APPENDIX L: HABITAT MITIGATION PLAN (NEW)

Draft Habitat Mitigation Plan

Horse Heaven Wind Farm

Benton County, Washington

Prepared for:
Horse Heaven Wind Farm, LLC

Prepared by:

TETRA TECH

19803 North Creek Parkway
Bothell, WA 98011

Submitted February 2021
Revised February 2022

TABLE OF CONTENTS

1 Introduction ... 1
2 Regulations and Guidelines ... 1
2.1 EFSEC ... 2
2.2 Benton County Critical Areas Ordinance ... 2
2.3 SEPA ... 3
2.4 WDFW Wind Guidelines ... 3
2.5 WDFW M-5002 Policy ... 4
3 Agency Consultation History ... 5
4 Habitat Mapping ... 7
5 Project Impacts ... 9
5.1 Landscape-Level Impacts ... 9
5.2 Habitat Impacts ... 10
5.3 Federal or State Listed Species Impacts ... 12
5.3.1 Ferruginous Hawk ... 12
5.3.2 Townsend's Ground Squirrel ... 13
6 Scientific Basis ... 13
7 Mitigation Measures ... 14
7.1 Avoidance and Minimization ... 14
7.2 Ferruginous Hawk Avoidance and Minimization Measures ... 16
7.3 Restoration ... 17
7.4 Compensatory Mitigation ... 17
7.4.1 Habitat Mitigation Calculation ... 17
7.4.2 Mitigation Siting Criteria ... 18
7.4.3 Mitigation Options ... 19
7.4.4 Implementation Schedule ... 21
8 Monitoring and Reporting ... 21
9 Success Criteria ... 22
10 Washington Administrative Code Compliance ... 23
11 References ... 23

LIST OF TABLES

Table 1. Summary of Agency Consultation History 5
Table 2. Project Habitat Type and Subtype Crosswalk with WDFW Habitat Type and Classification 8
Table 3. Estimated Impacts on Habitat Types from Construction and Operation of the Project 11
Table 4. Estimated Project Impacts on Habitat Subtypes and Associated Mitigation Need 17
Table 5. Washington Administrative Code 463-60-332(3) Requirements Matrix 23

LIST OF FIGURES

Figure 1. ALI Shared Priority Area Model Results
Figure 2. Townsend's Ground Squirrel Habitat Concentration Areas as Modeled by the WHCWG

LIST OF ATTACHMENTS

Attachment A Ferruginous Hawk Nests and Distances to Project Infrastructure

ACRONYMS AND ABBREVIATIONS

ALI	Arid Lands Initiative
Applicant	Horse Heaven Wind Farm, LLC
ASC	Application for Site Certification
BCC	Benton County Code
BESS	battery energy storage system
CRP	Conservation Reserve Program
EFSEC	Energy Facility Site Evaluation Council
FWHCA	fish and wildlife habitat conservation area
GE	General Electric
GMA	Growth Management Act
HCA	Habitat Concentration Area
HMP	Habitat Mitigation Plan
LCP	Least-Cost Path
Micrositing Corridor	Wind Energy Micrositing Corridor
MW	megawatt
MWac	megawatts output as alternating current
O&M	operation and maintenance
PHS	Priority Habitats and Species
Project	Horse Heaven Wind Farm
PV	photovoltaic
RCW	Revised Code of Washington
SCA	Site Certification Agreement
SEPA	State Environmental Policy Act
Turbine	wind turbine generator
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WHCWG	Wildlife Habitat Connectivity Working Group

1 INTRODUCTION

The Horse Heaven Wind Farm (Project) is a renewable energy generation facility that would have an energy injection capacity of up to 1,150 megawatts (MW) using a combination of wind and solar facilities as well as battery energy storage systems (BESS). Horse Heaven Wind Farm, LLC (the Applicant) proposes to construct wind turbine generators (Turbines) at a subset of 244 locations and up to three solar arrays, with all possible Turbine locations and solar array extent reviewed in the analysis of potential resource impacts in the Project's Energy Facility Site Evaluation Council (EFSEC) Application for Site Certification (ASC) and this Draft Habitat Mitigation Plan (HMP). Although all 244 Turbine locations and all three solar arrays are analyzed to conservatively assess potential impacts from the Project, not all Turbines and solar arrays will be constructed and in fact, under a mitigation agreement with the Department of Defense, the Project would be restricted to 235 Turbines. As described in the EFSEC ASC, the Project is considering two general Turbine options comprising four different Turbine technologies to facilitate flexible Turbine siting: Turbine Option 1 consists of up to 244 General Electric 2.82-MW or 3.03-MW Turbines, and Turbine Option 2 consists of up to 150 General Electric 5.5-MW or Siemens Gamesa 6.0-MW Turbines.

Power generated by the Project would be transmitted to existing Bonneville Power Administration transmission lines via two interconnections. Other Project components would include up to two BESS, underground and limited overhead electrical collection lines, underground communication lines, new Project substations, access roads, operation and maintenance (O&M) facilities, meteorological towers, control houses, and temporary construction yards. The Project would likely be built using a phased approach, with two phases currently under consideration. The EFSEC ASC describes the following example phased approach: Phase 1 could consist of 650 MW, with 350 MW generated via wind plus 300 MWac (megawatts output as alternating current) generated via solar; Phase 2 could consist of 500 MW, with either 250 MW generated via wind plus 250 MWac generated via solar or 500 MW generated via wind. Construction of the two Project phases would last approximately 11 months each, for a total of approximately 22 months of construction activity for the full 1,150-MW capacity build-out.

The HMP evaluated impacts at various spatial scales, which included the following three primary areas: the Project Lease Boundary, Wind Energy Micrositing Corridor, and Solar Siting Areas. The Project Lease Boundary (i.e., the extent of parcels in which the Applicant has executed a lease to construct Turbines, solar arrays, and associated facilities) encompasses approximately 72,428 acres and contains the Project's Wind Energy Micrositing Corridor (Micrositing Corridor; i.e., the area in which the Turbines and supporting facilities would be sited during the final design) and the Solar Siting Areas (i.e., three areas under consideration for siting of the proposed solar arrays during the final design) (see Figure 3.4-1 of the EFSEC ASC). The Micrositing Corridor and the Solar Siting Areas are larger than the Project's final footprint to allow minor rerouting to optimize the design and to avoid resources that may be discovered during the final design and pre-construction process.

2 REGULATIONS AND GUIDELINES

The HMP was developed to meet the regulatory standards described in the regulations and guidelines summarized in this section.

2.1 EFSEC

Energy facilities subject to review by EFSEC include thermal electrical generation, pipelines, electrical transmission lines, petroleum refineries, petroleum storage, and alternative energy electrical generation (wind, solar, geothermal, landfill gas, wave or tidal action, and biomass). However, alternative energy facilities (of any size) are not required to enter the EFSEC process in Washington; the applicant may opt in to the EFSEC process, or may choose to permit the project at the local level. For the proposed Project, the Applicant has elected to be sited under EFSEC jurisdiction.

Once an alternative energy facility has elected EFSEC permitting, EFSEC coordinates all evaluation and licensing steps for siting certain energy facilities in Washington. EFSEC specifies the conditions of construction and operation. If approved, a Site Certification Agreement (SCA) is issued in lieu of other individual state or local agency permits. Chapter 80.50 of the Revised Code of Washington (RCW) includes the laws EFSEC must follow in siting and regulating major energy facilities. Title 463 of the Washington Administrative Code (WAC) sets forth the regulations establishing how EFSEC functions under state and federal law.

EFSEC is responsible for evaluating applications under the Washington State Environmental Policy Act (SEPA; see Section 2.3) and to ensure that environmental and socioeconomic impacts are considered before a site is approved. After evaluating an application, EFSEC submits a recommendation to the Governor. If EFSEC determines that constructing and operating the facility will produce minimal adverse effects on the environment, ecology of the land and wildlife, and ecology of the state waters and aquatic life, and meets its construction and operation standards, then it recommends that a SCA be approved and signed by the Governor. The SCA lists the conditions the applicant must meet during construction and while operating the facility. WAC 463-60-332 outlines how potential impacts to habitat, vegetation, fish, and wildlife must be addressed in the EFSEC ASC. This information has been prepared and presented in Section 3.4 of the ASC. This HMP has been prepared pursuant to WAC 463-60-332(3), which requires that the EFSEC ASC include a detailed mitigation plan. In addition, this HMP describes how the Project follows the Washington Department of Fish and Wildlife (WDFW) Wind Power Guidelines (WDFW 2009), as applicable, and Policy M-5002, pursuant to WAC 463-60-332(4).

2.2 Benton County Critical Areas Ordinance

Under Washington State's Growth Management Act (GMA), all cities and counties are directed to adopt critical areas regulations. Counties and cities are required to include the best available science in developing policies and development regulations to protect the functions and values of critical areas (RCW 36.70A.172). Benton County's Critical Areas Ordinance was developed to comply with the requirements of the GMA, and was most recently updated on August 21, 2018, consistent with the GMA periodic review requirement in RCW 36.70A.130.

Benton County's regulations regarding critical areas are established in Title 15 of the Benton County Code (BCC). Title 15 defines critical areas as including any of the following areas or ecosystems: (1) wetlands (see Chapter 15.04 BCC); (2) critical aquifer recharge areas (see Chapter 15.06 BCC); (3) frequently flooded areas (see Chapter 15.08 BCC); (4) geologically hazardous areas (see Chapter 15.12 BCC); and (5) fish and wildlife habitat conservation areas (FWHCA; see Chapter 15.14 BCC).

Per BCC 15.14.010, FWHCAs include the following: (1) areas where federal or state designated endangered, threatened, and sensitive species have a primary association[1], (2) state priority habitats and areas associated with state priority species, (3) habitats and species of local importance as designated by Benton County (i.e., shrub-steppe habitat), (4) waters of the state, (5) naturally occurring ponds under 20-acres and their submerged aquatic beds that provide fish or wildlife habitat, (6) lakes, ponds, streams, and rivers planted with native fish populations, (7) Washington State Wildlife Areas, and (8) Washington State Natural Area Preserves and Natural Resource Conservation Areas (Benton County 2018). Information provided in Section 3.4 of the EFSEC ASC submitted for this Project, as well as this HMP, addresses the requirement per BCC 15.14.030 for the Applicant to provide a habitat assessment and discuss the habitat avoidance, minimization, and mitigation measures proposed for the Project.

As described in Section 3.4 of the EFSEC ASC, the Project would include disturbance in areas considered FWHCAs as defined by the BCC Critical Area Ordinance (i.e., primarily shrub-steppe and associated wildlife species). This HMP addresses mitigation for these impacts.

2.3 SEPA

SEPA is the state interdisciplinary policy that identifies and analyzes environmental impacts associated with state governmental decisions, including permits to construct energy facilities. The applicable SEPA statutes and regulations include RCW Ch. 43.21C, Washington Environmental Policy Act, WAC Ch. 197-11, Washington State Department of Ecology SEPA Rules, and Section 6.35 of the BCC, which establish requirements for compliance with SEPA. As the Applicant has elected to be sited under EFSEC jurisdiction, as discussed above, EFSEC will serve as the lead agency for SEPA review. Section 3.4 of the ASC addresses potential impacts to plants and animals. This HMP, in addition to the analysis provided in Section 3.4 of the Project's EFSEC ASC and the analysis presented by EFSEC in its Environmental Impact Statement, supports the finding that, with the implementation of proposed mitigation, probable significant adverse environmental impacts can be reduced to a level of non-significance as defined and understood in SEPA.

2.4 WDFW Wind Guidelines

The Project and this HMP have been developed consistent with WAC 463-60-332 and WAC 365-195-900 through 365-195-925, including adherence to WDFW Wind Power Guidelines as applicable. WDFW published the Wind Power Guidelines in 2009 to provide consistent statewide guidance for the development of land-based wind energy projects that avoid, minimize and mitigate impacts to fish and wildlife habitats in Washington State (WDFW 2009). The guidelines are intended to provide permitting agencies and wind project developers with an overview of the considerations made by WDFW in the review of wind energy project proposals. The permitting authority (e.g., EFSEC) is responsible for SEPA review before issuing a project permit. However, WDFW is considered an agency with environmental expertise through SEPA and provides review and comments on environmental documents. The Applicant used the Wind Power Guidelines to develop this HMP where applicable, including the mitigation considerations listed below summarizing the criteria for the habitat selected to replace the functions and values of habitat impacted by the Project (i.e., replacement habitat):

[1] Primary association area—The area used on a regular basis by, in close association with, or is necessary for the proper functioning of the habitat of a critical species. Regular basis means that the habitat area is normally, or usually known to contain a critical species, or based on known habitat requirements of the species, the area is likely to contain the critical species. Regular basis is species and population dependent. Species that exist in low numbers may be present infrequently yet rely on certain habitat types (Benton County 2018).

- Like-kind (e.g., shrub-steppe for shrub-steppe, grassland for grassland) and/or of equal or higher habitat value than the impacted area, noting that an alternative ratio may be negotiated for replacement habitat that differs from impacted habitat;
- Given legal protection (through acquisition in fee, a conservation easement, or other enforceable means);
- Protected from degradation, including development, for the life of the project to improve habitat function and value over time;
- In the same geographical region as the impacted habitat; and
- At some risk of development or habitat degradation and the mitigation results in a net habitat benefit.

2.5 WDFW M-5002 Policy

WDFW established Policy M-5002 requiring or recommending mitigation in 1999. This policy applies to all habitat protection assignments where WDFW is issuing or commenting on environmental protection permits, documents, or violation settlements; or when seeking commensurate compensation for impacts to fish and wildlife resources resulting from oil or other toxic spills. The Applicant reviewed Policy M-5002 to support the development of this HMP, including the following considerations:

- The goal is to achieve no loss of habitat functions and values. Mitigation credits and debits will be based on a scientifically valid measure of habitat function, value, and area. Ratios will be greater than 1:1 to compensate for temporal losses, uncertainty of performance, and differences in functions and values.
- On-site in-kind mitigation is preferred.
- Mitigation plans will include the following: baseline data, estimate of impacts, mitigation measures, goals and objectives, detailed implementation plan, adequate replacement ratio, performance standards to measure whether goals are being reached, maps and drawings of proposal, as-built drawings, operation and maintenance plans (including who will perform), monitoring and evaluation plans (including schedules), contingency plans, including corrective actions that will be taken if mitigation developments do not meet goals and objectives, and any agreements on performance bonds or other guarantees that the proponent will fulfill mitigation, operation and maintenance, monitoring, and contingency plan.
- Mitigation measures will be completed before or during project construction.
- Mitigation site will be protected for the life of the project.
- Mitigation banking may be an acceptable form of mitigation.

