revised, where applicable, based on data collected during wetlands and waters surveys (Tetra Tech 2023). Data collected in the field and summarized in this report characterizing a particular habitat subtype and quality represented the average condition of all such polygons. In general, a minimum mapping unit of 1 acre was implemented, except for

specialized habitat types such as wetlands. Following field surveys, digitized boundaries were downloaded and processed in GIS and data was reviewed for quality control.

# 5.0 Results

Biologists conducted habitat and botanical surveys on May 12, May 19, June 28, and August 10, 2023; March 28, 2024; and December 4, 2025. Habitat types, subtypes, and categories are presented in Table 2, shown on Figures 2 and 3, and representative photos are provided in Attachment 3. The entire Survey Area is within ODFW West Side Big Game Year-Round Peripheral Habitat, which is considered Category 4 habitat (ODFW 2017). Therefore, areas mapped as Category 5 in the field were considered Category 4 for mitigation purposes. The presence of a particular habitat category within the Survey Area does not indicate that this habitat will necessarily be impacted by the Facility.

**Table 2. Habitat Categories, Types, and Subtypes within the Survey Area**

| Habitat Type | Habitat Subtype | Habitat Category | | | Habitat Totals (acres)[1] | Percent of Survey Area[1] |
|---|---|---|---|---|---|---|
| | | 2 | 4 | 6 | | |
| Wetlands | Emergent Wetlands | 21 | 803 | -- | **824** | **51.9** |
| | Forested Wetlands | 5 | -- | -- | **5** | **0.3** |
| | Scrub-shrub Wetlands | 3 | -- | -- | **3** | **0.2** |
| Agriculture, Pasture, and Mixed Environs | Orchard, Vineyards, Grass Seed Fields, Other Row Crops | -- | 740 | -- | **740** | **46.6** |
| Open Water- Lakes, Rivers, Streams | Perennial Stream | 4 | -- | -- | **4** | **0.3** |
| Riparian Forest and Natural Shrubland Complexes | Westside Riparian | 4 | -- | -- | **4** | **0.3** |
| Urban and Mixed Environs | | -- | -- | 4 | **4** | **0.3** |
| Upland Forests and Woodlands | Westside Lowlands Conifer-Hardwood | -- | 4 | -- | **4** | **0.2** |
| **Category Total (acres)[1]** | | **38** | **1,546** | **4** | **1,588** | **100** |
| **Percent of Survey Area** | | **2.4** | **97.4** | **0.3** | **100** | |

Note: Survey results presented in this report are used to inform project design, including avoidance of sensitive habitats where practicable. Values listed in this table do not reflect acres of impact.

[1] Totals may not sum exactly due to rounding.

## 5.1 Wetlands

Wetlands, which consisted of Emergent, Scrub-shrub, and Forested Wetland habitat subtypes, were the dominant habitat type mapped in the Survey Area (52.4 percent of the Survey Area). Based on vegetative characteristics observed during field surveys, Emergent Wetlands mapped within the Survey Area were Category 2 and 4. Category 4 Emergent Wetlands consisted of highly disturbed and converted agricultural wetlands within or adjacent to cultivated agricultural fields or associated with streams mapped in the Survey Area. Common species included annual ryegrass, meadow foxtail (*Alopecurus pratensis*), common spikerush (*Eleocharis palustris*), and short-awn foxtail (*Alopecurus aequilis*).

Emergent Wetlands not in agricultural production had a higher predominance of native species including common spikerush, short-awn foxtail, American water plantain (*Alisma triviale* [*A. plantago-aquatica*]), and American sloughgrass (*Beckmannia syzigachne*). Non-native species along edges of agricultural fields included meadow foxtail, pennyroyal (*Mentha pulegium*), Himalayan blackberry (*Rubus bifrons*), spotted ladysthumb (*Persicaria maculosa*), hyssop loosestrife (*Lythrum hyssopifolium*), and barnyard grass (*Echinochloa crus-gallie*). Category 2 Emergent Wetlands included depressional wetlands in abandoned rice paddies in the north-central portion of the Survey Area and emergent wetlands adjacent to perennial streams in the northeastern portion of the Survey Area. Category 2 Emergent wetlands were characterized by areas of open water and a predominance of native species such as American water plantain and common spikerush early in the season (Attachment 3, Photo 6). Later in the season (i.e., in late June through August), non-native species such as curled dock (*Rumex crispus*), spotted ladysthumb, pennyroyal, and marsh cudweed (*Gnaphalium uliginosum*) became more dominant in these wetlands.

Areas adjacent to Little Muddy Creek in the central portion of the Survey Area were mapped as Category 2 Scrub-shrub Wetland. Dominant species in this area included willow (*Salix* sp.), Oregon ash (*Fraxinus latifolius*) saplings, Himalayan blackberry, common spikerush, and meadow foxtail.

Several small areas were mapped as Category 2 Forested Wetlands throughout the Survey Area. Forested Wetlands were located in the middle of cultivated annual ryegrass and tall fescue fields, along a perennial tributary to Little Muddy Creek, and adjacent to Putnam Creek (Figures 2 and 3). Dominant species in the canopy of the Forested Wetland in the agricultural field included Oregon ash, black cottonwood (*Populus trichocarpa*), and white poplar (*Populus alba*), and dominant understory species included Himalayan blackberry, white poplar saplings, and trailing blackberry (*Rubus ursinus*). Dominant species in the Forested Wetland along the tributary to Little Muddy Creek included Oregon ash, hawthorn (*Crataegus* sp.), and sweet cherry (*Prunus avium*) in the overstory, and Himalayan blackberry, snowberry (*Symphoricarpos albus*), meadow foxtail, reed canarygrass (*Phalaris arundinacea*), and cow parsnip (*Heracleum maximum*) in the understory.

## 5.2 Agriculture, Pasture, and Mixed Environs

Based on vegetative characteristics observed in the field, the second most dominant habitat type mapped in the Survey Area was Category 4 Agriculture, Pasture, and Mixed Environs habitat (46.6

percent of the Survey Area). This habitat type primarily consisted of annual ryegrass (*Lolium multiflorum*) fields grown for seed production, as well as a few fields of cultivated tall fescue (*Schedonurus arundinacea*).

## 5.3 Urban and Mixed Environs

Approximately 4.2 acres of the Survey Area was mapped as Category 6 Urban and Mixed Environs. This habitat subtype consisted of gravel roads and parking areas used for agricultural cultivation and an existing substation and transmission line.

## 5.4 Riparian Forest and Natural Shrubland Complexes

Within the Survey Area, Category 2 Westside Riparian habitat was found in association with perennial streams and a drainage ditch. Dominant vegetation in the overstory typically consisted of Oregon ash, hawthorn, sweet cherry, and willow; while the understory consisted of Himalayan blackberry, meadow foxtail, annual ryegrass, blue wildrye (*Elymus glaucus*), wild oats (*Avena fatua*), soft brome (*Bromus hordeaceus*), cow parsnip, and teasel (*Dipsacus fullonum*).

## 5.5 Open Water—Lakes, Rivers, Streams

Category 2 Perennial Stream habitat included six perennial streams mapped within the Survey Area. Named streams within the Survey Area include Little Muddy Creek, Putnam Creek, Bishop Creek, unnamed tributary to Muddy Creek, and two unnamed tributaries to Little Muddy Creek. These streams have been channelized and are periodically maintained for agricultural purposes. Agricultural ditches and roadside ditches covey surface water from the agricultural fields to these streams. Although vegetation along many of these streams was dominated by non-native species such as Himalayan blackberry, teasel, and reed canarygrass (Attachment 3, Photo 13), these streams were mapped as Category 2 because they were determined to be fish-bearing stream channels that support native fish per StreamNet (StreamNet 2023). During the 2024 surveys, small freshwater mussels, likely basket clams (*Corbicula fluminea*), and signal crayfish (*Pacifastacus leniusculus*) were observed.

## 5.6 Upland Forests and Woodlands

Adjacent and to the north of the Forested Wetland in the agricultural field (see Section 5.2) was a small area of Category 4 Westside Lowlands Conifer-Hardwood Forest. This area included a mix of native and horticultural tree species including bigleaf maple (*Acer macrophyllum*), black walnut (*Juglans nigra*), and Sierra redwood (*Sequoiadendron giganteum*). The understory was dominated by non-native species including tall fescue, orchard grass (*Dactylis glomerata*), tall oatgrass (*Arrhenatherum elatius*), meadow foxtail, and Himalayan blackberry.

# 6.0 Summary and Conclusions

This survey report describes conditions documented at the Facility to support assessment of potential impacts and/or adverse effects in the Application for Site Certificate. The presence of a particular habitat category within the Survey Area does not indicate that this habitat will necessarily be impacted by the Facility. Based on the results of field surveys and consultation with ODFW, habitat in the Survey Area meets the definition of Categories 2, 4, and 6 as defined by OAR 635-415-0025. The Survey Area is entirely within ODFW West Side Big Game Year-Round Peripheral Habitat, which is considered Category 4 habitat (ODFW 2017).

The mitigation goal for Category 2 habitat is no net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality and the mitigation strategy is in-kind, in-proximity mitigation (Table 1). The mitigation goal for Category 4 habitat is no net loss of habitat quantity or quality and the mitigation strategy is in-kind or out-of-kind, and in-proximity or off-proximity. No habitat mitigation is required for Category 6 habitat; instead, the mitigation goal is to minimize impacts.

# 7.0 References

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# Figures

# Muddy Creek Energy Park

## Figure 1
## Habitat Categorization Survey Area

**LINN COUNTY, OR**

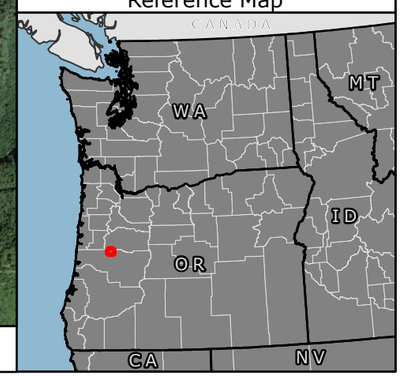
Survey Area
Interstate Highway
Local Roads

Bishop Creek
Putnam Creek
Little Muddy Creek
Muddy Creek
Muddy Creek Tributary
Priceboro Dr
Brownsville Coburg Rd
Priceboro Rd
Gap Rd
Alice Ln 3502
Bowers Dr
Bowers Rd
N Coburg Rd
Miller Dr
Mt Tom Dr
Mount Tom Dr
5

1:24,000 WGS 1984 UTM Zone 10N 0 0.5 1 2 Miles NOT FOR CONSTRUCTION

TETRA TECH Hanwha

Reference Map

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# Muddy Creek Energy Park

## Figure 2
## Habitat Categories

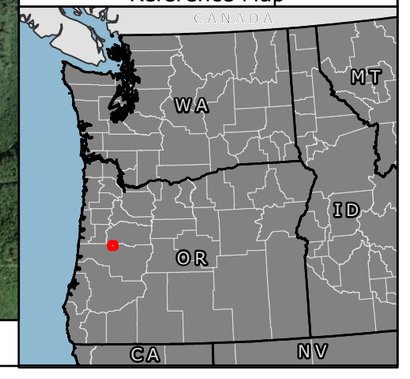
**LINN COUNTY, OR**

Interstate Highway
Local Roads
Survey Area

Habitat Categories
2
4
6

TETRA TECH
Hanwha

Reference Map




Priceboro Dr
Brownsville Coburg Rd
Alice Ln 3502
Gap Rd
Priceboro Rd
Bowers Dr
Bowers Rd
N Coburg Rd
Miller Dr
Mt Tom Dr
Mount Tom Dr

1:24,000 WGS 1984 UTM Zone 10N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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# Muddy Creek Energy Park

## Figure 3
## Habitat Types and Subtypes

**LINN COUNTY, OR**

Survey Area
Interstate Highway
Local Roads

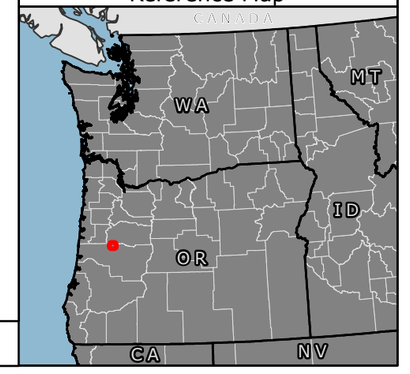
Habitat Type - Habitat Subtype

- Agriculture, Pasture, and Mixed Environs - Orchards, Vineyards, Grass Seed Fields, Other Row Crop
- Riparian Forest and Natural Shrubland Complexes - Westside Riparian
- Upland Forests and Woodlands - Westside Lowlands Conifer-Hardwood
- Urban and Mixed Environs - Urban and Mixed Environs
- Open Water- Lakes, Rivers, Streams - Perennial Stream
- Wetlands - Emergent Wetlands
- Wetlands - Forested Wetlands
- Wetlands - Scrub-shrub Wetlands

TETRA TECH

Hanwha

Reference Map




1:24,000

WGS 1984 UTM Zone 10N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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# Attachment 1. Habitat Categorization Field Datasheet

**Data Sheet Id**: _____

# MUDDY CREEK SOLAR 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 or Ephemeral(IS/EPH)

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

**Riparian forest and shrubland complexes:** Westside riparian(WR)

**Upland grassland:** Westside grasslands(WG)

**Upland forests and woodlands:** Westside lowlands conifer – hardwood forest(CH)/ Westside oak and dry Douglas-fir forest and woodlands(OD) / Westside oak woodlands/savanna(WO)

**Agriculture, pasture, and mixed environs:** Planted grasslands(PG)/ Orchards, vineyards, grass seed fields, other row crops, irrigated poplar plantations(AG)/ Irrigated pastures and hay meadows(PA**)**

**Cliffs, caves and talus(CT)**

**Urban and mixed environs(UR)**

Notes if confusion _____

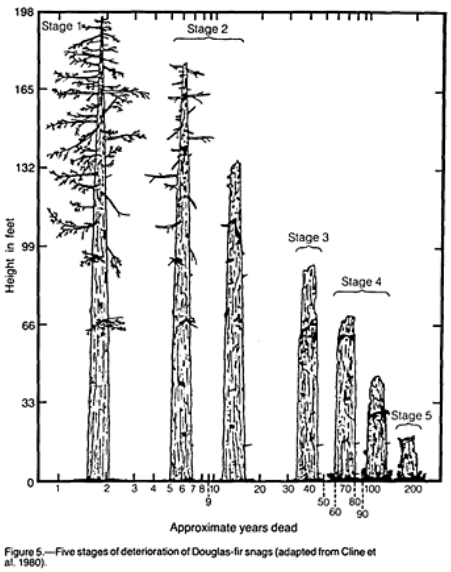


Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

## Detailed vegetation measurements:

**Dominant ≥20%, Subdominant 10-20%

### *Trees*

Dominant species _____

Subdominant species _____

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

Percent native cover _____ Percent bare ground or duff _____

Stumps present? Yes No

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

Forest phase per Brown: GF SHR OSP CSPS LGSAW OGDD

### *Shrubs*

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover _____ Percent bare ground _____

Percent crytobiotic crust (if applicable)_____

### *Herbs & Grasses*

Dominant species _____

Subdominant species _____

Canopy closure (%) _____ No. subcanopy layers ____

Percent native cover:_____ Percent bare ground or duff ____

Percent crytobiotic crust (if applicable)_____

**Other descriptions:**

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

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

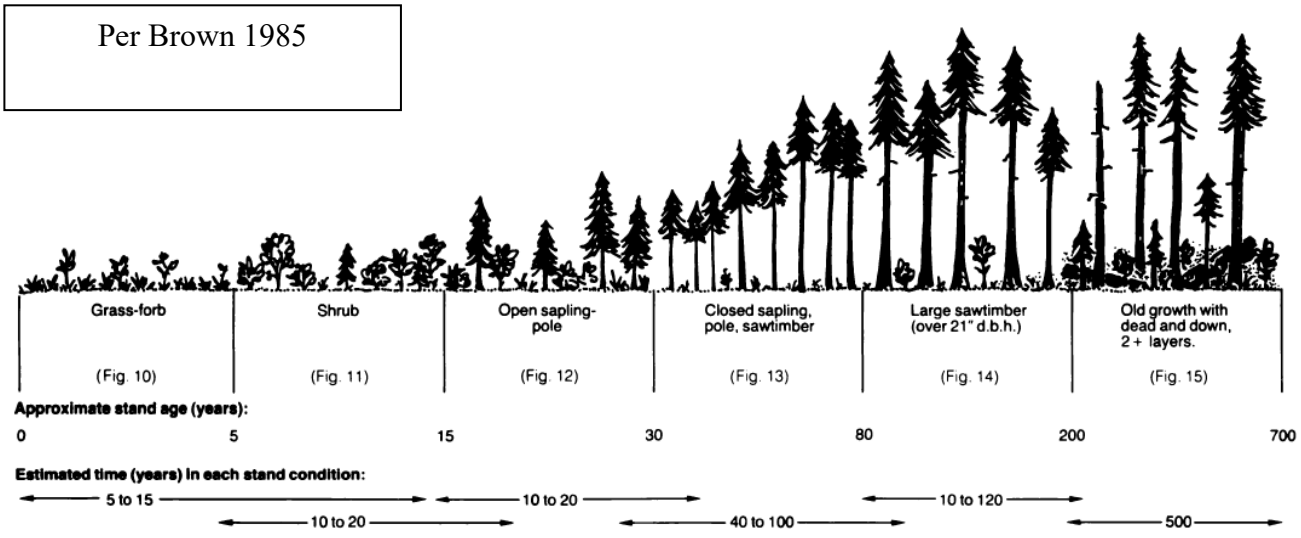
__Recreation, if so what kind? _____ Other (please specify) _____

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

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

Any additional notes:

Per Brown 1985



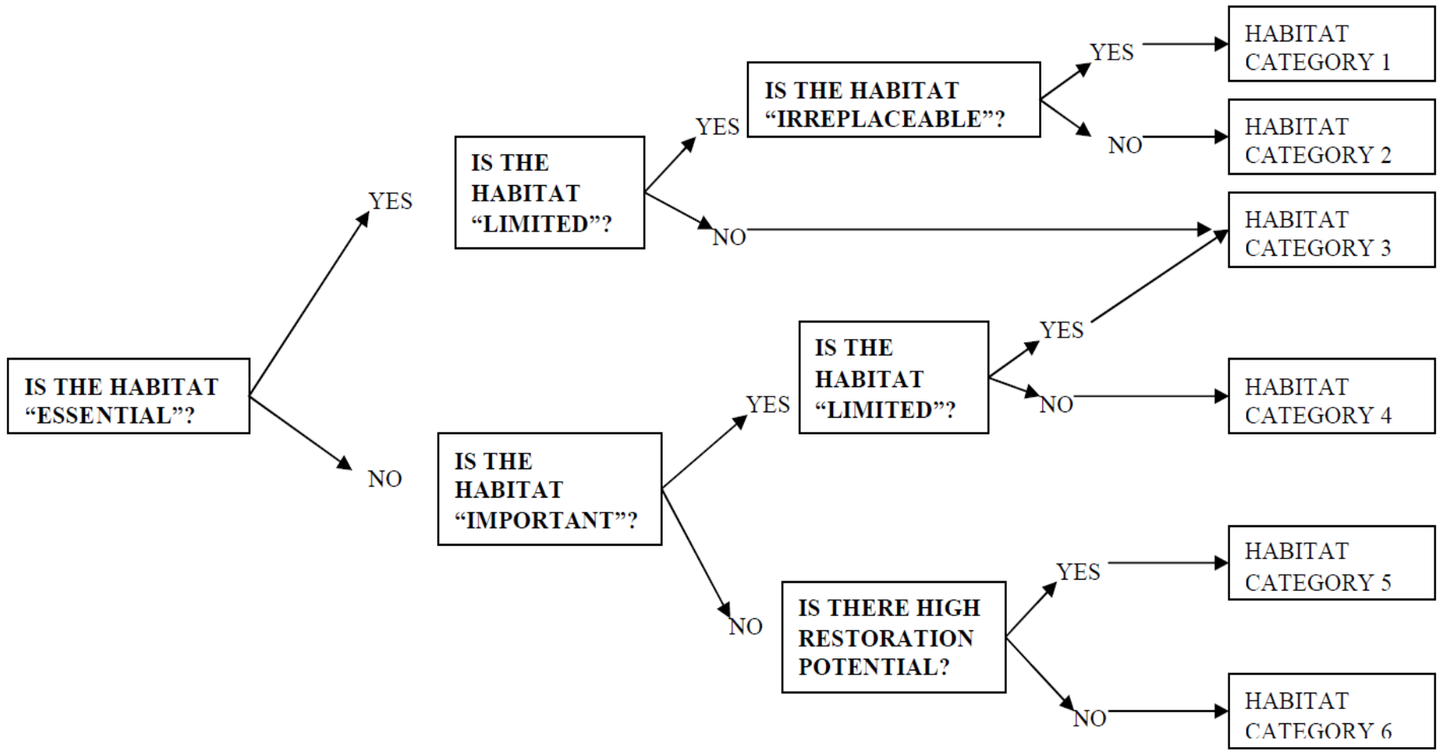
# Attachment 2. Habitat Categories, Types, and Subtypes with Potential to Occur at the Muddy Creek Energy Park

