Appendix N

Natural Resource Assessment

Moon Pit Site Evaluation - Natural Resource Assessment

Prepared for
Deschutes County Solid Waste Department

April 2024

Parametrix

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Prepared by

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April 2024 | 553-2509-011

Citation

Parametrix. 2024. Moon Pit Site Evaluation - Natural Resource Assessment . Prepared for Deschutes County Solid Waste Department by Parametrix, Bend, Oregon. April 2024.

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APPENDICES

1. Introduction

The purpose of the Natural Resource Assessment is to preliminarily assess the presence of protected natural resources and identify likely mitigation scenarios to inform siting of the proposed development of a Solid Waste Management Facility (SWMF) at Moon Pit Site (Site) (Figure 1 in Appendix A). The Site is in an unincorporated parcel of land in Deschutes County, Oregon (Township 19 South, Range 14 East, Sections 1, 2, 12).

Parametrix evaluated the Site using readily available data, including aerial photographs, topographic maps, public geographic information system (GIS) datasets, and information from agency websites. Background data are presented in Appendix B. A 1-day Site visit was conducted on September 27, 2023 to inspect the Site for waters of the state and protected species and their habitat. Parametrix evaluated Site conditions and associated environmental regulatory and mitigation requirements for development of the SWMF.

2. Methods

2.1 Review of Existing Information

The following available environmental data, maps, and materials related to the Site were reviewed:

- Aerial imagery of the Site from 1985 to 2023 (Google Earth 2023).
- Bald eagle and golden eagle nest locations (obtained from USFWS).
- Big game winter range (ODFW 2012).
- Essential and limited pronghorn habitat (ODFW 2021).
- Greater sage-grouse lek locations (obtained from Oregon Department of Wildlife).
- Natural Resources Conservation Service (NRCS) Web Soil Survey in the Site (U.S. Department of Agriculture [USDA] (USDA NRCS 2023).
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) in the Site (USFWS 2023a).
- USFWS Critical Habitat for Threatened and Endangered Species maps (USFWS 2023b).
- USFWS Information for Planning and Consultation (IPaC) resource list (USFWS 2023c).
- Oregon Department of Agriculture (ODA) WeedMapper (ODA 2023a).
- ODA Oregon Listed Plants by County (ODA 2023b).
- ODA Noxious Weed Policy and Classification System (ODA 2023c).
- Oregon Biodiversity Information Center (ORBIC) Rare, Threatened and Endangered Species Records (within a 2-mile radius of the project; generated July 19, 2022) (ORBIC 2023).
- Oregon Department of Fish and Wildlife Threatened and Endangered Species List (ODFW 2023a).
- SageCon Landscape Planning Tool (Oregon Explorer 2023)
- Wildlife combining zones (obtained from Deschutes County).

There is no Local Wetland Inventory (LWI) at the Site and its vicinity. Agency coordination with ODFW/USFWS, a review of stakeholder and public comments, and coordination with landowner representatives and the County were also conducted.

2.2 Site Visit

Parametrix scientists Colton Kyro and Chloe Kott conducted a Site visit on September 27, 2023, to determine the presence of waters of the United States and/or waters of the state, identify the potential for presence of protected species and habitats, and assess habitat conditions for greater sage-grouse (*Centrocercus urophasianus*, sage-grouse) at the Site, along potential access and transmission routes, and surrounding lands. Representative Site photographs are provided in Appendix C.

2.2.1 Waters and Wetlands

Wetland and waters presence or absence was determined using methods specified in the U.S. Army Corps of Engineers' (USACE) *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0; USACE 2008a), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008b), and *Streamflow Duration Assessment Method for the Pacific Northwest* (EPA 2015). Vegetation, soil, and hydrology conditions were documented at five sample plot (SP) locations. At each SP, Parametrix collected vegetation, soils, and hydrology data on standardized wetland determination data forms and documented field conditions with photographs. Additionally, Parametrix documented additional observation of habitats conditions and soils, vegetation, and hydrology conditions at 12 photo points (PP). Data points for SP and PP were recorded using a handheld global positioning system (GPS). The locations of the SPs and PPs are shown on Figure 2 of Appendix A. Wetland determination data forms are included in Appendix D.

2.2.2 Protected Species

Quality of habitat for big game and sensitive bird species was determined by a meandering survey through representative habitats on Site. Parametrix scientists documented habitat quality and evidence of use such as occurrence, scat, and tracks.

Sage-grouse habitat quality was determined using methods specified in the *Oregon Sage-Grouse Habitat Quantification Tool* (HQT) (ODFW 2019) and *Threat-Based Land Management in the Northern Great Basin*: *A Managers Guide* (Johnson et al. 2019). Map units of similar vegetation communities were determined for direct and indirect impact areas of the proposed SWMF within significant sage-grouse habitats. Significant sage-grouse habitat is defined as lands identified as core areas, low density areas, and lands within a general habitat area located within 3.1 miles of a lek.

Currently, ODFW is in the process of updating the mapping of significant sage-grouse habitats. Core and low-density habitats were mapped initially in 2011 with no subsequent updates. In 2022, ODFW notified stakeholders and conservation partners of their intent to update habitat maps with new data. Since the initially mapping, Oregon has improved understanding of sage-grouse distribution by the discovery of over 150 leks, development of habitat suitability maps, and sage-grouse research projects which have tracked the species movement through the use of radio- and GPS- marked individuals. New data was incorporated into the modelling process and was reviewed by ODFW

biologist to accurately depict boundaries of sage-grouse core and low-density habitat. Currently, the process is in the formal comment period which ends in December 2023. However, comments for consideration in the final draft habitat maps ended in September 2023. ODFW will soon begin to review comments and finalize core and low-density habitat maps for review by ODFW commission in December. It is anticipated that the new mapping will be adopted by Oregon's Land Conservation and Development Commission in mid-March 2024 (A. Walch, ODFW, personal communications, September 24, 2023).

It was assumed permitting for the project would occur after mid-March 2024 and the proposed mapping of core and low-density habitat was used for this assessment. Map units were determined using aerial imagery and vegetation communities were ground-truthed during the Site visit. Indirect impact areas also considered in this assessment includes the area within 3.3 kilometers from the Site, as indicated by the HQT for Utility/Solid Waste Disposal Facility. For each map unit, Parametrix scientists surveyed a portion of it to collect preliminary data on vegetation communities, potential threats, apparent trend, and the overall ecological state of the map unit. The ecological state of the map unit was used to inform the map unit's function in regard to sage-grouse habitat. Each map unit was ranked for its quality of ecological state from A to E, with A being the highest functioning. The state will have a modifier such as juniper, invasive annual grass (IAG), or Dual (i.e., both) which signifies the threats to the habitat present within the map unit for sage-grouse. Ecological states, A, B, and C IAG are considered habitat for sage-grouse whereas other states are considered nonhabitat. More detail on ecological states can be found in *Threat-Based Land Management in the Northern Great Basin*: *A Managers Guide* (Johnson et al. 2019).

Data points for SP and PP were recorded using a handheld global positioning system (GPS). The locations of the SPs and PPs are shown on Figure 2 of Appendix A. Representative photographs are included in Appendix C. Wetland determination data forms are included in Appendix D.

2.3 Sage-grouse Mitigation

Large-scale development with impacts to significant sage-grouse habitat would require compensatory mitigation according to State and County laws (OAR 660-023-0115(7), DCC 18.89.060). Potential impact of Site development on significant sage-grouse habitat was estimated by coordinating with ODFW on performing a preliminary HQT analysis for the SWMF. Parametrix coordinated with ODFW District Wildlife Biologist Andrew Walch and Regional Habitat Biologist Michael Moore on implementing HQT for the Site and the proposed SWMF. Sage-grouse map units and their preliminary ecological state was shared with ODFW to inform the HQT. The HQT compares pre- and post-development habitat function within the impact area. The difference in function, as a unit of functional acres, is the credit or debit for Oregon's sage-grouse Mitigation Program. Pre-development functional acres was informed by the ecological state of the Site and adjacent land as described above (Section 2.2 Site Visit). The impact of the SWMF on pre-development conditions is set by an internal function within HQT that quantifies the direct and indirect loss of function of a Utility/Solid Waste Disposal Facility. Preliminary HQT results are included in Appendix E.

3. General Characteristics and Existing Conditions

3.1 Landscape Setting and Site Use

According to the U.S. Geological Survey (USGS) (2023), the Site is located in the Smith Canyon-Dry River (HUC 170703050710) watershed, with general slope to the northwest. The Site consists of an

active aggregate material mine interspersed with juniper woodland and shrubland. The Site is incidentally grazed by cattle entering through gaps in fencing. The Site is bordered by Bureau of Land Management (BLM) Land and is nearby to Oregon Badlands Wilderness.

The topography of the Site is slightly sloped to the northwest with hillsides directly outside the Site to its north, east, and south. The Site elevation ranges from 3,600 to 3,860 feet.

3.2 Hydrology and Precipitation

Parametrix reviewed precipitation data from the Bend 7 NE weather station in Deschutes County, Oregon, available on the National Oceanic Atmospheric Administration (NOAA) Regional Climate Center website powered by the Applied Climate Information System (ACIS 2023). The normal range of annual precipitation in the area is between 7.25 and 9.78 inches. Most of the annual precipitation falls as rain or snow between October and March. The average growing season lasts 132 days from May 22 to October 1. The dry season extends from June to October, with normal monthly precipitation ranging from 0.1 to 0.81 inches. Average temperatures range from 32.5°F to 66.4°F, with the highest monthly average temperatures in July at 83.5°F and the lowest monthly average temperature in December at 23.1°F. The Site visit was conducted at the end of September during the dry season.

Parametrix conducted precipitation analysis to determine whether monthly precipitation in the 3-month period prior to Site visit and the water year was normal. According to the WETS table for the period 1992 to 2021 and recorded precipitation for July, August, and September 2023, the hydrologic condition on the Site was normal for this time of year.

Weather during the Site visit was partly cloudy with a high of 32 degrees Fahrenheit (°F). There was no precipitation during the Site visit.

3.3 Soils

According to NRCS soil mapping for Deschutes County (USDA 2023), several soil map units are mapped within the Site (see Table 1). All soils on Site are non-hydric and are either somewhat excessively drained or well drained.

Table 1. Summary of Soils Mapped within the Study Area

Map Unit Symbol	Map Unit Name	Percent in the Study Area	Hydric Soil	Drainage Class
27A	Clovkamp loamy sand, 0 to 3% slopes	55.7	No	Somewhat excessively drained
58C	Gosney-Rock outcrop-Deskamp complex, 0 to 15% slopes	2.8%	No	Somewhat excessively drained
103E	Redcliff-Rock outcrop complex, 30 to 65% south slopes	0.9	No	Well drained
137E	Stookmoor-Westbutte complex, 25 to 50% north slopes	42.7%	No	Somewhat excessively drained

Map Unit Symbol	Map Unit Name	Percent in the Study Area	Hydric Soil	Drainage Class
139B	Stukel sandy loam, dry, 3 to 8% slopes	0.6%	No	Somewhat excessively drained

3.4 Upland Habitat

Present within the Site is 167.1 acres of juniper woodland and 10.9 acres of shrub steppe (Figure 3 in Appendix A). The remainder of the Site consist of disturbed mined out areas, roads, and buildings (206.82 acres). The vegetation in the juniper woodland was dominated by western juniper (*Juniperus occidentalis*), big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), cheatgrass (*Bromus tectorum*), bluebunch wheat grass (*Pseudoroegneria spicata*), and Idaho fescue (*Festuca idahoensis*). Shrub steppe habitat was dominated by big sagebrush, rubber rabbitbrush, cheatgrass, bluebunch wheat grass, and Idaho fescue.

Other native species found include antelope bitterbrush (*Purshia tridentata)*, cushion wild buckwheat (*Eriogonum ovalifolium*), common yarrow (*Achillea millefolium*), needle and thread (*Hesperostipa comata*), and Sandberg bluegrass (*Poa secunda*). Common weedy species found within disturbed areas include cheatgrass, night-flowering catchfly (*Silene noctiflora*), Russian thistle (*Salsola tragus*), Mexican-fireweed (*Bassia scoparia*), and tumble mustard (*Sisymbrium altissimum*). Vegetation communities formed by these plants are nonhydrophytic because they are dominated either by facultative upland or by species that are not listed in the National Wetland Plant List (Lichvar et al. 2016).

3.5 Wetlands and Waters

Aerial imagery indicated a temporally ponded feature in the northwest of the Site (Google Earth 2023). The ponded feature was investigated and determined to have wetland conditions (SP-1, Figure 2 in Appendix A). Hydrophytic vegetation such as common spike-rush (*Eleocharis palustris*) and large barnyard grass (*Echinochloa crus-galli*) were present throughout the feature. Soils were hydric as they met the indicator for sandy redox. The wetland feature boundary was marked by a distinct change in elevation and vegetation communities. Hydrology within the feature is controlled by a pipe and the feature is used for the purpose of surface mining. The pond originally was used for gravel and sand washing but is now used for dust control and for fire suppression.

Three streambeds are mapped as intermittent seasonally flooded riverine features by NWI to occur within the eastern half of the Site (USFWS 2023a). These features are located in gullies with upland vegetation (Section 3.4). The gullies lacked stream bed and bank features and did not contain hydric soils or hydrophytic vegetation (SP-4). These gullies are likely ephemeral systems that only have flow during spring melt in high snowpack years. Collected field data confirmed the absence of the NWI-mapped resources.

The remainder of the Site is characterized by upland juniper woodlands and sage brush steppe habitats (SP-3 and 5).

3.6 Protected Species and Habitat

3.6.1 Federal and State Listed Species

USFWS IPaC (2023a) indicate that gray wolf (*Canis lupus*), a federally threatened species, has the potential to occur on Site. There are no known gray wolf populations within the Site (ODFW 2022a). However, wolves are habitat generalists and establish territories wherever sufficient food resources are present. Young individuals disperse on average 40 to 60 miles to establish new territories. Non-breeding individuals occur 40 miles northwest and southwest of the Site (ODFW 2022a). Thus, although unlikely given barriers to movement from known locations of wolf activity, gray wolves may migrate through or hunt on Site. However, gray wolves occurring on Site would be considered part of the Northern Rocky Distinct Population Segment which is currently delisted and not federally protected.

Monarch butterfly (*Danaus plexippus*), a federally listed candidate species, also is known to occur in Deschutes County (USFWS 2023a). However, the species is unlikely to occur on the Site due to a lack of suitable habitat (i.e., milkweed [*Asclepias* spp.] plants and large trees) for feeding, migration, or overwintering.

Previous meetings with USFWS and ODFW on SWMF siting indicate the potential presence of little brown bat (*Myotis lucifugus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) within the vicinity of the Site. Little brown bat is under review for listing under the ESA. In the summer, little brown bat roosts in human-made structures and old-growth trees located near water bodies where they prefer to forage (WNDR 2013). In the winter, little brown bats hibernate in humid caves or mines with near constant temperature. Townsend's big-eared bat is federal species of concern and is listed as sensitive by the state of Oregon. Townsend's big-eared bat commonly roosts in caves and abandoned mines in addition to buildings, bridges, rock crevices, and hollow trees (TPWD 2023). Townsend's big-eared bat forage along edge habitats along streams, forests, and agricultural fields. Abandoned human structures are present on Site but given the lack of edge habitats and lack of waterbodies within and adjacent to the Site, it is unlikely these bat species will roost within the Site given poor forage opportunities in the area. No caves or large trees with sufficient crevices are present onsite.

ORBIC has no records of state or federally listed species on the Site or nearby.

3.6.2 Habitat

Mule Deer and Elk

The Site is entirely within mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*) winter range designated by ODFW (ODFW 2012, Figure 4 of Appendix A) and is within a Wildlife Area Combining Zone for North Paulina Deer Winter Range as designated by Deschutes County code (DCC 18.88, Figure 5 of Appendix A). The Site is also partially within a Priority Wildlife Connectivity Area for mule deer and elk (ODFW 2023c).

Winter range habitat for mule deer and elk is designated as a Category 2 habitat by ODFW which is deemed to be essential for a species, populations, or species assemblage (OAR 635-415-0025). Mule deer and elk migrate from higher elevation summer ranges with better forage opportunities to lower elevation winter ranges. These winter ranges allow for mule deer and elk to avoid deeper snow and harsh winter conditions present within their summer ranges. Cover during winter range provides further protection from harsh winter conditions. Mule deer and elk generally rely upon their body reserves accrued during the summer for winter survival as forage during winter is of low quality.

Tracks and scat of mule deer and elk were observed throughout the Site. Species usage of the Site is likely low compared to the surrounding region due to habitat conditions present on Site. The Site is of low/moderate quality for mule deer and elk winter habitat. High juniper cover of the Site does provide protection from cold, wind, rain, and snow. However, surface mining operations continue throughout the year causing a continuous source of disturbance and noise pollution within the Site. In addition, the Site does not contain quality forage as previous disturbance from grazing and mining land use has resulted in a low density of perennial bunch grasses.

Pronghorn

The Site is entirely within essential and limited pronghorn (*Antilocapra americana*) habitat designated by ODFW (ODFW 2021, Figure 4 of Appendix A). The Site is also entirely within a Priority Wildlife Connectivity Area for pronghorn (ODFW 2023c). Essential and limited pronghorn habitat is designated as a Category 2 habitat by ODFW which is deemed to be essential for a species, populations, or species assemblage (OAR 635-415-0025).

Pronghorn are generally found in sagebrush-steppe and grassland environments with very low tree density (ODFW 2021). The species relies on long-distance sightablity of predators to avoid predation. Juniper woodland expansion is a documented threat to pronghorn (ODFW 2021) owing to the cover it can provide to predators and for reducing forage quality. The Site is composed predominately of juniper woodlands that contain only small patches of sagebrush-steppe environments. No evidence of pronghorn usage of the Site was observed. The Site is of low habitat quality for pronghorn and is likely only used as a migration corridor to more suitable habitats.

Sage-grouse

The Site is not within significant sage-grouse habitat (Figure 6 of Appendix A), but the SWMF would have indirect impacts on sage-grouse habitat. Indirect impacts can include sound disturbance and from increased densities of ravens (*Corvus corax*). Landfills can result in elevated densities of ravens due to additional food sources and roosting locations (Peebles and Conover 2017). Ravens predate on sage-grouse and higher abundance of the species within sage-grouse habitat has been linked with lower sage-grouse reproductive success (Bui et al. 2010, Dinkins et al. 2010, Coates et al. 2020). Raven abundance has been increasing throughout the Great Basin with higher densities associated with more development and agriculture.

Vegetation within areas that may be indirectly impacted are generally composed of juniper woodlands with intact and robust understory communities of sage brush and perennial bunch grasses. Cheatgrass is present but only dominates in disturbed areas. High juniper cover and expansion have resulted in the majority of indirectly impacted significant sage-grouse habitat to have an ecological state of C Dual. Sage-grouse avoid regions with areas with juniper due to an instinctive aversion to the vertical structure junipers provide and the resulted higher predation risk from avian predators (Johnson et al. 2019).

The preliminary HQT analysis conducted by ODFW indicated that the development of the Site would result in the loss of 7.8 functional acres of habitat for sage-grouse (Appendix E).

3.6.3 MBTA/BGEPA

Various migratory birds that are protected under the Migratory Bird Treaty Act (MBTA) of 1918 may forage on or nest on the Site. The bald eagle (*Haliaeetus leucocephalus)* is also protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940 and is known to occur in the vicinity (USFWS 2023c). Bald eagles prefer large trees for perching and nesting, typically near rivers, large lakes, and other open water (Snyder 1993). Such habitats are not present at the Site and no nests

have been observed within two miles of the Site (ORBIC 2023), thus this species was determined to be absent from the Site. The golden eagle (*Aquila chrysaetos)* is also protected under the Bald and Golden Eagle Protection Act of 1940 and is known to occur in the vicinity (ORBIC 2023, USFWS 2023c). Golden eagles prefer cliffs and steep escarpments in grassland, chapparal, shrubland, and forest for nesting, typically near canyonlands, rimrock terrain, and riverside cliffs and bluffs (Cornell Lab 2023a). ORBIC records indicate the one golden eagle nest is located out of sight in a Dry River Canyon 1.5 miles from the Site. Other bird species protected by MBTA that were indicated by IPaC to occur within the vicinity of the Site include the following:

- Cassin's finch (*Carpodacus cassinii*)
- Lewis's woodpecker (*Melanerpes lewis*)
- Olive-sided Flycatcher (*Contopus cooperi*)
- Pinyon jay (*Gymnorhinus cyanocephalus)*
- Sage thrasher (*Oreoscoptes montanus*)

Lewis's woodpeckers are not generally found in juniper woodlands and are unlikely to be on Site. Sage thrashers occur in sagebrush habitats and are unlikely to be present in the juniper dominated landscape. Habitat on Site is suitable for Cassin's finch, pinyon jay, and olive-sided flycatcher and these species may be present on Site.

Bureau of Land Management (BLM) Prineville District Office reviewed the SWMF siting for the Site and made comments in regard to MBTA and BGEPA species that occur within Dry River Canyon and that may utilize the Site for foraging. Dry River Canyon occurs 0.9 miles southeast of the Site and has supported golden eagles and prairie falcons (*Falco mexicanus*) nests. Prairie falcons generally nest in natural crevices and ledges found on cliffs or steep bluffs (Cornell Lab 2023b). The Canyon has seasonal closures for motorized vehicles from February 1 to August 31 each year. The Upper Deschutes Resource Management Plan restrict development of new roads within a quarter mile of nests (BLM 2005). The proposed development of the Site would likely not result in impacts to either species within the canyon. Foraging habitat is not limited for prairie falcons or golden eagles that may use the Site for hunting. Dry River Canyon is out of sight of the Site and noise generated from the SWMF is unlikely to reach the Canyon. Road development is unlikely to occur near golden eagle or prairie falcon nests.

A list of species observed during the Site visit and during previous habitat assessments of the Site that are protected under the MBTA is included in Appendix F.

3.7 Noxious Weeds

Plant species listed as noxious by the Oregon Department of Agriculture (ODA 2023c) and/or as designated weed by Department of State Lands (DSL) that were observed on the Site in juniper woodlands (See Table 2 below).

Table 2. Noxious Weeds That Are Present or Have Potential to Be Present on the Site

Scientific Name	Common Name	ODA List/DSL Designation [a]
Bassia scoparia	Mexican Fireweed	List B
Centaurea stroebe	Spotted Knapweed	List B

Note: DSL-designated weed = known problem species.

a List B = a weed of economic importance that is regionally abundant but may have limited distribution in some counties; T-Designated Weed (T) = 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.

4. Regulatory Requirements

4.1 Federal

4.1.1 Waters and Wetlands

The observed artificial ponded wetland located in the Site would not be considered jurisdictional to USACE as it is an isolated feature that is not used for navigation nor connected with a water of the United States (51 FR 41250). Drainages mapped by NWI similarly would not be considered jurisdictional to USACE as they do not have relatively permanent flow (51 FR 41250). No other waters or wetlands were observed on Site and therefore, Site development would not require permitting under Sections 404 and 401 of the Clean Water Act.

4.1.2 Protected Species

Federal and State Listed Species

Federally listed threatened and endangered species or designated critical habitat are not present within the Site; therefore, Site development would not initially require permitting by USFWS under Section 10 or Section 7 of the Endangered Species Act. If sage-grouse are listed as threatened or endangered during planning and construction of the SWMF or during major operational changes once constructed, the County would need to consult with USFWS for compliance under Section 10 or Section 7 of the ESA.

Potential Future Listing: Sage-grouse

Multiple petitions have been submitted to the USFWS to list sage-grouse as threatened under the ESA. In 2010, the USFWS determined that listing sage-grouse under the ESA was warranted but precluded by higher priority listing actions (75 FR 13910). To prevent the necessity for listing, Oregon and other states enacted legislation to address the primary threats of sage-grouse. In Oregon, the Sage-Grouse Conservation Partnership (SageCon) was formed, and they adopted the Sage-Grouse Rules on July 24, 2015 (OAR 660-023-0115). This rule was a fundamental component in Oregon's Sage-grouse Action Plan that was adopted by the Governor through executive Order 15-18 which was submitted to USFWS as evidence that listing of the species was not warranted. On October 2, 2015, the USFWS determined that the listing of the sage-grouse was not warranted at that time (80 FR 59857).

However, since the decision, sage-grouse populations have continued to decline range wide. From 2002 to 2021 range-wide populations have declined 41% (Coates et al. 2023). Oregon sage-grouse has experienced similar declines in populations. From 2002 to 2021 Oregon's sage-grouse population declined by 39% and from 2015 to 2023 the population declined by 20% (ODFW 2023d). To counteract population declines, the BLM in March 2024 announced a Draft Resource Management Plan Amendment to strength sage-grouse protections on public lands. Given the continued population declines of the species, the unknown implications of climate change and spread of invasives on sage-grouse habitat (Creutzburg et al. 2015), and the longevity of SWMF, there is a possibility sage-grouse in Oregon may become listed under the ESA either before the site is permitted and developed or during the long-term operational life of the facility.