3 AGENCY CONSULTATION HISTORY

Coordination on the project began with WDWF in 2017 and over time additional agencies and parties have joined the discussions. Table 1 briefly summarizes that coordination, including meeting dates, topics discussed, and key decisions or agreements made.

Table 1. Summary of Agency Consultation History

Meeting Date	Parties Present	Topics Discussed	Key Decisions or Agreements
September 19, 2017	USFWS WDFW Scout Tetra Tech WEST	• Project kick-off • Wildlife and habitat survey approach	• Recommendations were made regarding wildlife and habitat survey methods.
January 28, 2020	USFWS WDFW Scout Tetra Tech WEST Lower Columbia Audubon Society	• Update on project layout • Summary of wildlife and habitat surveys completed to date	• WDFW noted setback recommendations that may be appropriate during construction during the nesting/fledging season for the ferruginous hawk nest observed near the Project that was occupied all 3 years it was surveyed (2017-2019). • WDFW concurred that, based on survey data and lack of irrigated agriculture and wetland resources, sandhill cranes do not occupy the Project Lease Boundary but instead typically fly high above the Project and use the area north of the Project for foraging, loafing, and roosting. • WDFW noted that eastside (interior) grasslands have a 1:1 mitigation ratio for permanent impact.
January 27, 2021	WDFW Scout Tetra Tech WEST	• Update on project changes, addition of solar and BESS • Summary of habitat, rare plant, and avian surveys	• WDFW noted that the Project was well sited given the level of existing disturbance (e.g., agricultural activity and presence of non-native species) in the area, and identified minimization measures related to fencing that could further reduce potential impacts.
November 2, 2021	EFSEC WDFW Scout Tetra Tech	• Wildlife and habitat surveys • Habitat impacts • Further avoidance and minimization	• WDFW said wildlife and habitat surveys were done well; no comments. • WDFW reviewed habitat impact tables and thought they looked good. • WDFW expressed concerns about Sheep and Weber Canyon. • WDFW recommended also looking at off-site mitigation options; Scout requested locations or ideas.

Meeting Date	Parties Present	Topics Discussed	Key Decisions or Agreements
November 16, 2021	EFSEC WDFW Scout Tetra Tech WEST Golder	• Wildlife and habitat surveys • Habitat impact table • Impacts to ferruginous hawk • Impacts to big game	• WDFW reaffirmed agreement with habitat impacts. • WDFW requested further minimization in canyon by reducing or moving Turbines and lines to reduce canyon crossings. • WDFW recommended avoidance buffers around ferruginous hawk nests during construction; noted that the agency is working on updated guidance on how to address ferruginous hawk for all projects. • WDFW noted that pronghorn are not regulated by the agency and recommended that EFSEC consult with the Yakama Nation regarding that species, since the herd was reintroduced by them.
November 30, 2021	EFSEC WDFW Scout Tetra Tech WEST Stoel Rives Golder	• Project impacts • Avoidance and minimization • Mitigation (options and ratios)	• Scout provide an update on potentially implementing additional minimization measures through changes to project design. • WDFW agreed with the mitigation options presented in the draft HMP.
December 14, 2021	WDFW Scout Tetra Tech WEST	• Crossing of canyons by collector lines • Ferruginous hawk buffers • Pronghorn • Mitigation memo	• All agreed to memorialize approach to minimize impacts to canyons in the revised HMP. • Scout noted that implementing 10 km buffers would be problematic; Golder proposed concepts for use of the buffers in the EIS analysis. • Group requested presentation from WDFW on the origins of the buffers. • Scout noted that an updated pronghorn memo had been provided, with up to date information from the Yakama Nation; EFSEC and Golder had no questions. • Mitigation memo was not discussed in detail pending future discussions between WDFW and EFSEC.
January 6, 2022	EFSEC WDFW Scout Tetra Tech WEST Stoel Rives Golder	• Ferruginous hawk buffers (presentation by Jim Watson, WDFW)	• General discussion about utility of proposed buffers and timing of updated guidance from WDFW.
January 20, 2022	EFSEC	• Pronghorn memo	• No comments on pronghorn memo received.

Meeting Date	Parties Present	Topics Discussed	Key Decisions or Agreements
	Washington Attorney General's Office WDFW Scout Tetra Tech WEST Stoel Rives Golder	• Mitigation ratios and approach • Landscape level analysis	• WDFW confirmed agreement with mitigation ratios and approaches presented in draft HMP. • EFSEC presented recommended approach to characterizing mitigation in the documents, which included a criteria-based approach, rather than showing specific sites; WDFW concurred with this approach. • WDFW provided a verbal summary of landscape level analysis they had prepared.

EFSEC – Energy Facility Site Evaluation Council; Scout – Scout Clean Energy, LLC; Tetra Tech – Tetra Tech, Inc.; USFWS – U.S. Fish and Wildlife Service; WDFW – Washington Department of Fish and Wildlife; WEST – Western Ecosystems Technology, Inc.

4 HABITAT MAPPING

The Applicant used a combination of field survey data and desktop resources to map habitat within the Project Lease Boundary from 2017 through 2021, as described in Section 3.4.1.1 of the EFSEC ASC (Chatfield and Brown 2018a, 2018b; Tetra Tech 2021a; USFWS 2018; USGS 2016; Yang et al. 2018). Subsequent to submittal of the EFSEC ASC, additional habitat surveys were conducted within portions of the Project Lease Boundary that had not previously been surveyed (Tetra Tech 2021b). In general, habitat types and subtypes were adapted from habitat descriptions in the Wildlife Wind Power Guidelines (WDFW 2009) and *Wildlife-habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001), with some modifications as described below. Descriptions of habitat types and subtypes mapped within the Project Lease Boundary are provided in Section 3.4.1.1 of the EFSEC ASC as well as the survey reports prepared for the Project (Tetra Tech 2021a, b). Table 2 provides a crosswalk between habitats mapped at the Project and WDFW Habitat Types and Classifications (WDFW 2009).

Vegetation within the majority of the Project Lease Boundary has been degraded due to historical and current agriculture and grazing activity, and non-native invasive grasses and forbs are prevalent throughout the Project Lease Boundary.

Table 2. Project Habitat Type and Subtype Crosswalk with WDFW Habitat Type and Classification

Project Habitat Type	Project Habitat Subtype	WDFW Habitat Type	WDFW Classification
Agricultural land		Croplands	Class IV
Developed/disturbed		Urban and Mixed Environs	
Grassland	Eastside (interior) grassland	Eastside (Interior) Grasslands	Class III
	Non-native grassland		
	Planted grassland	Conservation Reserve Program Lands	
Shrubland	Rabbitbrush shrubland	Shrub-steppe	Class II
	Sagebrush shrub-steppe		
	Dwarf shrub-steppe		

Of the eight upland habitat subtypes mapped within the Project Lease Boundary, two were not readily classified into either WDFW (2009) or Johnson and O'Neil (2001) habitat types or subtypes: non-native grassland and rabbitbrush shrubland. Non-native grassland was considered eastside (interior) grassland (Class III) WDFW habitat because these areas were dominated by non-native grassland and forb species. The non-native grasslands mapped at the Project likely provide lower functional value to wildlife than typical eastside (interior) grassland due to the presence of invasive species (e.g., several areas field-mapped as non-native grassland habitat in 2020 consisted of vast areas dominated by dense cover of cereal rye [*Secale cereale*], a Class C noxious weed [BCNWCB 2020; WSNWCB 2020]). Non-native grassland was classified as eastside (interior) grassland because the definition for eastside (interior) grassland in the Wildlife Wind Power Guidelines (WDFW 2009) provided the best fit for classification of this habitat type.

Planted grassland and rabbitbrush shrubland are potentially Conservation Reserve Program (CRP) land because these areas appeared to have been planted with non-native grasses, native grasses, and/or native shrubs in formerly agricultural areas. That would make the habitat value of those areas the functional equivalent of typical CRP lands. Despite that, rabbitbrush shrubland that was observed in areas that appeared to have been planted was included as a Class II habitat type. It is unknown whether rabbitbrush was planted in those areas or established naturally. Rubber rabbitbrush (*Ericameria nauseosa*) is an early seral species that readily colonizes disturbed sites, such as areas disturbed by overgrazing or fire or abandoned agricultural lands (Faber et al. 2013; Tirmenstein 1999; USDA 2017).

Sagebrush shrub-steppe and dwarf shrub-steppe were considered shrub-steppe (Class II) WDFW habitat because they were dominated by native shrubs such as big sagebrush (*Artemisia tridentata*) and rock buckwheat (*Eriogonum sphaerocephalum*). Lithosol soils were not observed in the sagebrush shrub-steppe habitat mapped within the Project Lease Boundary, but were observed within the mapped dwarf shrub-steppe habitat, indicating a likely increased length of time for restoration following disturbance (WDFW 2009).

5 PROJECT IMPACTS

5.1 Landscape-Level Impacts

The following desktop resources were used to characterize how the Project may affect landscape-scale habitat connectivity and wildlife movement:

- Arid Lands Initiative (ALI) Spatial Conservation Priorities in the Columbia Plateau Ecoregion (ALI 2014);
- Priority Core Areas and Priority Linkage Areas (Great Northern Landscape Conservation Cooperative 2015); and
- Washington Wildlife Habitat Connectivity Working Group (WHCWG) Washington Connected Landscapes Project: Analysis of the Columbia Plateau Ecoregion (WHCWG 2012).

Each of these data sources identify landscape-level areas of importance to wildlife in the region, using a combination of data layers and key ecological attributes. These areas are generally described as:

- Priority Core Areas – Set of noncontiguous polygons selected by modeling where local protection and restoration actions can best contribute overall conservation goals (ALI 2014).
- Priority Linkages – Areas within the Columbia Plateau Ecoregion identified as important for maintaining movement opportunities for organisms or ecological processes (e.g., for animals to move to find food, shelter, or access to mates). In the WHCWG (2012) report, these are corridors identified by the models as important for wildlife movement between Habitat Concentration Areas (HCA).
- Linkage Network – System of habitats and areas important for connecting them. For the WHCWG linkage priorities, linkage networks represent the area encompassed by the combination of HCAs and modeled Priority Linkages that connect them (WHCWG 2012).

Connectivity along the east/west ridgeline to the north of the Project and the north/south corridor to the west of Interstate 82 has been avoided or minimized by designing the Project to avoid impacts to Priority Linkages. Along the northern ridgeline, Turbines and associated roads have been set back and do not overlap with Priority Core Areas or High/Very High Linkage Areas (see Figure 1). Spacing between Turbines along a string will be approximately 0.25 mile from the tower base and the perpendicular distance between strings will be much greater (approximately 0.5 to 1 mile), which would maintain open areas of habitat (agriculture, grassland, and shrub-steppe), facilitate wildlife movement, and maintain habitat connectivity. A small portion of the eastern solar array overlaps with, but does not substantially encroach into, a Linkage Area and thus would not impede species movement or habitat connectivity within the Linkage Area.

The two solar arrays located on the west side of the Project area do not overlap with a Priority Core Area or High Linkage Area. Wind turbines and associated infrastructure (with the exception of O&M buildings/substations) will remain unfenced, resulting in reduced habitat fragmentation and facilitate open movement of terrestrial wildlife species. By designing the Project in a manner that avoids or minimizes disturbances in modeled corridor areas, terrestrial wildlife corridors within the Horse Heaven Hills will be maintained.

The Project is not located within a migration route for big game species (WDFW 2020a). Although the Project provides low habitat value to mule deer (due to the extent of agricultural and developed land, which covers 75 percent of the Project Lease Boundary), one Least-Cost Path (LCP) modeled by the WHCWG (2012, 2013) passes through the Project along a north-south route west of and parallel to Highway 395. This LCP connects HCAs at the Hanford Site and Rattlesnake Hills in Washington to an HCA in Oregon between Pendleton and Heppner. This LCP falls outside the Solar Arrays but passes through the Micrositing Corridor. WDFW is currently working to further identify migratory corridors through research of mule deer movement; however, these are currently prioritized in the East Slope Cascades and East Columbia Gorge Mule Deer Management Zones and not the Columbia Plateau Mule Deer Management Zone (WDFW 2020b), where the Project occurs.

As the Project is not located within a migration route for big game species, impacts to big game migration routes are not anticipated from the Project. Although the Micrositing Corridor overlaps with one LCP modeled by WHCWG (2012, 2013), the Project Lease Boundary in general provides low-value habitat to mule deer and is unlikely to support large migrations of mule deer despite this modeled linkage. The modeled LCP that passes through the Project does not overlap with the fenced solar arrays (or the larger Solar Siting Areas), which are primarily located on agricultural and disturbed lands. This LCP is designated as low centrality; centrality is a measure of how important a habitat area or linkage is for keeping the overall connectivity network connected (WHCWG 2013). Therefore, construction and operation of the Project are not anticipated to constitute a barrier to deer movement.

5.2 Habitat Impacts

Construction and operation of the Project would result in both permanent and temporary impacts to wildlife habitat, as well as modifications to habitat within the solar array fencelines. Areas of permanent impacts include locations of permanent infrastructure (e.g., Turbines, meteorological towers, BESS, substations, permanent access roads, and O&M facilities), and areas of temporary impacts include locations that would be disturbed during construction and revegetated following construction outside the solar array fencelines (e.g., locations of underground collection and communication lines and temporary construction yards) (see Table 2.1-1 in Section 2 of the EFSEC ASC). Temporary impacts associated with solar facilities include a 10-foot construction buffer along the outside of the solar fencelines. Where not permanently impacted due to permanent infrastructure (i.e., graveled interior access roads, inverter pads, and tracker system support posts), habitat within the solar array fencelines would be revegetated with low-growing vegetation following construction and would remain available to wildlife such as small mammals, birds, reptiles, and invertebrates in a modified condition.