**Habitat Categories, Types, and Subtypes with Potential to Occur at the Muddy Creek Energy Park Solar Facility**

| Habitat Type | Habitat Subtype | Category 1 | Category 2 | Category 3 | Category 4 | Category 5 | Category 6 |
|---|---|---|---|---|---|---|---|
| **THE FIRST ROW IS AN OVERLAY THAT AUTOMATICALLY ASSIGNS CATEGORIES, BASED ON SPECIES PRESENCE, TO ONE OR MORE OF THE HABITAT TYPES DESCRIBED BELOW** | | | | | | | |
| Big Game Designated Habitats | **West Side Big Game Year-Round Peripheral Habitat** | | | | **As designated on County Comprehensive Land Use Maps and ODFW Western Oregon Deer and Elk Habitat map and guidance document.** | | |
| Open Water – Lakes, Rivers, Streams | **Permanent Ponds/Lakes**<br>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**<br>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**<br>Streams mapped as having permanent (year-round) flow | | **Fish-bearing natural stream channels that support native 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 stream channels that support native 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;<br>OR<br>non-fish-bearing stream channels which drain into fish-bearing streams based on StreamNet data. | Non-fish-bearing stream channels that do not directly drain into fish-bearing streams. | | |
| | **Intermittent or Ephemeral**<br>Streams mapped 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**<br>Emergent wetlands with herbaceous vegetation | Any bog, fen, or functional vernal pool. | **High quality habitat, dominated by native species.** | Mixture of native and non-native plant species and low to moderate disturbance. | **Farmed or moderately to highly disturbed wetlands; mixture of native and non-native plant species; provides seasonal wildlife habitat.** | Farmed wetlands; highly disturbed, dominated by non-native plant species. | |
| | **Scrub-shrub Wetlands**<br>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 moderately to highly disturbed wetlands; mixture of native and non- | Farmed or previously filled wetlands; highly disturbed, dominated by non-native plant species. | |

| Habitat Type | Habitat Subtype | Category 1 | Category 2 | Category 3 | Category 4 | Category 5 | Category 6 |
|---|---|---|---|---|---|---|---|
| | | | | | native plant species; provides seasonal wildlife habitat. | | |
| | **Forested Wetlands**<br>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 | **Westside Riparian**<br>Streamside deciduous broadleaf shrubland, woodland or forest | | **High quality, diverse riparian areas that are not degraded and are associated with fish-bearing streams.** | Typical mid-seral riparian that provides wildlife habitat; mix of native and non-native species;<br>OR<br>Degraded riparian areas associated with fish-bearing streams. | Standing riparian vegetation associated with non-fish-bearing streams, dominated by non-native species (<50% native). Provides marginal habitat; somewhat degraded. | Highly degraded; dominated by non-native plant species (<50% native). | |
| Upland Grassland | **Westside Grasslands**<br>Grassland areas dominated by natives | | Any size high quality remnant patch that provides potential habitat for uncommon wildlife species dependent on westside grasslands. | Any size medium/low quality remnant prairie habitat. | Low quality or fencerows with predominance of non-native species. | Very low quality dominated by non-native species with high restoration potential. | |
| Upland Forests and Woodlands | **Westside Lowlands Conifer-Hardwood Forest**<br>Lower elevation forests dominated by mixed conifer and/or hardwood species | | Large sawtimber or old growth forest stands (as defined in Brown ed. 1985) including complex vertical structure, closed canopy, downed wood (>21" DBH). | Mid-seral/closed sawtimber forest (as defined in Brown ed. 1985)(e.g., 10"-21" DBH). | **Regenerating or young closed and open sapling, pole forest (as defined in Brown ed. 1985) (e.g., < 10" DBH).**<br>**OR**<br>**Forested areas consisting of native and non-native horticultural tress that provide wildlife habitat.** | Shrub and clearcut stage areas that were recently logged. | |
| | **Westside Oak and Dry Douglas-fir Forest and Woodlands**<br>Woodlands (defined as forests with a canopy closure of 10 - 60%) dominated by Oregon white oak, with Douglas-fir and other evergreen conifers, deciduous broadleaf trees, or evergreen broadleaf trees | | 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.<br>OR<br>Large-diameter oaks, generally >20" DBH with open-canopy structure (spreading, rounded, or mushroom crowns; large lateral or broken limbs that contain cavities, crooked branches, and high insect diversity). | Essential, oak forests with higher disturbance and more non-natives than Category 2. | | Shrub and clearcut stage areas that were previously logged or conifers heavily encroaching into historic oak stand. | |

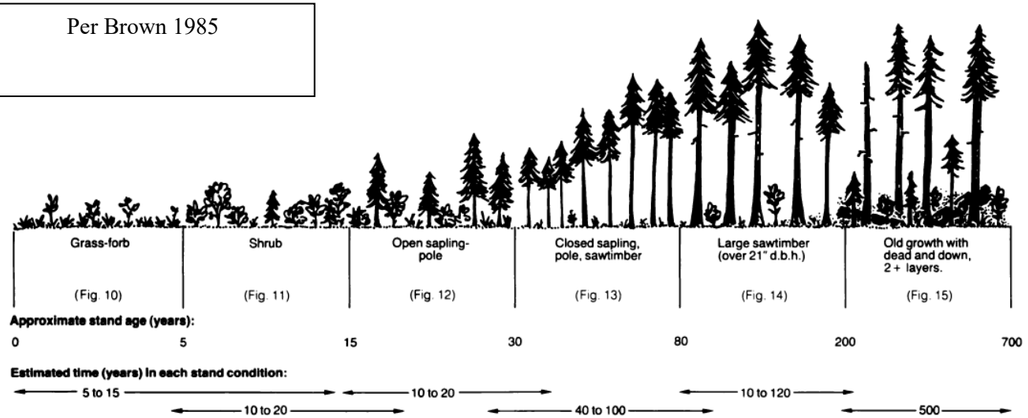
| Habitat Type | Habitat Subtype | Category 1 | Category 2 | Category 3 | Category 4 | Category 5 | Category 6 |
|---|---|---|---|---|---|---|---|
| | | | Younger oak stands with some disturbance and nonnative species present.<br><br>Habitat for special status species. | | | | |
| | **Westside Oak Woodlands/Savanna**<br>Pure oak woodlands/savanna | ≥ 1 acre patches with qualities of pure oak woodland.<br><br>May also be within oak savanna, given that total canopy closure is less than 25%, but oak comprises at least 50% of canopy present; large-diameter trees with open-canopy structure, few trees per acre. | 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.<br><br>OR<br><br>Large-diameter oaks, generally >20" DBH with open-canopy structure (spreading, rounded, or mushroom crowns; large lateral or broken limbs that contain cavities, crooked branches, and high insect diversity).<br><br>Younger oak stands with some disturbance and non-native species present.<br><br>Habitat for special status species. | Essential, oak forests with higher disturbance and nonnatives than Category 2.<br><br>OR<br><br>conifer encroachment occurring. | | | |
| | | | | | | | |
| Agriculture, Pasture, and Mixed Environs | **Planted Grasslands** | | | Croplands planted to grassland with characteristics necessary to potentially provide habitat for sensitive wildlife due to cover and forage quality. | Croplands planted to grassland that lack later seral stage vegetative communities or are of less importance as wildlife habitat due to management or location. | Croplands planted to grassland that lack later seral stage vegetative communities and are highly disturbed or degraded, and have high restoration potential. | |
| | **Orchards, Vineyards, Grass Seed Fields, Other Row Crops** | | | | **Active agricultural areas with high potential for restoration and seasonal wildlife habitat.** | Active agricultural areas with high potential for restoration. | Active agricultural areas with low potential for restoration. |
| | **Irrigated Pastures and Hay Meadows** | | | | Potential habitat for wildlife. | | |
| Urban and Mixed Environs | | | | | | | **All developed areas.** |
| Note: Bold text describes habitat types and categories found within the Survey Area. No Category 1 habitat occurs within the Survey Area. | | | | | | | |




ODFW. Mitigation Category Flow Chart.

See: https://www.dfw.state.or.us/lands/mitigation_policy.asp

Per Brown 1985



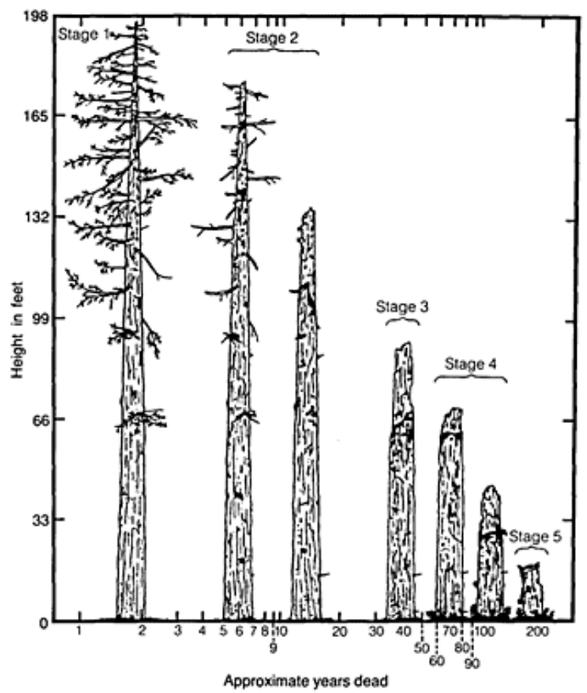




Figure 5.—Five stages of deterioration of Douglas-fir snags (adapted from Cline et al. 1980).

# Attachment 3. Select Photographs of Habitats Taken during Surveys

Photo 1. Category 4 annual ryegrass field in northwestern portion of Survey Area. 5/12/2023.

Photo 2. Category 4 tall fescue field in southern portion of Survey Area. 8/10/2023.

Photo 3. Category 4 Emergent Wetland within annual ryegrass field in northern portion of Survey Area. 5/12/2023.

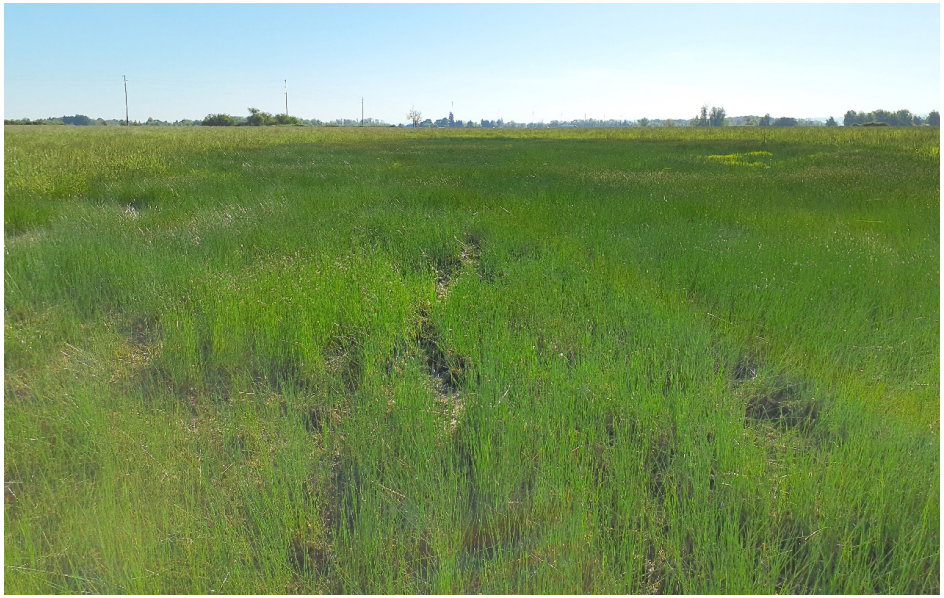


Photo 4. Category 4 Emergent Wetland in central portion of Survey Area. Photo taken in late May before non-native species became prevalent. 5/23/2023.

Photo 5. Category 4 Emergent Wetland in between two agricultural fields in north-central portion of Survey Area. 5/12/2023.

Photo 6. Category 2 Emergent Wetland in north-central portion of Survey Area. 5/12/2023.

Photo 7. Category 2 Scrub-shrub Wetland in northeastern portion of Survey Area. 5/26/2023.

Photo 8. Category 2 Forested Wetland in the middle of agricultural field in the central portion of the Survey Area. 5/12/2023.

Photo 9. Understory dominated by Himalayan blackberry in Category 2 Forested Wetland in the central portion of Survey Area. 8/10/2023.

Photo 10. Category 2 Forested Wetland in the southern portion of Survey Area along a perennial tributary to Little Muddy Creek. 5/19/2023.

Photo 11. Category 4 Westside Lowlands Conifer-Hardwood Forest in the central portion of Survey Area. 6/28/2023.

Photo 12. Understory of Category 4 Westside Lowlands Conifer-Hardwood Forest dominated by Himalayan blackberry and non-native grasses. 6/28/2023.

Photo 13. Category 2 Perennial stream in the central portion of the Survey Area. 5/19/2023.

Photo 14. Category 4 grass seed field. 5/19/2023.

Photo 15. Category 4 Westside Riparian in the northern portion of the Survey Area. 6/28/2023.

Photo 16. Category 4 Westside Grasslands in the southwestern portion of the Survey Area. 6/28/2023.

Photo 17. Category 6 Urban and Mixed Environs - gravel agricultural road. 6/28/2023.

Photo 18. Category 6 Urban and Mixed Environs - transmission line and disturbed area adjacent to existing substation. 6/28/2023.

# Botanical Survey Report
# Muddy Creek Energy Park

**Prepared for**
**Muddy Creek Energy Park LLC**

**Prepared by**

TETRA TECH

**January 2026**

**GENERAL DISCLAIMER FOR SCIENTIFIC WORK PRODUCTS**

This deliverable was prepared in accordance with generally accepted professional practices that are typically utilized for scientific work products. The work was performed within the limitations and assumptions of our approved scope of work, and the descriptive documentation associated with this deliverable. Unless explicitly included in our approved scope of work, information provided in this deliverable has not been prepared to meet industry standards for engineering and should not be used for construction.

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# 1.0 Introduction

Muddy Creek Energy Park LLC plans to develop the Muddy Creek Energy Park (Facility), a proposed solar photovoltaic power generation facility in Linn County, Oregon. As part of its environmental due diligence, Muddy Creek Energy Park LLC contracted Tetra Tech, Inc. (Tetra Tech) to conduct botanical surveys for the Facility in support of an Application for Site Certificate (ASC) through the Oregon Department of Energy's Energy Facility Siting Council (EFSC). The purpose of the botanical surveys was to document the presence of federal- or state-listed endangered, threatened, proposed, or candidate vascular plant species and state- and county-listed noxious weeds. The surveys were designed in accordance with EFSC standards set forth in Oregon Administrative Rules (OAR) 345-022-0060 and OAR 345-022-0070.

# 2.0 Agency Coordination

Prior to the surveys, Muddy Creek Energy Park LLC and Tetra Tech met with the Oregon Department of Fish and Wildlife (ODFW) and the U.S. Fish and Wildlife (USFWS) staff via video meetings on April 12 and 27, 2023, to introduce the Facility and discuss survey methods, survey extent, and plants of interest at the Facility. ODFW and USFWS staff provided input and concurrence on the scope, timing, and extent of the botanical field surveys prior to Tetra Tech's field deployments (ODFW 2023, USFWS 2023a).

# 3.0 Survey Area

Surveys were conducted within the micrositing area which encompassed the entire Facility site boundary as proposed at the time of surveys (Survey Area). The Survey Area encompasses approximately 1,588 acres (Figure 1).

# 4.0 Methods

## 4.1 Background Review

### *4.1.1 Threatened, Endangered, and Candidate Plants*

Prior to conducting field surveys, Tetra Tech conducted a review of existing information to identify federal and state endangered, threatened proposed, and candidate plant species with the potential to occur within the Survey Area. Sources of information included:

- USFWS Information for Planning and Consultation (IPaC) database query for Linn County (USFWS 2023b);

- USFWS threatened, endangered, and candidate species list for Oregon (USFWS 2024);
- Oregon's threatened, endangered, and candidate plants (ODA 2024a)
- Oregon Listed Plants by County (ODA 2024b);
- OAR 603-073-0070 - State List of Endangered and Threatened Species;
- Oregon Biodiversity Information Center (ORBIC) Element Occurrence Records for the vicinity of the Facility (ORBIC 2023a);
- ORBIC 2023 Rare, Threatened and Endangered Vascular Plant List (ORBIC 2023b); and
- OregonFlora online guide to vascular plants of Oregon (OregonFlora 2024).

The initial list of potential primary target species included all vascular plant species listed as endangered, threatened, proposed, or candidates for listing by the USFWS under the federal Endangered Species Act (ESA), or by the Oregon Department of Agriculture (ODA) under the OAR 603-073-0070 and 603-073-0080. Tetra Tech reviewed this initial list to produce a final list of target species that included all federal- and state-listed, proposed, and candidate plant species that have the potential to occur within or near the Survey Area based on known occurrences.

Based on this review, Tetra Tech determined that 13 federal and/or state-listed or candidate plant species have the potential to occur within the vicinity of the Survey Area (Table 1). Species were eliminated from consideration if their habitat was likely or known to be absent from the Survey Area, or their known or suspected range did not overlap with the Survey Area. Tetra Tech also reviewed the above desktop resources to identify ORBIC-tracked species with potential to occur within the Survey Area (Attachment 1). ORBIC-tracked species are not protected under federal or state law but are species of conservation concern or species for which more information is needed before their status can be determined (ORBIC 2019). Surveyors were directed to document these species if observed, although they were not the primary focus of surveys.

**Table 1. Federal- and State-Listed Plant Species with Potential to Occur within Survey Area**

| Scientific Name | Common Name | Federal Status[1] | State Status | Habitat |
|---|---|---|---|---|
| *Castilleja levisecta* | Golden paintbrush | DL | E | Flat grasslands, mounded prairies, and steep, grassy bluffs (ODA 2024c). |
| *Delphinium oreganum* | Willamette Valley larkspur | -- | C | In the Willamette Valley, species is most commonly found in wet prairies with shrubby or Oregon ash (*Fraxinus latifolia*) overstory. Also found in dry oak woodlands, open hillsides, well-drained native prairies, and along roadsides and fencerows (OregonFlora 2019a). |
| *Erigeron decumbens* | Willamette daisy; Willamette Valley daisy | FE | E | Seasonally flooded bottomland prairies and well-drained upland prairies at elevations ranging from 240-950 feet (ODA 2024d). |
| *Eucephalus vialis* | Wayside aster | -- | T | Occupies a range of habitat types, including dense coniferous forests, open deciduous woodlands, grassy balds, and exposed serpentine slopes. Often found in relatively open areas in the understory of mixed coniferous/hardwood forests, along roadsides, and on open slopes and prairie balds (ODA 2024e). |
| *Horkelia congesta* ssp. *congesta* | Shaggy horkelia | -- | C | Meadows and open woods at low elevations (OregonFlora 2019b). |
| *Lathyrus holochlorus* | Thin-leaved pea | -- | E | Low elevation roadsides, fencerows, creek banks, forest edges, oak savannas, shrublands, and grasslands (OregonFlora 2019c). |
| *Lomatium bradshawii* | Bradshaw's desert parsley | DL | E | Wet prairie habitats in clay soils or substrates having a dense clay layer below the surface. The majority of populations are located in the southern Willamette Valley in seasonally saturated or flooded prairies near creeks and small rivers (ODA 2024f). |
| *Lupinus oreganus* (*L. sulphureus ssp. kincaidii*) | Kincaid's lupine | FT | T | Upland prairie remnants, oak savannas, and ecotones between grassland and forest. It usually occurs in heavy, well-drained soils at elevations below 2,750 feet (ODA 2024g; OregonFlora 2019d). |
| *Montia howellii* | Howell's montia | -- | C | Vernally wet sites, often in compacted soil (Miller and Chambers 2012). |
| *Navarretia willamettensis* | Willamette navarretia | -- | E | Seasonally wet meadows or prairies and vernal pools (NatureServe 2023). |
| *Sericocarpus rigidus* | White-topped aster | -- | T | Open, grassy, seasonally moist prairie and savannah habitats (ODA 2024h). |
| *Sidalcea nelsoniana* | Nelson's checkermallow | DL | T | Typically found in open prairie remnants along the margins of streams, sloughs, ditches, roadsides, fence rows, and drainage swales and in fallow fields. Occasionally, occurs in the understory or at the edges of ash woodlands or among woody shrubs (ODA 2024i). |
| *Sisyrinchium hitchcockii* | Hitchcock's blue-eyed grass | -- | E | Prairies, oak savannas, grassy areas, and openings in woods, mostly where soil is dry late in season (OregonFlora 2019e; OregonFlora 2024). |

1. Federal Status: DL = federally delisted; FE = federally endangered; FT = federally threatened.
2. State Status: C = state candidate; E = state endangered; T = state threatened.