Under Section 7 of the ESA, federal agencies must consult with the Services when any action the agency carries out, funds, or authorizes may affect either a species listed as threatened or endangered under the Act, or any critical habitat designated for it. Should sage-grouse become listed under the ESA, a federal nexus to the project, such as compliance with NEPA or the Clean Air Act via the Oregon Title V Air Quality Operating Permit, may trigger compliance with Section 7 of the ESA. If no federal nexus exists and the project may result in take of sage-grouse, compliance under Section 10 of the ESA may be required. Section 10 of the ESA allows an individual or private citizen to "take" a listed species if they develop a Habitat Conservation Plan (HCP). The County would consult with the USFWS and prepare an HCP requesting issuance of an Incidental Take Permit (ITP) to authorize the incidental take of threatened or endangered species. In the HCP, the County would develop measures to minimize and mitigate for impacts and to monitor and manage sage-grouse and associated habitat. Mitigation measures for compliance with ODFW's Sage-grouse Mitigation Program and Policy for Site development (as described below in Section 4.2.2.2) may be sufficient to mitigate for impacts to the species and habitat. Additional mitigation or minimization measures for the SWMF would be determined during consultation with USFWS.

Bald and Gold Eagle Protection Act

The BGEPA makes it illegal to take or transport any bald eagle or golden eagle except as allowed by a valid permit (50 Code of Federal Regulations [CFR] 22.80). Take includes disturb which is defined as an agitation to bald or golden eagles to a degree that causes, or is likely to cause injury, decrease in productivity, or nest abandonment (50 CFR 22.6). The Site is within two miles of a golden eagle nest and its development will result in a permanent alteration of habitat. The USFWS recommended the submission of an Eagle Incidental Take Permit. The permit would be used for consultation and will be used to determine a take statement and associated required mitigation. The USFWS can waive the permit fee for Deschutes County. Compensatory mitigation would be required for any permit authorizing take that would exceed the applicable management units take limit (50 CFR 22.80), which is 0% for golden eagles in the mid-latitude Pacific Fly Way eagle management unit (DOI & USFWS 2016). Compensatory mitigation must reduce another ongoing form of morality by an amount equal to or greater than the mortality induced by the Site development. Potential mitigation can be conducted via and In Lieu Fee which is calculated as take over time. Alternatively, Deschutes County could allocate money to local utility companies to retrofit utility poles to protect raptors and other birds from electrocution through a Memorandum of Agreement for minimizing electrocution of golden eagles. Further coordination and consultation with USFWS is required to determine the extent of mitigation needed for Site development.

Migratory Bird Treaty Act

The MBTA makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird or the parts, nests, or eggs of such bird except under the terms of a valid federal permit from the USFWS. To avoid and minimize effects to migratory birds, initial Site development (vegetation clearing and grubbing) should be conducted during the non-nesting season. The non-nesting season generally extends from August 1 to January 31 and splits into two major timeframes:

- Early Nesting Season: February 1 to April 15. Raptors (owls, eagles, falcons, and hawks), herons, geese, and hummingbirds are early nesters.
- Primary Nesting Season: April 15 to July 31. Songbirds and most other avian species are late nesters.

If vegetation disturbance occurs during the nesting season, the Site should be surveyed for nesting birds by a qualified biologist. If an active nest is found, an exclusion buffer around the nest should be

established at an appropriate distance assigned by the biologist. Temporary protection fencing should be installed and maintained around the buffer area until young chicks have fledged to avoid impacts to migratory birds. Once young have fledged, construction may commence in the protected area.

4.2 State and County

4.2.1 Waters and Wetlands

The observed artificial ponded wetland would not be considered jurisdictional as it is an artificially created feature entirely within uplands and was constructed for the purpose of surface mining (Oregon Administrative Rule [OAR] 141-085-0515(7)). Drainage features present on Site lacked ordinary high water mark features and are likely ephemeral drainages which are not regulated by DSL ((OAR 141-085-0515(3)). No other wetlands or waters are present at the Site; therefore, Oregon's Removal-Fill Law (OAR 196.795-990) is not applicable to Site development.

4.2.2 Protected Species

4.2.2.1 Big Game Range

Mule Deer and elk winter range and essential and limited pronghorn habitat are considered Category 2 habitat by ODFW's Wildlife Habitat Mitigation Policy (OAR 635-415-0000). Category 2 habitat is deemed to be essential for a species, populations, or species assemblage (OAR 635-415-0025). Avoidance of impacts through alternatives to the proposed action are recommended. If impacts are unavoidable, mitigation of impacts would be required through in-kind, in-proximity, habitat mitigation to achieve "no net loss" and a "net benefit" of habitat quantity or quality.

Mitigation may involve making on-site habitat improvements or acquiring a parcel of land with those habitats to prevent its development (avoided loss) or improve its habitat (enhancement). Enhancement can include a combination of actions that may include:

- Livestock grazing restrictions
- Weed treatment
- Native revegetation/restoration
- Fire readiness
- Fence removal/fence upgrade

Mule Deer and Elk Winter Range Mitigation Options

Habitat present on Site is used by mule deer and elk during winter and compensatory mitigation to the impacts to the Category 2 habitat would likely be required (OAR 635-415-0025 (2)). Within the Site, areas already disturbed or developed by previous and current mining operations would not be considered Category 2 habitat and would require not mitigation. Impacts to 167.1 acres of juniper woodlands and 10.8 acres shrub steppe areas would require mitigation.

As mule deer and elk require similar habitat types and impacts to their winter ranges as a result of Site development overlap, mitigation for each can be stacked into one mitigation project.

On-site enhancement opportunities are limited given the Site's size and extent of proposed development within the Site. Thus, acquisition of a parcel of land or a conservation easement to

prevent development or improve habitat would likely be required for Site development. Acquired land or a conservation easement would likely need to be located within mule deer and elk winter range and located in proximity to the Site in order to adequately mitigate for impacts as a result of the project. In addition, mitigation must result in a net benefit. Thus, the parcel of land to be acquired or put into a conservation easement must have more than 167.1 acres juniper woodlands and 10.8 acres of shrub steppe. Current property available that meets these requirements are listed in Table 3. Main enhancement opportunities within the available properties are livestock grazing restrictions and native revegetation/restoration. Enhancement of the landscape would require initial actions and continued maintenance. The cost of operations and maintenance (O&M) of the parcel is based on *Investigations of Wildlife O&M Costs* (NWPCC 2007) which, accounting for inflation, predicts $78.67 per acre per year. Because parcel sizes are in excess of mitigation requirements, O&M costs were limited to 200 acres to appropriately account for necessary mitigation requirements of winter range impacts. Initial enhancement project cost is assumed to cost up to 5 years of O&M due to the initial extensive nature of native revegetation/restoration and/or fence removal and upgrades. O&M cost for 50 years does not include the initial project cost.

Table 3. Properties Available for Mule Deer and Elk Winter Range Mitigation

Property Location	Acres	Potential Enhancement Actions	Real Estate Sale Price	Initial Enhancement Project Cost	O&M Cost (50 years)	Total Cost
44.1135°, -120.5855°	320	Livestock grazing restrictions, native revegetation/restoration	$800,000	$78,670	$708,030	$1,586,700
		Avoided loss				
44.2059°, -120.6802°	723	Livestock grazing restrictions	$500,000	$78,670	$708,030	$1,286,700
		Avoided loss				

This property list is not exhaustive and does not include properties adjacent to winter ranges for mule deer or elk that could be suitable for enhancement as the species still use those areas during winter. Furthermore, a mitigation bank for winter range habitat is in the process of being set up and could be an option for compensatory mitigation at the timing of permitting for Site development. The cost of the mitigation bank and the timing of its opening are currently unknown.

Information provided above is an approximation of mitigation requirements for impacts to Category 2 Habitat. Further coordination with ODFW would be required to determine appropriate mitigation options to benefit both mule deer and elk for impacts to their winter range as a result of Site development.

Pronghorn Mitigation Options

Pronghorn likely only use the Site for migration to more suitable habitat. Mitigation for pronghorn essential and limited habitat may be minor and more focused toward habitat connectivity. Fence removal/upgrade within essential and limited pronghorn is likely suitable mitigation for impacts to habitat for Site development. Fence upgrade can be cost effective and can be applied to existing fences. Upgrades to existing fences can include (TPWD 2020):

- For 20 yards every half mile of fencing, raise the bottom wire or net-wire a minimum of 18 inches above the ground.
- Replace the bottom strand of barbed-wire with a smooth wire that is set 18 inches above the ground wherever possible.

These upgrades are field tested and do not increase the incidence of calves crawling underneath the fencing. Determining suitable locations for fence upgrades would need to be done in coordination with ODFW and landowners such as BLM and private individuals. The estimated cost of coordination and fence upgrade improvements is $30,000.

Information provided above is an approximation of mitigation requirements for impacts to Category 2 Habitat. Further coordination with ODFW would be required to determine appropriate mitigation options to benefit pronghorn for impacts to their essential and limited habitat as a result of Site development.

Wildlife Area Combining Zone

The Site is entirely within a Wildlife Area Combining Zone for North Paulina Deer Winter Range. Uses permitted outright within a WA zone are those permitted outright by the underlying zone (DCC 18.88.030). The Site's underlying zoning is for Surface Mining which does not allow landfill unless built prior to 1992. Information on land use approval process is provided in Moon Pit Site Development and Permitting Evaluation Technical Memorandum.

There are no mitigation requirements for impacts to WA Zone.

4.2.2.2 Sage-grouse

The SWMF is a large-scale development (>40 acres) which would impact significant sage-grouse habitat and thus is considered a conflicting use (OAR 660-023-0115(7)). Conflicting uses require compliance with the mitigation hierarchy and ODFW's Sage-grouse Mitigation Program and Policy. The development of the Site must show that the overall public benefits outweigh the damage to the significant sage-grouse habitat (DCC 18.89.110). The development of the SWMF at the Site must demonstrate that impacts to sage-grouse habitat are unavoidable and the project was developed to minimize impacts. The extent of direct and indirect impacts on significant sage-grouse habitats must be mitigated for and provide a net conservation benefit to sage-grouse (635-140-0010(e)). Design features for buildings and other infrastructure can be employed to deter raven roosting and minimize indirect impacts to sage-grouse.

Site development would result in the loss of 7.8 functional acres of sage-grouse habitat. To achieve a net conservation benefit, ODFW requires compensatory mitigation to restore 115% of impacted functional acres. Thus, a mitigation plan would need to be developed to characterize the restoration of nine functional acres of sage-grouse habitat. The mitigation plan would outline how net conservation benefit would be achieved by either:

- Purchasing approved mitigation credits through an in-lieu fee fund or private banker.
- Completing permittee-responsible on- or off-site mitigation.

Sage-grouse habitats are grouped into three geographically defined locations (service area) wherein mitigation actions must occur within the same service area as the impact occurred in. The Site is within the Central Service Area and mitigation actions must occur within that service area (ODFW 2023b). Any mitigation undertaken must have measures in place to ensure mitigation activities will persist for the life of the original impact (OAR 635-140-0025(4)). Site development will be a permanent impact and thus mitigation must be maintained in perpetuity.

Sage-grouse Mitigation Options

At present, there is no mitigation bank available with approved credits. ODFW is currently reviewing documents for a mitigation bank that could be a future option for mitigation for Site development. The estimated in-lieu fee cost provided by ODFW is $500,000. The in-lieu fee cost should be considered as the maximum cost for sage-grouse mitigation. It is likely that mitigation bank credits would be less expensive than in-lieu fee costs. In addition, permittee-responsible mitigation would not be as costly as in-lieu fee and likely not as expensive as mitigation bank credits.

Permittee-responsible on-site mitigation is not possible given the extent of the SWMF on the Site. On-site design features for buildings and other infrastructure can be employed to deter raven roosting and minimize indirect impacts to sage-grouse. However, permittee-responsible mitigation would require off-site mitigation. Off-site mitigation would involve improving habitat conditions that would result in an uplift of nine functional acres as quantified by ODFW's HQT. ODFW would run the HQT to quantify the off-site mitigation plan's functional uplift in functional acres. The mitigation plan must show that it would result in at least nine functional acres. Due to the nuances of the HQT, it is hard to quantify the extent of physical acres of mitigation that would be required for uplift of nine functional acres, i.e., mitigation of one physical acre would not result in one functional acre of uplift.

Off-site mitigation could involve acquiring a parcel of land and performing mitigation actions or working with private or public landowners on a conservation plan. Acquisition of a property would result in higher upfront costs but would allow for more robust mitigation strategies that would improve sage-grouse habitat such as grazing cessation. Mitigation plans and conservation strategies avoid the cost of parcel acquisition but involve coordination with landowners and limited mitigation opportunities. Management of the land and/or mitigation plan would need to last as long as the impact (i.e., the SWMF). Thus, the mitigation plan and associated land would need to be managed for at least 100 years.

Common mitigation measures that could result in restoration of sage-grouse habitat include juniper removal, cattle grazing management, reseeding of native forbs and grasses, fence removal, and invasive removal. Among these mitigation measures, juniper removal is a cost effective and practical mitigation measure. Juniper encroachment is noted threat for sage-grouse habitat (Johnson et al. 2019) and within the area (Hagen et al. 2008). For low density juniper areas, junipers could be cut down and the tree left to provide cover. For higher density juniper areas, some trees would likely need to be removed from the area.

Approximating from the preliminary HQT results, removal of junipers and establishment of sage brush and perennial grasses within 10 to 26 acres would result in a functional uplift of nine acres. Variation in acres is due to initial Site conditions of the mitigation area.

Land owned by the County can also be used for off-site mitigation such as juniper removal. The plot of land directly north of Roth East owned by the County (Tax lot 1915000001600) has a low density of perennial grasses and a high density of junipers. Enhancement of the property could result in functional uplift necessary to offset impacts. Further coordination with ODFW and their HQT would be required to determine the applicability of this approach.

Table 4 below provides a summary of mitigation options for off-site mitigation for parcel acquisition and for conservation agreement with landowner. Parcel cost was estimated by averaging cost per acre of several properties within area that is within low density of core sage-grouse habitat ($716.27 per acre). The cost of operations and maintenance (O&M) of the parcel is based on Investigations of Wildlife O&M Costs (NWPCC 2007) which, accounting for inflation, predicts $78.67 per acre per year. Initial enhancement project cost is assumed to cost up to 5 years of O&M due to the initial extensive

nature of native revegetation/restoration and/or fence removal and upgrades. O&M cost for 50 years does not include the initial project cost.

Table 4. Mitigation Plan Cost for Uplift of 9 Functional Acres

Mitigation Option	Mitigation Acres	Potential Enhancement Actions	Real Estate Sale Price	Initial Enhancement Project Cost	O&M Cost (50 years)	Total Cost
County Land	10-26	Juniper removal, livestock grazing restrictions, native revegetation/restoration	N/A	$3,933–$10,227	$35,401–$92,043	$39,335–$102,271
Parcel Acquisition and Mitigation	10-26	Juniper removal, livestock grazing restrictions, native revegetation/restoration	$7,162–$18,623	$3,933–$10,227	$35,401–$92,043	$46,497–$120,894
Conservation Agreement with Landowner	10-26	Juniper removal	N/A	$3,933–$10,227	$39,335–$102,271	$39,335–$102,271

Information provided above is an approximation of mitigation requirements for impacts to sage-grouse habitat. Further coordination with ODFW would be required to determine appropriate mitigation options to benefit sage-grouse habitat as a result of Site development. It is recommended that the formation of the mitigation plan should be coordinate with stakeholder such as the Oregon Natural Desert Association (ONDA). In addition, the Oregon Land Trust has a conservation project in Brothers and could be collaborative partners in sage-grouse mitigation projects.

Sage-Grouse Area Combining Zone

The SWMF is a large-scale development which would impact a sage-grouse area combining zone and thus is considered a conflicting use (DCC 18.89.060). Deschutes County may consider a large-scale development within significant-sage-grouse habitat if the project fits within disturbance thresholds and a mitigation hierarchy. Disturbance thresholds are for Priority Areas for Conservation (PACS; i.e., core area habitat). Direct impacts to core area habitat cannot exceed 1.0% of the total core area in any ten-year period and in total cannot exceed 3.0% (DCC 18.89.080). Site development will not result in direct impacts to core area habitat and thus disturbance thresholds do not apply. The mitigation hierarchy requires Site development to show avoidance and minimization measures in addition to compensatory mitigation (DCC 18.89.080/090). Compensatory mitigation must comply with OAR 635-140 and must fully offset the direct and indirect impacts of Site development. Deschutes County consideration for approval of the conflicting use is conditional on ODFW recommendations for minimization techniques and compensatory mitigation to resolve threats to significant sage-grouse habitat (DCC 18.89.080(B)). Thus, Deschutes County approval of Site development is contingent upon ODFW approval of mitigation plan as summarized above.

5. Summary

No waters of the United States or of the state were determined to be on-site. The development of the SWMF at the Site would require minimization and avoidance through site design, employing best management practices during construction and operations to avoid impacts to MBTA protected species, and to mitigate for impacts to golden eagle habitat, mule deer and elk winter range, essential and limited pronghorn habitat, and significant sage-grouse habitat (Table 5).

Table 5. Summary of Compensatory Mitigation for Site Development

Habitat	Impacted Habitat (acres)	Quality of Impacted Habitat	Mitigation Amount	Mitigation Options	Estimate Cost
Golden Eagle	Unknown	Moderate	Dependent upon USFWS decision if project would result in take	In-lieu fee, retrofit utility poles	Unknown
Mule deer and elk winter range	167.1 Juniper woodland 10.8 Shrub steppe	Moderate/low	Net benefit of habitat quantity or quality	Acquisition and enhancement of parcel of land	$1,286,700–$1,586,700
Essential and limited pronghorn habitat	167.1 Juniper woodland 10.8 Shrub steppe	Non-habitat. Used for migration	Net benefit of habitat quantity or quality	Fence upgrade and removal	$30,000
Significant sage-grouse habitat	7.8	Non-habitat	9 Functional Acres = 10-26 acres of mitigation	Acquisition and enhancement of land, conservation agreement with landowner, and in-lieu fee payment.	$39,335–$500,000
				Total:	**$1,356,065 – $1,737,579**

Table 6 below provides the estimated initial cost and O&M cost for mitigation actions for potential impacts of Site development. The estimate is conservation and makes several assumptions:

1) Mitigation options aside from in-lieu fee payment can be employed to offset impacts.
2) Land value prices will not change considerably.

Table 6. Estimated Cost for Natural Resource Mitigation for Site Development

Initial Cost	O&M
$700,000	$800,000

These values are approximations of costs for Site development and should only be used for Site selection comparisons for the SWMF. Further development of a mitigation plan and coordination with ODFW would be required to determine the cost of natural resource mitigation for the development of the SWMF at Moon Pit.

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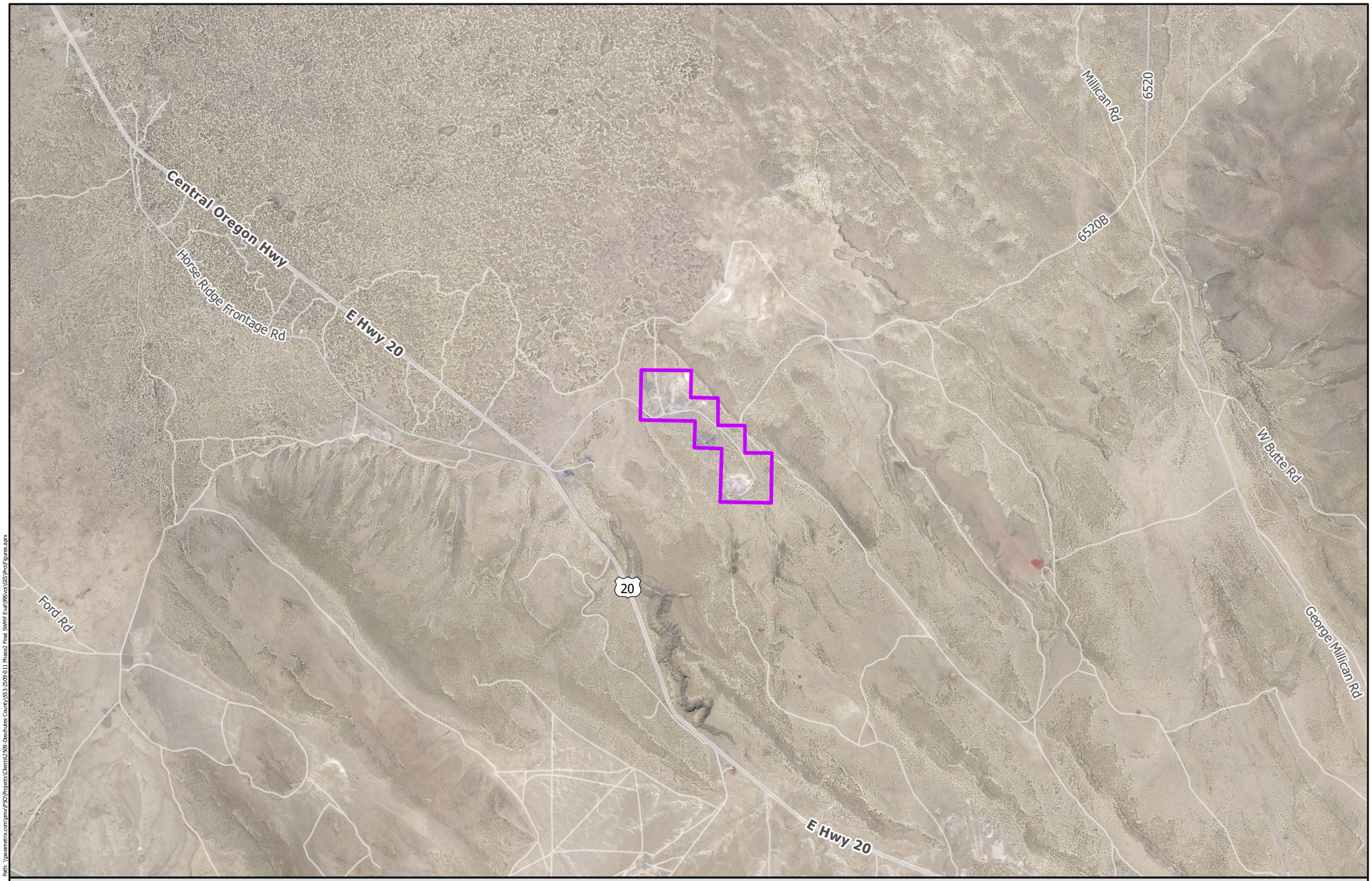
Appendix A

Figures



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Sources: Parametrix, ESRI
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Moon Pit Site Boundary

Figure 1 - Vicinity Map
Moon Pit
Deschutes SWMF Siting

Parametrix

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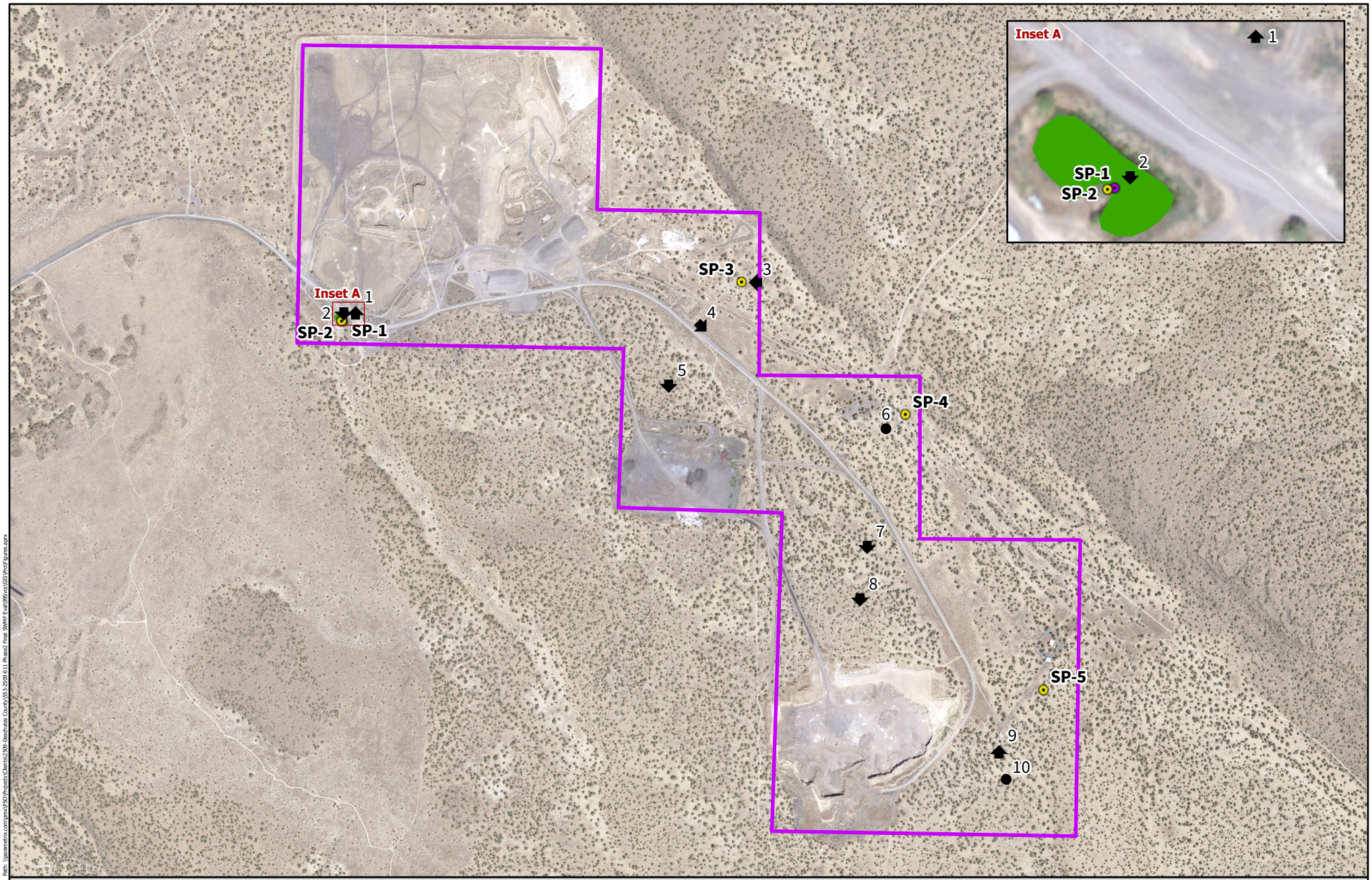
Feet