Table 3 provides the estimated acres of impact to wildlife habitat from construction and operation of the Project, including the acres of temporary and permanent impacts within the Micrositing Corridor and Solar Siting Areas, and acres of habitat modification within the Solar Siting Areas.[2] Table 3 conservatively includes the acres of impact to each habitat subtype under Turbine Option 1, which represents the estimated maximum acreage of impact (from the greatest number of Turbines and associated roads and collector lines) and thus would result in the maximum estimated acreage of mitigation (calculated in Section 7.3.1). If Turbine Option 2 is selected, impacts on habitat and thus the mitigation need would be reduced within the Micrositing Corridor. Impacts from the solar arrays and

[2] Acreages in Table 3 reflect additional habitat mapping conducted for the Project subsequent to submittal of the ASC; therefore, the habitat subtypes and acres of impacts to habitat subtypes in Table 3 do not match Table 3.4-14 of the ASC.

associated infrastructure would not vary based on Turbine options, but would be reduced if one or more of the Solar Siting Areas is not developed.

Table 3 lists the acres of Project impact by impact type and habitat subtype; where these impacts result in the need for mitigation (i.e., outside of agricultural and developed land), these values are again listed in Section 7.3.1 where they are multiplied by their respective mitigation ratios to determine the mitigation need by habitat type and subtype.

The vast majority (79 percent) of habitat proposed to be permanently impacted within the Micrositing Corridor is agricultural land, followed by planted grassland, rabbitbrush shrubland, non-native grassland, sagebrush shrub-steppe, developed/disturbed, eastside (interior) grassland, and dwarf shrub-steppe, (Table 3). The vast majority (84 percent) of habitat proposed to be modified within the solar array fencelines is agricultural land, followed by rabbitbrush shrubland, planted grassland, eastside (interior) grassland, non-native grassland, sagebrush shrub-steppe, and developed/disturbed (Table 3).

Habitat proposed to be impacted within the northern and western Solar Siting Areas is almost entirely agricultural and disturbed land, with small amounts of planted and non-native grassland and sagebrush shrub-steppe, while just over half of the habitat within the eastern Solar Siting Area is agricultural and disturbed land with the remaining habitat consisting of rabbitbrush shrubland, eastside (interior), planted, and non-native grassland, and sagebrush shrub-steppe habitat (e.g., see Figure 5 in Tetra Tech 2021b). Section 7.4 and Table 4 summarize the proposed mitigation acres needed to offset the loss or modification of habitat by the Project.

Table 3. Estimated Impacts on Habitat Types from Construction and Operation of the Project

Habitat Type	Habitat Subtype	Micrositing Corridor		Solar Siting Areas		
		Temporary Impact (Acres)[1/]	Permanent Impact (Acres)[1/]	Temporary Impact (Acres)[2/]	Permanent Impact (Acres)[2/]	Modified Habitat Impact (Acres)[2/]
Agricultural land		2,269	252	55	237	5,314
Developed/disturbed		21	2	0.01	’--	’--
Grassland	Eastside (Interior) grassland	15	‘--	2	5	68
	Non-native grassland	136	11	1	2	23
	Planted grassland	259	21	4	12	204
Shrubland	Dwarf shrub-steppe	9	1	--	--	--
	Rabbitbrush shrubland	141	11	13	38	668
	Sagebrush shrub-steppe	31	1	0.1	--	0.2
	Total[3/]	**2,881**	**299**	**76**	**294**	**6,276**

Notes:
1/ Overlapping permanent disturbance is subtracted from temporary impact corridors/areas (e.g., temporary impact area around a Turbine does not include the Turbine foundation and graveled areas); those are included only in the permanent impact column.
2/ Temporary impacts associated with solar facilities include a 10-foot construction buffer along the outside of the solar fencelines. Permanent impacts include the solar inverters and new access roads within the solar siting areas. Modified impacts are associated with the solar arrays and include those areas within the solar fencelines that are outside areas of permanent impact. Following construction, low growing vegetation would be planted under and between the solar arrays; therefore, these impacts would be considered a modification of habitat versus a temporary or permanent impact.
3/ Totals may not sum exactly due to rounding.

The Revegetation and Noxious Weed Management Plan (Appendix N to the EFSEC ASC) identifies a seed mix consisting of low-growing native grasses and forbs compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array) for revegetation under the solar arrays, including areas that previously consisted of agricultural lands. Therefore, the majority of areas of proposed modified habitat under the solar array may provide higher quality habitat following revegetation compared to the current condition (e.g., areas that are actively plowed and/or dominated by invasive species may provide higher quality habitat to wildlife once revegetated with low-growing vegetation). Details of planned revegetation, including seed mixes and methods, are provided in the Revegetation and Noxious Weed Management Plan (Appendix N to the EFSEC ASC).

Renewable energy facilities (i.e., wind and solar) have been built and proposed throughout the Columbia Plateau in Washington, including in Benton County (EFSEC 2021; Erickson et al. 2003; *Yakima Herald* 2019) for decades. Therefore, the Project has the potential to contribute to cumulative impacts on wildlife and habitat. Cumulative impacts are the comprehensive effect on the environment that results from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions (USFWS 2012). The Project is sited primarily on agricultural land, has minimized impacts to shrub-steppe to the extent feasible, and is sited outside of locations identified as key to the ALI and identified in the WHCWG. As summarized in Section 7.4, unavoidable impacts to habitat (including shrub-steppe habitat) will be mitigated appropriately through either a conservation easement, payment to WDFW, or a payment to a local land trust or conservation organization as discussed with WDFW. Thus, replacement habitat would be provided such that there would be no cumulative loss in function or value of habitat from Project development.

5.3 Federal or State Listed Species Impacts

No federally listed species occur in the Project area. There are two state listed species that have been observed either during project-related surveys or as documented in WDFW Priority Habitats and Species (PHS) data: ferruginous hawk and Townsend's ground squirrel.

5.3.1 Ferruginous Hawk

Surveys conducted in 2017 to 2019 documented nine ferruginous hawk nests within 2 miles of proposed Turbines. The methods and results of those surveys are summarized in Attachment A. Two of the nine nests were occupied at least once during the 3-year survey period; one was also considered active and the other was considered inactive (due to the lack of eggs or young present). The remaining seven nests were unoccupied, in poor condition, and would require substantial repair for nesting. The unoccupied nests were dilapidated and comprised scattered sticks and nest material, which suggests the nests were not used for one or more nesting periods prior to the 2017 surveys.

The linear distance from all nests to the nearest Turbine ranged between 1,115 and 4,708 feet. One of the occupied/active nests is located a linear distance of 2,795 feet (0.53 mile; ground distance 2,806 feet) to

Turbine 116 with an elevation difference of 245 feet from nest to the Turbine. The second nest, which was occupied/inactive in 2017, is a linear distance of 4,708 feet (0.89 mile; ground distance 4,743 feet) to Turbine 49 with an elevation difference of approximately 580 feet. More detail about nest locations and topography between Turbines and the nests is provided in Attachment A.

To avoid disturbance to nesting ferruginous hawks and their prey base, WDFW recommends spatial and temporal buffers around active nests (Attachment A; WDFW 2005). Around all active nests, WDFW recommends avoiding human access and ground-based activities within 820 feet of the nest between March 1 and May 30, and preventing prolonged activities lasting greater than 0.5 hour within 3,280 feet of a nest between March 1 and August 15 (WDFW 2005). The Project would implement those avoidance and minimization criteria as necessary, depending on nest location and status and distance from Project infrastructure. Additional minimization measures are listed in Section 7.2. In addition, a process for assessing the relative impacts on nesting ferruginous hawks from habitat removal or modification by the Project, as well as a mitigation approach to offset these effects, is described in Section 7.4.

5.3.2 Townsend's Ground Squirrel

Based on modeling from the WHCWG (2013) for Townsend's ground squirrel, there are several HCAs surrounding the Project. These HCAs are limited to the escarpment, northwest of the Project Lease Boundary, where Turbines have been excluded, the southcentral portion of the Project Lease Boundary, and areas west of Highway 82 (Figure 2). HCAs were modeled as High and Medium concentration by the WHCWG. Of the 244 proposed Turbine locations, none are located in High concentration areas, but 6 locations (2 percent) are within the Medium concentration area, just west of the eastern solar array. Only a very small portion of the eastern solar array encroaches on an existing (Medium concentration) HCA, and security fencing would be permeable to Townsend's ground squirrel, meaning that ground squirrels would be able to access revegetated habitat within the solar array.

6 SCIENTIFIC BASIS

WDFW (2009) defines permanent impacts to habitat as those impacts that are anticipated to persist and cannot be restored within the life of the Project, which may include "new permanent roads, operations and maintenance facilities, Turbine pads, impervious and/or areas devoid of native vegetation resulting from project operations." Areas that would be revegetated under the solar arrays following construction of the Project would not be impervious, would not be devoid of native vegetation, or otherwise built up, and would be restored within the life of the Project; therefore, these areas are generally not considered permanently impacted habitat. Following completion of construction, areas under the solar arrays would be revegetated with low-growing vegetation (see Appendix N to the EFSEC ASC, the Revegetation and Noxious Weed Management Plan).

A recent study demonstrated that successful revegetation under solar panels is possible, even with native grass species adapted to full-sun conditions (Beatty et al. 2017). This study demonstrated that revegetation under solar panels was able to "achieve ground cover sufficient to control erosion and begin to restore wildlife habitat" (Beatty et al. 2017). A recent study in Oregon (Hassanpour Adeh et al. 2018) quantified changes to the microclimatology, soil moisture, water usage, and biomass productivity due to the presence of solar panels. In this study, areas under photovoltaic (PV) panels maintained higher soil moisture, showed a significant increase in late season biomass (90 percent more biomass), and were significantly more water efficient (328 percent more efficient), although caution should be used in applying these results from west of the Cascade Mountains to the drier Columbia Plateau (Hassanpour Adeh et al. 2018). Hernandez et al.

(2020) evaluated the seed bank survival of two desert annual plant congeners, one rare (Barstow woolly sunflower [*Eriophyllum mohavense*]) and one common (Wallace's woolly daisy [*E. wallacei*]) in the Western Mojave Desert and found that seed bank survival across both species was significantly greater in shade (10 percent) microhabitats compared to runoff (5 percent) and control microhabitats (3 percent), possibly related to the shade microhabitats receiving less photosynthetically active radiation and having lower soil moisture and temperatures. Similarly, pre- and post-construction biological monitoring data at a PV solar facility in California indicated similar to higher vegetation productivity on-site compared to reference sites (Sinha et al. 2018). As a result, areas under solar panels that would be revegetated are generally considered modified rather than temporarily or permanently impacted.

As described above, habitat within the solar array fencelines would remain available to wildlife such as small mammals, birds, reptiles, and invertebrates in a modified condition. Limited research is available regarding the effects of PV array development (including the effects of fencing and shading) on residual wildlife habitat value; however, preliminary studies indicate residual habitat value remains for various species of birds, and the value may differ based on restoration and vegetation management practices. For example, DeVault et al. (2014) studied avian abundance at PV array fields and paired airport grassland areas using transect surveys. The results indicated that airport grasslands generally had greater species diversity and PV arrays generally had more total birds observed; however, overall bird mass was comparable at airport grasslands and PV arrays, suggesting more smaller birds tended to use the PV arrays than the airport grasslands. Similarly, Visser et al. (2018) measured bird abundance and diversity at a PV array facility in South Africa using point counts within and outside the facility. The primary conclusion of the study was that bird diversity and density were higher outside of the facility, but the facility was not absent of birds. Visser et al. (2018) found that the bird community inside the facility comprised birds that were generalist species or those that use grassland habitat. Thus, the species composition appeared to be associated with a change from a shrub/woodland habitat to a grassland habitat within the facility. This limited research demonstrates that while bird species use may change at PV arrays, use of the area is not eliminated; instead, the modified habitat supports a modified avifaunal community.

Similarly, post-construction biological monitoring data at a PV solar facility in California documented the presence of dozens of wildlife species, including California horned lark (*Eremophila alpestris actia*), ferruginous hawk, loggerhead shrike (*Lanius ludovicianus*), prairie falcon, black-tailed jackrabbit, California ground squirrel (*Otospermophilus beecheyi*), San Joaquin kit fox (*Vulpes macrotis mutica*), and coast range fence lizard (*Sceloporus occidentalis bocourtii*) (Sinha et al. 2018). This California site was reseeded with native flora species to allow vegetation to grow beneath the solar panels, creating new habitats, providing sources of food for various wildlife species, and providing dust control (Sinha et al. 2018). The results of monitoring indicated that, although solar facility construction activities do involve short-term disturbance, responsibly developed solar facilities can provide shelter, protection, and stable use of land to support biodiversity (Sinha et al. 2018).

7 MITIGATION MEASURES

7.1 Avoidance and Minimization

The following avoidance and minimization measures were either applied during Project development or are proposed for Project construction and operations:

- To minimize impacts to wildlife, baseline studies were conducted at the Project consistent with the WDFW Wind Power Guidelines (WDFW 2009), the USFWS' 2012 Final Land-Based Wind

Energy Guidelines (USFWS 2012), the 2013 USFWS Eagle Conservation Plan Guidance Module 1 – Land Based Wind Energy (USFWS 2013), and the USFWS 2016 Eagle Rule Revision (USFWS 2016). In order to minimize impacts to and avoid wildlife resources, the Applicant used the results of these baseline studies to inform the layout design.