### *4.1.2 Noxious Weeds*

Prior to field surveys, Tetra Tech reviewed lists of species designated as noxious weeds in Oregon state (ODA 2024j; Attachment 2). Linn County does not currently maintain a list of designated noxious weeds separate from the state list (K. Burright, Linn County Road Department, personal communication, April 4, 2023). Existing literature and other sources were also reviewed to familiarize surveyors with identification of designated noxious weeds that would potentially be encountered within the Survey Area. Sources of information reviewed included:

- OregonFlora Online Guide to Vascular Plants of Oregon (OregonFlora 2024);
- Oregon Noxious Weed Profiles (ODA 2024k); and
- Oregon WeedMapper (ODA 2024l).

## 4.2 Field Survey Methods

### *4.2.1 Threatened, Endangered, and Candidate Plants*

Field surveys were conducted in mid-May, late June, and mid-August 2023 and late-May 2024. The survey schedule was chosen based on the recommended survey period for target threatened, endangered, and candidate plant species with potential to occur within the Survey Area (Table 1). The survey period also coincided with the identification period for the majority of the ORBIC-tracked species that have the potential to occur within the Survey Area (Attachment 1). Surveys were conducted by a Tetra Tech botanist familiar with suitable habitat for and identification of the target plant species. Prior to conducting field surveys, fact sheets for the target plant species were compiled. These fact sheets were used by the surveyor in the field and included the following:

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

Botanical field surveys were conducted using the Intuitive Controlled survey method, a standard and commonly accepted survey protocol (USFS and BLM 1998). This method incorporates meandering transects that traverse the Survey Area, with the exception of active agricultural and developed areas as these areas do not provide suitable habitat for rare plants, and target the full array of major vegetation types, aspects, topographical features, habitats, and substrate types. While en route, the surveyors search for target species, and when the surveyors arrive at an area of high potential habitat (that was defined in the pre-field review or encountered during the field visit), they conduct a complete survey for the target species. Complete surveys include an examination of 100 percent of the habitat.

During surveys, Tetra Tech maintained a running list of vascular plant species encountered and made informal collections of unknown species for later identification. Identification was verified using appropriate plant keys; in particular, Flora of the Pacific Northwest (Hitchcock and Cronquist 2018). Nomenclature follows that used by OregonFlora (2023). The final vascular plant list of all species observed during the surveys is included as Attachment 3.

### *4.2.2 Noxious Weeds*

Noxious weed surveys were conducted concurrently with surveys for threatened and endangered plants. When a noxious weed was encountered, the location was recorded with a GPS-enabled tablet using the ArcGIS FieldMaps application and the species, estimated size of infestation (i.e., small – less than 0.1 acre, medium – 0.1 to 1 acre, or large – 1 to 5 acres), and relative abundance (i.e., sparse [only a few individuals noted or low cover of species in area], common [many individuals of the species noted in area], or very high cover [dense population of the species]) was recorded.

# 5.0 Results

Field surveys were conducted May 12, May 19, June 28, and August 10, 2023 and May 22, 2024. During the surveys, Tetra Tech observed that habitat within the Survey Area consists predominantly of cultivated annual ryegrass (*Lolium multiflorum*) and tall fescue (*Schedonorus arundinacea*) fields grown for seed and hay production (Photos 1 and 2, Attachment 4). Other habitat types observed within the Survey Area included Emergent, Forested, and Scrub-shrub Wetlands, Perennial streams, and Irrigation ditches, Westside Grasslands, Westside Lowlands Conifer-Hardwood Forest, Westside Riparian and Urban and Mixed Environs. Additional details on habitat types observed within the Survey Area are provided in the Habitat Categorization Survey Report and Wetland Delineation Report prepared for the Facility (Tetra Tech 2026a, Tetra Tech 2025). The entire Survey Area has been altered or disturbed, either through agricultural activities, ongoing human disturbance, or the introduction of non-native species. Attachment 4 provides representative photographs of the Survey Area.

## 5.1 Threatened, Endangered, and Candidate Plants

A total of 188 vascular plant species were observed in the Survey Area (Attachment 3). No threatened, endangered, candidate or ORBIC-tracked species (Attachment 1) were observed within the Survey Area. Additionally, due to the abundance of non-native invasive species and noxious weeds as well as the existing disturbance in general, very little suitable habitat for these special status plant species was observed within the Survey Area overall.

## 5.2 Noxious Weeds

Tetra Tech recorded 11 noxious weed species within the Survey Area. Table 2 lists the noxious weed species observed, their noxious weed designation (i.e., status), and the frequency of observations; Figure 2 provides the locations of these observations.

**Table 2. Noxious Weeds Observed within Survey Area**

| Scientific Name | Common Name | Noxious Weed Status[1] | Frequency |
|---|---|---|---|
| *Carduus pycnocephalus* | Italian thistle | B | Observed in two locations in Survey Area |
| *Cirsium arvense* | Canada thistle | B* | Frequently observed throughout Survey Area |
| *Cirsium vulgare* | Bull thistle | B | Small patches commonly observed in eastern and central portions of Survey Area |
| *Conium maculatum* | Poison hemlock | B* | Observed in three locations in Survey Area |
| *Convolvulus arvensis* | Field bindweed | B | Observed in three locations in Survey Area |
| *Geranium lucidum* | Shining cranesbill, shiny leaf | B | Observed in two locations in Survey Area |
| *Hypericum perforatum* | St. Johnswort, common St. John's wort | B | Commonly observed in Survey Area |
| *Phalaris arundinacea* | Reed canarygrass, ribbongrass | B, T | Frequently observed throughout Survey Area |
| *Rubus armeniacus* | Himalayan blackberry | B | Frequently observed throughout Survey Area |
| *Senecio jacobaea* | Tansy ragwort | B*, T | Observed in five locations in Survey Area |
| *Ventenata dubia* | Ventenata grass | B | Observed in one location in Survey Area |

[1] Oregon State "B" Listed Weed: Weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties; *recommended action*: Limited to intensive control at the state, county or regional level as determined on a site-specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.

"T"-Designated Weed: A designated group of weed species selected from either the A or B list as a 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.

* Species marked with a (*) are targeted for biocontrol (ODA 2024j).

Of the 11 noxious weeds observed, three were frequently observed throughout the Survey Area: Canada thistle, Himalayan blackberry, and reed canarygrass. Most observations of these three species were associated with wetlands or streams occurring within the Survey Area.

Two noxious weeds, bull thistle and common St. Johnswort, were commonly observed within the Survey Area and were also typically observed adjacent to wetlands and streams. Most of the observations of bull thistle consisted of just a few individuals, whereas the observations of common St. Johnswort ranged from sparse individuals to dense infestations.

Tansy ragwort was observed in five locations during field surveys: three adjacent to agricultural fields in the northern portion of the Survey Area and two on the banks of Little Muddy Creek in the

central and southern portions of the Survey Area. Poison hemlock and field bindweed were each observed in three locations within the Survey Area. Two medium-sized (0.1 to 1.0 acre) infestations of poison hemlock were located along streams in the north and central portions of the Survey Area and one small, dense population was observed near the existing substation along Priceboro Drive (Figure 2). The three observations of field bindweed were located near the edges of agricultural fields or along roads in the central portion of the Survey Area.

Italian thistle and shining cranesbill were each observed twice during field surveys. Both observations of Italian thistle were located within the north-central portion of the Survey Area along berms used to separate now-abandoned rice paddies. The observations of shining cranesbill were both medium-sized (0.1 to 1 acre) and located in the understory of Forested/Scrub-shrub Wetlands.

Ventenata grass was only observed in one location during field surveys. This observation consisted of a small patch adjacent to an agricultural road in the northern portion of the Survey Area.

All of the noxious weed species observed are "B"-listed weeds (Table 2; ODA 2024j). Two species, reed canarygrass and tansy ragwort, are also "T"-designated weeds, meaning that the ODA has targeted these species for prevention and control (ODA 2024j).

# 6.0 Conclusions

No state threatened, endangered, proposed, or candidate species were observed during botanical surveys conducted in 2023 and 2024. Extensive disturbance from past and current agricultural activities, as well as the abundance of non-native species, have reduced the habitat suitability for threatened, endangered, proposed, or candidate species throughout the Survey Area. Tetra Tech mapped 11 state-designated noxious weeds, three of which were frequently observed throughout the Survey Area.

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# Figures

# Muddy Creek Energy Park

## Figure 1
## Survey Area

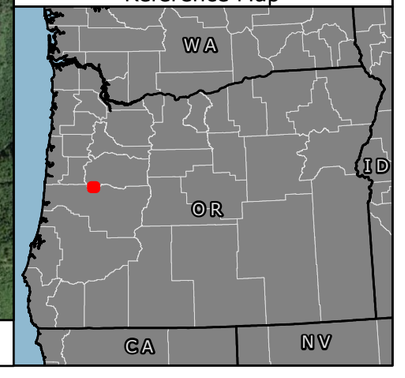
**LINN COUNTY, OR**

Survey Area
Interstate Highway
Local Roads

TETRA TECH

Hanwha

Reference Map



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# Muddy Creek Energy Park

## Figure 2
## Noxious Weeds Observed within Survey Area

**LINN COUNTY, OR**

Survey Area
Interstate Highway
Local Roads

Noxious Weeds Population Size
- < 0.1 acre
- 0.1 - 1 acre
- 1 - 5 acres

Noxious Weed Species
- Italian thistle *(Carduus pycnocephalus)*
- Canada thistle *(Cirsium arvense)*
- Bull thistle *(Cirsium vulgare)*
- Poison hemlock *(Conium maculatum)*
- Field bindweed *(Convolvulus arvensis)*
- Shining cranesbill *(Geranium lucidum)*
- Common St. Johnswort *(Hypericum perforatum)*
- Reed canarygrass *(Phalaris arudinacea)*
- Himalayan blackberry *(Rubus armeniacus)*
- Tansy ragwort *(Senecio jacobaea)*
- Ventenata *(Ventenata dubia)*

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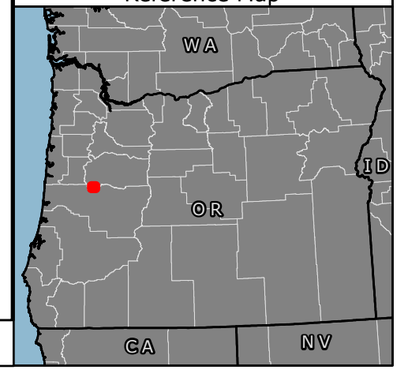
Reference Map

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0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

\\tt.local\GIS\US\CES\Projects\PDX\Hanwha\MuddyCreek\Maps\RarePlants_Surveyed_2023_2024_20260116\Hanwha_MuddyCreek_Botanical_20260116.aprx

# Attachment 1. ORBIC-tracked Vascular Plant Species with Potential to Occur within Survey Area

| Scientific Name | Common Name | Federal[1] | State[2] | ORBIC[3] | Habitat | Survey Period[4] |
|---|---|---|---|---|---|---|
| *Castilleja levisecta*[5] | Golden paintbrush | DL | E | 1-ex | Moist or wet meadows and native prairies, as well as steep, grassy bluffs at low elevations. | (April) May – June |
| *Cicendia quadrangularis* | Timwort | | | 2 | Moist open places. | March – May |
| *Cyperus acuminatus* | Short-pointed cyperus | | | 2 | Disturbed seasonal wetlands, usually in sandy soils. | Fruiting summer-fall (July – October). |
| *Delphinium oreganum*[5] | Willamette Valley larkspur | | C | 1 | Most commonly found in wet prairies with shrubby or Oregon ash (*Fraxinus latifolia*) overstory. Also found in dry oak woodlands, open hillsides, well-drained native prairies, and along roadsides and fencerows. | May – July |
| *Diplacus tricolor* | Three-colored monkeyflower | | | 2 | Vernally wet depressions. | March – June (July) |
| *Erigeron decumbens*[5] | Willamette Valley daisy | FE | E | 1 | Seasonally flooded bottomland prairies and well-drained upland prairies at elevations ranging from 240-950 feet. | May – July |
| *Eucephalus vialis*[5] | Wayside aster | | T | 1 | Occurs in a range of habitat types, including dense coniferous forests, open deciduous woodlands, grassy balds, and exposed serpentine slopes. Often found in relatively open areas in the understory of mixed coniferous/ hardwood forests, along roadsides, and on open slopes and prairie balds. | (June) July – September |
| *Hieracium umbellatum* | Umbellate hawkweed | | | 2 | Disturbed areas, roadsides, forest edges, thickets, sandy areas. | June – September |
| *Horkelia congesta* ssp. *congesta*[5] | Shaggy horkelia | | C | 1 | Meadows and open woods at low elevations. | April – July |
| *Juncus kelloggii* | Kellogg's dwarf rush | | | 2 | Creek banks, floodplains in wet prairie, swales, pool margins. | April – July |

| Scientific Name | Common Name | Federal[1] | State[2] | ORBIC[3] | Habitat | Survey Period[4] |
|---|---|---|---|---|---|---|
| *Lathyrus holochlorus*[5] | Thin-leaved pea | | E | 1 | Low elevation roadsides, fencerows, creek banks, forest edges, oak savannas, shrublands, and grasslands. | (March) April – June (July) |
| *Lomatium bradshawii*[5] | Bradshaw's lomatium | DL | E | 1 | Wet prairie habitats in clay soils or substrates having a dense clay layer below the surface. The majority of populations are located in the southern Willamette Valley in seasonally saturated or flooded prairies near creeks and small rivers. | (March) Mid-April – May (June) |
| *Lupinus oreganus*[5] | Kincaid's lupine | FT | T | 1 | Upland prairie remnants, oak savannas, and ecotones between grassland and forest. It usually occurs in heavy, well-drained soils at elevations below 2,750 feet. | Mid-April – June (July) |
| *Montia howellii*[5] | Howell's montia | | C | 4 | Vernally wet sites, often in compacted soil (Miller and Chambers 2012). | March – May |
| *Navarretia willamettensis*[5] | Willamette navarretia | | E | 1 | Seasonally wet meadows or prairies and vernal pools (NatureServe 2023). | June – July |
| *Potamogeton robbinsii* | Flatleaf pondweed | | | 2 | Shallow to deep water of ponds, lakes and slow-flowing rivers. | August – September |
| *Rhynchospora alba* | White beakrush | | | 2 | Acidic bogs and fens, often with Sphagnum, often on floating mats. | July – August |
| *Rotala ramosior* | Toothcup | | | 2 | Open, wet gravelly soil around ponds. | July – September |
| *Scirpus pendulus* | Drooping bulrush | | | 2 | Marshes, moist meadows, and ditches, often on calcareous soils. | Late May – July |
| *Sclerolinon digynum* | Northwestern yellow flax | | | 2 | Vernally moist meadows. | June – August |
| *Sericocarpus rigidus*[5] | White-topped aster | | T | 1 | Open, grassy, seasonally moist prairie and savannah habitats. | Late July – early September |
| *Sidalcea campestris*[5] | Meadow checker-mallow | | | 4 | Open shrublands, meadows, hedgerows, prairies. | May – August |

| Scientific Name | Common Name | Federal[1] | State[2] | ORBIC[3] | Habitat | Survey Period[4] |
|---|---|---|---|---|---|---|
| *Sidalcea cusickii* | Cusick's mallow | | | 4 | Moist to wet, mostly black, adobe soil, lowland and mountain meadows, often with *Juncus* and *Camassia*. | June – August |
| *Sidalcea nelsoniana*[5] | Nelson's sidalcea | DL | T | 1 | Typically found in open prairie remnants along the margins of streams, sloughs, ditches, roadsides, fence rows, and drainage swales and in fallow fields. Occasionally, occurs in the understory or at the edges of ash woodlands or among woody shrubs. | Late May – mid-July (September) |
| *Sisyrinchium hitchcockii*[5] | Hitchcock's blue-eyed grass | | E | 1 | Grassy areas, openings in woods, mostly where soil is dry late in season. | May – June |
| *Utricularia gibba* | Humped bladderwort | | | 2 | Shallow water, mud, mat-forming at surface of deep waters or not. | May – October |
| *Utricularia minor* | Lesser bladderwort | | | 2 | Ponds, slow-flowing streams. | May – October |
| *Viola praemorsa* ssp. *praemorsa* | Upland yellow violet | | | 3 | Generally in vernally moist soil, slopes, meadows, conifer forest, sagebrush. | March – July |
| *Wolffia borealis* | Dotted water-meal | | | 2 | Freshwater ponds and slow flowing ditches in which water has somewhat high levels of organic material. Occurs in natural ponds as well as in log and sewage treatment ponds. | June – December |
| *Wolffia columbiana* | Columbia water-meal | | | 1 | Freshwater ponds and slow-flowing ditches and streams in which water is rich in organic material. Occurs in natural ponds as well as in log and sewage treatment ponds. | June – December |

References: FNA 2024; Jepson Flora Project 2024; OAR 603-073-0070 (revised June 8, 2023); ODA 2023a; ORBIC 2019, 2023a, 2023b; Oregon Flora 2024; WNHP 2021; or as otherwise noted in table.

1. Federal: DL = Delisted, FE = Listed Endangered, FT = Listed Threatened
2. State: C = Candidate, E = Endangered, T= Threatened
3. ORBIC: 1=Threatened or Endangered Throughout Range, 2=Threatened or Endangered in Oregon but Secure Elsewhere, 3=Review, 4=Watch, 1-ex = Extirpated in Oregon, threatened or endangered throughout the rest of its range
4. Survey Period: typical peak flowering period; extended flowering periods that may occur during some years presented in parentheses.
5. Species is a target species (i.e., Federal and State Threatened, Endangered, and Candidate Vascular Plant Species with Potential to Occur within Survey Area).

# Attachment 2. Oregon State Noxious Weed List

OREGON DEPARTMENT OF AGRICULTURE

# Noxious Weed Policy and Classification System 2024

## Noxious Weed Control Program

**Address:** 635 Capitol Street NE, Salem, Oregon 97301

**Phone:** (503) 986-4625 **Fax:** (503) 986-4786

www.oregon.gov/ODA/programs/Weeds/Pages/AboutWeeds.aspx

## Mission Statement

To protect Oregon's natural resources and agricultural economy from the invasion and proliferation of invasive noxious weeds.

## Program Overview

The Oregon Department of Agriculture (ODA) Noxious Weed Control Program provides statewide leadership for coordination and management of state listed noxious weeds. The state program focuses on noxious weed control efforts by implementing early detection and rapid response projects for new invasive noxious weeds, implementing biological control, implementing statewide inventory and survey, assisting the public and cooperators through technology transfer and noxious weed education, maintaining noxious weed data and maps for priority listed noxious weeds, and assisting land managers and cooperators with integrated weed management projects. The Noxious Weed Control Program also supports the Oregon State Weed Board (OSWB) with administration of the OSWB Grant Program, developing statewide management objectives, developing weed risk assessments, and maintaining the state noxious weed list.

Troy Abercrombie
Program Manager
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# Noxious Weed Control Policy and Classification System

## Definition

"Noxious weed" means a terrestrial, aquatic or marine plant designated by the Oregon State Weed Board under ORS 569.615 as among those representing the greatest public menace and as a top priority for action by weed control programs.

Noxious weeds have become so thoroughly established and are spreading so rapidly on private, state, county, and federally owned lands, that they have been declared by ORS 569.350 to be a menace to public welfare. Steps leading to eradication, where possible, and intensive control are necessary. It is further recognized that the responsibility for eradication and intensive control rests not only on the private landowner and operator, but also on the county, state, and federal governments.

## Weed Control Policy

Therefore, it shall be the policy of ODA to:

1. Assess non-native plants through risk assessment processes and make recommendations to the Oregon State Weed Board for potential listing.
2. Rate and classify weeds at the state level.
3. Prevent the establishment and spread of listed noxious weeds.
4. Encourage and implement the control or containment of infestations of listed noxious weed species and, if possible, eradicate them.
5. Develop and manage a biological weed control program.
6. Increase awareness of potential economic losses and other undesirable effects of existing and newly invading noxious weeds, and to act as a resource center for the dissemination of information.
7. Encourage and assist in the organization and operation of noxious weed control programs with government agencies and other weed management entities.
8. Develop partnerships with county weed control districts, universities, and other cooperators in the development of control methods.
9. Conduct statewide noxious weed surveys and weed control efficacy studies.