Deschutes Co, OR



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Moon Pit Site Boundary
Photo Points
Non-jurisdictional Wetland

Sample Plots
Wetland
Upland

Parametrix

0 370 740 1,480
Feet

Figure 2 - Study Area
Moon Pit
Deschutes SWMF Siting

Deschutes Co, OR

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Figure 3 - Site Upland Habitat
Moon Pit
Deschutes SWMF Siting

Date: 10/25/2023
Sources: Parametrix, ESRI, ODFW
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
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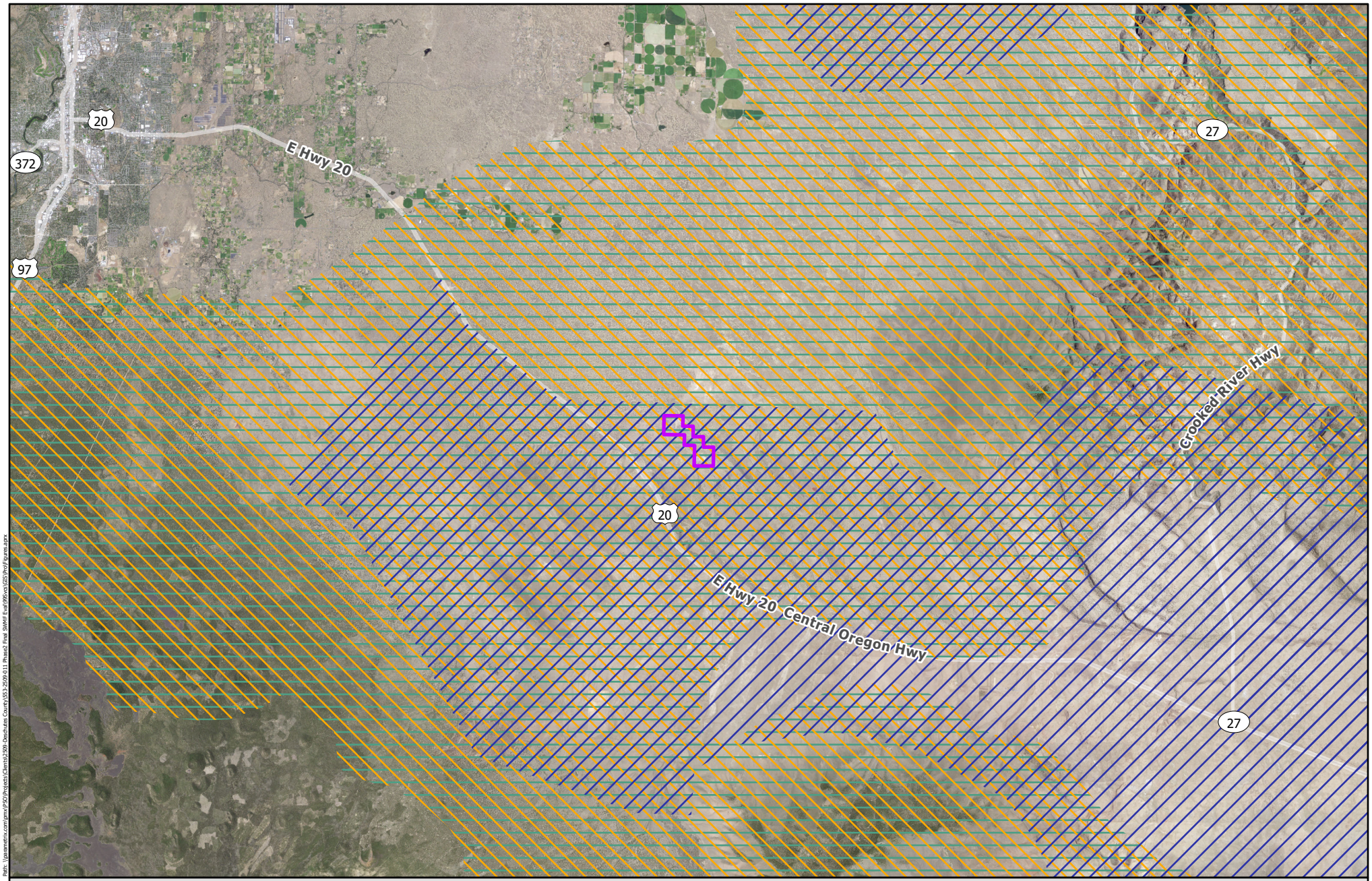

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Date: 10/25/2023
Sources: Parametrix, ESRI, Oregon Department Fish and Wildlife Winter Range for Eastern Oregon (2012), Oregon Essential and Limited Pronghorn Habitat (2021)
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
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Moon Pit Site Boundary
Pronghorn Essential and Limited Habitat
Elk Winter Range
Deer Winter Range

Figure 4 - Big Game Protected Habitat
Moon Pit
Deschutes SWMF Siting

Parametrix

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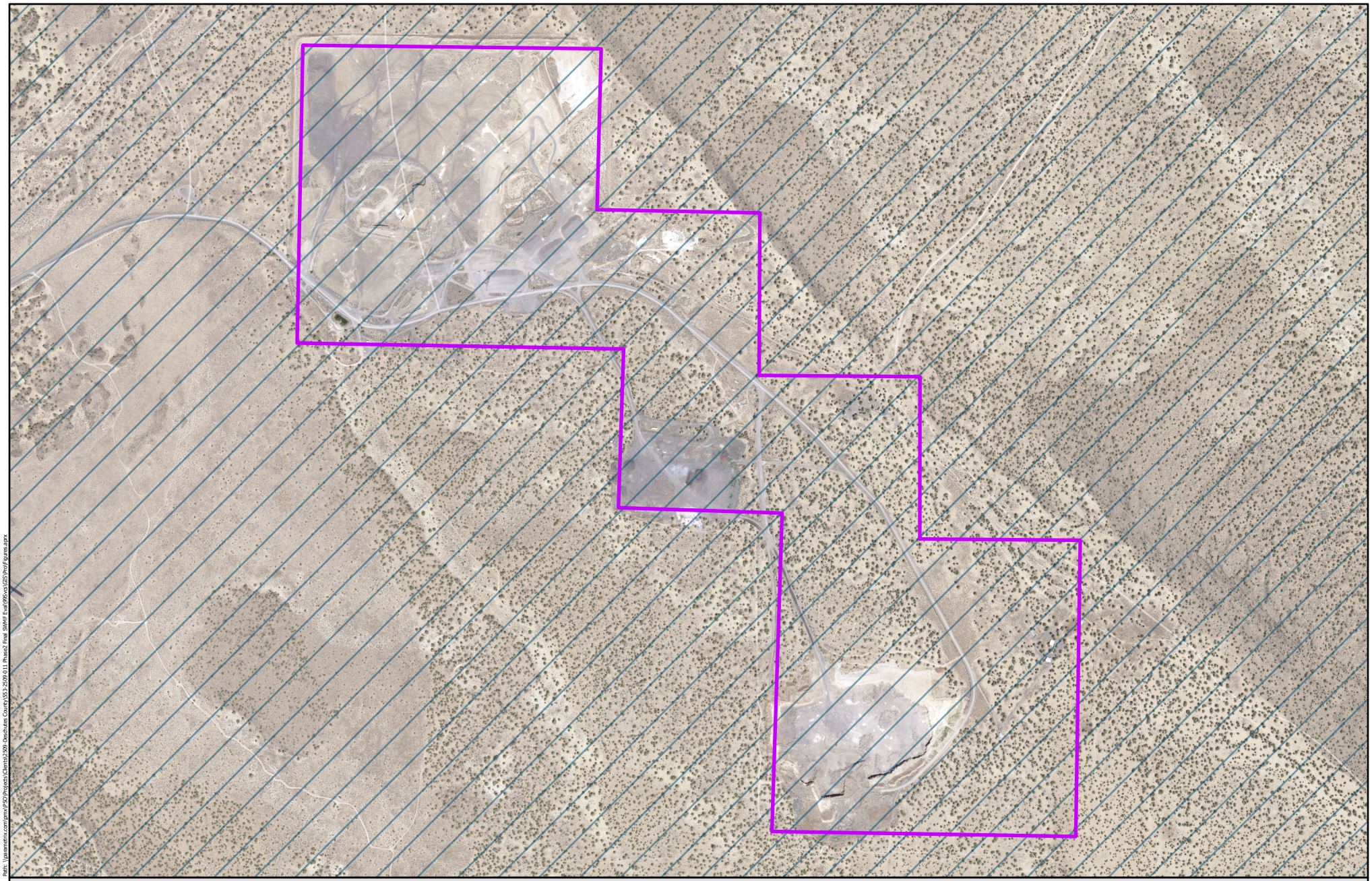
Feet

Deschutes Co, OR



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Date: 10/25/2023
Sources: Parametrix, ESRI, ODFW, Deschutes County Wildlife Combining Zones
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Figure 5 - Wildlife Combining Zone
Moon Pit
Deschutes SWMF Siting

Parametrix

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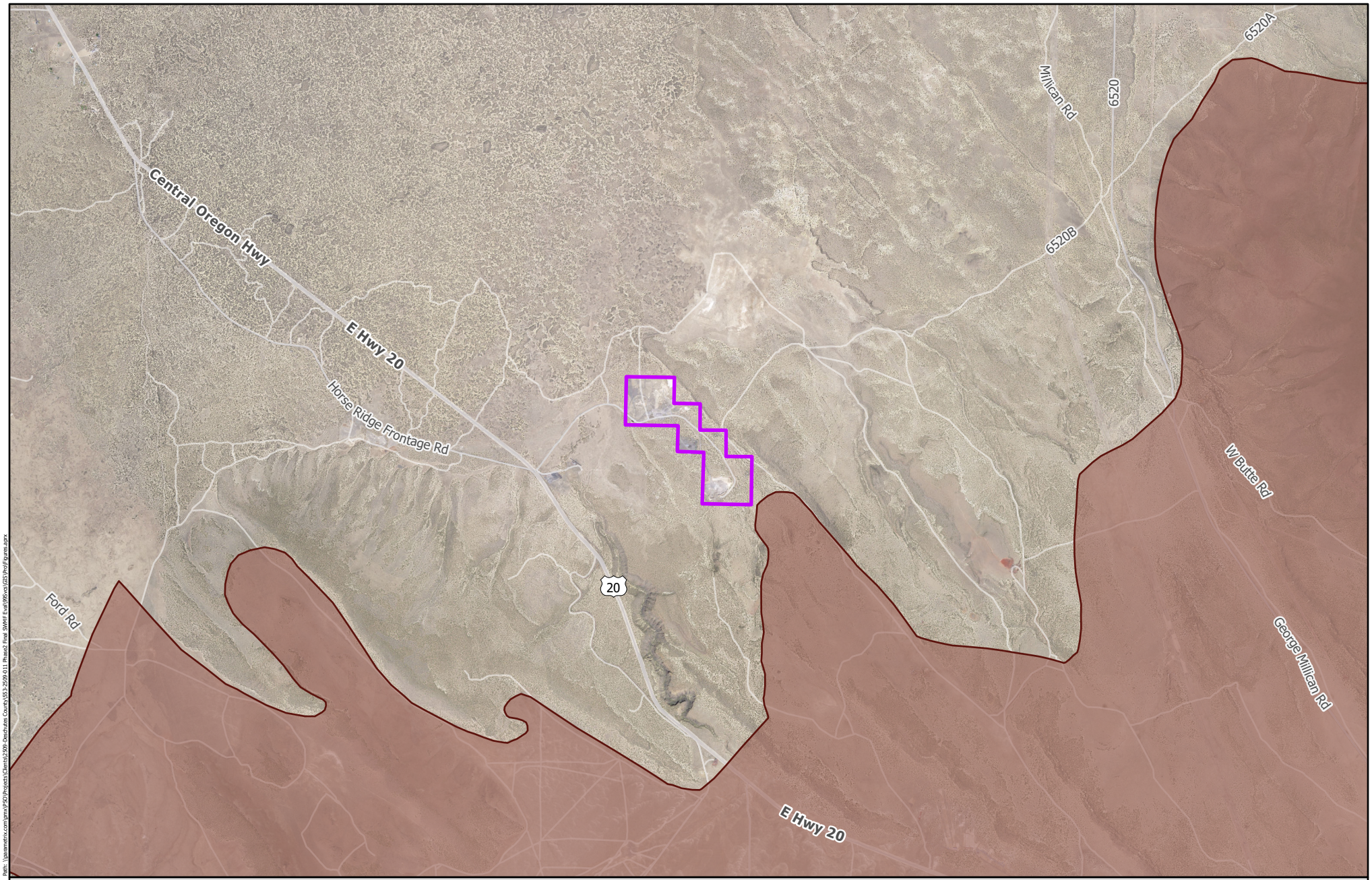
Feet

Deschutes Co, OR



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Date: 10/25/2023
Sources: Parametrix, ESRI, ODFW, Oregon Explorer SageCon Landscape Planning Tool (2023)
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Parametrix

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Feet

Moon Pit Site Boundary
Draft 2023 Low Density Sage-Grouse Habitat

Figure 6 - Significant Sage Grouse Habitat
Moon Pit
Deschutes SWMF Siting

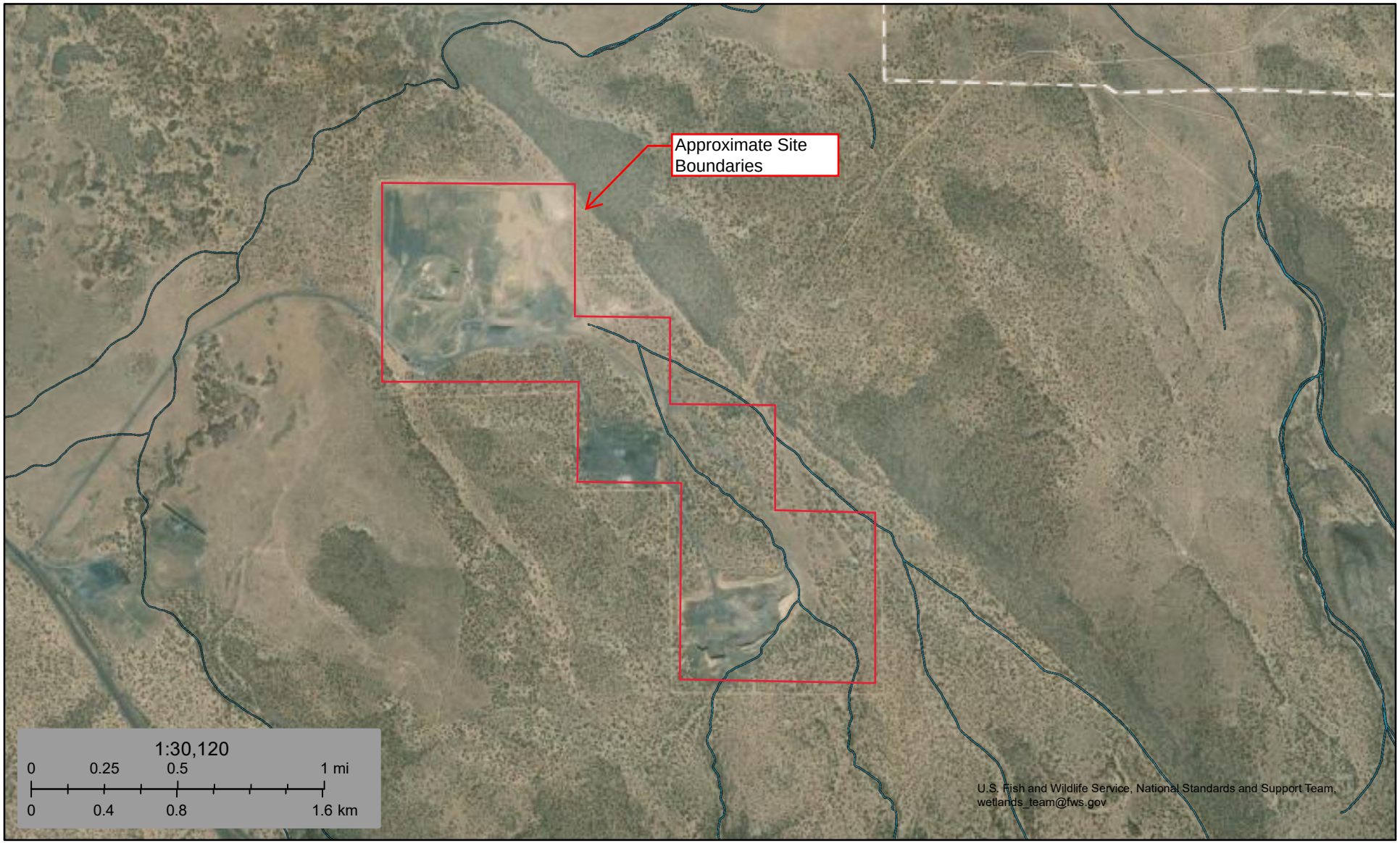
Deschutes Co, OR

Appendix B

Background Information

U.S. Fish and Wildlife Service
National Wetlands Inventory

Moon Pit



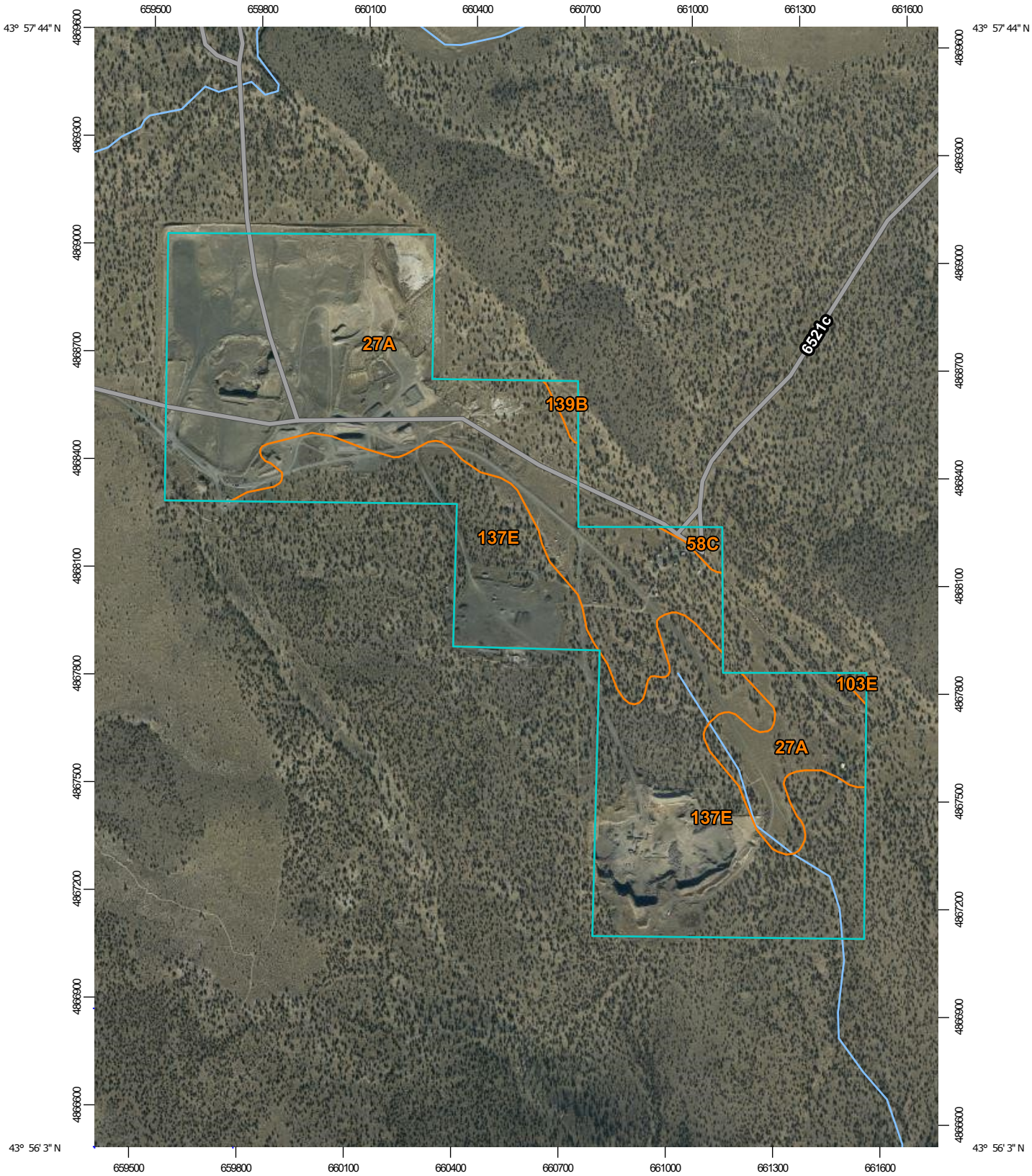
September 22, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Soil Map—Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties
(Moon Pit Soil Map)



Map Scale: 1:15,200 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties
Survey Area Data: Version 20, Sep 14, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

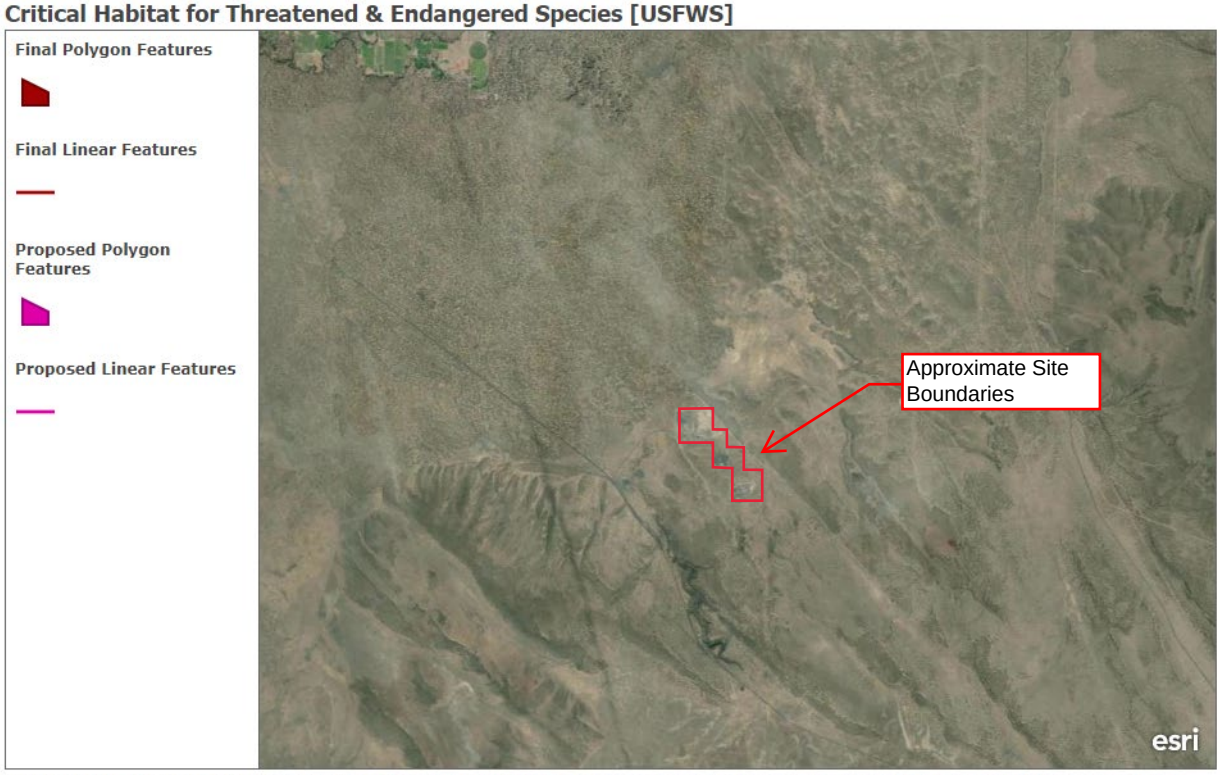
Date(s) aerial images were photographed: Nov 4, 2019—Nov 8, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
27A	Clovkamp loamy sand, 0 to 3 percent slopes	214.4	55.7%
58C	Gosney-Rock outcrop-Deskamp complex, 0 to 15 percent slopes	2.8	0.7%
103E	Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	0.9	0.2%
137E	Stookmoor-Westbutte complex, 25 to 50 percent north slopes	164.4	42.7%
139B	Stukel sandy loam, dry, 3 to 8 percent slopes	2.3	0.6%
Totals for Area of Interest		**384.7**	**100.0%**

Critical Habitat for Threatened & Endangered Species [USFWS]



A specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Earthstar Geographics

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

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

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

Location

Deschutes County, Oregon

Local office

Oregon Fish And Wildlife Office

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

2600 Southeast 98th Avenue, Suite 100

Portland, OR 97266-1398

Endangered species

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

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

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

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

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

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

Mammals

NAME	STATUS
Gray Wolf Canis lupus There is **final** critical habitat for this species. https://ecos.fws.gov/ecp/species/4488	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