- Project facilities were sited on previously disturbed (e.g., cultivated cropland) areas as feasible to avoid impacts to native habitats and associated wildlife species.
- The Project will use industry standard best management practices to minimize impacts to vegetation, waters, and wildlife.
- To the extent feasible, the solar array fencelines have been designed to enclose smaller solar arrays within the Solar Siting Areas rather than enclosing each entire Solar Siting Area, which will minimize habitat fragmentation and allow wildlife passage through the Solar Siting Areas. Fencing will be designed to be at least 4 inches above ground and will not have razor wire at the top.
- The Project was sited outside of wetlands and waters to the extent feasible to avoid and minimize impacts to these resources as described in Section 3.3 and Section 3.5 of the EFSEC ASC, which will also avoid impacts to fish and minimize impacts to wildlife species that use these habitats.
- If the final design results in impacts to waters of the state that cannot be avoided, the Applicant will work with EFSEC and WDFW to confirm whether a Hydraulic Project Approval is required, and will prepare an application accordingly.
- During construction, WDFW-recommended seasonal buffers (per Larsen et al. 2004) for ferruginous hawk nests would be observed to avoid disturbing nesting ferruginous hawks.
- During construction, WDFW-recommended seasonal buffers (per Larsen et al. 2004) for burrowing owl nests would be observed to avoid disturbing nesting burrowing owls, if present. If impacts to potentially suitable habitat cannot be avoided during final design, the Applicant will consult with WDFW regarding the need for burrowing owl surveys prior to construction, including surveys to determine habitat suitability for burrowing owls, and surveys for breeding owls if suitable habitat is present.
- The Applicant does not anticipate using pesticides during Project construction or operation; if unforeseen circumstances arise that require the use of pesticides, the Applicant will consult with WDFW and EFSEC regarding use of pesticides to avoid and minimize impacts to burrowing owl (per Larsen et al. 2004).
- The Applicant would minimize bird and bat collision with Project infrastructure by implementing down-shield lighting (e.g., for permanent lighting at the substations and O&M facilities) that will be sited, limited in intensity, and hooded in a manner that prevents the lighting from projecting onto any adjacent properties, roadways, and waterways; lighting will be motion activated where practical (i.e., excluding security lighting);
- All permanent meteorological towers would be designed as free-standing (i.e., un-guyed) to minimize collision risk for wildlife.
- The Applicant would acquire any necessary federal approvals as described in Section 2.23 of the EFSEC ASC. The Applicant will continue ongoing coordination with the USFWS regarding an eagle take permit for incidental take of bald and golden eagles, and will continue to evaluate eagle risk to determine if an eagle take permit is appropriate considering the use of the Project by bald and golden eagles. The Applicant does not plan to pursue an eagle take permit for the

anticipated Phase 1 of the Project but will re-evaluate eagle risk and whether there is a need for an eagle take permit for the anticipated Phase 2 of the Project.

- The Applicant will limit construction disturbance by flagging any sensitive areas (e.g., wetlands,) and will conduct ongoing environmental monitoring during construction to ensure flagged areas are avoided.
- The Applicant has prepared a Bird and Bat Conservation Strategy that describes the surveys conducted, avoidance and minimization, and potential impacts to birds and bats and their habitat as a result of construction and operation of the Project (see Appendix M to the EFSEC ASC).
- The Applicant will conduct 2 years of standardized post-construction fatality monitoring to assess impacts of Turbine operation on birds and bats. Proposed post-construction fatality monitoring is described in the Applicant's Bird and Bat Conservation Strategy (Appendix M to the EFSEC ASC).

7.2 Ferruginous Hawk Avoidance and Minimization Measures

As discussed in Section 3.4.3 of the EFSEC ASC as well as in related responses to data requests submitted to the EFSEC, a number of minimization and avoidance measures were implemented early in the Project design phase to reduce impacts to ferruginous hawk and other raptor species. Considerations to the Project design included the following:

- Land leases along the Columbia River with private landowners were dropped from consideration to avoid development in proximity to suitable raptor nesting habitat along the cliffs adjacent to the river.
- In accordance with project-specific guidance provided by WDFW, Turbines nearest to Nest 03 were repositioned to be more than 0.5 mile away from the nest, which exceeded the 0.25-mile setback recommendation (M. Ritter, pers comm).
- Collection lines were co-located along existing roads and proposed access roads to reduce disturbance to raptor foraging habitat and interactions with aboveground electrical lines and poles.
- Project infrastructure was sited in previously disturbed areas to the extent feasible to avoid impacts to suitable ferruginous hawk foraging habitat in shrub-steppe and grassland habitats.
- Overhead electrical infrastructure will conform with Avian Power Line Interaction Committee suggested practices for reducing avian electrocution (APLIC 2006).
- All permanent meteorological towers will be unguyed to minimize collision risk for ferruginous hawks and other raptors.
- Development in and near draws and canyons was minimized to the extent practicable to reduce impacts to suitable raptor foraging and nesting habitat. For example, based on consultations with WDFW and EFSEC, collector lines originally planned to cross Webber and Sheep Canyons will be relocated south to near or above the head of the canyons.
- The Project will implement spatial and seasonal restrictions on ground-disturbing activities during construction, per WDFW recommendations (Larson et al. 2004; WDFW 2005).
- The Project will avoid the application of pesticide and rodenticides during the construction and operation.

7.3 Restoration

As described in the Revegetation and Noxious Weed Management Plan (Appendix N to the EFSEC ASC), temporarily disturbed areas and areas under the solar arrays would be revegetated following completion of construction with native or non-invasive, non-persistent non-native plant species. Example seed mixes consisting of native species are provided in the Revegetation and Noxious Weed Management Plan. Revegetation would begin as soon as feasible following completion of construction. Seeding would be done in a timely manner and within the appropriate season to facilitate germination. Site preparation, seeding techniques, and example seed mixes are described in the Revegetation and Noxious Weed Management Plan, along with success criteria, monitoring, and reporting. The Revegetation and Noxious Weed Management Plan also provides the methods, monitoring, and reporting associated with preventing the introduction and controlling the spread of noxious weeds from construction and operation of the Project.

7.4 Compensatory Mitigation

After avoidance and minimization measures have been implemented, some impacts to wildlife habitat would remain. This section describes compensatory mitigation proposed to account for the effects of unavoidable impacts to habitat, in compliance with the regulations and guidelines described in Section 2.

7.4.1 Habitat Mitigation Calculation

Table 4 provides the estimated maximum number of acres of each habitat type and subtype proposed to be impacted by the Project under Turbine Option 1 that would result in the need for mitigation (i.e., excluding impacts to agricultural and disturbed land that are shown above in Table 3), and the resulting acres of mitigation needed based on the approach described in this HMP. In Table 4, the acres of impact are multiplied by the appropriate mitigation ratio, depending on impact type and duration as well as habitat subtype, in order to determine the mitigation need by habitat type and subtype. The acreages shown in the table will be revised, once final Project design is known. The temporary and permanent impact mitigation ratios shown in Table 4 are consistent with the WDFW (2009) Wind Power Guidelines because these impact types match the definitions provided in WDFW (2009). The habitat mitigation ratios were developed for modified habitat in the absence of solar development guidelines and considering that revegetated habitat under solar arrays does not meet the definition of temporary or permanent impacts from WDFW (2009).

Table 4 summarizes Project impacts by impact type for habitat subtypes that result in the need for mitigation, for the purpose of calculating the maximum mitigation need for the Project. See Table 3 in Section 5.2 for a full tabulation of all Project impacts.

Table 4. Estimated Project Impacts on Habitat Subtypes and Associated Mitigation Need

Habitat Type	Habitat Subtype[1/]	WDFW (2009) Classification	Impact (Acres)	Mitigation Ratio[2/]	Mitigation (Acres)
Temporary Impacts Only[3/,4/,5/]					
Grassland	Eastside (interior) grassland	Class III	16	0.1:1	2
	Non-native grassland		137	0.1:1	14
	Planted grassland		263	0.1:1	26
Shrubland	Rabbitbrush shrubland	Class II	155	0.1:1	15

	Dwarf shrub-steppe		9	1:1	9
	Sagebrush shrub-steppe		32	0.5:1	16
Permanent Impacts Only[3/, 4/]					
Grassland	Eastside (interior) grassland	Class III	5	1:1	5
	Non-native grassland		13	1:1	13
	Planted grassland		32	1:1	32
Shrubland	Rabbitbrush shrubland	Class II	49	2:1	98
	Dwarf shrub-steppe		1	2:1	2
	Sagebrush shrub-steppe		1	2:1	2
Modified Habitat Only[4/]					
Grassland	Eastside (interior) grassland	Class III	68	0.5:1	34
	Non-native grassland		23	0.5:1	11
	Planted grassland		204	0.5:1	102
Shrubland	Rabbitbrush shrubland	Class II	668	0.5:1	334
Total[6/]					**716**

Notes:
1/ Only impacted subtypes that result in the need for mitigation are shown.
2/ Temporary and permanent impact mitigation ratios are consistent with the WDFW (2009) Wind Power Guidelines; modified habitat mitigation ratios were developed for this Project in the absence of solar development guidelines and considering revegetated habitat under solar arrays does not meet the definition of temporary or permanent impacts from WDFW (2009).
3/ Overlapping permanent disturbance is subtracted from temporary impact areas (e.g., temporary impact area around a Turbine does not include the Turbine foundation and graveled areas); those are included only in the permanent impact calculations.
4/ Temporary impacts associated with solar facilities include a 10-foot construction buffer along the outside of the solar fencelines. Permanent impacts include the solar inverters and new access roads within the Solar Siting Areas. Modified impacts include those areas associated with the solar arrays. Following construction, low-growing vegetation would be planted under the solar arrays; therefore, these impacts would be considered a modification of habitat versus a temporary or permanent impact.
5/ Per WDFW (2009), for temporary impacts, a reduced mitigation ratio may be considered if restoration results in a higher level of habitat function than pre-project conditions. This reduced ratio may be applied as a credit to subsequent Project phases following determination that revegetated result in a higher level of habitat function compared to pre-Project conditions.
6/ Totals may not sum exactly due to rounding.

For most habitat subtypes, the mitigation ratio for modified habitat is less than the replacement ratio for permanent impacts but greater than the ratio for temporary impacts for each habitat subtype given that the function and value of these habitat subtypes will be reduced somewhat following construction of the solar arrays but not eliminated as described in Section 6.0. Therefore, revegetation of areas within the solar array fenceline outside of permanent impact areas (e.g., roads) in combination with the compensatory mitigation will result in no loss of functions and values of habitat overall.

7.4.2 Mitigation Siting Criteria

The total acreage and habitat types needed to offset Project impacts are estimated in Section 7.4.1 and Table 4. That mitigation is intended to offset the impacts from habitat loss or modification, as described in Section 5.2. In order to ensure that the mitigation also adequately addresses potential landscape-level impacts, including those to ferruginous hawk or other PHS species, the location of the mitigation area will be critical. Three mitigation options are described in Section 7.4.3. The mitigation siting criteria in this section are meant to guide where mitigation occurs, whether it is the placement of an easement (Option 1) or investment in conservation actions through WDFW (Option 2) or a local conservation or land management entity (Option 3).

Regardless of the mitigation option, mitigation for the Project must meet the following criteria:

Criteria 1 – Habitat Mitigation Ratios and Acreages
Mitigation ratios and acreages shown in Table 4 will be generally met, knowing that at least the following will occur:

- Ratios and acreage for permanent habitat loss will be met.
- Ratios and acreages for temporary loss and habitat modification of habitat classified as Class II will be met.
- All other ratios and acreages are flexible provided that the total acreage is met and any portions of the mitigation area that are Class IV habitat will be enhanced to at least Class III habitat.

Criteria 2 – Ferruginous Hawk Nesting and Foraging Habitat
Mitigation will address the relative impact that the Project may have on ferruginous hawk nesting and foraging habitat. Removal of foraging habitat within core use areas (~3.2 kilometers/ ~2 miles) and home ranges (~10 kilometers/~6.2 miles) of occupied ferruginous hawk nests will be addressed by completing mitigation similarly within a core use area or home range on an occupied nest. Mitigation actions do not have to be inside the same core use area or home ranges where the habitat loss is occurring, but must be within the core use area or home range of a ferruginous hawk nest that is known to have been active within the last three breeding seasons. When locating mitigation areas, locations of prey concentration or at least habitat that is suitable for prey species will be taken into account.

Criteria 3 – Landscape Habitat Connectivity
The Applicant will complete mitigation in a location that meaningfully contributes to landscape-scale habitat connectivity, including, but not limited to, one or more of the following:

- A location deemed important in statewide connectivity and linkage studies such as those completed by the WHCWG and the ALI; or
- A location that is adjacent to other federal, state, or privately protected lands that are managed for conservation purposes, in order to increase the overall size of those protected habitat blocks and create a buffer against unprotected areas; or
- A location that is adjacent to notable landscape features (e.g., ridgelines, draws) that are important for wildlife movement but are not at risk of development, in order to increase the overall size of those protected habitat blocks and create a buffer against unprotected areas.

7.4.3 Mitigation Options

The Applicant proposes three potential mitigation options including (1) acquisition of a conservation easement to protect and enhance a compensatory habitat mitigation area, (2) mitigation fee with WDFW, and (3) payment to provide option with a local land trust or conservation organization, as available. In addition, the Applicant would also consider alternative mitigation pathways if available in the future. The Applicant may use one option or a combination of options to mitigate for habitat impacts, and will determine the combination of the mitigation options that best correlate to the impacted areas in consultation with WDFW and the affected landowners, subject to EFSEC's approval. The final mitigation approach will offer enough suitable habitat to meet the regulatory requirements described in Section 2. The duration of all three mitigation options will be for the life of the Project.

Option 1 – Conservation Easement

Option 1 may include a conservation easement on habitat that will provide functions and values for native vegetation and wildlife with an emphasis on mitigating those functions and values being impacted by the Project. The actual mitigation acres may be adjusted to account for these functions and values. For example, fewer acres of mitigation land may be required if that land is higher functioning (e.g., provides higher quality habitat, supports WDFW priority species) relative to the Project site or provides a beneficial expansion of high-value habitat (e.g., adjacent to existing or assumed future protected land).

The mitigation areas may be onsite (i.e., within the Project Lease Boundary). For example, areas of sagebrush shrub-steppe and grassland initially proposed for Turbine locations have been avoided in the current layout, including areas of sagebrush shrub-steppe habitat subtype that were avoided due to their designation as WDFW PHS locations and critical areas (e.g., see Figures 3.4-1 and 3.4-4 of the EFSEC ASC). Sufficient acreage of like-kind habitat may be available within the Project Lease Boundary to mitigate for Project impacts and achieve no loss of habitat functions and values. This option would meet the criteria for replacement habitat outlined by WDFW (2009), including that it is like-kind, would be given legal protection as well as protection from degradation for the life of the Project, is in the same geographical region as the impacted habitat, and is at some risk of development given the wind resource at these locations that resulted in the initial placement of Turbines.