## Weed Classification System

The purpose of this Classification System is to:

1. Act as the ODA's official guideline for prioritizing and implementing noxious weed control projects.
2. Assist the ODA in the distribution of available funds through the Oregon State Weed Board to assist county weed programs, cooperative weed management groups, private landowners, and other weed management entities.
3. Serve as a model for private and public sectors in developing noxious weed classification systems that aid in setting effective noxious weed control strategies.

## Criteria for Determining Economic and Environmental Significance

### Detrimental Effects

1. A plant species that causes or has the potential to cause severe negative impacts to Oregon's agricultural economy and natural resources.
2. A plant species that has the potential to or does endanger native flora and fauna by its encroachment into forest, range, aquatic and conservation areas.
3. A plant species that has the potential or does hamper the full utilization and enjoyment of recreational areas.
4. A plant species that is poisonous, injurious, or otherwise harmful to humans and/or animals.

### Plant Reproduction

1. A plant that reproduces by seed capable of being dispersed over wide areas or that is long-lived, or produced in large numbers.
2. A plant species that reproduces and spreads by tubers, creeping roots, stolons, rhizomes, or other natural vegetative means.

### Distribution

1. A weed of known economic importance which occurs in Oregon in small enough infestations to make eradication/containment possible; or not known to occur, but its presence in neighboring states makes future occurrence seem imminent.
2. A weed of economic or ecological importance and of limited distribution in Oregon.
3. A weed that has not infested the full extent of its potential habitat in Oregon.

### Difficulty of Control

A plant species that is not easily controlled with current management practices such as chemical, cultural, biological, and physical methods.

## Noxious Weed Control Classification Definitions

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

- **A Listed Weed:**
  A weed of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent (Table I).
  *Recommended action:* Focus on prevention of new infestations through vector control, certification programs, education, outreach and surveys. New and existing infestations are prioritized for eradication or intensive control when and where found. Regionally focused, species-specific Statewide Management Strategies for A-listed weeds may be developed as necessary.

- **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 selected from the B list as a focus for prevention and control by the Noxious Weed Control Program. T-designated noxious weeds are determined by the Oregon State Weed Board and management actions are prioritized and informed by species-specific T-List Statewide Management Strategies created and maintained by the ODA. Action against these weeds will receive priority in accordance with the recommendations of the Statewide Management Strategy.

### 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 | *Peganum harmala* |
| Camelthorn | *Alhagi pseudalhagi* |
| Cape-ivy | *Delairea odorata* |
| Coltsfoot | *Tussilago farfara* |
| Common frogbit | *Hydrocharis morsus-ranae* |
| Cordgrass | |
| Common | *Spartina anglica* |
| Dense-flowered | *Spartina densiflora* |
| Saltmeadow | *Spartina patens* |
| Smooth | *Spartina alterniflora* |
| Delta arrowhead | *Sagittaria platyphyla* |
| European water chestnut | *Trapa natans* |
| Flowering rush | *Butomus umbellatus* |
| Garden yellow loosestrife | *Lysimachia vulgaris* |
| Giant hogweed | *Heracleum mantegazzianum* |
| Goatgrass | |
| Barbed | *Aegilops triuncialis* |
| Ovate | *Aegilops ovata* |
| Goatsrue | *Galega officinalis* |
| Hawkweed | |
| King-devil | *Hieracium piloselloides* |
| Mouse-ear | *Hieracium pilosella* |
| Orange | *Hieracium aurantiacum* |
| Yellow | *Hieracium floribundum* |
| Hoary alyssum | *Berteroa incana* |
| Hydrilla | *Hydrilla verticillata* |
| Japanese dodder | *Cuscuta japonica* |
| Kudzu | *Pueraria lobata* |
| Matgrass | *Nardus stricta* |
| Oblong spurge | *Euphorbia oblongata* |
| Palmer amaranth | *Amaranthus palmeri* |
| Paterson's curse | *Echium plantagineum* |
| Purple nutsedge | *Cyperus rotundus* |
| Ravennagrass | *Saccharum ravennae* |
| Squarrose knapweed | *Centaurea virgata* |

**(Continued)** **Table I: A Listed Weeds**

| Common Name | Scientific Name |
|---|---|
| Starthistle | |
| Iberian | *Centaurea iberica* |
| Purple | *Centaurea calcitrapa* |
| Thistle | |
| Plumeless | *Carduus acanthoides* |
| Smooth distaff | *Carthamus baeticus* |
| Taurian | *Onopordum tauricum* |
| Turkish | *Carduus cinereus* |
| Welted (curly plumeless) | *Carduus crispus* |
| Woolly distaff | *Carthamus lanatus* |
| Water soldiers | *Stratiotes aloides* |
| West Indian spongeplant | *Limnobium laevigatum* |
| White bryonia | *Bryonia alba* |
| Yellow floating heart | *Nymphoides peltata* |
| Yellowtuft | *Alyssum murale, A. corsicum* |

## Table II: B Listed Weeds

| Common Name | Scientific Name |
|---|---|
| Armenian (Himalayan) blackberry | *Rubus armeniacus (R. procerus, R. discolor)* |
| Biddy-biddy | *Acaena novae-zelandiae* |
| Broom | |
| French***** | *Genista monspessulana* |
| Portuguese (T) | *Cytisus striatus* |
| Scotch***** | *Cytisus scoparius* |
| Spanish | *Spartium junceum* |
| Butterfly bush | *Buddleja davidii (B. variabilis)* |
| Common bugloss (T) | *Anchusa officinalis* |
| Common crupina **(T)** | *Crupina vulgaris* |
| Common reed | *Phragmities australis ssp. australis* |
| Common viper's bugloss (T) | *Echium vulgare* |
| Cutleaf teasel | *Dipsacus laciniatus* |
| Dyer's woad (T) | *Isatis tinctoria* |
| English hawthorn | *Crataegus monogyna* |
| Eurasian watermilfoil | *Myriophyllum spicatum* |
| False brome | *Brachypodium sylvaticum* |
| Field bindweed | *Convolvulus arvensis* |
| Garlic mustard (T) | *Alliaria petiolata* |
| Geranium | |
| Herb Robert | *Geranium robertianum* |
| Shiny leaf | *Geranium lucidum* |
| Giant reed (T) | *Arundo donax* |
| Gorse***** (T) | *Ulex europaeus* |
| Halogeton | *Halogeton glomeratus* |
| Houndstongue | *Cynoglossum officinale* |

* Biocontrol (See page 4)

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

## (Continued) Table II: B Listed Weeds

| Common Name | Scientific Name |
|---|---|
| Indigo bush | *Amorpha fruticosa* |
| Ivy | |
| Atlantic | *Hedera hibernica* |
| English | *Hedera helix* |
| Jointed goatgrass | *Aegilops cylindrica* |
| Jubata grass | *Cortaderia jubata* |
| Knapweed | |
| Diffuse* | *Centaurea diffusa* |
| Meadow* | *Centaurea pratensis* |
| Russian* | *Acroptilon repens* |
| Spotted* | *Centaurea stoebe (C. maculosa)* |
| Knotweed | |
| Bohemian* | *Fallopia x bohemica* |
| Giant* | *Fallopia sachalinensis (Polygonum)* |
| Himalayan | *Polygonum polystachyum* |
| Japanese* | *Fallopia japonica (Polygonum)* |
| Kochia | *Kochia scoparia* |
| Lesser celandine | *Ranunculus ficaria* |
| Meadow hawkweed (T) | *Pilosella caespitosum (Hieracium)* |
| Mediterranean sage* | *Salvia aethiopis* |
| Medusahead rye | *Taeniatherum caput-medusae* |
| Old man's beard | *Clematis vitalba* |
| Parrot feather | *Myriophyllum aquaticum* |
| Perennial peavine | *Lathyrus latifolius* |
| Perennial pepperweed (T) | *Lepidium latifolium* |
| Pheasant's eye | *Adonis aestivalis* |
| Pine echium (T) | *Echium pininana* |
| Poison hemlock* | *Conium maculatum* |
| Policeman's helmet | *Impatiens glandulifera* |
| Primrose-willow | |
| Large-flower (T) | *Ludwigia grandiflora* |
| Water primrose (T) | *Ludwigia hexapetala* |
| Floating (T) | *Ludwigia peploides* |

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

## (Continued) Table II: B Listed Weeds

| Common Name | Scientific Name |
|---|---|
| Puncturevine* | *Tribulus terrestris* |
| Purple loosestrife* | *Lythrum salicaria* |
| Ribbongrass (T) | *Phalaris arundinacea var. Picta* |
| Rose | |
| Dog | *Rosa canina* |
| Sweetbriar | *Rosa rubiginosa* |
| Rush skeletonweed* (T) | *Chondrilla juncea* |
| Saltcedar* (T) | *Tamarix ramosissima* |
| Small broomrape | *Orabanche minor* |
| South American waterweed | *Egeria densa (Elodea)* |
| Spanish heath | *Erica lusitanica* |
| Spurge laurel | *Daphne laureola* |
| Spurge | |
| Leafy* (T) | *Euphorbia esula* |
| Myrtle | *Euphorbia myrsinites* |
| St. Johnswort | *Hypericum perforatum* |
| Sulfur cinquefoil | *Potentilla recta* |
| Swainsonpea | *Sphaerophysa salsula* |
| Tansy ragwort* (T) | *Senecio jacobaea (Jacobaea vulgaris)* |
| Thistle | |
| Bull | *Cirsium vulgare* |
| Canada* | *Cirsium arvense* |
| Italian | *Carduus pycnocephalus* |
| Milk | *Silybum marianum* |
| Musk | *Carduus nutans* |
| Scotch | *Onopordum acanthium* |
| Slender-flowered | *Carduus tenuiflorus* |
| Toadflax | |
| Dalmatian* | *Linaria dalmatica* |
| Yellow* | *Linaria vulgaris* |
| Tree of heaven | *Ailanthus altissima* |

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

## (Continued) Table II: B Listed Weeds

| Common Name | Scientific Name |
|---|---|
| Ventenata grass | *Ventenata dubia* |
| Whitetop | |
| Hairy | *Lepidium pubescens* |
| Lens-podded | *Lepidium chalepensis* |
| Whitetop (hoary cress)* | *Lepidium draba* |
| Yellow archangel | *Lamiastrum galeobdolon* |
| Yellow flag iris | *Iris pseudacorus* |
| Yellow nutsedge | *Cyperus esculentus* |
| Yellow starthistle* | *Centaurea solstitialis* |

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

# Attachment 3. Vascular Plant Species Observed

| Scientific Name[1] | Common Name[1] | Family | Habit | Nativity | ODA Noxious Weed Class | Synonyms/Notes |
|---|---|---|---|---|---|---|
| *Acer macrophyllum* | Bigleaf maple, Oregon maple | Sapindaceae | Tree | Native | | |
| *Achillea millefolium* | Yarrow, milfoil | Asteraceae | Forb | Native/non-native | | |
| *Acmispon americanus* | American deervetch | Fabaceae | Forb | Native | | |
| *Adelinia grande* | Pacific hound's tongue, grand hound's tongue | Boraginaceae | Forb | Native | | *Cynoglossum grande* |
| *Agrostis capillaris* | Colonial bentgrass | Poaceae | Graminoid | Non-native | | |
| *Agrostis exarata* | Spike bentgrass | Poaceae | Graminoid | Native | | |
| *Agrostis gigantea* | Redtop | Poaceae | Graminoid | Non-native | | *Agrostis alba* |
| *Alisma triviale* | American water plantain; northern water plantain | Alismataceae | Forb | Native | | *Alisma plantago-aquatica* |
| *Allium vineale* | Cow garlic, field garlic, wild garlic | Amaryllidaceae | Forb | Non-native | | |
| *Alopecurus aequalis* var. *aequalis* | Short-awn foxtail | Poaceae | Graminoid | Native | | |
| *Alopecurus geniculatus* | Water foxtail | Poaceae | Graminoid | Unknown | | |
| *Alopecurus pratensis* | Meadow foxtail | Poaceae | Graminoid | Non-native | | |
| *Amaranthus albus* | Tumbling pigweed | Amaranthaceae | Forb | Non-native | | |
| *Amaranthus* sp. | Pigweed, amaranth | Amaranthaceae | Forb | Native | | |
| *Amelanchier alnifolia* | Saskatoon serviceberry | Rosaceae | Shrub | Native | | |
| *Anthemis cotula* | Mayweed chamomile, dog-fennel | Asteraceae | Forb | Non-native | | |
| *Anthoxanthum odoratum* | Sweet vernalgrass | Poaceae | Graminoid | Non-native | | |
| *Anthriscus caucalis* | Bur chervil | Apiaceae | Forb | Non-native | | |
| *Apocynum cannabinum* | Common dogbane | Apocynaceae | Forb | Native | | |
| *Aralia californica* | California spikenard, western aralia | Araliaceae | Forb | Native | | |
| *Arrhenatherum elatius* | Tall oatgrass | Poaceae | Graminoid | Non-native | | |
| *Asclepias fascicularis* | Narrowleaf milkweed | Apocynaceae | Forb | Native | | |
| *Asclepias speciosa* | Showy milkweed | Apocynaceae | Forb | Native | | |
| *Avena fatua* | Wild oats | Poaceae | Graminoid | Non-native | | |
| *Barbarea orthoceras* | American winter cress | Brassicaceae | Forb | Native | | |
| *Beckmannia syzigachne* | American sloughgrass | Poaceae | Graminoid | Native | | |
| *Bellardia viscosa* | Yellow parentucellia | Orobanchaceae | Forb | Non-native | | *Parentucellia viscosa* |
| *Bidens cernua* | Bur marigold | Asteraceae | Forb | Native | | |
| *Bidens frondosa* | Leafy beggars-ticks | Asteraceae | Forb | Native | | |
| *Brassica rapa* | Field mustard | Brassicaceae | Forb | Non-native | | |
| *Briza minor* | Little quaking grass | Poaceae | Graminoid | Non-native | | |
| *Bromus commutatus* | Meadow brome, hairy chess | Poaceae | Graminoid | Non-native | | |
| *Bromus diandrus* | Ripgut brome | Poaceae | Graminoid | Non-native | | |
| *Bromus hordeaceus* | Soft chess; soft brome | Poaceae | Graminoid | Non-native | | |
| *Bromus secalinus* | Rye brome | Poaceae | Graminoid | Non-native | | |

| Scientific Name[1] | Common Name[1] | Family | Habit | Nativity | ODA Noxious Weed Class | Synonyms/Notes |
|---|---|---|---|---|---|---|
| *Bromus sitchensis* var. *carinatus* | California brome | Poaceae | Graminoid | Non-native | | |
| *Camassia quamash ssp. maxima* | Common camas | Asparagaceae | Forb | Native | | |
| *Cardamine oligosperma* | Few-seed bittercress; little western bittercress | Brassicaceae | Forb | Native | | |
| *Carduus pycnocephalus* | Compact-headed thistle, Italian thistle | Asteraceae | Forb | Non-native | B-List | |
| *Carex* sp. | Sedge | Cyperaceae | Graminoid | Native | | |
| *Carex stipata* var. *stipata* | Awl-fruit sedge, sawbeak sedge | Cyperaceae | Graminoid | Native | | |
| *Carex unilateralis* | Lateral sedge | Cyperaceae | Graminoid | Native | | |
| *Centaurium erythraea* | Common centaury | Gentianaceae | Forb | Non-native | | |
| *Cerastium glomeratum* | Sticky mouse-ear chickweed | Caryophyllaceae | Forb | Non-native | | |
| *Chamaesyce serpillifolia* | Thyme-leaved spurge | Euphorbiaceae | Forb | Native | | |
| *Chenopodium album* | Lamb's quarters, pigweed | Amaranthaceae | Forb | Non-native | | |
| *Cichorium intybus* | Chicory, wild succory | Asteraceae | Forb | Non-native | | |
| *Cirsium arvense* | Canada thistle | Asteraceae | Forb | Non-native | B-List | |
| *Cirsium vulgare* | Bull thistle | Asteraceae | Forb | Non-native | B-List | |
| *Conium maculatum* | Poison hemlock | Apiaceae | Forb | Non-native | B-List | |
| *Convolvulus arvensis* | Field bindweed | Convolvulaceae | Vine | Non-native | B-List | |
| *Conyza canadensis* | Horseweed, Canadian fleabane | Asteraceae | Forb | Native | | |
| *Cornus sericea* | Red-osier dogwood | Cornaceae | Shrub | Native | | |
| *Crataegus* sp. | Hawthorn | Rosaceae | Shrub/Tree | Native/non-native | | |
| *Crepis setosa* | Bristly hawksbeard | Asteraceae | Forb | Non-native | | |
| *Croton setigerus* | Turkey mullein, dove weed | Euphorbiaceae | Forb | Native | | *Eremocarpus setigerus* |
| *Cynodon dactylon* | Bermudagrass | Poaceae | Graminoid | Non-native | | |
| *Dactylis glomerata* | Orchard grass | Poaceae | Graminoid | Non-native | | |
| *Daucus carota* | Queen Anne's lace, wild carrot | Apiaceae | Forb | Non-native | | |
| *Dipsacus fullonum* | Fuller's teasel | Dipsacaceae | Forb | Non-native | | |
| *Downingia elegans* | Elegant downingia, showy downingia | Campanulaceae | Forb | Native | | |
| *Echinochloa crus-galli* | Barnyard grass | Poaceae | Graminoid | Non-native | | |
| *Eleocharis acicularis* | Needle spikerush | Cyperaceae | Graminoid | Native | | |
| *Eleocharis obtusa* | Blunt spikerush | Cyperaceae | Graminoid | Native | | |
| *Eleocharis palustris* | Common spikerush, creeping spikerush | Cyperaceae | Graminoid | Native | | |
| *Elymus glaucus* | Blue wildrye | Poaceae | Graminoid | Native | | |
| *Elymus* sp. | Wildrye | Poaceae | Graminoid | Native | | |
| *Epilobium brachycarpum* | Autumn willowherb, tall annual willowherb | Onagraceae | Forb | Native | | |
| *Epilobium ciliatum* | Fringed willowherb | Onagraceae | Forb | Native | | |
| *Epilobium densiflorum* | Denseflower spikeprimrose | Onagraceae | Forb | Native | | |

| Scientific Name[1] | Common Name[1] | Family | Habit | Nativity | ODA Noxious Weed Class | Synonyms/Notes |
|---|---|---|---|---|---|---|
| *Epilobium minutum* | Small flowered willowherb | Onagraceae | Forb | Native | | |
| *Equisetum arvense* | Common horsetail | Equisetaceae | Graminoid | Native | | |
| *Equisetum telmateia* | Giant horsetail | Equisetaceae | Graminoid | Native | | |
| *Fraxinus latifolia* | Oregon ash | Oleaceae | Tree | Native | | |
| *Galium aparine* | Cleavers, stickwilly, common bedstraw | Rubiaceae | Forb | Native | | |
| *Galium divaricatum* | Lamarck's bedstraw, spreading bedstraw | Rubiaceae | Forb | Non-native | | |
| *Galium trifidum* | Small bedstraw | Rubiaceae | Forb | Native | | |
| *Geranium dissectum* | Cutleaf geranium | Geraniaceae | Forb | Non-native | | |
| *Geranium lucidum* | Shining cranesbill | Geraniaceae | Forb | Non-native | B-List | |
| *Geranium pusillum* | Small flowered cranesbill | Geraniaceae | Forb | Non-native | | |
| *Geranium* sp. | Cranesbill, geranium | Geraniaceae | Forb | Native/non-native | | |
| *Geum macrophyllum* | Largeleaf avens | Rosaceae | Forb | Native | | |
| *Glyceria* sp. | Mannagrass | Poaceae | Graminoid | Native | | |
| *Gnaphalium palustre* | Lowland cudweed, western marsh cudweed | Asteraceae | Forb | Native | | |
| *Gnaphalium uliginosum* | Marsh cudweed | Asteraceae | Forb | Non-native | | |
| *Heracleum maximum* | Common cow parsnip | Apiaceae | Forb | Native | | |
| *Holcus lanatus* | Velvetgrass | Poaceae | Graminoid | Non-native | | |
| *Hordeum brachyantherum* | Meadow barley | Poaceae | Graminoid | Native | | |
| *Hordeum marinum* ssp. *gussonianum* | Mediterranean barley, geniculate barley | Poaceae | Graminoid | Non-native | | |
| *Hordeum murinum* | Mouse barley, hare barley, wall barley | Poaceae | Graminoid | Non-native | | |
| *Hypericum perforatum* | Common St. John's wort | Hypericaceae | Forb | Non-native | B-List | |
| *Hypochaeris radicata* | Hairy cat's-ear | Asteraceae | Forb | Non-native | | |
| *Juglans nigra* | Black walnut | Juglandaceae | Tree | Non-native | | |
| *Juncus bufonius* var. *bufonius* | Toad rush | Juncaceae | Graminoid | Native | | |
| *Juncus effusus* | Soft rush, pasture rush | Juncaceae | Graminoid | Native/non-native | | |
| *Juncus patens* | Spreading rush, gray | Juncaceae | Graminoid | Native | | |
| *Juncus tenuis* | Path rush, poverty rush, slender rush | Juncaceae | Graminoid | Native | | |
| *Kickxia elatine* | Sharp leaved fluellin | Plantaginaceae | Forb | Non-native | | |
| *Lactuca serriola* | Prickly lettuce | Asteraceae | Forb | Non-native | | |
| *Lamium purpureum* | Purple deadnettle; red deadnettle | Lamiaceae | Forb | Non-native | | |
| *Lapsana communis* | Nipplewort | Asteraceae | Forb | Non-native | | |
| *Lathyrus hirsutus* | Caley pea, rough pea | Fabaceae | Forb | Non-native | | |
| *Leersia oryzoides* | Rice cutgrass | Poaceae | Graminoid | Native | | |
| *Limnanthes alba ssp. alba* | White meadowfoam | Limnanthaceae | Forb | Non-native | | |
| *Linum* sp. | Flax | Linaceae | Forb | Non-native | | |