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

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list,click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey

effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

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

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

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

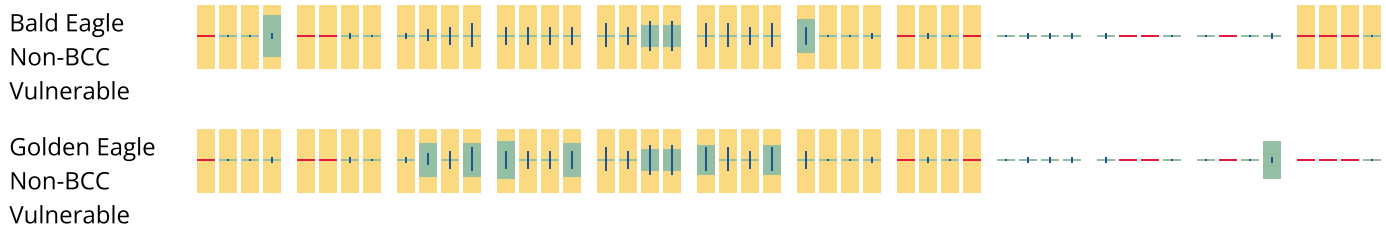
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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

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

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

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

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Sage Thrasher Oreoscoptes montanus — Breeds Apr 15 to Aug 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9433

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

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

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

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

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

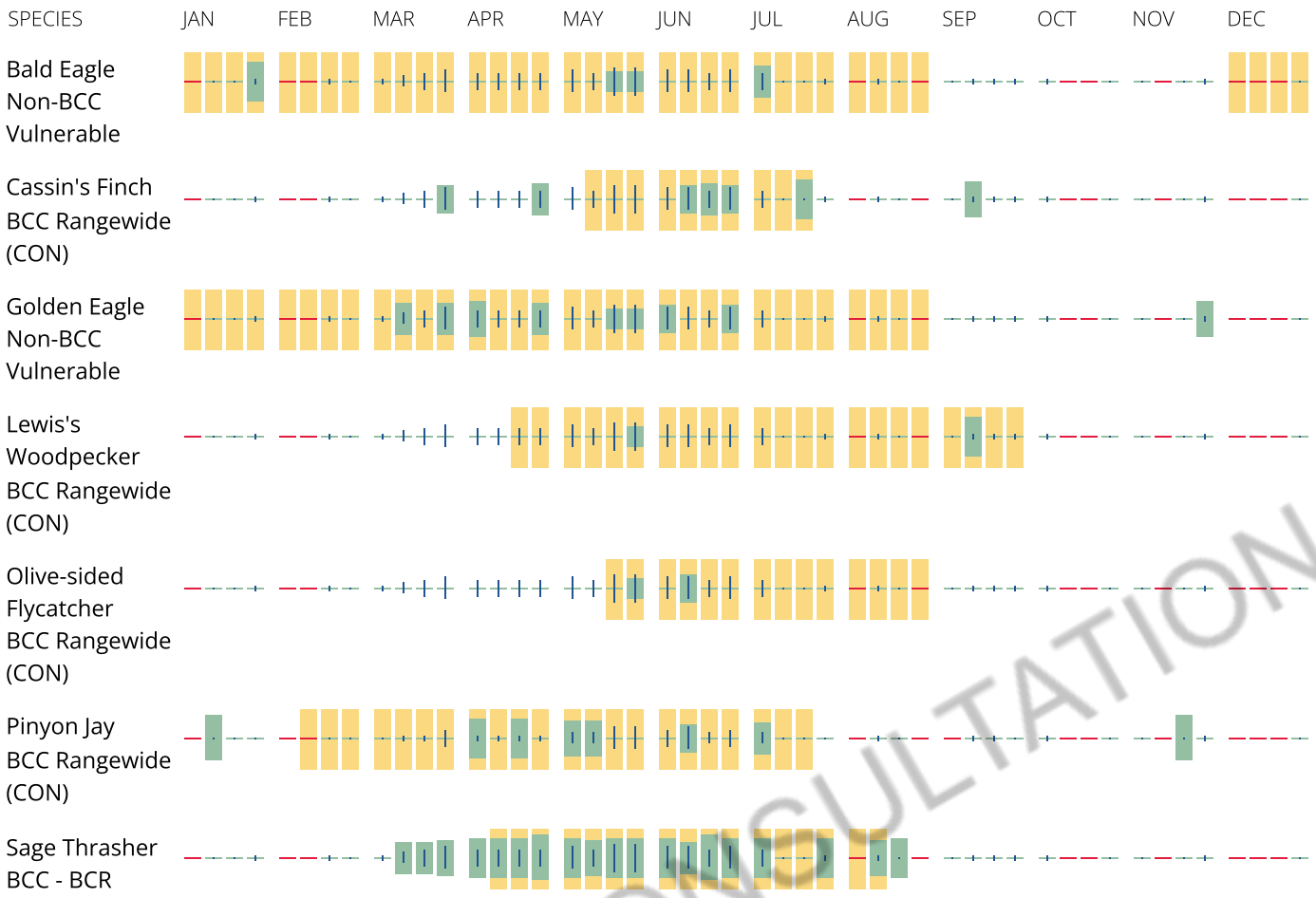
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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

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

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

▪ probability of presence ▪ breeding season | survey effort – no data



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

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

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

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

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

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

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

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

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

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

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

Data exclusions

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

Data precautions

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

NRCS method - Rainfall Documentation Worksheet Hydrology Tools for Wetland Determination
NRCS Engineering Field Handbook Chapter 19

Date	9/25/2023	**Landowner/Project**	on Pit Siting Natural Assessment
Weather Station	Bend 7NE	**State**	OR
County	Deschutes	**Growing Season**	Yes
Photo/obs Date	25-Aug	**Soil Name**	

shaded cells are locked or calculated

Long-term rainfall statistics (from WETS table or State Climatology Office)

	Month	30% chance <	30% chance >	Precip	Condition Dry, Wet, Normal	Condition Value	Month Weight Value	Product of Previous 2 Columns
1st Prior Month*	September	0.13	0.37	1.20	W	3	3	9
2nd Prior Month*	August	0.15	0.45	0.20	N	2	2	4
3rd Prior Month*	July	0.13	0.41	0	D	1	1	1
							Sum	**14**

*compared to photo/observation date

Note: If sum is	
6 - 9	prior period has been drier than normal
10 - 14	prior period has been normal
15 - 18	prior period has been wetter than normal

Condition value:
Dry =1
Normal =2
Wet =3

Conclusions: **prior period has been normal**

14 Days prior to site visit			Observed			WETS		
Days Prior to Investigation	**Date**	**Precip (in.)**	**Period**	**Days / month**	**Observed Total**	**Range**		**Observed - WETS**
1	9/25/2023	0.28	October 2022	31	0.22	0.36	0.80	Below
2	9/24/2023	0.14	November 2022	30	0.3	0.45	1.19	Below
3	9/23/2023	0.00	December 2022	31	1.15	0.44	1.35	Within
4	9/22/2023	0.05	January 2023	31	0.12	0.46	1.20	Below
5	9/21/2023	0.22	February 2023	28	0.08	0.28	0.88	Below
6	9/20/2023	0.00	March 2023	31	0.68	0.27	0.59	Above
7	9/19/2023	0.00	April 2023	30	0.09	0.41	0.92	Below
8	9/18/2023	0.00	May 2023	31	1.81	0.5	1.26	Above
9	9/17/2023	0.00	June 2023	30	0.05	0.38	0.96	Below
10	9/16/2023	0.00	July 2023	31	0	0.13	0.41	Below
11	9/15/2023	0.00	August 2023	31	0.2	0.15	0.45	Within
12	9/14/2023	0.00	September 1-26, 2023	30	1.20	0.13	0.36	Above
13	9/13/2023	0.00	7 Days Prior	31	0.69	0.04	0.10	Above
14	9/12/2023	0.00	14 Days prior	31	0.69	0.07	0.20	Above
	SUM	0.69	**2023 Water Year Total**		**5.90**	**3.96**	**10.37**	Within
Field Investigation	9/26/2023							

Appendix C

Representative Photos

Representative Photos

Job Name: Moon Pit Natural Resource Assessment
Job Number/Phase (Task) Mo/Yr: 553-2509-011/ 0.4 PMX Moon Pit Site Evaluation 11-23

Photo No. 1. Mining cell.

Photo No. 2. Artificial pond built for surface mining (SP-1).

Photo No. 3. Juniper woodland (SP-3).

Photo No. 4. Patch of open sage brush habitat.

Photo No. 5. Juniper woodland.

Photo No. 6. Mule deer track.

Photo No. 7. Vegetated gully.

Photo No. 8. Juniper woodland

Photo No. 9. Vegetated drainage.

Photo No. 10. Mule deer scat.

Appendix D

Wetland Determination Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moon Pit | City/County: Deschutes County | Sampling Date: 9/25/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-1**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 19S14E2NESE

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): concave | Slope (%): None

Subregion (LRR): (B) Columbia/Snake River Plateau | Lat: 43.950902 | Long: -121.010117 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Clovkamp loamy sand, 0-3% slopes - 27A - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes **X**	No ____
Hydric Soil Present?	Yes **X**	No ____
Wetland Hydrology Present?	Yes **X**	No ____

Is the Sampled Area within a Wetland? **Yes X** **No** ____

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.69" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

Plot is in an artificial pond built for the purpose of surface mining within uplands and would be considered non-jurisdictional.

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1.				
2.				
3.				
4.				
		0%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.				
2.				
3.				
4.				
5.				
		0%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1.	*Eleocharis palustris*	45%	Yes	OBL
2.	*Echinochloa crus-galli*	35%	Yes	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		80%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 20% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

Hard-stem bull rush (*Schoenoplectus acutus)* occurs within the wetland but not within the plot.

SOIL

Sampling Point: **SP-1**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-3	10YR 3/2	95	7.5YR 4/6	5	C	M	SaL	
3-8	10YR 3/2	90	7.5YR 4/6	10	C	M	Sa	
8-14	10YR 3/1	95	7.5YR 4/6	5	C	M	Sa	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** **X** **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- X Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	___
Water Table Present?	Yes ___	No X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	___

Wetland Hydrology Present? **Yes** **X** **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moon Pit | City/County: Deschutes County | Sampling Date: 9/25/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-2**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 19S14E2NESE

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): convex | Slope (%): >10%

Subregion (LRR): (B) Columbia/Snake River Plateau | Lat: 43.950900 | Long: -121.010138 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Clovkamp loamy sand, 0-3% slopes - 27A - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:
According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.69" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:
Plot is on slope that surronds the artificial wetland.

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1. *Juniperus occidentalis*		45%	Yes	NOL
2.				
3.				
4.				
		45%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.				
2.				
3.				
4.				
5.				
		0%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1. *Sisymbrium altissimum*		20%	Yes	FACU
2. *Bassia scoparia*		3%	No	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		23%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 77% | % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: 0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ Dominance Test is >50%
____ Prevalence Index is ≤3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL

Sampling Point: **SP-2**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-2	10YR 3/2	100					Sa	
2+	Fill Material							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	___
Water Table Present?	Yes ___	No X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moon Pit | City/County: Deschutes County | Sampling Date: 9/25/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-3**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 19S14E1NESW

Landform (hillslope, terrace, etc.): Plains | Local relief (concave, convex, none): none | Slope (%): <3%

Subregion (LRR): (B) Columbia/Snake River Plateau | Lat: 43.951839 | Long: -120.997666 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Clovkamp loamy sand, 0-3% slopes - 27A - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.69" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

VEGETATION

	Absolute	Dominant	Indicator
Tree Stratum (Plot size: 30')	% Cover	Species?	Status
1. *Juniperus occidentalis*	5%	Yes	NOL
2.			
3.			
4.			
	5% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10')			
1. *Artemisia tridentata*	20%	Yes	NOL
2. *Ericameria nauseosa*	20%	Yes	NOL
3. *Juniperus occidentalis*	3%	No	NOL
4.			
5.			
	43% = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Silene noctiflora*	30%	Yes	NOL
2. *Bromus tectorum*	15%	Yes	NOL
3. *Eriogonum ovalifolium*	5%	No	FACU
4. *Amsinckia tessellata*	2%	No	NOL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	52% = Total Cover		
Woody Vine Stratum (Plot size: 10')			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 48% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ **No X**

Remarks:

SOIL

Sampling Point: **SP-3**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-16	10YR 3/3	100					Sa	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- _____ 1 cm Muck (A9) (**LRR C**)
- _____ 2 cm Muck (A10) (**LRR B**)
- _____ Reduced Vertic (F18)
- _____ Red Parent Material (TF2)
- _____ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Marks (B1) (**Riverine**)
- _____ Sediment Deposits (B2) (**Riverine**)
- _____ Drift Deposits (B3) (**Riverine**)
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches):	_____
Water Table Present?	Yes _____	No X	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches):	_____

Wetland Hydrology Present? **Yes** _____ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moon Pit | City/County: Deschutes County | Sampling Date: 9/25/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-4**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 19S14E1SWSE

Landform (hillslope, terrace, etc.): Gully | Local relief (concave, convex, none): concave | Slope (%): <3%

Subregion (LRR): (B) Columbia/Snake River Plateau | Lat: 43.948875 | Long: -120.992529 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): osney-Rock outcrop-Deskamp complex, 0-15% slope - 58C - No Rating | NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? **Yes** ____ **No** **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.69" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

VEGETATION

	Absolute	Dominant	Indicator
Tree Stratum (Plot size: 30')	% Cover	Species?	Status
1. *Juniperus occidentalis*	15%	Yes	NOL
2.			
3.			
4.			
	15% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10')			
1. *Artemisia tridentata*	13%	Yes	NOL
2. *Ericameria nauseosa*	10%	Yes	NOL
3. *Juniperus occidentalis*	5%	No	NOL
4.			
5.			
	28% = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Pseudoroegneria spicata*	3%	Yes	NOL
2. *Bromus tectorum*	2%	Yes	NOL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5% = Total Cover		
Woody Vine Stratum (Plot size: 10')			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 95% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** ____

Remarks:

SOIL

Sampling Point: **SP-4**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-16	10YR 3/3	100					Sa	Small gravel
								inclusions

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- _____ 1 cm Muck (A9) (**LRR C**)
- _____ 2 cm Muck (A10) (**LRR B**)
- _____ Reduced Vertic (F18)
- _____ Red Parent Material (TF2)
- _____ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Marks (B1) (**Riverine**)
- _____ Sediment Deposits (B2) (**Riverine**)
- _____ Drift Deposits (B3) (**Riverine**)
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches):	_____
Water Table Present?	Yes _____	No _____	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches):	_____

Wetland Hydrology Present? **Yes** _____ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moon Pit | City/County: Deschutes County | Sampling Date: 9/25/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-5**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 19S14E12SENE

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): none | Slope (%): <3%

Subregion (LRR): (B) Columbia/Snake River Plateau | Lat: 43.942685 | Long: -120.988168 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Stookmoor-Westbutte complex, 25-50% slopes - 137E - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.69" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1. *Juniperus occidentalis*		5%	Yes	NOL
2.				
3.				
4.				
		5%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1. *Artemisia tridentata*		20%	Yes	NOL
2.				
3.				
4.				
5.				
		20%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1. *Bromus tectorum*		10%	Yes	NOL
2. *Festuca idahoensis*		5%	Yes	NOL
3. *Sisymbrium altissimum*		1%	No	FACU
4. *Silene noctiflora*		1%	No	NOL
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		17%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 83% | % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	____	x 1 =	____
FACW species	____	x 2 =	____
FAC species	____	x 3 =	____
FACU species	____	x 4 =	____
UPL species	____	x 5 =	____
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ **No X**

Remarks:

SOIL

Sampling Point: **SP-5**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-16	10YR 3/3	100					Sa	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- _____ 1 cm Muck (A9) (**LRR C**)
- _____ 2 cm Muck (A10) (**LRR B**)
- _____ Reduced Vertic (F18)
- _____ Red Parent Material (TF2)
- _____ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Marks (B1) (**Riverine**)
- _____ Sediment Deposits (B2) (**Riverine**)
- _____ Drift Deposits (B3) (**Riverine**)
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches):	_____
Water Table Present?	Yes _____	No _____	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches):	_____

Wetland Hydrology Present? **Yes** _____ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix E

Preliminary Habitat Quantification Tool Results

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

SITE INFORMATION

Site Name	Moon Pit Landfill
Location	Deschutes County
Description	Solid waste landfill proposed facility

DATA ENTRY: HQT ADJUSTMENT FACTORS

Minimization reductions		*Applies to development [debit] projects only. Default value is **0**.*
Legal protection multiplier	5%	*Applies to credit generation projects only. Default value is **5%**.*

HQT PROJECT DEBIT/CREDIT VALUES

UPLAND Habitat	
HQT Upland Debit(-) or Credit(+) Acres	**-9.0**

MESIC Habitat	
HQT Mesic Debit(-) or Credit(+) Acres	**0.0**

UPLAND CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

UPLAND Map Unit Data Summary

9 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres
	Physical Acres	Pre-Project	Post-Project	
Direct impacts	0.0	0.0	0.0	0.0
Indirect impacts	3168.7	471.0	463.2	-7.8
TOTAL	**3168.7**	**471.0**	**463.2**	**-7.8**

Average Scores (weighted by map unit area)					
Ecological State			Development Impacts		
Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
0.45	**0.45**	**0.00**	**0.279**	**0.260**	**-0.019**

UPLAND Credit Adjustments *all values in units of functional acres*

Raw upland habitat credit value	**-7.8**	Credit value after minimization	**-7.8**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**-1.2**
		HQT Upland Debit(-) or Credit(+) Acres	**-9.0**

MESIC CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

MESIC Map Unit Data Summary

0 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres
	Physical Acres	Pre-Project	Post-Project	
Direct impacts	0.0	0.0	0.0	0.0
Indirect impacts	0.0	0.0	0.0	0.0
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**

Average Scores (weighted by map unit area)					
Ecological State			Development Impacts		
Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score

MESIC Credit Adjustments *all values in units of functional acres*

Raw mesic habitat credit value	**0.0**	Credit value after minimization	**0.0**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**0.0**
		HQT Mesic Debit(-) or Credit(+) Acres	**0.0**

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

Data Entry

Calculated Cells

Management Designations Index 0.328
Enter the MDI score for the full project analysis area

Site Name: Moon Pit Landfill

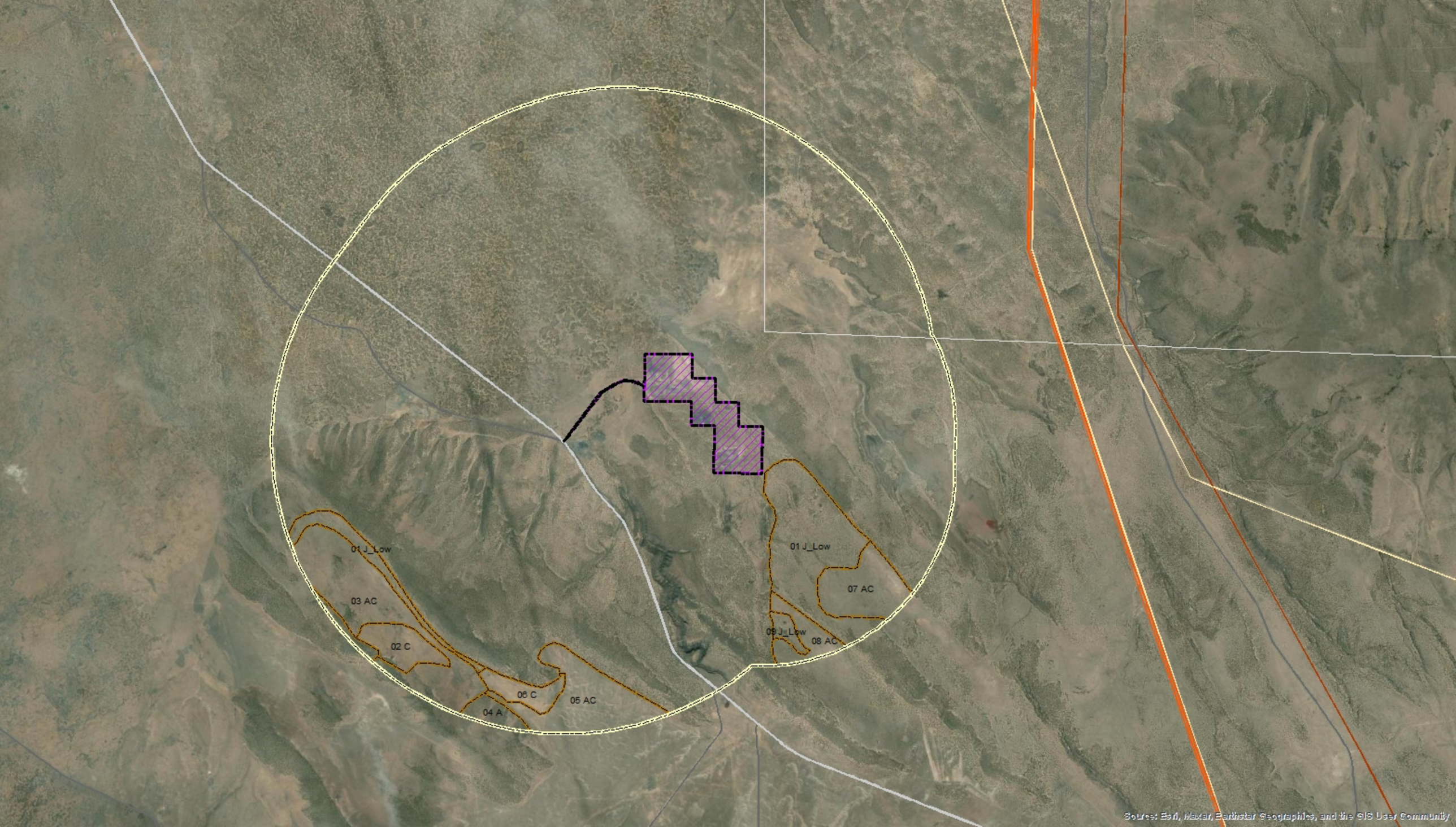
Location: Deschutes County

RAW DEBIT(-) OR CREDIT(+) ACRES

Upland -7.8

Mesic 0.0

DATA ENTRY								BASELINE HABITAT FUNCTION			HABITAT MODIFICATION								FUNCTIONAL ACRES		
				Ecological State		Development Impacts					Ecological State			Development Impacts							
Map Unit ID	**Acres**	Mesic (1=yes, 0=no)	Habitat Type	Pre-Project Ecological State	Post-Project Ecological State	Pre-Project Development Score	Post-Project Development Score	Pre-Project Ecological State Score	Pre-Project Development Score	**Baseline Habitat Function Subscore**	Pre-Project Ecological State Score	Post-Project Ecological State Score	**Change** in Ecological State Score	Pre-Project Development Score	Post-Project Development Score	**Change** in Development Score	**Pre-Project Habitat Modification Subscore**	**Post-Project Site Habitat Modification Subscore**	Pre-Project Functional Acres	Post-Project Functional Acres	**Debit (-) or Credit (+) Acres**
EXAMPLE	***80.0***	*0*	*Upland*	*B*	*B*	*0.700*	*0.500*	*0.80*	*0.700*	*0.750*	*0.80*	*0.80*	*0.00*	*0.700*	*0.500*	*-0.200*	*0.750*	*0.650*	*45.00*	*39.00*	***-6.00***
01	**947.1**		Upland	E-Juniper	E-Juniper	0.191	0.142	0.10	0.191	0.206	0.10	0.10	0.00	0.191	0.142	-0.048	0.145	0.121	28.38	23.67	**-4.71**
02	**186.7**		Upland	C	C	0.597	0.597	0.30	0.597	0.408	0.30	0.30	0.00	0.597	0.597	0.000	0.448	0.448	34.17	34.17	0.00
03	**763.0**		Upland	AC	AC	0.477	0.477	0.65	0.477	0.485	0.65	0.65	0.00	0.477	0.477	0.000	0.563	0.563	208.44	208.44	0.00
04	**94.5**		Upland	A	A	0.350	0.350	1.00	0.350	0.559	1.00	1.00	0.00	0.350	0.350	0.000	0.675	0.675	35.67	35.67	0.00
05	**493.4**		Upland	AC	AC	0.116	0.116	0.65	0.116	0.364	0.65	0.65	0.00	0.116	0.116	0.000	0.383	0.383	68.83	68.83	0.00
06	**131.6**		Upland	C	C	0.239	0.239	0.30	0.239	0.289	0.30	0.30	0.00	0.239	0.239	0.000	0.270	0.270	10.25	10.25	0.00
07	**334.8**		Upland	AC	AC	0.252	0.212	0.65	0.252	0.410	0.65	0.65	0.00	0.252	0.212	-0.040	0.451	0.431	61.91	59.18	**-2.73**
08	**164.0**		Upland	AC	AC	0.108	0.096	0.65	0.108	0.362	0.65	0.65	0.00	0.108	0.096	-0.011	0.379	0.373	22.48	22.14	**-0.34**
09	**53.5**		Upland	E-Juniper	E-Juniper	0.089	0.077	0.10	0.089	0.172	0.10	0.10	0.00	0.089	0.077	-0.012	0.094	0.088	0.87	0.81	**-0.06**


01 J_Low
03 AC
02 C
06 C
05 AC
04 A
01 J_Low
07 AC
09 J_Low
08 AC
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Appendix F

Migratory Bird Treaty Act
Species Observed on Site

MBTA Species Observed on the Site

Species (Common Name)	Species (Scientific Name)	Type of Observation
Black capped chickadee	*Poecile atricapilla*	Observed
Clark's nutcracker	*Nucifraga columbiana*	Observed
Northern flicker	*Colaptes auratus*	Feather
Mourning dove	*Zenaida macroura*	Observed
Black-capped chickadee	*Poecile atricapilla*	Observed
Western bluebird	*Sialia mexicana*	Observed
Mountain bluebird	*Sialia currucoides*	Observed
American kestrel	*Falco sparverius*	Observed
Spotted towhee	*Pipilo maculatus*	Audible call
Dark-eyed junco	*Junco hyemalis*	Observed
House finch	*Haemorhous mexicanus*	Observed
Savannah sparrow	*Passerculus sandwichensis*	Observed
American robin	*Turdus migratorius*	Observed
Townsend's solitaire	*Myadestes townsendi*	Observed
Common raven	*Corvus corax*	Observed
Bank swallow	*Riparia riparia*	Observed communal nest in bank (unoccupied)
Red-tailed Hawk	*Buteo jamaicensis*	Observed

Incidental observations on 8/18/22 and 9/27/23 (Wendy Wente, Consultant Mason Bruce and Girard).