If Option 1 is pursued, potential enhancements to provide habitat uplift may be appropriate depending on the mitigation area selected for conservation easement; enhancements could include weed control, seeding, planting, and/or other appropriate measures to ensure habitat functions and values are improved over time. The mitigation area could be managed by the Applicant or a designated conservation partner to ensure the habitat is protected from degradation for the life of the Project.

Option 2 – Mitigation Payment to WDFW

Option 2 is based on the mitigation "by fee" option outlined in WDFW (2009), which states that the wind project developer, the permitting authority, and WDFW can identify an appropriate annual fee for the life of the Project to mitigate the Project's impacts on habitat. Alternatively, a "lump-sum" upfront payment could be applied in lieu of annual fees and be determined by the number of acres of impact taking into consideration the duration of impact. The fee (annual or lump sum) would be determined by estimating the cost of placing a conservation easement and managing the mitigation area, as described in Option 1, over a number of acres and in a location sufficient to meet the mitigation ratios and other criteria summarized in Sections 7.4.1 and 7.4.2. Effectively, the fee would be the equivalent of the cost to acquire an easement and manage the conservation easement acres (Table 4) for the duration of the Project.

The payment would be used primarily to support "stewardship" (management, monitoring, restoration, protection from degradation [WDFW 2009]) of high-value habitat in the same ecological region as the Project. The stewardship funds could be applied to strategically important habitat acquired by WDFW throughout Washington. The annual fees or lump sum payment could be deposited into a dedicated WDFW account and may also be used for acquisition. The payment could be calculated by determining the cost per acre of obtaining a conservation easement and multiplying this by the acres of mitigation needed; the resulting value would be a payment amount equivalent to the cost of mitigating via a conservation easement. The determined cost per acre of a conservation easement may also take into consideration the cost of habitat enhancements, and maintenance and monitoring costs for the life of the Project.

Option 3 – Mitigation Payment to Local Conservation Entity

Option 3 may include a payment to a local land trust or conservation organization (e.g., Friends of Badger Mountain, Tapteal Greenway [Land Trust Alliance 2021; Ritter 2021]) and/or local tribes (i.e., Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, and the Wanapum Tribe) to support an ongoing or planned conservation project that benefits the types of habitats impacted by the Project. The identification of potential locations for mitigation in this option may consider areas identified for conservation and/or restoration by local tribes. The payment amount would be determined using similar methods as described for Option 2 (mitigation fee with WDFW), and could be used towards the acquisition and conservation of a property of the size described above to meet the Project mitigation need, or could be used to provide uplift to a larger area and/or at an existing conservation easement. The payment amount would be derived as described under Option 2, based on the acreage estimated in Option 1. The conservation project would be determined through coordination between the Applicant, EFSEC, WDFW, and the land trust or conservation organization or tribe.

Prior to construction, the Applicant would update or supplement this HMP to identify the selected mitigation option based on coordination with stakeholders, availability of mitigation opportunities, and the final layout and final habitat mapping, which will affect the quantity and habitat subtypes of impacted areas and thus the mitigation need. Additional details to be provided include a description of the baseline conditions at the mitigation area(s), including maps, mitigation measures (e.g., noxious weed control), and a description of how these mitigation measures have taken into consideration the probability of success, and ongoing management practices that will protect habitat and species, including a maintenance program.

7.4.4 Implementation Schedule

This HMP would be implemented concurrently with Project construction and continue through the life of the Project. Prior to construction, the Applicant would confirm the selected mitigation option(s) and update or supplement this HMP to describe the mitigation area(s) and appropriate mitigation measures, as applicable, as well as documentation of a conservation easement and/or a long-term financial commitment, depending on the option selected. During construction, the Applicant would initiate baseline surveys to inform any mitigation treatments (e.g., noxious weed control, seeding, etc.). Prior to operation, the Applicant would initiate any mitigation treatments, which could continue, as needed, through Project operation.

8 MONITORING AND REPORTING

For Option 1 (Conservation Easement), the Applicant would hire a qualified investigator (botanist, wildlife biologist, or revegetation specialist) to conduct a comprehensive monitoring program for the mitigation area, as appropriate. For Option 2 (Mitigation Fee with WDFW), the annual or lump-sum fee would cover the costs for WDFW to monitor and report, as needed, on stewardship activities. For Option 3 (Mitigation Payment to Local Conservation Entity), part of the payment would fund a stewardship endowment that would cover costs for the land trust, conservation organization, or tribe to monitor and report on how they have implemented the funding to meet the mitigation needs of the Project. The purpose of this monitoring is to evaluate on an ongoing basis the protection of the habitat quality and the results of any habitat enhancements.

For Option 1, the investigator would monitor the habitat mitigation area for the life of the Project beginning in the year following the initial planting/seeding as applicable. Monitoring would occur annually during the first 5 years following initial treatment, as applicable, then occur every 2 years until year 10 (i.e., in years 7 and 9), then every 5 years thereafter. The Applicant would identify appropriate monitoring actions for the Conservation Easement and any habitat treatments that are implemented in consultation with WDFW. Depending upon specific habitat treatments implemented, the investigator may carry out the following monitoring procedures:

1. Assess vegetation cover (species, structural stage, etc.) and progress toward meeting the success criteria (see Section 9 of this HMP);
2. Record environmental factors (such as precipitation at the time of surveys and precipitation levels for the year);
3. Record any wildfire that occurs within the mitigation area and any remedial actions taken to restore habitat quality in the damaged area;
4. Assess the success of the weed control program and recommend remedial action, if needed; and
5. Assess the survival rate and growth of planted/seeded species.

The investigator would visit identified monitoring locations within planted areas, as applicable. The mitigation area would be compared to baseline conditions to determine the success of any treatments, and may also be compared to reference sites at the Project to demonstrate how the mitigation achieves equivalent or greater habitat quality than the areas impacted. Prior to construction and after the mitigation option(s) has been selected, the Applicant would update or supplement this HMP to include additional monitoring details such as monitoring locations as applicable.

9 SUCCESS CRITERIA

Ultimately mitigation must achieve no loss of functions and values of fish and wildlife habitat. This will be demonstrated by tracking the quantity and quality of mitigation provided for the duration of the Project, relative to the quantity and quality of habitat lost during Project construction and operations. Mitigation for the quantity of habitat impacts of the Project will be considered successful if the Applicant documents through monitoring and reporting the protection and enhancement of sufficient habitat to meet the habitat replacement requirements as described in Sections 2 and 7.4.1. For Options 2 and 3, mitigation would be considered successful if the Applicant provided adequate funding for WDFW or a third-party conservation organization to protect and manage sufficient habitat to meet the habitat replacement requirements described in Sections 2 and 7.4.

Quality of habitat in the mitigation area or associated with the mitigation project (Options 2 and 3) will be measured relative to habitat conditions at the Project site, prior to construction, and relative to baseline conditions in the mitigation area. If habitat quality in the mitigation area is higher than that being lost at the Project site, the Applicant will at least maintain the habitat condition for the duration of the Project. If the habitat condition in the mitigation area is the same or lower than the Project site, the Applicant will enhance the habitat in the mitigation area so that the habitat quality exceeds that at the Project site.

In all cases, the Applicant may choose to use, for comparison, an agreed upon reference site to establish what is ecologically possible in the region. This will help account for variability in the timing and amount of precipitation, average winter and summer temperature, and other localized factors that influence habitat conditions over time.

10 WASHINGTON ADMINISTRATIVE CODE COMPLIANCE

Compliance with the WAC is shown in Table 5.

Table 5. Washington Administrative Code 463-60-332(3) Requirements Matrix

Requirement	Section(s) where addressed
(3) Mitigation plan. The application shall include a detailed discussion of mitigation measures, including avoidance, minimization of impacts, and mitigation through compensation or preservation and restoration of existing habitats and species, proposed to compensate for the impacts that have been identified. The mitigation plan shall also:	Entire
(a) Be based on sound science	Throughout (e.g., see Sections 6.0 and 7.4.1)
(b) Address all best management practices to be employed and setbacks to be established	Sections 7.1 and 7.2
(c) Address how cumulative impacts associated with the energy facility will be avoided or minimized	Sections 5.2 and 7.4
(d) Demonstrate how the mitigation measures will achieve equivalent or greater habitat quality, value and function for those habitats being impacted, as well as for habitats being enhanced, created or protected through mitigation actions	Sections 5.0 and 7.4
(e) Identify and quantify level of compensation for impacts to, or losses of, existing species due to project impacts and mitigation measures, including benefits that would occur to existing and new species due to implementation of the mitigation measures;	Sections 7.4.1 through 7.4.3
(f) Address how mitigation measures considered have taken into consideration the probability of success of full and adequate implementation of the mitigation plan	Section 7.0
(g) Identify future use of any manmade ponds or structures created through construction and operation of the facility or associated mitigation measures, and associated beneficial or detrimental impacts to habitats, fish and wildlife	Not Applicable
(h) Discuss the schedule for implementation of the mitigation plan, prior to, during, and post construction and operation	7.4.4
(i) Discuss ongoing management practices that will protect habitat and species, including proposed monitoring and maintenance programs	Sections 7.3, 7.4.3, and 8.0
(j) Mitigation plans should give priority to proven mitigation methods. Experimental mitigation techniques and mitigation banking may be considered by the council on a case-by-case basis. Proposals for experimental mitigation techniques and mitigation banking must be supported with analyses demonstrating that compensation will meet or exceed requirements giving consideration to the uncertainty of experimental techniques, and that banking credits meet all applicable state requirements.	Not Applicable

11 REFERENCES

ALI (Arid Lands Initiative). 2014. Spatial Conservation Priorities in the Columbia Plateau Ecoregion: Methods and data used to identify collaborative conservation priority areas for the Arid Lands

Initiative. Report prepared for the Great Northern Landscape Conservation Cooperative. 104 pp. Available online at: https://www.sciencebase.gov/catalog/folder/52050595e4b0403aa6262c64.

APLIC (Avian Power Line Interaction Committee). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Public Interest Energy Research Program (PIER) Final Project Report CEC-500-2006-022. Edison Electric Institute, APLIC, and the California Energy Commission. Washington D.C. and Sacramento, California.

BCNWCB (Benton County Noxious Weed Control Board). 2020. 2020 Benton County Noxious Weed List. Available online at: http://www.bentonweedboard.com/ (Accessed December 2020).

Beatty, B., J. Mcknick, J. McCall, G. Braus, and D. Buckner. 2017. Native Vegetation Performance under a Solar PV Array at the National Wind Technology Center. Technical Report NREL/TP-1900-66218. National Renewable Energy Laboratory. Golden, Colorado.

Benton County. 2018. Benton County Planning Department Staff Report to the Benton County Planning Commission, OA 2017-004 PC Staff Report March 13, 2018.

Chatfield, A., and S. Brown. 2018a. Results of the 2018 vegetation and land cover mapping for the Badger Canyon Wind Project, Benton County, Washington. Memo to Joseph Wood and Jeffrey Wagner, wpd Wind Projects Inc. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. September 20, 2018.

Chatfield, A., and S. Brown. 2018b. Results of the 2018 vegetation and land cover mapping for the Four Mile Wind Project, Benton County, Washington. Memo to Joseph Wood and Jeffrey Wagner, wpd Wind Projects Inc. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. October 8, 2018.

DeVault, T. L., T. W. Seamans, J. A. Schmidt, J. L. Belant, and B. F. Blackwell. 2014. Bird use of solar photovoltaic installations at US airports: Implications for aviation safety. *Landscape and Urban Planning* 122:122–128.

Erickson, W. P., K. Kronner, and R. Gritski. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. Available online: http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

EFSEC (Energy Facility Site Evaluation Council). 2021. Goose Prairie Solar Project Background. Yakima County, WA. Available online at: https://www.efsec.wa.gov/energy-facilities/goose-prairie-solar (Accessed January 27, 2021).

Great Northern Landscape Conservation Cooperative. 2015. Priority Core Area (PCA) and Priority Linkage Area (PLA) geodatabase. Available online at: https://www.sciencebase.gov/catalog/item/561fdda8e4b03ee62faa90a0 (Accessed August 10, 2021).

Hassanpour Adeh. E., J. S. Selker, and C. W. Higgins. 2018. Remarkable agrivoltaic influence on soil moisture, micrometeorology and water-use efficiency. *PLOS ONE* 13(11): e0203256. https://doi.org/10.1371/journal.pone.0203256

Hernandez, R. R., K. E. Tanner, S. Haji, I. M. Parker, B. M. Pavlik, and K. A. Moore-O'Leary. 2020. Simulated Photovoltaic Solar Panels Alter the Seed Bank Survival of Two Desert Annual Plant Species. *Plants* 9(9):1125.

Johnson, D. H., and T. A. O'Neil. 2001. *Wildlife-Habitat Relationships in Oregon and Washington.* Oregon State University Press, Corvallis. 736 pp.

Land Trust Alliance. 2021. Land Trust Alliance Member Land Trusts Working in Benton County, Washington. Available online at: https://www.findalandtrust.org/counties/53005 (Accessed January 27, 2021).

Larsen, E., J. M. Azerrad, and N. Nordstrom, editors. 2004. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Ritter, M. 2021. Personal Communication with Scout, Tetra Tech, and WEST during virtual Project update meeting. January 27, 2021.

Sinha, P., B. Hoffman, J. Sakers, and L. Althouse. 2018. Best practices in responsible land use for improving biodiversity at a utility-scale solar facility. *Case Studies in the Environment* 2(1):1–12. https://doi.org/10.1525/cse.2018.001123

Tetra Tech. 2021a. Botany and Habitat Survey Report. Horse Heaven Wind Farm. Prepared for Horse Heaven Wind Farm, LLC. January.

Tetra Tech. 2021b. 2021 Botany and Habitat Survey Report. Horse Heaven Wind Farm. Prepared for Horse Heaven Wind Farm, LLC. August.

Tirmenstein, D. 1999. *Ericameria nauseosa*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available online at: https://www.fs.fed.us/database/feis/plants/shrub/erinau/all.html (Accessed October 2020).

USDA (U.S. Department of Agriculture). 2017. Field Guide for Managing Rabbitbrush in the Southwest. U.S. Department of Agriculture, Forest Service, Southwestern Region. Document TP-R3-16-31. Available online at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd563029.pdf (Accessed October 2020).