| Scientific Name[1] | Common Name[1] | Family | Habit | Nativity | ODA Noxious Weed Class | Synonyms/Notes |
|---|---|---|---|---|---|---|
| *Lolium multiflorum* | Annual ryegrass | Poaceae | Graminoid | Non-native | | |
| *Lolium perenne* | perennial ryegrass | Poaceae | Graminoid | Non-native | | |
| *Lotus corniculatus* | Common bird's-foot trefoil | Fabaceae | Forb | Non-native | | |
| *Lotus uliginosus* | Big trefoil | Fabaceae | Forb | Non-native | | |
| *Ludwigia palustris* | Eastern false loosestrife | Onagraceae | Forb | Native | | |
| *Lupinus bicolor* | Two-color lupine, miniature lupine | Fabaceae | Forb | Native | | |
| *Lysimachia arvensis* | Scarlet pimpernel | Primulaceae | Forb | Non-native | | *Anagallis arvensis* |
| *Lysimachia minima* | Chaffweed | Primulaceae | Forb | Non-native | | *Anagallis minima* |
| *Lythrum hyssopifolium* | Hyssop loosestrife, grass-poly | Lythraceae | Forb | Non-native | | |
| *Madia exigua* | Little tarweed | Asteraceae | Forb | Native | | |
| *Madia* sp. | Tarweed | Asteraceae | Forb | Native | | |
| *Malus fusca* | Oregon crabapple; western crabapple | Rosaceae | Tree | Native | | |
| *Marah oregana* | Oregon bigroot | Cucurbitaceae | Vine | Native | | |
| *Medicago lupulina* | Black medic; hop clover | Fabaceae | Forb | Non-native | | |
| *Mentha pulegium* | Pennyroyal | Lamiaceae | Forb | Non-native | | |
| *Myosotis discolor* | Changing forget-me-not | Boraginaceae | Forb | Non-native | | *Myosotis versicolor* |
| *Navarretia squarrosa* | Skunkweed | Polemoniaceae | Forb | Native | | |
| *Oemleria cerasiformis* | Indian plum; osoberry | Rosaceae | Shrub | Native | | |
| *Osmorhiza* sp. | Sweet cicely | Apiaceae | Forb | Native | | |
| *Panicum capillare* | Witchgrass | Poaceae | Graminoid | Native | | |
| *Persicaria maculosa* | Spotted ladysthumb, heartweed | Polygonaceae | Forb | Non-native | | |
| *Phalaris arundinacea* | Reed canarygrass | Poaceae | Graminoid | Native/non-native | B-List/T-Designate | |
| *Phleum pratense* | Timothy | Poaceae | Graminoid | Non-native | | |
| *Plagiobothrys figuratus var. figuratus* | Fragrant popcornflower | Boraginaceae | Forb | Native | | |
| *Poa annua* | Annual bluegrass | Poaceae | Graminoid | Non-native | | |
| *Poa compressa* | Canada bluegrass | Poaceae | Graminoid | Non-native | | |
| *Poa palustris* | Fowl bluegrass | Poaceae | Graminoid | Unknown | | |
| *Poa pratensis* | Kentucky bluegrass | Poaceae | Graminoid | Native/non-native | | |
| *Polygonum aviculare* | Doorweed, prostrate knotweed | Polygonaceae | Forb | Non-native | | |
| *Polystichum munitum* | Common sword fern, western sword fern | Dryopteridaceae | Fern | Native | | |
| *Populus alba* | Silverleaf poplar, white poplar | Salicaceae | Tree | Non-native | | |
| *Populus nigra* | Black poplar, Lombardy poplar | Salicaceae | Tree | Non-native | | |
| *Populus trichocarpa* | Black cottonwood | Salicaceae | Tree | Native | | *Populus balsamifera* ssp. *trichocarpa* |
| *Portulaca oleracea* | Common purslane | Portulacaceae | Forb | Non-native | | |
| *Potentilla gracilis* | Graceful cinquefoil; slender cinquefoil | Rosaceae | Forb | Native | | |

| Scientific Name[1] | Common Name[1] | Family | Habit | Nativity | ODA Noxious Weed Class | Synonyms/Notes |
|---|---|---|---|---|---|---|
| *Prunus avium* | Sweet cherry | Rosaceae | Tree | Non-native | | |
| *Pyrus communis* | Domestic pear | Rosaceae | Tree | Non-native | | |
| *Ranunculus orthorhynchus* var. *orthorhynchus* | Bird's foot buttercup; straightbeak buttercup | Ranunculaceae | Forb | Native | | |
| *Ranunculus parviflorus* | Small flowered buttercup | Ranunculaceae | Forb | Non-native | | |
| *Ranunculus sceleratus* | Blister buttercup | Ranunculaceae | Forb | Native | | |
| *Ranunculus uncinatus* | Little buttercup | Ranunculaceae | Forb | Native | | |
| *Rorippa curvisiliqua* | Curvepod yellowcress, western yellowcress | Brassicaceae | Forb | Native | | |
| *Rosa eglanteria* | Eglantine rose; sweet briar rose | Rosaceae | Shrub | Non-native | | *Rosa rubiginosa* |
| *Rosa nutkana* | Nootka rose | Rosaceae | Shrub | Native | | |
| *Rubus armeniacus* | Himalayan blackberry | Rosaceae | Vine | Non-native | B-List | *Rubus armeniacus, Rubus discolor* |
| *Rubus laciniatus* | Evergreen blackberry, cut leaved blackberry | Rosaceae | Vine | Non-native | | |
| *Rubus leucodermis* | Blackcap; western blackcap raspberry | Rosaceae | Vine | Native | | |
| *Rubus ursinus* | Pacific blackberry, trailing blackberry | Rosaceae | Vine | Native | | |
| *Rumex acetosella* | Sheep sorrel | Polygonaceae | Forb | Non-native | | |
| *Rumex crispus* | Curly dock | Polygonaceae | Forb | Non-native | | |
| *Rumex occidentalis* | Western dock | Polygonaceae | Forb | Native | | |
| *Salix lasiandra var. lasiandra* | Pacific willow | Salicaceae | Tree | Native | | |
| *Salix sitchensis* | Sitka willow | Salicaceae | Shrub/Tree | Native | | |
| *Salix* sp. | Willow | Salicaceae | Shrub/Tree | Native | | |
| *Schedonorus arundinaceus* | Tall fescue | Poaceae | Graminoid | Non-native | | *Festuca arundinacea* |
| *Schoenoplectus acutus* | Hardstem bulrush | Cyperaceae | Graminoid | Native | | |
| *Schoenoplectus tabernaemontani* | Soft-stem bulrush | Cyperaceae | Graminoid | Native | | |
| *Senecio jacobaea* | Stinking willie, tansy ragwort | Asteraceae | Forb | Non-native | B-List/T-Designate | |
| *Senecio vulgaris* | Common groundsel | Asteraceae | Forb | Non-native | | |
| *Sequoiadendron giganteum* | Sierra redwood, giant sequoia | Cupressaceae | Tree | Non-native | | |
| *Solanum dulcamara* | Bitter nightshade | Solanaceae | Forb | Non-native | | |
| *Sonchus asper* | Prickly sow-thistle | Asteraceae | Forb | Non-native | | |
| *Sonchus oleraceus* | Common sow-thistle | Asteraceae | Forb | Non-native | | |
| *Sparganium* sp. | Bur-reed | Typhaceae | Forb | Native | | |
| *Symphoricarpos albus* | Common snowberry | Caprifoliaceae | Shrub | Native | | |
| *Tellima grandiflora* | Fringecup, large-flowered fringecup | Saxifragaceae | Forb | Native | | |
| *Thinopyrum obtusiflorum* | Tall wheatgrass | Poaceae | Graminoid | Non-native | | *Thinopyrum ponticum* |
| *Torilis arvensis* | Field hedge parsley | Apiaceae | Forb | Non-native | | |
| *Toxicodendron diversilobum* | Poison oak | Anacardiaceae | Shrub | Native | | |
| *Trifolium pratense* | Red clover | Fabaceae | Forb | Non-native | | |

| Scientific Name[1] | Common Name[1] | Family | Habit | Nativity | ODA Noxious Weed Class | Synonyms/Notes |
|---|---|---|---|---|---|---|
| *Trifolium repens* | White clover, Dutch clover | Fabaceae | Forb | Non-native | | |
| *Typha latifolia* | Common cattail, broad-leaf cattail | Typhaceae | Graminoid | Native | | |
| *Valerianella locusta* | Common cornsalad, lamb's lettuce | Valerianaceae | Forb | Non-native | | |
| *Ventenata dubia* | Ventenatagrass | Poaceae | Graminoid | Non-native | B-List | |
| *Verbascum blattaria* | Moth mullein | Scrophulariaceae | Forb | Non-native | | |
| *Veronica americana* | American brooklime | Plantaginaceae | Forb | Native | | |
| *Veronica arvensis* | Corn speedwell | Plantaginaceae | Forb | Non-native | | |
| *Veronica perigrina* | Purslane speedwell | Plantaginaceae | Forb | Native | | |
| *Vicia cracca* | Bird vetch, tufted vetch | Fabaceae | Forb | Non-native | | |
| *Vicia tetrasperma* | Lentil tare, slender vetch, sparrow vetch | Fabaceae | Forb | Non-native | | |
| *Vinca major* | Greater periwinkle; large periwinkle | Apocynaceae | Forb | Non-native | | |
| *Vulpia myuros* | Rat-tail six-weeks grass; rattail grass | Poaceae | Graminoid | Non-native | | |
| *Xanthium strumarium* | Common cocklebur | Asteraceae | Forb | Native | | |

1. Nomenclature follows OregonFlora: https://oregonflora.org/

# Attachment 4. Site Photographs

Photo 1. Annual ryegrass field in northwestern portion of Survey Area. 5/12/2023.

Photo 2. Tall fescue field in southern portion of Survey Area. 8/10/2023.

Photo 3. Basal rosette of Italian thistle in northern portion of Survey Area. 5/12/2023.

Photo 4. Dense patch of Canada thistle adjacent to emergent wetland within abandoned rice paddy in northern portion of Survey Area. 5/12/2023.

Photo 5. Bull thistle in central portion of Survey Area. 8/10/2023.

Photo 6. Field bindweed along edge of gravel road in central portion of Survey Area. 6/28/2023.

Photo 7. Common St. John's wort along edge of emergent wetland in eastern portion of Survey Area. 6/28/2023.

Photo 8. Dense cover of reed canarygrass and teasel (*Dipsacus fullonum*) along stream in central portion of Survey Area. 8/10/2023.

Photo 9. Dense cover of Himalayan blackberry along edge of agricultural field in northern portion of Survey Area. 5/12/2023.

Photo 10. Dense cover of Himalayan blackberry along streambank in southern portion of Survey Area. 5/19/2023.

Photo 11. Tansy ragwort along edge of agricultural field in north-central portion of Survey Area. 6/28/2023.

Photo 12. Cinnabar moth larva (*Tyria jacobaeae*), a biological control agent, on leaf of tansy ragwort in northeastern portion of Survey Area. 6/28/2023.

# Wildlife and Raptor Nest Survey Report
# Muddy Creek Energy Park

**Prepared for**
**Muddy Creek Energy Park LLC**

**Prepared by**

TETRA TECH

**March 2026**

**GENERAL DISCLAIMER FOR SCIENTIFIC WORK PRODUCTS**

This deliverable was prepared in accordance with generally accepted professional practices that are typically utilized for scientific work products. The work was performed within the limitations and assumptions of our approved scope of work, and the descriptive documentation associated with this deliverable. Unless explicitly included in our approved scope of work, information provided in this deliverable has not been prepared to meet industry standards for engineering and should not be used for construction.

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# 1.0 Introduction

Muddy Creek Energy Park LLC plans to develop the Muddy Creek Energy Park (Facility). As part of its environmental due diligence, Muddy Creek Energy Park LLC contracted Tetra Tech to conduct biological surveys for the Facility in support of an Application for Site Certificate through the Oregon Department of Energy's Energy Facility Siting Council. This summary report presents the methods and results for general wildlife and raptor nest surveys conducted in 2023 and 2024. The purpose of the surveys was to identify the presence of special status species and their habitats at the Facility and to inventory raptor nests within 0.5 miles of the Facility.

Habitat and botanical surveys and a wetland delineation are addressed in separate reports (Tetra Tech 2023, Tetra Tech 2026a, Tetra Tech 2026b); incidental raptor nest and other wildlife observations recorded during habitat categorization and rare plant surveys are reported here.

# 2.0 Survey Areas

Wildlife surveys were conducted within the entire Facility Site Boundary as proposed at the time of surveys (Wildlife Survey Area; Figure 1). The total acreage of the Wildlife Survey Area is approximately 1,588 acres. Raptor nest surveys were conducted within the Wildlife Survey Area and an additional 0.5-mile buffer around it (Raptor Nest Survey Area; Figure 1).

# 3.0 Methods

Prior to field surveys, Tetra Tech conducted a background review to identify potential habitat types and special status wildlife species with the potential to occur within the Wildlife Survey Area. The review was based on a literature review and search of public information sources, including online databases (OCS 2016, ODFW 2021a, ODFW 2021b, ORBIC 2019, ORBIC 2023, Sullivan et al. 2009, USFWS 2020, USFWS 2021, USFWS 2023a, USFWS 2023b, USGS 2001, Verts and Carraway 1998, Wildlife Explorer 2023) and Tetra Tech biologist experience. Aerial photography was reviewed to preliminarily assess potential wildlife habitats within the Wildlife Survey Area. Tetra Tech also considered information provided by participating landowners on the timing and location of wildlife activity within the Wildlife Survey Area. Field surveys were conducted by biologists familiar with the Willamette Valley ecoregion habitats and species.

Oregon Department of Fish and Wildlife (ODFW) and U.S. Fish and Wildlife Service (USFWS) staff concurred with the scope, timing, and extent of these surveys prior to Tetra Tech's field deployments (ODFW 2023, USFWS 2023c). Additionally, on July 31, 2023, ODFW staff visited the Facility with a Tetra Tech biologist to discuss potential for special status species and habitat occurrence at the Facility.

## 3.1 Wildlife Surveys

The objective of the wildlife survey was to document general wildlife and special status wildlife use of the Wildlife Survey Area. Prior to conducting surveys, Tetra Tech generated a list of special status wildlife species with potential to occur at the Facility 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 2021a, ODFW 2021b, ORBIC 2023, USFWS 2021, USFWS 2023a, USFWS 2023b, Wildlife Explorer 2023). Tetra Tech reviewed habitat and range information for special status wildlife species known to occur in Linn County and the Willamette Valley to develop the list of species that had the potential to occur at the Facility (Attachment 1). Species were eliminated from consideration if their habitat was absent from the Wildlife Survey Area, their range did not overlap, and/or they were unlikely to pass through the Wildlife Survey Area during migration. The list includes state-sensitive species associated with habitat types identified during the preliminary desktop review. Tetra Tech also reviewed data from ORBIC (2023) to determine known locations of special status species occurrences and sensitive habitat within 5 miles of the Wildlife Survey Area. Tetra Tech identified 23 special status wildlife species with the potential to occur at the Facility, including one amphibian, one mammal, two reptiles, three invertebrates, six fish, and ten birds (Attachment 1). 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.

During 2023 field surveys, biologists walked meandering transects within non-cultivated land in the Wildlife Survey Area, searching (scanning and listening) for wildlife species and recognizable signs of wildlife (e.g., scat, tracks, nests). Surveys began early in the morning and continued through late afternoon to facilitate observations of species most active at dawn and/or in the late afternoon. During 2024 field surveys, specific locations were visited within the Wildlife Survey Area that were previously observed to have high potential for early-season wildlife use (e.g., wetlands that may be used by migratory waterfowl).

Surveyors recorded the locations of special status wildlife species (or recognizable sign) on a GPS-enabled Samsung Galaxy tablet using the FieldMaps application and recorded information on the number of individuals and their behavior. Surveyors also kept a running list of wildlife species observed and documented special habitats and unique features such as raptor nest substrate, if encountered. Following field surveys, the digitized data were downloaded and processed in a GIS and reviewed for quality control and assurance.

During pre-survey planning with the USFWS (USFWS 2023c), USFWS staff requested additional measures be taken to document streaked-horned lark (*Eremophila alpestris strigata*) habitat and presence at the Facility during the species' breeding season from mid-April through mid-July. From early May through late August 2023, Tetra Tech biologists collected representative photos at various locations throughout the Wildlife Survey Area to document habitat conditions for the streaked-horned lark during their breeding season (Attachment 2).

## 3.2 Raptor Nest Surveys

Prior to conducting field surveys, Tetra Tech reviewed aerial photography and the results of a records request to ORBIC (2023), as well as USFWS data (Leal 2020) to identify potential raptor nests and nesting structures near the Facility. Tetra Tech conducted a ground-based raptor nest survey in June 2023 to document active and inactive raptor nests within the Raptor Nest Survey Area as discussed with ODFW and USFWS (Figure 1; ODFW 2023, USFWS 2023c). The survey was performed when most raptors in the region are engaged in late-breeding season reproductive activities (e.g., rearing young).

Biologists systematically searched raptor nest habitat within the Raptor Nest Survey Area by vehicle and on foot. Nesting substrate was investigated from public and private roads and on foot when additional inspection was necessary. The area outside the Wildlife Survey Area but within the 0.5-mile buffer was searched by scanning suitable nesting habitat from publicly accessible areas such as public roads and the Oak Grove Rest Area on Interstate 5. Periodic stops were made to scan suitable habitat (e.g., trees, utility towers, power poles) and examine nests with the aid of binoculars. To determine the status of a nest, biologists made observations on the behavior of the adults, presence of young, signs of nest building, or whitewash. To minimize disturbance to nesting raptors, biologists approached nests cautiously and maintained the greatest possible distance at which the species could be identified, with distances varying depending upon the nest location and behavior of nesting birds. Biologists also documented American crow (*Corvus brachyrhynchos*) and common raven (*Corvus corax*) nests and incidental eagle observations during the survey. Although not raptors, American crow and common raven nests were recorded because they could be used by nesting raptors during subsequent breeding seasons.

If a nest was found, biologists documented the location via GPS-enabled tablet and collected data on the nest status, size class, condition, substrate, height, exposure, as well as the nesting species and number of eggs or young observed on an electronic data form. Raptor nests were also documented incidentally during general wildlife surveys in 2023 and 2024.

# 4.0 Results

## 4.1 Wildlife Surveys

Tetra Tech biologists searched for special status wildlife species, documented observations of wildlife species, and maintained a running list of wildlife individuals and sign found within the Wildlife Survey Area (see Attachment 3) during mobilizations on:

- May 12 and 13, 2023;
- June 9 and 29, 2023;
- July 31, 2023;
- August 10 and 25, 2023;

- March 28, 2024; and
- April 2, 2024.

One special status species, the bald eagle (*Haliaeetus leucocephalus*), was observed within the Wildlife Survey Area (Figure 2). Two bald eagle individuals were observed during May 2023 surveys; one adult perched on a power pole and one sub-adult in flight. Seven bald eagles were observed during March 2024 surveys; three sub-adults and two adult pairs were congregated at a large wetland in a ryegrass field. Several more adults and sub-adults were seen flying overhead in the vicinity.

In 2023, five Columbian black-tailed deer (*Odocoileus virginianus*) were observed foraging in a wooded area that abuts the eastern boundary of the Wildlife Survey Area. In 2024, a group of approximately 10 Roosevelt elk (*Cervus canadensis roosevelti*) were observed near a forested wetland. Evidence of deer and elk movement (scat, tracks) was observed throughout the Wildlife Survey Area, with highest use along field margins in the eastern parcels.