Roth East Site Evaluation - Natural Resource Assessment

Prepared for
Deschutes County Solid Waste Department

April 2024

Parametrix

Roth East Site Evaluation - Natural Resource Assessment

Prepared for

Deschutes County Solid Waste Department

Prepared by

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April 2024 | 553-2509-011

Citation

Parametrix. 2024. Roth East Site Evaluation - Natural Resource Assessment . Prepared for Deschutes County Solid Waste Department by Parametrix, Bend, Oregon. April 2024.

Contents

Contents (Continued)

TABLES

APPENDICES

1. Introduction

The purpose of the Natural Resource Assessment is to preliminarily assess the presence of protected natural resources and identify likely mitigation scenarios to inform siting of the proposed development of a Solid Waste Management Facility (SWMF) at the Roth East Site (Site) Figure 1 in Appendix A). The Site is in an unincorporated parcel of land in Deschutes County, Oregon (Township 20 South, Range 15 East, Sections 11 and 12).

Parametrix evaluated the Site using readily available data, including aerial photographs, topographic maps, public geographic information system (GIS) datasets, and information from agency websites. Background data are presented in Appendix B. A 1-day Site visit was conducted on September 26, 2023, to inspect the Site for waters of the state and protected species and their habitat. Parametrix evaluated Site conditions and associated environmental regulatory and mitigation requirements for development of the SWMF.

2. Methods

2.1 Review of Existing Information

The following available environmental data, maps, and materials related to the Site were reviewed:

- Aerial imagery of the Site from 1985 to 2023 (Google Earth 2023).
- Bald eagle and golden eagle nest locations (obtained from USFWS).
- Big game winter range (ODFW 2012).
- Essential and limited pronghorn habitat (ODFW 2021).
- Greater sage-grouse lek locations (obtained from Oregon Department of Wildlife).
- Natural Resources Conservation Service (NRCS) Web Soil Survey in the Site (U.S. Department of Agriculture [USDA] (USDA NRCS 2023).
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) in the Site (USFWS 2023a).
- USFWS Critical Habitat for Threatened and Endangered Species maps (USFWS 2023b).
- USFWS Information for Planning and Consultation (IPaC) resource list (USFWS 2023c).
- Oregon Department of Agriculture (ODA) WeedMapper (ODA 2023a).
- ODA Oregon Listed Plants by County (ODA 2023b).
- ODA Noxious Weed Policy and Classification System (ODA 2023c).
- Oregon Biodiversity Information Center (ORBIC) Rare, Threatened and Endangered Species Records (within a 2-mile radius of the project; generated July 19, 2022) (ORBIC 2023).
- Oregon Department of Fish and Wildlife Threatened and Endangered Species List (ODFW 2023a).
- SageCon Landscape Planning Tool (Oregon Explorer 2023)
- Wildlife combining zones (obtained from Deschutes County).

There is no Local Wetland Inventory (LWI) at the Site and its vicinity. Agency coordination with ODFW/USFWS, a review of stakeholder and public comments, and coordination with landowner representatives and the County were also conducted.

2.2 Site Visit

Parametrix scientists Colton Kyro and Chloe Kott conducted a Site visit on September 27, 2023, to determine the presence of waters of the United States and/or waters of the state, identify the potential for presence of protected species and habitats, and assess habitat conditions for greater sage-grouse (*Centrocercus urophasianus,* sage-grouse) at the Site, along potential access and transmission routes, and surrounding lands. Representative Site photographs are provided in Appendix C.

2.2.1 Waters and Wetlands

Wetland and waters presence or absence was determined using methods specified in the U.S. Army Corps of Engineers' (USACE) *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0; USACE 2008a), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008b), and *Streamflow Duration Assessment Method for the Pacific Northwest* (2015). Vegetation, soil, and hydrology conditions were documented at five sample plot (SP) locations. At each SP, Parametrix collected vegetation, soils, and hydrology data on standardized wetland determination data forms and documented field conditions with photographs. Additionally, Parametrix documented additional observation of habitats conditions and soils, vegetation, and hydrology conditions at 12 photo points (PP). Data points for SP and PP were recorded using a handheld global positioning system (GPS). The locations of the SPs and PPs are shown on Figure 2 of Appendix A. Wetland determination data forms are included in Appendix D.

2.2.2 Protected Species

Quality of habitat for big game and sensitive bird species was determined by a meandering survey through representative habitats on Site. Parametrix scientists documented habitat quality and evidence of use such as occurrence, scat, and tracks.

Sage-grouse habitat quality was determined using methods specified in the *Oregon Sage-Grouse Habitat Quantification Tool* (HQT) (ODFW 2019) and *Threat-Based Land Management in the Northern Great Basin*: *A Managers Guide* (Johnson et al. 2019). Map units of similar vegetation communities were determined for direct and indirect impact areas of the proposed SWMF within significant sage-grouse habitats. Significant sage-grouse habitat is defined as lands identified as core areas, low density areas, and lands within a general habitat area located within 3.1 miles of a lek.

Currently, ODFW is in the process of updating the mapping of significant sage-grouse habitats. Core and low-density habitats were mapped initially in 2011 with no subsequent updates. In 2022, ODFW notified stakeholders and conservation partners of their intent to update habitat maps with new data. Since the initially mapping, Oregon has improved understanding of sage-grouse distribution by the discovery of over 150 leks, development of habitat suitability maps, and sage-grouse research projects which have tracked the species movement through the use of radio- and GPS- marked individuals. New data was incorporated into the modelling process and was reviewed by ODFW biologist to accurately depict boundaries of sage-grouse core and low-density habitat. Currently, the

process is in the formal comment period which ends in December 2023. However, comments for consideration in the final draft habitat maps ended in September 2023. ODFW will soon begin to review comments and finalize core and low-density habitat maps for review by ODFW commission in December. It is anticipated that the new mapping will be adopted by Oregon's Land Conservation and Development Commission in mid-March 2024 (A. Walch, ODFW, personal communications, September 24, 2023).

It was assumed permitting for the project would occur after mid-March 2024 and the proposed mapping of core and low-density habitat was used for this assessment. Map units were determined using aerial imagery and vegetation communities were ground-truthed during the Site visit. Indirect impact areas also considered in this assessment includes the area within 3.3 kilometers from the Site, as indicated by the HQT for Utility/Solid Waste Disposal Facility. For each map unit, Parametrix scientists surveyed a portion of it to collect preliminary data on vegetation communities, potential threats, apparent trend, and the overall ecological state of the map unit. The ecological state of the map unit was used to inform the map unit's function in regard to sage-grouse habitat. Each map unit was ranked for its quality of ecological state from A to E, with A being the highest functioning. The state will have a modifier such as Juniper, Invasive Annual Grass (IAG), or Dual which signifies the threats to the habitat present within the map unit for sage-grouse. Ecological states, A, B, and C IAG are considered habitat for sage-grouse whereas other states are considered nonhabitat. More detail on ecological states can be found in *Threat-Based Land Management in the Northern Great Basin*: *A Managers Guide* (Johnson et al. 2019).

2.3 Sage-grouse Mitigation

Large-scale development with impacts to significant sage-grouse habitat would require compensatory mitigation according to State and County laws (OAR 660-023-0115(7), DCC 18.89.060). Potential impact of Site development on significant sage-grouse habitat was estimated by coordinating with ODFW on performing a preliminary HQT analysis for the SWMF. Parametrix coordinated with ODFW District Wildlife Biologist Andrew Walch and Regional Habitat Biologist Michael Moore on implementing HQT for the Site and the proposed SWMF. Sage-grouse map units and their preliminary ecological state was shared with ODFW to inform the HQT. The HQT compares pre- and post-development habitat function within the impact area. The difference in function, as a unit of functional acres, is the credit or debit for Oregon's sage-grouse Mitigation Program. Pre-development functional acres was informed by the ecological state of the Site and adjacent land as described above (Section 2.2 Site Visit). The impact of the SWMF on pre-development conditions is set by an internal function within HQT that quantifies the direct and indirect loss of function of a Utility/Solid Waste Disposal Facility. Preliminary HQT results are included in Appendix E.

3. General Characteristics and Existing Conditions

3.1 Landscape Setting and Site Use

According to the U.S. Geological Survey (USGS) (2023), the Site is located in the Mahogany Butte-Dry River (HUC 170703050706) watershed, with general slope to the northwest. The Site consist sage brush steppe environment with native and non-native grasses bunch grasses and is currently used for grazing. The Site is bordered by private lands that are also used for grazing.

The topography of the Site is slightly sloped to the north. The Site elevation ranges from 4,480 to 4,600 feet.

3.2 Hydrology and Precipitation

Parametrix reviewed precipitation data from the Bend 7 NE weather station in Deschutes County, Oregon, available on the National Oceanic Atmospheric Administration (NOAA) Regional Climate Center website powered by the Applied Climate Information System (ACIS 2023). The normal range of annual precipitation in the area is between 7.25 and 9.78 inches. Most of the annual precipitation falls as rain or snow between October and March. The average growing season lasts 132 days from May 22 to October 1. The dry season extends from June to October, with normal monthly precipitation ranging from 0.1 to 0.81 inches. Average temperatures range from 32.5°F to 66.4°F, with the highest monthly average temperatures in July at 83.5°F and the lowest monthly average temperature in December at 23.1°F. The Site visit was conducted at the end of September during the dry season.

Parametrix conducted precipitation analysis to determine whether monthly precipitation in the 3-month period prior to Site visit and the water year was normal. According to the WETS table for the period 1992 to 2021 and recorded precipitation for July, August, and September 2023, the hydrologic condition on the Site was normal for this time of year.

Weather during the Site visit was cloudy with a high of 63 degrees Fahrenheit (°F). Intermittent and short rain events occurred during the Site visit.

3.3 Soils

According to NRCS soil mapping for Deschutes County (USDA 2023), two soil units are mapped on-site: Blayden loamy sand, 0% to 3% slopes soils unit (Map Unit 17A), and Menbo stony loam, 5% to 25% slopes (88D). Both soils units are nonhydric soils and well drained.

3.4 Upland Habitat

The Site is entirely composed of shrub steppe habitat (309.3 acres, Figure 3 of Appendix A). Vegetation within the Site is dominated by big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), crested wheat grass (*Agropyron cristatum*), and Idaho fescue (*Festuca idahoensis*). Other native species found include western juniper (*Juniperus occidentalis*), bluebunch wheat grass (Pseudoroegneria spicata), cushion wild buckwheat (*Eriogonum ovalifolium*), antelope bitterbrush (*Purshia tridentata*), lupine (*Lupinus species*), and prairie June grass (*Koeleria macrantha*). Invasive and non-native species present in low densities included cheatgrass (*Bromus tectorum*), spotted knapweed (*Centaurea stoebe),* tumble mustard (*Sisymbrium altissimum*), and clasping pepper weed (*Lepidium perfoliatum*). Vegetation communities formed by these plants are nonhydrophytic because they are dominated either by facultative upland or by species that are not listed in the National Wetland Plant List (Lichvar et al. 2016).

3.5 Wetlands and Waters

Nine streambeds are mapped as intermittent seasonally flooded riverine streambeds by NWI to occur across the Site (USFWS 2023a). These features are located in gullies with upland vegetation (Section 3.4). The gullies lacked stream bed and bank features and did not contain hydric soils or hydrophytic vegetation (SP-1, 2, 4, and 5). These gullies are likely relict topographical features from previous climatic conditions and are currently ephemeral systems that may only have flowing water during spring of high snow pack years. Collected field data confirmed the absence of the NWI-mapped resources.

The remainder of the Site is characterized by upland sage brush steppe habitats (SP-3).

3.6 Protected Species

3.6.1 Federal and State Listed Species

USFWS IPaC (2023a) indicate that gray wolf (*Canis lupus*), a federally threatened species under the Endangered Species Act (ESA), has the potential to occur on Site. There are no known gray wolf populations within the Site (ODFW 2022). However, wolves are habitat generalists and establish territories wherever sufficient food resources are present. Young individuals disperse on average 40 to 60 miles to establish new territories. Non-breeding individuals occur 40 miles northwest and southwest of the Site (ODFW 2022). Thus, although unlikely given barriers to movement from known locations of wolf activity, gray wolves may occur on Site.

Monarch butterfly (*Danaus plexippus*), a federally listed candidate species, also is known to occur in Deschutes County (USFWS 2023a). However, the species is unlikely to occur on the Site due to a lack of suitable habitat (i.e., milkweed [*Asclepias* spp.] plants and large trees) for feeding, migration, or overwintering.

Previous meetings with USFWS and ODFW on SWMF siting indicate the potential presence of little brown bat (*Myotis lucifugus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) within the vicinity of the Site. Little brown bat is under review for listing under the ESA. In the summer, little brown bat roosts in human-made structures and old-growth trees located near water bodies where they prefer to forage (WNDR 2013). In the winter, little brown bats hibernate in humid caves or mines with near constant temperature. Townsend's big-eared bat is federal species of concern and is listed as sensitive by the state of Oregon. Townsend's big-eared bat commonly roosts in caves and abandoned mines in addition to buildings, bridges, rock crevices, and hollow trees (TPWD 2023). Townsend's big-eared bat forage along edge habitats along streams, forests, and agricultural fields. It is unlikely either bat species will roost on Site as there are no large trees, caves, or human structures. These bat species are also unlikely to forage on Site as there is a lack of waterbodies and forests.

ORBIC has no records of state or federally listed species on the Site or nearby.

3.6.2 Habitat

Mule Deer and Elk

The Site is entirely within mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*) winter range designated by ODFW (ODFW 2012, Figure 3 of Appendix A) and is partially in a Wildlife Area Combining Zone for Deer Winter Range (Figure 4 of Appendix A). The Site is also entirely within a Priority Wildlife Connectivity Area for mule deer and elk (ODFW 2023c).

Winter range habitat for mule deer and elk is designated as a Category 2 habitat by ODFW which is deemed to be essential for a species, populations, or species assemblage (OAR 635-415-0025). Mule deer and elk migrate from higher elevation summer ranges with better forage opportunities to lower elevation winter ranges. These winter ranges allow for mule deer and elk to avoid deeper snow and harsh winter conditions present within their summer ranges. Cover during winter range provides further protection from harsh winter conditions. Mule deer and elk generally rely upon their body reserves accrued during the summer for winter survival as forage during winter is of low quality.

No mule deer and elk tracks or scat were observed on the Site. The Site has low density of topographic and vegetative cover from winter conditions but has high density of forage opportunities from the intact sage brush and bunch grass communities. Thus, the Site is of moderate quality for mule deer and elk winter range habitat.

Pronghorn

The Site is entirely within essential and limited pronghorn (*Antilocapra americana*) habitat as designated by ODFW (ODFW 2021, Figure 4 of Appendix A) and is within a Wildlife Area Combining Zone for Antelope Range as designated by Deschutes County code (DCC 18.88, Figure 5 of Appendix A). The Site is also entirely within a Priority Wildlife Connectivity Area for pronghorn (ODFW 2023c) Essential and limited pronghorn habitat is designated as a Category 2 habitat by ODFW which is deemed to be essential for a species, populations, or species assemblage (OAR 635-415-0025).

The Site is of high habitat quality for pronghorn. The Site has a high density of sage brush and bunch grasses with few very junipers present. Pronghorn are generally found in sagebrush-steppe and grassland environments with very low tree density (ODFW 2021). The sage brush and bunch grasses provide good forage for pronghorn and the limited juniper presence allows them to spot predators. No pronghorn tracks or scat were observed on Site. Pronghorn may have limited access to the Site due to nearby limits to movement such as fencing.

Sage-grouse

The Site is entirely within low-density sage-grouse habitat and is adjacent to core area sage-grouse habitat (Figure 6 of Appendix A). The Site is used lightly by sage-grouse during the summer and winter (Henderson 2019) and is located within a corridor that connects leks located to the Site's east and west (Jones et al. 2015). Significant sage-grouse habitats within the vicinity of the Site vary in vegetation community and thus ecological function for sage-grouse varies. In general, the Site is located near the valley bottom. The Site and other areas within the bottoms of the valley that have not been grazed heavily and are not experiencing juniper expansion, have robust sage brush and perennial bunch grass communities, and thus have an ecological state of A. Heavily grazed regions have resulted in the removal of perennial bunch grasses and/or sage brush, resulting in cheatgrass dominant systems with states such a C IAG and D IAG. Higher elevation regions, and some valley bottom areas, have the presence of juniper resulting in a C Dual and D Dual states. Sage-grouse avoid regions with areas with juniper due to an instinctive aversion to the vertical structure's junipers provide and the resulted higher predation risk from avian predators (Johnson et al. 2019). Map units with C Dual and D Dual are considered non-habitat (Johnson et al. 2019).

Aside from the potential direct impacts of Site development to sage-grouse such as loss of habitat, impediments to migration, and increased anthropogenic disturbance, landfills can result in elevated densities of ravens (*Corvus corax*) due to additional food sources and roosting locations (Peebles and Conover 2017). Ravens predate on sage-grouse and higher abundance of the species within sage-grouse habitat has been linked with lower sage-grouse reproductive success (Bui et al. 2010, Dinkins et al. 2010, Coates et al. 2020). Raven abundance has been increasing throughout the Great Basin with higher densities associated with more development and agriculture.

The preliminary HQT analysis conducted by ODFW indicated that the development of the Site would result in the loss of 173.3 functional acres of habitat for sage-grouse (Appendix E).

3.6.3 MBTA/BGEPA

Various migratory birds that are protected under the Migratory Bird Treaty Act (MBTA) of 1918 may forage on or nest on the Site. The bald eagle (*Haliaeetus leucocephalus)* is also protected under the

Bald and Golden Eagle Protection Act (BGEPA) of 1940 and is known to occur in the vicinity (USFWS 2023c). Bald eagles prefer large trees for perching and nesting, typically near rivers, large lakes, and other open water (Snyder 1993). Such habitats are not present at the Site and no nests have been observed within two miles of the Site (ORBIC 2023), thus this species was determined to be absent from the Site. The golden eagle (*Aquila chrysaetos)* is also protected under the BGEPA of 1940 and is known to occur in the vicinity (USFWS 2023c). Golden eagles prefer cliffs and steep escarpments in grassland, chapparal, shrubland, and forest for nesting, typically near canyonlands, rimrock terrain, and riverside cliffs and bluffs (Cornell Lab 2023). There are no steep escarpments within the immediate vicinity of the Site and ORBIC records indicate that no nests of either bald eagles or golden eagles are within two miles from the Site.

Other bird species protected by MBTA that were indicated by IPaC to occur within the vicinity of the Site include the following:

- Cassin's Finch (*Carpodacus cassinii*)
- Lewis's woodpecker (*Melanerpes lewis*)
- Long-eared owl (*Asio otus*)
- Olive-sided Flycatcher (*Contopus cooperi*)
- Pinyon jay (*Gymnorhinus cyanocephalus)*
- Sage thrasher (*Oreoscoptes montanus*)

Cassin's finch, Lewis's woodpeckers, and olive-sided flycatcher are generally found in coniferous forests and are unlikely to be on Site. Long-eared owl generally occur in woodland conifer groves but may occasionally use the Site for hunting. Habitat on Site is suitable for sage thrasher and pinyon jay.

Other birds protected by the MBTA that were observed on Site include horned lark (*Eremophila alpestris*), Clark's nutcracker (*Nucifraga columbiana*), and American kestrel (*Falco sparverius*).

3.7 Noxious Weeds

Plant species listed as noxious by the Oregon Department of Agriculture (ODA 2023c) and/or as designated weed by Department of State Lands (DSL) that were observed on the Site in low densities (See Table 2 below).

Table 1. Noxious Weeds That Are Present or Have Potential to Be Present on the Site

Scientific Name	Common Name	ODA List/DSL Designation [a]
Centaurea stroebe	Spotted Knapweed	List B
Taeniatherum canput-medusae	Meduasahead Rye	List B

Note: DSL-designated weed = known problem species.

a List B = a weed of economic importance that is regionally abundant but may have limited distribution in some counties; T-Designated Weed (T) = 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.

4. Regulatory Requirements

4.1 Federal

4.1.1 Waters and Wetlands

Drainages mapped by NWI and observed on Site would not be considered jurisdictional to USACE as they do not have relatively permanent flow (51 FR 41250). No other waters or wetlands were observed on Site and therefore, Site development would not require permitting under Sections 404 and 401 of the Clean Water Act.

4.1.2 Protected Species

Federal and State Listed Species

Federally listed threatened and endangered species or designated critical habitat are not present within the Site; therefore, Site development would not initially require permitting by USFWS under Section 10 or Section 7 of the Endangered Species Act. If sage-grouse are listed as threatened or endangered during planning and construction of the SWMF or during major operational changes once constructed, the County would need to consult with USFWS for compliance under Section 10 or Section 7 of the ESA.

Potential Future Listing: Sage-grouse

Multiple petitions have been submitted to the USFWS to list sage-grouse as threatened under the ESA. In 2010, the USFWS determined that listing sage-grouse under the ESA was warranted but precluded by higher priority listing actions (75 FR 13910). To prevent the necessity for listing, Oregon and other states enacted legislation to address the primary threats of sage-grouse. In Oregon, the Sage-Grouse Conservation Partnership (SageCon) was formed, and they adopted the Sage-Grouse Rules on July 24, 2015 (OAR 660-023-0115). This rule was a fundamental component in Oregon's Sage-grouse Action Plan that was adopted by the Governor through executive Order 15-18 which was submitted to USFWS as evidence that listing of the species was not warranted. On October 2, 2015, the USFWS determined that the listing of the sage-grouse was not warranted at that time (80 FR 59857).

However, since the decision, sage-grouse populations have continued to decline range wide. From 2002 to 2021 range-wide populations have declined 41% (Coates et al. 2023). Oregon sage-grouse has experienced similar declines in populations. From 2002 to 2021 Oregon's sage-grouse population declined by 39% and from 2015 to 2023 the population declined by 20% (ODFW 2023d). To counteract population declines, the BLM in March 2024 announced a Draft Resource Management Plan Amendment to strength sage-grouse protections on public lands. Given the continued population declines of the species, the unknown implications of climate change and spread of invasives on sage-grouse habitat (Creutzburg et al. 2015), and the longevity of SWMF, there is a possibility sage-grouse in Oregon may become listed under the ESA either before the site is permitted and developed or during the long-term operational life of the facility.

Under Section 7 of the ESA, federal agencies must consult with the Services when any action the agency carries out, funds, or authorizes may affect either a species listed as threatened or endangered under the Act, or any critical habitat designated for it. Should sage-grouse become listed under the ESA, a federal nexus to the project, such as compliance with NEPA or the Clean Air Act via the Oregon Title V Air Quality Operating Permit, may trigger compliance with Section 7 of the ESA. If

no federal nexus exists and the project may result in take of sage-grouse, compliance under Section 10 of the ESA may be required. Section 10 of the ESA allows an individual or private citizen to "take" a listed species if they develop a Habitat Conservation Plan (HCP). The County would consult with the USFWS and prepare an HCP requesting issuance of an Incidental Take Permit (ITP) to authorize the incidental take of threatened or endangered species. In the HCP, the County would develop measures to minimize and mitigate for impacts and to monitor and manage sage-grouse and associated habitat. Mitigation measures for compliance with ODFW's Sage-grouse Mitigation Program and Policy for Site development (as described below in Section 4.2.2.2) may be sufficient to mitigate for impacts to the species and habitat. Additional mitigation or minimization measures for the SWMF would be determined during consultation with USFWS.

Bald and Gold Eagle Protection Act

The BGEPA makes it illegal to take or transport any bald eagle or golden eagle except as allowed by a valid permit (50 Code of Federal Regulations [CFR] 22.80). Take includes disturb which is defined as an agitation to bald or golden eagles to a degree that causes, or is likely to cause injury, decrease in productivity, or nest abandonment (50 CFR 22.6). The Site is not within two miles of a golden eagle or bald eagle nest and thus Site development is unlikely to impact these species. Site development would not require permitting under the BGEPA.

Migratory Bird Treaty Act

The MBTA makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird or the parts, nests, or eggs of such bird except under the terms of a valid federal permit from the USFWS. To avoid and minimize effects to migratory birds, initial Site development (vegetation clearing and grubbing) should be conducted during the non-nesting season. The non-nesting season generally extends from August 1 to January 31 and splits into two major timeframes:

- Early Nesting Season: February 1 to April 15. Raptors (owls, eagles, falcons, and hawks), herons, geese, and hummingbirds are early nesters.
- Primary Nesting Season: April 15 to July 31. Songbirds and most other avian species are late nesters.