USFWS (U.S. Fish and Wildlife Service). 2012. Land-Based Wind Energy Guidelines. March 23, 2012. 82 pp. Available online at: http://www.fws.gov/cno/pdf/Energy/2012_Wind_Energy_Guidelines_final.pdf

USFWS. 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. 103 pp. + frontmatter. Available online at: https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf

USFWS. 2016. Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests. Final Rule. *Federal Register* 81(242): 91494-91554. December 16, 2016.

USFWS. 2018. National Wetlands Inventory (NWI). Seamless Wetlands Data by State. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C. Geodatabase and Shapefile data available online: http://www.fws.gov/wetlands/data/State-Downloads.html

USGS (U.S. Geological Survey). 2016. National Land Cover Database (NLCD) 2016 Land Cover Conterminous United States. Published January 2019. Available online at: https://www.mrlc.gov/

Visser, E., V. Perlod, S. Ralston-Paton, A. C. Cardenal, and P. G. Ryan. 2018. Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa. *Renewable Energy* 133:1285–1294.

WDFW (Washington Department of Fish and Wildlife). 1999. Requiring or recommending mitigation. Policy POL-M-5002. Available online at: https://wdfw.wa.gov/sites/default/files/about/advisory/hcicag/documents/implementation_guidance/pol-m5002.pdf

WDFW. 2005. Management Recommendations for Washington Priority Species. For Use to Guide Site Specific Management of Priority species. Ferruginous Hawk (*Buteo regalis*). Olympia, Washington.

WDFW. 2009. Washington Department of Fish and Wildlife Wind Power Guidelines. Olympia, WA. 30 pp.

WDFW. 2020a. Priority Habitats and Species database query results. Provided by WDFW February 18, 2020.

WDFW. 2020b. Washington Action Plan For Implementation of Department of the Interior Secretarial Order 3362: "Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors".

WHCWG (Washington Wildlife Habitat Connectivity Working Group). 2012. Washington Connected Landscapes Project: Analysis of the Columbia Plateau Ecoregion. Washington's Department of Fish and Wildlife, and Department of Transportation, Olympia, WA. Available online at: http://waconnected.org/cp_focalspecies_landscapeintegrity/

WHCWG. 2013. Columbia Plateau Ecoregion Connectivity Analysis Addendum: Habitat Connectivity Centrality, Pinch-points, and Barriers/Restoration Analyses. Washington's Department of Fish and Wildlife, and Department of Transportation, Olympia, WA.

WSNWCB (Washington State Noxious Weed Control Board). 2020. 2020 Washington State Noxious Weed List. Available online at: https://www.nwcb.wa.gov/printable-noxious-weed-list (Accessed December 2020).

Yakima Herald. 2019. Central Washington stepping up to produce renewable energy. June 23, 2019; Updated Jul 30, 2019. Available online at: https://www.yakimaherald.com/news/local/central-washington-stepping-up-to-produce-renewable-energy/article_77d185ea-2a26-5a6c-bdbc-e0114787cb76.html (Accessed February 3, 2021).

Yang, L., S. Jin, P. Danielson, C. Homer, L. Gass, S. M. Bender, A. Case, C. Costello, J. Dewitz, J. Fry, M. Funk, B. Granneman, G. C. Liknes, M. Rigge, and G. Xian. 2018. A new generation of the

United States National Land Cover Database: Requirements, research priorities, design, and implementation strategies. *ISPRS Journal of Photogrammetry and Remote Sensing* 146:108–112.

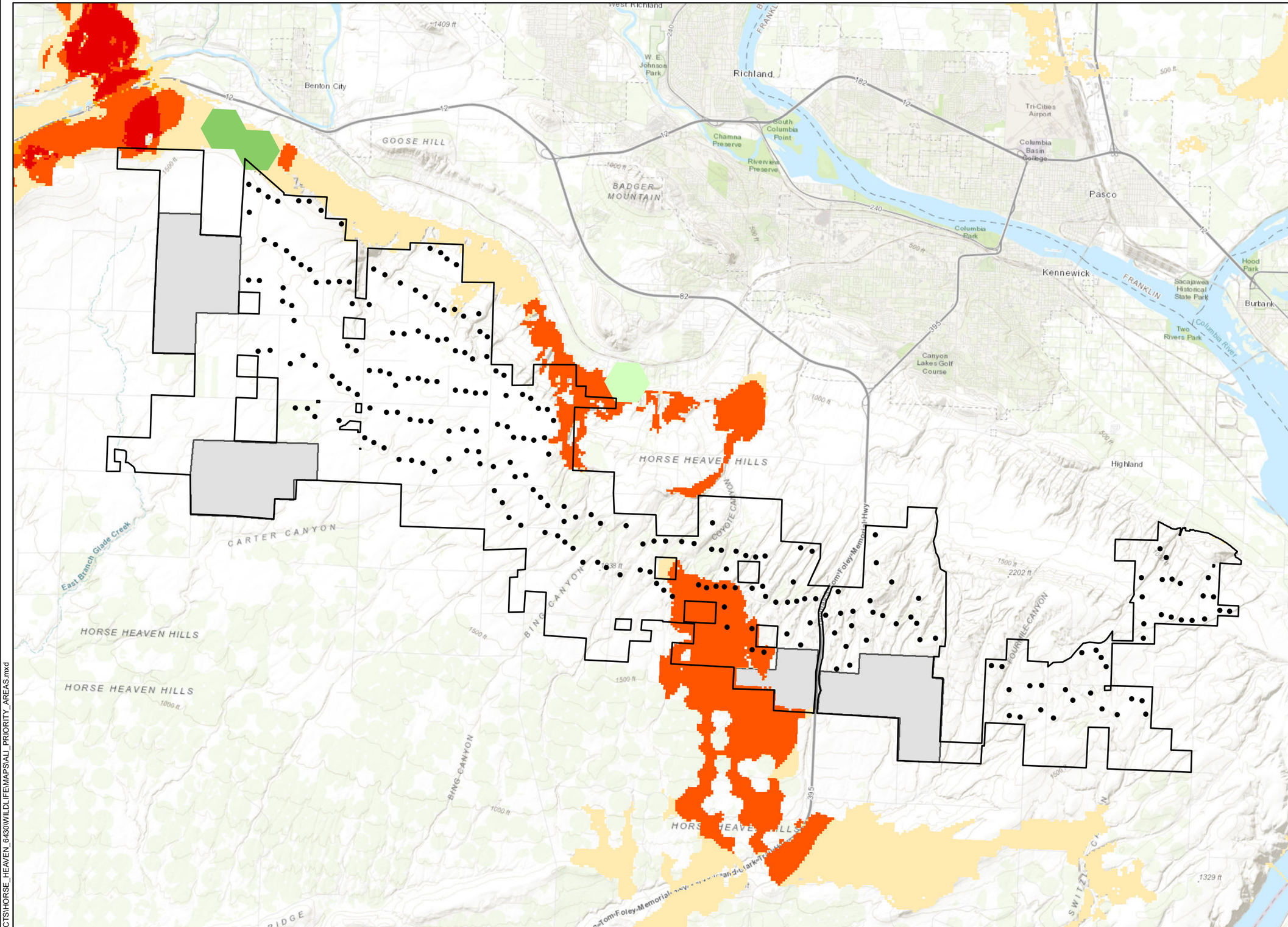
FIGURES

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 1
ALI Shared Priority Area Model Results

BENTON COUNTY, WA



- Option 1 Turbine Layout
- Project Lease Boundary
- Solar Siting

Priority Core

Contribution of Priority Area to under-represented Targets

- Low
- Medium-low

WHCWG Linkages

Linage Centrality Cumulative Rating

- High Linkage Centrality
- Very High Linkage Centrality

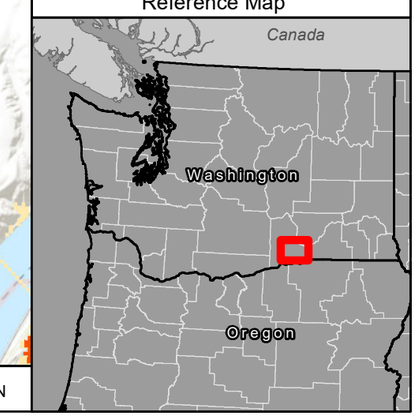
Number of Overlapping WHCWG Focal Species Networks

- 4-5 Overlapping Focal Species Networks
- 6-9 Overlapping Focal Species Networks

NOTE: Turbine Layout Option 1 is provided as submitted with Application for Site Certification (February 2021). Infrastructure locations subject to change pending ongoing discussions with EFSEC.

TETRA TECH

Reference Map



1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

R:\PROJECTS\HORSE_HEAVEN_6430\WILDLIFE\MAPS\ALI_PRIORITY_AREAS.mxd

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 2
Townsend's Ground Squirrel Habitat Concentration Areas as Modeled by the WHCWG

BENTON COUNTY, WA

- Option 1 Turbine Layout
- Project Lease Boundary
- Solar Siting Area

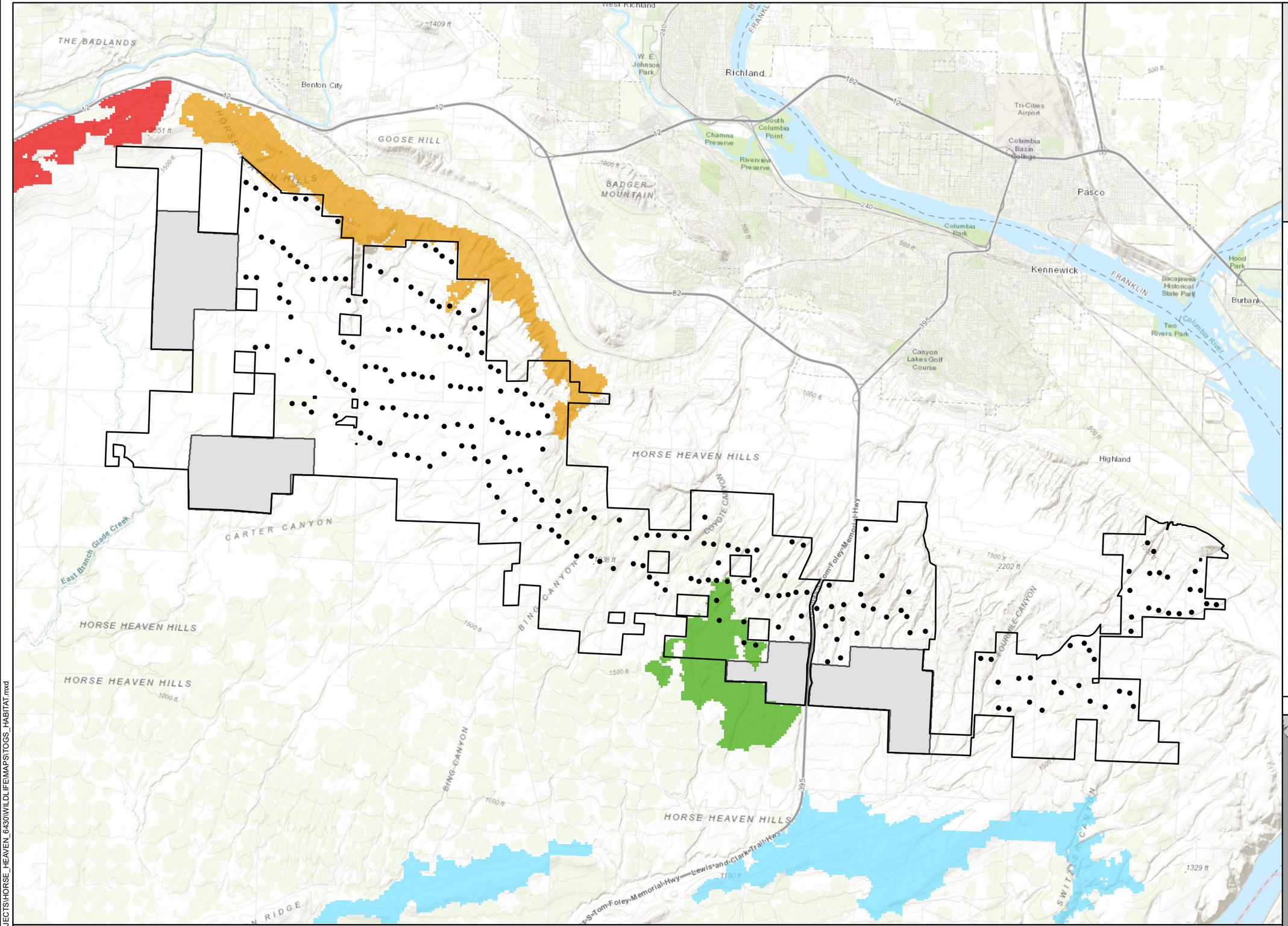
Habitat Concentration Area

- Highest
- Very High
- High
- Medium
- Low

NOTE: Turbine Layout Option 1 is provided as submitted with Application for Site Certification (February 2021). Infrastructure locations subject to change pending ongoing discussions with EFSEC.

TETRA TECH

Reference Map



1:140,000 WGS 1984 UTM Zone 11N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

R:\PROJECTS\HORSE_HEAVEN_6430\WILDLIFE\MAPS\TOGS_HABITAT.mxd

ATTACHMENT A
FERRUGINOUS HAWK NESTS AND DISTANCES TO PROJECT INFRASTRUCTURE

ENVIRONMENTAL & STATISTICAL CONSULTANTS

2725 NW Walnut Blvd., Corvallis, OR 97330

Phone: 541-230-1790 ◆ www.west-inc.com ◆ Fax: 307-637-6981

DATE: November 23, 2021

TO: David Kobus, Senior Project Manager, Scout Clean Energy

FROM: Erik Jansen, Wildlife Biologist, Western EcoSystems Technology, Inc.

RE: WDFW Data Request for Ferruginous Hawk Nests and Distances to Project Infrastructure Received From the Washington Energy Facility Site Evaluation Council on November 18, 2021.

Objective

The objective of the assessment was to measure the distance from the nearest Wind Turbine (Turbine) or access road to the nearest ferruginous hawk nest identified during 2017−2019 raptor nest surveys located within 2-miles of the Horse Heaven Clean Energy Center (HHCEC or Project), Benton County, Washington. This assessment also outlines minimization and avoidance measures as described in the Project's Application for Site Certification (ASC) that have been implemented in the Project design to minimize impacts to ferruginous hawk and other nesting raptors.