Results of streaked-horned lark habitat documentation show that the height and cover density of vegetation within agricultural fields from May through June does not provide typical nesting habitat for this species. The June harvest creates the stubble and bare-ground conditions typical of preferred nesting habitat for streaked-horned lark in the Willamette Valley (Anderson and Pearson 2015). In August, fields are tilled, and stubble is removed leaving only bare ground throughout most of the Wildlife Survey Area.

Patches of milkweed (*Asclepias* ssp.) were observed along field margins within the Wildlife Survey Area. Milkweed is the host plant for the monarch butterfly (*Danaus plexippus*, Federal Candidate at the time of survey, now Federal Proposed Threatened; USFWS 2024). However, no monarch butterflies were observed during field surveys.

In 2024, multiple large flocks (100 or more individuals) of migrating waterfowl (e.g., ducks and geese) and shorebirds (e.g., herons) were observed using flooded ryegrass fields throughout the Wildlife Survey Area. No state sensitive species or state or federally listed threatened or endangered species were documented during surveys.

## 4.2 Raptor Nest Survey

A review of ORBIC and USFWS data did not identify raptor nests within 0.5 miles of the Facility (ORBIC 2023, Leal 2020). The closest bald eagle nest record is approximately 2 miles east, and the nearest golden eagle (*Aquila chrysaetos*) nest record is approximately 1 mile south of the Facility.

Tetra Tech conducted raptor nest surveys within the Raptor Nest Survey Area concurrently with wildlife surveys. Primary raptor nesting substrate in the Raptor Nest Survey Area includes trees and utility poles. Six nests were detected during surveys, including two in-use red-tailed hawk nests, one in-use great-horned owl nest, and three small inactive nests with unknown species determinations (Table 1, Figure 2). The three in-use nests were located within the Wildlife Survey Area. No eagle nests or large nests likely to be used by eagles in the future were found during surveys.

**Table 1. Raptor Nest Survey Results**

| Nest ID | Species | Nest Status[1] | Nest Size[2] | Nest Substrate | Pertinent Survey Notes |
|---|---|---|---|---|---|
| 1 | Red-tailed hawk | In-use | Small | Broadleaf tree | Two adults using nest |
| 2 | Great horned owl | In-use | Small | Broadleaf tree | One owlet on branch next to nest |
| 3 | N/A | Unknown | Small | Broadleaf tree | American kestrel in vicinity |
| 4 | N/A | Unknown | Small | Broadleaf tree | Northern harrier in vicinity |
| 5 | N/A | Unknown | Small | Broadleaf tree | – |
| 6 | Red-tailed hawk | In-use | Small | Broadleaf tree | One adult using nest |

1. Nest Status (adapted from the 2016 Eagle Rule [USFWS 2016] and Postupalsky [1974]): Inactive: Defined by the absence of any adult, egg, or dependent young at the nest, or signs of building or adding to the nest in preparation for egg-laying. In-use Nest: The presence of eggs, dependent young, or adult on the nest, or signs of building or adding to the nest in preparation for egg-laying. Unknown: A nest that is present but for which surveyors are unable to determine status (e.g., vegetation around the nest site obscured the view of nest, etc.).
2. Nest Size: Classified as large or small; small nests were those estimated by the biologist as having a diameter of less than 24 inches, comprised of smaller sticks, and with other characteristics typical of nests used by smaller raptors and not by eagles. Large nests were those estimated by the biologist as having a diameter of 24 inches or greater, comprised of larger sticks, and with other characteristics typical of nests used by eagles and other large raptors.

# 5.0 Summary and Conclusion

One special status species, the bald eagle, was documented during surveys in 2023 and 2024. Bald eagles appear to congregate at the Facility in early spring and are likely to use the area during breeding and migration. Six raptor nests were documented within the Raptor Nest Survey Area. Large flocks of migratory waterfowl use wetlands at the Facility as stopover habitat during spring migration. The presence of milkweed indicates suitable habitat is present for the monarch butterfly, however, no monarch individuals were observed. No state or federally listed threatened or endangered species were observed.

No streaked-horned larks were observed during surveys in 2023 or 2024. Habitat documentation from May through August demonstrated that suitable nesting habitat is limited or absent during most of the breeding period, and ground disturbance in rye grass fields continues through late August, likely precluding streaked-horned lark nesting at the Facility. However, this species has the potential to use the Facility for foraging.

# 6.0 References

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# Figures

# Muddy Creek Energy Park

## Figure 1
## Survey Areas

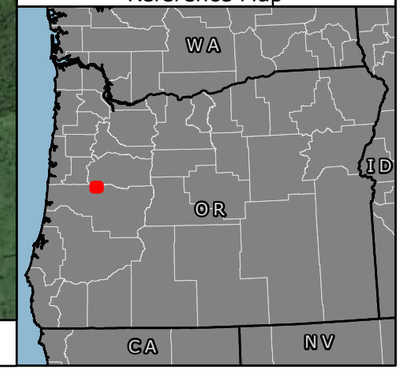
**LINN COUNTY, OR**

- Wildlife Survey Area
- Raptor Nest Survey Area (0.5-mile Buffer)
- Interstate Highway
- Local Roads

TETRA TECH

Hanwha

Reference Map

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WGS 1984 UTM Zone 10N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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# Muddy Creek Energy Park

## Figure 2
## Special Status Species Observations and Raptor Nest Survey Results

**LINN COUNTY, OR**

- Wildlife Survey Area
- Raptor Nest Survey Area (0.5-mile Buffer)
- Interstate Highway
- Local Roads

Raptor Nest (Species, Status)

- Great horned owl, In-use
- Red-tailed hawk, In-use
- Unknown, Inactive
- Unknown, Unknown

Incidental Sightings

- Bald Eagle

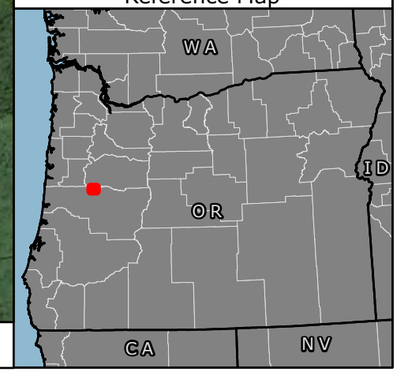
Other Incidental Observations

- Monarch Butterfly Host Plant, No Butterflies Observed

TETRA TECH

Hanwha

Reference Map

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# Appendix 1. Special Status Wildlife Species with Potential to Occur

| Common Name | Scientific Name | Federal Status[1] | ODFW Status in Willamette Valley[2] | Occurs in Linn County per ORBIC 2019 |
|---|---|---|---|---|
| **Birds** | | | | |
| bald eagle | *Haliaeetus leucocephalus* | BCC, BGEPA | - | Yes |
| golden eagle | *Aquila chrysaetos* | BCC, BGEPA | - | Yes |
| streaked horned lark | *Eremophila alpestris strigata* | FT | SS-C, CSS | Yes |
| grasshopper sparrow | *Ammodramus savannarum* | - | SS-C, CSS | Yes |
| Oregon vesper sparrow | *Pooecetes gramineus affinis* | FSOC | SS-C, CSS | Yes |
| western meadowlark | *Sturnella neglecta* | - | SS-C, CSS | Yes |
| purple martin | *Progne subis* | - | SS-C | Yes |
| olive-sided flycatcher | *Contopus cooperi* | BCC | SS | Yes |
| acorn woodpecker | *Melanerpes formicivorus* | FSOC | SS | Yes |
| chipping sparrow | *Spizella passerina* | - | SS | Yes |
| **Fish** | | | | |
| Pacific lamprey | *Entosphenus tridentatus* | FSOC | SS | Yes |
| western brook lamprey | *Lampetra richardsoni* | FSOC | SS | Yes |
| coastal cutthroat trout | *Oncorhyncus clarkii clarkii* | - | SS | No |
| steelhead trout | *Onchorynchus mykiss* | FT | SS | Yes |
| Chinook salmon | *Onchorynchus tshawytscha* | FT | SS-C | Yes |
| Oregon chub | *Oregonichthys crameri* | DL | SS | Yes |
| **Invertebrates** | | | | |
| Fender's blue butterfly | *Icaricia icarioides fender* | FT | CSS | No |
| monarch butterfly | *Danaus plexippus* | FPT[3] | CSS | Yes |
| winged floater mussel | *Anodonta nuttalliana* | FSOC | - | Yes |
| **Reptiles** | | | | |
| northwestern pond turtle | *Actinemys marmorata* | FSOC | SS-C | Yes |

| Common Name | Scientific Name | Federal Status[1] | ODFW Status in Willamette Valley[2] | Occurs in Linn County per ORBIC 2019 |
|---|---|---|---|---|
| western painted turtle | *Chrysemys picta bellii* | – | SS-C, CSS | Yes |
| **Amphibians** | | | | |
| northern red-legged frog | *Rana aurora aurora* | FSOC | SS, CSS | Yes |
| **Mammals** | | | | |
| fringed myotis | *Myotis thysanodes* | - | SS | Yes |

Sources: OCS 2016, ODFW 2016, ODFW 2021, ORBIC 2019, ORBIC 2023, USFWS 2021, USFWS 2023a, USFWS 2023b

1. Federally Listed Species: FT = Threatened, FPT = Proposed Threatened, FSOC = Species of Concern, BCC = Bird of Conservation Concern, DL = Delisted

2. Oregon Department of Fish and Wildlife: SS-C = State Sensitive Critical, SS = State Sensitive, CSS = Conservation Strategy Species in Oregon's State Wildlife Action Plan

3. Listed as a Federal Candidate species at the time of surveys.

# Appendix 2. Select Photographs Taken during Wildlife Surveys

Photo 1. Represenative wetland habitat for northern red-legged frog, northwestern pond turtle, and western painted turtle. Looking East. Taken: 5/12/2023. Lat/Long: 44.25265476, -123.0425773.

Photo 2. Representative raptor nesting substrate. Looking Northwest. Taken: 6/9/2023. Lat/Long: 44.2433659, -123.0357147.

Photo 3. Little Muddy Creek. Looking North. Taken: 5/12/2023. Lat/Long: 44.237185, -123.042781.

Photo 4. Streaked-horned lark habitat documentation, no suitable nesting habitat as of May 12, 2023. Looking Northeast. Taken: 5/12/2023. Lat/Long: 44.248526, -123.05717.

Photo 5. Streaked-horned lark habitat documentation, no suitable nesting habitat as of June 9, 2023. Looking Northeast. Taken: 6/9/2023. Lat/Long: 44.23189769, -123.056116.

Photo 6. Streaked-horned lark habitat documentation, harvested area of suitable nesting habitat as of June 29, 2023. Looking South. Taken: 6/29/2023. Lat/Long: 44.248252 -123.055661.

Photo 7. Streaked-horned lark habitat documentation, most fields harvested but not suitable nesting habitat as of June 29, 2023. Looking West. Taken: 6/29/2023. Lat/Long: 44.26676, -123.006737.

Photo 8. Streaked-horned lark habitat documentation, fields harvested and bailed creating suitable nesting habitat as of August 10, 2023. Looking Southeast. Taken: 8/10/2023. Lat/Long: 44.258062, -123.041971.

Photo 9. Streaked horned lark habitat documentation. Ground disturbance in rye grass fields continues through August. Looking Northwest. Taken: 8/25/2023. Lat/Long: 44.254195, -123.038184.

Photo 10. Red-tailed hawk nest. Looking Southeast. Taken: 6/9/2023. Lat/Long: 44.27230032, -123.006836.

Photo 11. Great horned owlet near nest. Looking Southwest. Taken: 6/9/2023. Lat/Long: 44.24829391, -123.0556432.

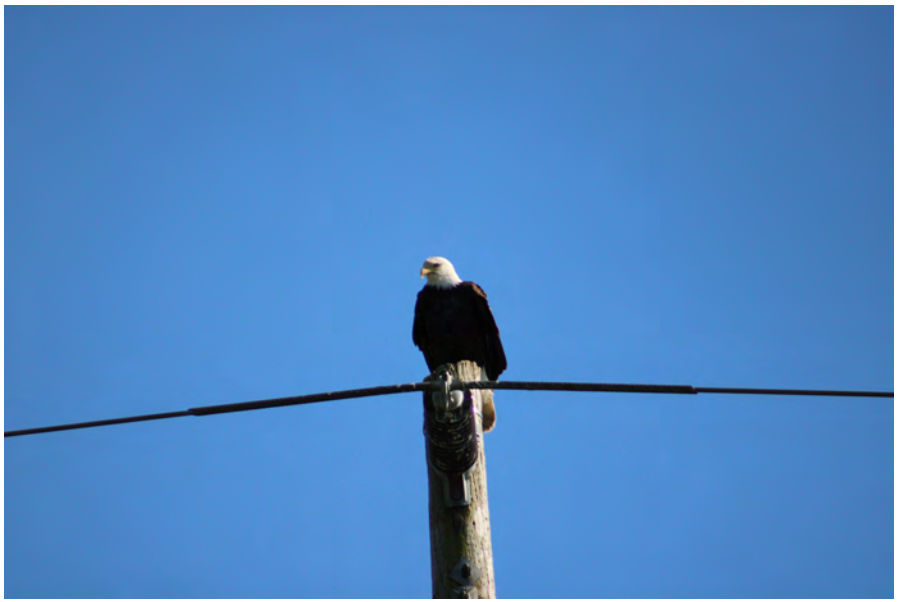

Photo 12. Bald eagle perched on power pole. Looking South. Taken: 5/13/2023. Lat/Long: 44.23586895, -123.0483785.

# Appendix 3. Complete List of Wildlife Species Observed

## Complete List of Wildlife Species Observed

| Common Name | Scientific Name |
|---|---|
| **Birds** | |
| American crow | *Corvus brachyrhynchos* |
| American goldfinch | *Spinus tristis* |
| American kestrel | *Falco sparverius* |
| American robin | *Turdus migratorius* |
| bald eagle | *Haliaeetus leucocephalus* |
| barn swallow | *Hirundo rustica* |
| Bewick's wren | *Thryomanes bewickii* |
| black-capped chickadee | *Poecile atricapillus* |
| black-headed grosbeak | *Pheucticus melanocephalus* |
| Brewer's blackbird | *Euphagus cyanocephalus* |
| brown headed cowbird | *Molothrus ater* |
| bushtit | *Psaltriparus minimus* |
| California scrub jay | *Aphelocoma californica* |
| Canada goose | *Branta canadensis* |
| cedar waxwing | *Bombycilla cedrorum* |
| common yellowthroat | *Geothlypis trichas* |
| dark-eyed junco | *Junco hyemalis* |
| European starling | *Sturnus vulgaris* |
| golden crowned sparrow | *Zonotrichia atricapilla* |
| great blue heron | *Ardea herodias* |
| great egret | *Ardea alba* |
| great-horned owl | *Bubo virginianus* |
| green-winged teal | *Anas crecca* |
| house finch | *Haemorhous mexicanus* |
| house sparrow | *Passer domesticus* |

| Common Name | Scientific Name |
|---|---|
| killdeer | *Charadrius vociferus* |
| lesser goldfinch | *Spinus psaltria* |
| mallard duck | *Anas platyrhynchos* |
| mourning dove | *Zenaida macroura* |
| northern flicker | *Colaptes auratus* |
| northern harrier | *Circus hudsonius* |
| northern pintail | *Anas acuta* |
| northern shoveler | *Spatula clypeata* |
| pied billed grebe | *Podilymbus podiceps* |
| purple finch | *Haemorhous purpureus* |
| red-breasted nuthatch | *Sitta canadensis* |
| red-tailed hawk | *Buteo jamaicensis* |
| red-winged black bird | *Agelaius phoeniceus* |
| ring-necked duck | *Aythya collaris* |
| scrub jay | *Aphelocoma coerulescens* |
| song sparrow | *Melospiza melodia* |
| sora | *Porzana carolina* |
| spotted towhee | *Pipilo maculatus* |
| turkey vulture | *Cathartes aura* |
| violet-green swallow | *Tachycineta thalassina* |
| Wilson's warbler | *Cardellina pusilla* |
| Wilson's snipe | *Gallinago delicata* |
| wood duck | *Aix sponsa* |
| **Mammals** | |
| Columbian black-tailed deer | *Odocoileus hemionus columbianus* |
| cottontail rabbit, sp. | *sylvilagus sp.* |
| coyote – tracks and scat | *Canus latrans* |

| Common Name | Scientific Name |
|---|---|
| nutria | *Myocastor coypus* |
| raccoon – tracks and remains | *Procyon lotor* |
| Roosevelt elk – scat | *Cervus canadensis roosevelti* |
| striped skunk – tracks and remains | *Mephitis mephitis* |
| Townsend's chipmunk | *Tamias townsendii* |
| **Reptiles** | |
| garter snake | *Thamnophis* sp. |
| **Amphibians** | |
| American bullfrog | *Lithobates catesbeianus* |
| Pacific tree frog | *Pseudacris regilla* |
| **Invertebrates** | |
| freshwater mussel | *Anodonta* sp. |
| basket clams – empty shells | *Corbicula fluminea* |
| signal crayfish-large claw near culvert | *Pacifastcus leniusculus* |
| **Fish** | |
| carp | *Cyprinus carpio* |

# Attachment G-2. Draft Habitat Mitigation Plan

# Draft Habitat Mitigation Plan

**Muddy Creek Energy Park**
**May 2026**

**Prepared for**
**Muddy Creek Energy Park, LLC.**

**Prepared by**

# Table of Contents



# List of Tables

# 1.0 Introduction

Muddy Creek Energy Park, LLC (Applicant) seeks to develop the Muddy Creek Energy Park (Facility), consisting of a 150-megawatt (MW) solar energy generation facility, a 150-MW battery energy storage system (BESS) project, and related or supporting facilities on approximately 1,590 acres of private land in Linn County, Oregon.

This Draft Habitat Mitigation Plan (HMP) describes how the Applicant will mitigate for the unavoidable wildlife habitat impacts of the Facility and therefore, in conjunction with Exhibit G of the Application for Site Certificate (ASC), demonstrates how the Applicant will construct and operate the Facility consistent with the Oregon Department of Fish and Wildlife (ODFW) Fish and Wildlife Habitat Mitigation Policy, Oregon Administrative Rule (OAR) 635-415-0025. The Applicant has conducted habitat categorization surveys and other biological studies that inform habitat categorization in accordance with the ODFW Fish and Wildlife Habitat Mitigation Policy and has avoided and minimized impacts to wildlife and habitat as described in Exhibit G of the ASC. The actual acres of impacts and the associated mitigation needs will be determined based on the final design and will be included in a final HMP prior to construction of the Facility.

# 2.0 Applicable Rules and Agency Guidance

## 2.1 General Standards for Siting Facilities

In order to issue a site certificate for the Facility, the Energy Facility Siting Council (EFSC) must find that the Facility, taking into account mitigation, is consistent with the ODFW Fish and Wildlife Habitat Mitigation Policy detailed in OAR 635-415-0000 through 0025 (OAR 345-022-0060). The ODFW policy describes six categories of habitat quality and establishes specific mitigation goals for impacts to each of these habitat categories (see Section 4.0 below). This policy, although aimed specifically at mitigating the loss of habitat, inherently benefits listed and other desirable native species dependent on the impacted habitats.

# 3.0 Description of Impacts Addressed by the HMP

Construction and operation of the Facility will result in both permanent and temporary impacts to wildlife and their habitats. Permanent impact areas are those that would be converted from the existing condition to a different condition for the life of the Facility. The entire solar array area within the security fence is considered permanently impacted and includes all solar components. Although it is considered permanently impacted, vegetation within the solar array area fence will be returned to agriculture grass seed production.

Temporary impact areas include temporary impacts from the underground collector lines and transmission lines outside the solar array area fence, as well as temporary impacts around the outside of perimeter fencing. All temporary impact areas will be returned to agriculture following construction and land within the solar array area fence will be managed using agrivoltaics as described in the Agrivoltaics Plan.

The Facility is located entirely within the ODFW Designated West Side Big Game Year-Round Peripheral Habitat. ODFW (2017) describes Year-Round Peripheral Habitat in western Oregon as important, but not limited or essential habitat for big game; therefore, it should be considered as Category 4 under ODFW's Habitat Mitigation Policy. It is not possible to site the Facility outside of the designated Year-Round Peripheral Habitat because the Facility is location-dependent on its interconnection point at Diamond Hill Substation. ODFW can and does issue elk damage tags and deer and elk landowner preference program tags within the Facility vicinity. Solar array blocks are fenced individually, which allows movement for big game within and around the Facility. Big game will still have access to grass fields outside of the fencing. The streams within the Site Boundary will not be fenced, and thus the Facility fending will not prohibit wildlife access to these streams. Fencing is not proposed around the 1,590-acre Site Boundary.