If vegetation disturbance occurs during the nesting season, the Site should be surveyed for nesting birds by a qualified biologist. If an active nest is found, an exclusion buffer around the nest should be established at an appropriate distance assigned by the biologist. Temporary protection fencing should be installed and maintained around the buffer area until young chicks have fledged to avoid impacts to migratory birds. Once young have fledged, construction may commence in the protected area.

4.2 State and County

4.2.1 Waters and Wetlands

Drainage features present on Site lacked ordinary high water mark features and are likely ephemeral drainages which are not regulated by DSL ((OAR 141-085-0515(3)). No other wetlands or waters are present at the Site; therefore, Oregon's Removal-Fill Law (OAR 196.795-990) is not applicable to Site development.

4.2.2 Protected Species

4.2.2.1 Big Game Range

Mule Deer and elk winter range and essential and limited pronghorn habitat are considered Category 2 habitat by ODFW's Wildlife Habitat Mitigation Policy (OAR 635-415-0000). Category 2 habitat is deemed to be essential for a species, populations, or species assemblage (OAR 635-415-0025). Avoidance of impacts through alternatives to the proposed action are recommended. If impacts are unavoidable, mitigation of impacts would be required through in-kind, in-proximity, habitat mitigation to achieve "no net loss" and a "net benefit" of habitat quantity or quality (OAR 635-415-0025(B)).

Mitigation may involve making on-site habitat improvements or acquiring a parcel of land with those habitats to prevent its development (avoided loss) or improve its habitat (enhancement). Enhancement can include a combination of actions that may include:

- Livestock grazing restrictions
- Weed treatment
- Native revegetation/restoration
- Fire readiness
- Fence removal/fence upgrade

Mitigation Options

Compensatory mitigation to impacts to 309.3 acres of shrub steppe present on Site would be required as the habitat is Category 2 for elk, mule deer, and pronghorn (OAR 635-415-0025). Because impacts to mule deer and elk winter range essential and limited pronghorn habitat spatial overlap, mitigation for each can be stacked into one mitigation project.

Mitigation opportunities include:

- On-site enhancement
- Off-site enhancement

On-site enhancement opportunities are limited given the Site's current ecological state of the shrub steppe present on the property is likely high with intact sage brush and bunch grass communities. Juniper expansion is prevalent throughout the valley and the property and juniper removal would benefit pronghorn, but not mule deer or elk. Thus, the ability to enhance is limited and mitigation may be more focused on avoided loss which could increase the required acreages needed to make mitigation requirements. Avoided loss would need to show that by preventing the development or excessive grazing of the acquired parcel of land would result in habitat function benefits in excess of habitat loss as a result of Site development. An estimated 400 acres of shrub steppe habitat would likely need to be put in a conservation easement to prevent grazing or development. Additionally, property available associated with Roth West could similar be used. The applicability of this approach would need to be determined by further coordination with ODFW.

Off-site enhancement would involve acquiring off-site land or putting land into conservation easement to be conserved and ecologically enhanced. Acquired land or a conservation easement would likely need to be located within mule deer and elk winter range and essential and limited pronghorn habitat and located in-proximity to the Site in order to adequately mitigate for impacts as a result of the project. In addition, mitigation must result in a net benefit (OAR 635-415-0025(B)). Thus, the parcel of land to be acquired or put into a conservation easement must have more than

309 acres of shrub steppe. Current properties available for sale that meet these requirements are listed in Table 2. Main enhancement opportunities within the available properties are livestock grazing restrictions, fence upgrades, and native revegetation/restoration. Enhancement of the landscape would require initial actions and continued maintenance. The cost of operations and maintenance (O&M) of the parcel is based on *Investigations of Wildlife O&M Costs* (NWPCC 2007) which, accounting for inflation, predicts $78.67 per acre per year. Initial enhancement project cost is assumed to cost up to 5 years of O&M due to the initial extensive nature of native revegetation/restoration and/or fence removal and upgrades. O&M cost for 50 years does not include the initial project cost.

Table 2. Properties Available for Mule Deer and Elk Winter Range and Essential and Limited Pronghorn Mitigation

Property Location	Acres	Potential Enhancement Actions	Real Estate Sale Price	Initial Enhancement Project Cost	O&M Cost (50 years)	Total Cost
On-site	400	Livestock grazing restrictions, native revegetation, fence upgrades Avoided loss	N/A	$157,340	$1,416,060	$1,573,400
43.4426°, -120.6324°	153[1]	Livestock grazing restrictions, native revegetation, fence upgrades Avoided loss	$145,000	$60,182	$541,642	$746,825
43.8797°, -120.4826°	159[1]	Livestock grazing restrictions, native revegetation, fence upgrades Avoided loss	$124,300	$62,542	$562,883	$749,726
43.8071°, -120.7927°	7,824[2]	Livestock grazing restrictions, native revegetation, fence upgrades Avoided loss	$408,997[2]	$125,872	$1,132,848	$1,667,717

[1]Properties are likely used by mule deer during winter but are not mapped within mule deer winter range

[2]Property would need to be parceled. Estimates are based upon average cost per acre of the market prices for a 320-acre parcel

This property list is not exhaustive and does not include properties not in proximity to the Site. Not all properties are of sufficient size for full mitigation for impacts to habitat. Acquisition of a combination of properties may be necessary.

Information provided above is an approximation of mitigation requirements for impacts to Category 2 Habitat. Further coordination with ODFW would be required to determine appropriate mitigation options to benefit mule deer, elk, and pronghorn for impacts to their habitat as a result of Site development.

Wildlife Area Combining Zone

The Site is entirely within a Wildlife Area Combining Zone (WA Zone) for Antelope Range and is partially within Deer Winter Range. Uses permitted outright within a WA zone are those permitted outright by the underlying zone (DCC 18.88.030). The Site's underlying zoning is for Exclusive Farm Use and thus Site development must be permitted conditionally per applicable requirements in DCC 18.88.040 and DCC 18.128.120. Information on land use approval process is provided in Roth East Site Development and Permitting Evaluation Technical Memorandum.

There are no mitigation requirements for impacts to WA Zone.

4.2.2.2 Sage-grouse

The SWMF is a large-scale development (>40 acres) which would impact significant sage-grouse habitat and thus is considered a conflicting use (OAR 660-023-0115(7)). Conflicting uses require compliance with the mitigation hierarchy and ODFW's Sage-grouse Mitigation Program and Policy. The development of the Site must show that the overall public benefits outweigh the damage to the significant sage-grouse habitat (DCC 18.89.110). The development of the SWMF at the Site must demonstrate that impacts to sage-grouse habitat are unavoidable and the project was developed to minimize impacts. The extent of direct and indirect impacts on significant sage-grouse habitats must be mitigated for and provide a net conservation benefit to sage-grouse (635-140-0010(e)).

Site development would result in the loss of 173.7 functional acres of sage-grouse habitat. To achieve a net conservation benefit, ODFW requires compensatory mitigation to restore 115% of impacted functional acres. Thus, a mitigation plan would need to be developed to characterize the restoration of 199.3 functional acres of sage-grouse habitat. The mitigation plan would outline how net conservation benefit would be achieved by either:

- Purchasing approved mitigation credits through an in-lieu fee fund or private banker.
- Completing permittee-responsible on- or off-Site mitigation.

Sage-grouse habitats are grouped into three geographically defined locations (service area) wherein mitigation actions must occur within the same service area as the impact occurred in. The Site is within the Central Service Area and mitigation actions must occur within that service area (ODFW 2023b). Any mitigation undertaken must have measures in place to ensure mitigation activities will persist for the life of the original impact (OAR 635-140-0025(4)). Site development will be a permanent impact and thus mitigation must be maintained in perpetuity.

Sage-grouse Mitigation Options

At present, there is no mitigation bank available with approved credits. ODFW is currently reviewing documents for a mitigation bank that could be a future option for mitigation for Site development. The estimated in-lieu fee cost provided by ODFW is $7.6 million. The in-lieu fee cost should be considered as the maximum cost for sage-grouse mitigation. It is likely that mitigation bank credits would be less expensive than in-lieu fee costs. In addition, permittee-responsible mitigation would not be as costly as in-lieu fee and likely not as costly as mitigation bank credits.

Permittee-responsible on-site or off-site would involve improving habitat conditions that would result in an uplift of 199.3 functional acres as quantified by ODFW's HQT. ODFW would run the HQT to quantify the on and/or off-site mitigation plan's functional uplift in functional acres. The mitigation plan must show that it would result in at least 199.3 functional acres. Due to the nuances of the HQT, it is hard to quantify the extent of physical acres of mitigation that would be required for uplift of 199.3 functional acres, i.e., mitigation of one physical acre would not result in one functional acre of uplift.

On-site mitigation would involve improving habitat conditions within the parcel of land on or adjacent to the impact Site, whereas off-site mitigation could involve acquiring a parcel of land and performing mitigation actions or working with private or public landowners on a conservation plan. Common mitigation measures that could result in restoration of sage-grouse habitat include juniper removal, cattle grazing management, reseeding of native forbs and grasses, fence removal, and invasive removal. Among these mitigation measures, juniper removal is a cost effective and practical mitigation measure. Juniper encroachment is noted threat for sage-grouse habitat (Johnson et al. 2019) and within the area (Hagen et al. 2008). For low density juniper areas, junipers could be cut down and the tree left to provide cover. For higher density juniper areas, some trees would likely need to be removed from the area. A combination of measures would likely be required. Management of the land and mitigation plan would need to last as long as the impact (i.e., the SWMF). Thus, the mitigation plan and associated land would need to be managed for at least 100 years.

Approximating from the preliminary HQT results, removal of juniper and establishment of sage brush and perennial grasses within 221.44 to 560.42 acres would result in a functional uplift of 199.3 acres. Variation in acres is due to initial Site conditions of the mitigation area.

Within the Roth East property, there is approximately 500 acres of land that could be enhanced by juniper removal. Juniper encroachment is present along the southern and north portions of the property and removal of tree's would provide functional uplift to sage-grouse habitat. However, on-site mitigation would be limited by its proximity to the SWMF. The SWMF would lower the quality of nearby land for sage-grouse by impediments to migration from the facility and the access road and increased raven density. Roadway impacts can be minimized with flat cut/fill slopes and on-site design features for buildings and other infrastructure. Operational BMPs can also be employed to deter raven roosting and minimize indirect impacts to sage-grouse. Mitigation on-site would likely need to be augmented with off-site mitigation. Further analysis of the Roth East parcel and coordination with ODFW and their HQT would be required to determine the applicability of this on-site mitigation approach.

The adjacent Roth West property has limited potential for sage-grouse mitigation. The majority of the property is largely intact sage brush steppe without the presence of juniper. Some juniper is present within the southern portion of the property that could be removed to provide functional uplift, but this is only a fraction of the property. The area is used lightly during the summer and winter by sage-grouse (Henderson 2019) and the is located within a migratory corridor that connects leks (Jones et al. 2015). The Bradetich Well Area, a portion of the Roth West Property, is in the center of the migratory corridor of sage-grouse between leks and sage-grouse have been observed transiting through the property (S. Payer, Roth Representative). Cattle grazing restrictions on the land could result in some functional uplift by increasing the density of ground cover and perennial grasses and annual forbs. Removal of structures such as fences and structures could also provide uplift by removing impediments to migration. However, functional uplift of Roth West would be limited by its proximity to the development of the SWMF as described above. Mitigation on Roth West would likely need to be augmented with further mitigation. Further analysis of the Roth West parcel and

coordination with ODFW and the HQT would be required to determine the functional uplift potential of this off-site mitigation approach.

Land owned by the County can also be used for off-site mitigation such as juniper removal. The plot of land directly north of Roth East owned by the County (Tax lot 1915000001600) has a low density of perennial grasses and a high density of junipers. Enhancement of the property could result in functional uplift. However, the plot of land is relatively small and would be insufficient to uplift 199.3 functional acres. Functional lift would also be limited by its proximity to the development of the SWMF as described above. Other mitigation options would need to be employed in tandem with this option to fully offset the impacts of Site development.

Table 3 below provides a summary of mitigation options for on and off-site mitigation in addition in in-lieu fee payment to ODFW. Off-site parcel cost was estimated by averaging cost per acre of several properties within area that is within low density or core sage-grouse habitat ($716.27 per acre). The cost of operations and maintenance (O&M) of the parcel is based on Investigations of Wildlife O&M Costs (NWPCC 2007) which, accounting for inflation, predicts $78.67 per-acre per-year. Initial enhancement project cost is assumed to cost up to 5 years of O&M due to the extensive nature of juniper removal and/or native revegetation/restoration. O&M cost for 50 years does not include the initial project cost.

Table 3. Mitigation Plan Cost for Uplift of 199.3 Functional Acres

Mitigation Option	Mitigation Acres	Potential Enhancement Actions	Real Estate Sale Price	Initial Enhancement Project Cost	O&M Cost (50 years)	Total Cost
On-site*	~500	Juniper removal, livestock grazing restrictions, native revegetation/restoration.	N/A	$196,675	$1,770,057	$1,966,750
Parcel Acquisition and Mitigation	221–560	Juniper removal, livestock grazing restrictions, native revegetation/restoration	$158,610–$401,433	$86,930–$220,276	$782,373–$1,982,484	$1,029,645–$2,605,964
Conservation Agreement with Landowner	221–560	Juniper removal	N/A	$86,930–$220,276	$782,373–$1,982,484	$871,034–$2,204,530
In-Lieu Fee	199.3 functional acres	Payment to ODFW	N/A	N/A	N/A	$7,600,000

*Mitigation will likely be insufficient to uplift 199.3 functional acres of sage-grouse habitat and will need additional action.

A mitigation plan would likely include multiple mitigation measures to offset impacts to sage-grouse habitat. A combination of mitigation bank credit (if available during permitting), in-lieu fee, and permittee responsible on- or off-site mitigation can be applied in a mitigation plan to uplift 199.3 functional acres of sage-grouse habitat. Further Site assessment and coordination with ODFW would be required to determine appropriate mitigation options to benefit sage-grouse habitat as a result of Site development. It is recommended that the formation of the mitigation plan should be coordinated

with stakeholders such as the Oregon Natural Desert Association (ONDA). In addition, the Oregon Land Trust has a conservation project in Brothers, Oregon, and could be collaborative partners in a sage-grouse mitigation project.

Sage-Grouse Area Combining Zone

The SWMF is a large-scale development which would impact a sage-grouse area combining zone and thus is considered a conflicting use (DCC 18.89.060). Deschutes County may consider a large-scale development within significant-sage-grouse habitat if the project fits within disturbance thresholds and a mitigation hierarchy. Disturbance thresholds are for Priority Areas for Conservation (PACS; i.e., core area habitat). Direct impacts to core area habitat cannot exceed 1.0% of the total core area in any ten-year period and in total cannot exceed 3.0% (DCC 18.89.080, OAR 660-023-0115). Site development will not result in direct impacts to core area habitat and thus disturbance thresholds do not apply. The mitigation hierarchy requires Site development to show avoidance and minimization measures in addition to compensatory mitigation (DCC 18.89.080/090). Compensatory mitigation must comply with OAR 635-140 and must fully offset the direct and indirect impacts of Site development. Deschutes County consideration for approval of the conflicting use is conditional on ODFW recommendations for minimization techniques and compensatory mitigation to resolve threats to significant sage-grouse habitat (DCC 18.89.080(B)). Thus, Deschutes County approval of Site development is contingent upon ODFW approval of mitigation plan as summarized above.

5. Summary

No waters of the United States or of the state were determined to be on-site. The development of the SWMF at the Site would require employing best management practices during construction and operations to avoid impacts to MBTA protected species and to mitigate for impacts to mule deer and elk winter range, essential and limited pronghorn habitat, and significant sage-grouse habitat (Table 4).

Table 4. Summary of Compensatory Mitigation for Site Development

Habitat	Impacted Habitat (acres)	Quality of Impacted Habitat	Mitigation Amount	Mitigation Options	Estimated Cost Range
Mule deer and elk winter range and essential and limited pronghorn habitat	309.3 Shrub steppe	Moderate/low for mule deer and elk High for pronghorn	Net benefit of habitat quantity or quality	On-site and off-site acquisition and enhancement of a parcel of land	$1,075,976–$1,236,357
Significant sage-grouse habitat	173.3	High to Moderate	199.3 Functional Acres = 221–560 acres of mitigation	On-site mitigation, acquisition and enhancement of land, conservation agreement with landowner, and in-lieu fee payment.	$871,034–$7,600,000
				Total:	**$1,947,010 – $8,836,357**

Table 5 below provides the estimated initial cost and O&M cost for mitigation actions for potential impacts of Site development. The estimate is conservative and makes several assumptions:

1) Mitigation options aside from in-lieu fee payment can be employed to offset impacts.
2) Land value prices will not change considerably.
3) On-site mitigation will not be sufficient and other mitigation options will need to be employed in addition to on-site enhancement.

Table 5. Estimated Cost for Natural Resource Mitigation for Site Development

Initial Cost	O&M
$1,500,000	$2,500,000

These values are approximations of costs for Site development and should only be used for Site selection comparisons for the SWMF. Further development of a mitigation plan and coordination with ODFW would be required to determine the cost of natural resource mitigation for the development of the SWMF at Roth East.

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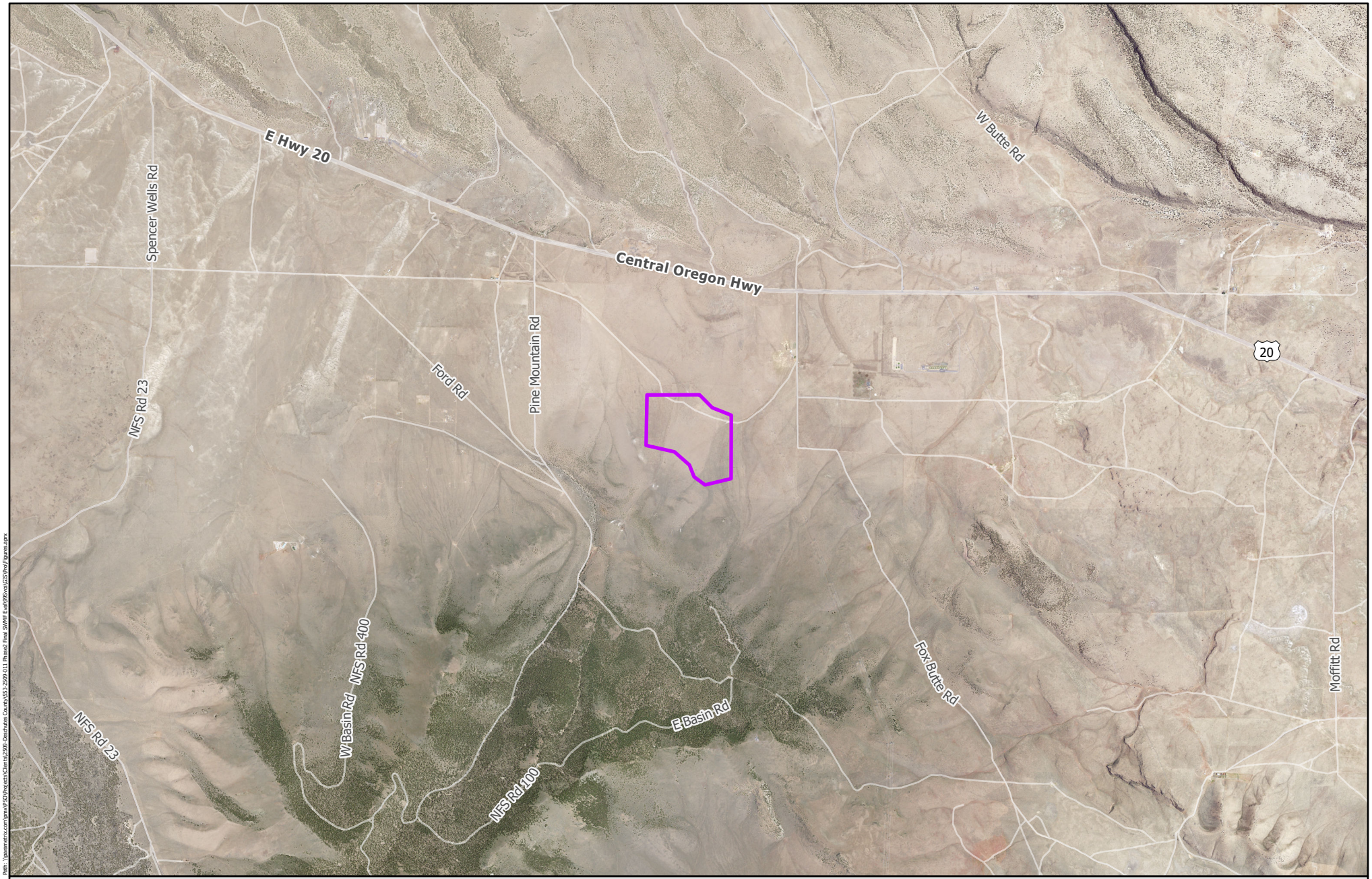
Appendix A

Figures



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Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Roth East Site Boundary

Figure 1 - Vicinity Map
Roth East
Deschutes SWMF Siting

Parametrix

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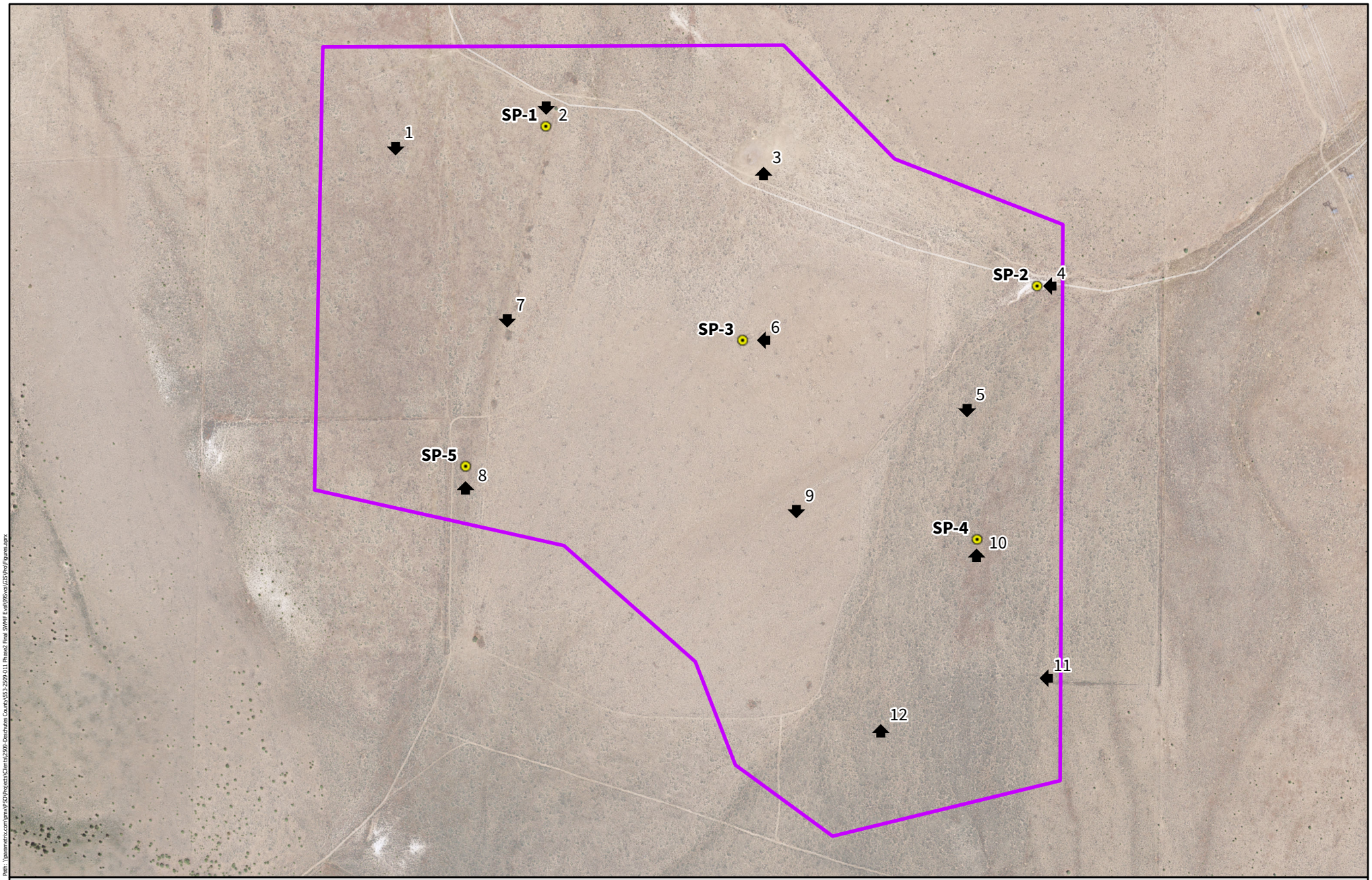
Feet

Deschutes Co, OR



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Roth East Site Boundary
Photo Points
Sample Plots
Upland