Methods

Using the Turbine and road layout submitted in the HHCEC ASC, the linear and ground distance from a ferruginous hawk nest to the nearest Turbine or road was measured in Google Earth. The linear distance is defined as the straight-line distance whereas the ground distance accounts for changes in topography. Elevation (above sea level) for both nest and nearest Turbine/road were calculated in Google Earth.

WEST included all occupied and unoccupied ferruginous hawk nests documented during 2017−2019 aerial surveys and located within two miles of the currently proposed Turbines or roads. Survey methods are described in the technical reports (Jansen 2017, Jansen and Brown 2018, Chatfield 2019a-b, Jansen et al. 2019).

WEST categorized territory occupancy and nest status using definitions originally proposed by Postupalsky (1974) and largely followed today (USFWS 2013). Nests were classified as occupied if any of the following were observed at the nest structure: (1) an adult in an incubating position; (2) eggs; (3) nestlings or fledglings; (4) presence of an adult (sometimes sub-adults); (5) a newly constructed or refurbished stick nest in the area where territorial behavior of a raptor had been observed earlier in the breeding season; or (6) a recently repaired nest with fresh sticks (clean breaks) or fresh boughs on top, and/or droppings and/or molted feathers on its rim or underneath. Occupied nests were further classified as active if an egg (s) or young were observed or an adult was clearly in an incubating position. Nests were classified as inactive if no eggs or young were present. Nests not meeting the above criteria for "Occupied" during at least two consecutive surveys were classified as "Unoccupied."

Although the majority of the nests were unoccupied during the three survey years, ferruginous hawks typically construct robust stick nests on the ground or rock outcroppings that can be differentiated from other raptor species. The robust construction and nest location on the ground results in long persistence times of the nest on the landscape, even when the nest has been unoccupied for many years. To assist in determining territory occupancy and nesting status, the nest condition was classified as good, fair or poor which was defined as: good = in excellent condition with very well-defined bowl, no sagging, possible to use immediately or currently in use; fair = in generally good condition with fairly well-defined bowl, minor sagging, may require some repair or addition to use immediately; and poor = dilapidated nest that is sloughing or sagging and would require substantial rebuilding to be usable during the nesting period (Appendix A).

Results

Surveys conducted in 2017−2019 documented nine ferruginous hawk nests within 2 miles of proposed Turbines (Table 1). Two of the nine nests (Nest 03 and Nest 08) were occupied at least once during the three-year survey period (Figure 1 and Figure 2). Nest 03 had an adult sitting in the nest incubating or contained eggs during the second aerial survey during all three-survey years. Nest 08 had an adult standing on the rim of the nest during the first aerial survey in 2017, which suggests territory occupancy, but follow-up surveys in 2017−2019 resulted in no sign of active nesting or nest tending. The remaining seven nests were in poor condition and would require substantial repair for nesting. The inactive nests were dilapidated and comprised of scattered sticks and nest material, which suggests the nests were not used for one or more nesting periods prior to 2017 surveys.

The linear distance from all nests to the nearest Turbine ranged between 1,115 – 4,708 feet (ft). The occupied/active Nest 03 is located a linear distance of 2,795 ft (0.53 mi; ground distance 2,806 ft) to Turbine 116 with an elevation difference of 245 ft from nest to the Turbine. The sloping topography between Nest 03, which is in a tree located at the bottom of Coyote Canyon, and Turbine 116, which is located on the adjacent ridge to the southwest, reduces but not eliminates the line-of-sight from the nest to the proposed Turbine (Figure 3). Nest 08 which was occupied/inactive in 2017 is located a linear distance of 4,708 ft (0.89 mi; ground distance 4,743 ft) to Turbine 49 with an elevation difference of approximately 580 feet. The nest is located on a steep, southeast facing cliff within Badger Canyon that obstructs the line-of sight to Project infrastructure located to the west (Figure 4). The nest (Nest 10) nearest to a Turbine, was unoccupied and inactive and in poor condition during all survey years (Table 1). In all cases, roads were located further away from the nest than Turbines.

To avoid disturbance to nesting ferruginous hawks and their prey base, the Washington Department of Fish and Wildlife (WDFW) recommends spatial and temporal buffers around active nests (Appendix B; WDFW 2005). Around all active nests, WDFW recommends avoiding human access and ground-based activities within 820 ft of the nest between March 1 – May 30, and preventing prolonged activities lasting greater than 0.5 hrs within 3,280 ft of a nest between March 1 – August 15 (WDFW 2005). Based on the nesting status of Nest 03, ground-disturbing activities lasting greater than 0.5 hrs should be prevented within 3,280 ft of the nest between March 1 – August 15; affecting construction activity around proposed Turbine 116 (Figure 3). Nest 08 is

located greater than the maximum disturbance buffer from Turbine 49 and other proposed infrastructure.

As discussed in Section 3.4.3 of the Project ASC as well as in related responses to data requests submitted to the Energy Facility Site Evaluation Council (EFSEC), a number of minimization and avoidance measures were implemented early in the Project design phase to reduce impacts to ferruginous hawk and other raptor species. Considerations to the Project design included:

- Land leases along the Columbia River with private landowners were dropped from consideration to avoid development in proximity to suitable raptor nesting habitat along the cliffs adjacent to the River.
- In accordance with guidance provided by WDFW, Turbines nearest to Nest 03 were repositioned more than 0.5 miles away from the nest, which exceeded the 0.25 mile set-back recommendation (M. Ritter, pers comm).
- Collection lines were co-located along existing roads and proposed access roads to reduce disturbance to raptor foraging habitat and interactions with aboveground electrical lines and poles.
- Project infrastructure was sited in previously disturbed areas to the extent feasible to avoid impacts to suitable ferruginous hawk foraging habitat in shrub-scrub and grassland habitats.
- Overhead electrical infrastructure will conform with Avian Power Line Interaction Committee suggested practices for reducing avian electrocution (APLIC 2006).
- All permanent meteorological towers will be unguyed to minimize collision risk for ferruginous hawks and other raptors.
- Development in and near draws and canyons was minimized to the extent practicable to reduce impacts to suitable raptor foraging and nesting habitat.
- The Project will implement spatial and seasonal restrictions on ground disturbing activities, per WDFW recommendations (Larson et al. 2004, WDFW 2005).
- The Project will avoid the application of pesticide and rodenticides during the construction and operation of the HHCEC (WDFW 2005).

References

Avian Power Line Interaction Committee (APLIC). 2006) Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison electric Institute, APLIC and the California Energy Commission. Washington, D.C. and Sacramento, California.

Chatfield, A., T. Rintz, and E. Jansen. 2019a. Results of the 2019 Raptor Nest Survey for the Badger Canyon Wind Project, Benton County, Washington. Prepared for Badger Canyon MW LLC, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. July 12, 2019.

Chatfield, A., T. Rintz, and E. Jansen. 2019b. Results of the 2019 Raptor Nest Survey for the Four Mile Wind Project, Benton County, Washington. Prepared for Badger Canyon MW LLC, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. July 12, 2019.

Jansen, E. 2017. 2017 Raptor Nest Survey Report for the Proposed Horse Heaven Wind Project, Benton County, Washington. Memo to Horse Heaven Wind Project, LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. August.

Jansen, E. W. and S. R. Brown. 2018. Wildlife Survey Report for the Horse Heaven Wind Project, Benton County, Washington. Final Report: August 11, 2017 – July 16, 2018. Prepared for Horse Heaven Wind Farm, Boulder Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. October.

Jansen, E. W., S. R. Brown, and K. B. Hutchison. 2019. Avian Use and Raptor Nest Survey Report for the Horse Heaven Wind Energy Project, Benton County, Washington Draft Report. Year 2 Final Report July2018 – June 2019. Prepared for Horse Heaven Wind Farm, Boulder Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. August.

Larsen, E., J. M. Azerrad, and N. Nordstrom, editors. 2004. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Postupalsky, S. 1974. Raptor Reproductive Success: Some Problems with Methods, Criteria and Terminology. Pp. 21-31 F. N. Hamerstrom, Jr., B. E. Harrell, and R. R. Olendorff , eds., *In* Management of Raptors. Raptor Research Foundation, Vermillion, South Dakota.

U.S. Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. Executive Summary and front matter + 103 pp. Available online: https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf

Washington Department of Fish and Wildlife. 2005. Management Recommendations for Washington Priority Species. For Use to Guide Site Specific Management of Priority species. Ferruginous Hawk (*Buteo regalis*). Olympia, Washington.

Table 1. Status of ferruginous hawk nests and distance to nearest disturbance within 2-miles* of the Horse Heaven Clean Energy Center, Benton County, Washington.

Nest ID	Territory Occupancy / Nest Status	2019 Nest Condition	Distance to Turbine (ft)	Closest Turbine #	Landscape Context
03	2017: Occupied / Active[1] 2018: Occupied / Active 2019: Occupied / Active	Good	Linear: 2,795 Ground: 2,806	116	*Tree nest along Coyote Creek Rd.* Nest Elevation: 1,366 ft Turb Elevation: 1,611 ft
08	2017: Occupied / Inactive[2] 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Good	Linear: 4,708 Ground: 4,743	49	*Badger Canyon* Nest Elevation: 1,162 ft Turb Elevation: 1,745 ft
10	2017: Unoccupied / Inactive 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 1,115 Ground: 1,127	19	*Sheep Canyon* Nest Elevation: 1,379 ft Turb Elevation: 1,541 ft
11	2017: Unoccupied / Inactive 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 4,621 Ground: 4,635	18	*Sheep County* Nest Elevation: 994 ft Turb Elevation: 1,346 ft
13	2017: Unoccupied / Inactive 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 2,266 Ground: 2,278	05	*Unnamed Canyon; nest fragments* Nest Elevation: 895 ft Turb Elevation: 1,115 ft
15	2017: Unoccupied / Inactive 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 4,082 Ground: 4,083	05	*Webber Canyon* Nest Elevation: 1,012 ft Turb Elevation: 1,115 ft
16	2017: Unoccupied / Inactive 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 2,025 Ground: 2,036	09	*Webber Canyon* Nest Elevation: 1,249 ft Turb Elevation: 1,454 ft
17	2017: Unoccupied / Inactive 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 4,348 Ground: 4,374	09	*Webber Canyon* Nest Elevation: 987 ft Turb Elevation: 1,454 ft
30	2017: Not Located 2018: Unoccupied / Inactive 2019: Unoccupied / Inactive	Poor	Linear: 1,688 Ground: 1,710	28	*Webber Canyon* Nest Elevation: 1,169 ft Turb Elevation: 1,475 ft

[1] Nest 03: 2017-2019 = Adult in incubating posture during second survey; 2018: Adult on eggs observed second survey; 2019: Adult in incubating posture during second survey.
[2] Nest 08: 2017 = Adult standing on nest rim during first survey and absent second survey with no sign of nesting.
* Nest 04 and Nest 22 in 2017−2018 and 2018−2019 survey reports are >2 miles from Project Turbines and roads.

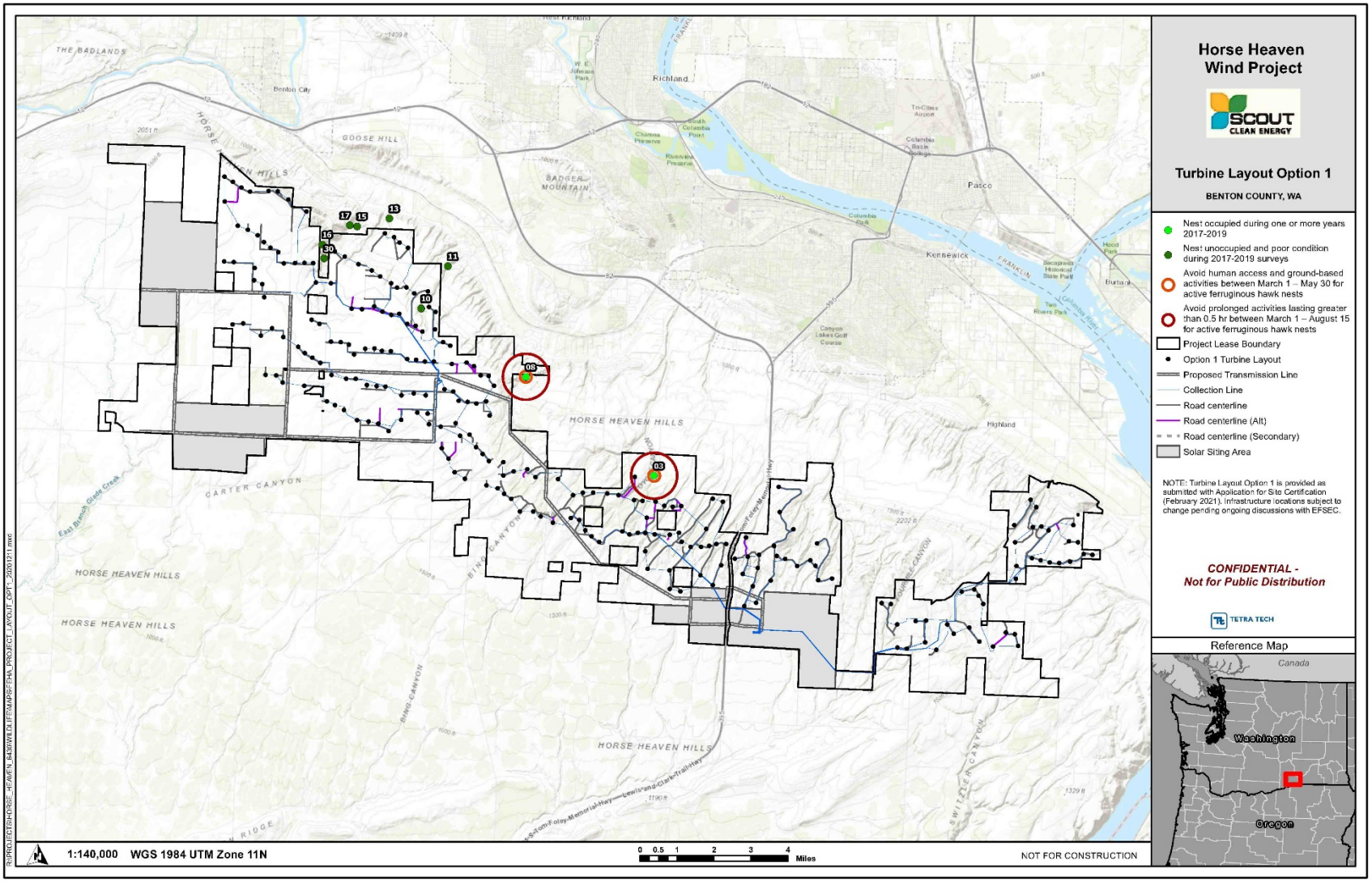


Figure 1. Ferruginous hawk nests documented 2017−2019 and associated WDFW disturbance avoidance buffers at active nests located within 2-miles of the Horse Heaven Clean Energy Center, Benton County Washington.