The Facility will not have impacts on Category 1 habitat. The Facility avoids impacts to Category 2 habitat to the extent possible; however, a very small amount of Category 2 habitat will be impacted. As the Facility design and layout are finalized this small amount may be reduced even more. ODFW lists restorable rye grass fields as an example of Category 5 habitat, however ODFW has provided input that the grass seed fields provide habitat benefits for grassland bird species in the Willamette Valley, and because the Facility is within ODFW's Designated West Side Big Game Year-Round Peripheral Habitat, the grass fields should be categorized as Category 4 habitat (ODFW 2017). Therefore, the Facility will have temporary and permanent impacts to Category 4 habitat. No habitat mitigation is required for impacts to Category 6 areas. Table 1 presents anticipated acres of impact for ODFW-recommended habitat categorization present at the Facility. These areas will be mitigated using one of the mitigation options presented in Section 5, including but not limited to placement of a conservation easement on land with opportunities for enhancement.

The Oregon Removal-Fill Law administered by the Oregon Department of State Lands (DSL) requires any loss of wetland (waters of the state) that does not meet an exemption will be permitted and mitigated in accordance with OAR Chapter 141 Division 85. The wetland mitigation approach proposed is to purchase wetland mitigation bank credits from a DSL approved wetland mitigation bank. There are areas within the Facility that are being mitigated two-fold, for wetland loss and habitat loss.

Table 1 lists the acres that will be permanently or temporarily impacted by the Facility, organized by habitat category and subtype. These habitats are described in Exhibit G and the biological survey reports (Exhibit G, Attachment G-1).

**Table 1. Acres of Impact to Habitat Categories and Types within the Solar Array Area**

| Habitat Category | Habitat Type | Habitat Type-Subtype | Disturbance (acres) | |
|---|---|---|---|---|
| | | | Temporary | Permanent |
| 2 | Riparian Forest and Natural Shrubland Complexes | Westside Riparian | 0.1 | 0.1 |
| | Wetlands | Emergent Wetlands | 0.04 | 0.1 |
| | | Forested Wetlands | 0.04 | 0.03 |
| **Category 2 Final Total** | | | **0.2** | **0.3** |
| 4 | Agriculture, Pasture, and Mixed Environs | Irrigated Pastures and Hay Meadows | 0.2 | 0.2 |
| | | Orchards, Vineyards, Grass Seed Fields, Other Row Crops | 21.7 | 380 |
| | Upland Forests and Woodlands | Westside Lowlands Conifer-Hardwood | 0.02 | 0.01 |
| | Wetlands | Emergent Wetlands | 15.7 | 454 |
| **Category 4 Final Total** | | | **37.6** | **834** |
| 6 | Urban and Mixed Environs | Urban and Mixed Environs | 0.3 | 1.2 |
| **Category 6 Final Total** | | | **0.3** | **1.2** |
| **Grand Total** | | | **38.1** | **835** |
| Note: Totals in this table may not be precise due to rounding. | | | | |

# 4.0 Methods for Calculating Mitigation

Table 2 shows methods for calculating mitigation for permanent impacts. No mitigation is proposed for temporary impacts as all land will be returned to agriculture after construction. The grass seed fields are temporarily impacted annually as the grass seed is harvested and the soil prepped for seeding. The cropland areas that are temporarily impacted by construction will be prepped for seeding and returned to grass seed cropland post construction. The Applicant will determine the final mitigation ratio in consultation with ODFW prior to construction, based on the mitigation option selected (see Section 5.0), the type of mitigation, duration of mitigation (i.e., term vs. perpetuity), and the likelihood of mitigation success.

**Table 2. Mitigation Calculation**

| Habitat Category | Permanent Impacts (acres)[1] | Mitigation Ratio[2] | Mitigation Need (acres) | Mitigation Description |
|---|---|---|---|---|
| Category 2 | 0.3 | 2:1 | 0.6 | No net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality. Mitigation must be in-kind and in-proximity. |
| Category 4 | 834 | 1:1 | 834 | No net loss of quantity or quality. Mitigation can be in-kind or out-of-kind, in-proximity or off-proximity. |
| **Grand Total** | **-** | **-** | **834.6** | |

1. Acres of permanent impact requiring mitigation, which excludes habitat types and categories with less than a 0.05-acre mitigation need as well as Category 6 areas.

2. Acres mitigation per acre impacted.

# 5.0 Mitigation Options

The Applicant 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 would be in the Willamette Valley and "in proximity" to the Facility. The Applicant may use one or more options to mitigate for habitat impacts and will determine the combination of the mitigation options that best correlates to the impacted areas in consultation with ODFW and the affected landowners, subject to Oregon Department of Energy (ODOE) approval.

The final mitigation approach will offer enough suitable habitat to achieve the ODFW goal of no net loss of habitat quantity or quality and will provide habitat for streaked horned lark (*Eremophila alpestris strigata*) and other grassland bird species. Category 4 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 which is above and beyond ODFW mitigation goals for this habitat category. 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 Facility[1] by means of an outright purchase, conservation easement, or similar conveyance, and will provide a copy of the documentation to ODOE.

[1] As used in this Plan, "life of the facility" means continuously until the Facility site is restored and the site certificate is terminated in accordance with OAR 345-027-0110.

## 5.1 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, 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.

## 5.2 Option 2: In-lieu Fee

Under this option, the Applicant would partner with a land trust or other qualified non-governmental organization (NGO) for the purpose of habitat enhancement and conservation. The Applicant would contribute funds to the organization. The funds could be used for acquisition, monitoring, and long-term maintenance and site protection of the habitat mitigation area.

## 5.3 Option 3: Conservation Easement Lands Adjacent to the Facility

Under this option, the Applicant would identify parcels available for placing conservation easements on lands adjacent to the Facility. This in-kind and in-proximity mitigation strategy is proposed although Category 4 habitat mitigation strategy can also include out-of-kind or off-proximity mitigation. Grass seed fields adjacent to the Facility have been identified as potential areas of enhancement and conservation. Vegetation within the mitigation area would specifically be enhanced to create habitat for streaked horned lark. The mitigation area would be managed as a streaked horned lark reserve where ruderal grassland conditions would be maintained mechanically or manually through control of ground cover and vegetation growth as recommended by the American Bird Conservancy. 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.

Under this option, the Applicant may partner with a third-party such as the American Bird Conservancy for long-term enhancement and monitoring of the mitigation parcels. 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.

### *5.3.1 Habitat Enhancement Actions*

Habitat enhancements for the streaked horned lark include removal of existing vegetation (i.e. grass seed crops) and establishment and maintenance of ruderal grasslands with native graminoids and forbs. Ruderal grasslands are open landscapes of low statured vegetation with a high percentage of bare ground or sparsely vegetated ground with few to no trees and shrubs[2]. Active vegetation management is required to maintain ruderal grassland habitat and often requires vegetation management actions to occur 2 to 3 times per year. Vegetation management actions can

[2] Altman, Bob. Avifauna Northwest. 2026. Ruderal Grasslands and Streaked Horned Lark Reserves in the Willamette Valley: Reviving a Unique Ecosystem and Recovering an Imperiled Pacific Northwest Bird. February 2026.

include grazing, mowing (mechanical removal), prescribed fire, or use of herbicide. Weed control is particularly important to maintain sparsely vegetated ground. Vegetation management and maintenance will promote the habitat structure preferred by streaked horned larks and other grassland bird species.

# 6.0 Monitoring

Monitoring needs for the mitigation area would vary depending on the mitigation option selected. For Option 1 (ODFW Payment-to-Provide) and Option 2 (In-lieu Fee), 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 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 the year following implementation of enhancement actions. Monitoring will occur annually until the trajectory of ecological change is understood and then would be relaxed to less frequent monitoring to ensure that the ecological site is maintained (e.g., every 3 years). The Applicant will identify appropriate monitoring actions and performance standards for the Conservation Easement and habitat enhancement actions implemented in consultation with ODOE and ODFW to design and maintain ruderal grasslands. Depending upon specific habitat enhancement actions implemented, the investigator may carry out the following monitoring procedures:

1. Assess vegetation height, species diversity, and percentage of bare ground toward meeting the success criteria specific to ruderal grasslands (Section 5.3.1);
2. Record environmental factors (such as precipitation at the time of surveys and precipitation levels for the year);
3. Assess the success of the weed control program through an accounting of the severity and size of invasive weed infestations and reduction in both over time, and recommend remedial action, if needed.

# 7.0 Success Criteria

Mitigation of permanent habitat impacts for 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 for impacts to Category 4 habitat or provides commensurate funding. The Applicant must ensure 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 will determine the actual mitigation area requirements for the Facility, subject to ODOE approval, before beginning construction 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/seeded vegetation (as applicable), suitability of habitat for streaked horned lark, and successful weed control. If the Applicant cannot demonstrate that the habitat mitigation area is trending toward the habitat quality goals within 5 years after the initial implementation of enhancement actions, the Applicant would propose remedial actions, which could include, but are not limited to, 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" goals described above. The investigator will recommend remedial actions 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.

# 8.0 Amendment of the HMP

This HMP may be amended from time to time by agreement of the Applicant and 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.

# Attachment G-3. Draft Noxious Weed Control Plan

# Muddy Creek Energy Park
# Draft Weed Control Plan

**Prepared for**
**Muddy Creek Energy Park, LLC**

**Prepared by**

TETRA TECH

**May 2026**

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# 1.0 Introduction

Muddy Creek Energy Park LLC, a subsidiary of Hanwha Renewables, LLC (Applicant), proposes to construct and operate the Muddy Creek Energy Park (Facility), a solar energy generation facility and related or supporting facilities in Linn County, Oregon.

This Draft Weed Control Plan (Plan) was prepared to comply with Oregon Administrative Rule 660-033-0130 (38)(h)(D), which 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."*

The intent of this Plan is to provide clear methods to minimize the introduction and spread of designated noxious weeds from construction and operation of the Facility, control existing populations of noxious weeds within the weed management area, and to describe noxious weed monitoring methods. The weed management area is defined as the Facility disturbance area plus a 10-foot buffer. The Applicant and its contractors will be responsible for implementing the methods detailed in this Plan.

# 2.0 Regulatory Framework

## 2.1 State of Oregon

In Oregon, a noxious weed is defined under Oregon Revised Statutes (ORS) 569.175 as "a terrestrial, aquatic, or marine plant designated by the State Weed Board under ORS 569.615 as among those representing the greatest public menace and as a top priority for action by weed control programs." Noxious weeds have been declared by ORS 569.350 as a menace to public welfare, and control of these plants is the responsibility of private landowners and operators, as well as county, state, and federal governments.

The Oregon State Weed Board (OSWB) was created by the Oregon Department of Agriculture (ODA) under ORS 569.600. OSWB provides recommendations for noxious weed control at the state-level and is responsible for updating the State Noxious Weed List. The OSWB and the ODA classify noxious weeds in Oregon in accordance with the ODA Noxious Weed Classification System (ODA 2025a). There are three designations under the State's system:

- **A Listed Weed:** A weed of known economic importance that 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.
    - **Recommended Action:** Focus on prevention of new infestations through vector control, certification programs, education, outreach and surveys. New and existing

infestations are prioritized for eradication or intensive control when and where found. Regionally focused, species-specific Statewide Management Strategies for A-listed weeds may be developed as necessary.

- **B Listed Weed:** A weed of economic importance that is regionally abundant but may have limited distribution in some counties.
    - **Recommended Action:** Limited to intensive control at the state, county, or regional level as determined on a site-specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.
- **T-Designated Weed:** A designated group of weed species selected from the B list as a focus for prevention and control by the Noxious Weed Control Program. T-designated noxious weeds are determined by the OSWB and management actions are prioritized and informed by species-specific T-List Statewide Management Strategies created and maintained by the ODA. Action against these weeds will receive priority in accordance with the recommendations of the Statewide Management Strategy.

## 2.2 Linn County

The Linn County Noxious Weed Advisory Committee maintains a list of noxious weeds of concern for the County which consists of the following species:

- Tansy ragwort
- Puncture vine
- Poison hemlock
- Knotweed
- Canada thistle
- Himalayan blackberry
- Shiny leaf geranium
- False brome
- Gorse
- Knapweed

The Linn County Noxious Weed Advisory Committee and Soil and Water Conservation District are available to provide guidance on noxious weed control (pers. comm. Debra Paul, April 20, 2026).

# 3.0 Noxious Weeds Identified at the Facility

In 2023 and 2024, Tetra Tech completed botanical surveys within the Site Boundary, documenting 11 listed noxious weed species (Tetra Tech 2026). Table 1 lists the noxious weed species observed,

their noxious weed designation (i.e., status), and the frequency of observations. Locations of these noxious weeds documented during surveys are included in Exhibit G, Attachment G-1 of the Application for Site Certificate. All of the noxious weed species observed during surveys are "B" listed weeds (ODA 2025a). Two species, reed canarygrass (*Phalaris arundinacea*) and tansy ragwort (*Senecio jacobaea*) are also "T"-designated weeds, meaning that the ODA has targeted these species for prevention and control (ODA 2025a). The Facility is dominated by grass seed fields, which are maintained and managed. Therefore, noxious weeds were not observed within the majority of the fields but instead were primarily observed on the edges of the fields or in areas not currently in grass seed production.

**Table 1. Noxious Weeds Observed within the Site Boundary during Surveys**

| Scientific Name | Common Name | Noxious Weed Status[1] | Frequency |
|---|---|---|---|
| *Carduus pycnocephalus* | Italian thistle | B | Observed in two locations in the Site Boundary |
| *Cirsium arvense* | Canada thistle | B* | Frequently observed throughout the Site Boundary |
| *Cirsium vulgare* | Bull thistle | B | Small patches commonly observed in eastern and central portions of the Site Boundary |
| *Conium maculatum* | Poison hemlock | B* | Observed in three locations in the Site Boundary |
| *Convolvulus arvensis* | Field bindweed | B | Observed in three locations in the Site Boundary |
| *Geranium lucidum* | Shining cranesbill, shiny leaf | B | Observed in two locations in the Site Boundary |
| *Hypericum perforatum* | St. Johnswort, common St. John's wort | B | Commonly observed in the Site Boundary |
| *Phalaris arundinacea* | Reed canarygrass, ribbongrass | B, T | Frequently observed throughout the Site Boundary |
| *Rubus bifrons* (*R. armeniacus*) | Himalayan blackberry | B | Frequently observed throughout the Site Boundary |
| *Senecio jacobaea* | Tansy ragwort | B*, T | Observed in five locations in the Site Boundary |
| *Ventenata dubia* | Ventenata grass | B | Observed in one location in the Site Boundary |

1. Definitions for noxious weed status are provided in Section 2.1. Species marked with a (*) are targeted for biocontrol (ODA 2025a).

Of the 11 noxious weeds observed, three were frequently observed throughout the Site Boundary: Canada thistle, Himalayan blackberry, and reed canarygrass. Most observations of these three species were associated with wetlands or streams occurring within the Site Boundary. Two noxious weeds, bull thistle and common St. Johnswort were commonly observed within the Site Boundary,

and these species were also typically observed adjacent to wetlands and streams. Most of the observations of bull thistle consisted of just a few individuals, whereas the observations of common St. Johnswort ranged from sparse individuals to dense infestations.

Tansy ragwort was observed in five locations during field surveys: three adjacent to agricultural fields in the northern portion of the Site Boundary and two on the banks of Little Muddy Creek in the central and southern portions of the Site Boundary.

Poison hemlock and field bindweed were each observed in three locations within the Site Boundary. Two medium-sized (0.1 to 1.0 acre) infestations of poison hemlock were located along streams in the north and central portions of the Site Boundary, and one small population was observed near the existing substation along Priceboro Drive. The three observations of field bindweed were located near the edges of agricultural fields or along roads in the central portion of the Site Boundary.

Italian thistle and shining cranesbill were each observed twice during field surveys. Both observations of Italian thistle were located within the north-central portion of the Site Boundary along berms used to separate now-abandoned rice paddies. The observations of shining cranesbill were located in the understory of forested/scrub-shrub wetlands. Ventenata grass was only observed in one location during field surveys. This observation consisted of a small patch adjacent to an agricultural road in the northern portion of the Site Boundary.

# 4.0 Noxious Weed Management

Noxious weed control methods for the weed management area (i.e., the Facility disturbance area plus a 10-foot buffer, Figure 1) described in this Plan were developed utilizing information from the ODA Noxious Weed Control Program. The management of noxious weeds will be considered throughout all stages of construction and operation of the Facility and will include:

- **Prevention:** Implement measures to prevent the spread of noxious weeds during construction, operation, and maintenance activities.
- **Control:** Treat noxious weed populations with their appropriate control methods, at appropriate time intervals.
- **Monitoring:** Assess noxious weed changes within the weed management area over time and ensure that legacy as well as new weed populations are not increasing their distribution.

The Applicant's objective is to prevent the introduction of new noxious weed populations and spread of existing noxious weed populations. The methods described in this Plan will be implemented to minimize the spread of noxious weeds during construction activities. New noxious weeds detected within the weed management area during post-construction revegetation will be considered a result of construction activities and will be controlled accordingly.

## 4.1 Management Objectives

Management objectives shall be based on the classification status of a species and frequency of observations (Tables 1 and 2). Management objectives for problematic species that are not on a state or county noxious weed list will be determined on a case-by-case basis based on need for control (e.g., fire control, etc.)

**Table 2. Management Objectives**

| Weed Classification | Years | | |
|---|---|---|---|
| | 0 | 1-5 | 6+ |
| A or B(T) | Begin control prior to construction and continue throughout construction. | Intensive control with the goal to eradicate within first 5 years of operations. Prevent new infestations. | Intensive control and eradication for life of Facility. Prevent new infestations. |
| B | Begin control prior to construction on a case-by-case basis and continue throughout construction. | Intensive control on a case-by-case basis with the goal to eradicate within first 5 years of operations. Prevent new infestations. | Monitor and manage to prevent new populations or spread of existing populations. |
| Invasive Annual Grasses[1] | Monitor and manage to minimize wildfire risk. | Monitor and manage to minimize wildfire risk. | Monitor and manage to minimize wildfire risk. |
| 1. Applies to problematic invasive annual grasses that are not on a state or county noxious weed list. | | | |

## 4.2 Prevention

The following best management practices will be implemented to prevent the spread of noxious weeds during construction activities, revegetation efforts, and operation and maintenance activities.

- Flag areas of noxious weed infestations prior to construction, where appropriate, to alert construction personnel.
- Limit vehicle access to designated routes, whether existing roads or newly constructed roads, and the outer limits of construction disturbances per the final design for the Facility.
- Limit vehicle traffic in areas with noxious weeds.
- Require construction vehicles to pass through a wheel wash station the first time they enter the Facility or return to the Facility from another project.
- Clean vehicles and equipment associated with ground disturbance and movement of topsoil utilizing a mobile wash station after performing work in noxious weed-infested areas and prior to performing work in non-infested areas.
- Topsoil and other soils from noxious weed-infested areas will not be moved outside of the infested areas and will be returned to its previous location during reclamation activities.

- Treat soils from noxious weed infested areas with herbicide prior to initiation of revegetation efforts, depending on site-specific conditions.
- Limit movement of topsoil and other soils from non-infested areas to eliminate the transport of weed seeds, roots, or rhizomes.
- Provide information regarding target noxious weed species at the operations and maintenance building.
- Treat noxious weeds in weed management areas via biological, mechanical, or chemical control.
- Prevent conditions favorable for noxious weed germination and spread by revegetating temporarily disturbed areas as soon as possible.
- Monitor weed management areas for noxious weeds after construction, during the normal course of revegetation maintenance of temporary workspaces, and implement control measures as appropriate.
- Return disturbance areas to agricultural crop production after construction.
- Inspect and certify that the seed and straw mulch used for Facility rehabilitation and revegetation are free of noxious weed seed and propagules.

## 4.3 Control Methods

Control of noxious weeds and other invasive weed species within weed management areas will be implemented through biological, mechanical, or chemical control measures. The control method used will depend on the weed species and size of infestation, time of year, proximity to intact native habitats, and resources available (Tu et al. 2001). Generally, mechanical control is best suited for small infestations of tap-rooted weeds that can be hand pulled or large occurrences in areas where mowing or soil disturbance is acceptable. Chemical control is used for most occurrences of perennial weeds with rhizomes or stolons and large occurrences of any weed in areas where mowing or soil disturbance are not recommended. Successful noxious weed control programs typically combine multiple treatment strategies (USEPA 2008).

### *4.3.1 Biological*

Biological control involves the use of prescribed insects, fungi, and livestock to control noxious weeds to achieve management objectives. Biological control methods are typically targeted to a specific species or plant to control its persistence. They are also used for maintenance in targeted areas for vegetation management control in height and density that includes mitigating fire risk and erosion. Biological control is environmentally friendly and should be the first consideration when applicable.