Figure 2 - Study Area
Roth East
Deschutes SWMF Siting

Parametrix

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Feet

Deschutes Co, OR

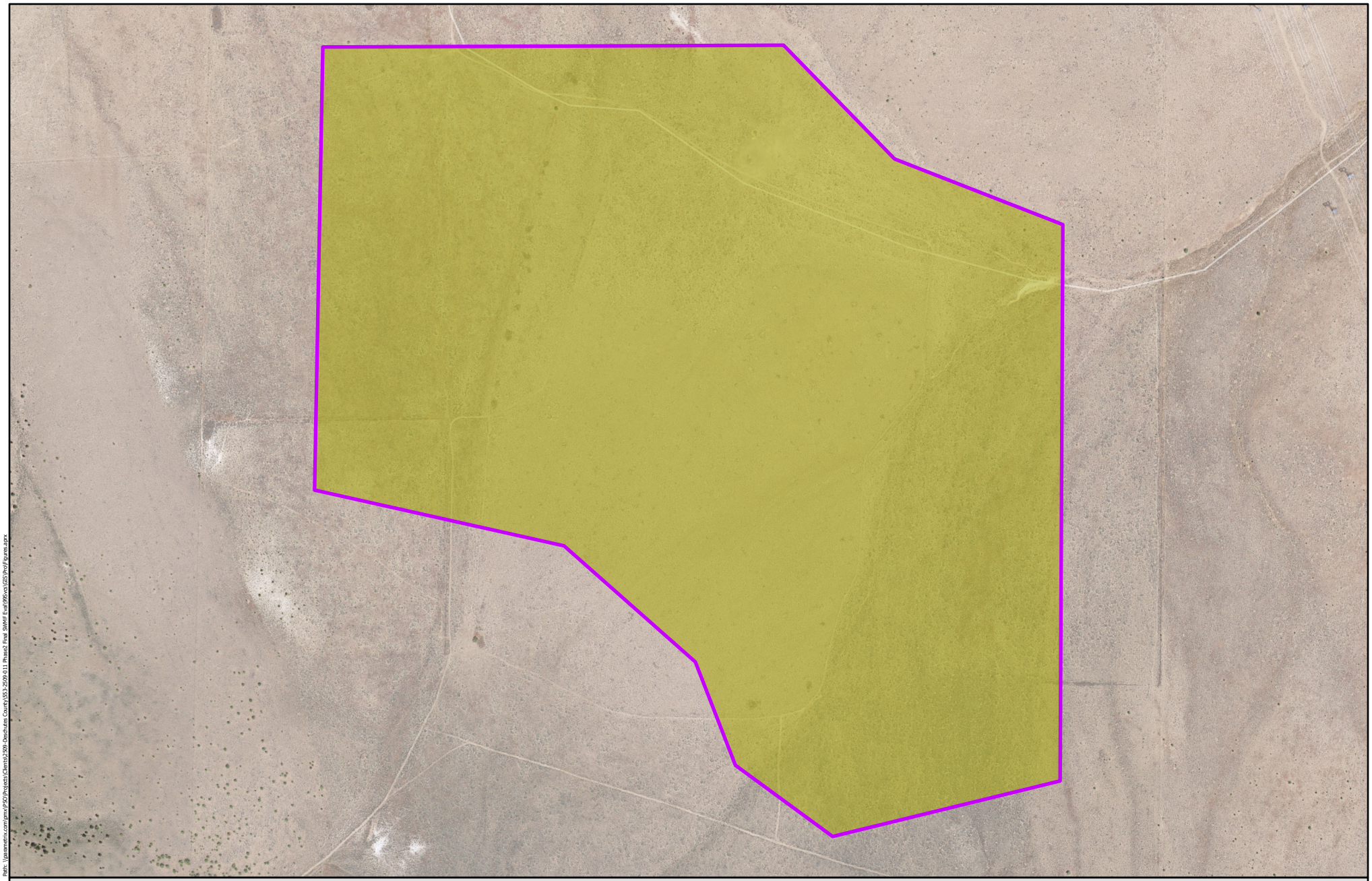

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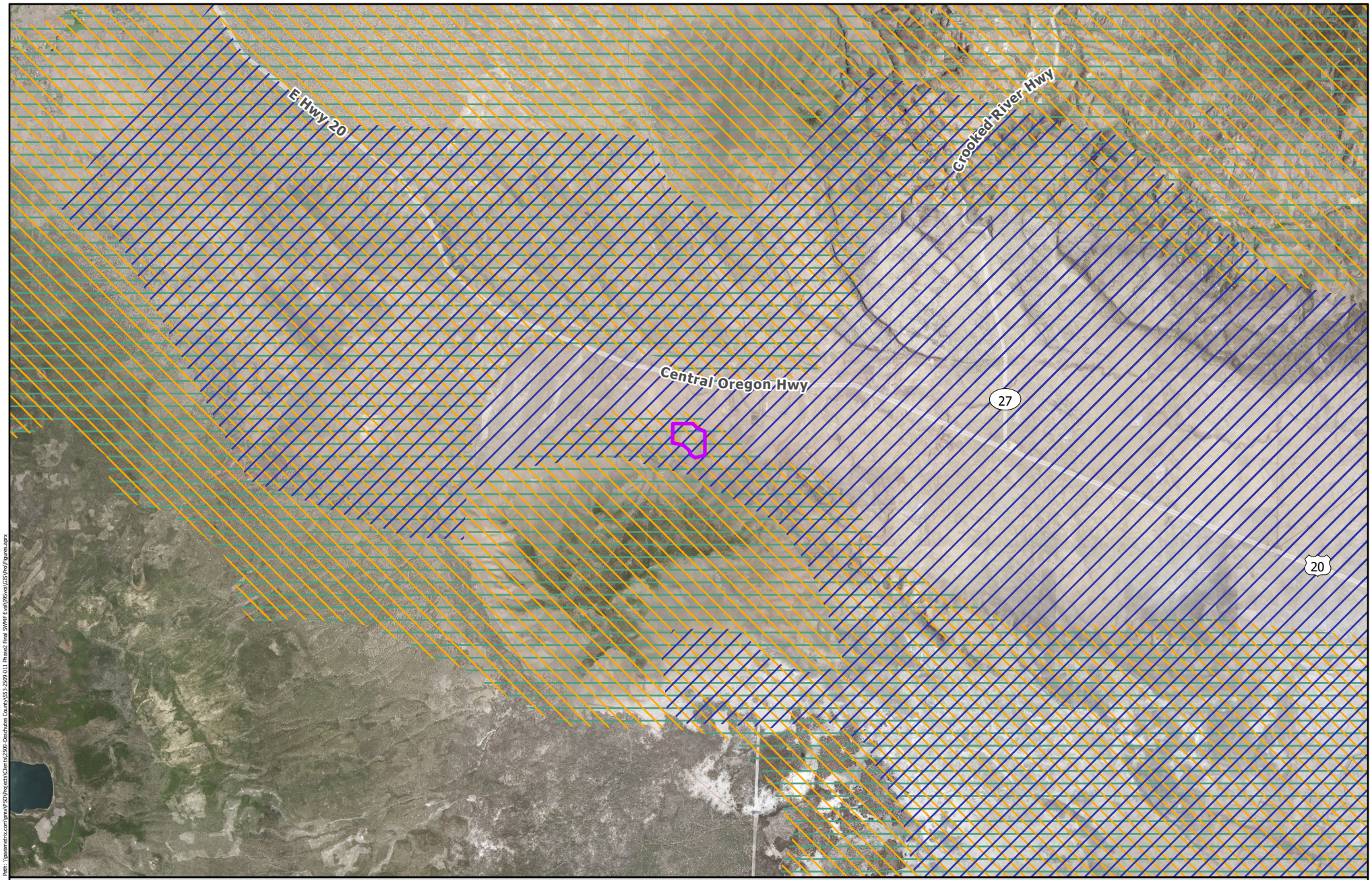
Figure 3 - Site Upland Habitat
Roth East
Deschutes SWMF Siting

Deschutes Co, OR



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Date: 10/25/2023
Sources: Parametrix, ESRI, Oregon Department Fish and Wildlife Winter Range for Eastern Oregon (2012), Oregon Essential and Limited Pronghorn Habitat (2021)
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Roth East Site Boundary
Pronghorn Essential and Limited Habitat
Elk Winter Range
Deer Winter Range

Figure 4 - Big Game Protected Habitat
Roth East
Deschutes SWMF Siting

Parametrix

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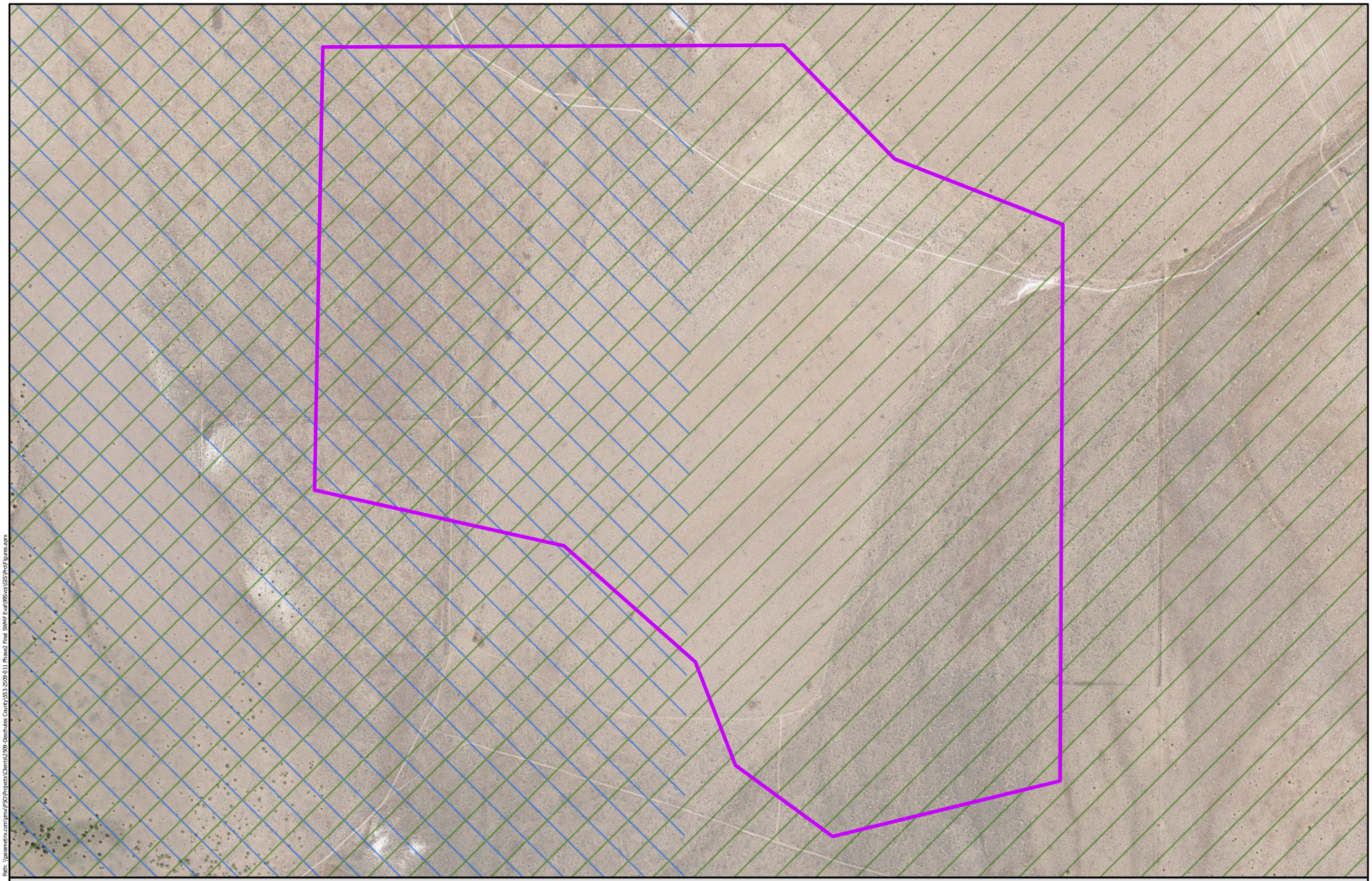
Feet

Deschutes Co, OR



Date: 10/25/2023
Sources: Parametrix, ESRI, ODFW, Deschutes County Wildlife Combining Zones
PCS: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Parametrix

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Feet

Figure 5 - Wildlife Combining Zone
Roth East
Deschutes SWMF Siting

Deschutes Co, OR

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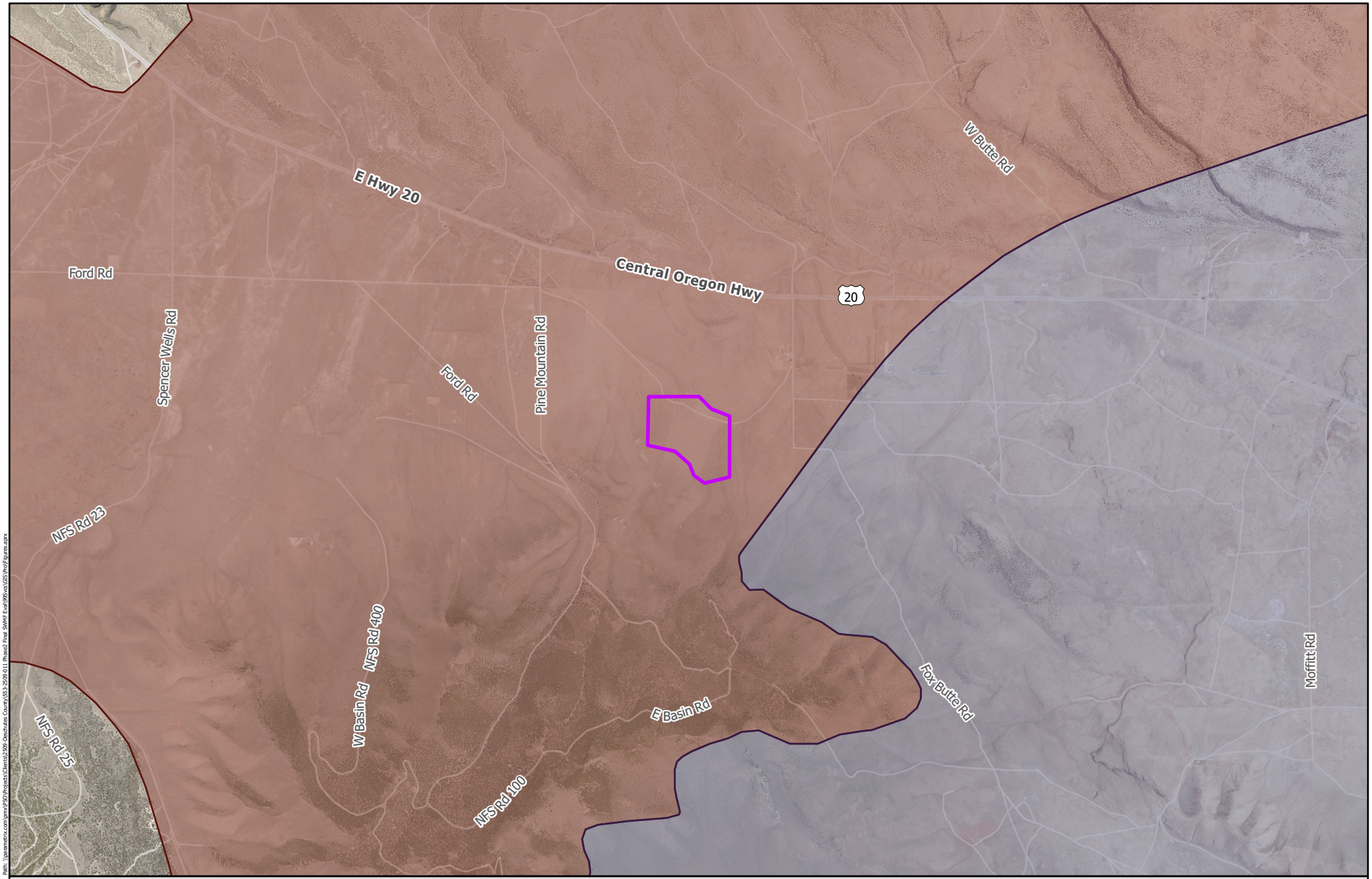

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Date: 10/25/2023
Sources: Parametrix, ESRI, ODFW, Oregon Explorer SageCon Landscape Planning Tool (2023)
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Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Parametrix

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- Roth East Site Boundary
- Draft 2023 Core Sage-Grouse Habitat
- Draft 2023 Low Density Sage-Grouse Habitat

Figure 6 - Significant Sage Grouse Habitat
Roth East
Deschutes SWMF Siting

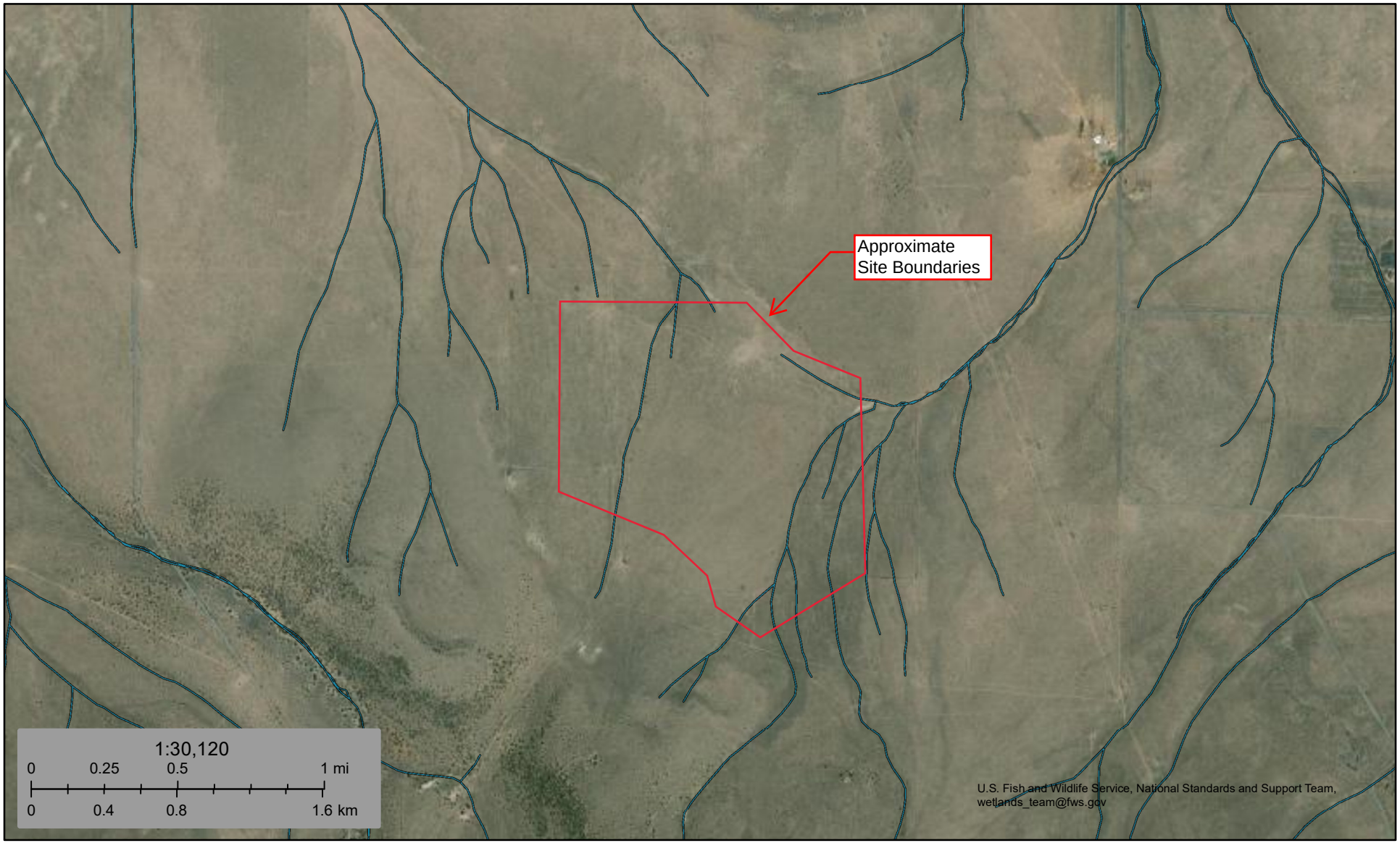
Deschutes Co, OR

Appendix B

Background Information

U.S. Fish and Wildlife Service
National Wetlands Inventory

Roth East



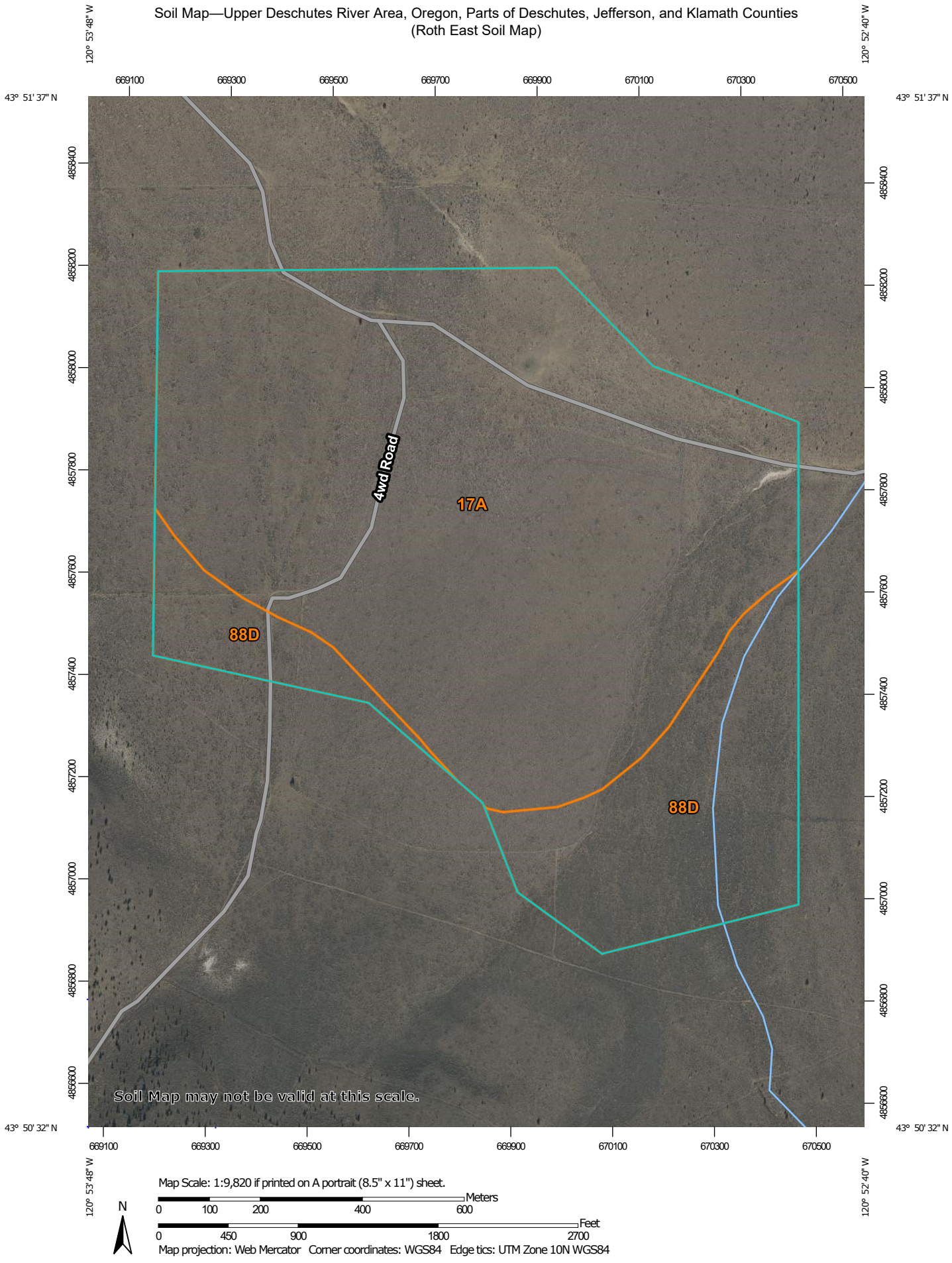
September 22, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Soil Map—Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties
(Roth East Soil Map)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties
Survey Area Data: Version 20, Sep 14, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