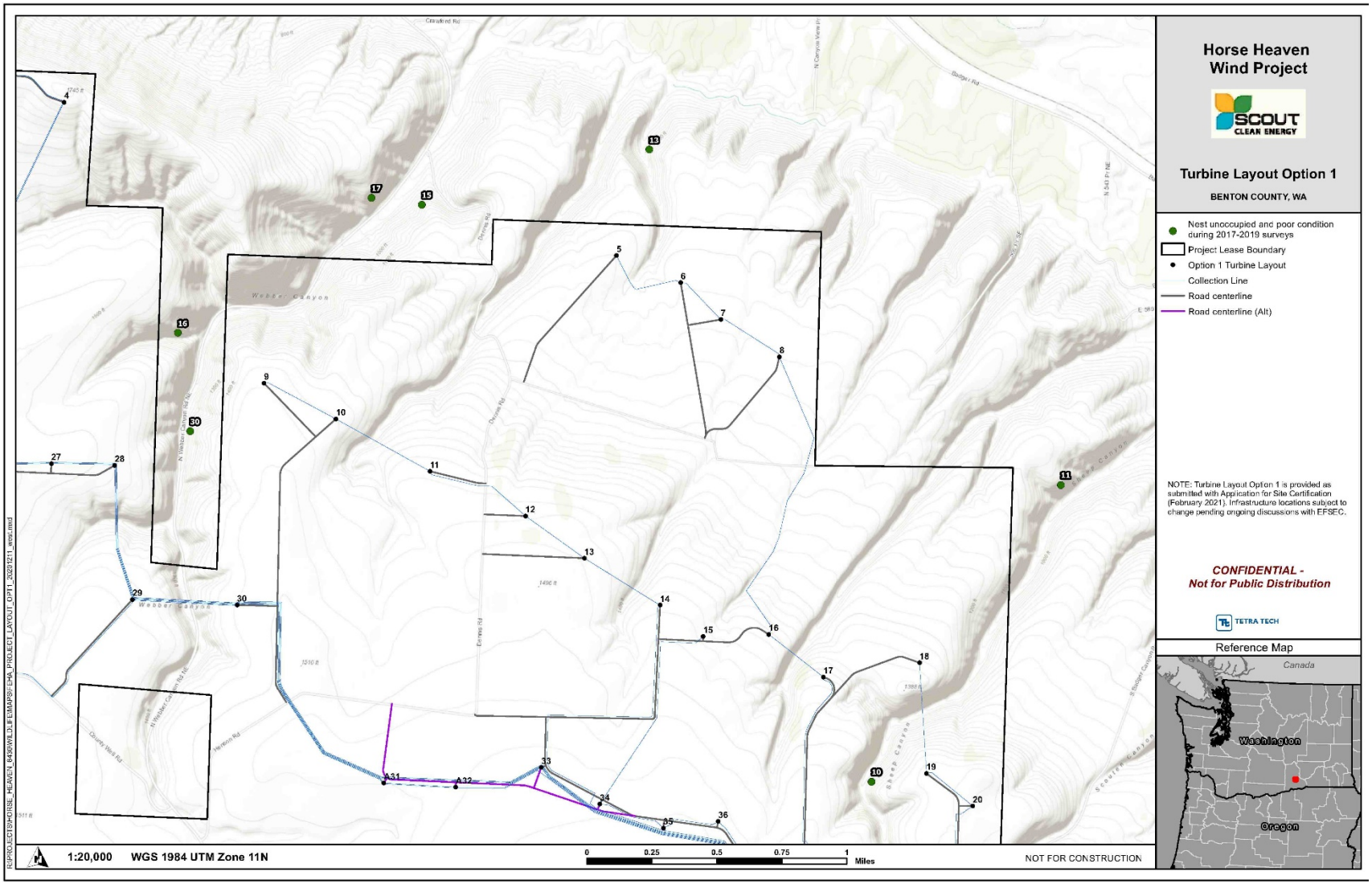


Figure 2. Unoccupied/Inactive ferruginous hawk nests documented 2017−2019 within Webber Canyon and Sheep Canyon at the Horse Heaven Clean Energy Center, Benton County Washington.

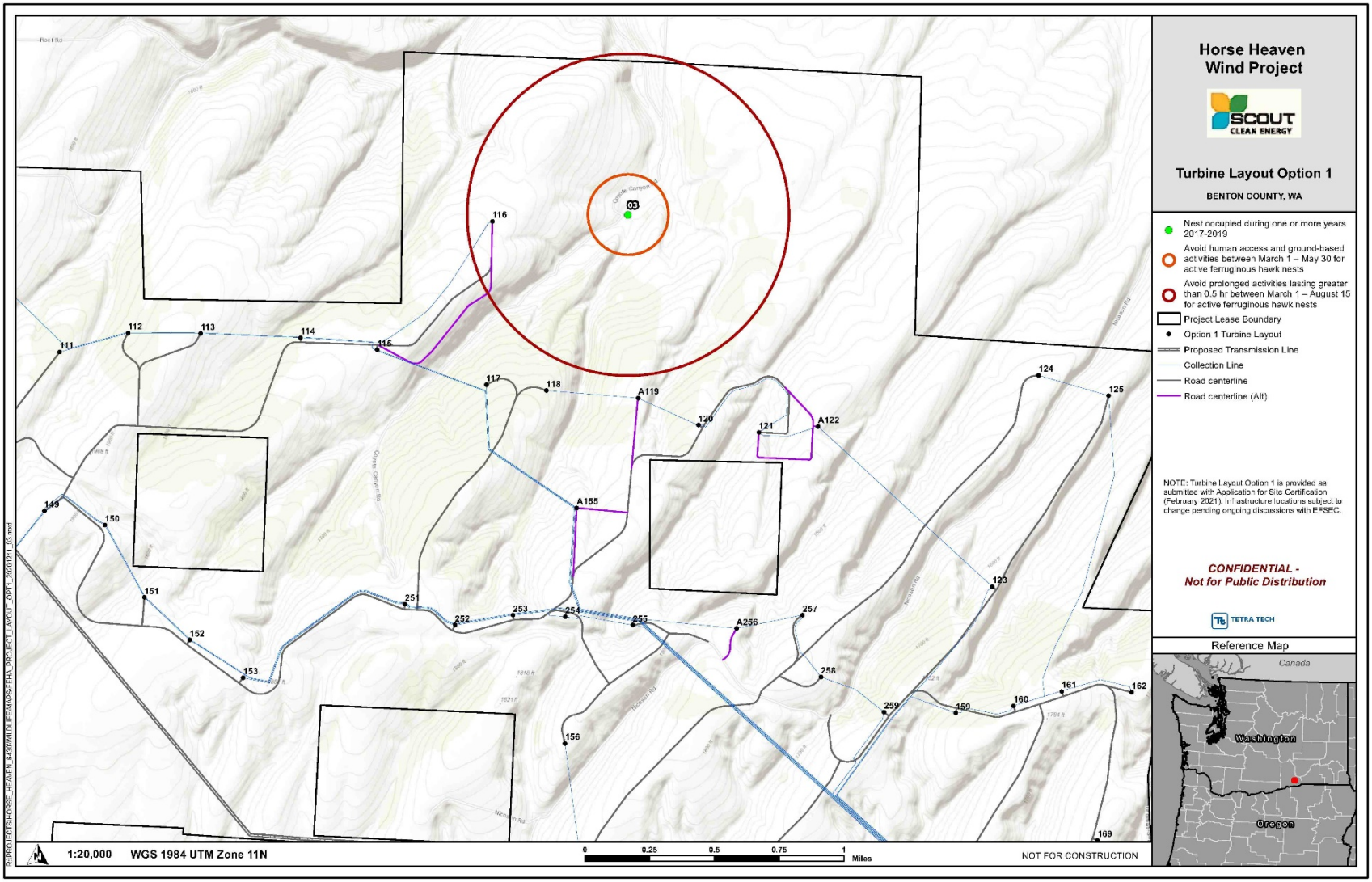


Figure 3. Ferruginous hawk Nest 03 documented as occupied/active during raptor nest surveys conducted 2017-2019 within 2-miles of the Horse Heave Clean Energy Center, Benton County Washington. WDFW (2005) disturbance buffers are shown.

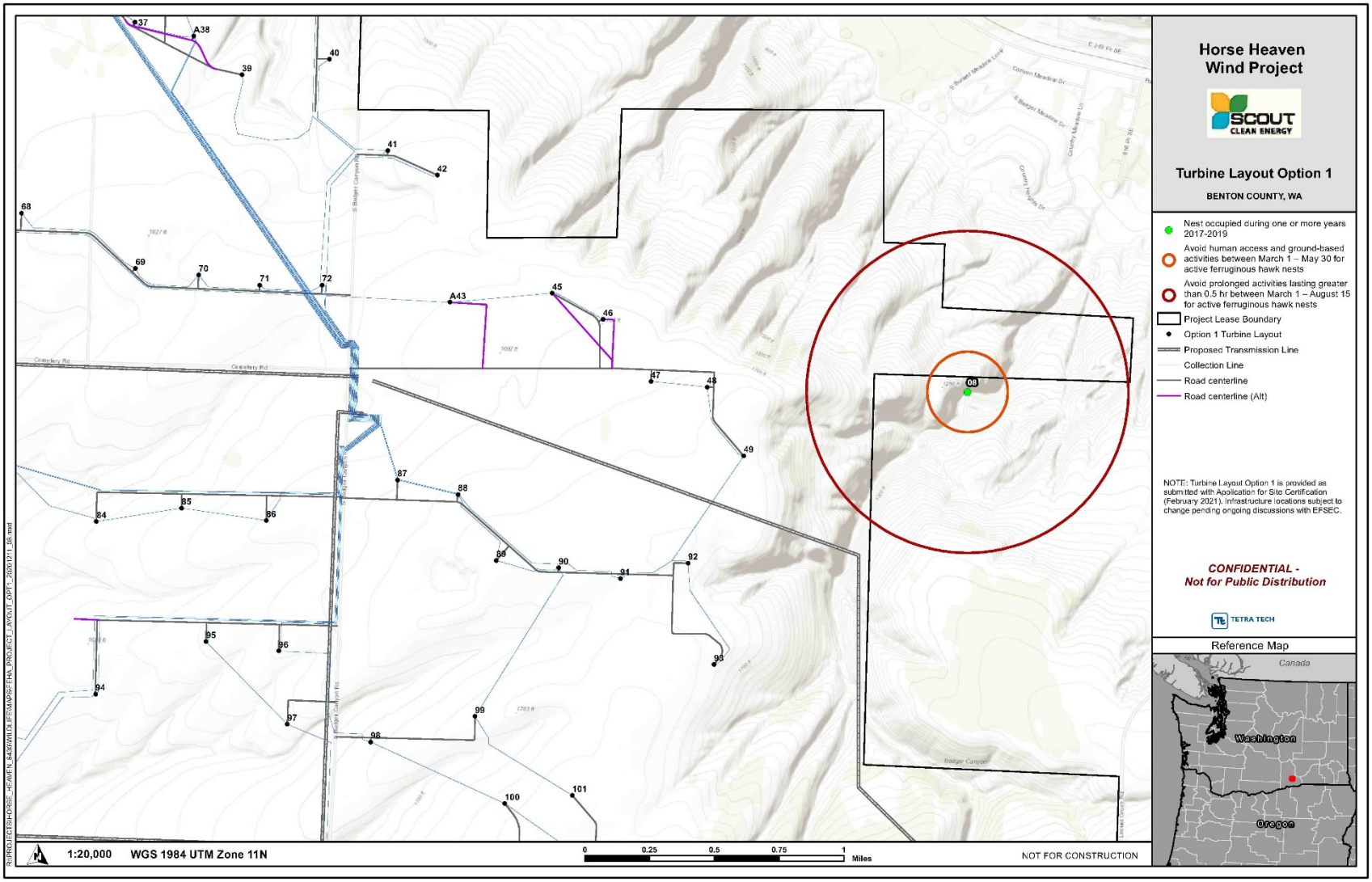


Figure 4. Ferruginous hawk Nest 08 documented as occupied/inactive in 2017 and associated WDFW disturbance avoidance buffer at the Horse Heave Clean Energy Center, Benton County Washington.

Appendix A. Examples of ferruginous hawk nest conditions

Example of a ferruginous hawk nest in good condition. Fresh nest material has been added and the nest may be used with very little repair, if any.

Example of a ferruginous hawk nest in poor condition. Substantial repair is needed prior to nesting. On the spectrum of poor nest conditions, this example is "higher quality" relative to other poor condition nests in the Horse Heaven Hills that were highly dilapidated and only remnants or a faint ring of sticks were present.

Appendix B. Recommended protective buffers for specified activities (WDFW 2005).

Activities	Buffer Width (ft)[a]	Buffer Around	Timing	Comments
Avoid all human access & ground-based activities	820	Active nests	1 March - May 30[c]	Delay construction and development until after young have dispersed, which generally occurs about a month after fledging
Prevent prolonged activities (>0.5 hrs)	3,280	Active nests	1 March - August 15[c]	Ferruginous hawk's breeding season
Avoid development, rodenticide and pesticide application	1,300	major prey concentrations	year round[b]	Prey concentrations include ground squirrel colonies

[a] Buffers should be tailored to the individual hawks involved, based on factors such as line-of-sight distance between nest and activity, nest structure security, disturbance history, observed responses, and nest elevation in relation to the activity.
[b] Permanent buffer.
[c] Seasonal buffer to minimize disturbance during critical periods.