### 4.3.2 Mechanical

Mechanical treatment will be the preferred method of treatment for existing noxious weed populations where appropriate within the weed management area. Mechanical control methods rely on removal of plants, seed heads, and/or cutting roots with a shovel or other hand tools or equipment that can be used to remove, mow, or disc noxious weed populations. Hand removal of plants is also included under this treatment method. Mechanical methods are useful for smaller, isolated populations of noxious weeds in areas of sensitive habitats. 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 because they reproduce vegetatively from small root fragments. As such, implementation of discing will be species-specific and avoided in areas where it will be counter productive. If discing is employed in areas that will be revegetated following construction, subsequent seeding will be conducted to re-establish desirable vegetative cover that will stabilize the soils and slow the potential re-invasion of noxious weeds. Discing, tilling, or other mechanical treatments that disturb the soil surface within native habitats will also be avoided in favor of herbicide application, which is an effective means of reducing the size of noxious weed populations as well as preventing the establishment of new infestations.

### 4.3.3 Chemical

Chemical control can effectively remove noxious weeds through use of selective herbicides when mechanical control is not feasible. 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 such as rush skeletonweed versus monocots such as jointed goatgrass).

Herbicides will be applied to identified, treatable, noxious weed infestations. The Applicant or their contractors will consult with the County Noxious Weed Advisory Committee to determine which populations are treatable and will notify landowners of proposed herbicide use on their lands prior to application. If a noxious weed population is deemed to be untreatable (e.g., too widespread and established in an area to successfully control), the Applicant will implement the applicable prevention measures discussed in this Plan, subject to approval by the Oregon Department of Energy (ODOE). Herbicide application will be performed within the appropriate season to achieve desired results, as approved by ODOE and the County Noxious Weed Advisory Committee. No weed treatment will occur in agricultural lands without landowner permission.

#### *4.3.3.1 Herbicide Application and Handling*

Herbicide application will occur within the appropriate season and during the appropriate timeframe to achieve desired results, as approved by ODOE and the County Noxious Weed Advisory Committee. Herbicide application will adhere to U.S. Environmental Protection Agency and ODA standards. Only those herbicides that are approved by the U.S. Environmental Protection Agency

and ODA will be used. In general, application of herbicides will not occur when the following conditions exist:

- Wind velocity exceeds 15 miles per hour for granular application or exceeds 10 miles per hour for liquid applications;
- Snow or ice covers the foliage of target species; or
- Adverse weather conditions are forecasted within the next few days.

Hand application methods (e.g., backpack spraying) may be used in roadless areas or in rough terrain. Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Calibration checks of equipment will be conducted prior to spraying activities, as well as periodically throughout use, to ensure that appropriate application rates are achieved.

Herbicides will be transported and used in accordance with all manufacturer label recommendations and warnings.

#### *4.3.3.2 Herbicide Spills and Cleanups*

All appropriate precautions will be taken to avoid herbicide spills. In the event of a spill, cleanup will be immediate. Contractors will keep spill kits in their vehicles to allow for quick and effective response to spills. Herbicide spills will be managed in accordance with the Facility SPCC.

#### *4.3.3.3 Herbicide Spill Reporting*

All herbicide contractors will have readily available copies of the appropriate material safety data sheets for the herbicides used at their disposal and will keep copies of the safety data sheets in the application vehicle. If an herbicide spill of any size occurs, the appropriate agency and spill coordinators will be notified promptly. In case of a spill into wetlands and waterbodies, the appropriate federal, state, and county agencies will be notified immediately. All herbicide spills equal to or greater than 200 pounds or 25 gallons of pesticide residue will be reported to the Oregon Emergency Response System in accordance with applicable laws and requirements (Oregon Administrative Rules 340-142-0050). The Applicant will report all herbicide spills to ODOE by phone or email within 72 hours with follow-up reporting as appropriate. Incidents will also be summarized in the annual operations report.

# 5.0 Monitoring

Noxious weeds will be monitored and mapped throughout the weed management area (Facility disturbance area and a 10-foot buffer) at the frequency listed in Table 3. Results of baseline noxious weed surveys will be used to recommend treatments to be conducted prior to construction. During the construction phase, the environmental monitoring contractor will conduct periodic monitoring

of noxious weeds. The Applicant will be responsible for treating all noxious weeds observed within the weed management area.

The environmental monitoring contractor will conduct seasonal (spring, summer, and fall) post-construction noxious weed monitoring within the weed management area for 2 years, starting the first growing season after construction, to map the extent of all noxious weed occurrences and identify areas for treatment. In Year 5, the Applicant will consult with ODOE and the County Weed District to determine if the monitoring cycle can be reduced during operations.

**Table 3. Noxious Weed Monitoring Schedule**

| Year | Frequency | Activity |
|---|---|---|
| Prior to construction | Once | Conduct site-wide noxious weed survey to identify areas for treatment prior to construction. |
| During construction | Periodic | Conduct periodic monitoring of noxious weeds in the weed management area. |
| Years 1 – 2 | Seasonal (spring, summer, fall) | Conduct site-wide noxious weed survey to identify areas for treatment. Document previous treatment effectiveness, as applicable. |
| Years 3 – 5 | Annual (May – September) | Conduct site-wide noxious weed survey to identify areas for treatment. Document previous treatment effectiveness, as applicable. Surveys, monitoring, and reporting will occur consistent with soil and revegetation monitoring and reporting. |
| Years 5+ | To be determined | Operational staff or contractor will monitor and control noxious weeds as determined in coordination with ODOE and as designated in this Plan. |

Noxious weed monitoring will be conducted within the weed management area through visual inspection while driving or walking. The environmental monitoring contractor will record the following information for each noxious weed occurrence:

- Map occurrence location with a point or polygon;
- Approximate number of individuals;
- Density; and disturbance type.

Landowners may contact the Applicant directly to report the presence of noxious weeds related to Facility activities. The Applicant will control reported noxious weeds on a case-by-case basis and prepare a summary of measures taken for that landowner. The Applicant will report the investigator's findings and recommendations regarding weed control in the Facility's annual report required by Oregon Administrative Rule 345-026-0080.

# 6.0 Treatment Plan

Table 4, below, provides a treatment plan for noxious and invasive weeds (listed by ODA) in the weed management area, including management objectives and treatment guidelines. Specific herbicide application rates will be determined in consultation with the Weed Control Contractor. Table 4 will be updated based on the actions taken for the previous season or year and submitted to ODOE consistent with this Plan. Records of herbicide types, frequency and timing of application, and application methods shall be maintained and provided to ODOE in applicable monitoring reports.

**Table 4. Recommended Timing and Control Methods for Noxious Weeds Identified at the Facility**

| Noxious Weed | Treatment Method and Timing | | | |
|---|---|---|---|---|
| | **Mechanical Control** | **Grazing** | **Biological Control** | **Chemical Control** |
| ***Carduus pycnocephalus*** **(Italian thistle)** | Hand-pulling or grubbing prior flowering or seed set is effective at controlling small patches. However, roots must be severed at least four inches below ground so that the plant does not regrow.<br><br>Mowing is not effective because the plant will re-sprout multiple flower heads at a low height. | Deferring autumn grazing of sheep has been effective in reducing stand density because the thistles grow etiolated and less spiny when competing with ungrazed grasses. Then sheep will graze the thistle along with the grass. Sheep will also eat the rosettes.<br>Grazing by goats during flowering season may reduce seed set as goats like the flowerheads and are able to digest the seeds. | Two approved biocontrol agents, a seed head weevil and a crown/root weevil, are approved and have been successfully established in Oregon<br><br>Contact the ODA for more information and release form. | Apply when actively growing but before bolting. |
| ***Cirsium arvense***[1] **(Canada thistle)** | Hand-pull, dig, or hoe prior to seed set at least three times each season in June, August, and September.<br>Mow at early bolt stage and then again, every 21 days during growth season to deplete stored energy in roots and prevent seed production.<br>If flowers or seed are present, debris should be bagged or burned to prevent spread.<br>**Combination Option:** Mow early in spring and then repeat 2 to 4 times during growing season. In fall, allow shoots to regrow to more than 15 inches in height and the spray with herbicide. Periodically monitor for new seedlings and spot treat or hand remove regrowth. | Use a short-term intensive grazing approach in the spring before plants begin to bolt.<br>Seedlings and rosettes can be most effectively grazed by goats, then sheep, and lastly cows.<br>**Combination option:** After intensive, controlled grazing on infested areas in the spring apply herbicide treatment before flowering stage. Repeat in fall with another herbicide treatment if necessary. | Four approved biocontrol agents established in Oregon: a stem weevil, a seed head weevil, a crown weevil, and a stem gall fly.<br><br>Contact the ODA for more information and release form. | Apply in the spring to plants in the pre-bud stage of growth or in the fall to plant regrowth. |
| ***Cirsium vulgare*** **(bull thistle)** | Any mechanical or physical method that severs the root at least an inch below the soil surface will kill bull thistle plants.<br>Hoe, hand-pull, or mow before flowering to prevent seed production.<br>Carefully bag and dispose of flowering plants. | Sheep, goats, and horses will eat young plants and are most effective on thistles in the early stages of an infestation. | Four approved biocontrol agents established in Oregon: a stem weevil, a seed head weevil, a crown weevil, and a stem gall fly.<br><br>Contact the ODA for more information and release form. | Apply in spring or early summer to rosettes or bolting plants or in fall to seedlings and rosettes. |
| ***Conium maculatum*** **(poison hemlock)** | Digging up small infestations and removing the entire taproot is effective. Remove prior to seed set.<br><br>Mowing is ineffective as plants will re-sprout, sending up new stalks in the same season mowing occurs.<br><br>Toxins will remain potent in dried plant material. Never put pulled plants in the compost or leave them where livestock might eat them. Remove pulled plants from site, bag and put in the trash.<br><br>Monitor sites for resprouts and seedlings as seeds will readily germinate on disturbed ground.<br><br>****Always wear protective gloves and clothing when working with poison hemlock as all plant parts are toxic.** | Grazing is not recommended for control due to the plant's toxicity. | No effective biological control agents currently available for use in Oregon. | Apply in seedling to rosette stage in spring. |
| ***Convolvulus arvensis*** **(field bindweed)** | In general, mechanical control is not a good option because plants are able to reproduce from roots, and seeds remain viable in the soil for long periods of time. | Grazing has not been shown to be effective for management of field bindweed. | Two approved biological control agents are established in Oregon: a moth and a mite.<br>Contact the ODA for more information and release form. | Apply at bud growth stage in spring or during summer fallow in early August. |

| Noxious Weed | Treatment Method and Timing | | | |
|---|---|---|---|---|
| | **Mechanical Control** | **Grazing** | **Biological Control** | **Chemical Control** |
| ***Geranium lucidum*** **(shining cranesbill, shiny leaf)** | Individual plants and small infestations can easily be controlled by carefully hand-pulling, bagging, and putting in the trash.<br>Remove in fall after plants germinate or in spring before plants flower.<br><br>Make sure the plant's fibrous roots are removed to prevent resprouting. Larger populations can be covered with sheet mulch – ideally overlapping pieces of cardboard covered with a thick layer of woodchips.<br><br>Repeatedly monitoring and controlling seedlings before they set seed is required for effective control.<br><br>Mowing is not recommended as it will spread the seeds if capsules are present. | Grazing has not been shown to be an effective method of control on other invasive species of *Geranium.* | No approved biological control agents currently available for use in Oregon. | Herbicides with the active ingredients ***triclopyr*** and ***glyphosate*** effectively control shiny geranium. |
| ***Hypericum perforatum*** **(St. Johnswort)** | Due to it's deep taproot and ability to regenerate, hand-pulling or digging is only practical for small, isolated infestations. Repeated pulling will be necessary to ensure removal of the whole plant and any lateral roots. Pull before seed set and do not leave plants on site as vegetative growth will occur.<br><br>Tillage is effective when repeated in croplands.<br><br>Repeated mowing at two-week intervals in the spring has shown some effectiveness. | Grazing is generally not recommended because of the potential for livestock poisoning; however, grazing by goats, which are less susceptible to the toxins, may help keep plants at low densities. | Several biocontrol agents have been approved and are well-established in Oregon: a moth, a looper, and two beetles.<br>Contact the ODA for more information and release form. | Apply before any blossoms open, preferably on new seedlings after germination. |
| ***Phalaris arundinacea*** **(reed canarygrass)** | Physically removing plants and tarping prior to seed set is effective; however, it is impractical for larger infestations.<br><br>Mowing may be effective if done prior to seed maturation.<br><br>Studies in Wisconsin indicated that twice-yearly mowings (in early to mid-June and early October) resulted in increased cover of native species in comparison to reed canarygrass-infested plots that were not mowed. | Reed canarygrass is not a preferred forage due to its thick stems and unpalatable alkaloids. Therefore, unless grazed early, it may not be effective.<br><br>Grazing early while plants are more palatable followed by repeated grazing has been shown to be effective. Infestations should be grazed down to about 3-4 inches in height before plants are 10 inches tall. Plant should be regrazed when plants reach about 10 inches in height.<br><br>Grazing by livestock can also be used to remove biomass and stimulate new growth that can be treated with an herbicide. | No approved biological control agents currently available for use in Oregon. | Apply to actively growing plants at early heading or in fall from mid-September to after first light frost. |
| ***Rubus bifrons*** **(*R. armeniacus*)** **(Himalayan blackberry)** | Hand-pulling can be effective for small populations; however, canes, roots, and root crowns must be removed to prevent resprouting. A Pulaski or similar device can be used to remove plants.<br><br>Roots that break off and remain in the soil may resprout, so make sure to monitor the area and control for resprouts and seedlings.<br><br>Remove from site and dispose of stems and roots, | Grazing, especially by goats, has been shown to be successful. Grazing by sheep and cattle may also be effective.<br><br>Grazing by goats has been shown to be more effective when used to clear or suppress one to four year old stands of brush rather than dense, tall mature stands of blackberry. | No approved biological control agents currently available for use in Oregon. | Apply in September to October when plants are actively growing and after berries are formed. Fall treatments must be made before a killing frost. |

| Noxious Weed | Treatment Method and Timing | | | |
|---|---|---|---|---|
| | Mechanical Control | Grazing | Biological Control | Chemical Control |
| | Repeated cutting of the above-ground biomass during flowering will exhaust root stores will provide some control.<br><br>Tillage can be effective if the canes are raked and removed from the site. However, this can cause significant soil disturbance. | | | |
| ***Senecio jacobaea*** **(tansy ragwort)** | Small infestations can be controlled manually by pulling up the entire plant, including its roots. Pulling once flowering stems are beginning to form but prior to flowering is preferred. Pulling plants while the soil is moist will allow for easier removal of roots.<br><br>Roots left in ground may resprout, and seeds may germinate in the late summer, fall, and spring, so repeated monitoring of the area for new plants is required.<br><br>Pulled plants should be sealed in a plastic bag and disposed of off-site. **Protective gloves and clothing should be worn when pulling and handling plants.**<br><br>**Combination Option:** Mowing alone is not effective as tansy ragwort can re-sprout if entire plant is not removed. Mowing to keep plants from blooming and going to seed, followed by herbicide application the same year can provide control. | Tansy ragwort plants are toxic to horses and cattle.<br><br>Sheep and goats are less susceptible to tansy ragwort poisoning and sheep can help manage infestations. However, sheep may choose to graze other desirable plant species before consuming large amounts of tansy ragwort. | Three approved biological control agents are well established in Oregon: a seed head fly, a flea beetle and a moth.<br><br>Contact the ODA for more information and release form. | Apply during the flowering stage. Fall applications after rains begin seed germination have proven effective also. |
| ***Ventenata dubia*** **(ventenata grass)** | Hand pulling plants when the soil is moist may be effective for small infestations.<br><br>Mowing can help prevent seed production. Mowing should occur prior to development of seed heads as plants mowed following development of seed heads may bend or become tangled in equipment. Plants that are mowed prior to development of seed heads may produce another flush of inflorescences, so mowing multiple times throughout the growing season is required to prevent seed production.<br><br>Ventenata stems are difficult to cut and need sharpened equipment and slow mow speeds. | Grazing is likely not effective as animals tend to avoid plants, especially once plants mature.<br><br>Grazing in summer or fall of co-occurring plant species can remove plant biomass in order to increase herbicide contact on ventenata seedlings that emerge in the fall. | No approved biological control agents currently available for use in Oregon. | Apply pre-emergent herbicide in late summer or post-emergent in the fall after emergence (1 inch rain and soil temperature above 45°F). |
| Sources: Cal-IPC 2025, DiTomaso et al. 2013, Hutchison and Reilly 2017, ODA 2025b, ODA 2025c, OSU 2024, OSU 2025, Peachey 2023, Schick 2021, Soll and Lipinski 2004, USDA 2017, WSNWCB 2025, YSWCD 2025, Zouhar, 2002.<br>1. Control methods noted for Canada thistle are for non-cropland control. If control is adjacent to crops, see Peachey (2023) for alternative control methods. | | | | |

# 7.0 Roles and Responsibilities

The Applicant is the overall responsible party for construction and operation of the Facility and implementation of noxious weed management activities described in this Plan. However, the Applicant may use contractors to complete tasks associated with noxious weed management and monitoring. Responsible parties and their roles are described in Table 5. Names and contact information for responsible parties that have not yet been identified (e.g., operational staff) will be added to Table 5 prior to construction or operations, as appropriate.

**Table 5. Roles and Responsibilities**

| Responsible Party | Name and Contact Information | Role |
|---|---|---|
| Applicant | Hanwha Renewables, LLC | Responsible for compliance with all condition requirements, hiring contractors, and ensuring that all contractors perform work in accordance with the requirements of this Plan. |
| Weed Control Contractor | Name:<br>Contact Person:<br>Address:<br>Phone:<br>Email: | Responsible for performing weed control actions in the weed management area, as described in this Plan. |
| Construction/Operational Environmental Monitoring Contractor | Name:<br>Contact Person:<br>Address:<br>Phone:<br>Email: | Responsible for conducting environmental monitoring and documenting compliance with aspects of this Plan during and following construction. Conduct compliance monitoring to ensure that contractors are complying with noxious weed prevention measures in this Plan. Facilitate coordination meetings with ODOE and County Noxious Weed Advisory Committee, train all personnel to maintain tracking sheets, conduct routine check-in calls with the construction team, and document communication with landowners prior to chemical application. Maintain records and provide ODOE with copies annually along with the noxious weed report. |
| Operational Staff | Name:<br>Contact Person:<br>Address:<br>Phone:<br>Email: | Responsible for conducting environmental monitoring during operations and documenting compliance with aspects of this Plan. Maintain records and provide ODOE with copies as designed in this Plan. |
| Oregon Department of Energy (ODOE) | Oregon Department of Energy<br>Compliance Specialist<br>550 Capitol St. NE<br>Salem, OR 97301<br>Phone:<br>Email: | Responsible for providing technical input on proposed BMPs and other measures to minimize impacts and for validating all compliance deliverables described in this Plan. ODOE may utilize contractors to meet its responsibilities under this Plan during some or all phases. |

| Responsible Party | Name and Contact Information | Role |
|---|---|---|
| Linn County (County) | Linn County Soil and Water Conservation District<br>Debbie Paul<br>33935 Hwy 99E<br>Tangent, OR 97389<br>(541) 926-2483<br>debra.paul@or.nacdnet.net | Responsible for providing input on weed control and other actions described in this Plan and its implementation as needed. The County will also attend calls with ODOE and other agencies as needed and as available. |

# 8.0 Plan Amendment

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

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# Figures

# Muddy Creek Energy Park

## Figure 1
## Noxious Weeds

**LINN COUNTY, OR**

- Facility Site Boundary
- City/Town
- County Boundary
- Interstate Highway
- Local Roads
- Railroad
- Existing Transmission Line
- Weed Management Area

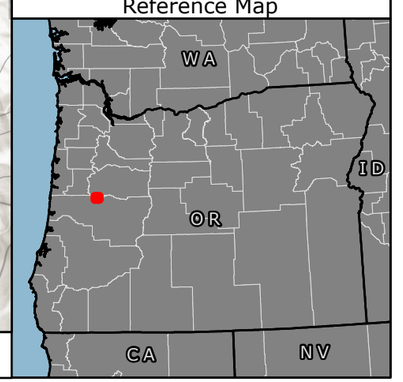
Noxious Weed

- Cirsium arvense *(Canada thistle)*
- Convolvulus arvensis *(field bindweed)*
- Hypericum perforatum *(common St. Johnswort)*
- Phalaris arundinacea *(Reed canarygrass)*
- Rubus armeniacus *(Himalayan blackberry)*

TETRA TECH

Hanwha Renewables

Reference Map

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