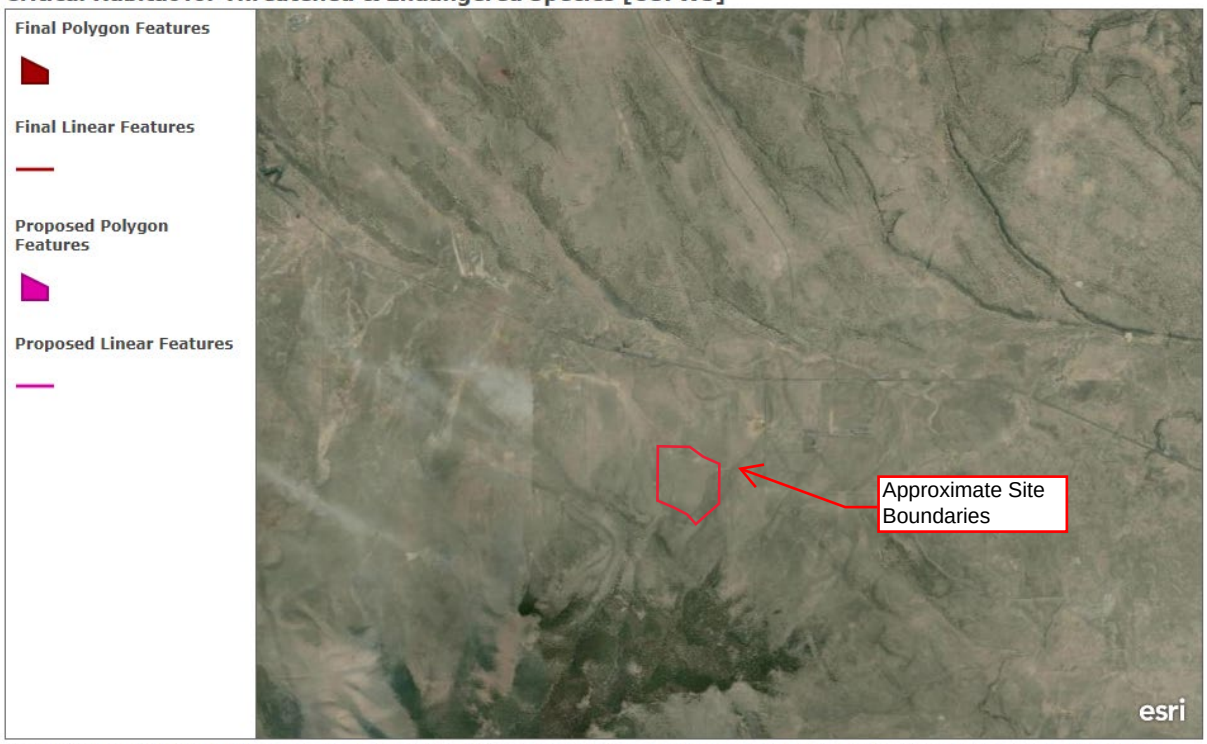
Date(s) aerial images were photographed: Nov 4, 2019—Nov 8, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
17A	Blayden loamy sand, 0 to 3 percent slopes	235.3	76.1%
88D	Menbo stony loam, 5 to 25 percent slopes	74.1	23.9%
Totals for Area of Interest		**309.3**	**100.0%**

Critical Habitat for Threatened & Endangered Species [USFWS]



A specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Earthstar Geographics

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

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

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

Location

Deschutes County, Oregon

Local office

Oregon Fish And Wildlife Office

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

2600 Southeast 98th Avenue, Suite 100

Portland, OR 97266-1398

Endangered species

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

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

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

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

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

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

Mammals

NAME	STATUS
Gray Wolf Canis lupus There is **final** critical habitat for this species. https://ecos.fws.gov/ecp/species/4488	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

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

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list,click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey

effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

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

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

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

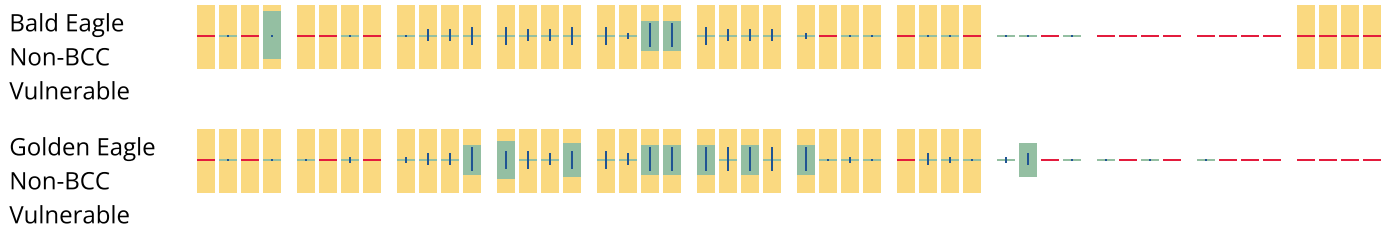
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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

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

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

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

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Sage Thrasher Oreoscoptes montanus — Breeds Apr 15 to Aug 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9433

Probability of Presence Summary

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

understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

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

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

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

Breeding Season (▪)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

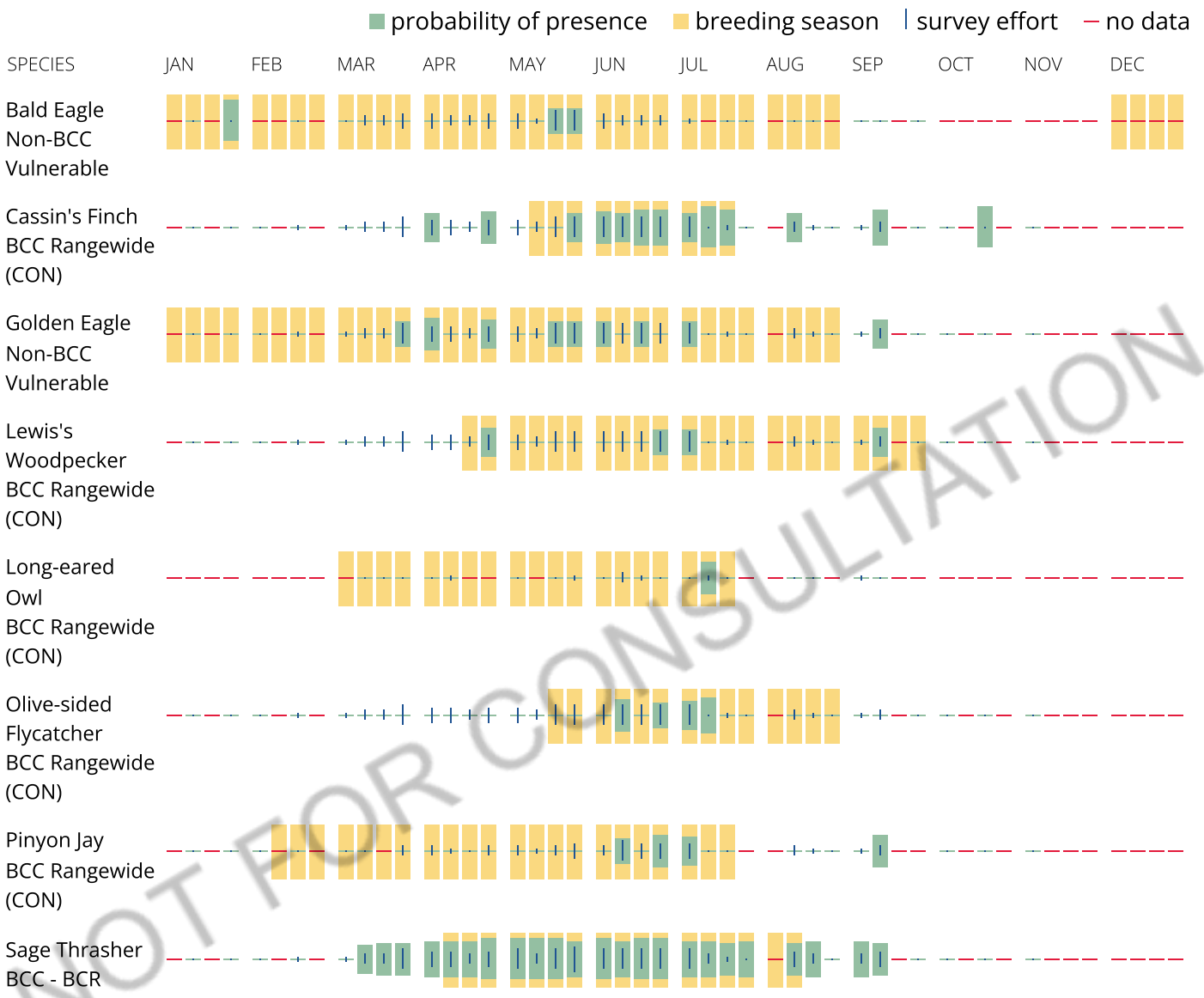
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

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

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

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

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

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

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

- R4SBJ
- R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

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

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

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

Data exclusions

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

Data precautions

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

NRCS method - Rainfall Documentation Worksheet Hydrology Tools for Wetland Determination
NRCS Engineering Field Handbook Chapter 19

Date	9/25/2023	**Landowner/Project**	Roth East
Weather Station	Bend 7NE	**State**	OR
County	Deschutes	**Growing Season**	Yes
Photo/obs Date	25-Aug	**Soil Name**	

shaded cells are locked or calculated

Long-term rainfall statistics (from WETS table or State Climatology Office)

	Month	30% chance <	30% chance >	Precip	Condition Dry, Wet, Normal	Condition Value	Month Weight Value	Product of Previous 2 Columns
1st Prior Month*	September	0.13	0.36	1.08	W	3	3	9
2nd Prior Month*	August	0.15	0.45	0.20	N	2	2	4
3rd Prior Month*	July	0.13	0.41	0	D	1	1	1
							Sum	**14**

*compared to photo/observation date

Note: If sum is	
6 - 9	prior period has been drier than normal
10 - 14	prior period has been normal
15 - 18	prior period has been wetter than normal

Condition value:
Dry =1
Normal =2
Wet =3

Conclusions: **prior period has been normal**

14 Days prior to site visit			Observed			WETS		
Days Prior to Investigation	**Date**	**Precip (in.)**	**Period**	**Days / month**	**Observed Total**	**Range**		**Observed - WETS**
1	9/24/2023	0.14	October 2022	31	0.22	0.36	0.80	Below
2	9/23/2023	0.00	November 2022	30	0.3	0.45	1.19	Below
3	9/22/2023	0.05	December 2022	31	1.15	0.44	1.35	Within
4	9/21/2023	0.22	January 2023	31	0.12	0.46	1.20	Below
5	9/20/2023	0.00	February 2023	28	0.08	0.28	0.88	Below
6	9/19/2023	0.00	March 2023	31	0.68	0.27	0.59	Above
7	9/18/2023	0.00	April 2023	30	0.09	0.41	0.92	Below
8	9/17/2023	0.00	May 2023	31	1.81	0.5	1.26	Above
9	9/16/2023	0.00	June 2023	30	0.05	0.38	0.96	Below
10	9/15/2023	0.00	July 2023	31	0	0.13	0.41	Below
11	9/14/2023	0.00	August 2023	31	0.2	0.15	0.45	Within
12	9/13/2023	0.00	September 1-25, 2023	30	1.08	0.13	0.36	Above
13	9/12/2023	0.00	7 Days Prior	31	0.41	0.04	0.10	Above
14	9/11/2023	0.00	14 Days prior	31	0.41	0.07	0.20	Above
	SUM	0.41	**2023 Water Year Total**		**5.78**	**3.96**	**10.37**	Within
Field Investigation	8/15/2022		**Key:**	**Above**	**Within**	**Below**		

Appendix C

Representative Photos

Photo Gallery

Job Name: Roth East Natural Resource Assessment
Job Number/Phase (Task) Mo/Yr: 553-2509-011/ 0.5 PMX Roth East Site Evaluation 11-23

Photo No. 1. Sage brush shrub steppe.

Photo No. 2. Broad vegetated gully (SP-1).

Photo No. 3. Small patch of grassland.

Photo No. 4. Vegetated gully (SP-2).

Photo No. 5. Sage brush shrub steppe.

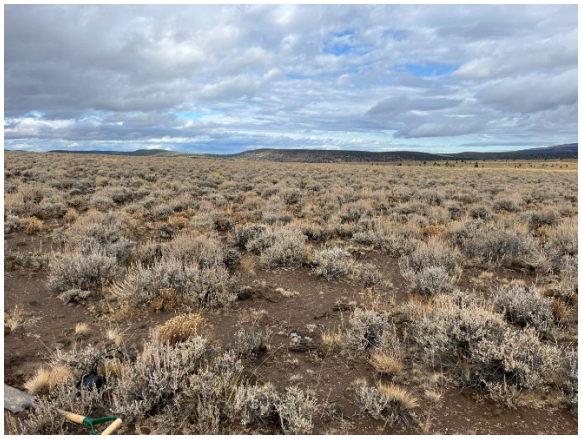


Photo No. 6. Sage brush shrub steppe (SP-3).

Photo No. 7. Rock pile adjacent to broad vegetated gully.

Photo No. 8. Broad vegetated gully (SP-5).

Photo No. 9. Sage brush shrub steppe.

Photo No. 10. Sage brush shrub steppe (SP-4).

Photo No. 11. Sage brush shrub steppe.

Photo No. 12. Sage brush shrub steppe.

Appendix D

Wetland Determination Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Roth East | City/County: Deschutes County | Sampling Date: 9/26/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-1**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 20S15E11NENE

Landform (hillslope, terrace, etc.): Gully | Local relief (concave, convex, none): concave | Slope (%): 3-5%

Subregion (LRR): (D) Interior Deserts | Lat: 43.856233 | Long: -120.890353 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Blayden loamy sand, 0-3% slopes - 17A - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:
According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.41" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:
Plot is in a vegetated gully.

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1.				
2.				
3.				
4.				
		0%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.	*Ericameria nauseosa*	30%	Yes	NOL
2.	*Artemisia tridentata*	5%	No	NOL
3.				
4.				
5.				
		35%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1.	*Agropyron cristatum*	50%	Yes	NOL
2.	*Alyssum desertorum*	7%	No	NOL
3.	*Festuca idahoensis*	5%	No	FACU
4.	*Bromus tectorum*	1%	No	NOL
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		63%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 37% | % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ____ Dominance Test is >50%
- ____ Prevalence Index is ≤3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ **No X**

Remarks:

SOIL

Sampling Point: **SP-1**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-8	10YR 3/2	100					Sa	
8+								Large angular
								rocks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	___
Water Table Present?	Yes ___	No X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Roth East | City/County: Deschutes County | Sampling Date: 9/26/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-2**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 20S15E12SENW

Landform (hillslope, terrace, etc.): Gully | Local relief (concave, convex, none): concave | Slope (%): <3%

Subregion (LRR): (D) Interior Deserts | Lat: 43.853826 | Long: -120.879949 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Blayden loamy sand, 0-3% slopes - 17A - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.41" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1.				
2.				
3.				
4.				
		0%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.	*Ericameria nauseosa*	30%	Yes	NOL
2.	*Artemisia tridentata*	1%	No	NOL
3.				
4.				
5.				
		31%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1.	*Festuca idahoensis*	10%	Yes	FACU
2.	*Bromus tectorum*	5%	Yes	NOL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		15%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 85% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ **No X**

Remarks:

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-13	10YR 3/2	100					Sa	
13+								Bedrock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Bedrock

Depth (inches): 13

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	___
Water Table Present?	Yes ___	No X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Roth East | City/County: Deschutes County | Sampling Date: 9/26/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-3**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 20S15E12SWNW

Landform (hillslope, terrace, etc.): Plains | Local relief (concave, convex, none): none | Slope (%): 3-5%

Subregion (LRR): (D) Interior Deserts | Lat: 43.852973 | Long: -120.886176 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Blayden loamy sand, 0-3% slopes - 17A - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.41" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1.				
2.				
3.				
4.				
		0%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.	*Artemisia tridentata*	60%	Yes	NOL
2.	*Ericameria nauseosa*	9%	No	NOL
3.				
4.				
5.				
		69%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1.	*Festuca idahoensis*	7%	Yes	FACU
2.	*Elymus elymoides*	3%	Yes	FACU
3.	*Lupinus species*	1%	No	FAC*
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		11%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 89% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ **No X**

Remarks:

SOIL

Sampling Point: **SP-3**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-6	10YR 3/2	100					Sa	Angular rock
								inclusions
6+								Cemented material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Cemeneted materials

Depth (inches): 6

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	___
Water Table Present?	Yes ___	No X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Roth East | City/County: Deschutes County | Sampling Date: 9/26/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-4**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 20S15E12NESW

Landform (hillslope, terrace, etc.): Plains | Local relief (concave, convex, none): none | Slope (%): <3%

Subregion (LRR): (D) Interior Deserts | Lat: 43.849943 | Long: -120.881201 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Menbo stony loam, 5-25% slopes - 88D - No Rating | NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.41" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1.				
2.				
3.				
4.				
		0%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.	*Ericameria nauseosa*	65%	Yes	NOL
2.	*Artemisia tridentata*	2%	No	NOL
3.				
4.				
5.				
		67%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1.	*Agropyron cristatum*	45%	Yes	NOL
2.	*Bromus tectorum*	35%	Yes	NOL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		80%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 20% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ **No X**

Remarks:

SOIL

Sampling Point: **SP-4**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-16	10YR 3/2	100					Sa	Angular gravel
								inclusions

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- _____ 1 cm Muck (A9) (**LRR C**)
- _____ 2 cm Muck (A10) (**LRR B**)
- _____ Reduced Vertic (F18)
- _____ Red Parent Material (TF2)
- _____ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Marks (B1) (**Riverine**)
- _____ Sediment Deposits (B2) (**Riverine**)
- _____ Drift Deposits (B3) (**Riverine**)
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches):	_____
Water Table Present?	Yes _____	No X	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches):	_____

Wetland Hydrology Present? **Yes** _____ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Roth East | City/County: Deschutes County | Sampling Date: 9/26/2023

Applicant/Owner: Deschutes County | State: OR | Sampling Point: **SP-5**

Investigator(s): Colton Kyro, Chloe Kott | Section, Township, Range: 20S15E11NESE

Landform (hillslope, terrace, etc.): Gully | Local relief (concave, convex, none): concave | Slope (%): <3%

Subregion (LRR): (D) Interior Deserts | Lat: 43.851025 | Long: -120.892017 | Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Menbo stony loam, 5-25% slopes - 88D - No Rating | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? Yes ____ No **X**

Precipitation prior to fieldwork:

According to the Bend 7NE weather station, 0.12" of precipitation was received on the day of fieldwork and 0.41" during the two weeks prior. Precipitation was within the normal range for the three months prior to the site visit.

Remarks:

Within a broad vegetated gully.

VEGETATION

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size: 30')	% Cover	Species?	Status
1.				
2.				
3.				
4.				
		0%	= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10')			
1.	*Ericameria nauseosa*	30%	Yes	NOL
2.	*Artemisia tridentata*	10%	Yes	NOL
3.				
4.				
5.				
		40%	= Total Cover	
Herb Stratum	(Plot size: 5')			
1.	*Agropyron cristatum*	45%	Yes	NOL
2.	*Centaurea stoebe*	10%	No	NOL
3.	*Eriogonum ovalifolium*	5%	No	FACU
4.	*Festuca idahoensis*	3%	No	FACU
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		63%	= Total Cover	
Woody Vine Stratum	(Plot size: 10')			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 37% % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL

Sampling Point: **SP-5**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	[3]Texture	Remarks
0-6	10YR 3/2	100					Sa	
6+								Large angular
								gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- _____ 1 cm Muck (A9) (**LRR C**)
- _____ 2 cm Muck (A10) (**LRR B**)
- _____ Reduced Vertic (F18)
- _____ Red Parent Material (TF2)
- _____ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Marks (B1) (**Riverine**)
- _____ Sediment Deposits (B2) (**Riverine**)
- _____ Drift Deposits (B3) (**Riverine**)
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches):	_____
Water Table Present?	Yes _____	No X	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches):	_____

Wetland Hydrology Present? **Yes** _____ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix E

Preliminary Habitat Quantification Tool Results

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

SITE INFORMATION

Site Name	Roth East Landfill PRELIM
Location	Deschutes County
Description	Proposed Solid Waste Landfill in Deschutes County

DATA ENTRY: HQT ADJUSTMENT FACTORS

Minimization reductions		*Applies to development [debit] projects only. Default value is **0**.*
Legal protection multiplier	5%	*Applies to credit generation projects only. Default value is **5%**.*

HQT PROJECT DEBIT/CREDIT VALUES

UPLAND Habitat	
HQT Upland Debit(-) or Credit(+) Acres	**-199.3**

MESIC Habitat	
HQT Mesic Debit(-) or Credit(+) Acres	**0.0**

UPLAND CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

UPLAND Map Unit Data Summary

16 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	313.7	55.7	0.0	-55.7						
Indirect impacts	24631.5	3103.0	2985.4	-117.6						
TOTAL	**24945.2**	**3158.7**	**2985.4**	**-173.3**	**0.38**	**0.37**	**-0.01**	**0.186**	**0.163**	**-0.022**

UPLAND Credit Adjustments *all values in units of functional acres*

Raw upland habitat credit value	**-173.3**	Credit value after minimization	**-173.3**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**-26.0**
		HQT Upland Debit(-) or Credit(+) Acres	**-199.3**

MESIC CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

MESIC Map Unit Data Summary

0 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	0.0	0.0	0.0	0.0						
Indirect impacts	0.0	0.0	0.0	0.0						
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**						

MESIC Credit Adjustments *all values in units of functional acres*

Raw mesic habitat credit value	**0.0**	Credit value after minimization	**0.0**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**0.0**
		HQT Mesic Debit(-) or Credit(+) Acres	**0.0**

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

Data Entry

Calculated Cells

Management Designations Index 0.592

Enter the MDI score for the full project analysis area

Site Name: Roth East Landfill PRELIM

Location: Deschutes County

RAW DEBIT(-) OR CREDIT(+) ACRES

Upland -173.3

Mesic 0.0

DATA ENTRY								BASELINE HABITAT FUNCTION			HABITAT MODIFICATION								FUNCTIONAL ACRES		
				Ecological State		Development Impacts					Ecological State			Development Impacts							
Map Unit ID	**Acres**	Mesic (1=yes, 0=no)	Habitat Type	Pre-Project Ecological State	Post-Project Ecological State	Pre-Project Development Score	Post-Project Development Score	Pre-Project Ecological State Score	Pre-Project Development Score	**Baseline Habitat Function Subscore**	Pre-Project Ecological State Score	Post-Project Ecological State Score	**Change** in Ecological State Score	Pre-Project Development Score	Post-Project Development Score	**Change** in Development Score	**Pre-Project Habitat Modification Subscore**	**Post-Project Site Habitat Modification Subscore**	Pre-Project Functional Acres	Post-Project Functional Acres	**Debit (-) or Credit (+) Acres**
EXAMPLE	***80.0***	*0*	*Upland*	*B*	*B*	*0.700*	*0.500*	*0.80*	*0.700*	*0.750*	*0.80*	*0.80*	*0.00*	*0.700*	*0.500*	*-0.200*	*0.750*	*0.650*	*45.00*	*39.00*	***-6.00***
01	**6019.0**		Upland	E-Juniper	E-Juniper	0.168	0.168	0.10	0.168	0.287	0.10	0.10	0.00	0.168	0.168	0.000	0.134	0.134	231.16	231.03	**-0.13**
02	**313.7**		Upland	AC	Developed	0.127	0.030	0.65	0.127	0.457	0.65	0.00	-0.65	0.127	0.030	-0.098	0.389	0.000	55.66	0.00	**-55.66**
03	**2242.5**		Upland	Nonhabitat	Nonhabitat	0.643	0.580	0.00	0.643	0.412	0.00	0.00	0.00	0.643	0.580	-0.062	0.000	0.000	0.00	0.00	0.00
04	**1944.5**		Upland	E-Juniper	E-Juniper	0.441	0.299	0.10	0.441	0.378	0.10	0.10	0.00	0.441	0.299	-0.143	0.271	0.199	198.92	146.45	**-52.47**
05	**324.4**		Upland	E-Juniper	E-Juniper	0.641	0.641	0.10	0.641	0.444	0.10	0.10	0.00	0.641	0.641	0.000	0.370	0.370	53.39	53.39	0.00
06	**876.4**		Upland	A	A	0.496	0.465	1.00	0.496	0.696	1.00	1.00	0.00	0.496	0.465	-0.032	0.748	0.732	456.48	446.83	**-9.66**
07	**899.1**		Upland	C	C	0.203	0.168	0.30	0.203	0.365	0.30	0.30	0.00	0.203	0.168	-0.035	0.252	0.234	82.59	76.82	**-5.77**
08	**1985.6**		Upland	AC	AC	0.058	0.047	0.65	0.058	0.433	0.65	0.65	0.00	0.058	0.047	-0.011	0.354	0.348	304.73	299.82	**-4.91**
09	**1411.8**		Upland	C	C	0.005	0.005	0.30	0.005	0.299	0.30	0.30	0.00	0.005	0.005	0.000	0.152	0.152	64.26	64.26	**0.00**
10	**501.6**		Upland	A	A	0.251	0.085	1.00	0.251	0.614	1.00	1.00	0.00	0.251	0.085	-0.165	0.625	0.543	192.69	167.21	**-25.48**
11	**2790.8**		Upland	AC	AC	0.345	0.324	0.65	0.345	0.529	0.65	0.65	0.00	0.345	0.324	-0.021	0.497	0.487	734.40	719.00	**-15.40**
12	**4399.2**		Upland	C	C	0.090	0.088	0.30	0.090	0.328	0.30	0.30	0.00	0.090	0.088	-0.002	0.195	0.194	281.34	279.60	**-1.74**
13	**1729.9**		Upland	AC	AC	0.015	0.009	0.65	0.015	0.419	0.65	0.65	0.00	0.015	0.009	-0.006	0.332	0.330	240.94	238.88	**-2.06**
14	**485.3**		Upland	AC	AC	0.241	0.241	0.65	0.241	0.494	0.65	0.65	0.00	0.241	0.241	0.000	0.445	0.445	106.86	106.86	0.00
15	**825.2**		Upland	AC	AC	0.157	0.157	0.65	0.157	0.466	0.65	0.65	0.00	0.157	0.157	0.000	0.403	0.403	155.25	155.25	0.00
16	**438.7**		Upland	Developed	Developed	0.041	0.035	0.00	0.041	0.211	0.00	0.00	0.00	0.041	0.035	-0.006	0.000	0.000	0.00	0.00	0.00